



## Gardiner Expressway and Lake Shore Boulevard East Reconfiguration

# Environmental Assessment and Urban Design Study Chapter 4: Description and Evaluation of Alternative Solutions

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## 4.0 Description and Evaluation of Alternative Solutions

This chapter describes and evaluates the alternatives to the undertaking (herein referred to as alternative solutions) for the project to determine a preferred solution. As it is common for alternative solutions to evolve during the EA process based on new information and feedback from stakeholders, the evaluation of alternative solutions was undertaken in two stages - the first stage further developed and evaluated the four alternatives of Maintain, Improve, Replace and Remove (Boulevard) that were presented in the EA ToR. Of the four alternatives assessed, the Stage 1 evaluation identified Remove as the technically preferred alternative solution.

Although Remove was identified as technically preferred overall, there were some evaluation criteria for which Remove was not preferred (e.g., changes in commuter travel times).

**Section 4.3** provides details regarding the Stage 1 evaluation. Following the completion of this evaluation, further direction was received by the City of Toronto's Public Works and Infrastructure Committee (PWIC) and a new alternative solution (the Hybrid) was proposed for further study. PWIC also directed the project team to review opportunities to minimize impacts on commuter travel times for the Remove alternative (referred to as the Remove optimization). This commenced Stage 2 of the alternative solutions evaluation. The new Hybrid alternative solution was then developed and compared to the optimized Remove alternative (the technically preferred alternative identified in the Stage 1 work). This chapter is organized on the basis of this two-stage alternative solutions evaluation process. Stage 1 is documented in **Sections 4.2** and **4.3** and Stage 2 is documented in **Sections 4.4** and **4.5**.

### 4.1 Alternatives Development Influences

To develop alternative solutions for the four alternatives of Maintain, Improve, Replace and Remove (Boulevard) that were presented in the EA ToR, the project team undertook a review of case studies of cities facing similar issues regarding what to do with aging elevated expressways in their downtowns. The project team also facilitated input on design ideas that were sought from international consultants. The following documents these two activities.

#### 4.1.1 Case Study Review

To support the development of the alternative solutions, the project team reviewed a number of case studies to explore how other cities in the world have addressed the problem of aging highway infrastructure. The case studies included the following cities:

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- Seattle, Washington, USA
- New York, New York, USA
- Montreal, Quebec, Canada
- Chattanooga, Tennessee, USA
- San Francisco, California, USA
- Seoul, South Korea
- Bronx, New York, USA
- Zaanstadt, The Netherlands
- Paris, France
- Buffalo, New York, USA
- Washington, DC, USA

Case studies were used to highlight potential alternatives and gain insight into different urban design strategies. The case studies provided a unique perspective and were aligned with the project team's goal of considering the undertaking from a perspective other than just transportation. The case studies also provided lessons regarding public and stakeholder input, costs and benefits, and implementation.

Key lessons identified from the case studies include:

- Solutions come in several shapes and sizes;
- Transportation solutions should focus on opportunities for city-building and improving quality of life;
- Transportation uses are continually evolving - changes in demographics, economics and lifestyle affect travel demand;
- Traffic demand can be managed;
- Transportation infrastructure offers extraordinary opportunities for design, creating new public realm;
- Infrastructure does not have to be single-purpose or boring;
- The public sector must be strategic in order to capture the value of investments in infrastructure to serve community and development goals; and

- City building projects of this magnitude require vision and active commitment at the highest levels of leadership – mayors, governors and city councils. Moreover, the full range of stakeholder input, from support to opposition must be understood to respond substantively.

Additional details about each case study are included in **Appendix N, Case Study Report**. The lessons learned through the case study review have helped to inform the development and evaluation of alternative solutions.

### 4.1.2 Design Ideas

To inspire the development of the alternative solutions, Waterfront Toronto and the City gathered design ideas from internationally renowned architects, planners and engineers in 2010. Six teams were selected to participate in the Design Ideas exhibition which focused on three of the alternatives: Improve, Replace and Remove. Two teams were assigned to each alternative to prepare design ideas. In June, 2013, the design ideas from the international teams were presented to the stakeholders and the public. Some of the key ideas that were identified included:

- A new iconic entrance into the city from the east;
- Adding new public open space and enhancing the public realm throughout the corridor;
- Balancing modes of transportation;
- Enhancing waterfront connectivity;
- Providing new transportation infrastructure;
- Reducing the infrastructure footprint; and,
- Freeing up land for redevelopment.

**Appendix B, Record of Consultation**, includes a summary of the inputs that were received through this Design Ideas process. Full copies of the design submissions were made available to the public on the consultation website.

In addition to the formal Design Ideas submissions, members of the public also submitted ideas for reconfiguring the expressway to Waterfront Toronto and the City. These public ideas, along with the international Design Ideas, were reviewed by the project team and considered in the

preparation of the alternative solutions. The purpose of collecting Design Ideas and other public input was to assist the project team in identifying:

- A new vision for the Study Area;
- Critical opportunities and constraints for the design;
- Prioritizing key issues to be managed through reconfiguration; and,
- Inspiring urban design and infrastructure elements to be considered for each alternative solution.

The following presents a summary of the ideas collected through the public and international Design Ideas.

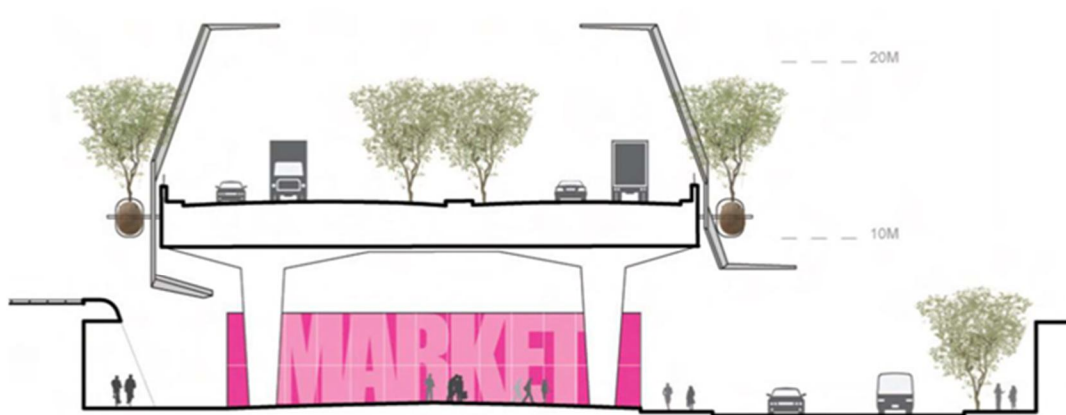
#### 4.1.2.1 Improve

Improve focused on the public realm, creating new spaces and reimagining underutilized space for new parks, pathways, communities and market space. The focus was on improving connections and creating vibrant areas throughout the corridor that people want to be in. Some of the elements included adding new structures over or around the existing elevated Gardiner for park space and commercial/retail space. A common theme was to develop innovative solutions for greening the corridor. The existing condition is dominated by concrete road infrastructure with little vegetation.



*KPMB Architects and BIG – Improve Submission “The GAR”*





*Diller Scofidio + Renfro and architectsAlliance – Improve Submission “Gardiner City”*



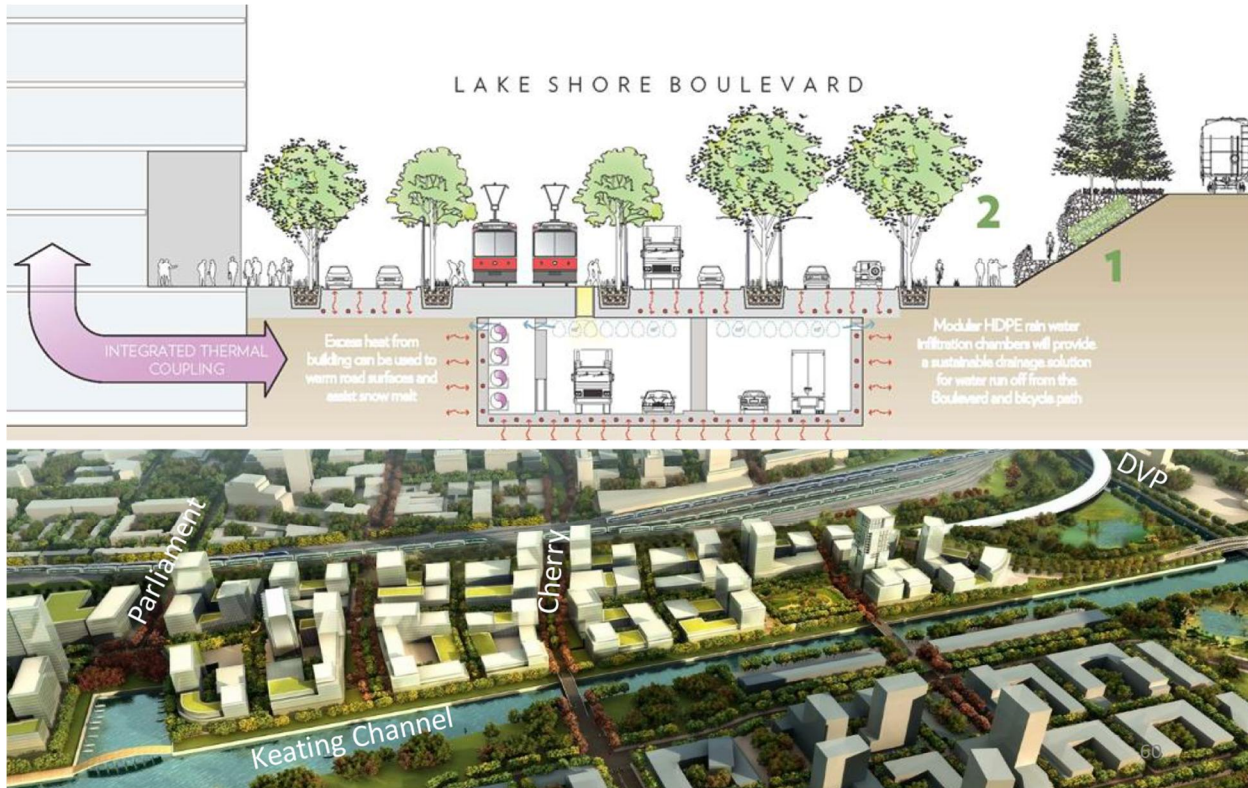
*Les Klein – Improve public idea “Green Ribbon”*

#### 4.1.2.2 Replace

Replace focused on the opportunity to rebuild the expressway with new infrastructure, either above grade (elevated) or below grade (tunnel), to provide the highway traffic function. Replacing the existing structure opens up opportunities to explore new development blocks, connections, and public realm. Ideas for Replace brought focus to the challenge of consolidating infrastructure with the rail corridor and opening up Lake Shore Boulevard to light and air by removing the expressway overhead. Again, a common theme was the effort to green the area and allow for a more pedestrian scale environment. The designs presented innovative solutions for a tunnel and for consolidating the elevated expressway with the adjacent rail corridor. Both options open up the Lake Shore Boulevard corridor to be reimagined as a great street.



*West 8, DTAH, Cecil Balmond and AGU – Replace (rail embankment) Submission “Stitching the City to its Lakefront”*



*Adrian Smith and Gordon Gill Architecture – Replace (tunnel) Submission “Four Flows”*

#### 4.1.2.3 Remove (Boulevard)

Remove focused on the opportunity to build a new boulevard and redefine the eastern downtown waterfront with an active and vibrant street. Removing the existing structure opens up opportunities to explore the alignment of a new eight-lane boulevard with new development blocks, connections, and public realm. Ideas for Remove brought focus to the challenge of balancing modes of transportation and creating a pedestrian friendly boulevard that would be a signature feature of the community. Again, a common theme was the effort to green the area and allow for a more pedestrian scale environment. The designs presented innovative solutions for a boulevard and new communities as a result. Both submissions from the design teams open up the new Lake Shore Boulevard to be reimagined as a great street.



*Rem Koolhaas and Office for Metropolitan Architecture - Remove Submission "Toronto 2036"*



*James Corner Field Operations – Remove Submission “Toronto’s Great Street”*

## 4.2 Alternative Solutions Development and Evaluation: Stage 1

This section describes the development and evaluation of alternative solutions that were originally identified in the ToR for this EA.

### 4.2.1 Consideration of Public Input - Alternatives Development

Alternative solutions are intended to be conceptual in nature. They present the possibilities and limitations for each alternative. Once a preferred alternative solution is selected and supported by City Council, more detailed alternative designs are generated for the preferred alternative solution to explore the opportunities of the solution.

Input from agencies, stakeholders and the public has been an important component of the alternative solution development. The ToR provided the basis for developing the alternative solutions and identified four to be considered:

- Maintain the elevated expressway;
- Improve the urban fabric while maintaining the existing expressway;
- Replace with a new above or below grade expressway; and,
- Remove the elevated expressway and build a new boulevard.

On June 13, 2013, the Design Ideas from the international teams (see **Section 4.1.2**) were presented to the stakeholders and the public who were asked to provide both feedback on which ideas they did or did not like and offer ideas of their own. Between May and June, over 1,000 people provided their thoughts on the alternative solutions. Some of the key ideas that the public identified as important were:

- Balancing modes of transportation;
- Enhancing waterfront connectivity;
- Providing new transportation infrastructure; and
- Enhancing the public realm.

At the June 2013 public meeting people were also asked what information they needed to have in order to provide input on the alternative solutions. The most prevalent responses were:

- The financial implications and lifecycle costs of the alternatives;
- Traffic conditions for each alternative; and
- How the alternative solutions relate to the rail corridor.

Between June and October 2013, the alternative solutions were further developed and consulted on through agency and stakeholder meetings. Conceptual representations of the alternative solutions were then presented to the public for input at a second public meeting on October 16, 2013.

Input received from stakeholders, technical advisors, and the public, assisted in the development and refinement of the alternative solutions. At the October 2013 public meeting, more than 1,500 people provided input to the alternative solutions. Comments received regarding all four alternatives can be summarized as follows:

- For Maintain, people thought this was the least disruptive to traffic as it keeps the existing road capacity, but it is not a long-term solution and misses the opportunity to revitalize the area;
- For Improve, the added bicycle and pedestrian features were good but the cost of moving the columns of the elevated expressway in order to fit Lake Shore Boulevard entirely under the expressway was too expensive for the limited benefits it achieved;
- For Replace, the improved environment along Lake Shore Boulevard and the opportunities for development do not appear to be worth the costs, especially in reference to the extraordinary costs of the tunnel alternative; and
- For Remove, the revitalization and redevelopment of the area is good but there are concerns regarding traffic impact and whether an at-grade 8-lane boulevard would still be a barrier between the city and the waterfront.

As a result of the public input received at the October 2013 public meeting, revisions were made to the Improve and Remove alternatives. Improve revisions involved rethinking the alignment of Lake Shore Boulevard to be entirely under the Gardiner Expressway as the cost of moving columns to achieve this was a concern. Improve revisions also included new considerations to reduce the impacts of the existing ramps to and from the expressway along Lake Shore Boulevard and to improve intersections for safety, legibility and pedestrian experience. For the Remove alternative, revisions were made to improve the pedestrian experience of an 8-lane boulevard and to identify opportunities to develop a two-sided street.

These revisions, along with the evaluation results, were presented to the public at the February 6, 2014 public meeting. **Sections 4.2.2 and 4.2.3** below present further details regarding the development and features of each alternative solution.

## 4.2.2 Alternative Solution Development Considerations

The alternative solutions were developed in an iterative manner by the project team that took into account several considerations including: the goals of the study, case studies, design ideas, stakeholder input, and constraints/opportunities within the Study Area. Various draft concepts were developed, reviewed and then revised with input from City of Toronto and Waterfront Toronto staff. Some of the key issues that were considered in the development of the alternative solutions included:

- Traffic operations;
- Traffic demand, patterns and the impact of travel times;
- Constructability;
- Right-of-way width (existing corridor varies from 42m to 77 m);
- Pedestrian and cyclist movement;
- Pedestrian crossing times of Lake Shore Boulevard;
- Pedestrian, cyclist and motorist safety;
- Number and width of roadway lanes;
- Median widths;
- Need and location of expressway access ramps;
- Adjacent land use;
- Availability of light within the corridor;
- Urban Design/new development opportunities;
- New public realm creation;
- Connecting with existing road infrastructure;
- Potential property impacts.



## 4.2.3 Description of Alternative Solutions

The following sub-sections provide a summary of the final alternative solutions developed from input through the design ideas, stakeholder meetings, technical advisory meetings and public input.

### 4.2.3.1 Maintain

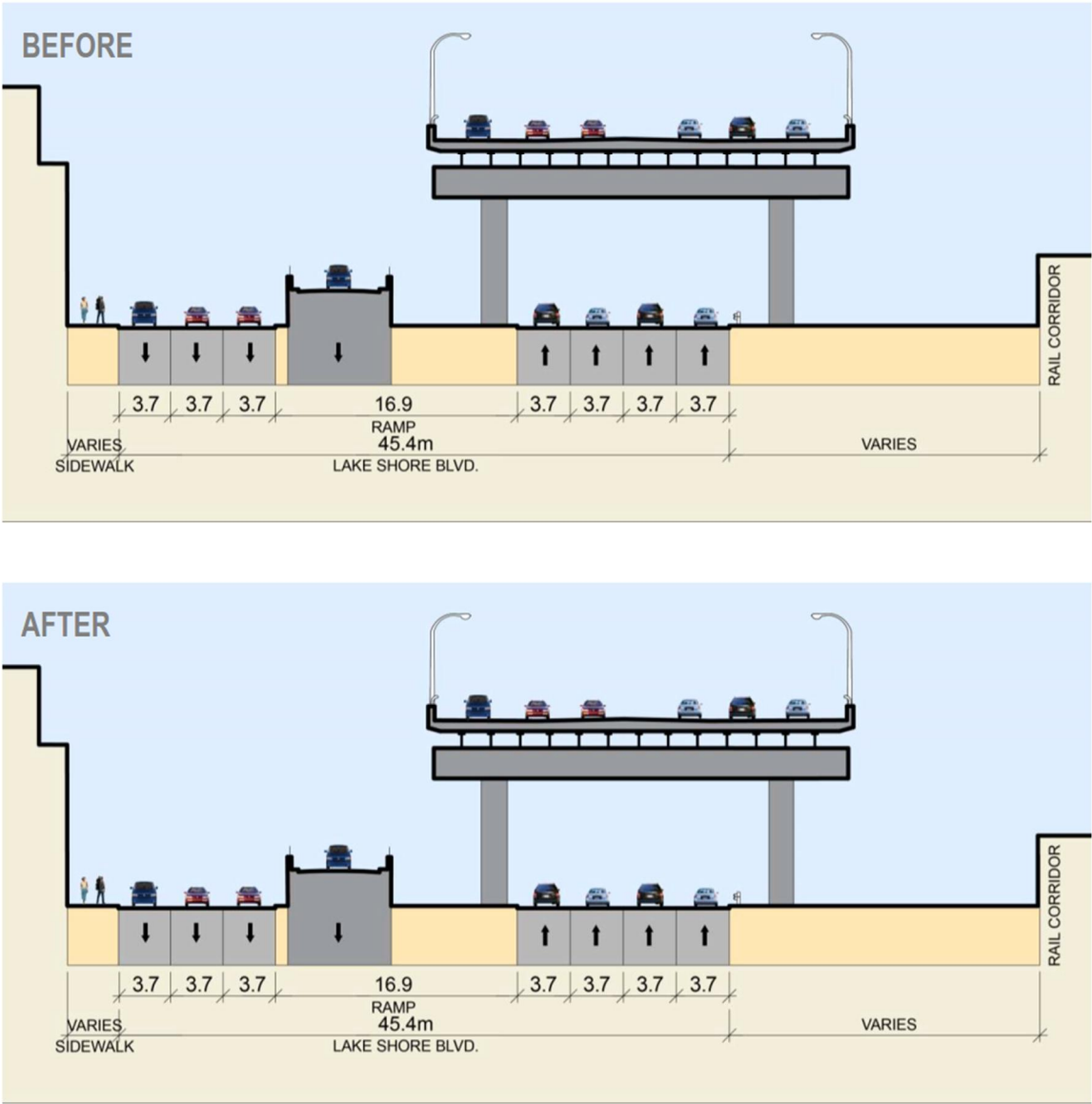


The Maintain alternative included the completion of the 2013 Gardiner East rehabilitation program, which requires complete reconstruction of the deck of the expressway. Maintain also included implementation of the precinct plans as they are approved currently. This included the realignment of Lake Shore Boulevard through the Keating Channel Precinct between Cherry Street and the Don Roadway. The realignment of Lake Shore Boulevard would position Lake Shore further north through this area of Keating and allow the Keating Channel edge to be reclaimed for a pedestrian promenade, recreation and public space. **Figure 4-1** illustrates the cross section for Maintain.

Figure 4-1: Maintain Cross Section

# Maintain

Cross Section of Gardiner/Lake Shore Blvd corridor looking west at Jarvis Street



## 4.2.3.2 Improve



The Improve alternative involved the following elements:

- Rebuilding the expressway deck with four basic lanes (the existing deck contains six basic lanes) with additional speed change lanes for on-off ramps where required. The four basic lanes would be shifted to the north side of the existing Gardiner corridor and the space where the southern two lanes currently exist would be opened up to light and air that would improve the pedestrian experience at grade.
- Lake Shore Boulevard would largely stay where it is between Jarvis and Cherry Streets. Modest improvements would be made at intersections to improve crossings for pedestrians and limit auto conflicts with pedestrians and cyclists.
- The Jarvis Street on- and off-ramps to and from the Gardiner would be shortened, moving their entry points further away from Jarvis Street, to open up more space at grade.
- Dedicated turning lanes for Gardiner on- and off-ramps would be reduced to connect directly with Lake Shore Boulevard. This would reduce the number of access ramps that pedestrians have to cross at intersections.
- A continuous bicycle path would be created on the north side of Lake Shore Boulevard east of Jarvis Street.

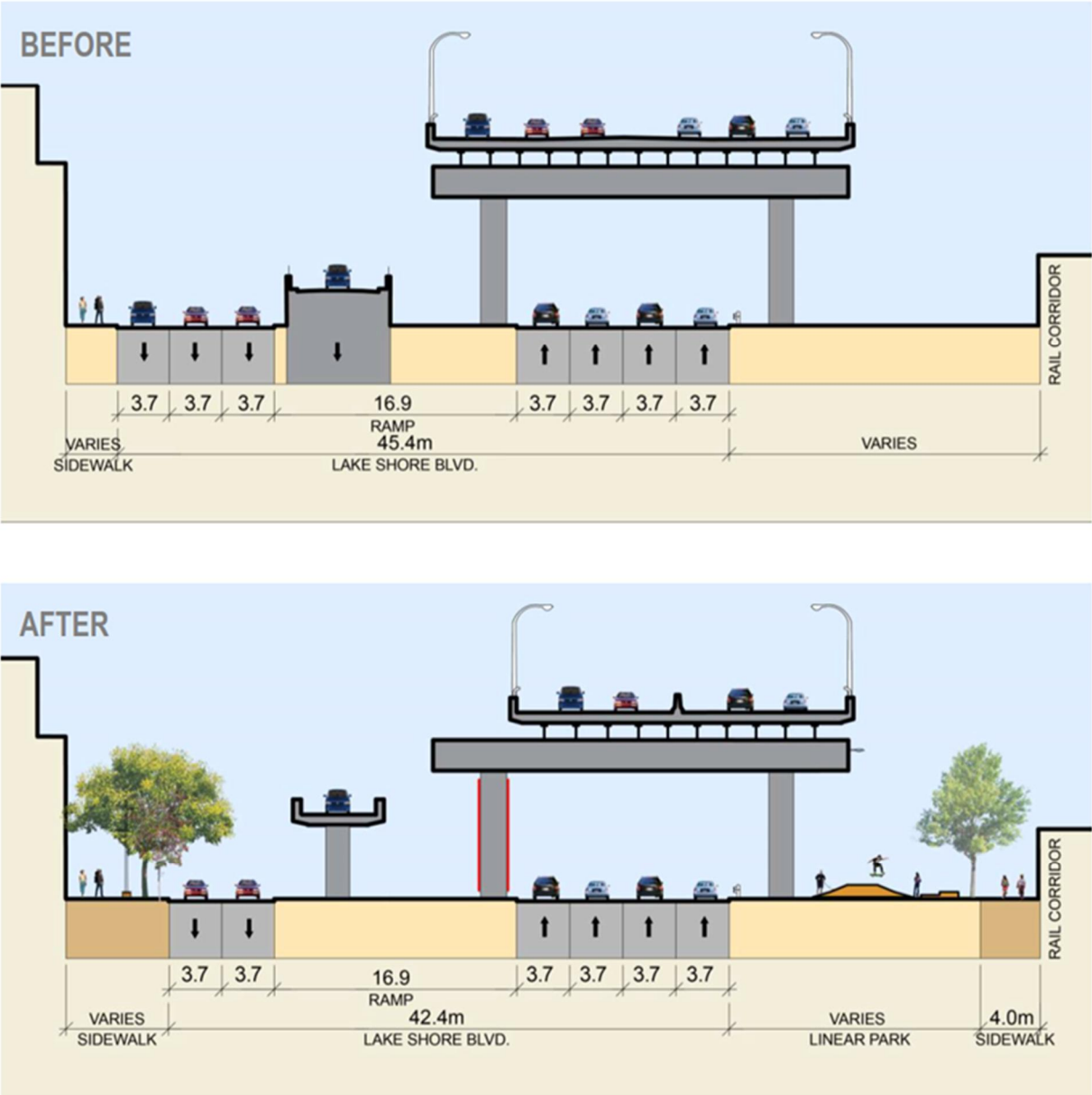
- Where possible, the underutilized space on the north side of the corridor abutting the rail property between Jarvis Street and Cherry Street would be redesigned to include hardscape public spaces such as skateboard parks. This would be adjacent to the bicycle/walking path.
- The southernmost eastbound lane on Lake Shore Boulevard would be removed east of Jarvis Street. This space would be redesigned for improved pedestrian space, landscaping and public realm.
- The realignment of Lake Shore Boulevard through the Keating Channel Precinct between Cherry Street and the Don Roadway would be completed as per the approved Keating Channel Precinct Plan. This is consistent with the Maintain solution.

Figure 4-2 illustrates the cross section for Improve.

Figure 4-2: Improve Cross Section

# Improve

*Cross Section of Gardiner/Lake Shore Blvd corridor looking west at Jarvis Street*



### 4.2.3.3 Replace



The Replace alternative began with three options to replace the elevated expressway with either: a new above- or below-grade expressway considered an extension of the rail embankment; a below-grade tunnel (cut and cover) expressway; or a new elevated expressway. In order to determine which alternative solution should be carried forward to represent the Replace alternative, a screening level assessment was completed to identify the benefits and challenges of these options. The screening focused on assessing the technical feasibility of the alternatives given the physical constraints of the corridor. This included, for example, considerations for land requirements, constructability, transition area needs/impacts, ramp connection opportunities, new development and open space creation, estimated cost envelope, and overall corridor experience. A discussion of the screening assessment findings for the Replace option (embankment, tunnel, new elevated) is provided below.

#### *Replace: Embankment*

Previous studies conducted on the Gardiner Expressway included investigating the opportunity to extend the existing rail berm along the north edge of the corridor to accommodate expressway vehicle lanes. Providing ramps to connect to north-south roads and the transition to the existing elevated Gardiner at either end was a challenge with this option. In addition, the Gardiner East EA study team met with Metrolinx to discuss this option in the summer of 2013. Recognizing the growing importance of rail, particularly GO Transit, as a means to access the Downtown for GTA commuters, Metrolinx advised that using any of the rail lands for a roadway

would not be possible as all rail lands are required to support future rail expansion plans. The embankment option was therefore not carried forward as a Replace alternative.

*Replace: Tunnel*

The below grade tunnel presented the greatest opportunity to transform the ground level experience of the Gardiner Expressway and Lake Shore Boulevard East corridor. New land would be opened by placing a new at-grade Lake Shore Boulevard over top of the buried Gardiner Expressway freeing up lands within the corridor. Transfers between the buried Gardiner would not be possible and it would function as a through-traffic route only. With Gardiner through-traffic functions placed below grade and only Lake Shore Boulevard at ground level, new public land would become available allowing enhanced connections between the city and the waterfront. It would transform Lake Shore Boulevard into an active and inviting local boulevard. The pedestrian environment, public realm, parks and open spaces would be developed to create new destinations. The tunnel would provide for an express auto-transportation facility to bypass the east end of Downtown while Lake Shore Boulevard would provide at-grade access to Downtown.

Although the opportunities of a tunnel are plentiful, there were many technical and financial challenges that arose while developing the tunnel option for the Replace alternative solution. The transition areas posed a technical challenge in terms of connecting a below-grade tunnel to existing structures elevated up to 10 m above-grade on either end. At the west-end transition the tunnel would need to connect to the existing Gardiner structure west of Jarvis Street. At the east end the tunnel would need to connect to the DVP ramps that traverse over the Don River. The transition areas ended up being 500 m in length on either end. As such the tunnel was only approximately 1 km in length before it had to begin ascending on either end. The length of the transition areas also limited redevelopment potential above grade as there would be significant segments of land abutting transition ramps to and from the tunnel that would not be ideal for development.

In addition to the lengthy and complicated transition areas there would be no opportunities for midsection ramp connections to and from the tunnel. Tunnel access would only be possible at the two ends. With only 1 km of tunnel there would be no opportunity to connect ramps to/from the tunnel between Jarvis Street and the DVP. As such, one of the primary connections that exist today through the Jarvis/Sherbourne ramps would be lost.

Finally, from a technical point of view, the east-end entrance into the tunnel from the DVP ramps would be located in a flood zone. This adds significant technical challenges and increases the cost in order to design the tunnel so as to address flooding potential.

From a cost perspective, the tunnel is by far the most expensive solution. Although the tunnel length is short, the cost comes from the complicated transitions.

A summary of the benefits and challenges of the tunnel option were presented to stakeholders and the public in October 2013. It was determined by the technical EA team, Waterfront Toronto, City of Toronto, and with input from stakeholders and the public, that the tunnel would not be carried forward for further consideration.

*Replace: New Elevated*

Replace the existing expressway with a new elevated structure was developed and carried forward as the alternative solution for Replace.

The Replace alternative with a new elevated structure included:

- Construction of a new 4-basis lane elevated expressway between Jarvis Street and the DVP. Design of the structure would include a single, centre column to support the structure that would be more widely spaced than the distance between columns today.
- New ramp connections would be built to connect to the DVP.
- The new elevated expressway would be aligned through the north section of the Keating Channel Precinct between Cherry Street and the DVP ramps. This opens up land along the Keating Channel for redevelopment.
- The new structure would be 5 m higher than the existing Gardiner structure. This opens up access to light and air at grade and allows for landscaping and tree planting along Lake Shore Boulevard.
- New ramp connections would be built to provide the Jarvis/Sherbourne connections.
- Lake Shore Boulevard would be rebuilt as a 4-lane boulevard situated underneath the new elevated expressway.
- New development parcels along the south edge of Lake Shore Boulevard would be available and
- Opportunities for new parks and public spaces would be created between the rail corridor and the north side of Lake Shore Boulevard.



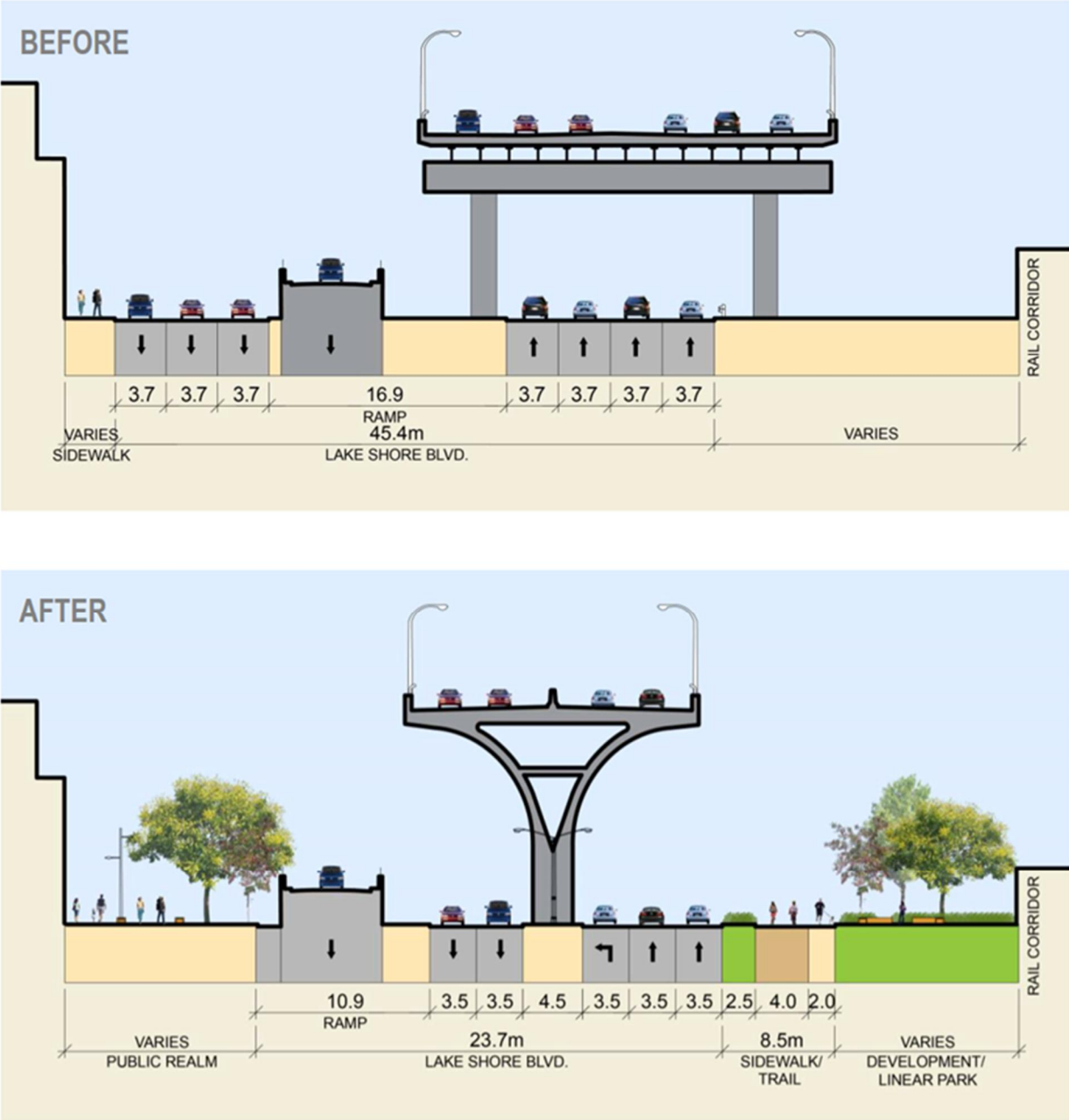
- A new east-west continuous bicycle path would be developed on the north side of Lake Shore Boulevard.

**Figure 4-3** illustrates the cross section for Replace.

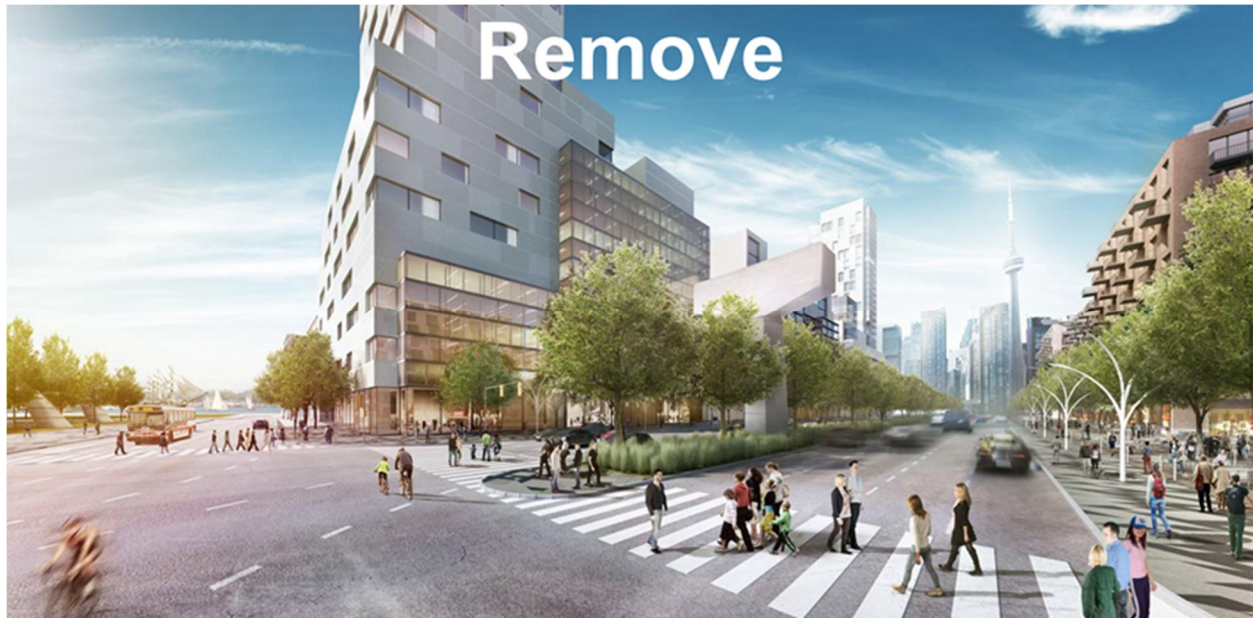
Figure 4-3: Replace Cross Section

# Replace

*Cross Section of Gardiner/Lake Shore Blvd corridor looking west at Jarvis Street*



## 4.2.3.4 Remove (Boulevard)



The Remove alternative solution involved the demolition of the existing Gardiner Expressway east of Jarvis Street and the construction of a new 8-lane boulevard with potential for new development on both the north and south sides of the street. The Remove alternative would open up the corridor to light and air and would allow for a boulevard planted with two continuous rows of trees. The transition from the boulevard back up to the existing elevated expressway in the west end of the Study Area would occur between Yonge Street and Jarvis Street.

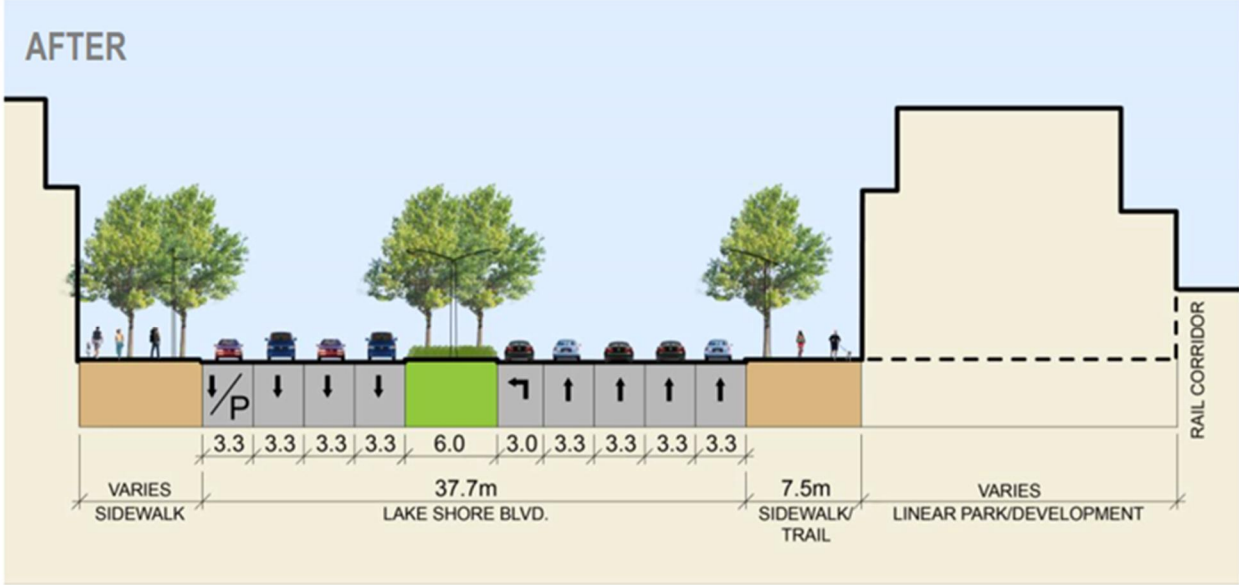
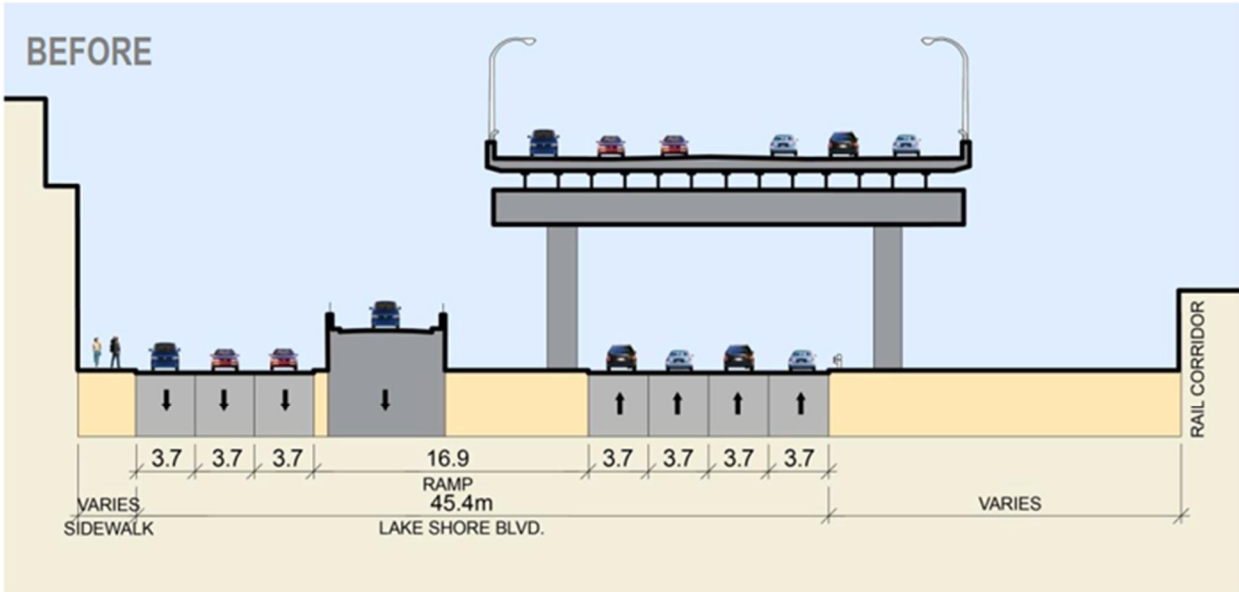
Signalized intersection crossings would be provided at all north-south crossing roads and left turn lanes established along Lake Shore Boulevard (currently no separate left turn lanes exist on Lake Shore Boulevard in this section). Although the alignment is similar, the configuration of Lake Shore Boulevard through the Keating Channel Precinct between Cherry Street and the Don Roadway would be modified from that in the approved Keating Channel Precinct Plan given the need for additional lanes and revised connections to the Don Valley Parkway in this area. Two-lane ramps would connect to and from the Don Valley Parkway and to and from Lake Shore Boulevard to the east.

Opportunities for new development parcels on the north side of the new green boulevard would allow for a buffer between the rail corridor and Lake Shore Boulevard. Dedicated left-turn lanes would exist at the intersections and the potential for off-peak parking would exist in the southern eastbound lane. A new continuous bicycle path would be developed on the north edge of Lake Shore Boulevard. **Figure 4-4** illustrates the cross section for Remove.

Figure 4-4: Remove Cross Section

# Remove

Cross Section of Gardiner/Lake Shore Blvd corridor looking west at Jarvis Street



## 4.3 Evaluation Criteria

The assessment and evaluation of the alternative solutions was based on a set of evaluation criteria and measures that represent the broad definition of the environment and consider both qualitative and quantitative (i.e., numerical) data. These criteria and measures are organized on the basis of the four study lenses and 16 criteria groups. The four study lenses, as outlined in the EA ToR are Transportation and Infrastructure, Urban Design, Economics and Environment.



**Table 4-1** presents the criteria groups and criteria that provided a framework for the evaluation. Also provided is a definition of each of the criteria. The criteria were developed considering the nature of the project and characteristics of the Study Area. The draft criteria were presented to the Stakeholder Advisory Committee (SAC) and the public in October 2013 in conjunction with the draft alternative solutions. Comments received on the criteria were considered in their finalization.

For each of the criteria, one or more measures were developed. The measures specify the data to be collected and/or the effects to be assessed for each criterion.

Table 4-1: Evaluation Criteria Groups and Criteria

Study Lens/Criteria Group	Criteria	Definition
<b>TRANSPORTATION &amp; INFRASTRUCTURE</b>		
Automobiles	Commuter Travel Time (Average travel time for AM peak hour)	Average in-bound peak hour travel time using EMME and PARAMICS model outputs between selected Origin-Destination (OD) pairs.
	Impact on Average Auto Travel Time (peak AM hour) within Transportation Study Area	Change in average peak hour travel times (all directions) in PARAMICS model for local traffic trips within Spadina Avenue and Woodbine Avenue south of Dundas Street.
	Road Network/ Flexibility Choice	Number of available road network connections that provide drivers with the ability to accommodate planned future transit service.
Transit	Transit Impact	Change in average travel times in PARAMICS model for street cars on Dundas Street, Queen Street and King Street and impact on subway service. Ability to accommodate planned future transit service.
Pedestrians	North-South Sidewalks	Extent, quality and condition of pedestrian connections crossing Lake Shore Boulevard. Walking distance across Lake Shore Boulevard at major north-south streets (e.g., Jarvis Street).
	East-West Sidewalks	Extent, quantity and condition of pedestrian connections along Lake Shore Boulevard.

Study Lens/Criteria Group	Criteria	Definition
Cycling	East-West Movement	Extent and quantity of east-west cycling facilities and opportunities to connect with existing and planned north-south cycling facilities.
Movement of Goods	Vehicle Operations	Extent to which truck movement and operations could be impacted from changes in road capacity.
	Access Opportunity	Extent of access to properties in the Study Area (number of turning prohibitions that limit access opportunities).
Safety	Safety Risk for Pedestrians	Extent of automobile traffic exposure for pedestrians at intersections and crossing Lake Shore Boulevard (number of lanes to cross).
	Safety Risk for Pedestrians and Cyclists	Extent to which pedestrians and cyclists are exposed to free flowing/uncontrolled traffic flow. This includes free-flowing access ramps to and from the Gardiner Expressway where automobile traffic has the right of way.
	Safety Risks for Cyclists and Motorists	Extent to which there are road safety concerns for cyclists. Includes poor sight lines and intersection turns that cross cycling facilities without controlled traffic lights.
Constructability	Duration	Number of years required to complete construction, with an emphasis on the number of years that will result in traffic impacts.
	Transportation Management	Extent of pedestrian and cycling facilities to be affected during construction. Level of traffic disruption during construction and potential for disruption to other roadways from traffic diversion.
	Construction Impact on Private Property	Extent of private property to be used during construction and potential access to private properties (e.g., driveways) to be impacted.

Study Lens/Criteria Group	Criteria	Definition
<b>URBAN DESIGN</b>		
Planning	Consistency with Official Plans	Extent to which the principles and recommendations of the Central Waterfront Secondary Plan are accommodated and supported.
	Consistency with Precinct Plans	Extent to which the goals, objectives and recommendations of the East Bayfront and Keating Channel Precinct Plans are accommodated and supported.
Public Realm	Streetscape	Quality and consistency of a cohesive street design and character along Lake Shore Boulevard. Considers the balance between hardscape (e.g., paved road surface) and softscape (e.g., landscape, open space, etc.).
	View Corridors	Visual sight lines within and across the corridor to destinations and landmarks in and surrounding the Study Area (e.g., views of the water and downtown skyline).
	Public Realm Space (open space, landscape, multi-use paths, tree canopy, etc.)	Public space that is created for passive and active recreation and leisure including parks, plazas, trails, streetscapes, etc.
	Rail Corridor and Berm	Opportunity to minimize the visual and noise impacts of the rail corridor for pedestrians on Lake Shore Boulevard.
Built Form	Street Frontage	Relationship between development and Lake Shore Boulevard at the pedestrian scale. This includes the active at-grade uses in buildings fronting onto Lake Shore Boulevard that may contribute to street character and vibrancy. Also includes the average number of podium floors with obstructed views and limited access to light and air that may limit programming/leasing those floors.



Study Lens/Criteria Group	Criteria	Definition
<b>ENVIRONMENT</b>		
Social & Health	Health (Air Quality & Noise)	Air quality conditions at the local and regional level, including changes in NOx, VOCs, PM2.5, as well as the level of greenhouse gas emissions. Noise levels at various receptors locations.
Natural Environment	Terrestrial Environment	Conditions for land-based natural habitat, species and features.
	Aquatic Environment	Conditions for aquatic-based habitat, species and features.
	Water Quality	On-site capability to treat stormwater and manage the conditions/quality of water run-off.
	Water Quantity	Amount of stormwater run-off potentially generated.
	Microclimate	Local atmospheric conditions related to sunlight and temperature.
	Tree-Lined Shaded Street	Amount of trees that can grow in the corridor and the percent of tree canopy coverage possible.
Cultural Resources	Built Heritage	Potential for impact on historic physical architecture and cultural property that is inherited and maintained within the corridor.
	Cultural Landscape	Potential for impact on the existence of a built or natural landscape that is valued by people for its religious, artistic or cultural associations within the corridor.
	Archaeology	Potential for impact on known buried resources or artefacts within the corridor.

Study Lens/Criteria Group	Criteria	Definition
	First Nations People and Activities	Potential for impact on the use of the Study Area by First Nations for traditional purposes.
<b>ECONOMICS</b>		
Regional Economics	City Competitiveness	Influence on the regional economy of the Greater Toronto Area.
	Post-Construction Congestion	Influence of traffic congestion resulting from the alternatives to influence the regional economy of the Greater Toronto Area.
Local Economics	Business Activity	Number of jobs created in the Study Area.
	Visitor/Tourism Attractiveness	Change in the attractiveness of the waterfront for visitors to the area related to tourism.
	On Street Parking	Parking opportunities on Lake Shore Boulevard.
Direct Cost & Benefit	Capital Cost & Funding	Capital cost to construct the alternatives in 2013\$, including the cost to acquire private property (if required). The funding is currently available in the City budget for rehabilitation.
	Lifecycle Cost	Net present value of construction cost and 100-year operations and maintenance costs of the alternative.
	Land Value Creation	Amount of money that could be generated through the creation and sale of new land for the City.

### 4.3.1 Evaluation Approach

To compare the advantages and disadvantages of the alternatives, both construction effects and long-term operations effects were identified and assessed based on the criteria and definitions previously noted. Qualitative and quantitative data were collected and considered.

Much of the lands in the Study Area adjacent to the Gardiner-Lake Shore Boulevard corridor are in transition. Based on current City Precinct Plans, Master Plans and the CWSP, these former industrial lands are to be transformed from their current vacant/underutilized state, to mixed-use communities with commercial, office and residential uses. Some of the industrial uses will also remain that relate to the Toronto Port operations (e.g., Redpath Sugar). The potential for both construction and operation effects on these communities resulting from the alternative solutions have been considered. Regarding the construction period, while it is assumed that construction would not start until 2020, for the construction effects assessment it was assumed that land uses in the vicinity of the project location are similar to current (2013) land uses. Additionally, as previously noted, the base year for operation effects is 2031. The analysis assumed the full build out of the Study Area including the East Bayfront Precinct, Keating Channel Precinct and Port Lands would be fully built-out by 2031. As it is likely that full build-out of the Study Area would not be achieved until after 2031 (some areas would be 40-50 years before full build out is achieved), the effects assessment work is considered to be conservative.

The evaluation of the alternative solutions was based on a qualitative or “reasoned argument” approach as the evaluation criteria include a mixture of quantitative and qualitative data. Data was collected on the basis of the evaluation criteria/measures. Considering this data, alternative preference rankings were then determined for each measure and these rankings were then considered to generate alternative preference rankings by criteria group.

It is typical in EAs to not have an alternative that is preferred for all the evaluation criteria. When comparing alternatives, there are often trade-offs that need to be made to select the technically preferred alternative. To highlight these trade-offs and to assist in the selection of the preferred alternative, a “paired-comparison” approach was used. This approach involves the comparison of the alternatives in pairs considering the alternative preference rankings by criteria group. The preferred alternative of the pair is then carried forward for the next comparison. The alternative that is determined to be preferred over all the other alternatives is considered to be the overall technically preferred alternative. The paired comparisons of the alternatives were completed at a criteria group level. Considering the alternative preferences by criteria group, the key trade-offs were then highlighted by Evaluation Lens (four lenses were considered, see **Section 4.2**).

For the purposes of this evaluation, a relative weighting was not applied to the criteria groups, criteria or measures considered. The decision to not weight the criteria reflects the study goals as presented in the EA ToR. It is noted that the public was asked to provide input on the relative importance of the criteria groups at the October 2013 public meeting; however, there was no consistent feedback on the relative importance of the criteria groups. Details regarding public input received are provided in **Appendix B, Record of Consultation**.

As noted above, the evaluation of the four alternative solutions considered effects during both the construction and operational stages of the project. Most of the effects anticipated to result from the project are associated with the construction stage. The following table, organized by the study lenses, outlines the types of mitigation that were assumed to be available and would be implemented.

**Table 4-1a: Summary of Mitigation Assumed in Evaluation of Alternative Solutions**

<b>Table 4.1a – Summary of Mitigation Assumed in Evaluation of Alternative Solutions</b>	
Transportation and Infrastructure	<p>Auto travel disruption would be minimized as much as possible. A minimum number of east-west travel lanes would be kept open during construction to minimize delay. Develop a traffic management plan and direct traffic to detour roads.</p> <p>Construction would be staged to minimize impacts on auto travel.</p> <p>Rail agencies would be consulted with and delays to rail traffic would be minimized if not avoided.</p> <p>Pedestrian and cycle pathways would be relocated/detoured.</p> <p>Signage and notification of construction would be available to inform corridor users.</p> <p>Monitor traffic infiltration into neighbourhoods as a result of road closures. Follow-up and address issues if required.</p> <p>Once operational, City to monitor roadway usage to ensure efficient operations.</p>
Planning and Urban Design	<p>Consult with proponents of other planned developments in the study area to minimize conflicts during construction.</p> <p>Manage contaminated soils and groundwater as per applicable MOECC requirements.</p> <p>Apply best management practices to minimize air emissions during construction including the use of dust suppressants and efforts to minimize construction equipment idling.</p> <p>Conform to municipal noise by-laws.</p> <p>Follow-up on and resolve construction air and noise related complaints.</p> <p>Minimize and monitor vibration effects for buildings that are close to the area of construction.</p> <p>Revise area precinct plans to accommodate changes to the Gardiner/Lake Shore Boulevard corridor.</p>

Table 4.1a – Summary of Mitigation Assumed in Evaluation of Alternative Solutions	
Natural Environment	<p>Minimize removal of natural habitat. Replace with new green space.</p> <p>Monitor new plantings to ensure they thrive. Replace as required.</p> <p>Avoid vegetation clearing during nesting season and avoid in-water work during periods of sensitive life stages of aquatic species.</p> <p>Prepare and implement an erosion and sediment control plan.</p> <p>Apply Stormwater run-off BMPS to minimize effects to local waterways.</p> <p>Accommodate Don River flood conveyance requirements as per the TRCA DMNP EA.</p>
Cultural Resources	<p>Complete (if required subject to Stage 1 assessment) archaeological monitoring during construction or investigations prior to construction.</p> <p>Continue engagement with interested First Nations communities.</p>
Economics	<p>Provide appropriate road detours for truck traffic.</p> <p>Keep local area commercial operators informed of construction staging and activity.</p> <p>Maintain access to local area business/commercial properties.</p>

### 4.3.2 Alternatives Evaluation

The following section presents the results of the assessment and evaluation of the four alternative solutions. **Table 4-2** presents the data/effects by measure for each of the alternatives. The data in this table provides the basis for the comparative evaluation of the alternatives. Preference rankings are first provided by study lens/criteria group. Following this is a discussion of the trade-offs of the alternatives resulting in the identification of a recommended alternative.

#### 4.3.2.1 Criteria Group Ranking Rationale

The following provides the rationale for the preference rankings of the alternatives for each of the 16 criteria groups as presented in **Table 4-2**. For each criteria group, the alternatives have been ranked in order of preference: Preferred, Moderately Preferred or Less Preferred. The rankings are relative, not measures of acceptability/unacceptability. As such, a ranking of Less Preferred does not necessarily mean that the alternative is considered to be unacceptable for a particular measure or criteria group, just less preferred than the other alternatives. The alternatives preference rankings by criteria group were considered in the overall evaluation to identify a preferred alternative.

Table 4-2: Alternative Solutions Full Evaluation Matrix

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE	
<b>TRANSPORTATION AND INFRASTRUCTURE</b>							
<b>Automobiles</b>	Commuter Travel Time (Modeled average travel time for AM Peak Hour) <i>Note:</i> Transportation demand based on regional projections for growth expected by 2031 in addition to full build-out of East Bayfront, Keating, Port Lands expected to occur over a 40-50 year timeline.	<b>North York to CBD - Victoria Park/ Finch to Front/ Bay [A-D]</b>	50 min (Existing travel time modeled at 45 min)	55 min		60 min	
		<b>Don Mills to CBD - Don Mills/ Eglinton to Front/ Bay [B-D]</b>	30 min (Existing travel time modeled at 25 min)	35 min		40 min	
		<b>Scarborough to CBD - Victoria Park/ Kingston to Front/ Bay [C-D]</b>	25 min (Existing travel time modeled at 20 min)		30 min	30 min	
		<b>Etobicoke to CBD - Kipling/Lake Shore to Front/Bay [E-D]</b>	25 min (Existing travel time modeled at 25 min)	30 min			
		Auto travel time sensitivity to future transit scenarios	<b>Equally Preferred</b> - Travel times for most of the selected O-D pairs increase by between 2 and 4 minutes without the planed transit projects. (based on no new transit sensitivity runs for Maintain and Remove)				
		Average travel times between representative Origins and Destinations	<b>Preferred</b> - Generates the lowest modeled auto travel times.	<b>Moderately Preferred</b> - Generate higher travel times than Maintain, but lower modeled auto travel times than Remove.		<b>Less Preferred</b> - Generates the highest modeled auto travel times.	
	Impact on Average Auto Travel Time (AM peak hr.) Within Transportation Study Area	Total Volume Assigned (reflects available road capacity)	70,500				63,000
		Percentage/volume (vehicles per hr.) of vehicles experiencing increased travel time over Maintain Alternative					
		< 2 min	Base case to compare alternatives. Auto travel time increases between today and 2031 assumed in base case as per Commuter Travel Time analysis above.	85% (59,500 vph)		80% (57,000 vph)	75% (48,000 vph)
		2-7 min		15% (11,000 vph)		20% (13,500 vph)	20% (12,500 vph)
> 7 min	0			0	5% (2,500 vph)		
Trip Reduction/Diversion	Approximately 15%				Approximately 25%		



Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
		Overall impact on auto travel in Downtown	<b>Preferred</b> - Generates the lowest modeled auto travel times in downtown area.	<b>Moderately Preferred</b> - Generates higher modeled downtown auto travel times than Maintain, but lower travel times than Remove.		<b>Less Preferred</b> - Generates the highest modeled downtown auto travel times.
	Road Network Flexibility/ Choice	Turning prohibitions at key intersections <i>Existing</i> <i>Jarvis Street: 4 prohibitions</i> <i>Sherbourne Street: 2 prohibitions</i> <i>Parliament Street: 1 prohibition</i> <i>Cherry Street: 2 prohibitions</i> <i>Don Roadway: 3 prohibitions</i>	<b>Less Preferred:</b> Jarvis Street: 4 prohibitions Sherbourne Street: 2 prohibitions	<b>Moderately Preferred:</b> Jarvis Street: 2 prohibitions Sherbourne Street: 1 prohibition	<b>Preferred</b> - None	
<b>Automobiles Summary Ranking</b>			<b>Preferred</b>	<b>Moderately Preferred</b>		<b>Less preferred</b>
<b>Transit</b>	Transit Impact	Impact on surface transit service Note: Assumes no service improvements of the existing Queen, Dundas and King lines.	<b>Preferred</b> - Base case	<b>Preferred</b> -Essentially same as base case	<b>Less Preferred</b> - Results in minor increases in travel time (between 1 and 4 minutes per streetcar) when compared to Maintain Option.	<b>Less Preferred</b> - Results in minor increases in travel time (between 1 and 4 minutes per streetcar) when compared to Maintain Option.
		Impact on subway service	<b>Equally Preferred</b> - No impact to subway transit			
		Ability to accommodate planned transit service	<b>Less preferred</b> - Can accommodate the Downtown Relief Line, Waterfront LRT. Cherry Street LRT, and expansion of GO Transit Service.	<b>Preferred</b> - Accommodates same planned transit projects but provides greater flexibility in transit planning east of the Don River (e.g., Broadview Extension).		
<b>Transit Summary Ranking</b>			<b>Equally Preferred</b>			
<b>Pedestrians</b>	North-South sidewalks	Ability to physically implement City standard north-south sidewalks for use by the local community and travelers.	<b>Less Preferred</b> - Existing sidewalks are substandard along north-south streets.	<b>Moderately Preferred</b> - Improvements not possible at all north-south crossings.	<b>Preferred</b> - Reconstruction of the corridor allows for sidewalks to be built to City standards along the entire length of Lake Shore Boulevard.	
		Crossing Points <i>Existing Crossing's Permitted:</i> <i>Jarvis - East Leg, West Leg</i> <i>Sherbourne - East Leg, West Leg</i> <i>Parliament - East Leg</i> <i>Cherry - East Leg, east</i>	<b>Less Preferred</b> - Existing constraints do not allow standardization of crosswalks on both the east and west side of the street. Improvements not budgeted under rehabilitation program.	<b>Less Preferred</b> - Improvements and standardization possible at a number of intersections given infrastructure improvement. However, existing constraints do not allow standardization of crosswalks on both the east and	<b>Preferred</b> - Reconstruction of the corridor allows for city standard crosswalks to be built on both the east and west side of the street.	

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
		<i>intersection Don Roadway – East Leg</i>		west side of the street for all intersections.		
		North-south crosswalk crossing distance at Lake Shore Boulevard (linear metres)	<i>(W = westside crossing, E = eastside crossing)</i>			
		<i>Jarvis Street</i>	45.4m W, 44.5m E	42.4m W, 48.4m E	23.7m W, 25.7m E	37.7m W, 37.4m E
		<i>Lower Sherbourne Street</i>	48.3m W, 41.4m E	41.8m W, 51.1m E	23.7m W and E	37.5m W and E
		<i>Parliament Street</i>	29m W, 29.2m E	25.3m W, 26m E	25.5m W, 25.1m E	38.5m W, 38.9m E
		<i>Cherry Street</i>	33.5m W, 31.4m E	28.7m W, 20.3m E	25.3m W, 22.4m E	39m W, 36.2m E
		<i>Don Road</i>	Not available W, 42.1m E	Not available W, 25.9m E	Not available W, 30.5m E	Not available W, 29.6m E
		<i>Broadview Avenue/ Saulter Street</i>	Not possible	Not possible	25.8m W and E	25.8m W and E
		<i>Bouchette Street</i>	Not possible	Not possible	25.8m W and E	25.8m W and E
		<i>Logan Avenue</i>	Not possible	Not possible	26.9m W, 27.8m E	26.9m W, 27.8m E
		<i>Carlaw Avenue</i>	29.9m W, 31.3m E	29.9m W, 31.3m E	28.9m W, 31.3m E	28.8m W, 31.3m E
		North-south crosswalk average for both east and west side of street (linear metres)	<b>Less Preferred</b> - 36.9 m	<b>Moderately Preferred</b> - 33.7 m	<b>Preferred</b> - 26.1 m	<b>Moderately Preferred</b> - 32.4 m
	East-West sidewalks	Ability to physically implement City standard east-west sidewalks as measured by length along the corridor for use by the local community and travelers.	<b>Less Preferred</b> - Existing sidewalks are sub-standard and or not existing in parts of the corridor. Improvements not budgeted under rehabilitation program. Re-alignment of Lake Shore Boulevard in Keating allows for sidewalks on both the north and south side for all options. 1,500 total linear metres.	<b>Moderately Preferred</b> - Sidewalk on the north side of Lake Shore Boulevard are not possible between Yonge and Parliament Street due to physical limitations of on/ off ramps. 4,000 total linear metres.	<b>Preferred</b> - Reconstruction of the corridor allows for sidewalks to be built to City standards along the entire length of Lake Shore Boulevard for use by both the local community and travelers on the north and south sides of Lake Shore Boulevard. 4,400 total linear metres.	
<b>Pedestrians Summary Ranking</b>			<b>Less Preferred</b>	<b>Moderately Preferred</b>	<b>Preferred</b>	

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
Cycling	East-West Movement	Length and width of facility	<b>Less Preferred</b> – Existing trail is discontinuous and in a poor state of repair. Width of trail varies from 2.5m to 3.0m. Improvements not budgeted under rehabilitation program. Total length of existing facility is 2,200 m in length between Leslie Street and Yonge Street.	<b>Moderately Preferred</b> – Physical limitations between Yonge St and Jarvis Street. Total length of existing and proposed facility is 3,690 m in length between Leslie Street and Yonge Street.	<b>Preferred</b> – Total length of existing and proposed facility is 4,200 m in length between Leslie Street to Yonge Street.	
		Connectivity with other bikeway facilities <i>Existing cycling facilities</i> <ul style="list-style-type: none"> <li>· Yonge Street</li> <li>· Sherbourne Street</li> <li>· Martin Goodman Trail (east of Parliament)</li> </ul> <i>Planned cycling facilities</i> <ul style="list-style-type: none"> <li>· Trinity Street</li> <li>· Cherry Street</li> </ul>	<b>Less Preferred</b> – Includes no new cycling facility	<b>Moderately Preferred</b> – No connection to existing facility at Yonge Street.	<b>Preferred.</b> – New facility can connect with all existing and planned facilities.	
<b>Cycling Summary Ranking</b>			<b>Less Preferred</b>	<b>Moderately Preferred</b>	<b>Preferred</b>	
Movement of Goods	Vehicle Operations	Change in operations level to truck movement	<b>Preferred</b> – Highest overall road capacity		<b>Moderately Preferred</b> – New elevated expressway with reduced Lake Shore Boulevard lanes expected to increase travel times through the corridor but to a lesser extent than the Remove alternative.	<b>Less Preferred</b> – potential increase in traffic diversion / congestion, particularly during peak periods, may impact goods movement in and around the Study Area. Goods movement impacts expected to be less during non-peak periods.
	Access Opportunity	Change of access levels for commercial/ industrial activities in the Study Area (turning prohibitions)	<b>Less Preferred</b> – Jarvis Street: 4 prohibitions Sherbourne Street: 2 prohibitions	<b>Moderately Preferred</b> – Jarvis Street: 2 prohibitions Sherbourne Street: 1 prohibition	<b>Preferred</b> – Improved access given elimination of turning prohibitions	
<b>Movement of Goods Summary Ranking</b>			<b>Preferred</b>		<b>Moderately Preferred</b>	<b>Less Preferred</b>

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
Safety	Safety Risk for Pedestrians	Traffic exposure for pedestrians at intersections - number of lanes on Lake Shore Boulevard that pedestrians have to cross	<b>Moderately Preferred</b> – Maintain and Improve present basically a six lane cross-section, less than Remove, but more than Replace.		<b>Preferred</b> – Replace presents the fewest number of lanes for pedestrians to cross.	<b>Less Preferred</b> – Remove presents the largest number of lanes for pedestrians to cross.
	Safety Risk for Pedestrians and Cyclist	Number of potential uncontrolled conflict points (e.g., crossing of free flow turns/ ramps) <i>Existing</i> <i>Jarvis – S/B RT; Gardiner Expressway ramp west of Jarvis</i> <i>Sherbourne – W/B Gardiner Expressway off ramp; S/B RT</i> <i>Cherry (west) – W/B RT; S/B RT</i> <i>Cherry (east) – E/B RT; N/B RT</i> <i>Don Roadway – N/B RT</i>	<b>Less Preferred</b> – Maintain, Improve and Replace alternatives include more uncontrolled conflict points than Remove. Jarvis – S/B RT; Gardiner Expressway ramp west of Jarvis Sherbourne – none Cherry – none Don Roadway – N/B RT			<b>Preferred</b> – Remove eliminates all free flow right turns. While greater volume of traffic will be on an at-grade street, design speed will be lower and road can be designed to accommodate expected volume to meet safety standards.
	Safety Risk for Cyclists and Motorists	Number of Lake Shore Boulevard intersections with road safety concerns <i>Existing</i> <i>Lake Shore Boulevard/Jarvis – short merge for E/B on-ramp</i> <i>Lake Shore Boulevard/Jarvis – short diverge for W/B on-ramp</i> <i>Lake Shore Boulevard/Jarvis – poor sightlines for Gardiner Expressway W/B on-ramp</i> <i>Lake Shore Boulevard/Sherbourne – poor sightlines for S/B RT</i> <i>Lake Shore Boulevard/ Don Roadway – speed differential for merge between E/B and N/B RT</i> <i>Lake Shore Boulevard/ Don Roadway – unexpected conflict</i>	<b>Less Preferred</b> – A number of intersections and road segments along Lake Shore Boulevard have been identified on the City’s top 20% list of roadways in need of improvement based on collisions from 2007 to 2011. Road Segments identified on list include: 1) Yonge to Jarvis; 2) Jarvis to Sherbourne; and 3) Don Road to Carlaw. Intersections identified on list include: 1) Jarvis; 2) Sherbourne; 3) Don Road; and 4) Carlaw. Maintain and Improve do not improve the majority of the existing road safety concerns. Existing constraints including free flow ramps and columns obscuring sight lines on Lake Shore Boulevard. Maintain alternative does not include budget for improvements to Lake Shore Boulevard. Improve alternative does eliminate the southbound right-turn channel on Sherbourne Street.		<b>Preferred</b> – Replace and Remove eliminate existing road safety concerns at Jarvis Street, Sherbourne Street, and the Don Roadway.	

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE	
		<i>between S/B and Martin Goodman Trail</i>					
	Safety Risk for Motorists on Gardiner Expressway	Gardiner expressway geometry	<b>Less Preferred</b> – Gardiner expressway shoulders not to standard	<b>Preferred</b> – New Gardiner expressway deck to include full shoulders		<b>NA</b>	
<b>Safety Summary Ranking</b>			<b>Less Preferred</b>	<b>Moderately Preferred</b>	<b>Preferred</b>		
<b>Constructability</b>	Duration	Length of construction period  <i>Note: Opportunity to reduce construction periods can be studied, the feasibility and costs of which need to be assessed during the Alternative Design phase of the Environmental Assessment.</i>	<b>Preferred</b> – The City's program is to re-deck this section of Gardiner Expressway in 6 years. Approximately 6 years of direct impact on expressway lanes. Rolling Lake Shore Boulevard lane closures. Given reduction of capacity, traffic delay is anticipated throughout this period although the magnitude of disruption is expected to be less than Replace and Remove.	<b>Preferred</b> – Same impact as Maintain. In addition reconstruction of Lake Shore Boulevard will require additional at-grade lane closures. Overall length of construction is expected to be the same.	<b>Less Preferred</b> – This is a complex multi-stage project requiring significant pre-stage preparation. Estimated construction period is 8 years involving a multi-stage construction process. Approximately 6 years of direct impact on expressway lanes.	<b>Moderately Preferred</b> – It is expected that a 5 to 6 year construction period will be required. Approximately 3 years of direct impact on expressway lanes. 1.5 years per direction. Rolling Lake Shore Boulevard lane closures	
	Transportation Management	Potential impact to pedestrian/cycling infrastructure during construction	<b>Equally Preferred</b> – It is assumed that all pedestrian/cycling infrastructure can be largely maintained during construction.				
		Capacity to accommodate traffic flows through corridor during construction	<b>Preferred</b> – Traffic flows can be accommodated through corridor during construction.		<b>Less Preferred</b> – May be periods when traffic flow cannot be accommodated through corridor.	<b>Moderately Preferred</b> – Corridor should be available at all times based on the proposed staging scheme.	
		Potential off-site traffic disruption during construction	<b>Preferred</b> – Least off-site traffic disruption. Some Gardiner Expressway ramps may be affected during some stages.		<b>Less Preferred</b> – Major disruption anticipated due to detour routes and pre-construction works.	<b>Moderately Preferred</b> – Off-site disruption is expected to be less than Replace as some amount of traffic flow can be maintained through the corridor at all times.	
	Construction Impact on Private Property	Potential need for private property for construction staging/ detours	<b>Preferred</b> – None expected			<b>Less Preferred</b> – Potential private property needs during construction. To be confirmed subject to the development of more detailed design.	
Potential property/ access disruption during construction		<b>Preferred</b> – None expected			<b>Less Preferred</b> – Potential, depending on laydown area, casting yard and detour routes.	<b>Moderately Preferred</b> – Potential, depending on final detour layout.	

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
Constructability Summary Ranking			Preferred		Less Preferred	Moderately Preferred
<b>URBAN DESIGN</b>						
Planning	Consistency with Official Plans	Consistent with approved Central Waterfront Secondary Plan principles: 1) Removing Barriers; 2) Building a Network of Spectacular Waterfront Parks and Public Spaces; 3) Promoting a Clean and Green Environment; and 4) Creating Dynamic and Diverse New Communities to support residential and employment growth along the Gardiner/ Lake Shore Boulevard corridor.	<b>Less Preferred</b> – Does not achieve the Central Waterfront Secondary Plan principles given existing physical constraints. Improvements at-grade not budgeted under rehabilitation program.	<b>Less Preferred</b> – Minimally achieves the Central Waterfront Secondary Plan principles given existing physical constraints and opportunities for improvements.	<b>Moderately Preferred</b> – Moderately achieves the Central Waterfront Secondary Plan principles improving north-south crossings, implementation of continues trail, adding park space, and improving the alignment of Lake Shore Boulevard.	<b>Preferred</b> – Fully achieves the Central Waterfront Secondary Plan principles improving north-south crossings, implementation of continues trail, adding park space, creating a tree-lined urban boulevard, creating right-of-way infrastructure to support transportation, community and neighbourhood objectives.
	Consistency with Precinct Plans	Consistent with approved East Bayfront, Keating, Port Lands, Don Mouth Naturalization, South Riverdale and other plans and land use goals which define standards for high quality and high value urban development.	<b>Less Preferred</b> – Consistent with physical plans but does not create a vibrant streetscape to support mixed-use community land uses along the corridor given prioritization of regional expressway infrastructure.			<b>Preferred</b> – Consistent with physical plans and creates a vibrant streetscape to support mixed-use community land uses along the corridor.
Planning Summary Ranking			Less Preferred		Moderately Preferred	Preferred
Public Realm	Streetscape	Quality of place along Lake Shore Boulevard	<b>Less Preferred</b> – Intersections with free turns, irregular road geometries, over-scaled fixtures, low-quality finishes, deep shadow, noise amplification, and visual barriers to waterfront destinations create a an unattractive and disorienting	<b>Less Preferred</b> – Minimal improvements to intersections with free turns, irregular road geometries, scale of fixtures, and quality of finishes create an only slightly less unattractive and disorienting environment	<b>Moderately Preferred</b> – Significant improvements to highway connection design and reduce shadow, noise amplification, obstructed views, and visual barriers to the waterfront.	<b>Preferred</b> – Urban boulevard design, familiar road geometries, human-scale fixtures, standard city finishes, full sun exposure, no noise amplification, unobstructed views and clear sight lines to destinations create a comfortable and easily navigable environment

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
			environment.			
		Consistent and cohesive character from east to west on Lakeshore Boulevard	<b>Less Preferred</b> – Varying conditions and widths across the length of the corridor make cohesive character impossible to achieve		<b>Moderately Preferred</b> – Varying conditions across the length of the corridor make cohesive character difficult to achieve given expressways connections.	<b>Preferred</b> – Consistent conditions and only minor variations in width enable a consistent character to be achieved along the length of the corridor
		Ratio of hardscape to softscape surfaces in the corridor	<b>Less Preferred</b> – 90% hardscape, 10% softscape		<b>Preferred</b> – 78% hardscape, 22% softscape.	<b>Moderately Preferred</b> – 83% hardscape, 17% softscape
	View corridors	Quality of north-south visual connections between downtown and the waterfront	<b>Less Preferred</b> – No opportunity to mitigate the visual barrier of the Gardiner columns and elevated deck		<b>Moderately Preferred</b> – Fewer columns and higher deck structure minimizes the visual barrier.	<b>Preferred</b> – Removes all visual barriers
		Quality of east-west visual connections between the East End and the Financial Core on Lake Shore Boulevard	<b>Less Preferred</b> – No opportunity for skyline views from Lake Shore Boulevard. Gardiner structure remains.		<b>Moderately Preferred</b> – Minimal opportunities for skyline views from Lake Shore Boulevard. Gardiner structure remains.	<b>Preferred</b> – Fully opens up all the skyline views from Lake Shore Boulevard.
	Public realm area (acres)	Usable public realm area in new Lake Shore Boulevard public right-of-way dedicated for pedestrian uses, patios, passive recreation, multi-use trails and landscaping.	<b>Less Preferred</b> – Improvements not budgeted under rehabilitation program. Approximately 6 acres existing.	<b>Less Preferred</b> – Existing constraints allow for some additional public realm area to be created. Approximately 11 acres.	<b>Moderately Preferred</b> – Reconstruction of the corridor allows for moderate public realm area to be created. Approximately 13 acres.	<b>Preferred</b> – Reconstruction of the corridor allows for most public realm area to be created. Approximately 15 acres.
	Usable park area (acres)	Surplus right-of-way that could be dedicated as City of Toronto park land that would be usable and programmable above existing baseline	<b>Preferred</b> – Re-alignment of Lake Shore Boulevard allows for former alignment along Keating Channel, east of Cherry to be converted for use for active sports (e.g., Underpass skate park). Approximately 3 acres.	<b>Preferred</b> – Re-alignment of Lake Shore Boulevard allows for former alignment along Keating Channel, east of Cherry to be converted for use for active sports (e.g., Underpass skate park). Approximately 3 acres.	<b>Moderately Preferred</b> – Reconstruction of the corridor allows for some land to be dedicated as park land along the rail corridor. Approximately 1 acre.	<b>Moderately Preferred</b> – Reconstruction of the corridor allows for some land to be dedicated as park land along the rail corridor. Approximately 1 acre.
	Rail corridor and berm	Length of the CN rail corridor exposed to the public sidewalk and open space along Lake Shore Boulevard	<b>Less Preferred</b> – No additional buffering of rail corridor from Lake Shore Boulevard.			<b>Preferred</b> – Proposed north side buildings provide a buffer to Lake Shore Boulevard (330 metres buffer Jarvis to east of Sherbourne)
<b>Public Realm Summary Ranking</b>			<b>Less Preferred</b>		<b>Moderately Preferred</b>	<b>Preferred</b>

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE		
Built Form	Street frontage	Length of leasable, active, at-grade space supported by the design of the corridor on Lakeshore Boulevard	<b>Less Preferred</b> – Majority of space along the Lake Shore Boulevard corridor will consist of back of house activities such as garages, driveways, service entrances, and building utilities access. Retail opportunities along the corridor will be of low quality and difficult to lease based on comparable sites in the Gardiner/ Lake Shore Boulevard corridor to the west. Total 330 linear metres of frontage (10% of corridor length).		<b>Moderately Preferred</b> – Improved expressway infrastructure will improve retail opportunities along Gardiner/ Lake Shore Boulevard corridor and mitigate some negative aspects of the elevated structure. Total 2,160 linear metres of frontage (60% of corridor length).	<b>Preferred</b> – Removal of elevated expressway will allow for entire corridor to be developed for retail and active uses. Total 2,920 linear metres of frontage (80% of corridor length).		
		Number of podium floors with obstructed views, limited access to light and air and expressway impacts due to proximity of elevated structure	<b>Less Preferred</b> – Existing Gardiner height of approximately 10 metres (west of Cherry) and 15 metres (east of Cherry) will negatively impact the lower 4–7 building storeys.		<b>Less Preferred</b> – Existing Gardiner height of approximately 15 metres will negatively impact the lower 7 building storeys.	<b>Preferred</b> – Removal of Gardiner results in no negative impacts to any north or south facing building storeys.		
<b>Built Form Summary Ranking</b>			<b>Less Preferred</b>		<b>Moderately Preferred</b>	<b>Preferred</b>		
<b>ENVIRONMENT</b>								
Social & Health	Air Quality	Extent of change in regional air quality (NOx, VOC, & PM2.5)	<b>Less Preferred</b> – Modeling results indicate higher regional emissions relative to the other alternatives. Regional burden of 0.25%.			<b>Preferred</b> – Modeling results indicate least impact to regional air quality relative to the other alternatives. Regional burden of 0.24%.		
		Extent of change in local air quality (NOx, VOC, & PM2.5)	<b>Less Preferred</b> – Modeling results indicate the greatest concentration of local emissions relative to the other alternatives. Greatest difference is for NOx and PM2.5.	<b>Moderately Preferred</b> – Modeling results indicate a lower concentration of local emissions than the Maintain but a greater concentration of emissions than the Replace and Remove alternatives. Greatest difference is for NOx and PM2.5.	<b>Preferred</b> – Modeling results indicate the lowest concentration of local emissions relative to the other alternatives. Greatest difference is for NOx and PM2.5.			
		Level of Greenhouse Gas Emissions	<b>Less Preferred</b> – Modeling results indicate the highest levels in GHG emissions relative to the other alternatives. Regional burden of 0.29%	<b>Moderately Preferred</b> – Modeling results indicate slightly less GHG emissions than Maintain but a greater concentration of emissions than Remove. Regional burden of 0.28%.	<b>Preferred</b> – Modeling results indicate the lowest levels in GHG emissions relative to the other alternatives. Regional burden of 0.24%.			



Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
	Noise	Extent of change in noise levels <i>Note: noticeable differences in the predicted noise levels are mainly for the receptors in close proximity to the Gardiner Expressway/Lake Shore Boulevard corridor.</i>	<b>Less Preferred</b> – Alternative results in greatest noise levels for the identified receptors. Local area noise levels range from 69 to 78 dBA.	<b>Moderately Preferred</b> – Alternative is predicted to result in slightly lower noise levels for identified receptors than for Maintain alternative. Greatest difference is for alternatives along the Gardiner Expressway/Lake Shore Boulevard corridor. Local area noise levels range from 67 to 78 dBA.		<b>Preferred</b> – Alternative is predicted to have the lowest noise levels for identified receptors. Greatest difference is for alternatives along the Gardiner Expressway/lake Shore Boulevard corridor. Local area noise levels range from 61 to 72 dBA.
<b>Social &amp; Health Summary Ranking</b>			<b>Less Preferred</b>	<b>Moderately Preferred</b>		<b>Preferred</b>
<b>Natural Environment</b>	Terrestrial Environment	Potential to create new terrestrial/ habitat/ natural features	<b>Less Preferred</b> – No potential for improvement between Jarvis and Cherry Streets. Minimal improvement through the Keating Channel Precinct as the relocation of Lake Shore Boulevard will allow for planting and natural features along Lake Shore Boulevard and the Keating Channel.	<b>Minimally Preferred</b> – Limited potential for improvement between Jarvis and Cherry Streets. Reducing the deck of the Gardiner will allow for more light to penetrate the ground level of Lake Shore Boulevard. This increases the potential for planting and natural features. Minimal improvement through the Keating Channel Precinct as the relocation of Lake Shore Boulevard will allow for planting and natural features along Lake Shore Boulevard and the Keating Channel.	<b>Moderately Preferred</b> – New elevated structure will be higher and have fewer bents/columns therefore allowing more light to penetrate the ground level of Lake Shore Boulevard. This increases the potential for planting and natural features.	<b>Preferred</b> – With no elevated structure through the corridor, opportunities for planting and natural features are greatly increased due to increased sunlight.
	Aquatic Environment	· Potential to create new aquatic habitat	<b>Equally Preferred</b> – Relocation of Lake Shore Boulevard through Keating Channel Precinct will allow for improved runoff control into the Keating Channel. This will provide for some improvement of aquatic habitat in the Keating Channel. All solutions to utilize new Don River crossing proposed in Don Mouth Naturalization Project.			
	Water Quality	· Ability to treat stormwater on-site/at source	<b>Less Preferred</b> –. Through Keating Channel Precinct the new Lake Shore Boulevard alignment could be designed to improve treatment of stormwater and water quality.		<b>Preferred</b> – Provides the greatest amount of new ground surface with the reduction of Lake Shore Boulevard lanes. This presents the greatest opportunity for source controls/ground infiltration.	<b>Moderately Preferred</b> – redesigning the entire roadway at grade allows for the potential to integrate stormwater management and water quality features that are not available unless the road is reconstructed.
	Water Quantity	· Area of paved surface (higher number equates to more surface water run-off)	<b>Less Preferred</b> – 125,074 sq. m.	<b>Moderately preferred</b> - 114,010 sq. m.	<b>Preferred</b> – 91,095 sq. m	<b>Preferred</b> – 84,575 sq. m.

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
	Microclimate	<ul style="list-style-type: none"> <li>Access to natural sunlight in the corridor</li> </ul>	<b>Less Preferred</b> – Least amount of natural light access to street level west of Cherry Street.	<b>Minimally Preferred</b> – Reducing the deck of the Gardiner will allow for more light to penetrate the ground level of Lake Shore Boulevard west of Cherry Street.	<b>Moderately Preferred</b> – New elevated structure will be higher and have fewer bents/columns therefore allowing more light to penetrate the ground level of Lake Shore Boulevard.	<b>Preferred</b> – With no elevated structure through the corridor there is full access to sunlight.
	Tree-Lined and Shaded Street	<ul style="list-style-type: none"> <li>Tree Canopy coverage. Encourages active transportation. Reduces urban heat island effect, improve air quality, increase evapotranspiration.</li> </ul>	<b>Less Preferred</b> – Minimal potential for tree canopy improvement between Jarvis and Cherry Streets (35 new trees estimated – 1% coverage in corridor). Relocation of Lake Shore Boulevard out from under the elevated structure through Keating Channel Precinct provides for increased opportunity for a tree canopy along the road corridor but not included as part of this alternative.	<b>Moderately Preferred</b> – Some improved opportunity for new trees west of Cherry Street and east of Cherry along new Lake Shore Boulevard alignment. (133 new trees estimated – 6% coverage in corridor).	<b>Moderately Preferred</b> – New elevated structure will be higher, have fewer bents/columns and be narrower therefore allowing more light to penetrate the ground level. This increases the potential for a tree canopy along the corridor. Removal of Gardiner Expressway along Keating channel opens up that area for new tree plantings. (371 new trees estimated providing 16% coverage in corridor).	<b>Preferred</b> – With no elevated structure through the corridor, opportunities for tree planting are greatly increased due to increased sunlight which will result in the greatest tree canopy. (1,237 new trees estimated providing 52% coverage in corridor).
<b>Natural Environment Summary Ranking</b>			<b>Less Preferred</b>		<b>Moderately Preferred</b>	<b>Preferred</b>
<b>Cultural Resources</b>	Built Heritage	Direct impact on built heritage features	<b>Equally Preferred:</b> Based on available documentation, no built heritage features within existing or proposed right-of-way. Pending completion of a heritage assessment, the existing Gardiner Expressway should be considered a potential built heritage feature.			
	Cultural Landscape	Direct impact on cultural landscapes	<b>Equally Preferred:</b> Based on available documentation, no cultural landscapes within or adjacent to the existing or proposed right-of-way. Pending completion of a heritage assessment, the existing Gardiner Expressway corridor should be considered a potential cultural landscape.			
	Archaeology	Potential for impact on archaeological resources  <i>Note all alternatives result in impact from New Lake Shore Boulevard alignment east of Cherry. Potential effects on three archaeological features:</i> <ul style="list-style-type: none"> <li>Toronto Dry Dock</li> <li>Toronto Iron Works</li> </ul>	<b>Preferred</b> – No additional impacts.	<b>Preferred-</b> minor disturbances possible from:  Shift Jarvis Off-ramp 50m East - Potential effects on one archaeological feature: <ul style="list-style-type: none"> <li>Knapp's Roller Boat</li> </ul> Widen Westbound Gardiner off Ramp (Relocate Piers) East of Sherbourne - Potential effects on	<b>Less preferred</b> – Greatest amount of excavation results in increased potential for disturbance to known features. Potential effects on 9 archaeological wharf related features: <ul style="list-style-type: none"> <li>circa 1893-1925 Yonge Street Wharf</li> <li>circa 1893-1925 City Wharf</li> <li>circa 1893-1925 Toronto</li> </ul>	<b>Moderately Preferred</b> – while this alternative generally overlaps with the same features as the Replace, less excavation would be required and thus there is less potential for archaeological impacts

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE	
		<ul style="list-style-type: none"> <li>British American Oil</li> </ul>		one archaeological feature: <ul style="list-style-type: none"> <li>circa 1910-1926 City Corporation Wharf</li> </ul>	Electric Light Co. wharf <ul style="list-style-type: none"> <li>circa 1870 Don Breakwater</li> <li>circa 1900 Don Mouth Fill Limit</li> <li>circa 1910-1926 Polson Iron Works Wharf</li> <li>circa 1910-1926 City Corporation Wharf</li> <li>Knapp's Roller Boat</li> <li>National Iron Works</li> </ul>		
	First Nation People and Activities	Potential impact on lands used for traditional purposes	<b>Equally Preferred:</b> No impact anticipated. Previous 19th and 20th century developments have removed features related to traditional uses of lands by Aboriginal peoples.				
<b>Cultural Resources Summary Ranking</b>			<b>Preferred</b>		<b>Less Preferred</b>	<b>Moderately Preferred</b>	
<b>ECONOMICS</b>							
<b>Regional Economics</b>	Regional Competitiveness	Potential change in Regional competitiveness	<b>Equally Preferred</b> – All alternatives are not expected to have an influence on the regional economy. A number of case studies were reviewed including cities that have removed, never had, or continue to have a through expressway in their downtown. There are no indicators that indicate the cities competitiveness at a regional level is tied to expressway infrastructure. Other factors such as access to talent and success of specialized industries are overall more important to a cities competitiveness.				
	Post Construction Congestion	Potential net economic impacts of post construction congestion	<b>Equally Preferred</b> – Post Construction Congestion Costs were reviewed and considered. The cost of congestion for auto users under each of the alternatives was estimated. The level of difference in congestion cost between the Maintain and Remove alternatives was considered to be insignificant from a regional perspective (a maximum difference of \$200K in comparison to a 2031 projected congestion cost of \$2.8 billion for the City of Toronto. The Improve and Replace alternatives would have congestion cost differences less than this amount. As such, all the alternatives were ranked equally.				
<b>Regional Economics Summary Ranking</b>			<b>Equally Preferred</b>				

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
Local Economics	Business Activity	Number of potential new jobs in corridor and/or Study Area	Less Preferred – 0 jobs		Moderately Preferred – 1,810 jobs	Preferred – 2,120 jobs
	Visitor/Tourism Attractiveness	Potential change in visitor/tourism attractiveness of waterfront.	Less Preferred – No change over existing condition regarding visitor/tourism attractiveness.		Moderately Preferred – Moderate opportunities to improve base case.	Preferred – Removal of the elevated structure will open up views and vistas and create a signature boulevard that would become a gateway to the waterfront. Active street frontages and retail would increase foot traffic and foster an environment for visitors and tourist to spend more time on the waterfront and increase economic activity locally.
	On Street Parking	Ability to provide on-street parking <i>(All options allow for off-peak period parking on Lake Shore Boulevard in the Keating Channel Precinct)</i>	Less Preferred – No opportunities for off-peak parking along Lake Shore Boulevard with the exception of the re-alignment Lake Shore Boulevard segment between Cherry and Don River given existing constraints and associated view corridors.		Preferred – Street could be designed for off-peak parking along Lake Shore Boulevard to support retail along the corridor.	
Local Economics Summary Ranking			Less Preferred		Moderately Preferred	Preferred
Direct Cost & Benefit	Capital Cost and Funding	Total capital cost (in 2013\$)	\$350 million (2013\$) · Includes City approved deck replacement of \$215 million plus costs for additional works to enable comparison with the other alternatives (ramp structures, Don River Bridge, Lake Shore Boulevard east to Logan, Don Roadway improvements, Engineering costs)	\$410 million (2013\$) · Includes basic intersection improvements along Lake Shore Boulevard, additional urban design and landscaping improvements and Lake Shore Boulevard reconstruction · Cost allows for the reconstruction of 10 deck support bents to facilitate intersection improvements	\$970 million (2013\$) · Includes complete replacement of both the Gardiner deck plus Lake Shore Boulevard from Jarvis to Carlaw and major urban design and landscaping throughout · Cost allows for complete replacement of the deck and support infrastructure (bents) with major construction staging and detour costs · New deck is approximately 15 m in height	\$330 million (2013\$) · Includes demolition and removal of the existing Gardiner Expressway and 8-lane Lake Shore Boulevard construction and major urban design and landscaping throughout · Includes construction of new bridge structures across Don River to connect to Lake Shore Boulevard and Don Valley Parkway

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
		Property acquisition	· No property requirements.	· Minimal property requirements around the Don Roadway/DVP connection.	· Minimal property requirements around the Don Roadway/DVP connection.	· Minimal property requirements around the Don Roadway/DVP connection. · Assumed that the southern sidewalk area through RoW width restricted area can be accommodated with building set back area (7m) so no property purchase is assumed to be required.
		Funding availability	\$212.7 million (2013\$) for Gardiner Rehabilitation Program (Jarvis to DVP Ramps) \$105 million (2013\$) for Gardiner Rehabilitation Program - Transition Areas: 1) Yonge to Jarvis; and 2) DVP/ Logan Ramps			
	Lifecycle cost	100 year life cycle cost (includes total capital cost + 100yr operations and maintenance cost) *Maintain figures are +/- 10%, All others +/- 20%	\$870 million (2013\$) \$300 million (NPV)	\$865 million (2013\$) \$360 million (NPV)	\$1,390 million (2013\$) \$700 million (NPV)	\$470 million (2013\$) \$240 million (NPV)
	Land Value Creation	Public Land disposition proceeds. All figures +/- 10%	\$0	\$3 million (2013\$) \$2 million (NPV)	\$145 million (2013\$) \$68 million (NPV)	\$230 million (2013\$) \$85 million (NPV)
<b>Direct Cost and Benefit Summary Ranking (2013\$ and NPV)</b>			<b>Moderately Preferred</b> \$870 million (2013\$) Net Cost \$300 million (NPV) Net Cost	<b>Moderately Preferred</b> \$862 million (2013\$) Net Cost \$358 million (NPV) Net Cost	<b>Less Preferred</b> \$1,245 million (2013\$) Net Cost \$632 million (NPV) Net Cost	<b>Preferred</b> \$150 million (2013\$) Net Revenue \$155 million (NPV) Net Cost
<b>Study Goals Achievement</b>						
<i>Revitalize the Waterfront</i>			No	No	Partially	Yes
<i>Reconnect the City with the Lake</i>			No	Partially	Partially	Yes
<i>Balance Modes of Travel</i>			No	No	Partially	Yes

Study Lens/ Criteria Group	Criteria	Measures	MAINTAIN	IMPROVE	REPLACE	REMOVE
<i>Achieve Sustainability</i>			No	No	No	Yes
<i>Create Value</i>			No	Partially	Yes	Yes
<b>SUMMARY</b>			The scope of Maintain is based on the City's elevated structure rehabilitation program and transition areas that have been added to make this alternative comparable to the other alternatives under consideration. The Maintain alternative solution continues as a single purpose regional transportation corridor and does not include infrastructure improvements for local transportation access and support of significant waterfront population and employment growth.	Addresses many of the negative impacts of the existing infrastructure while maintaining auto capacity and functionality. Does not lead to transformation of the corridor and commits the City to live with an elevated waterfront expressway for decades to come. Allows for small additional advancement of the CWSP objectives over the base condition.	Significantly cost required to create a new elevated expressway. And while LAKE SHORE BOULEVARD level changes are substantial, the analysis shows that the alternative does not result in direct economic benefits commensurate with the investment.	This transformative option yields substantial benefits to the eastern waterfront in terms of environmental quality, city-building, and development compatibility. Local benefits are considerably greater than under any other alternative, while lifecycle costs are the Less. Negative impacts are primarily related to longer auto travel times for those continuing to choose this form of transportation to access the downtown.
<b>EVAUATION RESULTS</b>			<b>Not Preferred</b>	<b>Not Preferred</b>	<b>Not Preferred</b>	<b>Preferred</b>

































































Criteria Group Ranking Summary

Table 4-3 provides a summary of the alternatives preference ranking by criteria group.

Table 4-3: Summary Evaluation Table

Preference Ranking Code

Preferred  Moderately Preferred  Least Preferred 

Study Lens/ Criteria Group	MAINTAIN	IMPROVE	REPLACE	REMOVE
<b>TRANSPORTATION &amp; INFRASTRUCTURE</b>				
Automobiles				
Transit				
Pedestrians				
Cycling				
Movement of Goods				
Safety				
Constructability				
<b>URBAN DESIGN</b>				
Planning				
Public Realm				
Built Form				
<b>ENVIRONMENT</b>				
Social and Health				
Natural Environment				
Cultural Resources				
<b>ECONOMICS</b>				
Regional Economics				
Local Economics				
Direct Cost and Benefits				

Preferred  Moderately Preferred  Least Preferred

Study Lens/ Criteria Group	MAINTAIN	IMPROVE	REPLACE	REMOVE
<b>Study Goals Achievement</b>				
Revitalize the Waterfront	No	No	Partially	Yes
Reconnect the City with the Lake	No	Partially	Partially	Yes
Balance Modes of Travel	No	No	Partially	Yes
Achieve Sustainability	No	No	No	Yes
Create Value	No	Partially	Yes	Yes



## Discussion of Alternative Trade-offs by Criteria Group

The following discussion presents a detailed review of the results found in **Table 4-2**.

### Transportation and Infrastructure

Under this criteria group, the potential influences of the alternatives on all modes of transportation were considered, including: automobile, transit, cycling and walking. Also considered is the potential for impact on safety and goods movement. An extensive amount of Transportation modelling work was undertaken to provide data to inform the impact on travel auto times as explained further below. Details of the Transportation modelling work are available in **Appendix K**. Construction related issues including duration and impact on commuters were also considered.

#### *Automobiles*

This criteria group considered three criteria: 1) Commuter Travel Time based on average AM peak hour auto in-bound travel times for select origin-destination (OD) pairs; 2) Impact on Average Auto Travel Time based on average AM peak hour auto travel times within the Transportation Study Area (roughly bounded by Spadina, Dundas, Woodbine and Lake Ontario); and 3) Road Network Flexibility/Choice represented by the number of turning prohibitions.

The modelling results indicate that for the select OD pairs, the Improve and Replace alternatives had similar or up to 5 min greater Average AM peak hour Travel Times than the Maintain alternative. The Remove alternative was typically expected to result in 5 to 10 min greater Average AM peak hour Travel Times as compared to the Maintain alternative. As such, Improve and Replace were ranked *less preferred* than Maintain, and Remove was ranked *least preferred* for this criterion.

Travel Times were also examined for travel in the AM peak hour (both directions) within the Transportation Study Area. While the rankings of the alternatives for this criterion generally mimic those for the OD pairs (City-wide), this analysis provided information on the volume of automobiles affected. The Improve and Replace alternatives had no increased Travel Times greater than 7 min (over the Maintain). For the Remove alternative, 5% of vehicles were projected to experience a greater than 7 min increase in Travel Time within the Transportation Study Area.

The final criterion considered in this criteria group was Road Network Flexibility/ Choice which was represented by the measure "Turning Prohibitions at Key Intersections". The Replace and

Remove alternatives were ranked preferred as they would result in the fewest number of turn restrictions.

Considering the rankings for the three criteria in this criteria group, the Maintain alternative was identified as preferred due to its lowest Travel Times, the Improve and Replace alternatives were ranked as moderately preferred and the Remove alternative was ranked as least preferred with the highest Travel Times.

### *Transit*

This criteria group has one criterion: Transit Impact, which includes three measures: Impact on Existing Streetcars, Impact on Subway Service, and Ability to Accommodate Planned Transit Service. The Maintain alternative as the base case was preferred. In regards to the first measure, the impacts of the alternatives on Streetcar Travel Times were modelled using PARAMICS within the Transportation Study Area along Dundas, Queen and King Streets. The Improve alternative was considered moderately preferred with a slight increase in some of the Travel Times for some Streetcar routes. Modelling results show that the Replace and Remove alternatives would result in a 1 to 4 min increase in Streetcar Travel Times and are thus ranked less preferred than the other alternatives.

None of the alternatives were expected to result in impact on Subway Service and thus were ranked as equal for this measure.

In terms of the impact of the alternatives on Planned Transit Service, the Replace and Remove alternatives were ranked preferred over Maintain and Improve, as the removal of the Gardiner east of the Don River is expected to better accommodate Planned Transit Service in this area (e.g., Broadview streetcar extension).

Considering the preference rankings for these measures, the alternatives were considered equally preferred for the Transit criteria group.

### *Pedestrians*

For the Pedestrian criteria group, two criteria were considered: North-South Sidewalks and East-West Sidewalks. In regards to North-South Sidewalks, three measures were considered. The first examined the dimension and condition of sidewalks. The Replace and Remove were ranked as preferred as reconstruction of the corridor allows for Sidewalks to be built to City standards along the entire length of Lake Shore Boulevard. Improve was ranked moderately preferred as Sidewalk improvements are not possible at all north-south crossings. Finally, the

Maintain alternative was less preferred as existing sidewalks are substandard along north-south streets.

The second measure considered Crossing Points. The Replace and Remove were ranked preferred as the reconstruction of the corridor allows for city standard crosswalks to be built on both the east and west side of the street. The Improve was ranked less preferred as improvements and standardization is possible at a number of intersections but not all. Existing constraints did not allow standardization of crosswalks on both the east and west side of the street for all intersections. Maintain was ranked less preferred as existing constraints did not allow standardization of crosswalks on both the east and west sides of the street and improvements were not been budgeted under the rehabilitation program.

Finally, the third measure under the North-South Sidewalks criterion measured Crossing Distances. The Replace alternative was ranked as preferred as it has the smallest average intersection Crossing Distance at 26.1 m and could be crossed in one stage. The Improve and Remove alternatives were ranked moderately preferred with average Crossing Distances of 33.7 m and 32.4 m, respectively. Finally, the Maintain alternative is ranked less preferred with an average intersection Crossing Distance of 36.9 m.

The second criterion, East-West Sidewalks, considered one measure related to the dimension and condition of sidewalks: "Ability to physically implement City standard east-west sidewalks as measured by length along the corridor for use by the local community and travelers." The Replace and Remove alternatives were preferred as reconstruction of the corridor allows for sidewalks to be built to City standards along the entire length of Lake Shore Boulevard for use by both the local community and travelers on the north and south sides of Lake Shore Boulevard. In total, 4,400 total linear metres of sidewalk are possible. The Improve alternative was moderately preferred as sidewalks on the north side of Lake Shore Boulevard are not possible between Yonge Street and Parliament Street due to physical limitations of on/ off ramps. In total, 4,000 total linear metres of sidewalks are possible. The Maintain alternative was less preferred as existing sidewalks are sub-standard and/ or not existing in parts of the corridor and improvements were not budgeted under the existing Gardiner rehabilitation program. Re-alignment of Lake Shore Boulevard in the Keating Channel Precinct allowed for sidewalks on both the north and south side for all alternatives that would provide 1,500 total linear metres of sidewalk.

Overall, for the Pedestrian criteria group, The Replace and Remove alternatives were ranked as preferred as they accommodate new North-South and East-West Sidewalks and involved shorter

Crossing Distances of Lake Shore Boulevard. The Improve alternative was ranked moderately preferred as it provided improved North-South and East-West Sidewalks, but also involved a greater Lake Shore Boulevard Crossing Distance. The Maintain alternative was ranked *less preferred* as it provided limited sidewalks and involves the longest Lake Shore Boulevard Crossing Distances (measured at Jarvis Street).

### *Cycling*

This criteria group had one criterion, East-West Movement, and included two measures: Length and Width of Facility, and Connectivity with Other Bikeway Facilities. For Length and Width, the Maintain alternative was ranked less preferred with a total length of existing trails in the corridor of 2,200 m. The Improve was moderately preferred as it allowed for a facility of 3,690 m in Length and which would extend as far west as Jarvis Street. The Replace and Remove alternatives were preferred as they allowed for a new cycling facility that could extend as far west as Yonge Street and would have a total Length of 4,200 m.

The second measure considers Connectivity of the new north side east-west cycling facility with other existing and planned cycling facilities. The Maintain alternative included no new facility so was least preferred. The Improve alternative included connections with all facilities except Yonge Street and was ranked as moderately preferred. Finally, the Replace and Remove alternatives were ranked as preferred as the new cycling facility could connect with all existing and planned cycling facilities.

Considering the preference rankings for these two measures, for the Cycling criteria group, Replace and Improve were both ranked as preferred, Improve was ranked moderately preferred, and Maintain was ranked as less preferred.

### *Movement of Goods*

This criteria group included two criteria: Vehicle Operations and Access Opportunity. Vehicle Operations considered the potential for changes in truck vehicle operations levels. Available road capacity was used as a surrogate measure for this. For this criterion, Maintain and Improve were ranked as preferred as they provide the most road capacity. Replace was ranked as moderately preferred as it provides slightly less road capacity, and Remove was ranked less preferred as it reduces road capacity further. It is noted that this is a measure of effect during the peak periods of road usage. Truck Vehicle Operations were not expected to be significantly affected for non-peak periods which represent the greatest portion of a 24-hour period.

The second criterion, Access Opportunity, was measured by the extent of Turning Prohibitions in the corridor. Turning Prohibitions could affect access levels for the movement of goods. Maintain had the most Turning Prohibitions (6 in total) and was ranked less preferred. Improve had fewer Turning Prohibitions (3) and was ranked moderately preferred. Replace and Remove had no or a limited number of Turning Prohibitions and were preferred.

The preference rankings for the two criteria were generally opposite to each other. Maintain/Improve were preferred for Vehicle Operations and less preferred for Access Opportunity, whereas the rankings for Replace/Remove were the reverse. If the Vehicle Operations criterion was considered to be a more important measure of potential impact on goods movement, then Maintain/Improve were ranked as *preferred*, Replace as *moderately preferred* and Remove as *less preferred*.

### *Safety*

The Safety criteria group included four criteria: Safety Risk for Pedestrians, Safety Risk for Pedestrians and Cyclists, Safety Risk for Cyclists and Motorists, and Safety Risk for Motorists on the Gardiner. For Safety Risk for Pedestrians, the number of lanes at intersection crossing points was used as a measure. The Replace alternative, with a 4-lane crossing section, was preferred. The Maintain/Improve alternatives both had a 6-lane crossing section and were ranked moderately preferred. The Remove with an 8-lane crossing section was ranked less preferred.

For the criterion Safety Risk for Pedestrians and Cyclists, the number of potential uncontrolled conflict points was measured. Uncontrolled conflict points included free flow turns, ramps, etc. The Remove alternative was ranked as preferred as it eliminated all free flow right turns. While greater volume of traffic would be on an at-grade street, design speed would be lower and the new road could be designed to accommodate expected volume to meet safety standards. The other alternatives were all ranked less preferred as they included more uncontrolled access points.

For the Safety Risk for Cyclists and Motorists criterion, there were several existing safety concerns within the corridor that were considered. Replace and Remove were ranked as preferred as they eliminated existing road safety concerns at Jarvis Street, Sherbourne Street, and the Don Roadway. Maintain and Improve would not improve the majority of the existing road safety concerns, although the Improve alternative eliminated the southbound right turn channel on Sherbourne Street. These two alternatives were therefore ranked as less preferred.

Finally, for the criterion Safety Risk for Motorists on the Gardiner expressway (referred to as FGE in the evaluation table), Maintain was considered to be less preferred as it would still result in sub-standard shoulders along the Expressway. The Improve and Replace alternatives provided improved shoulders along the expressway and were preferred.

Considering the above criteria/ measure preference rankings, the Replace and Remove alternatives were ranked as preferred for the Safety criteria group as they were ranked preferred for three of the four criteria. The Replace alternative was ranked preferred for: Safety Risk for Pedestrians, Safety Risk for Cyclists and Motorists, and Safety Risk for Motorists on the Gardiner. The Remove alternative was ranked preferred in regards to: Safety Risk for Pedestrians and Cyclists, Safety Risk for Cyclists and Motorists, and Safety Risk for Motorists on the Gardiner. The Improve alternative was ranked moderately preferred as the safety improvements were less substantial than for Replace and Remove. Maintain was ranked overall as less preferred as it generally resulted in a higher Safety Risk to all users of the corridor.

#### *Constructability*

The Constructability criteria group included three criteria: Duration, Transportation Management, and Construction Impact on Private Property. Maintain and Improve were ranked as preferred for Duration. While the expected Duration of construction for Maintain and Improve was not substantially less than the other alternatives, they generally are expected to have a lower magnitude of disruption. Remove was ranked as moderately preferred and Replace as less preferred as Replace had the longest multi-stage construction period. The Duration of construction for Remove would have a greater impact on lane closures than Maintain and Improve but would not be as complex as Replace.

In regards to Transportation Management, the evaluation considered the impact to pedestrians and cyclists, traffic flows and off-site traffic disruption. Maintain and Improve were ranked as preferred for this criterion. They would both result in the least amount of traffic disruption and no road detours are anticipated. Remove was ranked as moderately preferred as the proposed staging scheme would allow access to the corridor throughout the construction period but there would be some impacts off-site to support traffic flow. Replace was ranked as less preferred as it had the greatest impact on Traffic Management with periods when traffic flow cannot be accommodated through the corridor and would be required to detour.

Finally, for Construction Impact on Private Property criterion, the evaluation considered two measures: impacts on land for staging and detours and impacts to private property access. Maintain and Improve were again ranked as preferred with no impact to private property

expected. Remove was ranked moderately preferred as it would have some potential private property access impacts and had the potential to require some private property during construction. The Replace alternative was ranked as less preferred as it had the potential to require some private property during construction as well as required more land for laydown areas, yards and detour routes during construction. For both Remove and Replace the Construction Impact on Private Property would be confirmed during the development of the more detailed design.

Overall, the Maintain and Improve alternatives were ranked *preferred* for this criteria group.

### Urban Design

In recent years the City and Waterfront Toronto have made great strides in defining and investing in the best of Urban Design character for the next generation of waterfront precincts. The evaluation of alternative solutions has considered what ways changes in the Gardiner East corridor might reinforce that vision.

### *Planning*

The Planning criteria group analyzed the relationship of Gardiner alternatives to the key policy documents defining urban design intent for the waterfront. As such, the criteria group considered two criteria: Consistency with Official Plans, and Consistency with Approved Precinct Plans. Consistency with Official Plans examined the extent to which each alternative is consistent with the principles that make up the Council-approved *Central Waterfront Secondary Plan* (CWSP). The core principles included "Removing Barriers/Making Connections", "Promoting a Clean Green Environment", and "Transforming Lake Shore Boulevard into an Urban Waterfront Avenue". Maintain and Improve were ranked less preferred for this criteria as they did little to achieve the CWSP principles. Replace was ranked moderately preferred as it proposed a plan that would progress the goals of the principles by improving north-south crossings, adding some green space, and improving the alignment of Lake Shore Boulevard. Remove was ranked preferred as it fully achieved the CWSP principles by removing the visual barrier of the elevated expressway structure, fully regularizing north-south crossings, creating a tree-lined urban boulevard, and transforming the area with an "urban waterfront avenue" as described in the CWSP.

Consistency with Precinct Plans examined the extent to which each alternative is consistent with the goals of the approved East Bayfront and Keating Channel precinct plans. Maintain, Improve and Replace were all ranked as less preferred for this criterion/measure. This was because

although they allowed the precinct plans to be achieved, they do not support the development of the highest value of land uses adjacent to Lake Shore Boulevard. This was primarily due to the continued presence of an elevated structure through the corridor. Remove was ranked as preferred for this measure as it was consistent with physical plans for the precincts and in addition it most successfully met the plan definitions of high quality and high value design for the land uses along Lake Shore Boulevard.

Overall for the Planning criteria group Remove was preferred as it reflected longstanding Waterfront design aspirations and created the greatest opportunity to transform the corridor into a green, pedestrian and inviting place that would also result in positive effects to adjacent development parcels. Replace was moderately preferred as it encouraged some improvement to Study Area in accordance with the planning documents, while Maintain and Improve were less preferred as they did not contribute to advancing the plans for the Study Area.

#### *Public Realm*

The Public Realm criteria group considered five criteria: 1) Streetscape, 2) View Corridors, 3) Public Realm Area, 4) Useable Park Area and 5) Rail Corridor and Berm.

The Streetscape criterion considered the quality, consistency and character of the streetscape along Lake Shore Boulevard. Maintain and Improve were ranked less preferred for Streetscape as there were limited modifications being made at grade for these alternatives and therefore little chance to enhance the quality of the environment or provide a consistent character along Lake Shore Boulevard. There would be improvements to Streetscape through the Keating Channel Precinct with the relocation of Lake Shore Boulevard away from the Keating Channel and the balancing of the realigned section of the roadway with pedestrian realm as per the Keating Channel Precinct Plan. However, the Streetscape conditions between Jarvis Street and Cherry Street would see little transformation from either alternative. For Maintain there would continue to be confusing road geometries, over-scaled fixtures, low-quality finishes, deep shadows with poor visibility, noise amplification, visual barriers to the city and to waterfront destinations, and extensive hard surfaces (paving and concrete) with minimal landscaping along Lake Shore Boulevard.

The Improve alternative presented minimal advances over the Maintain condition, although there would be some improvements to crossings, road geometries and landscaping of Lake Shore Boulevard.



Replace was ranked as moderately preferred and Remove as preferred for the Streetscape criterion. This is a reflection of the improved Streetscape condition that Replace presented over Maintain and Improve and the full achievement of an urban boulevard design for Remove. Replace presented a narrower roadway at grade for Lake Shore Boulevard which offered opportunities for softscape landscaping that offsets the hardscape of the paved roadway. Remove presented human-scale fixtures, standard city finishes, full sun exposure, no noise amplification (as the structure would be removed), unobstructed views and clear sight lines to destinations to create a comfortable and easily navigable environment. The character of the urban boulevard presented under Remove would be consistent throughout the Study Area with only minor variations as the width of the corridor requires. Replace also relocated the new elevated expressway away from the Keating Channel to align with the new alignment of Lake Shore Boulevard.

This opened up development and public realm opportunities along Keating Channel. However, from a Streetscape perspective, the realigned Lake Shore would have the new elevated expressway above it which would reduce opportunities for streetscaping Lake Shore Boulevard through the Keating Channel Precinct. For Remove, there would no longer be an elevated structure, which would result in opportunities for development along Keating Channel as well as a greatly enhanced streetscape for the new urban boulevard. Together these elements resulted in Remove as preferred for streetscaping.

For the View corridors criterion, Maintain and Improve were ranked less preferred as they provided no opportunities to enhance Lake Shore Boulevard-level views of the city skyline or waterfront as the dominant visual mass of the Gardiner Expressway structure remains in the corridor. Replace provided some improved view corridors as the expressway structure is higher and there would be fewer supporting columns blocking views. However, the elevated structure would still exist in Replace and therefore it was ranked as moderately preferred. Remove provided the greatest opportunity to open up views from downtown and neighbourhoods to the Lake and along the full corridor with the removal of the elevated structure and was ranked as preferred to address view corridors.

The Public Realm Space criterion considered the area of land dedicated to passive and active public open space uses such as space for multiuse paths, landscaping, parks and plazas. Maintain and Improve were less preferred with little enhancement for Public Realm Space as there would still be a significant area of land required for the road infrastructure, including ramps and supporting structures for the elevated expressway. Replace is moderately preferred as it allows for new Public Realm to be created. This would be a result of building an

expressway that required significantly less footprint for columns and ramps while also providing a reduced number of lanes on Lake Shore Boulevard. Remove provided the greatest useable public realm area. Remove was preferred as it frees up the most usable publicly owned land for an improved Public Realm and potential north-side development parcels. These would be opened up as a result of removing all of the infrastructure supporting the elevated expressway.

The Usable Park Area criterion considered the surplus right-of-way that could be dedicated as City of Toronto park land that would be usable and programmable above the existing park area (which is limited). Remove and Replace were moderately preferred for this criterion. Both alternatives allowed for some new Park Area to be dedicated along the rail corridor. Maintain and Improve were preferred, although they did not open up as much new land for development, the re-alignment of Lake Shore Boulevard allowed for the use of the former alignment along the Keating Channel, east of Cherry Street, to be converted for use with active recreation and sports courts (e.g., Underpass skate park).

Finally, under the Public Realm criteria group was the Rail Corridor and Berm criterion. This criterion examined the opportunity for the alternatives to reduce the exposure of pedestrians to the Rail Corridor while using public sidewalks and open spaces along Lake Shore Boulevard. The Remove was ranked as preferred for this criterion and all other alternatives were ranked as less preferred. This was due to the limited ability for Maintain, Improve, or Replace to mitigate the Rail Corridor. The current Rail Corridor is elevated and includes a berm that is owned by Metrolinx. Although some landscaping could be provided to enhance the at-grade condition, it would do little to buffer the Rail Corridor and would have to be very significant in size to reduce the visibility and noise from the Rail Corridor. Remove provided the only opportunity to alter the exposure of the Rail Corridor to pedestrians. This was due to the Remove plan proposal to include development on the north side of Lake Shore Boulevard. The alignment of the new urban boulevard in Remove would allow enough space for north-side buildings between Jarvis and Sherbourne Streets. This would reduce exposure to the Rail Corridor along Lake Shore Boulevard.

Overall, Remove ranked as preferred for the Public Realm criteria group as it achieved the greatest benefits related to the Streetscape, View Corridors, Public Realm Space, and Rail Corridor and Berm criteria/ measures. Replace was ranked as moderately preferred and Maintain and Improve were ranked as less preferred.

### *Built Form*

The consideration of Built Form related to the varied opportunities offered to achieve an urban character defined by attractive urban structures that frame lively urban places and promenades along efficient movement corridors. The assessment focused on the opportunities for leasable, active, at-grade space supported by the design of the corridor as well as the number of podium floors for development fronting on Lake Shore Boulevard with obstructed views and limited access to light and air due to the elevated structure.

Maintain and Improve were ranked less preferred for Street Frontage as they both offered no increase in active building fronts at grade. The presence of the existing elevated structure in both of these alternatives also impacted the quality of space for the lower three floors of the podiums for the developments fronting on Lake Shore Boulevard. Replace was moderately preferred as it advanced the corridor in terms of the quantity of building fronts that would be expected to have active at-grade uses. This would be due to the improved pedestrian and public space available at grade to support an active pedestrian street in Replace. Remove was preferred and presented the greatest benefit to the corridor in terms of Built Form as a result of removing the elevated expressway and opening the full corridor to light, air and views and building a green urban boulevard. Remove would result in the greatest amount of leasable, active, at-grade building space fronting onto Lake Shore Boulevard. As the new boulevard would consist of a two-sided street it would provide activity on both sides of Lake Shore Boulevard. Remove also eliminated the physical barrier of the elevated expressway in front of the development blocks. The podiums would not be impacted by an elevated structure and would have full access to light and air from all storeys.

Considering the above preference rankings, Maintain and Improve were ranked less preferred, Replace as moderately preferred, and Remove was most preferred for the Built Form criteria group.

### Environment

#### *Social and Health*

Two criteria were included as part of this criteria group: Air Quality and Noise. Regarding the Air Quality criterion, three measures were included: the Extent of Change in Regional Air Quality, Extent of Change in Local Air Quality, and Level of Greenhouse Gas Emissions. Air Quality modelling was undertaken following provincial methodologies using the MOBILE 6.2C model. (See **Appendix H – Air Quality and Greenhouse Gas Impact Assessment Report**).

The Air Quality modelling work used the future transportation volumes/patterns associated with each of the alternatives as developed by the PARAMICS transportation model. Total vehicle kilometres travelled and average vehicle speeds were considered in the analysis.

Extent of Change in Regional Air Quality considered several parameters, including NO<sub>x</sub>, VOC, and PM<sub>2.5</sub>. The “region” considered in this analysis was the Transportation Study Area, which includes the lands extending from Dundas Street to Lake Ontario and from Spadina Avenue to Woodbine Avenue. The Regional Air Quality contribution from vehicles under the Maintain, Improve and Replace alternatives were determined to be similar (each contributing 0.25% of the regional air emissions contribution). The greatest difference among the alternatives was for NO<sub>x</sub> and PM<sub>2.5</sub>. The results of this analysis indicated that the Remove and Replace alternatives were predicted to have the lowest air emissions for the local area receptors and were preferred. The Improve alternative was ranked moderately preferred and the Maintain alternative was ranked less preferred.

The final measure considered the Level of Greenhouse Gas (GHG) Emissions. A regional burden analysis (GHG regional contribution by the alternative) was completed for a 24 hr. period. The Remove alternative was ranked as preferred with the lowest regional GHG emission contribution of 0.24%. The Improve and Replace alternatives were ranked moderately preferred with a regional emission contribution level of 0.28%. The Maintain alternative was ranked less preferred with a slightly higher regional burden contribution of 0.29%.

Similar to Air Quality, Noise Levels were modelled considering the traffic outputs of the PARAMICS model. The measure used to assess the Noise criterion was the Extent of Change in Noise Levels. Noise modelling was completed following Ministry of Transportation endorsed methodology using the ORNAMENT noise model (See **Appendix I – Noise Assessment Report** for details on the modelling work). Over 150 receptor points were modelled. Based on the modelled results, Remove was predicted to have the lowest Noise Levels for identified receptors with local area Noise Levels ranging from 61 to 72 dBA and was ranked as preferred. The Improve and Replace alternatives had predicted Noise Levels for the same receptor locations that range from 67 to 78 dBA, and these two alternatives were ranked moderately preferred. The Maintain alternative was predicted to result in Noise Levels that range from 69 to 78 dBA and was ranked less preferred.

Considering the Noise and Air Quality modelled results and preference rankings, the Remove alternative was ranked as preferred with the lowest predicted levels. The Improve and Replace

alternatives were ranked moderately preferred with slightly higher air emission and Noise Levels and Maintain was ranked less preferred with the highest modelled levels.

### *Natural Environment*

For the Natural Environment criteria group, six criteria were considered: 1) Terrestrial Environment, 2) Aquatic Environment, 3) Water quality, 4) Water quantity, 5) Microclimate, and 6) Tree Lined and Shaded Street (measured through Tree Canopy Coverage).

Replace was ranked as moderately preferred for Terrestrial Environment as there was significantly more light at grade and more space for planting and natural features. However, with the continued presence of an elevated structure that blocks sunlight needed for vegetation it was not the preferred alternative. Remove was ranked as preferred as it had no elevated structure which resulted in greater opportunities for planting and natural features due to increased sunlight.

For the Aquatic Environment criterion the alternatives were all ranked equally. The relocation of Lake Shore Boulevard through the Keating Channel Precinct would allow for improved runoff control into the Keating Channel. This provided improvement of aquatic habitat in the Keating Channel, which was the case with all alternatives. All of the alternatives would utilize the new Don River crossing proposed in Don Mouth Naturalization Project, which supports an improved Aquatic Environment. As all of the alternatives provided these improvements they were all ranked equally.

The Water Quality and Water Quantity criteria related to how water could be treated and managed on-site. In regards to Water Quality, Replace was ranked preferred as it provided the greatest amount of new available unpaved ground surface with the reduction of Lake Shore Boulevard.

In regards to Water Quantity, the area of paved surface (open to the sky) of each alternative was determined to represent the amount of surface water run-off generated as rainfall events. The Replace and Remove alternatives were preferred with paved surface areas of 91,095 sq. m and 84,575 sq. m, respectively.

For the Microclimate criterion, east of Cherry Street both Maintain and Improve provided the same condition. Maintain was less preferred as it had the least amount of natural light access to street-level west of Cherry Street. For Improve, reducing the deck of the elevated expressway would allow for more light to penetrate the ground level of Lake Shore Boulevard west of Cherry Street and therefore Improve was minimally preferred. Replace provided an improved

Microclimate condition over Improve as the new elevated structure would be higher and have fewer bents/columns, allowing more light to penetrate the ground level and was ranked as moderately preferred.

Finally, under the Natural Environment criteria group was the Tree Canopy Coverage criterion. Tree Canopy Coverage reduces the urban heat island effect, improves air quality and increases evapotranspiration. As with previous criterion, Maintain and Improve provided the same condition east of Cherry Street with regards to Tree Canopy. West of Cherry Street, Maintain was less preferred as it provided minimal potential for tree planting. Improve was moderately preferred as there was some potential for tree planting west of Cherry Street along Lake Shore Boulevard. Replace was also moderately preferred for the Tree Canopy criterion. This was because the new elevated structure would allow more light to penetrate the ground level. This increases the potential for a Tree Canopy along the corridor. Remove was preferred for this criterion as it presented the greatest opportunity for tree planting along the corridor with the removal of the elevated structure and increased access to sunlight at ground level. This resulted in the greatest potential for Tree Canopy.

As a result of the evaluation of the six criterion under Natural Environment, Remove was ranked preferred, Replace was moderately preferred and Maintain and Improve were both ranked less preferred.

### *Cultural Resources*

The Cultural Heritage criteria group considered four criteria including: Built Heritage, Cultural Landscape, Archaeology, and First Nations People and Activities. Regarding the first two criteria groups, none of the alternatives were expected to result in impacts to Built Heritage features and/or landscapes. As such, the alternatives were ranked equal for these two criteria. Similar, none of the alternatives were expected to result in impacts to First Nations People and Activities and were ranked equal for that criterion.

With regards to Archaeology, an assessment of the potential for impact on known archaeological resources in the Study Area was completed. As all alternatives generally have the same footprint, the potential for impact was distinguished based on the level of excavation expected to be required. The Maintain alternative was preferred with the potential for impact on three archaeological features. The Improve alternative was also considered as preferred as it resulted in the potential for impact on only two additional features. The Replace and Remove alternatives had the potential for impact on nine additional features. As the level of excavation

associated with the Remove alternative would be less, the Remove was ranked moderately preferred and Replace was ranked as less preferred for Archaeology.

Based on the criteria assessed, Maintain and Improve were preferred for Cultural Resources, Remove was moderately preferred, and Replace was less preferred.

## Economics

### *Regional Economics*

For the Regional Economics criteria group, two criteria were considered: City Competitiveness and Post Construction Congestion. Regarding the first criterion, the case study research examined the role/absence of expressways in or near CBDs. The research considered cities listed on the North American Competitiveness Ranking<sup>1</sup> and compared the rankings of the cities to the highway access that exists in these cities.

The case study research also considered population and employment growth as well as office vacancy rates in cities/CBDs with and without freeway access. Based on the case study research, it was determined that none of the alternatives would have a material impact on the competitiveness of the City's Regional Economy. All alternatives were therefore ranked as equal for this criterion.

In regards to the Post-Construction Congestion criterion, an attempt was made by the City to measure the net economic impact of post- construction congestion associated with each of the alternatives from a 2008 study by HDR Corporation (HDR) on behalf of Metrolinx. It has been widely published that the "cost of congestion" in the GTHA is \$6 billion annually (based on travel figures in 2006). This "cost of congestion", which has often been referred to as "lost productivity", was comprised of two components: the cost borne by commuters annually (estimated to be \$3.3 billion) and the annual cost to the economy (estimated to be \$2.7 billion).

The HDR study defined the congestion cost to commuters as the difference between the cost to commuters travelling in the peak hours versus the cost to commuters travelling in free-flow conditions. For the purpose of this EA Study, a comparative analysis of congestion cost was undertaken using the methodology in the HDR study to determine whether there is a discernible difference in the "cost of congestion" amongst the four alternatives.

The cost of congestion to commuters in the GTHA was estimated to be \$3.3 billion of which approximately \$1.4 billion (42%) was estimated to occur in the City of Toronto. These figures also included the delay to transit users, so when factoring out these transit delays the cost of

congestion to auto commuters in the GTHA and Toronto was calculated to be \$3.0 billion and \$1.2 billion (40%), respectively. This cost of congestion to auto commuters, as outlined in the HDR study, was assumed to consist of the following elements:

1. Delay Cost – Longer travel times result in a cost to motorists in the form of the value placed on this excess time spent travelling. This is referred to as an "opportunity cost" which is equivalent to the value of activities foregone. The added unpredictability of travel times is included in this cost.
2. Increased Vehicle Operating Costs – Vehicle operating costs increase in congested traffic conditions due to the stop-and-go nature of travel. Additionally, the higher traffic volumes represent operating costs in excess of the socially optimal level.
3. Excess Vehicle Emissions Externality Costs – As with operating costs, vehicle emissions increase with congestion due to the stop-and-go driving conditions and the total amount of emissions is high due to the excess traffic volume.
4. Excess Accident Externality Costs – Congested traffic conditions result in a higher accident rate, which translates into additional costs to auto users.

In regards to the Gardiner East alternatives, congestion costs for the Maintain and Remove alternatives were developed as these two alternatives provide the range of road capacity associated with all of the alternatives. It is also important to note that the methodology used by Metrolinx to assess the cost of congestion is appropriate on a system-wide basis for a large area. The methodology was not intended to assess the cost of congestion for a specific facility. This methodology; however, was used strictly for comparative purposes to assess the relative merits of each alternative from a congestion cost perspective.

As a result of this Regional Economics analysis, all alternatives were ranked equally preferred for Regional Competitiveness and Post Construction Congestion.

#### *Local Economics*

For the Local Economics criteria group, the following three criteria were considered: Business Activity, Visitor/Tourism Attractiveness, and On-Street Parking.

Business Activity measures the number of potential new jobs in the Study Area. Remove was ranked as preferred for this measure as it has the potential for the highest number of new jobs as a result of the new development parcels (2,120). Replace results in 1,810 jobs and Maintain and Improve did not support any new jobs.



Visitor/Tourism Attractiveness considers the potential for the alternatives to change the attractiveness of the waterfront for visitors and tourism. Maintain and Improve were less preferred for this measure as they would encourage no change in existing visitor/tourism attractiveness. The Replace alternative was moderately preferred as it provided some potential to improve on the base case to encourage visitors/tourism to the waterfront, particularly with the potential to build an elegant architectural structure. However, it was Remove that had the highest potential to attract additional tourists/visitors to the waterfront and allowed for on-street parking (off-peak periods) which could contribute to at-grade retail uses and visitor increases in the corridor. As such, Remove was ranked preferred for the Visitor/Tourism Attractiveness measure.

For On-Street Parking, the criteria measure looked at the ability to provide On-Street Parking which would encourage at-grade retail uses and improved street life. This measure considered the area west of Cherry Street for parking as all of the alternatives would allow for off-peak period parking on Lake Shore Boulevard in the Keating Channel Precinct. Maintain and Improve were less preferred as they did not allow for On-Street Parking west of Cherry Street. Replace and Remove were ranked preferred as Lake Shore Boulevard could be designed to allow off-peak period parking under both alternatives.

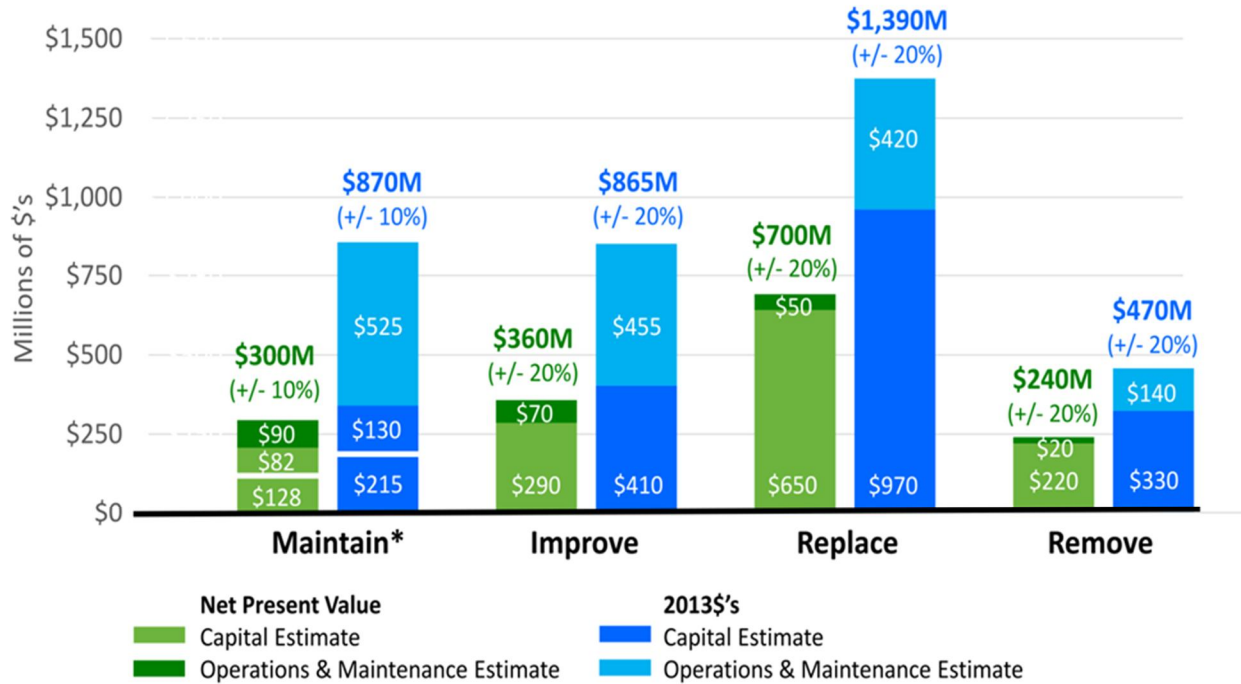
#### *Direct Cost and Benefits*

The final criteria group considered under the Economic lens was Direct Cost and Benefits. Three criteria were considered, Capital Cost and Funding, Lifecycle Cost and Land Value Creation. **Appendix O** provides the assumptions regarding how the capital costs were generated. The Remove alternative was preferred for this criterion as it had the lowest estimated capital cost at \$330 M. This was followed by Maintain (\$345 M), Improve (\$410 M) and Replace which was the most expensive at \$970 M (all costs in 2013\$). Also considered under this criterion was the measure Property Acquisition. None of the alternatives were expected to require significant private property. There was potential for minimal private property acquisition along the Don Roadway (to the east of the right-of-way) for the Remove alternative to accommodate new ramps that are required to connect the Don Valley Parkway with the new at-grade boulevard. The Funding Availability measure was provided as information but was not considered as an appropriate measure to rank the alternatives.

Lifecycle Costs as a net present value (NPV) were determined and include the total capital cost and the 100-year operations and maintenance costs for each alternative. Net present value (NPV) is the present day (2013) value of the cash expenditures to implement (initial capital

costs) and operate/maintain (yearly costs) the facility for a given period (100 years). The Remove alternative was ranked preferred with the lowest lifecycle cost (\$240 M). The next lowest NPV cost alternative was Maintain at \$300 M, followed by Improve at \$360 M and the most expensive was Replace with a NPV cost of \$700M (See Figure 4-5).

Figure 4-5: 100-year Lifecycle Costs (2013\$ and Net Present Value)



\*Capital cost for Maintain includes: 1) \$215M for Jarvis to DVP Ramps; 2) \$105M for Transitions (Yonge to Jarvis & DVP Ramps); 3) \$25M for Don Mouth Naturalization at Lake Shore and Don River Bridge

The Land Value Creation criterion considered the value of new lands potentially available for future development. These are lands under City control that could be sold to offset the capital cost for the alternative. As shown in Table 4-2, Remove has the greatest potential for Land Value Creation with a potential benefit of \$230 M (2013\$) or (\$85 M NPV) followed by Replace at \$145 M (2013\$) and Improve at \$3 M (2013\$).

Considering the total Capital Cost, Lifecycle Costs and the Land Value Created for each alternative, a NPV net cost was determined. The Remove alternative was identified as preferred with a NPV net cost of \$155 M. The Maintain and Improve alternatives were ranked moderately preferred with a NPV net cost of \$300M and \$358 M. The Replace alternative was ranked less preferred as it had the highest NPV net cost at \$632 M.

#### 4.3.2.2 Consideration of Public Input - Alternatives Evaluation

Consultation activities associated with the evaluation of the alternative solutions were focused on the engagement of the SAC, the holding of a public meeting with a live webcast, the release of the presentation package on the project web site, and an open comment period following the public meetings. The Stakeholder Advisory Committee met on February 4th, 2014 to review and provide feedback on the alternatives evaluation results. A public meeting was held on February 6th, 2014 at the Toronto Reference Library, with over 250 participants at the meeting and another 50 or more watching the webcast and participating online. Hundreds of people either completed an online survey on the project website or weighed in via Twitter to provide their feedback on the evaluation results. The following provides a high level summary of public feedback received during this round of the consultation.

The majority of consultation participants (approximately 60%) indicated support for the Remove alternative. The benefits cited by those who favour the remove alternative include: cost-effectiveness; creation of opportunities for future public (e.g., parks and greenspace) and private redevelopment (e.g., commercial and residential buildings); improved accessibility to the waterfront; and the opportunity to enhance public transit and alternative modes of transportation.

- Participants also expressed support for the Maintain (approximately 11%) and improve (approximately 5%) alternatives. Those who favour these options cited the need to keep existing highway capacity, mitigate pollution from idling vehicles, and maintain the movement of goods and services. Concerns were also expressed about the potential for traffic displacement with the remove option.
- There was also support for the Replace alternative (approximately 4%) with those who support this option citing safety as a key benefit.
- Approximately 20% of participants provided general feedback on the evaluation results and/or advice to the project team and did not express clear support for any of the alternatives.
- Many participants indicated that investments in public transit should be prioritized, particularly if the Gardiner Expressway east of Jarvis is removed. Participants expressed concern about removing the elevated highway if long-term transit assumptions in the modeling and study are not realized.

The details of the consultation activities are documented in **Appendix B, Record of Consultation**.

#### 4.3.2.3 Paired Comparison Evaluation

Considering the preference rankings of the alternatives by the criteria group as described in the previous section, the following presents the comparative evaluation of the alternatives. This comparison was undertaken in two ways; first was an overview level comparison of the alternative preferences by criteria group. And second, was a paired-comparison approach.

Considering the ranking of alternatives by criteria group as presented in the previous section and in **Table 4-2**, this section presents an overview of the preference rankings. **Table 4-3** presents a summary of the preference rankings for the alternatives for the 16 criteria groups, which was also presented to the public at the February 2014 PIC. Also presented is the extent to which the study goals are met by each alternative. As the alternatives are considered as equally preferred for the Transit criteria group and the Regional Economics criteria group, these two criteria groups do not help to differentiate among the alternatives. Of the remaining 14 criteria groups that do differentiate among the alternatives, the Remove alternative is identified as *preferred* for eight criteria groups and identified as *moderately preferred* for three criteria groups. The Remove alternative was identified as being *less preferred* for only three criteria groups. If all the criteria groups/criteria are considered to have equal weight, and the level of effect associated with each criteria group is considered similar, then the Remove alternative can be identified as being the overall technically preferred alternative. The paired-comparison approach in the following section describes the trade-offs to support the identification of an overall preferred alternative.

As previously described, to identify the trade-offs among the alternatives a “paired-comparison” approach was used. This approach involves the comparison of the alternatives in pairs based on the criteria group rankings. The alternative rationalized to be preferred of the pair is then carried forward for the next comparison. The alternative that is rationalized to be preferred over all the other alternatives is considered to be the overall preferred alternative. The paired comparisons of the alternatives were completed at a criteria group level. The key trade-offs between the pairs of alternatives being compared were then highlighted at the Evaluation Lens level (four Lenses were considered), as presented in **Table 4-4 through Table 4-6**.

The first comparison made was **Maintain vs. Improve**. The results of this comparison are presented in **Table 4-4**. The Maintain and Improve alternatives are considered equal for the Transportation Lens. The Improve is considered to be preferred for Urban Design and Environment lenses whereas the Maintain is considered preferred for the Economics (costs) lens. It is the opinion of the evaluation team that the Urban Design and Environment benefits

of the Improve alternative justify the additional cost (net cost of \$58 M NPV). This includes increased access to light and diminished volumes of noise due to the reduced width of the Gardiner, creation of wider more comfortable sidewalks between Jarvis and Bonnycastle Streets, improved and safer pedestrian crossings at intersections, enhanced lighting and signage along Lake Shore Boulevard, and an addition of an east-west multi-use pathway along the north edge of Lake Shore Boulevard. The Improve alternative is therefore considered preferred and carried forward to the next paired comparison.

The next comparison is **Improve vs. Replace**. The results of this comparison are presented in **Table 4-5**. The Improve alternative is considered preferred for Transportation (less complex construction) while the Replace alternative is considered preferred for Urban Design (improved streetscape, street animation potential and pedestrian experience). Both alternatives were ranked as equal for the Environment Lens. A key disadvantage of the Replace alternative is with respect to Economics, where the Replace alternative is expected to have a higher net cost of approximately \$275 M NPV. The Urban Design benefits of the Replace alternative do not justify this additional net cost in the opinion of the evaluation team and, as such, the Improve alternative is recommended as preferred over the Replace alternative.

The final comparison is **Improve vs. Remove**. The results of this comparison are presented in **Table 4-6**. The key advantages of the Remove alternative are with respect to Urban Design, Environment and Economics. The Improve alternative is preferred for Transportation & Infrastructure. The Remove alternative will transform the corridor into a place that is consistent with the goals of this study and of the Central Waterfront Secondary Plan. Local benefits are considerably greater and the net costs are significantly less (approx. \$200 M NPV less). Considering Transportation, the Remove alternative will result in much better pedestrian and cycling opportunities in the waterfront area. The most notable disadvantage associated with the Remove alternative is with respect to the auto user, as auto travel times will be higher (about 5 minutes more on average during the AM peak hour period) and greater auto disruption is expected during the construction period. It is noted that 90% of all AM peak hour commuters inbound to the Central Area are unaffected by the Remove alternative (change in travel time of less than 2 minutes). Considering the goals of the study, the advantages of the Remove alternative are considered greater than its disadvantages. **For these reasons the Remove alternative was recommended as the technically preferred alternative.**

Table 4-4: Maintain vs. Improve Paired Comparison

MAINTAIN VS. IMPROVE					
Evaluation Lenses	Criteria Groups	Maintain	Improve	Comparison	Preference
Transportation & Infrastructure	Automobiles	Preferred - As average AM peak hour auto travel times for select OD pairs are slightly shorter – typically by less than 5 min.	Less preferred - As average AM peak hour auto travel times for select OD pairs are slightly longer – typically by less than 5 min. About 15% of all auto travellers in transportation Study Area to experience a “Minor Impact” on travel time. No auto travellers to experience a “Noticeable Impact” (greater than 7 min delay – on average).	On balance the slight auto benefit associated with the Maintain alternative (potential for slight delay) is considered to be similar to the Pedestrian/Cyclist/Safety advantages of the Improve alternative. As such the alternatives are considered to be equal in regards to Transportation and Infrastructure.	EQUAL
	Transit	Equal: Maintain and Improve Options result in similar travel times on east-west routes serving transit in the Central Area, such as Dundas, Queen, and King Street Streetcars.			
	Pedestrians	Less Preferred – Slightly longer pedestrian crossing distances. Substandard NS sidewalks. Less total sidewalk total linear distance (1,588 m).	Preferred - shorter pedestrian crossing distances. NS sidewalks would be improved to meet City standard. Longer total sidewalk linear distance (4,000m).		
	Cycling	Less Preferred - Does not facilitate an east-west multi-use pathway along north side of corridor west of Cherry Street.	Preferred - Facilitates an east-west multi-use pathway along north side of corridor west of Cherry Street.		
	Movement of Goods	Equal - Provides similar overall road capacity and access to Port Lands, South of Eastern and the Waterfront, in general. Off peak travel times expected to be very similar among the two alternatives.			
	Safety	Less Preferred – Safety levels along Lake Shore Boulevard generally the same.	Preferred – Safety levels along Lake Shore Boulevard generally the same. Improve roadway geometry for FGE with inclusion of shoulders as part of re-decking.		
	Constructability	Equal - Constructability differences are considered to be minor. Both options will result in traffic delay from Gardiner re-decking activities. Expected construction period for these options is in the range of 6 years although acceleration of this period is possible subject to City funding. And while construction for the Improve alternative is considered to be slightly more complicated as a result of the need to relocate a select number of Gardiner support piers, the difference is not considered to be overly significant. (Note that both options are to involve re-paving of the road surface as part of road maintenance activities and as such would both involve traffic delays as a result).			

MAINTAIN VS. IMPROVE					
Evaluation Lenses	Criteria Groups	Maintain	Improve	Comparison	Preference
Urban Design	Planning	Equal – Both alternatives are equally compatible with existing plans and policies and have similar flexibility to accommodate additional proposed new growth. Neither alternative would achieve the Central Waterfront Secondary Plan principles.		The Improve alternative proposes a number of modest Urban Design opportunities that include intersection modifications to better facilitate pedestrian crossings, the addition of an east-west multi-use pathway, narrowing of the FGE to allow for more access to air and light, the creation of a new wider sidewalk/public realm area between Jarvis and Bonnycastle, new lighting and signage, and general clean-up to the Lake Shore Boulevard road. With these changes, the Improve option is considered to be preferred.	IMPROVE
	Public Realm	Less Preferred – Existing conditions hinder attractiveness and placemaking opportunities, no opportunity for continuous sidewalk & multi-use pathway.	Preferred – Increased opportunity to improve the attractiveness through removal of pedestrian and bicyclist barriers and encumbrances, minor realignment of ramps, and reconfiguration of intersections. Continuous north-side multi-use pathway possible.		
	Built Form	Equal – neither alternative is expected to result in changes to adjacent planned developments. Same amount of two-sided street through the corridor.			
Environment	Social & Health	Less Preferred – Slightly higher air emissions and noise levels.	Preferred – Slightly lower air emissions and noise levels.	Slight preference for the Improve alternative as a result of predicted lower air emission levels and noise levels.	IMPROVE
	Natural Environment	Equal – Alternatives have limited opportunity for new/enhanced habitat & trees. And while the Improve option has a slightly smaller area of impervious surface, this difference is expected to not be enough to result in noticeable environmental benefit to the area.			
	Cultural Resources	Equal – Similar potential for impact on known archaeological features.			
Economics	Regional Economics	Equal – No significant difference in city competitiveness.		The Improve option is estimated to have slightly higher lifecycle cost than Maintain (including initial capital cost and 100 year O&M costs). Considering economic benefits, the Maintain alternative also has a lower net cost. The Maintain alternative is considered to be preferred.	MAINTAIN
	Local Economics	Equal – No significant difference in visitor and tourism attractiveness to corridor.			
	Direct Cost & Benefits	Preferred - Facility lifecycle cost (NPV construction and O&M costs) of \$300 M. Net cost of \$300 M (net of potential economic benefits).	Less Preferred - Facility lifecycle cost (NPV construction and O&M costs) of \$360 M. Net cost of \$358 M (net of potential economic benefits).		

Table 4-5: Improve vs. Replace Paired Comparison

IMPROVE VS. REPLACE					
Evaluation Lenses	Criteria Groups	Improve	Replace	Comparison	Preference
Transportation & Infrastructure	Automobiles	Equal: Both alternatives has relatively similar average peak AM hour average travel times from select OD pairs that have been modelled.		The key difference among the alternatives is with respect to constructability. And while feasible, construction of the Replace option is expected to be very complex and likely to result in multi-year travel delays in the area. As such, the Improve alternative is considered to be preferred.	IMPROVE
	Transit	Equal: Maintain and Improve Options result in similar travel times on east-west routes serving transit in the Central Area, such as Dundas, Queen, and King Street Streetcars.			
	Pedestrians	Less Preferred - Longer Lake Shore Boulevard crossing distances than Replace. Intersection improvements and Gardiner deck reduction improves crossing experience but presence of ramps at some intersections makes crossing more complicated for pedestrians. Less total sidewalk distance (4,000m).	Preferred - Shorter Lake Shore Boulevard crossing distances than Improve. Crossing experience improved with smaller/higher Gardiner deck. Absence of ramps/free turns makes corridor crossing less complex. Longer total sidewalk linear distance (4,400m).		
	Cycling	Less Preferred – New north cycling facility can extend only to Jarvis Street.	Preferred – New north cycling facility can extend to Yonge Street.		
	Movement of Goods	Preferred – Due to greater road capacity provided.	Less Preferred – Less road capacity may have an impact on the movement of goods through the area.		
	Safety	Less preferred – More road lanes for pedestrians to cross and does not improve the majority of the existing road safety concerns. Does eliminate the southbound right turn channel on Sherbourne Street.	Preferred – Has fewer road lanes for pedestrians to cross and eliminates existing road safety concerns at Jarvis Street, Sherbourne Street, and the Don Roadway.		
	Constructability	Preferred - Shorter construction period but potential for reduction at a higher cost. Less complex traffic management.	Less Preferred - Longer construction period. More complex traffic management.		
Urban Design	Planning	Less Preferred - While both alternatives can accommodate future growth in the area, Improve does not allow for full achievement of the Central Waterfront Secondary Plan and does not provide potential to better accommodate other	Preferred - While both alternatives can accommodate future growth in the area, Replace allows for a fuller achievement of the Central Waterfront Secondary Plan, provides a more attractive context for new waterfront development, and provides more potential to accommodate other proposed	The Replace alternative is considered to be preferred for all urban design criteria groups and is thus considered preferred.	REPLACE



IMPROVE VS. REPLACE					
Evaluation Lenses	Criteria Groups	Improve	Replace	Comparison	Preference
		proposed developments east of the DVP/Don River.	developments east of the DVP/Don River.		
	Public Realm	Less Preferred - Minor to moderate improvement in streetscaping – minor increase in public realm. Narrowing of Gardiner deck will allow more natural light on south side. Some opportunity for more trees.	Preferred - Greater opportunity for streetscaping improvements and greater new public realm space created.		
	Built Form	Less Preferred – Majority of space along Lake Shore Boulevard will consist of “back of house” uses and will not provide active uses at-grade.	Preferred – Up to 2,160 m of building fronts expected to have active uses at-grade oriented towards Lake Shore Boulevard.		
Environment	Social & Health	Equal – Modeling results indicate that the alternatives would result in similar air emissions and noise levels.		Minimal difference between these two alternatives and therefore they are ranked equally.	EQUAL
	Natural Environment	Less Preferred - Limited opportunity for new/enhanced habitat & trees. Greater area of impervious surface.	Preferred - Greater opportunity for increased habitat/trees in corridor. Higher and slimmer overhead structure provides some increased light access. Less area of impervious surface.		
	Cultural Resources	Preferred – Less potential for impact on known archaeological resources.	Less Preferred - Greater potential for impact on known archaeological resources as a result of required excavations.		
Economics	Regional Economics	Equal – No significant difference in city competitiveness.		The Improve alternative has significantly less net lifecycle cost (net of economic benefit - approx. \$275 M less). The Improve alternative is therefore preferred.	IMPROVE
	Local Economics	Less Preferred – No new jobs generated. No increased attractiveness to visitors/tourists.	Preferred – More new jobs potentially generated (1,810). Improved pedestrian crossings of Lake Shore Boulevard may enhance tourism/visitor connections between the City and the waterfront.		
	Direct Cost & Benefits	Preferred - Facility lifecycle cost (NPV construction and O&M costs) of \$360M. Net cost of \$358M (net of potential economic benefits).	Less Preferred - Highest facility lifecycle cost (NPV construction and O&M costs) - \$700 M. Higher net cost - \$632 M (net of potential economic benefits).		

Table 4-6: Improve vs. Remove Paired Comparison

IMPROVE VS. REMOVE					
Evaluation Lenses	Criteria Groups	Improve	Remove	Comparison	Preference
Transportation & Infrastructure	Automobiles	Preferred – As average AM peak hour auto travel times for select OD pairs are slightly shorter – typically by about 5 min on average. Slightly less volume of auto travellers to experience a “Minor Impact” on travel times (15%). No auto travellers to experience a “Noticeable Impact” (greater than 7 min delay – on average).	Less preferred - As average AM peak hour auto travel times for select OD pairs are slightly longer – typically by about 5 min on average. Slightly greater volume of auto travellers in transportation Study Area to experience a “Minor Impact” on travel time (20%). 5% of auto travellers to experience a “Noticeable Impact” (greater than 7 min delay – on average).	The Improve is preferred for the Auto, Movement of Goods and Constructability criteria groups.	IMPROVE
	Transit	Equal: Maintain and Improve Options result in similar travel times on east-west routes serving transit in the Central Area, such as Dundas, Queen, and King Street Streetcars.			
	Pedestrians	Equal: Both alternatives will provide improved north-south and east-west sidewalks that will meet if not exceed city standards.			
	Cycling	Equal – Both options provide for a new facility along the north side of the corridor that will connect with all other existing and planned cycling facilities.			
	Movement of Goods	Preferred – Due to greater road capacity provided.	Less Preferred – Less road capacity may have an impact on the movement of goods through the area.		
	Safety	Equal – Both options address current safety concerns with the corridor including largely if not entirely removing free-flow turns, eliminating safety concerns at key intersections and address intersections with difficult geometry.			
	Constructability	Preferred - Similar construction period (6 years), but with less complex traffic management. No detour roads expected to be required.	Less Preferred – Similar construction period (6 years), but with more complex traffic management requirements and greater potential for traffic delays.		
Urban Design	Planning	Less Preferred - Accommodates current waterfront plans. Less flexibility to accommodate additional growth.	Preferred - Further advances the goals of waterfront plans. More flexibility to accommodate additional growth.	The Remove is clearly preferred for Urban Design. The take-down of the elevated FGE creates an opportunity for dramatic improvement in the urban design fabric of the City. This action transforms the	REMOVE
	Public Realm	Less Preferred - Minor to moderate improvement in streetscaping – minor increase in public realm. Narrowing	Preferred - Opportunity for significant streetscaping improvements. Significant increase in public realm area within		

IMPROVE VS. REMOVE					
Evaluation Lenses	Criteria Groups	Improve	Remove	Comparison	Preference
		of FGE will allow more natural light on south side. Some opportunity for more trees.	corridor. Corridor will be open to sun and sky.	corridor and allows the full development of a vibrant urban district introduced by a tree canopied urban boulevard.	
	Built Form	Less preferred - Majority of space along Lake Shore Boulevard will consist of "back of house" uses and will not provide active uses at-grade.	Preferred - Up to 2,920 linear metres of building fronts expected to have active uses at-grade oriented towards Lake Shore Boulevard.		
Environment	Social & Health	Less Preferred – Higher air emissions and noise levels.	Preferred – Lower air emissions and noise levels.	Combination of lower AQ and noise effects with higher opportunity for new green space makes Remove preferred.	REMOVE
	Natural Environment	Less Preferred - Limited opportunity for new/enhanced habitat & trees. Greater area of impervious surface.	Preferred - Greater opportunity for increased habitat/trees in corridor with increased access to light and less area of impervious surface.		
	Cultural Resources	Preferred – Less area of disturbances and less potential for impact on known archaeological features	Less Preferred – Potential for greater impact on known archaeological features as a result of excavation.		
Economics	Regional Economics	Equal – No significant difference in city competitiveness.		The Remove alternative is preferred from an economics perspective as it has lower lifecycle cost (\$120 M less) and a lower cost net of economic benefit (approx. \$203 M less).	REMOVE
	Local Economics	Less Preferred –No new jobs generated.	Preferred – More new jobs potentially generated (2,120).		
	Direct Cost & Benefits	Less Preferred - Facility lifecycle cost (NPV construction and O&M costs) of \$360 M. Net NPV net cost of \$358 M (net of potential economic benefits).	Preferred - Lower capital/lifecycle cost (NPV construction and O&M costs) - \$240 M. Lower net NPV net cost - \$155 M (net of potential economic benefits).		

#### 4.3.2.4 Stage 1 Alternatives Evaluation Conclusion

The key trade-off in identifying Remove as the preferred alternative is with respect to auto travel times, which are expected to add on average another 5 to 10 minutes in the AM peak hour period (over the Maintain alternative) depending on the travel route. As previously noted, it is the view of the study team that the Urban Design, Environment, and Economic advantages associated with the Remove alternative off-set the additional auto travel times which impact a small proportion of the total commuter volumes as noted in the following:

- In regards to traffic movement in the transportation Study Area (all directions), 75% of the vehicles will experience a less than 2 min increase (over the Maintain), 20% will experience a 2 min to 7 min increase and only 5% will experience more than 7 min increase; and,
- In regards to all commuters coming into the Downtown, approximately 90% of inbound commuters to the core in the AM peak hour are unaffected with the Remove.

In conclusion, the Remove alternative provides the following:

- Contributes to achieving a better balance among transportation modes including driving, walking, cycling, and transit use;
- Addresses the many safety issues in the corridor for pedestrians, cyclists and drivers alike;
- Reduces air emissions and noise levels in the corridor;
- Provides a long-term cost saving to the City;
- Opens a signature, sun-filled, path into Downtown from the Don Valley and eastern;
- neighbourhoods providing vistas to the City's skyline beyond a green canopy of trees, promenade plantings, and park spaces;
- Invests in a public realm system that is characteristic of a great urban street in a city that values and invites its residents, workers and visitors to walk or cycle;
- Delivers an attractive 2-sided Lake Shore Boulevard that animates the corridor, and invites people to the waterfront whether at the Downtown core, St. Lawrence neighbourhood or Distillery District;
- Brings a human-scale promenade edge to the Keating Channel with the removal of the elevated Gardiner;

- Improves the attractiveness of development lands in the corridor and adds value to these properties; and,
- Provides support for other planned developments and transit initiatives through the removal of the expressway.

## 4.4 Alternative Solutions Development and Evaluation: Stage 2

### 4.4.1 Rationale for Additional Alternatives Solution Development and Evaluation

A recommendation for the Remove alternative was presented to City of Toronto Public Works and Infrastructure Committee (PWIC) on March 4, 2014. After careful consideration of the City Staff report and its recommendation for the Remove alternative, plus the deputations made to PWIC by various stakeholders, PWIC provided the following direction (referral decision):

1. *Work with WT and community stakeholders to review the recommended option [Remove] under the EA process to mitigate congestion concerns;*
2. *Prepare an additional option that combines the maintain and replace components to preserve expressway linkage and functionality between the Gardiner Expressway and the Don Valley Parkway, and evaluate it against the EA criteria and the following:*
  - a. *Transportation functionality;*
  - b. *Impacts on key economic sectors;*
  - c. *Cost benefit;*
  - d. *Future land use considerations;*
  - e. *Public transit components;*
  - f. *Environmental impacts; and*
  - g. *Neighbourhood growth and compatibility.*
3. *Report back to City Council in February 2015, through the Public Works and Infrastructure Committee.*

The direction from PWIC to complete item 2 of the referral decision reflects consideration of the input received from stakeholders and the public. Public deputations made to PWIC and input received through EA consultation activities identified public interest in considering a solution that could maintain the Gardiner – DVP connection while also achieving removal of the Gardiner Expressway east of the DVP / Don Roadway.

On the basis of this direction, the Gardiner East EA project team undertook the following work:

1. Optimized the Remove (Boulevard) alternative to improve auto travel times;
2. Developed a Hybrid alternative (to address item 2 of the PWIC referral decision);
3. Studied Goods Movement and City Economic Competitiveness impacts; and
4. Assessed and compared the optimized Remove (Boulevard) alternative against the new Hybrid alternative.

The following sections document the results of this work.

## 4.4.2 Remove (Boulevard) Alternative

### 4.4.2.1 Strategies to Mitigate Traffic Congestion

One of the key directions stemming from the March 4, 2014 Public Works and Infrastructure Committee meeting was to review the Remove (Boulevard) alternative and identify measures to mitigate traffic congestion concerns.

The primary constraints considered within the boulevard section were related to competition for traffic signal “green time” between the following conflicting functions:

- High westbound (and eastbound) through traffic during peak periods;
- High eastbound left turn demand at some intersections;
- Southbound traffic demand accessing the boulevard; and
- Pedestrian crossing time.

Although a variety of alternate roadway configurations and cross sections were considered (including some less conventional treatments such as Michigan U-turns which provide specific U-turn lanes along a roadway), the optimization process resulted in sufficient improvement to the “conventional” Remove (Boulevard) configuration. Some of the key improvements are presented below:

- Adjustments to the Gardiner Expressway cross section and its interface with Lake Shore Boulevard, west of Jarvis Street (including maintaining three eastbound lanes east of Rees Street);
- Revised lane configurations at intersections — in particular, identifying opportunities to provide southbound dedicated right turn lanes on streets intersecting with the new Boulevard (e.g., at Jarvis Street);
- Road network adjustments (Queens Quay extension east of Cherry Street);
- Modifications to signal phasing patterns at some intersections (review of advance left turn phases; more efficient accommodation of the Cherry Street streetcar and Waterfront East LRT);
- Confirmation of pedestrian crossing requirements (assuming two-stage crossings where a wide median is available as a refuge, and single-stage crossings otherwise);
- Strategic turn prohibitions to maximize the efficiency of intersections (Lake Shore Boulevard at Cherry Street and at Queens Quay);
- Adjustments to the length of green signals at individual intersections to more efficiently allocate capacity between conflicting movements; and
- Improvements to signal coordination between adjacent intersections to minimize delays and reduce queue lengths.

It is noted that while the previous transportation model runs assumed a higher level of traffic demand reduction for the Remove (Boulevard) alternative (25% versus 15% assumed for the other alternatives), for the optimized Remove (Boulevard) model runs, the Remove (Boulevard) alternative was able to function at the same level of traffic demand reduction (i.e., 15%) as the Hybrid alternative. As such, the Remove (Boulevard) alternative would be able to process the same volume of traffic as the Hybrid under its optimized configuration (70,500 trips were processed for both models in the AM peak hour).

#### Other Strategies Considered

In addition to the strategies noted above to reduce traffic congestion associated with the Boulevard alternatives, also considered were the inclusion of additional travel lanes and grade separated crossings of Lake Shore Boulevard. The following describes the examination of these other strategies.

### Additional Travel Lanes

In 2013, as a result of concerns about travel time impacts related to the Remove alternative, the project team explored the potential to expand Lake Shore Boulevard from eight through-lanes to 10 through-lanes in order to determine the extent to which the additional travel times could be reduced. The traffic modelling of a 10-lane Remove configuration was completed prior to the optimization of the Remove alternative, thus the results could be different with the optimized Remove now under study. Traffic modelling for the 10-lane Remove configuration resulted in a decrease of three minutes for eastbound trips (from Spadina/Gardiner Expressway to Front/Parliament) but added one minute to travel time for south-to-west and westbound travel. The increases in travel time for the south-to west and westbound trips as forecasted in the model are potentially attributed to more vehicles being attracted to the corridor under a 10-lane scenario. Although some travel time reductions could be achieved with the addition of two through-lanes, the resulting increase in the pavement width of the roadway by approximately 6.6 metres would have other implications. The wider pavement would require more pedestrians to cross the road in two stages instead of one stage as with the eight-lane configuration. Furthermore, in the area between Small Street and Cherry Street, the existing road right-of-way would need to be widened to accommodate the 10-lane cross section. Due to the proximity of the corridor to the railway embankment to the north, an additional one-half acre of private property south of Lake Shore Boulevard would have to be acquired. Considering these negative impacts, particularly the cost and timing of land acquisition, the 10-lane configuration was not pursued further.

### Pedestrian Overpasses at Key Intersections

The potential to install pedestrian overpasses to allow for more "green time" for auto traffic was explored. Although pedestrian bridges over Lake Shore Boulevard might allow north-south "green times" for vehicle crossings to be reduced at certain intersections, the need for some amount of green time to accommodate these vehicle movements would remain and potential gains for additional east-west green times would be limited. There would also be significant considerations and potential constraints in the design and implementation of grade-separated pedestrian crossings, whether enclosed climate-controlled bridges or unenclosed walkways, as follows:

- There would be challenges in finding feasible horizontal and vertical alignments for pedestrian bridge(s) over Lake Shore Boulevard, particularly with the proximity to and the constraints created by the rail corridor.



- Ramps and/or elevators would be required to ensure that bridges are accessible and compliant with the Accessibility for Ontarians with Disabilities Act (AODA).
- The separation of pedestrian and vehicular traffic would increase safety but if the bridges are not convenient, pedestrians would attempt to cross at-grade without adequate crossing time and protection. Therefore, for safety reasons, it would be necessary to provide minimum pedestrian walk times regardless, affecting the potential for increased east-west vehicular capacity.
- Pedestrian bridges are generally not preferred by pedestrians when at-grade options exist, unless they are fully climate-controlled, directly connected to buildings and/or part of a continuous pedestrian network or incorporated into adjacent developments such as the PATH (Toronto's downtown underground pedestrian walkway).
- Pedestrian bridges would detract or obstruct view corridors along Lake Shore Boulevard.
- Clearances and available head room may not readily facilitate enclosed crossings and may require crossings at considerable elevation or open platforms.
- Crossings would need to be movable to allow for Gardiner maintenance activities such as the recent Watermark Place enclosed bridge accessed in the Air Canada Centre. Although staff were directed to examine the potential for pedestrian overpasses at key intersections, the feasibility of pedestrian underpasses could also be examined as part of the Alternative Designs stage, should the Remove option be selected as the preferred EA alternative.

#### 4.4.2.2 Optimized Remove

The Remove alternative (renamed to "Remove (Boulevard)" to clarify the changes that are proposed under this alternative) included the following modifications to the corridor:

- Remove all of the 2.4 km elevated expressway east of approximately Jarvis Street, including removal of about 750 m (EB lanes) and 850 m (WB lanes) of the existing Logan on/off ramps.
- Rebuild the corridor with a new at-grade 8-lane tree lined Lake Shore Boulevard, west of the Don River and a new 6-lane at-grade boulevard east of Don River.
- Develop new public realm space within the corridor.
- Remove all road infrastructure along Keating Channel.

- Build new DVP ramp connection at east end of the Keating Channel Precinct (2 lanes each direction).
- Build new Gardiner ramps west of Jarvis Street (3 lanes each direction).
- Build new multi-use pathway along north side of Lake Shore Boulevard to extend to Yonge Street.

The basic configuration of the Remove (Boulevard) alternative remained largely the same as previously developed and evaluated in 2014. **Figure 4-6** presents a rendering of the Remove (Boulevard) alternative at the east end of the corridor which shows a new two-way DVP ramp over the Don River that connects with the new Lake Shore Boulevard through the Keating Channel Precinct lands.

As a result of the Remove (Boulevard) alternative optimization activities, the additional travel times of Remove (Boulevard) over the 2031 future Baseline or Maintain alternative for the selected origin-destination trip pairs were reduced to a 3-5 minute increase. This is a reduction in travel time over the previously reported 5-10 minute increase of the Remove alternative in 2014.

Figure 4-6: Remove Alternative – Rendering Through Keating Channel Precinct

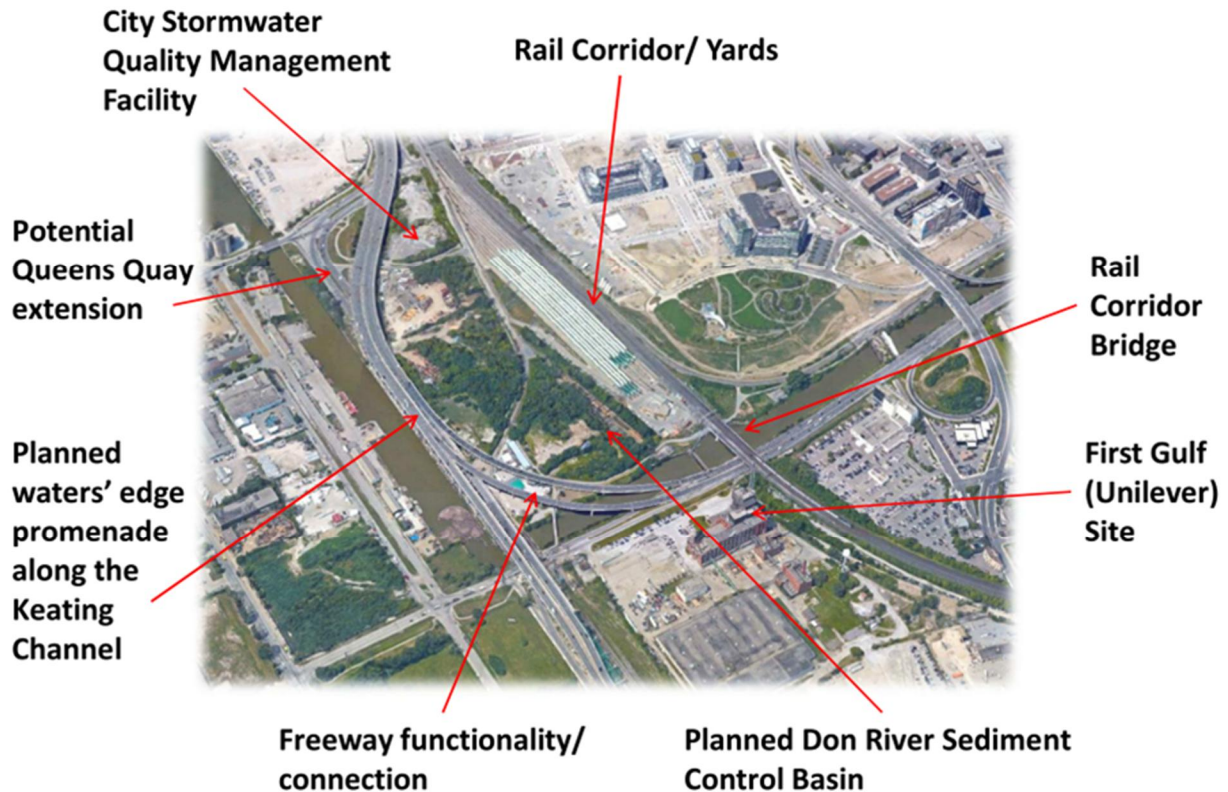


### 4.4.3 Hybrid Alternative Development

#### 4.4.3.1 Strategies to Enhance the Hybrid Alternative

In the development of a Hybrid alternative, there were several features/considerations in the Keating Channel Precinct that were taken into account as presented in **Figure 4-7** below.

**Figure 4-7: Hybrid Development Considerations**



In the review and development of the Hybrid concept, variations to the concept were proposed by different stakeholders. This included an alternate configuration by First Gulf, a land developer that is proposing a major commercial development on the east side of the Don River, south of the Metrolinx rail tracks and north of Lake Shore Boulevard. This proposal included a much tighter alignment that would run south of the rail corridor (see **Figure 4-8**). Furthermore, local community concern was expressed regarding the proposed new Cherry Street access ramps and its potential for impact on urban design considerations in the Keating Channel Precinct.

Figure 4-8: First Gulf Hybrid Concept



Considering stakeholder input, the project team explored Hybrid concept variations including:

- First Gulf Hybrid Concept;
- Hybrid with no new access ramps east of Cherry Street;
- Hybrid with a westbound only new on-ramp east of Cherry Street; and
- Improve Existing Jarvis Street westbound On-Ramp.

#### First Gulf Hybrid Concept

In consultation with the First Gulf team it was determined that their proposal would not be feasible due to:

- The proposed tight alignment would require a 50 km/hr design speed ramp that would require too large of a speed reduction of vehicles travelling along the DVP/Gardiner.
- The “hugging” of the rail corridor along its south side would require passing over the existing stormwater management facility on the east side of Cherry Street. This would require changes to the planned building at this location (it would need to be lowered) and would limit underside access to an elevated expressway.

#### Hybrid Without New On/Off Ramps at Cherry Street

By removing the existing Logan on-ramp and not providing a new westbound Gardiner on-ramp at Cherry Street, westbound traffic on Lake Shore Boulevard would have to use the existing on-ramp at Jarvis Street to access the Gardiner. It is expected that the volume of traffic that would access the existing Jarvis Street on-ramp would be significantly less than that of the Logan on-ramp today as 75% of AM peak-hour traffic volumes on the Logan on-ramp are destined to downtown locations and would therefore likely remain on Lake Shore Boulevard to reach their destinations (vehicles using the Jarvis on-ramp cannot exit to the Yonge/Bay/York off-ramp). Similarly, by removing the existing Logan off-ramp and not providing a new eastbound Gardiner off-ramp at Cherry Street, eastbound traffic on the Gardiner wanting to access Lake Shore Boulevard would need to exit at the existing Jarvis Street off-ramp.

With the elimination of the on/off ramps at Cherry Street, travel times in the AM peak hour would decrease by two minutes for travel from Victoria Park/Finch to Union Station and from Don Mills/Eglinton to Union Station when compared to the travel times for the Hybrid (with new ramps) configuration. This reduction in AM peak-hour travel times for trips coming south along the DVP is a result of the elimination of vehicles entering the Gardiner from the east (either through the existing Logan westbound on-ramp or the proposed new Cherry Street westbound on-ramp), thus allowing for a better flow of traffic and improved travel times from southbound DVP to the westbound Gardiner.

PM peak hour travel times were also modeled with a no new ramps scenario. The results indicate that without the new on/off ramps at Cherry Street, the outbound travel times for the Hybrid option will increase by one minute to the east (to Queen/Woodbine), two minutes to the north (to the DVP at Dundas) and four minutes to the west (to the Gardiner at Spadina), compared to the outbound travel times for the Hybrid option with ramps at Cherry Street. In addition to the impact of outbound trips originating in the Study Area, the PM peak hour analysis also examined the impact of the Hybrid option (with and without the new ramps at Cherry Street) on trips travelling through the length of the Gardiner-Lake Shore corridor (i.e., not originating in or destined to the downtown area).

The through trip most impacted under the Hybrid option without the new ramps at Cherry Street is the westbound through trip. The model forecasts that a through trip under the Maintain base case in the PM peak hour starting at Queen/Woodbine would require approximately 10 minutes to travel, via Lake Shore Boulevard and the Logan on-ramp, to a point on the Gardiner at Spadina, for destinations further west. In comparison to the Maintain, if the Hybrid includes a new westbound on-ramp at Cherry Street, an additional one minute of travel time is required to travel, via Lake Shore Boulevard, to the new Cherry Street westbound on-ramp to the Gardiner. Without a new westbound Cherry Street on-ramp, an additional nine minutes is required over the Maintain. This trip would involve travelling on Lake Shore Boulevard to the Jarvis Street on-ramp, which is already congested, enter and merge with Gardiner traffic, and get to a point on the Gardiner at Spadina. Considering the east-to-west through trip in the PM peak hour without new ramps at Cherry Street is forecast to have a significant increase in travel time, a new westbound on-ramp for the Hybrid alternative would appear to be important from a traffic capacity and service perspective.

#### Westbound Only On-Ramp

The project team also examined the option of constructing a Gardiner westbound onramp east of Cherry Street only (i.e., no new eastbound off-ramp). Instead of being located south of Lake Shore Boulevard along the north edge of the Gardiner, the proposed westbound on-ramp could be located to run along the north side of the realigned Lake Shore Boulevard. The ramp would rise and cross overhead above the boulevard to connect with the elevated Gardiner at Cherry Street.

This Hybrid alignment would avoid redevelopment parcels south of the realigned Lake Shore Boulevard. It would also eliminate the need for the access road and new intersection that would both be required to access the westbound on-ramp for the Hybrid alternative. With a westbound on-ramp only in place, it was determined that while travel times in the AM peak would be similar to those with new ramps in both directions, eastbound travel in the PM peak would be increased significantly for those drivers wanting to access Lake Shore Boulevard east of the Don river. As a result, this concept was not explored further.

#### Improve Existing Jarvis Westbound On-Ramp

The project team examined the potential to increase the capacity of the existing Jarvis Street westbound on-ramp as a means of reducing travel time delays associated with the implementation of Hybrid without new on/off ramps at Cherry Street, as well as to improve safety conditions at the Jarvis and Lake Shore intersection. The proposal would involve expansion of the westbound on-ramp to two lanes from one. With this modification, it would be possible to move the entrance to the ramp further west from the Jarvis Street / Lake Shore intersection. It may also be possible to remove the southbound right-turn lane onto the existing ramp to normalize the intersection.

Modelling results for the 2031 AM peak hour indicated no travel time benefit from this Jarvis Street on-ramp widening for Hybrid without new ramps at Cherry Street. However, widening the Jarvis westbound on-ramp and improving Lake Shore Boulevard to facilitate a widened on-ramp is expected to offer some remedy to increased travel times of the westbound through trip under PM peak hour conditions. Notwithstanding travel time results, the proposed changes to the existing Jarvis on-ramp, including the access to this ramp, would improve safety conditions at the intersection of Jarvis Street and Lake Shore Boulevard, particularly for pedestrians.

#### 4.4.3.2 Hybrid Alternative

Considering the work undertaken to review alternative Hybrid concepts as described above, the following describes the main elements of the Hybrid alternative developed by the Gardiner East EA project team:

- Rehabilitation of the Gardiner deck east of Cherry Street;
- West of Cherry Street, retention of the existing Gardiner structure/ramps;
- Retention of the existing Gardiner-DVP on/off ramps;



- Removal of the existing Logan on/off ramps (about 750 m of EB lanes and 850 m of WB lanes);
- Rebuilding of Lake Shore Boulevard east of the Don River as a new six-lane landscaped boulevard including planned Broadview extension intersection;
- Construction of one new westbound Gardiner on-ramp and one new eastbound Gardiner off-ramp (each two lanes, about 450 m in length) at Cherry Street (in Keating Channel Precinct);
- Construction of new approach roads to the new on/off Gardiner ramps that run under/north of the Gardiner through the Keating Channel Precinct (within footprint of current westbound Lake Shore Boulevard lanes);
- Extension of Queens Quay east of Cherry Street as a one-lane eastbound roadway;
- Building of new Lake Shore Boulevard/Queens Quay intersection (under DVP ramps);
- Realignment of Lake Shore Boulevard as per the Keating Channel Precinct Plan;
- Extend multi-use pathway along north side of Lake Shore Boulevard; and
- Improvements to some of the existing Lake Shore Boulevard intersections west of Cherry Street.

**Figure 4-9** provides a plan view of the Hybrid and **Figure 4-10** shows a rendering looking north-west from the Port Lands.

Figure 4-9: Hybrid Alternative (eastern section)

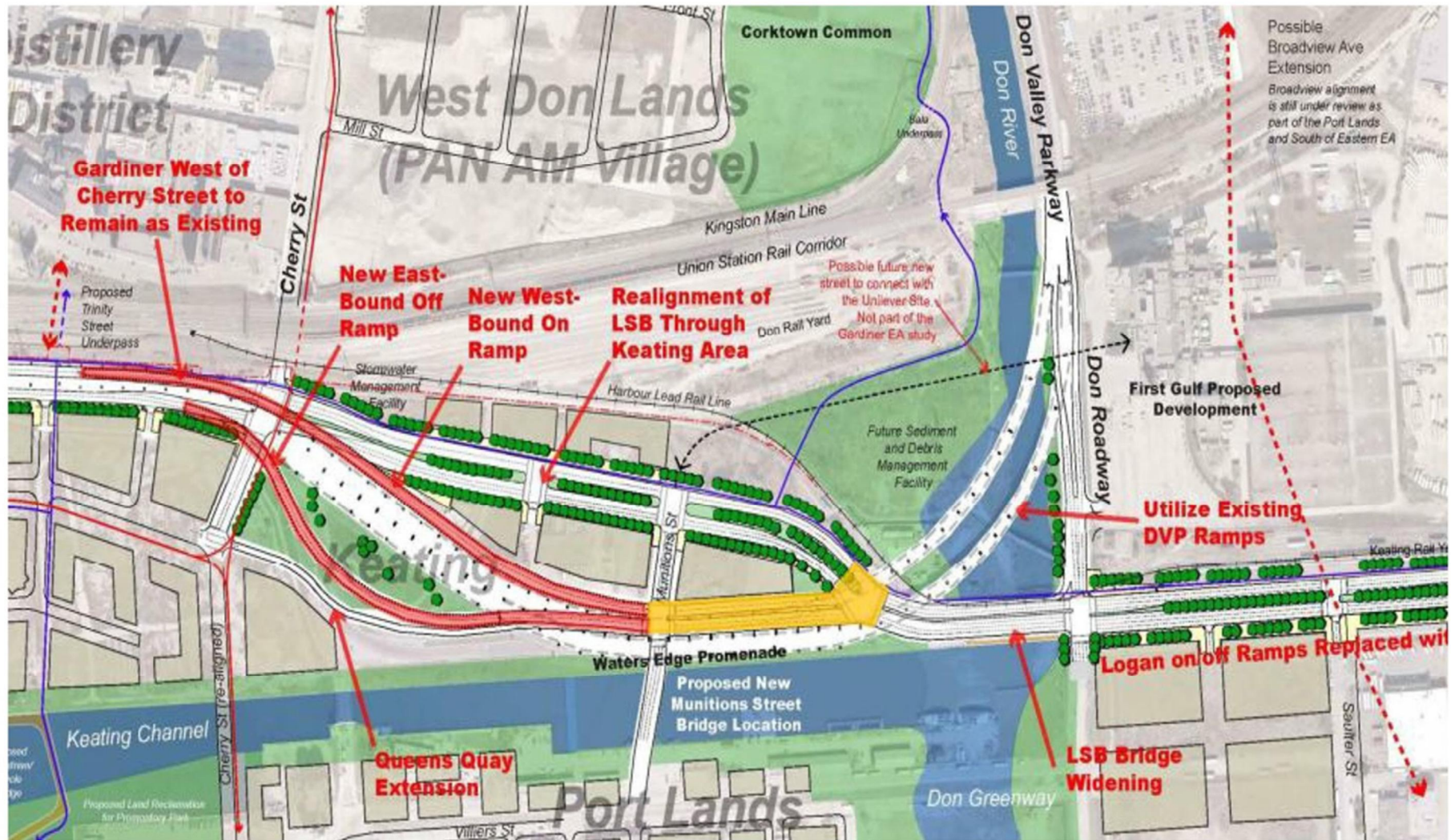


Figure 4-10: Hybrid Alternative (looking north-west from Port Lands)



The transportation model results forecast that the Hybrid would result in travel time increases up to 3 minutes over the future Baseline or Maintain alternative for the selected origin-destination trip pairs. This travel time increase is associated with trips coming from the east in the AM period. Trips originating north and west of the downtown would not be impacted under the Hybrid alternative. Note that even for the Maintain alternative; future auto travel times would increase over current (2014) travel times due to expected population and employment growth in the City.

#### 4.4.4 Additional Studies

In response to PWIC direction to explore potential impacts related to Goods Movement and the City's Economic Competiveness, two additional studies were undertaken by specialist consultant firms. The following summarizes the studies that were undertaken. It is noted that the results of these studies are reflected in the evaluation of the Remove (Boulevard) and Hybrid alternatives.

#### 4.4.4.1 Goods Movement

CPCS (a consulting firm that specializes in goods movement and commercial transportation) was retained to carry out an analysis of goods movement in the Transportation Study Area considered in the Gardiner EA study. The objectives of the goods movement analysis were as follows:

- To provide a better understanding of the nature of goods movement in the Gardiner-Lake Shore corridor/Transportation Study Area.
- To provide a comparative assessment and explanation of the opportunities and constraints for goods movement between the Remove (Boulevard) and the Elevated Expressway alternatives being considered in the EA.
- To recommend high-level mitigation measures for any constraints identified that may be applied to goods movement.

The Goods Movement Study Report is available in **Appendix P**. The following provides a summary of the study and the results.

The study involved the review of City traffic count and cordon count data, future modelled travel times, and other available data including:

- **Municipal Property Assessment Corporation zoning data** and Canadian Business Patterns data (from December 2013) used to identify the location of goods movement industries.
- **Ontario Ministry of Transportation (MTO) Global Positioning System (GPS) data** to identify major truck traffic generators. MTO provided GPS-based data on truck stops, which indicate key goods movement origins and destinations (due to confidentiality constraints, this is only available at the county/regional level for this study).
- **MTO iCorridor data**. MTO's iCorridor web application provided data on average speeds of commercial vehicles on roads, including the Gardiner, as well as commercial vehicle counts for 400 series highways.

Furthermore, a large part of this assignment was informed through stakeholder consultations. The purpose of the consultations was to gather information on supply chains and stakeholders' current use of the Gardiner Expressway, likely impacts of the alternatives, and any relevant issues raised by stakeholders. Some issues discussed include the differing impacts of the alternatives by: time of day (peak vs. off-peak movement), local vs. through movements, estimates of the reliability of the road network, and perceived challenges to travel time reliability.

A list of stakeholders was identified through an analysis of Canadian Business Patterns data as well as truck stop data in order to identify areas where larger generators of goods movement flows are located. Several participants had deputed at the Public Works and Infrastructure Committee meeting in 2014. Additionally, industry associations were contacted in order to gain a better understanding of the perspective of stakeholders that may not be located in the Study Area but would be impacted by the Remove (Boulevard) alternative. In some cases, industry organizations recommended particular additional stakeholders that may be significantly impacted by the alternatives.

Stakeholders consulted include key goods movement companies in the Industrial/Manufacturing, Retail and Courier/Logistics industries that could be affected by the implementation of the Remove (Boulevard) alternative.

Key findings of the study are as follows:

### **Traffic Patterns**

- The Gardiner Expressway facilitates some of the largest flows of commercial vehicles in Toronto outside of the 400 series highways; it has been identified by stakeholders as the preferred route for most commercial vehicle trips starting or ending within the Study Area.
- The Gardiner Expressway has approximately 40% of the flow of trucks on Highway 401 at Yonge Street during the peak 8:00-9:00am hour and approximately 28% of the flow of trucks at Highway 427 at Dundas Street at the peak 8:00am-9:00am hour.
- For longer distance trips, including those passing through the City of Toronto or those that are not originating in or destined to the Gardiner EA Transportation Study Area (Spadina, Dundas, and Woodbine), the 400 series highways are the preferred routes for commercial vehicle traffic.

- On a wider scale, the Gardiner Expressway/Lake Shore Boulevard Corridor, along with the Don Valley Parkway (DVP), Highway 401 and Highway 427 form a higher speed and higher capacity network around the City that allows for the transportation of goods around the City of Toronto.
- Local traffic is a significant component of all commercial traffic on the Gardiner in the Study Area (80% of truck traffic on the Gardiner either begins or ends in the local Study Area).
- A large number of truck trip ends currently occur in the southeast corner of the study area (i.e. Port Lands).

Truck trip patterns by 2031 (EA time horizon) will be affected greatly by development, growth, and changing land use in the Study Area.

#### **Transportation Decisions by Goods Movement Stakeholders**

- Transportation decisions of goods movement stakeholders in the Study Area are generally dictated by downstream customer requirements.
- Key factors that goods movement stakeholders consider in transportation decisions are (A) Travel Time, (B) Reliability, and (C) Cost. Goods movement stakeholders value all three factors, but weigh each factor differently depending on the nature of the supply chain in which they operate.
- The main types of goods movement generators using the Gardiner in the Study Area are categorized into three principal groups (1) Industrial and Manufacturing, (2) Retail, and (3) Courier and Logistics stakeholders.
- Industrial and Manufacturing stakeholders tend to move larger volumes of goods and have a strong focus on cost of transportation. Retail stakeholders often focus on reliability for restocking shelves, and courier services tend to focus on both travel time and reliability in order to meet customer expectations.

## Alternatives Assessment Input

Metrics to compare the alternatives considered under the EA were developed based on the supply chain analysis of impacted firms and key concerns raised by stakeholders during consultations. In order to better understand stakeholder feedback received, a framework was developed to convert comments into objective and measurable concerns. These measures were used to evaluate the potential impact of the Remove (Boulevard) and alternatives that included the elevated Gardiner (e.g., the Hybrid).

Considering the above information, an assessment of the alternatives was undertaken on the basis of the following criteria: Travel Time, Travel Reliability, and Cost. This input was considered in the overall evaluation of the alternatives as presented in **Section 4.4.5** below.

### 4.4.4.2 Economic Competitiveness

To further explore the potential for the Remove (Boulevard) and Hybrid alternatives to impact the City's economic competitiveness, additional study was undertaken by HR&A Advisors. HR&A conducted research and stakeholder consultation beginning in September 2014. HR&A first undertook an evaluation of the importance of Downtown Toronto to the regional economy, recent economic trends in Downtown, and the competitiveness of Toronto when compared to other global cities. HR&A presented this information to stakeholders in December 2014 to confirm its understanding of Downtown's and Toronto's competitive positioning, factors that drive that competitiveness, and risks to Downtown Toronto. Stakeholders included leading representatives from Toronto's real estate, economic development, and business communities. To fully articulate how the alternatives may affect Downtown's competitive positioning, HR&A synthesized stakeholder feedback and conducted additional industry research on the factors that drive business location decisions. HR&A then isolated those factors that may be affected by the EA alternatives and evaluated the alternatives, using available data. HR&A reviewed its findings with stakeholders in March 2015.

HR&A relied on a combination of third-party research and stakeholder consultation to describe Toronto's relative competitiveness, the importance of Downtown to that position, Downtown's strengths and weaknesses, and more globally the factors that drive business location decisions. The research and findings from the stakeholder consultations represent widely accepted perspectives in the business, real estate, and economic development communities. However, there were varied opinions among stakeholders about the risks to Downtown and what considerations draw businesses to locate and invest in Downtown.

An assessment of potential impacts of each alternative was developed on the basis of the following criteria groups:

1. **Global & Regional Economic Impacts.** These criteria identify the role of the eastern portion of the Gardiner Expressway in the competitive positioning of Downtown Toronto, the economic hub and driver of the City and regional economy, and how the alternatives may affect that competitive positioning. These criteria respond most directly to the additional analysis requested by PWIC to articulate how the alternatives affect the City's economic competitiveness.
2. **Local Economic Impacts.** These criteria identify how the alternatives would impact the Study Area in terms of the potential to create jobs and the marketability of those lands.
3. **Fiscal Net Benefits.** These criteria account for how the alternatives would impact the City's fiscal position by updating HR&A's prior cost-benefit analysis to reflect the latest alternatives and to reflect adjustments in the area.

The full details of this study are included in the Economic Competitiveness Study Report that is included in **Appendix Q** to this report. The economic assessment results of the two alternatives are summarized below and also presented in **Table 4-9**, which presents the assessment results of the alternatives for all the criteria groups.



Table 4-7: Economic Competitiveness Evaluation Inputs

Category	Description	Conclusion
<b>Regional Economics</b>	Impact of alternatives on Toronto's global competitiveness.	The alternatives are unlikely to affect global competitiveness, which is driven by a range of factors, the vast majority of which are unrelated to the alternatives. The alternatives are equally preferred.
	Impact of alternatives on the marketability and competitiveness of Downtown to business.	Remove entails 2-3 minutes higher travel times in AM peak hour and entails a longer construction period which could impact business decisions to locate Downtown. The Hybrid alternative is preferred.
<b>Local Economics</b>	Potential for job creation in the areas adjacent to the alternative alignments, and impact to the marketability of the areas to development.	Both alternatives support the potential for job creation, but the Remove alternative makes more land directly available for development and job creation. The Remove alternative makes available parcels west of Cherry Street; and both alternatives make land available between Cherry Street and the Don River. Both alternatives improve the marketability of the local area, the Remove by enhancing public realm and visibility, and the Hybrid by maintaining convenient and direct highway access. The Remove alternative is preferred.
<b>Fiscal Net Benefits</b>	Potential revenues from the sale of public land and projected lifecycle costs of the alternatives.	The Remove entails lower lifecycle costs and results in more land revenues than the Hybrid alternative. The Remove alternative is preferred.

#### 4.4.5 Evaluation of Boulevard and Hybrid Alternatives

The following presents the alternatives evaluation approach and the results of the Boulevard vs. Remove evaluation.

##### 4.4.5.1 Evaluation Criteria and Approach

The assessment and evaluation of the optimized Remove (Boulevard) and Hybrid alternatives was based on a set of evaluation criteria and measures. The draft criteria were previously presented to the Stakeholder Advisory Committee (SAC) and the public in October 2013 in conjunction with the draft alternative solutions.

Some minor revisions were made to the criteria/measures that were used in the original alternatives evaluation (see **Section 4.2**). Criteria revisions were made to better clarify what was measured and to accommodate the new information collected through the Goods Movement and Economic Competitiveness studies that were completed (see **Table 4-8** below – criteria/measure changes are indicated in italicized font). There were also a few criteria considered in the previous alternative solutions evaluation that were not considered in this evaluation as they were considered not applicable or found not to be helpful in distinguishing among these two alternatives.

**Table 4-8: Evaluation Criteria Groups and Criteria (Updated)**

*(italicized font indicate revisions to the criteria)*

Study Lens/Criteria Group	Criteria	Definition
<b>TRANSPORTATION &amp; INFRASTRUCTURE</b>		
Automobiles	Commuter Travel Time (Average travel time for AM peak hour)	Average in-bound peak hour travel time using EMME and PARAMICS model outputs between selected Origin-Destination (OD) pairs.
	Impact on Average Auto Travel Time (peak AM hour) within Transportation Study Area	Change in average peak hour travel times (all directions) in PARAMICS model for local traffic trips within Spadina Avenue and Woodbine Avenue south of Dundas Street.

Study Lens/Criteria Group	Criteria	Definition
	Road Network/ Flexibility Choice	Number of available road network connections that provide drivers with the ability to accommodate planned future transit service.
Transit	Transit Impact	Change in average travel times in PARAMICS model for street cars on Dundas Street, Queen Street and King Street and impact on subway service. Ability to accommodate planned future transit service.
Pedestrians	North-South Sidewalks	Extent, quality and condition of pedestrian connections crossing Lake Shore Boulevard. Walking distance across Lake Shore Boulevard at major north-south streets (e.g., Jarvis Street).
	East-West Sidewalks	Extent, quantity and condition of pedestrian connections along Lake Shore Boulevard.
Cycling	East-West Movement	Extent and quantity of east-west cycling facilities and opportunities to connect with existing and planned north-south cycling facilities.
Movement of Goods	<i>Travel Time</i>	<i>Potential for changes in travel times for the movement of goods. Considers the modelled peak hour travel time results.</i>
	<i>Reliability</i>	<i>Additional time expected to be required to ensure that the goods arrive on the scheduled time (buffer index). The importance of reliability depends on the types of goods being delivered.</i>

Study Lens/Criteria Group	Criteria	Definition
	<i>Transport and Shipper Cost</i>	<i>Transportation costs can be impacted by a number of factors including mode of transport choice, service standards required, regulations, etc. Increase in travel time increases costs to carriers and transporters (increased fuel consumption, driver time, need for more trucks on the road).</i>
Safety	<i>Pedestrians conflict points</i>	<i>Traffic exposure risk for pedestrians at intersections and crossing Lake Shore Boulevard considering width/distance of roadway to cross, intersection configuration and sight lines.</i>
	<i>Cyclist conflict points</i>	<i>Extent to which cyclists are exposed to free flowing/uncontrolled auto traffic flow. This includes free flowing access ramps to and from the Gardiner Expressway where automobile traffic has the right of way.</i>
	<i>Motorists conflict points</i>	<i>Extent to which there are road safety concerns for motorists. Includes poor sight lines and intersection configuration.</i>
	Safety Risk for Motorists on the Gardiner East	Extent of expressway road geometry that poses safety risk for drivers, particularly lack of shoulders.
Constructability	Duration	Number of years required to complete construction, with an emphasis on the number of years that will result in traffic impacts.

Study Lens/Criteria Group	Criteria	Definition
	Transportation Management	Extent of pedestrian and cycling facilities to be affected during construction. Level of traffic disruption during construction and potential for disruption to other roadways from traffic diversion.
	Construction Impact on Private Property	Extent of private property to be used during construction and potential access to private properties (e.g., driveways) to be impacted.
<b>URBAN DESIGN</b>		
Planning Public Realm	Consistency with Official Plans	Extent to which the principles and recommendations of the Central Waterfront Secondary Plan are accommodated and supported.
	Consistency with Precinct Plans and other initiatives	Extent to which the goals, objectives and recommendations of the East Bayfront and Keating Channel Precinct Plans are accommodated and supported as well the Don Mouth Naturalization Project EA and the Port Lands and South of Eastern TSMP EA Study.
	Streetscape	Quality and consistency of a cohesive street design and character along Lake Shore Boulevard. Considers the balance between hardscape (e.g., paved road surface) and softscape (e.g., landscape, open space, etc.).

Study Lens/Criteria Group	Criteria	Definition
	View Corridors	Visual sight lines within and across the corridor to destinations and landmarks in and surrounding the Study Area (e.g., views of the water and downtown skyline).
	Amount of Public Realm	Public space that is created for passive and active recreation and leisure, including parks, plazas, streetscapes, etc.
	New Park Land	Surplus right-of-way that could be dedicated as City of Toronto park land that would be usable and programmable above existing baseline.
	Rail Corridor and Berm	Opportunity to minimize the visual and noise impacts of the rail corridor for pedestrians on Lake Shore Boulevard.
Built Form	Street Frontage	Relationship between development and Lake Shore Boulevard at the pedestrian scale. This includes the active at-grade uses in buildings fronting onto Lake Shore Boulevard that may contribute to street character and vibrancy. Also includes the average number of podium floors with obstructed views and limited access to light and air that may limit programming/leasing those floors.
<b>ENVIRONMENT</b>		
Social & Health	Air Quality	Air quality conditions at the local and regional level, including changes in NOx, VOCs, PM2.5, as well as the level of greenhouse gas emissions.

Study Lens/Criteria Group	Criteria	Definition
	Noise	Noise levels at various receptors locations in the Study Area.
Natural Environment	Terrestrial Environment	Conditions for land based natural habitat, species and features.
	Aquatic Environment	Conditions for aquatic based habitat, species and features.
	Storm Water Quality	On-site capability to treat stormwater and manage the conditions/quality of water run-off.
	Storm Water Quantity	Amount of stormwater run-off potentially generated.
	Microclimate/Heat Island Effect	Local atmospheric conditions related to sunlight, temperature and amount of trees that could grow in the corridor.
Cultural Resources	Built Heritage	Potential for impact on historic physical architecture and cultural property that is inherited and maintained within the corridor.
	Cultural Landscape	Potential for impact on the existence of a built or natural landscape that is valued by people for its religious, artistic or cultural associations within the corridor.
	Archaeology	Potential for impact on known buried resources or artefacts within the corridor.
	First Nations People and Activities	Potential for impact on the use of the Study Area by First Nations for traditional purposes.

Study Lens/Criteria Group	Criteria	Definition
<b>ECONOMICS</b>		
Global and Regional Economics	<i>Toronto's Global Competitiveness</i>	<i>Influence on change in the global attractiveness of the City of Toronto.</i>
	<i>Regional Labour Force Access</i>	<i>Potential for change in level of access to/from the downtown core.</i>
	<i>Mobility within Downtown</i>	<i>Potential for change in worker mobility in the downtown core/CBD.</i>
	<i>Entertainment Venues</i>	<i>Potential for change in access to major entertainment venues in the downtown (e.g., ACC, Rogers Centre, etc.) and change in their ability to draw visitors.</i>
Local Economics	Business Activity	Number of jobs created in the Study Area.
Direct Cost & Benefit	Capital Cost & Funding	Capital cost to construct the alternatives in 2013\$, including the cost to acquire private property (if required). The funding is currently available in the City budget for rehabilitation.
	Lifecycle Cost	Net present value of construction cost and 100-year operations and maintenance costs of the alternative.
	Land Value Creation	Amount of money that could be generated through the creation and sale of new land for the City.



#### 4.4.5.2 Effects Assessment and Evaluation Approach

Data for each of the alternatives was collected on the basis of the evaluation criteria as presented in **Table 4-8** above and in **Table 4-9** presented further below. To compare the advantages and disadvantages of the alternatives, both construction effects and long-term operations effects were identified and assessed based on the criteria and measures.

Considering this data, alternative preference rankings were then determined for each measure and these rankings were then considered to generate alternative preference rankings by criteria group. It is not unusual in EA studies to not have an alternative that is preferred for all the evaluation criteria. As such, when comparing among alternatives, there are often trade-offs that need to be made to select the technically preferred alternative. As both quantitative and qualitative data was collected, the evaluation of the two alternatives was undertaken using a "reasoned argument" approach. The reasoned argument approach involves the use of data as well as the consideration of public, stakeholder and agency input to identify reasoned judgements to support a preference or decision.

#### 4.4.5.3 Consideration of Public Input

Consultation activities associated with the development and evaluation of the optimized Remove (Boulevard) and Hybrid alternatives were focused on the engagement of the SAC, the holding of two public meetings (April 15<sup>th</sup> and 20<sup>th</sup>, 2015) with a live web cast of the April 15 event, the release of the presentation package on the project web site, and an open comment period following the public meetings. Including web site visits, close to 8,500 people were in some way engaged in consultation activities in this fourth round. The details of the consultation activities are documented in **Appendix B, Record of Consultation**. The key questions asked at the consultation events were:

- Public Works and Infrastructure Committee and Toronto City Council will soon consider what to do with the Gardiner East. Thinking about the results of the additional work and updated evaluation:
  - What are the most important considerations in making this decision?
  - What other advice do you have on making a decision that involves finding a balance among diverse priorities?
  - Other comments?

A summary of key public commentary on the alternatives is presented below:

### Remove (Boulevard) Alternative

Participants who indicated support for the Remove (Boulevard) alternative typically provided the following reasons:

- Contributes to broader city building goals;
- Improves the public realm for a variety of users;
- Presents the most cost-effective solution;
- Improves urban design in the Study Area;
- Reconnects the City to the waterfront;
- Frees land for future development;
- Integrates transit and active forms of transportation;
- Replaces out-dated infrastructure;
- Increases traffic time marginally.

### Hybrid Alternative

Participants who indicated support for the Hybrid alternative generally provided the following reasons:

- Does not decrease road capacity;
- Does not significantly increase travel time or add to congestion;
- Maintains a continuous expressway connection between the east and west ends of the City and into the downtown core;
- Supports the movement of goods and the transportation needs of local businesses;
- Enhances safety better than the Remove (Boulevard) alternative.

Concerns about projected increases in travel times, safety, impacts from construction, assumptions about public transit and the potential for future development were expressed by participants about both alternatives.

#### 4.4.5.4 Comparative Evaluation of Alternatives











The following provides a description of the differences between the two alternatives within each of the four evaluation lenses. Data for all the criteria groups are available in **Table 4-9**. The process to generate the data and the interpretation of the data is similar to that previously outlined in **Section 4.2**.

Table 4-9: Remove (Boulevard) and Hybrid Evaluation Matrix

















Final PDF to have high res version of table inserted to larger scale.

Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid		
A. Transportation & Infrastructure	A.1 Automobiles	<p><b>A.1.1 Commuter Travel Time</b> (Modeled average travel time for AM Peak Hour) Note: Transportation demand based on regional projections for growth expected by 2031 in addition to full build-out of East Bayfront, Keating, Port Lands expected to occur over a 40-50 year timeline.</p> <p><b>A.1.2 Impact on Average Auto Travel Time (AM peak hr.) Within Downtown/ Transportation Study Area</b></p> <p><b>A.1.3 Road Network Flexibility/ Choice</b></p>	Average travel times between representative Origins and Destinations	<p> <b>Less Preferred</b> - Generates higher peak hour modeled auto travel times.</p> <p>Don Mills to CBD - Don Mills/ Eglinton to Front/ Bay [B-D] 33 minutes</p> <p>Scarborough to CBD - Victoria Park/ Kingston to Front/ Bay [C-D] 28 minutes</p> <p>Etobicoke to CBD - Kipling/Lake Shore to Front/Bay [E-D] 49 minutes</p> <p>North York to CBD - Victoria Park/ Finch to Front/ Bay [A-D] 55 minutes</p>	<p> <b>Preferred</b> - Generates lower peak hour modeled auto travel times.</p> <p>30 minutes</p> <p>26 minutes</p> <p>46 minutes</p> <p>52 minutes</p>		
			Auto travel time sensitivity to future transit scenarios	<b>Equally Preferred</b> - Similar increases in travel times without planned transit projects.	<b>Equally Preferred</b> - Similar increases in travel times without planned transit projects.		
			Total Volume Assigned (reflects available road capacity)	<b>Equally Preferred</b> - 70,500 vph	<b>Equally Preferred</b> - 70,500 vph		
			Percentage of vehicles experiencing increases in travel time over the future Base Case/Maintain.	<p> <b>Less Preferred</b> - More vehicles per hour impacted for more than 2 minutes</p> <p>&lt;2 min 75% (46,000 vph)</p> <p>&gt;2 min 25% (17,000 vph)</p>	<p> <b>Preferred</b> - Less vehicles per hour impacted for more than 2 minutes</p> <p>90% (64,500 vph)</p> <p>10% (7,000 vph)</p>		
			Trip Reduction/Diversion	<b>Equally Preferred</b> - Approx. 15%	<b>Equally Preferred</b> - Approx. 15%		
			Overall impact on auto travel in Downtown	<b>Less Preferred</b> - Generates the higher modeled peak hour auto travel times.	<b>Preferred</b> - Generates lower modeled peak hour auto travel times.		
			Turning prohibitions at key intersections	<p> <b>Equally Preferred</b> - Both options are significantly better than existing.</p> <p>Cherry Street: 2 prohibitions (SB left &amp; NB right prohibited)</p>	<p> <b>Equally Preferred</b> - Both options are significantly better than existing.</p> <p>Jarvis Street: 1 prohibition (WB left prohibited)</p>		
			<b>Automobiles Summary Ranking</b>			<b>Less Preferred</b>	<b>Preferred</b>
			A.2 Transit	A.2.1 Transit Impact	Impact on surface transit service	<b>Less Preferred</b> - Minor travel time impacts on surface transit when compared to the base case	<b>Preferred</b> - Essentially same as the base case
					Impact on subway service	<b>Equally Preferred</b> - No impact to subway transit	<b>Equally Preferred</b> - No impact to subway transit
Ability to accommodate planned transit service	<b>Equally Preferred</b> - Accommodates same planned transit projects and provides similar flexibility in transit planning east of the Don River (e.g. Broadview Extension).	<b>Equally Preferred</b> - Accommodates same planned transit projects and provides similar flexibility in transit planning east of the Don River (e.g. Broadview Extension).					
<b>Transit Summary Ranking</b>					<b>Equally Preferred</b>	<b>Equally Preferred</b>	

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
	A.3 Pedestrians	A 3.1 North-South Sidewalks	Ability to physically implement City standard north-south sidewalks for use by the local community and travelers.	<p> <b>Preferred</b> – Reconstruction of the corridor allows for sidewalks to be built to City standards for all intersections along the entire length of Lake Shore Boulevard.</p> <p> <b>Preferred</b> – Reconstruction of the corridor allows for city standard crosswalks to be built on both the east and west side of the street .</p>	<p> <b>Less Preferred</b> – Improvements not possible at all north-south crossings.</p> <p> <b>Less Preferred</b> – Improvements and standardization possible at some intersections. However, existing constraints do not allow standardization of crosswalks on both the east and west side of the street for all intersections.</p>
			<p><u>North-South Crosswalk Locations at Lake Shore Blvd.</u></p> <p>Jarvis Street                      Sherbourne Street                      Parliament Street                      Cherry Street                      Don Roadway                      Broadview Avenue                      Bouchette Street                      Logan Avenue                      Carlaw Avenue</p>	<p>East and West                      East and West                      East and West                      East and West                      East                      East and West                      East and West                      East and West                      East and West</p>	<p>East and West (non-standardized)                      East and West (non-standardized)                      East and West                      East and West                      East                      East and West                      East and West                      East and West                      East and West</p>
			<p>North-south crosswalk crossing distance at Lake Shore Boulevard (W = westside crossing, E = eastside crossing)</p> <p>Jarvis Street                      Lower Sherbourne Street                      Parliament Street                      Cherry Street                      Don Road                      Broadview Avenue/ Saulters Street                      Bouchette Street                      Logan Avenue                      Carlaw Avenue</p>	<p> <b>Preferred</b> - crossing distance ranges from 25 - 39 metres</p> <p>37.7m W, 37.4m E                      37.5m W and E                      38.5m W, 38.9m E                      39m W, 36.2m E                      Not available W, 29.6m E                      25.8m W and E                      25.8m W and E                      26.9m W, 27.8m E                      28.8m W, 31.3m E</p>	<p> <b>Less Preferred</b> - crossing distance ranges from 25 - 55 metres.</p> <p>44.6m W, 44.6m E                      46.9.8m W, 55.1m E                      37.05m W, 31.5m E                      38.1m W, 33.7m E                      Not available W, 29.6m E                      25.8m W and E                      25.8m W and E                      26.9m W, 27.8m E                      29.9m W, 31.3m E</p>
		A 3.2 East-West Sidewalks	Ability to physically implement City standard east-west sidewalks as measured by length along the corridor for use by the local community and travelers (Yonge to Logan).	<p> <b>Preferred</b> - Reconstruction of the corridor allows for sidewalks to be built to City standards along the entire length of Lake Shore Boulevard for use on the north and south sides of Lake Shore Boulevard. 5,600 total linear metres of city-standard sidewalk.</p>	<p> <b>Less Preferred</b> – Sidewalks on the north side of Lake Shore Boulevard are not possible between Yonge and Parliament St due to physical limitations of on/off ramps. 2,700 total linear metres of city-standard sidewalk.</p>
<b>Pedestrians Summary Ranking</b>				 <b>Preferred</b>	 <b>Less Preferred</b>

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
	A.4 Cycling	A 4.1 East-West Movement	Length of facility	 <b>Equally Preferred</b> – Total length of cycling facility is 4,200 m in length between Leslie Street to Yonge Street.	 <b>Equally Preferred</b> – Total length of cycling facility is 4,200 m in length between Leslie Street to Yonge Street. While it is assumed that the cycling facility can be extended west of Jarvis in the Hybrid, this is being confirmed through a separate study by the City.
			Connectivity with other planned and existing bikeway facilities <u>Existing cycling facilities</u> <ul style="list-style-type: none"> <li>- Yonge Street</li> <li>- Sherbourne Street</li> <li>- Martin Goodman Trail (east of Parliament)</li> </ul> <u>Planned cycling facilities</u> <ul style="list-style-type: none"> <li>- Trinity Street</li> <li>- Cherry Street</li> </ul>	 <b>Equally Preferred</b> – New facility can connect with all existing and planned facilities.	 <b>Equally Preferred</b> – New facility can connect with all existing and planned facilities. While it is assumed in the Hybrid that the cycling facility can be extended west of Jarvis, this is being confirmed through a separate study.
	<b>Cycling Summary Ranking</b>			 <b>Equally Preferred</b>	 <b>Equally Preferred</b>
	A.5 Movement of Goods	A 5.1 Travel Time	Modelled Average Travel Time (impact to Truck Movements)	 <b>Less Preferred</b> – Vehicle travels times expected to be 2-3 minutes greater than the Hybrid for the AM peak hour period which has potential for delay to truck traffic during peak period travel.	 <b>Preferred</b> – Vehicle travels times expected to be 2-3 minutes less than the Remove for the AM peak hour period which has potential for delay to truck traffic during peak period travel.
			Impact of Construction	<b>See Construction Impact</b>	<b>See Construction Impact</b>
		A 5.2 Reliability	Change in overall travel speeds in corridor due to incident	 <b>Equally Preferred:</b> Reduction of 2 km/hr. for incident modelled on LSB (between Jarvis and Sherbourne).	 <b>Equally Preferred:</b> Reduction of 0.5 km/hr. for incident on LSB and reduction of 4.5 km/hr. for modelled incident on the Gardiner (between Jarvis and Sherbourne).
			Change in traffic volumes through corridor due to incident	 <b>Equally Preferred:</b> Reduced volume of 1,685 vehicles for modelled incident on LSB.	 <b>Equally Preferred:</b> Reduced volume of 368 vehicles for modelled incident on LSB and 2,211 vehicles for an incident on the Gardiner.
		A 5.3 Transport & Shipper Cost	Transport & Shipper Cost	 <b>Less Preferred:</b> Longer vehicle travel times may result in higher transport and shipper costs than the Hybrid.	 <b>Preferred:</b> Shorter vehicle travel times may result in lower transport and shipper costs than the Remove.
	<b>Movement of Goods Summary Ranking</b>			 <b>Less Preferred</b>	 <b>Preferred</b>

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid	
A.6 Safety	A 6.1 Pedestrian Conflict Points	Risk Exposure for pedestrians at intersections: - road crossing length - presence of free turns - presence of poor sight lines		<b>Preferred</b> – Shorter crossing length, normalized intersections and removal of Gardiner columns that improves sight lines.  Greater volume of traffic will be on an at-grade street, design speed will be lower and road can be designed to accommodate expected volume to meet safety standards.	<b>Less Preferred</b> – Longer crossing lengths, greater number of free turns and poor sight line conditions remain.	
			A 6.2 Cyclist Conflict Points	Potential for conflict points (e.g. crossing of free flow turns/ ramps)	<b>Preferred</b> – Eliminates all free flow right turns and removal of Gardiner columns improves sight lines.	<b>Less Preferred</b> – Number of free turns is expected to be reduced compare to Base Case, however sight line issues still exist at certain intersections.
			A 6.3 Motorist Conflict Points	Potential conflict points/safety concerns at Lake Shore Blvd. intersections <u>Existing</u> Lake Shore Blvd./Jarvis – short merge for E/B on-ramp Lake Shore Blvd./Jarvis – short diverge for W/B on-ramp Lake Shore Blvd./Jarvis – poor sightlines for Gardiner Expressway W/B on-ramp Lake Shore Blvd./Sherbourne – poor sightlines for S/B RT Lake Shore Blvd./ Don Roadway – speed differential for merge between E/B and N/B RT Lake Shore Blvd./ Don Roadway – unexpected conflict between S/B and Martin Goodman Trail	<b>Preferred</b> – Eliminates existing road safety concerns at Jarvis Street, Sherbourne Street, and the Don Roadway.	<b>Less Preferred</b> – A number of intersections and road segments along Lake Shore Blvd. have been identified on the City's top 20% list of roadways in need of improvement based on collisions from 2007 to 2011. The existing Gardiner columns result in poor sight line conditions that potentially contribute to higher rates of incidents on this roadway. Hybrid maintains these columns.
			A 6.4 Safety Risk for Motorists on Gardiner Expressway	Gardiner expressway geometry	<b>Not Applicable</b>	<b>Less Preferred</b> – Gardiner Expressway shoulders not to standard
			<b>Safety Summary Ranking</b>			
A.7 Construction Impact	A 7.1 Duration	Length of construction period  Note: Opportunity to reduce construction periods can be studied, the feasibility and costs of which need to be assessed during the Alternative Design phase of the Environmental Assessment.	<b>Less Preferred</b> – It is expected that a 5 to 6 year construction period will be required. Approximately 3 years of direct impact on expressway lanes. 1.5 years per direction. Rolling Lake Shore Blvd. lane closures will be required. Removal of the Expressway and the rebuild of LSB will at times require the temporary detouring of traffic away from the corridor (one direction at a time). The period requiring detour roads is greater than for Hybrid.	<b>Preferred</b> – This alternative includes the City's program to re-deck this section of Gardiner resulting in approximately 6 years of direct impact on expressway lanes. Rolling Lake Shore Blvd. lane closures are also expected for deck replacement. Given reduction of capacity, traffic delay is anticipated throughout this period. It is expected that the new on/off ramps in Keating area can be built while maintaining traffic flow. Removal of the Logan ramps will require the temporary detouring of EB and WB traffic away from LSB. The length of period requiring detour roads is much less than for Remove.		

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
		<b>A 7.2 Transportation Management</b>	Potential impact to pedestrian/ cycling infrastructure during construction	<b>Equally Preferred</b> – It is assumed that all pedestrian/cycling infrastructure can be largely maintained during construction.	<b>Equally Preferred</b> – It is assumed that all pedestrian/cycling infrastructure can be largely maintained during construction.
			Capacity to accommodate traffic flows through corridor during construction	<b>Less Preferred</b> – Will be periods that the corridor is not available for traffic and will require the use of detour roads based on the proposed staging scheme. It is expected that detouring of traffic may be required for up to 3-4 years. East of Don River both options will require diversion when Logan ramps are removed.	<b>Preferred</b> – It is expected that traffic flows can largely be accommodated through corridor during construction. East of Don River both options will require traffic diversion when Logan ramps are removed.
			Potential off-site traffic disruption during construction	<b>Less Preferred</b> – Off-site disruption is expected to be greater than Hybrid as greater amount of traffic diversion to other roadways is expected to be required.	<b>Preferred</b> – Off-site disruption is expected to be less than Remove as less amount of traffic diversion to other roadways is expected to be required.
		<b>A 7.3 Private Property</b>	Potential need for private property for construction staging/ detours	<b>Less Preferred</b> – Potential private property needs during construction. To be confirmed subject to the development of more detailed design.	<b>Preferred</b> – None expected
			Potential property/ access disruption during construction	<b>Less Preferred</b> – Greater potential to impact private property, depending on final road detour plan.	<b>Preferred</b> – None expected
		<b>Construction Impact Summary Ranking</b>		<b>Less Preferred</b>	<b>Preferred</b>
<b>OVERALL RATING: TRANSPORTATION &amp; INFRASTRUCTURE</b>				<b>LESS PREFERRED</b>	<b>PREFERRED</b>
<b>B. Urban Design</b>	<b>B.1 Planning</b>	<b>B 1.1 Consistency with Official Plans</b>	Consistency with approved Central Waterfront Secondary Plan principles: 1) Removing Barriers; 2) Building a Network of Spectacular Waterfront Parks and Public Spaces; 3) Promoting a Clean and Green Environment; and 4) Creating Dynamic and Diverse New Communities to support residential and employment growth along the Gardiner/ Lake Shore Blvd corridor.	<b>Preferred</b> – Fully achieves the Central Waterfront Secondary Plan principles improving north-south crossings, implementation of continuous trail, adding park space, creating a tree-lined urban boulevard, creating right-of-way infrastructure to support transportation, community and neighbourhood objectives.	<b>Less Preferred</b> – Minimally achieves the Central Waterfront Secondary Plan principles given existing physical constraints and opportunities for improvements.
		<b>B 1.2 Consistency with Precinct Plans and Other Initiatives</b>	Consistency with approved East Bayfront, Keating, Port Lands, Don Mouth Naturalization, South of Eastern and other plans and land use goals which define standards for high quality and high value urban development.	<b>Preferred</b> – Fully realizes all approved Precinct Plans.	<b>Less Preferred</b> – There are negative effects on the Keating Precinct Plan due to the new ramps and new access road between Cherry and Lake Shore Blvd.
		<b>Planning Summary Ranking</b>		<b>Preferred</b>	<b>Less Preferred</b>















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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
	<b>B.2 Public Realm</b>	<b>B 2.1 Streetscape</b>	Quality of place along Lake Shore Boulevard	<p> <b>Preferred</b> - Urban boulevard design, familiar road geometries, human-scale fixtures, standard city finishes, full sun exposure, no noise amplification, unobstructed views and clear sight lines to destinations create a comfortable and easily navigable environment</p>	<p> <b>Less Preferred</b> - Minimal improvements to intersections with free turns, irregular road geometries, scale of fixtures, and quality of finishes create an only slightly less unattractive and disorienting environment than at present. Removal of Logan on/off ramp east of the Don River allows for the creation of a new 6-lane Lake Shore Blvd. with the same benefits of the Remove option for this segment.</p>
			Consistent and cohesive character from east to west on Lake Shore Boulevard	<p> <b>Preferred</b> - Consistent conditions and only minor variations in width enable a consistent character to be achieved along the length of the corridor</p>	<p> <b>Less Preferred</b> - Varying conditions and widths across the length of the corridor make cohesive character impossible to achieve. Creation of a new Lake Shore Blvd. east of the Don River improves part of the corridor but not its entire length.</p>
			Ratio of hardscape to softscape surfaces in the corridor	<p> <b>Preferred</b> - 83% hardscape, 17% softscape</p>	<p> <b>Less Preferred</b> - 88% hardscape, 12% softscape</p>
		<b>B 2.2 View Corridors</b>	Quality of north-south visual connections between downtown and the waterfront	<p> <b>Preferred</b> - Removes all visual barriers</p>	<p> <b>Less Preferred</b> - No opportunity to mitigate the visual barrier of the Gardiner columns and elevated deck except at Don River.</p>
			Quality of east-west visual connections between the east end and the financial core on Lake Shore Boulevard	<p> <b>Preferred</b> - Fully opens up all the skyline views from Lake Shore Blvd.</p>	<p> <b>Less Preferred</b> - No opportunity for skyline views from Lake Shore Blvd. Gardiner structure remains except at Don River.</p>
		<b>B 2.3 Amount of Public Realm</b>	Usable public realm area in the Lake Shore Blvd corridor, including pedestrian areas, patios, passive recreation, multi-use trails and streetscaping. (Yonge to Logan).	<p> <b>Preferred</b> - Reconstruction of the corridor allows for most public realm area to be created. Approximately 18 acres.</p>	<p> <b>Less Preferred</b> - New public realm space limited to east of Don River along Lake Shore Boulevard. Approximately 14 acres.</p>
		<b>B 2.4 New Park Land</b>	Surplus right-of-way that could be dedicated as City of Toronto park land that would be usable and programmable above existing baseline.	<p> <b>Equally Preferred</b> - There is not a meaningful difference of parkland creation between the two options in the Keating Precinct within the current Gardiner right-of-way.</p>	<p> <b>Equally Preferred</b> - There is not a meaningful difference of parkland creation between the two options in the Keating Precinct within the current Gardiner right-of-way.</p>
		<b>B 2.5 Rail Corridor and Berm</b>	Length of the CN rail corridor exposed to the public sidewalk and open space along Lake Shore Boulevard	<p> <b>Preferred</b> - Proposed north side buildings provide a buffer to LSB (330 metres buffer Jarvis to east of Sherbourne).</p>	<p> <b>Less Preferred</b> - No additional buffering of rail corridor from Lake Shore Blvd.</p>
<b>Public Realm Summary Ranking</b>				<p> <b>Preferred</b></p>	<p> <b>Less Preferred</b></p>

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
	<b>B.3 Built Form</b>	<b>B 3.1 Street Frontage</b>	<p>Length of leasable, active, at-grade space supported by the design of the corridor on Lakeshore Boulevard (North &amp; South frontage)</p> <p>Number of podium floors with obstructed views, limited access to light and air and expressway impacts due to proximity of elevated structure</p>	<p> <b>Preferred</b> – Removal of elevated structure will allow for entire corridor to be developed for retail and active uses. Total 3,812 linear metres of frontage (approximately 80% of corridor length).</p> <p> <b>Preferred</b> - Removal of Gardiner would result in no obstructed views to podiums floors and allows access to light and air.</p>	<p> <b>Less Preferred</b> – Presence of elevated structure along most of the corridor will limit retail and active uses. Total 896 linear metres of frontage (approximately 15% of corridor length).</p> <p> <b>Less Preferred</b> - Existing Gardiner height of approximately 10 metres (west of Cherry) and 15 metres (east of Cherry) will negatively impact the lower 4–7 building storeys. Removal of the elevated Logan on/ off ramp resulting in an improved Lake Shore Blvd. east of the Don River.</p>
<b>Built Form Summary Ranking</b>				<b>Preferred</b>	<b>Less Preferred</b>
<b>OVERALL RATING: URBAN DESIGN</b>				<b>PREFERRED</b>	<b>LESS PREFERRED</b>
<b>C. Environment</b>	<b>C.1 Social &amp; Health</b>	<b>C 1.1 Air Quality</b>	<p>Extent of change in regional air quality (NOx, VOC, &amp; PM2.5)</p> <p>Extent of change in local air quality (NOx, VOC, &amp; PM2.5)</p> <p>Level of Greenhouse Gas Emissions</p>	<p> <b>Equally Preferred</b> – Modeling results indicate similar regional emissions relative to the Hybrid. Regional burden of 0.0038%.</p> <p> <b>Preferred</b> – Previous modeling results indicate that a lower concentration of local emissions (NOx) would exist due to lower volumes of vehicles in the corridor.</p> <p> <b>Preferred</b> – Modeling results indicate similar levels in GHG emissions. Regional burden of 0.28%</p>	<p> <b>Equally Preferred</b> – Modeling results indicate similar regional emissions relative to the Remove. Regional burden of about 0.0037%.</p> <p> <b>Less Preferred</b> - Based on previous modeling results, a higher concentration of local emissions (NOx) is expected for the Hybrid due to higher volumes of vehicles in the corridor.</p> <p> <b>Less Preferred</b> – Modeling results indicate similar levels in GHG emissions. Regional burden of 0.31%.</p>
		<b>C 1.2 Noise</b>	<p>Extent of change in noise levels Note: noticeable differences in the predicted noise levels are mainly for the receptors in close proximity to the Gardiner Expressway/Lake Shore Blvd. corridor.</p>	<p> <b>Equally Preferred</b> – Alternative is expected to have slightly lower noise levels in the Gardiner corridor as a result of lower volume of traffic in corridor but there is potential for increased noise levels on other City streets due to traffic diversion on other streets. While the relative increase in noise is higher in the corridor, most of the receptors potentially affected are future receptors and would relocate to the corridor with knowledge of the roadway/traffic conditions.</p>	<p> <b>Equally Preferred</b> – Alternative is expected to have higher noise levels in the Gardiner corridor but lower noise levels on other City streets as traffic diversion is less. The greatest change is expected to be along the corridor. Changes on other City streets are expected to be minor to moderate.</p>
<b>Social &amp; Health Summary Ranking</b>				<b>Preferred</b>	<b>Less Preferred</b>













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	<b>C.2 Natural Environment</b>	<b>C.2.1 Terrestrial Environment</b>	Potential to create new terrestrial/ habitat/ natural features	 <b>Equally Preferred</b> – Neither alternative has potential for creation of meaningful new terrestrial habitat.	 <b>Equally Preferred</b> – Neither alternative has potential for creation of meaningful new terrestrial habitat.
		<b>C.2.2 Aquatic Environment</b>	Potential to create new aquatic habitat	 <b>Preferred</b> - Relocation of all road infrastructure along the Keating Channel will allow for improved runoff control into the Keating Channel. This may provide for some improvement of aquatic habitat in the Keating Channel.  Both solutions facilitate the Don Mouth Naturalization Project.	 <b>Less Preferred</b> - Although relocation of Lake Shore Blvd. through Keating Precinct will allow for improved runoff control into the Keating Channel, the Hybrid maintains the existing Gardiner and introduces on/off ramps and the approach road near the Keating Channel which could affect the potential to improve aquatic habitat through increased road run-off. Both solutions facilitate the Don Mouth Naturalization Project.
		<b>C.2.3 Storm Water Quality</b>	Ability to treat stormwater on-site/at source	 <b>Preferred</b> – redesigning the entire roadway at grade allows for the potential to integrate stormwater management and water quality features that are not available unless the road is reconstructed.	 <b>Less Preferred</b> – The new Lake Shore Blvd. alignment in Keating Precinct could be designed to improve treatment of stormwater and water quality. East of Don River redesign of LSB has potential to integrate stormwater management and water quality features that are not available unless road is reconstructed.
		<b>C.2.4 Storm Water Quantity</b>	Area of paved surface (higher number equates to more surface water run-off)	 <b>Preferred</b> – 84,575 sq. m. of paved surface.	 <b>Less Preferred</b> – 125,074 sq. m. of paved surface.
		<b>C.2.5 Microclimate/Heat Island Effect</b>	Access to natural sunlight in the corridor and tree canopy coverage (which can encourage active transportation, reduce urban heat island effect, improve air quality, increase evapotranspiration)	 <b>Preferred</b> – With no elevated structure through the corridor there is full access to sunlight and opportunities for tree planting are greatly increased due to increased sunlight which will result in the greatest tree canopy. (1,237 new trees estimated providing 52% coverage in corridor).	 <b>Less Preferred</b> – Elevated structure west of Don River remains. Removal of Logan ramps east of Don River provides full access to sunlight through this section. Some improved opportunity for new trees west of Cherry Street and east of Cherry along new Lake Shore Blvd. alignment and east of Don River due to Logan ramp removal. (326 new trees estimated – 12% coverage in corridor)
<b>Natural Environment Summary Ranking</b>				 <b>Preferred</b>	 <b>Less Preferred</b>

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
	<b>C.3 Cultural Resources</b>				
		<b>C 3.1 Built Heritage</b>	Direct impact on built heritage features	<b>Equally Preferred:</b> Based on available documentation, no built heritage features within existing or proposed right-of-way.	<b>Equally Preferred:</b> Based on available documentation, no built heritage features within existing or proposed right-of-way.
		<b>C 3.2 Cultural Landscape</b>	Direct impact on cultural landscapes	<b>Equally Preferred:</b> Based on available documentation, no cultural landscapes within or adjacent to the existing or proposed right-of-way.	<b>Equally Preferred:</b> Based on available documentation, no cultural landscapes within or adjacent to the existing or proposed right-of-way.
		<b>C 3.3 Archaeology</b>	Potential for impact on archaeological resources <i>Note all alternatives result in impact from New Lake Shore Blvd. alignment east of Cherry. Potential effects on three archaeological features: Toronto Dry Dock Toronto Iron Works British American Oil</i>	<b>Less Preferred:</b> Greater amount of excavation results in increased potential for disturbance to known features. Potential effects on 9 archaeological wharf related features: • circa 1893-1925 Yonge Street Wharf • circa 1893-1925 City Wharf • circa 1893-1925 Toronto Electric Light Co. wharf • circa 1870 Don Breakwater • circa 1900 Don Mouth Fill Limit • circa 1910-1926 Polson Iron Works Wharf • circa 1910-1926 City Corp. Wharf • Knapp's Roller Boat • National Iron Works	<b>Preferred:</b> minor disturbances possible from widen westbound Gardiner off Ramp (Relocate Piers) East of Sherbourne - Potential effects on one archaeological feature: • circa 1910-1926 City Corporation Wharf
		<b>C 3.4 First Nation People and Activities</b>	Potential impact on lands used for traditional purposes	<b>Equally Preferred:</b> No impact anticipated.	<b>Equally Preferred:</b> No impact anticipated.
	<b>Cultural Resources Summary Ranking</b>			<b>Less Preferred</b>	<b>Preferred</b>
<b>OVERALL RATING: ENVIRONMENT</b>				<b>PREFERRED</b>	<b>LESS PREFERRED</b>

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
D. Economics	D.1 Global & Regional Economics	D.1.1 Toronto's Global Competitiveness	Potential for change in Toronto's Global Competitiveness	 <b>Equally Preferred</b> – Based on the City's high global ranking, the anticipated increase in travel times and the relative small proportion of commuters expected to be affected by the increase, and the fact that accessibility is only one of many considerations factored into assessing competitiveness, neither option is expected to have an impact on the City's global economic competitiveness.	 <b>Equally Preferred</b> – Based on the City's high global ranking, the anticipated increase in travel times and the relative small proportion of commuters expected to be affected by the increase, and that accessibility is only one of many considerations factored into assessing competitiveness, neither option is expected to have an impact on the City's global economic competitiveness.
		D.1.2 Regional Labour Force Access	Potential for change in Regional Labour Force Access to downtown	 <b>Less Preferred</b> – While 95% of new commuter trips to the downtown will be on transit, the additional auto travel times could impact employers and employees decisions to locate/work downtown as compared to other regional employment centres.	 <b>Preferred</b> – Change to the regional attractiveness of downtown Toronto is not expected to change.
		D.1.3 Mobility within Downtown	Potential for change in mobility within Downtown	 <b>Equally Preferred</b> – With an increased reliance on transit, walking and cycling in the downtown, neither option is expected to have a meaningful impact on downtown mobility.	 <b>Equally Preferred</b> – With an increased reliance on transit, walking and cycling in the downtown, neither option is expected to have a meaningful impact on downtown mobility.
			Disruption During Construction	 <b>Less Preferred</b> – While the total period of construction is similar, the Remove will result in more traffic delay during construction that could result in greater economic impacts.	 <b>Preferred</b> – While the total period of construction is similar, the Hybrid will result in less traffic delay during construction and thus has less potential economic impacts.
D.1.4 Entertainment Venues	Potential for change in access and attractiveness to downtown entertainment venues.	 <b>Equally Preferred</b> - The City's downtown venues are highly accessible by public transit. Further, there is typically minimal overlap with peak commuter travel times and travel to the entertainment venues. It is unknown if patrons that use the Gardiner Expressway to visit Downtown's venues will face higher travel times in one EA alternative versus the other. Regardless, information on the sensitivity of a customer's willingness to attend an event due to changes in travel time is unavailable.	 <b>Equally Preferred</b> - The City's downtown venues are highly accessible by public transit. Further, there is typically minimal overlap with peak commuter travel times and travel to the entertainment venues. It is unknown if patrons that use the Gardiner Expressway to visit Downtown's venues will face higher travel times in one EA alternative versus the other. Regardless, information on the sensitivity of a customer's willingness to attend an event due to changes in travel time is unavailable.		
Global and Regional Economics Summary Ranking				 <b>Less Preferred</b>	 <b>Preferred</b>

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Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
	D.2 Local Economics	D 2.1 Business Activity	Number of potential new jobs in corridor and/or study area	Preferred – as about 2,000 more jobs expected to be generated in the corridor over the Hybrid. But both options support the First Gulf development that is projected to generate in excess of 25,000 new jobs	Less Preferred – less new local jobs than the Remove. But both options support the First Gulf development that is projected to generate in excess of 25,000 new jobs
Local Economics Summary Ranking				Preferred	Less Preferred
	D.3 Fiscal Net Benefits	D 3.1 Capital Cost and Funding	Total capital cost (in 2013\$)	Preferred \$326 million (2013\$) Includes demolition and removal of the existing Gardiner Expressway and 8-lane Lake Shore Blvd. construction and major urban design and landscaping throughout and construction of new bridge structures across Don River to connect to Lake Shore Blvd. and Don Valley Parkway.	Less Preferred \$414 million (2013\$) Includes demolition and removal of the Gardiner Logan ramps and rebuild of a new at-grade 6-lane boulevard. Building of new on and off ramps and connecting roads in the Keating areas and modifications to the Gardiner to accommodate these ramps and Construction of new bridge structures across Don River to connect to Lake Shore Blvd. and Don Valley Parkway.
			Property acquisition	Equally Preferred Minimal property requirements around the Don Roadway/DVP connection.	Equally Preferred Minimal property requirements around the Don Roadway/DVP connection.
			Funding Availability	Preferred \$342 (\$2013) Capital is available (Yonge to Logan Ramps). Less additional Capital funding required over budget.	Less Preferred \$342M (\$2013) Capital is available (Yonge to Logan Ramps). More additional Capital funding required over budget.
		D 3.2 Lifecycle Cost	100 year life cycle cost (includes total capital cost + 100yr operations and maintenance cost) *Figures are +/- 20%	Preferred - \$461M 2013\$ (\$326M Capital + \$135M Operations and Maintenance) \$240M NPV (\$221M Capital + 19M Operations and Maintenance)	Less Preferred - \$919M 2013\$ (\$414M Capital + \$505M Operations and Maintenance) \$336M NPV (260M Capital + \$76 M Operations and Maintenance)
		D 3.3 Public Land Value Creation	Public Land disposition proceeds. All figures +/- 10%	Preferred \$176 million (2013\$) \$128 million (NPV) (31 acres of public land) These values are for land west of Don River only. East of Don River, both alternatives would have equal benefit. The amount of this benefit is subject to development plans but is expected to be in excess of \$100M.	Less Preferred \$39 million (2013\$) \$29 million (NPV) (19 acres of public land) These values are for lands west of Don River only. East of Don River, both alternatives would have equal benefit. The amount of this benefit is subject to development plans but is expected to be in excess of \$100M.
		D 3.4 Total Net Benefit	Net 100 Year Life Cycle Cost after land revenues.	Preferred \$285 million (2013\$) Net Cost \$112 million (NPV) Net Cost	Less Preferred \$880 million (2013\$) Net Cost \$307 million (NPV) Net Cost
Direct Cost and Benefit Summary Ranking				Preferred	Less Preferred
OVERALL RATING: ECONOMICS				PREFERRED	LESS PREFERRED

DESCRIPTION AND EVALUATION OF ALTERNATIVE SOLUTIONS | AMENDED APRIL 2017

Study Lens	Criteria Group	Criteria	Measures	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid
Study Goals Achievement	Revitalize the Waterfront Reconnect the City with the Lake Balance Modes of Travel Achieve Sustainability Create Value			● Preferred Preferred Preferred Preferred Preferred	● Less Preferred Less Preferred Less Preferred Less Preferred Less Preferred
Summary				<p>This transformative option yields substantial benefits to the eastern waterfront in terms of environmental quality, city-building, and development compatibility. Local benefits are considerably greater than under any other alternative, while lifecycle costs are also less. Negative impacts are primarily related to slightly longer auto travel times for those continuing to choose this form of transportation to access the downtown.</p>	<p>Partially addresses some of the negative impacts of the existing infrastructure while largely maintaining auto capacity and expressway functionality. Does not lead to transformation of the corridor west of Cherry St. and commits the City to live with an elevated waterfront expressway for decades to come. Allows for small additional advancement of the CWSP objectives over the base condition.</p>

## Transportation and Infrastructure Lens

The following provides commentary on two criteria groups within this lens: Automobiles and Constructability, as these two issues received much attention by stakeholders and are key considerations within this evaluation lens.

### Automobiles Criteria Group

This criteria group considered three criteria: 1) Commuter Travel Time based on average AM peak hour auto in-bound travel times for select origin-destination (OD) pairs; 2) Impact on Average Auto Travel Time based on average AM peak hour auto travel times within the Transportation Study Area (roughly bounded by Spadina, Dundas, Woodbine and Lake Ontario); and 3) Road Network Flexibility/Choice represented by the number of turning prohibitions.

Traffic forecasting for the Gardiner Expressway EA was undertaken for a 2031 horizon year for AM commuter peak hour conditions. The transportation modelling process used an integrated application of City of Toronto's regional planning model (in EMME/2 software) and a detailed operations model (in Paramics software) developed specifically for the project (See **Appendix K – Transportation Modelling Report**).

The EMME model provided the regional perspective on travel demand forecasting. It was used to forecast demands in the primary travel modes for existing and 2031 conditions for the two alternative solutions (Remove (Boulevard) and Hybrid). The EMME model accounts for the impacts of major road and transit infrastructure projects; growth in population and employment levels; and changes in travel patterns due to the new residential and employment areas expected to develop across the City (e.g., development of Lower Yonge, Keating, Don Lands, Port Lands will increase percentage of employees who live downtown).

The PARAMICS model (a micro-simulation model) was used to develop the local assignment of auto volumes to Study Area roads. The transportation Study Area extends from Dundas Street to Lake Ontario and from Spadina Avenue to Woodbine Avenue. While the EMME model projected auto demands on all major roads in the Study Area, it is a planning tool that does not account for fine operational details (e.g., delay at traffic signals, interaction with streetcars, etc.) and can be unreliable when used to project demands within a specific corridor or on a specific segment. The PARAMICS model took the aggregate auto demand and travel patterns for the Study Area from EMME and generate a more robust estimate of future auto demands.



Travel times for the OD pairs were determined using a combination of travel times from the City-wide EMME transportation model (for portions of the OD pairs travel outside the Study Area) and use of the PARAMICS transportation model for travel within the Study Area. The OD pairs were selected as representative trips into the Downtown to show travel time differences among the alternatives. The OD pairs represent travel from zones in the City that have particularly high usage of the Gardiner-Lake Shore Boulevard East corridor. The AM peak hour was chosen to be assessed as it provides the most consistent commuter travel patterns and the highest volume of users. It serves as the “worst-case” auto travel condition. Afternoon (PM) travel often varies for commuters depending on the day.

The models represent travel times for 2031 which assume the full build out of lands in the Study Area and future population and employment projections. In addition, it was also assumed that new transit projects and other road network changes would be in place in the Study Area, as was done in the 2014 modelling, including the following:

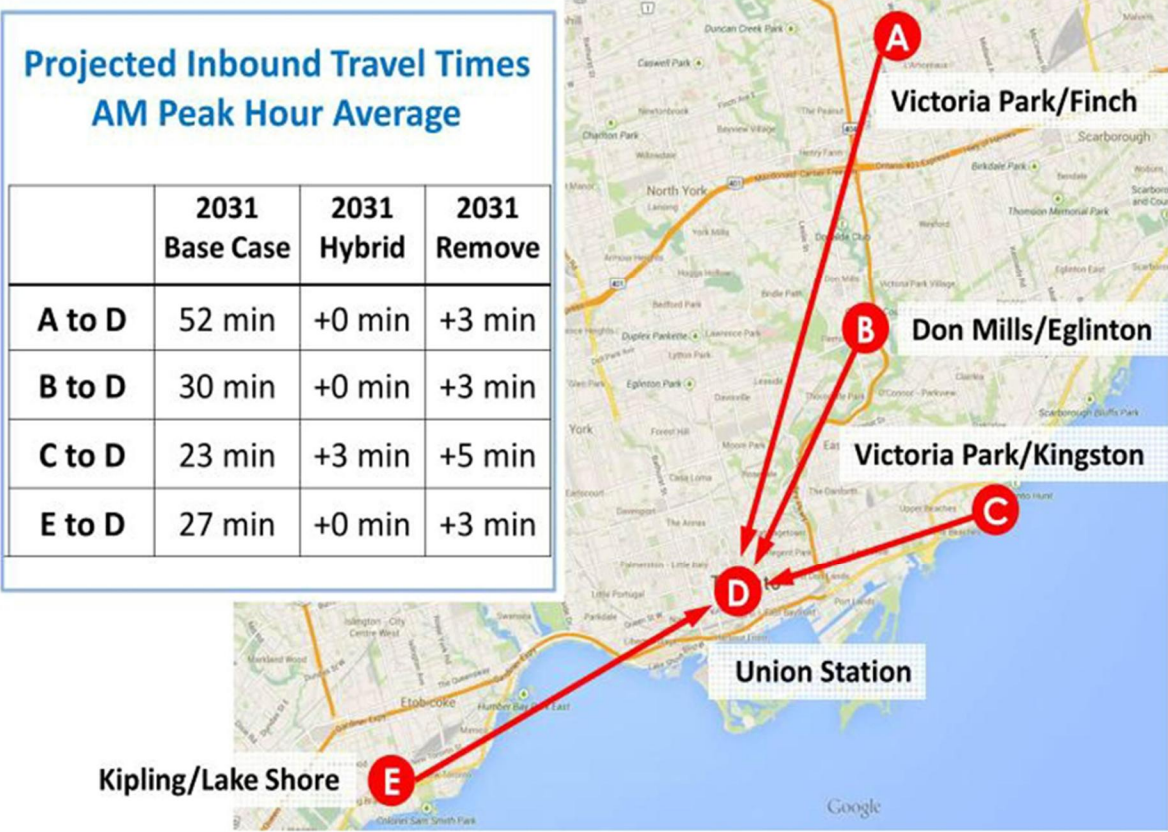
- Go Transit service improvements;
- Relief Line (transit);
- Queens Quay East (Bay to Parliament), with transit in its own ROW and re-configuration of Queens Quay;
- Queens Quay East Extension (Parliament to Cherry), with transit in its own ROW and re-configuration of Queens Quay;
- Cherry Street reconfiguration (King to Railway Tracks) and transit in its own ROW (as part of the WDL Plan);
- Cherry Street reconfiguration (Railway Tracks to Ship Channel/ Commissioners) and new alignment (as part of Lower Don Lands Master Plan);
- Port Lands transit lines (Cherry, Villiers/Commissioners/Don Roadway, Leslie, and Unwin) Transit in its own ROW to serve the Keating, Lower Don Lands, and Port Lands areas. Transit service on the new Cherry Street, Villiers Street/Commissioners, and Don Roadway;
- New Public Roads in the West Don Lands (Bayview, River, Front) as part of the West Don Lands Precinct Plan; Extension of Bayview, River and Front to the WDL area;
- Broadview Extension contemplated in the Central Waterfront Secondary Plan: The actual alignment would be subject to the ongoing Environmental Assessment Study;

- York-Bay-Yonge Ramps Interchange Reconfiguration EA, which includes Gardiner Expressway ramps reconfiguration;
- Queens Quay West Transit in its own ROW; Re-configuration of Queens Quay from Bay to Spadina;
- Re-configuration of Front Street (outside Union Station);
- John Street public realm improvements and some lane reconfiguration;
- Bremner/Fort York Boulevard (construction of Fort York Boulevard, between Bathurst and Spadina is underway); and
- Simcoe Street underpass (completed).

Prior to running the PARAMICS model, additional Travel Demand Management (TDM) measures were added to reflect anticipated changes in future travel behaviour as supported by trends and industry research (see **Appendix K – Transportation Modelling Report**). Both the Hybrid and optimized Remove (Boulevard) were assigned a 15% demand reduction. Note that the former Remove alternative was previously assigned a 25% demand reduction. As a result of the Remove (Boulevard) optimization efforts, the Remove (Boulevard) alternative can now process a higher volume of vehicles and reduced travel times.

The travel time modelling results are presented in **Figure 4-11** and indicate that for the select OD pairs, the optimized Remove (Boulevard) alternative reduces the additional travel time (over the future base case) to 3-5 minutes from the previously presented 5-10 minutes (AM peak hour). Despite these reductions, the Remove (Boulevard) still results in an additional travel time of 2-3 minutes over the Hybrid.

Figure 4-11: Auto Travel Times for Select OD Pairs for Hybrid and Optimized Remove



Note: 2031 Base case travel times are approximately 5 minutes higher than current travel times due to expected growth in background (overall) traffic volumes.

It is noted that travel times were previously modelled as a sensitivity test for the original alternatives without the planned new transit projects noted above (expanded GO service was left in). The result of this “no new transit” sensitivity test indicates that Auto travel times for the selected OD pairs would increase by approximately an additional 2-3 minutes for these alternatives (over the travel times modelled for the original alternatives in 2031 with the planned transit projects in place). While not modelled, it is assumed that the Hybrid alternative would react similarly without new transit projects. This illustrates that new transit projects in addition to GO Transit improvements, while necessary to accommodate future travel demand, do not have a large impact on Auto Travel Times for the selected OD pairs.

Travel Times were also examined for travel in the AM peak hour (both directions) within the Transportation Study Area. While the rankings of the alternatives for this criterion generally mimic those for the OD pairs (City-wide), this analysis provides information on the volume of automobiles affected. As presented in Table 3, for the Hybrid, 90% of the trips in the AM peak hour will have delays of less than 2 minutes while for the Optimized Remove (Boulevard), 75% of the trips will have delays of less than 2 minutes. Related to this, the total vehicle hours in the AM peak for all trips in the Transportation Study Area were modelled. As shown in **Table 4-10**, Vehicle Hours Travelled (VHT) values are provided for:

- Total hours travelled in the peak hour for each alternative;
- Additional hours travelled for trips that have less than 2 minute increases over the Maintain; and
- Additional hours travelled for trips that have greater than 2 minute increase over the Maintain.

**Table 4-10: Auto Travel Times for Select OD Pairs**

Alternative	Total VHT	Additional Total hrs.	Additional hrs. for Trips <2min	Additional hrs. for Trips >2min
Maintain	5,649	--	--	--
Hybrid	6,272	624	367	256
Remove	7,289	1,640	694	947

The Remove (Boulevard) results in 1016 more total hours traveled in the AM peak hour than the Hybrid. To put this in context, there are 70,500 vehicle trips in the peak hour in the transportation system. As such, the Remove (Boulevard) results in an average approximate increase of approximately 52 seconds per vehicle trip over the Hybrid in the AM peak hour. It also needs to be highlighted that the presented increases in time are for auto trips only and if we were to distribute the increase across all modes of commuter travel then the impact of the travel time increase would be perceived as less significant.

A breakdown of additional travel hours in categories of <2 minutes and >2 minutes are provided as there is rationale to suggest that that trip length increases per commuter of less than 2 minutes are of less importance than trips length increases that are greater than 2 minutes because:

- Additional trip lengths that are < 2 minutes are within the average variability of the model outputs (on non-incident days); and
- Research on the value of time suggests small increments of time savings are less valuable as it is not possible for people to reschedule their activities to make use of the extra time in a meaningful way.

As such, if only additional trip lengths that are >2 minutes are considered, the travel time increase per trip would decrease to about 36 seconds.

Considering the rankings for the three criteria in this criteria group, the Hybrid alternative was identified as preferred due to its 2-3 minute lower travel times in the AM peak hour for the selected OD pairs over the optimized Remove (Boulevard). The Hybrid also results in lower total vehicle hours than the optimized Remove (Boulevard) for all vehicle trips in the transportation Study Area.

#### Movement of Goods

Modelled vehicle travel times for the representative OD pairs indicate that the Remove (Boulevard) results in additional travel times of 2-3 minutes over the Hybrid alternative. Further, other major City roads in the Downtown area may have higher traffic volumes due to traffic diversion under the Remove (Boulevard) during peak period travel hours. It can be expected that the movement of goods would experience similar additional travel times.

To assess reliability of the alternatives, a traffic incident/accident scenario was modelled for both alternatives. The reliability measure is concerned with the resilience of the alternatives to accommodate traffic incidences (e.g., accidents, road maintenance). Some of the goods movement stakeholders expressed opinion that a system with two roadways (Gardiner and Lake Shore Boulevard) should be more resilient as it provides more roadway options versus a system that includes just one roadway (Lake Shore Boulevard) through the corridor. The modelling work included the simulated closure of one westbound lane east of Jarvis Street for one-half hour in the peak hour.

Considering the change in average vehicle speed in the corridor, for the Remove (Boulevard), a westbound lane closure on Lake Shore Boulevard during the AM peak hour results in a 2 km/hr average speed reduction. In comparison, the Hybrid resulted in a 0.5 km/hr speed reduction for an incident on Lake Shore Boulevard and a 4.5 km/hr speed reduction for an incident on the Gardiner. Considering change in traffic volume during an incident, for the Remove (Boulevard), there was a reduced volume of 1,685 vehicles on Lake Shore Boulevard. In comparison, for the

Hybrid, there was a reduction of 368 vehicles from an incident on Lake Shore Boulevard and a reduction of 2,211 vehicles from an incident on the Gardiner. Based on these results, it was determined that there is not a significant difference between the alternatives for this measure. It is noted that these modelled results are corroborated from observations by the City's Traffic Operations Monitoring group, which noted that incidences in the corridor are more impactful to traffic flow if on the Gardiner than on Lake Shore Boulevard. It was also noted that there is a higher frequency of incidents west of Yonge Street than in the Study Area.

Many stakeholders within the Study Area are involved in industrial and manufacturing operations. Examples of major goods produced include sugar, cement, concrete, cooling systems, roofing, and other manufacturing goods. While supply chains of these stakeholders may not be as sensitive to changes in average travel time and reliability as some others consulted, based on the stakeholder consultations, above 90% of all their goods movement traffic could be impacted by the removal of the Gardiner East (i.e., the trip would take longer and/or increase shipping costs). Their businesses currently rely significantly on the Gardiner Expressway/Lake Shore Boulevard corridor and for this reason may be particularly sensitive to proposed changes that may impact travel times or reliability.

For other stakeholders in retail and courier sectors, while reliance on the Gardiner Expressway for movements in Toronto may still be quite significant, a lower proportion of their total trips would be impacted by Gardiner East removal since these stakeholders operate in more diverse locations as opposed to an industrial stakeholders with a factory located in the Study Area. While the proportion of trips impacted for these stakeholders may be lower, these stakeholders may be more sensitive to changes in reliability and average travel times due to the nature of their supply chains and their businesses. For example, a courier company may need to allocate additional resources (additional delivery vehicles and additional labour) to carry out the same number of deliveries on routes that utilize the Gardiner-Lake Shore Boulevard corridor or impacted alternate routes with the same level of reliability and delivery times compared to the elevated expressway remaining (e.g., Hybrid). What this can mean is that for some stakeholders, reduced corridor capacity may equate to an increase in goods movement vehicles on the road for the same number of trips in order to maintain service standards.

### Constructability Criteria Group

Stakeholders have expressed concerns regarding the construction staging of the alternatives, thus an example description of how the construction staging of each alternative could be phased is provided here.

#### **Remove (Boulevard) Construction Staging**

- **Stage 1-Pre-works (1 year)**
  - Prepare/extend detour roads including Queens Quay, Commissioners Street and Don Roadway, Cherry Street etc. Coordinate with planned development in this area
  - Complete detour road connections to Lake Shore Boulevard (east of Don River)
  - Construct new Lake Shore Boulevard alignment through Keating
  - Install temporary Gardiner bents to support demolition activities
- **Stage 2 - Westbound Gardiner/Lake Shore Boulevard Works (2 years)**
  - Detour westbound traffic and demolish DVP off-ramp and westbound Gardiner Lanes
  - Construct new westbound boulevard lanes, intersections and DVP off-ramp
  - reroute traffic to new westbound lanes
- **Stage 3 - Eastbound Gardiner/Lake Shore Boulevard Works (2 years)**
  - Detour eastbound traffic and demolish DVP on-ramp and eastbound Gardiner lanes
  - Construct new eastbound boulevard lanes, intersections and DVP off-ramp
  - reroute traffic to new eastbound lanes
- **Stage 4 - Final configuration (1 year)**
  - Complete boulevard including public realm features

- Remove detour roads

### Hybrid Construction Staging

- **Stage 1 - Keating Works (2.5 years)**
  - Build new westbound on-ramp and Lake Shore Boulevard realignment through Keating Channel Precinct
  - Redirect traffic to new Lake Shore Boulevard alignment
  - Build new eastbound off-ramp and approach roads
- **Stage 2 - Logan Ramp Demolition/Boulevard Construction (2 years)**
  - Prepare/extend temporary detour roads including Don Roadway, Commissioners Street and Cherry Street
  - Detour Lake Shore Boulevard traffic east of Don River to temporary detour roads (traffic west of Cherry Street is unchanged)
  - Demolish Logan ramps and build new Lake Shore Boulevard
- **Stage 3 - Final configuration (1 year)**
  - Reroute traffic back to Lake Shore Boulevard
  - Complete boulevard including public realm features
  - Remove detour roads

Considering the above, while both alternatives are expected to involve a 6-year construction period, the Remove (Boulevard) alternative is expected to result in greater construction impacts and delays to traffic with 3-4 years of roads detours as compared to the Hybrid alternative which will require 1 to 1.5 years of road detours.



### Urban Design Lens

The Urban Design lens considers three criteria groups: Planning, Public Realm and Built Form.

In regards to the Planning criteria group, the Hybrid is less preferred when considering consistency with Precinct Plans, as it would result in impacts to the Keating Channel Precinct as the new Gardiner on/off ramps would result in the loss of public space and limit pedestrian access between the Keating Channel and the realigned Lake Shore Boulevard. Both alternatives support the recommendations in the Don Mouth Naturalization Project EA and provide opportunity for the extension of Broadview Ave/LRT which is being studied in the Port Lands and South of Eastern TSMP EA.

Considering the Public Realm criteria group, both alternatives provide equal benefit east of the Don River. Within the Keating Channel Precinct, the Hybrid is less preferred due to the loss of public lands from the ramps/approach roads. West of Cherry Street, the Remove is clearly preferred as it provides new public realm space while with the Hybrid, current conditions essentially remain.

Finally, with respect to Built Form, again both alternatives facilitate redevelopment plans east of the Don River. The key differences lie west of Cherry Street, where the Remove (Boulevard) will allow building fronts to have active uses at-grade oriented towards Lake Shore Boulevard. Under the Hybrid, the majority of space along Lake Shore Boulevard west of Cherry Street will be back-facing and will not provide active uses at-grade.

Considering the above, the Remove (Boulevard) is preferred over the Hybrid for the Urban Design lens.

### Environment Lens

The Environment Lens is concerned with noise and air effects and the potential for natural habitat enhancement within the corridor. Recognizing the baseline conditions of the corridor, first many of the noise/air receptor locations represent future residential development locations as lands along much of the corridor are either vacant or are to be redeveloped. Regarding the natural environment, the corridor is highly degraded due to historical development and land use activities; the only natural feature of note in the corridor is the mouth of the Don River/Keating Channel which is proposed to be realigned and re-naturalized.

Regarding potential noise effects, based on previous modelling results (see 2014 Alternatives Evaluation Report) the Remove (Boulevard) is expected to have slightly lower noise levels in the Gardiner-Lake Shore Boulevard corridor as a result of lower volumes of traffic (and slower speeds) in the corridor but there is potential for minor increased noise levels on other City streets due to expected traffic diversion to these streets. The previous model results showed that the relative change in noise levels is greater in the Gardiner-Lake Shore Boulevard corridor than on other City streets. It also needs to be recognized that most of the receptors potentially affected in the corridor are future receptors. As such, the difference between the alternatives with respect to noise is considered to be minimal.

Considering local air emissions in the Gardiner-Lake Shore Boulevard corridor, based on previous modelling results, it is anticipated that the Remove (Boulevard) would have slightly lower levels than the Hybrid due to lower vehicle volumes in the corridor. As noted above, many of the receptors in the corridor will be future receptors pending the completion of development plans in the area. The difference between the alternatives with respect to regional scale air emissions is considered to be of more relevance in comparing the alternatives given the ability of auto users to freely choose what routes they take to their Downtown destinations. Regarding regional air shed emissions, based on the completed modelling results, there is a minor difference between the alternatives. The alternatives are therefore considered to be similar. Thus, from a community health point of view, the alternatives are considered similar.

However, regarding regional greenhouse gas emissions, based on the model results, the Remove (Boulevard) has 12% less emissions which is reflective of the lower vehicle kilometers travelled in the transportation system for the Remove (Boulevard).

Opportunities for tree plantings and other habitat enhancements are similar for both alternatives east of the Don River but, to the west, Remove (Boulevard) results in better sunlight conditions that offer significantly greater “greening” opportunities. Considering aquatic habitat, with the removal of all road infrastructure along the north side of the Keating Channel, the Remove (Boulevard) is expected to provide greater opportunity for the enhancement of aquatic habitat in the channel. Neither alternative result in significantly different impacts on built heritage and cultural landscape features or the activities of First Nations People. However, Remove (Boulevard), which involves the expansion and realignment of Lake Shore Boulevard, results in a greater disturbance of known archaeological features.

Considering the above, for the Environment Lens, there is modest preference for the Remove (Boulevard).

## Economics Lens

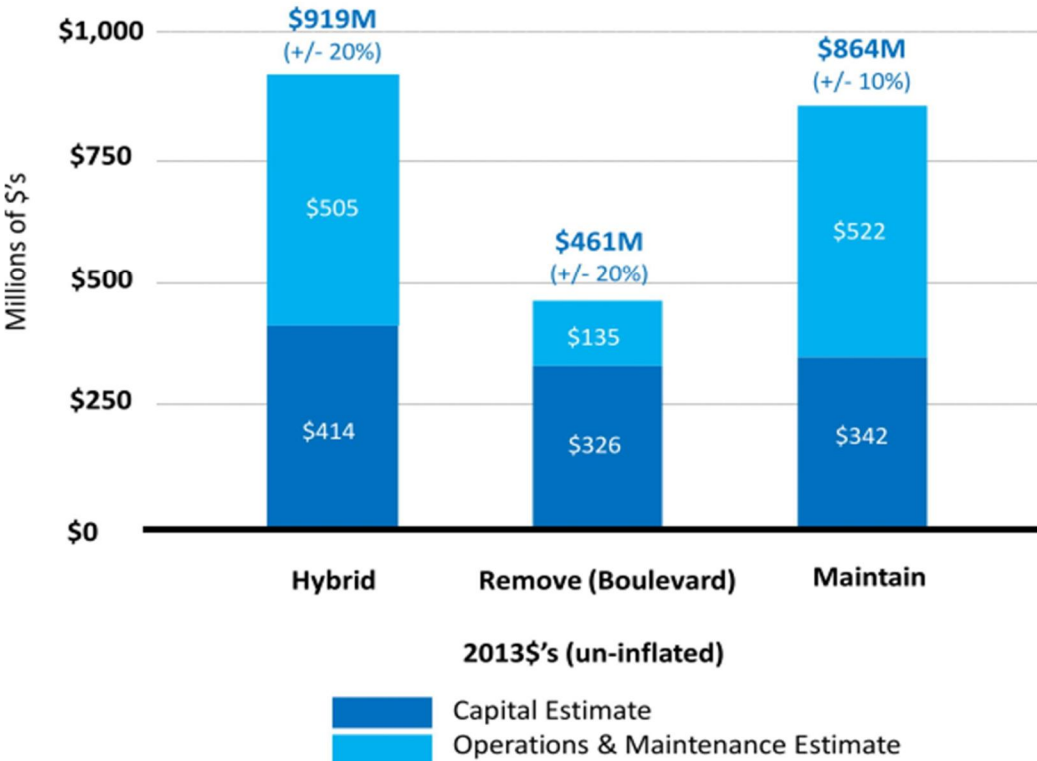
For this lens, the following describes the differences between the alternatives for the Direct Costs and Benefits criteria group. Differences between the alternatives for the other criteria groups within the Economics lens were previously discussed in **Section 4.3.2**.

Three criteria were considered under this criteria group: Capital Cost and Funding, Lifecycle Cost and Land Value Creation. Other than costs referencing the City's approved Capital Budget and Plan for the Maintain base case, costs for the Remove (Boulevard) and Hybrid alternatives outlined in this report represent high order-of-magnitude costs for comparative purposes only. These costs were based on conceptual designs only and may have a significant margin of error. Current cost estimates have not taken into consideration conflicts and constraints with respect to environmental and utility issues. More refined cost estimates will be derived from the next stage of EA work in which the preferred EA alternative solution is designed in greater detail. Costs for the Maintain option only have been advanced to the 30% design stage and reflect a conventional construction approach.

In regards to Capital Cost and Funding, **Figure 4-12** and **Figure 4-13** present the estimated capital costs for the alternatives. **Appendix O** provides the assumptions regarding how the capital costs were generated. The estimated costs that were developed are high-level estimates that were developed on the bases of the concept plans for each alternative. These costs are intended for comparative purposes. The Remove (Boulevard) alternative has the lowest estimated lifecycle capital cost at \$326 M (2013\$) (\$221 NPV) while the Hybrid has a cost of \$414 M (2013\$) (\$260 NPV). Also considered under this criterion was the measure Property Acquisition. None of the alternatives are expected to require significant private property. There is potential for minimal private property acquisition along the Don Roadway (to the east of the right-of-way) for the Remove (Boulevard) alternative to accommodate new ramps that are required to connect the Don Valley Parkway with the new at-grade boulevard. The Funding Availability measure was provided as information but was not considered as an appropriate measure to rank the alternatives.

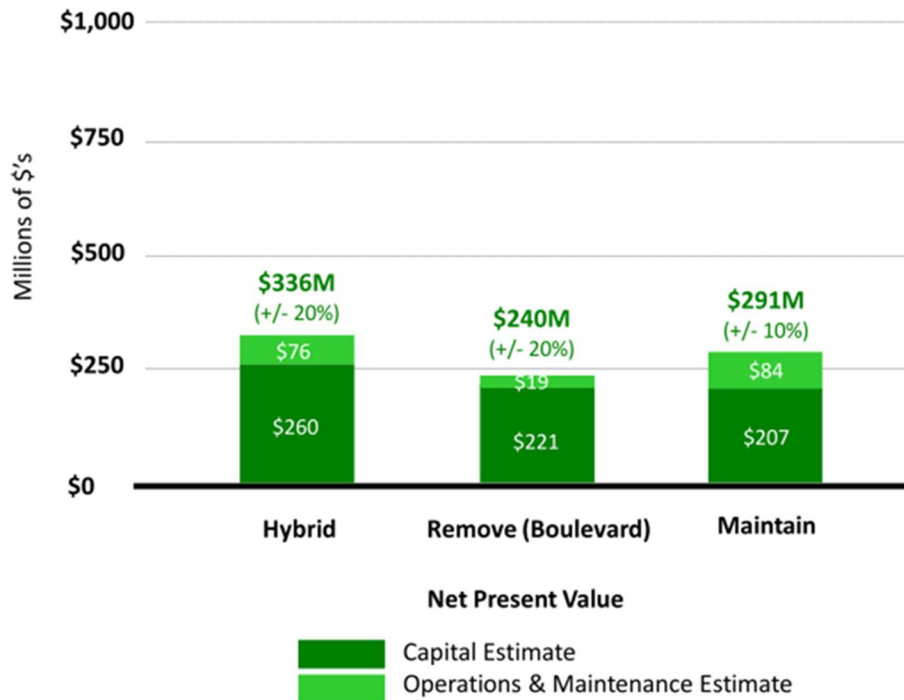
Lifecycle Costs as a net present value (NPV) were determined and include the total capital cost and the 100-year operations and maintenance costs for each alternative. The Remove (Boulevard) alternative was ranked preferred with the lowest NPV lifecycle cost (\$240 M). The 100-year NPV lifecycle cost for the Hybrid is \$336 M. **Figures 4-12 & 4-13** provide a breakdown of the 100-year lifecycle costs in 2013\$ and NPV.

Figure 4-12: Alternatives Lifecycle Cost 2013\$



<sup>1</sup> All costs are high level order of magnitude prepared for comparative purposes only.

Figure 4-13: Alternatives Lifecycle Cost Net Present Value (NPV)



<sup>1</sup> All costs are high level order of magnitude prepared for comparative purposes only.

#### Land Value Creation and Net Cost

An analysis of potential revenues from the sale of City land under the two alternatives was undertaken by HR&A Advisors. Development opportunities on publicly owned land in two distinct areas were examined: west of Cherry Street, and the area between Cherry Street and the Don River. Also described are development opportunities along Lake Shore Boulevard on publicly owned land east of the Don River.

Remove (Boulevard) would create 4.6 acres of redevelopment land west of Cherry Street, north of the realigned Lake Shore Boulevard between Yonge Street and Bonnycastle Street. This land is currently occupied by Gardiner-Lake Shore infrastructure and there would be no change under Hybrid. Between Cherry Street and the Don River, Remove (Boulevard) would create 12.9 acres of redevelopment land while Hybrid would create only 5.5 acres. The difference is because of the additional on/off ramps and connecting road infrastructure for Hybrid, as well as the existing elevated Gardiner East deck that would remain.

In summary, between Yonge Street and the Don River, Remove (Boulevard) would create an additional 12 acres of redevelopment land. Potential revenues from the sale of these City-

owned lands have been valued at approximately \$137 M in 2013 dollars – the equivalent of approximately \$100 M in net present value.

The public land value benefit on the east side of the Don River is expected to well exceed \$100 M (2013\$). The full benefit is pending final development plans within the area. HR&A estimates that the 14 acre TPLC development block to the south-east of Lake Shore Boulevard and Don Roadway could generate land sale revenues of \$64 M (2013). Also, there are additional City and TPLC lands further east in the Port Lands and South of Eastern area that cannot be valued until zoning is finalized through the various land use planning exercises that are currently underway. According to First Gulf, 20 acres of City and TPLC owned land could generate \$100 M (2014\$) in land sales. Both alternatives support the marketability of those lands because both alternatives feature a landscaped boulevard east of the Don River that will improve the accessibility and visibility of those lands.

If we consider the public land value creation benefits as a result of each alternative (between Jarvis and Don River there are 31 acres available from the Remove (Boulevard) and 19 acres available from the Hybrid), the net costs of the Remove (Boulevard) are \$285 million (2013\$)/\$112 million (NPV) and the net costs for Hybrid are \$880 million (2013\$)/\$337 million (NPV). If the potential land value east of the Don River is also considered, as discussed above, then these net costs would be equally further reduced.

It should be noted that HR&A's analysis of potential land sale revenues did not include the costs of soil and groundwater remediation because they are unknown at this time.

## 4.5 Preferred Alternative Solution

**Table 4-11** presents a summary of the alternatives rankings by the four study lenses. As presented in this table, the Hybrid alternative is preferred on the basis of the Transportation and Infrastructure lens while the Remove (Boulevard) is preferred on the basis of the Urban Design, Economics and the Environment lenses.

Considering the evaluation results presented in the previous chapter, both alternatives facilitate:

- Revitalization of the Don River Mouth and Flood Protection project;
- Development of the First Gulf site; and
- Implementation of new public transit projects.

However, there are differences in the benefits between the two alternatives, including:

- **Remove (Boulevard)** has a lower cost, higher revenue to the City from public land redevelopment, creates a lively Lake Shore Boulevard, facilitates better connections to the waterfront and is to result in less greenhouse gas emissions.
- **Hybrid** maintains an expressway connection function and level of service between the Gardiner and Don Valley Parkway, has lower auto travel and goods movement times, and less construction disruption.

Considering the benefit trade-offs of these two alternatives, the decision as to which of these two alternatives should be recommended as preferred was found to be difficult. Selecting the alternative based only on the number of evaluation lens/criteria groups preferences was not appropriate as this approach would not consider the variation in the magnitude of the effect/benefit, the period of the effect/benefit, the scale of users affected, the certainty of the forecast, and measures available to mitigate the effect. Further, a decision made on this basis would not consider how stakeholders and decision makers might weigh the relative importance of the criteria.

Opinions on the alternatives were highly divisive with some comments stating that the Gardiner infrastructure is integral to the City's transportation system while others noting that the east Gardiner is antiquated infrastructure that largely only serves as a DVP ramp to the downtown core and beyond and presents a barrier between the city and the waterfront.

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Table 4-11: Summary of Remove (Boulevard) and Hybrid Evaluation Matrix

Final PDF to have high res version of table inserted to larger scale.

Study Lens	Criteria Group	Alternative 1: Optimized Remove (Boulevard)	Alternative 2: Hybrid	Summary
A. Transportation and Infrastructure	A.1 Automobiles	<b>Less Preferred</b> - As average AM peak hour auto travel times for select OD pairs are slightly longer – typically by about 2-3 min on average. More auto travellers in study area to experience a greater than 2 min increase in travel time (25%).	<b>Preferred</b> – As average AM peak hour auto travel times for select OD pairs are slightly shorter – typically by about 2-3 min on average. Less volume of auto travellers to experience a greater than 2 min increase in travel times (10%).	Hybrid is preferred for the Transportation and Infrastructure Evaluation Lens due to the lower auto travel time.
	A.2 Transit	<b>Equally Preferred</b> : Both alternatives to result in similar travel times on east-west routes serving transit in the Central Area, such as Dundas, Queen, and King Street Streetcars. Both alternatives facilitate new transit projects.	<b>Equally Preferred</b> : Both alternatives to result in similar travel times on east-west routes serving transit in the Central Area, such as Dundas, Queen, and King Street Streetcars. Both alternatives facilitate new transit projects.	
	A.3 Pedestrians	<b>Preferred</b> : Shorter crossing distances on Lake Shore Blvd. and more City standard sidewalk configurations	<b>Less Preferred</b> : Less normalized intersections and longer crossing distances on Lake Shore Blvd.	
	A.4 Cycling	<b>Equally Preferred</b> - 4200 metre cycling facility between Yonge and Leslie Streets	<b>Equally Preferred</b> - 4200 metre cycling facility between Yonge and Leslie Streets	
	A.5 Movement of Goods	<b>Less Preferred</b> – Less road capacity/higher travel times may have an impact on the movement of goods through the area.	<b>Preferred</b> – Due to greater road capacity and reduced vehicle travel times	
	A.6 Safety	<b>Preferred</b> - due to elimination of free flow right turns and sight line issues resulting from Gardiner columns.	<b>Less Preferred</b> - due to sight line issues resulting from Gardiner columns.	
	A.7 Construction Impacts	<b>Less Preferred</b> – Similar overall construction period (6 years), but with more complex traffic management requirements and greater period of traffic detours required (3-4 years) and greater potential for traffic delays	<b>Preferred</b> – Similar overall construction period (6 years), but less period of traffic detours required (1.5 years).	
B. Urban Design	B.1 Planning	<b>Preferred</b> - Accommodates development proposals east of the Don River and opens up the mouth of the Don River with removal of Logan Ramps. More flexibility to accommodate additional growth. Accommodates precinct plans in study area.	<b>Less Preferred</b> - Accommodates development proposals east of the Don River and opens up the mouth of the Don River with removal of Logan Ramps. Less flexibility to accommodate additional growth. Results in negative impact to Keating Precinct Plan.	The Remove is preferred for Urban Design. The take-down of the elevated FGE creates an opportunity for dramatic improvement in the urban design fabric of the corridor. This action transforms the corridor and allows the full development of a urban district introduced by a tree canopied urban boulevard.
	B.2 Public Realm	<b>Preferred</b> - Opportunity for significant streetscaping improvements. Significant increase in public realm area within corridor. Corridor will be open to sun and sky.	<b>Less Preferred</b> - Minor to moderate improvement in streetscaping – minor increase in public realm. Some opportunity for more trees.	
	B.3 Built Form	<b>Preferred</b> - Same benefits east of the Don River from removal of Logan Ramps. West of Cherry St., will allow building fronts to have active uses at-grade oriented towards Lake Shore Blvd.	<b>Less preferred</b> – Same benefits east of the Don River from removal of Logan Ramps. Majority of space along Lake Shore Blvd west of Cherry St. will consist of service uses and will not provide active uses at-grade.	
C. Environment	C.1 Social and Health	<b>Preferred</b> - Considering potential effects on community health, the alternatives are considered to be similar. However, due to 12% less Green House Gas emissions, the Remove is considered preferred.	<b>Less Preferred</b> - Considering potential effects on community health, the alternatives are considered to be similar. However, due to 12% greater Green House Gas emissions the Hybrid is less preferred.	The alternatives are similar with respect to community health effects. Remove is however, considered to be preferred due to lower green house gas emissions and greater opportunity to create new natural habitat.
	C.2 Natural Environment	<b>Preferred</b> - Neither alternative will result in impact to existing natural features. Better facilitates enhancement of aquatic habitat in Keating Channel, less area of impervious surface (reduced stormwater generation), and improved micro-climate in corridor.	<b>Less Preferred</b> – Neither alternative will result in impact to existing natural features. Less opportunity for new/enhanced habitat and trees. Greater area of impervious surface.	
	C.3 Cultural Resources	<b>Less Preferred</b> – Potential for greater impact on known archaeological features as a result of excavation.	<b>Preferred</b> – Less area of disturbances and less potential for impact on known archaeological features	
D. Economics	D.1 Global and Regional Economics	<b>Less Preferred</b> – Higher vehicle travel times could impact employers and employee decisions to locate/work downtown as compared to other regional employment centres.	<b>Preferred</b> – change to the regional attractiveness of the downtown is not expected to change.	The Remove alternative is preferred from an economics perspective as it has lower net 100 year lifecycle cost.
	D.2 Local Economics	<b>Preferred</b> – Both facilitate job growth opportunities east of the Don River. More new job opportunities west of the Don River (about 2,000 more).	<b>Less Preferred</b> – Both facilitate job growth opportunities east of the Don River. Less new jobs generated west of the Don River.	
	D.3 Direct Cost & Benefits	<b>Preferred</b> - Less \$595 M (2013\$/195 M (NPV) net revenue lifecycle cost.	<b>Less Preferred</b> – Additional \$595 M (2013\$/195 M (NPV) net revenue lifecycle cost.	



This decision required a trade-off between two very important (and related) City priority issues: traffic congestion and City building/prosperity (understanding that traffic congestion is a product of City growth and prosperity). There was not a strong technical case to select one alternative over the other. With or without the Gardiner, the waterfront/downtown core will grow just as it has in the recent past, and traffic congestion in the City will increase – even with new transit projects being developed. Both alternatives are technically viable although offer different advantages and disadvantages. Rationalizing a defensible preference for either alternative on the basis of the available facts, effects forecasts and received stakeholder input proved to be extremely difficult. To make the decision, the values, goals and priorities of those who represent the affected public needed to be taken into account. As such it was recommended in the Dillon Consulting May 2015 Alternative Solutions Interim Evaluation Report - Addendum and the May 6 2015 Toronto City Staff Report to Public Works and Infrastructure Committee that the decision regarding the preferred alternative solution should rest with Toronto City Council who, as representatives of the citizens of Toronto, can consider the facts and apply their value judgements on the trade-offs between these two alternatives.

City Council reviewed and considered the technical evaluation results at their June 10-12, 2015 meeting. Primary issues discussed and debated during that meeting included: the merits of preserving a continuous elevated Gardiner-DVP freeway linkage versus removal of a portion of the elevated expressway and its replacement with an at-grade boulevard and new on/off ramps; an acceptable level of impact on road capacity and travel times (for both personal and commercial vehicles) in any future preferred design; capital and lifecycle cost comparisons among the Remove, Maintain and Hybrid options before Council at that time, and the various opportunity costs related thereto; compatibility of the various alternatives with the Gardiner East EA Terms of Reference, applicable City of Toronto Official Plan policies, and various waterfront revitalization initiatives; and potential for impact to the parks, open spaces and development opportunities identified within the Keating Channel Precinct Plan.

After significant Council debate on the trade-offs and advantages and disadvantages of the two alternatives, City Council endorsed the Hybrid as the preferred solution and further directed City staff to develop and evaluate alternative Hybrid designs that would mitigate any negative impacts associated with the Hybrid solution.