

Tolling Options for the Gardiner Expressway and Don Valley Parkway

Date:	September 10, 2015	
To:	Executive Committee	
From:	Deputy City Manager, Cluster B Deputy City Manager & Chief Financial Officer	
Wards:	Ward 5 – Etobicoke-Lakeshore Ward 13 – Parkdale-High Park Ward 19 – Trinity-Spadina Ward 26 – Don Valley West Ward 28 – Toronto Centre-Rosedale Ward 31 – Beaches-East York	Ward 6 – Etobicoke-Lakeshore Ward 14 – Parkdale-High Park Ward 20 – Trinity-Spadina Ward 29 – Toronto-Danforth Ward 30 – Toronto-Danforth Ward 34 – Don Valley East
Reference Number:	P:\2015\Cluster B\TRA\TIM\ ex15001tim.docx	

SUMMARY

The purpose of this report is to respond to a request from City Council to examine various options for tolling for the Gardiner Expressway and Don Valley Parkway (DVP), for the primary purpose of offsetting capital, operating and maintenance costs for these facilities. Currently the Gardiner Expressway carries 164,000 vehicles per weekday west of the Central Area at Spadina Avenue and 228,000 weekday vehicles east of Highway 427. The Don Valley Parkway carries 110,000 vehicles per weekday north of the Bayview Avenue/Bloor Street interchange.

This report presents findings on the available tolling technologies, various fare strategies, toll rates and revenue generated under various scenarios. However, given the limited time to carry out the study and report back to the Executive Committee in time for its September 21, 2015 meeting, the analysis could not consider in-depth impacts on the network and particularly on parallel adjacent roads and facilities, impacts on the environment, or how to address implementation issues.

For Council to ultimately make an informed decision on whether the City should proceed with the implementation of tolls or pricing on the Gardiner Expressway and DVP, a more in-depth study should be undertaken. This report seeks Council's approval to have the General Manager, Transportation Services undertake a more comprehensive tolling and pricing study so that Council can understand the full range of issues, impacts and implications associated with the implementation of tolling and pricing.

RECOMMENDATION

The Deputy City Manager, Cluster B and the Deputy City Manager & Chief Financial Officer recommend that:

1. City Council authorize the General Manager, Transportation Services to undertake a more detailed study on tolling and pricing of the Gardiner Expressway and Don Valley Parkway, including, but not limited to, more detailed cost and revenue projections, impacts on other elements of the transportation network, and impacts on economic competitiveness and to report back to the Executive Committee in 2016.

FINANCIAL IMPACT

This report provides some preliminary high-level estimates for the toll rates and the annual net toll revenues for a toll system on both the Gardiner Expressway and Don Valley Parkway (DVP). Two base scenarios were studied: (1) flat fee, referred to as an open system; and (2) fee based on distance travelled, referred to as a closed system. Both systems were found to be valid options for the City considering both business and customer service needs.

In order to determine the toll rates, the first step is to identify the target revenue required by taking into account all costs related to capital, operating and maintenance, and life-cycle maintenance costs for the Gardiner Expressway, the DVP as well as the toll system over a time period — typically 30 years for large physical infrastructure.

A separate report from the Deputy City Manager, Cluster B and the Deputy City Manager & Chief Financial Officer titled "F. G. Gardiner Expressway Strategic Rehabilitation Plan Procurement Strategy" details the capital construction and 30-year operating and maintenance (O&M) and life-cycle maintenance costs for the Gardiner using an Alternative Financing and Procurement (AFP) approach. The use of this procurement approach pre-qualifies the Gardiner project for Federal funding of up to one-third of the eligible costs through the P3 Canada Fund and New Building Canada Fund, subject to the submission of successful business case applications.

Table A below summarizes the total capital, operating and maintenance (O&M) and life-cycle maintenance costs for the Gardiner, DVP and the toll system.

Table A: Total Estimated Capital, Operating and Maintenance Costs (30-year horizon) - \$ Billions

Facility	Nominal Cost (As spent)
Gardiner ¹	3.8
DVP	0.2
Toll System ²	1.7
Total	5.7

Notes:

¹ Includes estimated capital project costs of \$2.6 billion using the Alternative Financing Procurement (AFP) approach (2018 - 2023) and 30-year O&M and lifecycle maintenance costs (2024-2053). This amount does not include the \$820M expected Federal funding.

² Average costs of the Open and Closed Toll Systems for the 30-year period 2024-2053

Toll rates have been estimated to generate revenue sufficient to cover the costs identified in Table A above. Under current assumptions in the financial model, toll collection will start after all capital construction and rehabilitation work is completed (by 2024). The analysis is summarized in Table B below.

Table B: Summary of Estimated Toll Rates expressed in \$2015 Required to Fund Estimated Costs of Gardiner and DVP (as shown in Table A) over a 30-year period

Toll System	Toll Rates	
	Light Vehicle	Heavy Vehicle /Truck
Flat fee (Open System)	\$1.25 flat	\$2.50 flat
Distance-based (Closed System)	10 cents/km	20 cents/km

It is possible to recover all costs within a shorter time period. While the revenue targets would remain the same, the necessary toll rates would be much higher than the 30-year scenario. For example, Table C below illustrates the estimated toll rates required to recover costs within a 10-year period. However, a 5-year recovery period is not feasible as the toll rates would be so high as to cause drivers to seek alternative routes with consequential impacts on revenue.

Table C: Estimated Toll Rates expressed in \$2015 Required to Recover Cost Within a 10-year period

Toll System	Recovery Period of 10 years	
	Light Vehicle	Heavy Vehicle /Truck
Flat fee (Open System)	\$3.25 flat	\$6.50 flat
Distance-based (Closed System)	35 cents/km	70 cents/km

Revenue from toll rates higher than what is required to cover all capital, O&M and lifecycle maintenance costs for the Gardiner, DVP and the toll system could be directed to other transportation alternatives for the City, for example transit. A reserve fund could be established by Council to set aside the toll revenues.

Further research and analysis is necessary to support a final recommendation in regard to tolls and pricing. Such a study would need to go beyond planning-level review based on a range of input assumptions, which is the basis for the findings presented in this report. Further refinement under detailed study and/or preliminary design is needed to determine the full range of economic impacts and to develop detailed cost estimates and revenue forecasts and understand impacts on other elements of the transportation network.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

City Council, at its meeting of June 10, 11 and 12, 2015, considered a staff report (Item PW4.1) entitled, "Gardiner Expressway and Lake Shore Boulevard East Reconfiguration Environmental Assessment (EA) and Integrated Urban Design Study - Updated Evaluation of Alternatives (Ward 28, 30) " and in so doing, City Council directed,

".....the City Manager to report to the September 21, 2015 meeting of the Executive Committee on the following:

- a. various options for City of Toronto highway road pricing (tolling) for the Gardiner Expressway including linkage to the Don Valley Parkway, for the purpose of offsetting capital, operating and maintenance cost for these highways and other Transportation needs, such report to include:
 - 1. the following options and associated projected revenues:
 - a. flat rate fees;*
 - b. fees by distance;*
 - c. fee cost allocation reduced by number of passengers;*
 - d. fee cost reduced by frequency or monthly pass concept; and*
 - e. a five (5) and ten (10) year sunset clause,**
 - 2. information on the number of vehicles per day including:
 - a. number and type of trucks and commercial vehicles per day;*
 - b. estimated number of cars and truck originating:
 - 1. from within Toronto City limits; and*
 - 2. from outside Toronto,***
 - 3. information on various technological options such as electronic scanning of plates, transponders and number of passengers; and*
 - 4. current and projected operating and capital costs;**
- b. the feasibility of City of Toronto highway road pricing (tolling) for the Gardiner Expressway and the Don Valley Parkway, for non-residents of the City, with the resulting revenues to be directed to the Toronto Transit Expansion Reserve Fund."*

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PW4.1>

At the meeting of December 16, 17, and 18, 2013, City Council adopted the report EX36. 14 titled 'Administration Amendments to Reserve Fund Accounts – 2013'. Among other things, it recommended (Rec. #18) that a discretionary reserve fund account called the 'Toronto Transit

Expansion Reserve Fund' be established in Schedule #7 of Chapter 227, the purpose of which will be to serve as a funding source to support transit expansion where the Provincial and/or the Federal Governments have committed to matching any City contribution to said Fund. The criteria for the account were not provided at that time. Council subsequently approved the criteria for this account at its meeting on August 25, 2014 in consideration of the report EX44.24 titled 'Administrative Amendments to Reserve Fund Accounts – 2014'. Appendix #6 of that report describes the criteria for this account.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.EX44.24>

ISSUE BACKGROUND

The F.G. Gardiner Expressway and Don Valley Parkway are integral components of the transportation network serving the City of Toronto. The Gardiner Expressway was built between 1955 and 1964, and extends 18 kilometres from Highway 427 at its west end to the DVP at its east end. The DVP was built between 1958 and 1966, and stretches approximately 15 kilometres, running from the Gardiner Expressway at its south end to Highway 401 at its north end.

The Gardiner Expressway, after almost 60 years of service, requires significant rehabilitation to keep it safe and operational. Some elements of that rehabilitation are currently underway. In 2014, City Council approved the accelerated method of construction for the balance of the rehabilitation of the Gardiner Expressway.

Given the significant cost of rehabilitating the Gardiner Expressway, whether over a twelve-year or six-year accelerated program, tolling would provide a revenue source for funding the capital cost of rehabilitation, as well as ongoing operating and maintenance costs for these facilities. Tolling can also be a tool to achieve policy objectives such as reducing peak hour congestion or encouraging modal shift.

COMMENTS

Tolling versus Pricing

At times the terms 'tolling' and 'pricing' are used interchangeably; however there is a difference between the two that should be recognized.

Tolling – users are charged directly to use specific infrastructure thereby creating a revenue stream that is generally used only to recover that infrastructure's capital, operating and maintenance costs.

Pricing – users are charged directly to use infrastructure with the pricing used as a demand management tool or to achieve some other policy objective such as to increase use of non-car modes including transit. Revenue generated covers the pricing system implementation and operation costs and typically generates a surplus which is generally used to cover the construction, operating and maintenance costs of new or enhanced transportation infrastructure, such as transit.

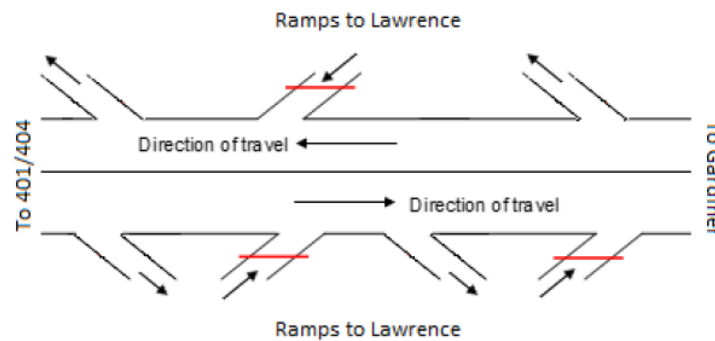
Tolling Approach

For this initial assessment of tolling feasibility, the Gardiner Expressway and DVP have been treated as a single continuous facility and assumed that all vehicles using any portion of the facility are to be charged. The approach to charging customers can be one of two primary charging schemes:

- Flat rate (known as an Open system); or
- Distance-based (known as a Closed system).

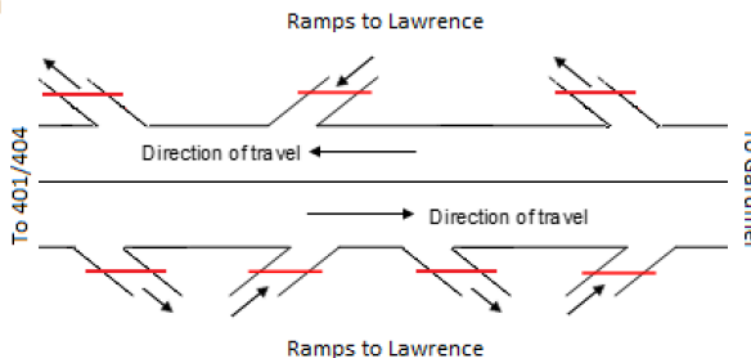
For an open system, all vehicles are charged a flat rate each time they pass a toll point. To capture all vehicles that will use the DVP and Gardiner Expressway, toll points are required for all entry ramps, as illustrated in Figure 1, below. Many other variations are possible but for this study this example was modelled.

Figure 1 – Open System Tolling



In a closed system, vehicles are charged based on the distance travelled between the point of entry and exit. This requires tolling sites to be set up at all entry and exit points along the DVP and Gardiner Expressway. With information collected on each user's origin and destination on the facility, a closed system allows users to pay proportionally to their use of the facility. Highway 407ETR and GO Transit uses a similar charging structure with fares increasing by distance travelled.

Figure 2 – Closed System Tolling



Both flat (open) and distance-based (closed) charging approaches can be applied to Gardiner Expressway-DVP, but a distance-based system requires higher capital costs and annual operating

costs since more tolling sites would need to be constructed and transaction processing is more complex. Table 1, below, provides a comparison of the number of tolling points for an open and closed system.

Table 1: Number of Tolling Points, Open vs. Closed System

Open System – All Entry Points	Closed System – All Entry & Exit Points
Mainline ¹ = 2	Mainline ¹ = 4
Ramp = 37	Ramp = 67

Note: ¹ Entry/exit from/to 404/401/DVP interchange and QEW/427/Gardiner Expressway interchanges

With City toll policy objectives still to be defined, both flat and distance-based charging approaches have been carried forward for rough order-of-magnitude cost estimates in this report.

Toll Technology

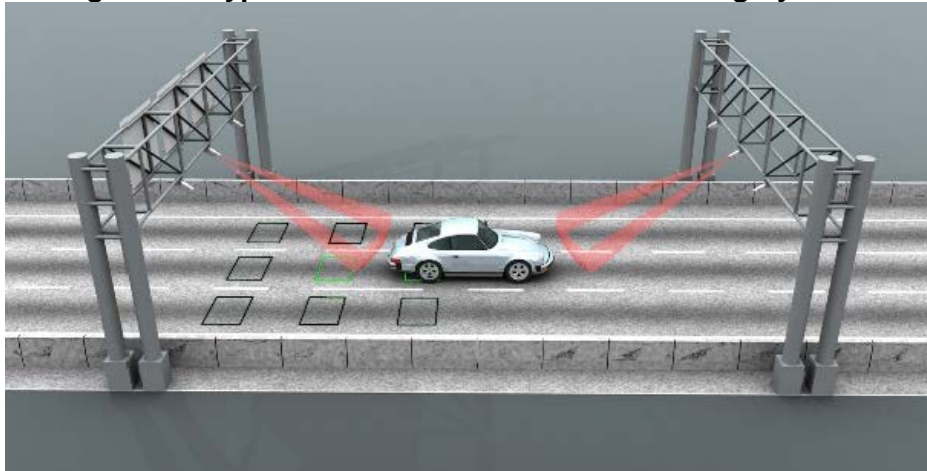
To complete the rough order-of-magnitude estimate, in addition to the number of tolling points, the toll technology solution at each toll point must be defined. Toll technology options for tolling customers at each toll point include traditional tolling where customers stop at a toll plaza to pay at a toll booth or self-serve device, All-Electronic Tolling (AET) with all customers proceeding through toll points at highway speed without any need to stop or a combination of traditional and AET. AET offers significant advantages including increased customer safety, reduced customer travel time, reduced vehicle emissions, and reduced land requirements. The Gardiner Expressway and DVP have space limitations that would make traditional tolling very challenging and the traffic impact to routes leading onto them would be significant. Therefore, given the existing configuration of the Gardiner Expressway and DVP facilities, AET would be the recommended toll system approach and has been carried forward for the Gardiner Expressway-DVP order-of magnitude estimates.

To setup the tolling solution for the facility, there are two primary components:

- Roadside system (at each toll point); and
- A central system.

The roadside system is needed to capture each vehicle that enters (open system) or enters/exits (closed system) the facility - see Figure 3 below. The central system is used to collect information at the roadside and subsequently charge customers. The City solution for the central system can take on different forms based on the level of interoperability established with other tolling agencies in the region (i.e. 407ETR).

Figure 3 – Typical All-Electronic Roadside Tolling System



Currently, the Province is also considering tolling its GTHA 400 series highways, in light of experience with High Occupancy Vehicle (HOV) lanes, and statements indicate that High Occupancy Toll (HOT) lanes, in particular, will be considered. Should there be a Provincial announcement, and should the City decide to implement tolls on its highways, the City would seek to coordinate systems and interoperability.

Toll System Estimated Costs

In the absence of detailed system requirements and business rules, a rough order-of-magnitude cost estimate has been prepared based on the following assumptions:

Primary Scenarios

- Flat rate (open) system with toll points on ramps (except for entry to road network);
- Distance based (closed) system with toll points on ramps (except for entry and exit to road network).

Tolling Points and Roadside System

- For mainline tolling points – 4 travel lanes and 2 shoulders.
- For ramp tolling points – 1 travel lane and 2 shoulders.
- Each tolling point will use an AET system solution.
- Power to tolling point exists and can be used for toll system.
- Communications link from tolling point to facility host and back office exists; communications devices at each end of link included with estimate.

Central System and Operations

- Stand-alone City toll system back office and customer service.
- 60% of users will have a transponder; 40% will be video/image based customers.
- Transponder customers will use facility an average of 12 times per month.
- Image customers will use facility an average of 6 times per month.
- Cost allowance to cover customer mail-in bill payments, similar to 407ETR.

- Payment collection includes issuing a mailed invoice for first time using facility, second invoice for non-payers of first invoice, a registered mail notice if second notice not paid (e.g., a final notice with plate denial warning) and collections/plate denial.
- Costs associated with collections and plate denial process have not been estimated since the process is typically recovered via additional fees to customer.

The above assumptions were used to estimate:

- The **capital costs** associated with gantry structures, toll hardware/software and communications devices at each toll point; and central system hardware/software to support processing transactions and the operations center staff. The communications link from toll points to central system and the building used to house the central system hardware/software and operations staff are not included in estimates.
- The **annual maintenance costs** (staff, tools, parts) for 24/7 maintenance of the toll system hardware and software.
- An **annual replacement/upgrade** fund to perform a system replacement/upgrade every 8 years, which is in line with industry practice.
- The **annual operations costs** for processing toll transactions, billing customers and providing customer service.

Costs developed are summarized in Tables 2a and 2b below.

Table 2a – Toll System Capital Estimates (in 2015 Dollars)

Item	Unit Amount (\$ Millions)	Total (\$ Millions)	
		Open	Closed
Roadside	0.56-0.75	22.5	41.0
Central System - Open	5.0	5.0	-
Central System - Closed	6.5	-	6.5
Total		27.5	47.5

Table 2b – Annual Operations, Maintenance and Replacement Cost (in 2015 Dollars)

Item	Annual Total (\$ Millions)	
	Open	Closed
Annual Operations Cost ¹	27.0	30.0
Annual Maintenance and Replacement Costs	3.9	6.6
Total	30.9	36.6

Note: ¹ Operating costs based on 2031 transaction levels

Tolling Revenue Targets

Tolling the Gardiner Expressway and DVP will provide a source of revenue for the City. Revenues collected by tolling are intended to cover the capital, operating, and maintenance costs of the Gardiner Expressway and DVP.

Capital

The Gardiner Expressway capital cost for its rehabilitation, including the 'Hybrid' option for the Gardiner East section, is estimated to be approximately \$2.6 billion; with construction occurring from 2018 to 2023 under an AFP model with an overall project cost of \$3.8 billion. The capital cost for the Don Valley Parkway is limited to approximately \$2.6 million per year to cover resurfacing work. The capital cost was carried forward as an annual cost and inflated into nominal dollars for the financial analysis.

Operating and Maintenance

The operating and maintenance cost for the Gardiner Expressway are incorporated into the AFP contract and together with the capital cost are estimated at \$3.8 billion. The operating and maintenance cost for the Don Valley Parkway is estimated at approximately \$400,000 per year, 2015 dollars.

Revenue Targets

The sum of the capital, operating, and maintenance costs for the Gardiner Expressway, DVP as well as the toll system provides the total revenue target. Revenue targets were developed for a 30-year capital, operating and maintenance horizon. The toll rate analysis presented in this report provides the toll rates to meet revenue targets over a 30-year payback horizon and over a 10-year payback horizon as requested by Council. The 5-year payback horizon was also examined, as requested by Council, however, a 5-year recovery period is not feasible as the toll rates would be so high as to cause drivers to seek alternative routes with consequential impacts on revenue.

Table 3, below, provides the summary totals for the 30-year horizon. The total revenue target is \$5.7 billion in nominal dollars.

Table 3: Total Estimated Capital, Operating and Maintenance Costs (30-year horizon) - \$ Billions

Facility	Nominal Cost (As spent)
Gardiner ¹	3.8
DVP	0.2
Toll System ²	1.7
Total	5.7

Notes: ¹ Includes estimated capital project costs of \$2.6 billion using the Alternative Financing Procurement (AFP) approach (2018 - 2023) and 30-year O&M and lifecycle maintenance costs (2024-2053). This amount does not include the \$820M expected Federal funding.

² Average costs of the Open and Closed Toll Systems for the 30-year period 2024-2053

Existing and Future Traffic Conditions

The Gardiner Expressway and DVP corridors are very heavily utilized and are operating at or near capacity in both directions over much of the day. The Gardiner Expressway carries 164,000 vehicles per weekday west of the Central Area at Spadina Avenue and 228,000 vehicles per weekday east of Highway 427. The Don Valley Parkway carries 110,000 vehicles per weekday north of the Bayview Avenue Interchange. Toronto residents account for roughly 65% of the

total traffic volumes on both roadways. The toll traffic volumes, i.e., the number of toll transactions per day, would be significantly higher than weekday traffic totals as they include all traffic entering and exiting the Gardiner and the DVP, not simply daily traffic at a given location.

Network Assumptions

Future Network

Future highway network improvements including highway widenings and extensions have been assumed in horizon years based on the Ontario Ministry of Transportation capital program. Additional municipal arterial road widenings, extensions and new road facilities are included as specified in capital plans obtained from municipalities. The Gardiner Expressway coding follows the reconstruction plan and includes the 'hybrid' alternative which maintains current access points to the road network. There are not assumed to be any further road capacity changes to major roadways serving downtown Toronto as the road network is already built-out.

A range of transit improvements are included in the future year network scenario to reflect funded and planned rapid transit and commuter rail projects. To provide a conservative analysis, transit improvements follow the recommendations of the Big Move and include the expansion of the GO commuter rail system, extension of the Spadina and Sheppard subway lines, and completion of the Eglinton Crosstown LRT.

Toll Assumptions

Additional assumptions used to prepare toll traffic and revenue estimates are listed below.

Toll structure: The assumed toll structure is based on class of vehicle and time of day. Three classes of vehicles are assumed as follows:

- Light vehicle: includes vehicles under 5 tonnes in weight: passenger cars, vans, pickups, sport utility vehicles and light-duty trucks.
- Single Unit Heavy Vehicle: includes single-unit vehicles over 5 tonnes: trucks, tractors, school buses, transit buses and intercity buses.
- Multiple Units Heavy Vehicle: includes trucks or tractors with or two trailers.

Time of day toll rates: Night traffic (8:00pm to 6:00am) receives a 50% discount compared to daytime base tolls.

Trucks: Depending on the time of day during Monday to Friday truck traffic on the Gardiner and DVP varies between 5% and 9% of total traffic. In this analysis, it is assumed that these truck percentages remain constant with the application of tolls on the Gardiner Expressway. This implies that trucks are diverted away from the Gardiner Expressway at the same rate as passenger cars. It is assumed that 60% of trucks are single units and 40% are multiple-unit, with trucks paying on average double the toll of light vehicles.

Expansion Factors:

Expansion factors were derived to expand the weekday a.m. peak hour traffic and revenue to annual values. Factors are based on count data obtained for the Gardiner Expressway and Don Valley Parkway.

Toll Rates to Attain Revenue Targets

Toll rates were derived to offset capital, operating and maintenance costs for the Gardiner and DVP, and for the tolling system itself, to the nearest 25 cents for open/flat toll and to the nearest 5 cents for the closed system/ toll by distance. For the Gardiner, the figures are based on the AFP approach identified in the "Procurement" report, before consideration of Federal funding. The resultant toll rates are identified in Table 5.

The table indicates that for the 30-year payback horizon, a \$1.25 flat toll per light vehicle (\$2.50 for trucks) is needed to meet revenue targets. Similarly, in the closed system option, a toll of \$0.10 per kilometre would be needed to achieve the same revenue target.

An analysis of a potential 5-year payback horizon indicated that the required revenues were higher than the maximum toll revenues, i.e. at very high tolls, traffic diverts away from the facilities, resulting in lower revenues. This suggests that a 5-year payback horizon is not realistic. This can be tested in more detail should staff be directed to perform a more detailed study.

Table 5: Summary of Toll Rates and Revenue, Toll per Light Vehicle

Toll System	Toll*	Payback Horizon
Flat Fee (Open System)	\$1.25 flat	30 years
	\$3.25 flat	10 years
Distance-based (Closed System)	10 cents/km	30 years
	35 cents/km	10 years

* per light vehicle. Trucks pay on average double the toll of light vehicles

In addition to the revenue analysis above, an alternative scenario was evaluated based on continuing the 10-year toll rate beyond the payback period and out to 2053. This scenario would reflect tolls to pay for the capital and operating costs of the Gardiner Expressway and DVP over ten years, after which the tolls would be continued as a general revenue source for the City. The resulting surplus for the open system (flat fee) or closed system (distance-based) will result in an overall excess revenue with a present value of at least \$4.5 billion (2015 dollars).

Toll Charging Approaches & Probable Impact

Toll rates have been assumed as fixed daily values that vary by vehicle type with rates are set to meet revenue targets. They do not account for variation in charge rates by factors such as vehicle occupancy, resident status and frequency of use. Various charging approaches are in use throughout North America as a tool to provide incentives to toll customers or to meet agency objectives such as congestion reduction, modal shift, time of day shift or to encourage HOV use.

Charge variation is possible under either an open or a closed system. Commonly used charging approaches which are used in isolation or in combination include: *Toll Variable by Time-of-Day*, *Toll Variable by Congestion*, *Toll by Number of Passengers*, *Toll Variable by Residency*, *Toll Discount for Fleets and Tourism Discount or Toll Relief*. The potential impact of these on toll rates is provided in Table 6, below where the 10-year, \$3.25 flat toll scenario was used as a base toll scenario.

Table 6: Toll Charging Strategies, Revenue Impact, and Toll Impact (Light Vehicle)

Charge Rate Variable	Parameter	Revenue Impact	Toll Effect
Base	N/A	N/A	No effect - \$3.25 flat toll
Time of Day	Evenings 50% discount	10% of traffic receives discount	Base toll increase to \$3.40
	Evenings 25% discount	10% of traffic receives discount	Base toll increase to \$3.30
Congestion	Congestion Period charge increases 50%	30% of traffic pays higher rate	Base toll reduces to \$2.80, congestion toll increases to \$4.20
	Congestion Period charge increases 25%	30% of traffic pays higher rate	Base toll reduces to \$3.00, congestion toll increases to \$3.80
Occupancy	HOV2+ free of charge	10% of traffic are free of charge	Base toll increases to \$3.60
	HOV3+ free of charge	5% of traffic are free of charge	Base toll increases to \$3.40
Resident Status	Toronto Residents 50% discount	65% of traffic receives discount	Toronto residents' toll \$2.40, Non-residents' toll is \$4.80
	Toronto Residents 25% discount	65% of traffic receives discount	Toronto residents' toll \$2.90, Non-residents' toll is \$3.90
	Toronto Residents 100% discount	65% of traffic receives discount	Non-residents' toll is \$9.30
Quantity of Use	Frequent users (e.g., 40+ trips/month) 10% discount	80% of traffic receive discount	Base toll increases to \$3.50
Fleet Size	Large Fleet 10% discount	20% of traffic receive discount	Base toll increases to \$3.30
Tourist Forgiveness	No toll collection from out-of-jurisdiction user	5% of traffic are not tolled	Base toll increases to \$3.40

Traffic and Travel Impacts

A comparison of the effects of implementing tolling on the Gardiner Expressway and DVP was undertaken using the travel demand model used for toll-revenue analysis. The comparison was limited to roadway network performance measures between the no-toll scenario and a \$3 flat toll for both facilities. Table 7 provides the vehicle-kilometres of travel (VKT), vehicle-hours of travel (VHT), travel time from end to end, and average speed in kilometres per hour. Results indicate that the toll would divert approximately 9% of traffic from the Gardiner Expressway and 12% from the Don Valley Parkway to other modes (transit) and other roads. The reduction in traffic improves travel times and average speed on both facilities, however changes are modest because of the toll level assumed. A higher toll would result in a greater reduction. End to end trips on the Gardiner Expressway would save approximately 3 minutes in average travel time while 5 minutes would be saved on the Don Valley Parkway in the peak direction during peak hours.

Table 7: Gardiner Expressway and Don Valley Parkway Performance Measures – Toll vs No-toll

AM Peak Hour		VKT	VHT	Travel Time Peak Direction (min.)	Average Speed Peak Direction (km/hour)
Gardiner Expressway	No Toll	180,106	4,711	32	32
	Toll (\$3)	163,797	3,781	29	36
	% Difference	-9%	-20%	-11%	13%
Don Valley Parkway	No Toll	139,463	4,112	34	26
	Toll (\$3)	122,361	3,169	29	30
	% Difference	-12%	-23%	-16%	15%

Legislative Challenges in the Implementation of Toll Roads

Environmental Assessment Act

Tolls themselves are likely not subject to the Environmental Assessment Act (EAA). However the infrastructure required to operate a tolling system is likely subject to the EAA.

City of Toronto Act, 2006

Legally the City of Toronto Act, 2006 (Section 41) allows the city to have toll highways, however in each case it requires that the Province pass a regulation (Section 116) to do so. Excerpts of those two sections of the Act are provided below.

Restriction re Toll Highways

"41. The City does not have the power to designate, operate and maintain a highway as a toll highway until a regulation is made under section 116 that applies to the proposed toll highway."

Regulation re Toll Highways

"116. (1) The Lieutenant Governor in Council may make regulations providing for any matters which, in the opinion of the Lieutenant Governor in Council, are necessary or desirable for the purposes of section 41, including,

- (a) requiring the City to obtain the approval of any person or body before designating, operating or maintaining a highway as a toll highway;*
- (b) providing for criteria which must be met before the City can designate, operate or maintain a highway as a toll highway;*
- (c) imposing conditions and limitations on the powers of the City to designate operate or maintain a highway as a toll highway;*
- (d) granting the City additional powers with respect to the operation and maintenance of a toll highway, including powers with respect to the collection and enforcement of tolls imposed for the use of a toll highway;*
- (e) without limiting clause (d), providing that the provisions of the Capital Investment Plan Act, 1993 and the regulations under that Act which relate to toll highways apply to the City with such changes as are prescribed;*
- (f) establishing process requirements with respect to the designation, operation and maintenance of a highway as a toll highway, including requiring the City to provide notice to the Minister of Municipal Affairs and Housing or any other person or body of its intention to designate a highway as a toll highway;*
- (g) providing that the Minister of Municipal Affairs and Housing or any other person or body who receives notice under clause (f) may prohibit the City from making the designation even though the designation is otherwise authorized under the regulation. 2006, c. 11, Sched. A, s. 116 (1)."*

Contribution to Toronto Transit Expansion Reserve Fund

Reserves and Reserve Funds are established by Council to assist with long term financial management and planning. Revenues from one period can be set aside to accumulate, and drawn upon in future to finance planned capital and operating expenditures as designated by Council.

The Toronto Transit Expansion Reserve Fund (Cost centre XR1727) is a corporate discretionary reserve fund, the purpose of which is to serve as a funding source to support transit expansion where the Provincial and/of the Federal Governments have committed to matching any City contribution to the fund. Its contribution policy states that funds may be provided through the 2015 Operating Budget; and funds from other orders of government may also be contributed to this account where there is no legal requirement to hold funds in a separate account. The fund criteria indicate that if funds have not been provided in 2015, then consideration should be given to closing the account.

This reserve fund does not have an on-going regular source of revenue. As at June 30, 2015 there was no planned budget contribution to the fund, and the projected 2015 year-end fund balance is nil.

If Council wishes to set aside the toll revenues from the Gardiner Expressway and DVP to a reserve fund for future transit expansion, Council may create a reserve fund with a specific purpose at any time.

CONCLUSION

Development of a tolling system is an involved process with a number of technical, business, legal and customer/user related considerations to factor into the final solution. Two base scenarios were developed in this report: (1) flat fee, referred to as an open system; and (2) fee based on distance travelled, referred to as a closed system. Several system elements were reviewed including toll infrastructure and back office and customer service needs. Alternate charging approaches, such as tolls based on number of vehicle passengers and frequency of travel and residency, were reviewed at a planning level and found to be possible under both systems.

Overall both systems were found to be valid options for the City. Capital costs for the toll system range from \$28 million for the open system to \$48 million for the closed system. Operating and maintenance incurs a relatively high cost ranging from \$31 million to \$37 million per year, for the open and closed systems respectively, due to high number of anticipated transactions and users.

Toll-revenue analysis indicates that toll rates to fund capital, operating and maintenance of the two highways range from \$1.25 dollar flat toll or 10 cents per kilometre for light vehicles in the 30-year payback horizon scenario, to \$3.25 flat toll or 35 cents per kilometre in the 10-year payback horizon. A 5-year payback horizon would require a toll rate level which diverts traffic away from the Gardiner and DVP, resulting in lower revenues than required to achieve payback. This suggests that a 5-year payback horizon is not realistic. Higher toll rates could generate significantly higher revenues than are needed to cover capital, operating and maintenance costs and could be directed to other transportation investments for the City.

A review of the transportation impacts of the tolling system indicates that tolling would have a small but positive effect on travel times on the Gardiner Expressway and Don Valley Parkway. Under the \$3 flat toll scenario, travel times would be reduced by three to five minutes. On a system-wide basis, the tolling system has a very small but still positive effect on overall network performance.

The findings in this study are limited by its scope as a planning-level review based on a range of input assumptions. Further refinement under detailed study and/or preliminary design is needed to develop detailed cost estimates and revenue forecasts. It is therefore recommended that City Council authorize the General Manager of Transportation Services to undertake a more detailed study on tolling and pricing of the Gardiner Expressway and Don Valley Parkway, including, but not limited to, more detailed cost and revenue projections, impacts on other elements of the transportation network, and impacts on economic competitiveness and to report back to the Executive Committee in 2016.

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