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| TO: | Steve Taylor, Project Manager | DATE: | December 17, 2008 |
| FROM: | Henry Zygowski | PROJECT NO.: | 2006-029 |
| PROJECT: | Interprovincial Crossings EA Study | | |
| SUBJECT: | Current and Projected Traffic Demands | | |

1. Study Purpose

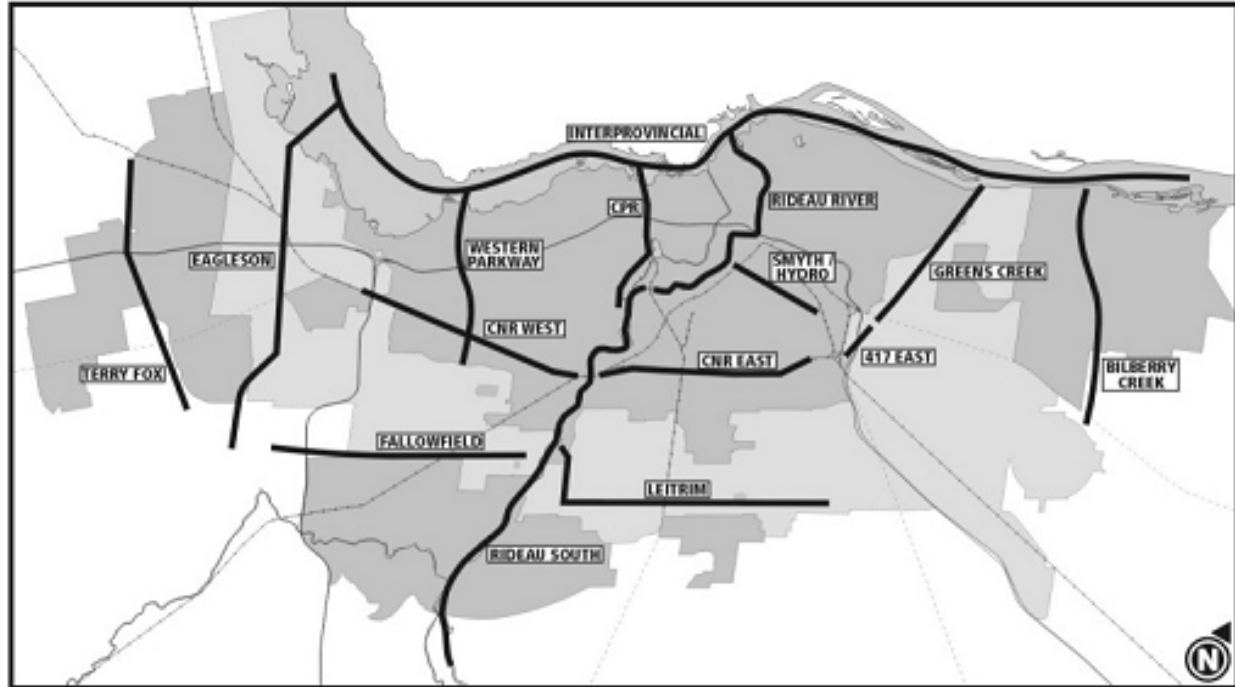
This memorandum examines the current and projected interprovincial travel demands in the National Capital Region (NCR). This memorandum includes a review of past transportation planning studies/reviews and provides an update to the previous analyses, considering revised population and employment data and the objectives of the City of Ottawa and City of Gatineau Official Plans (OP), and of the National Capital Commission. This document forms part of the formal Environmental Assessment (EA) planning processes (both provincial and federal).

The City of Ottawa is responsible for the development and operation of the transportation modelling activities in the NCR. The City employs the emme/3 transportation model which is based on approved population and employment distributions in Ottawa and Gatineau and employs data from extensive trip behaviour surveys. The emme/3 transportation model is a key tool that is used to assist in the identification of future transit and roadway needs.

The emme/3 model derives traffic demands at a series of screenlines in the NCR. A screenline is an imaginary boundary that is used to identify the magnitude of person-trips (consisting of transit users, pedestrians, cyclists and auto drivers) at critical geographic locations. Screenlines are normally located where barriers to travel exist, such as major rivers or rail lines and where fewer transportation facilities are typically provided. This approach also facilitates the identification and quantification of travel behaviour.

This review is based on an analysis of travel demands at the Interprovincial Screenline which extends along the Ottawa River from the easterly to the westerly limits of Ottawa and Gatineau (see **Figure 1**).

Figure 1 – NCR Screenlines



Source: Transportation Master Plan, 2004

This memorandum presents a broad, region-wide examination of Interprovincial travel characteristics primarily for the purpose of identifying whether (and when) crossing capacity is required. A detailed examination of the specific impacts of all candidate crossing corridors will also be undertaken in a subsequent stage of the planning process.

2. Background

The movement of people and goods across the Ottawa River is accommodated by five vehicular bridges and two ferries. The existing bridges are all centrally located, with the Champlain Bridge being the most westerly crossing and the Macdonald-Cartier Bridge being the most easterly. Of the five existing bridges, only the Chaudière Bridge and the Macdonald-Cartier Bridge are designated truck routes. In addition, two ferry services are situated in the greater NCR including:

- Cumberland/Masson Ferry (Approximately 22 km east of the Macdonald-Cartier Bridge); and
- Fitzroy/Quyon Ferry (Approximately 32 km west of the Champlain Bridge).

Both ferries are privately owned, fee-based operations. The Cumberland-Masson ferry operates year-round while the Quyon ferry is seasonal. Both ferry services have limited capacity in terms of the number and/or size of vehicles that can be accommodated on the vessels.

3. Previous Studies

Several previous studies have considered interprovincial travel in the NCR. The **1994 Joint Administrative Committee on Planning and Transportation (JACPAT) Study of Interprovincial Bridges in the National Capital Region**, and the **1999 Interprovincial Transportation Concept Plan**, conducted jointly by the National Capital Commission (NCC), the former *Communauté urbaine de l'Outaouais* and the former *Regional Municipality of Ottawa-Carleton* (RMOC), concluded that additional crossing capacity will be required (both in the east and west sectors of the NCR) to accommodate forecast growth.

The 1999 Interprovincial Plan also examined historical growth in the NCR over the last century and documented a trend that includes growth in the suburban areas of both cities. This outward growth trend has led to less efficient interprovincial travel because all five bridges are centrally located. The recommended long-term plan included protected corridors both in the east and west sectors of the NCR to address current needs and to accommodate growth beyond the 20 year horizon of the two Official Plans.

The 1994 JACPAT Study and the 1999 Interprovincial Transportation Concept Plan clearly identified deficiencies in interprovincial transportation infrastructure (i.e. insufficient capacity to meet the current and projected demands). These studies also indicated that the situation will deteriorate with continued growth in population, employment and tourism unless concerted efforts are made to address the lack of capacity.

4. Planning Context

Policies of both the local municipalities and the NCC support the planning and protection of new east and west transportation corridors to serve planned community growth.

- The **City of Ottawa's Official Plan (OP)**, (Page 28, Section 40), specifies that the City will work with the federal, Ontario and Québec governments and the City of Gatineau to determine the location of two new crossings of the Ottawa River.
- The **City of Gatineau** is currently protecting two crossings (Deschênes and Kettle Island corridors) in their Official Plan, and Council has recently endorsed the planning for new corridors (common crossing locations) as part of this study (November 2005 motion).
- The **National Capital Commission's (NCC) White Paper titled 'A Strategic Transportation Initiative for Canada's Capital Region'**, published in June 2005 establishes the NCC's role in the planning, development and improvement of the NCR, including the area of transportation. Under its policy "Moving People", the NCC's strategy to improve interprovincial integration and continuity, capacity and access is to conduct joint studies (Reference, Page 5). Similarly, to improve goods movement and address the current effects truck traffic has on established communities, the NCC supports the relocation of heavy truck transport from the core area, in the context of new interprovincial crossings in the NCR (reference, Page 6).

The current arrangement of crossings directs all interprovincial truck movements through Ottawa's Central Business District (CBD). Both the City of Ottawa and the NCC have expressed a need to eliminate or reduce this condition.

5. Population and Employment Projections

Population levels in the NCR have increased from approximately 100,000 at the turn of the last century to approximately 1.1 million today (i.e. 2007). Projections indicate that the population of Ottawa and Gatineau will respectively grow by 30% and 32% equalling 1.5 million people in the NCR by 2031. Employment growth is expected to be robust with an additional 180,000 jobs generated by 2031 in Ottawa and a further 61,000 in Gatineau. **Table 1** illustrates the current (2007) and projected (2031) population and employment characteristics for the NCR.

| Table 1 Population and Employment Projections | | | | | | |
|--|-------------------|------------|------------|-------------------|------------|------------|
| | Population | | | Employment | | |
| | Ottawa | Gatineau | Total | Ottawa | Gatineau | Total |
| 2007 | 870,700 | 279,200 | 1,149,900 | 521,700 | 102,600 | 624,300 |
| 2031 | 1,135,700 | 368,200 | 1,503,900 | 703,000 | 163,000 | 866,000 |
| % Increase | 30% | 32% | 31% | 35% | 59% | 39% |

Source: City of Ottawa

It is noted that the growth areas will predominantly be in the suburban areas of Ottawa (the East, West and South Urban Centres) and in Gatineau (i.e. the Aylmer Sector).

6. Transportation Objectives

The movement of people throughout the NCR is an inherent growth-related challenge that must be addressed. Long term planning activities in Ottawa and Gatineau have identified the transportation policies, facilities, programs and services to be implemented over the next two decades, to address the mobility needs of local residents. The policies of both municipalities include several objectives that focus on minimizing costs, minimizing unnecessary travel, minimizing automobile dependence, keeping neighbourhoods livable, protecting public health and the environment, and making efficient use of current infrastructure and services.

One of the key strategies/objectives includes a substantial increase in the use of non-auto modes of travel (i.e. transit, walking, and cycling). More specifically, the City of Ottawa's TMP includes increasing city-wide peak hour transit use from 17 per cent of total person trips (2001) to about 30% by 2021. At the Interprovincial Screenline, transit currently accommodates approximately 16% of peak hour trips while the 2021 transit share is projected to increase to approximately 36%.

The City of Ottawa has also established the following goals with respect to increases in the share of peak-hour travel (city wide) by walking and cycling modes by 2021:

- Walking modal share – increase from 9.6 per cent in 2001 to 10 per cent in 2021; and
- Cycling modal share – increase from 1.7 per cent in 2001 to 3 per cent in 2021.

It should be noted that modal share refers to the total number of trips that occur by all modes of travel both motorized and non-motorized (i.e. transit, walking, cycling, automobile) while modal split refers to the number of trips taken by motorized vehicles (i.e. transit or automobile). In addition to the above, the TMP also identifies the need for Transportation Demand Management (TDM) and Transportation System Management (TSM) programs. These programs respectively promote policies and program that reduce the demand for travel (TDM) and maximize the

efficiency of the transportation system. For example, adjusting traffic control devices to maximize traffic flow would be considered a TSM measure. Numerous policies and programs have also been established to support these objectives.

These modal share values reflect the morning and afternoon peak commuter hour of travel, when volumes on the transportation system are typically highest. The increase in transit use is considered aggressive, in particular when compared to current usage levels for large urban areas in Canada. This ambitious objective requires a comprehensive package of supporting measures to make transit more competitive relative to automobile use, and to help make it the first choice for many people. These measures are essential to prevent lower than desired transit ridership, with its consequent increases in road requirements, congestion and air pollution. They include actions to: improve the form of development; reduce the supply of abundant free parking at key destinations; improve public awareness and support; level the financial playing-field between transit and driving; better integrate transit with other modes; and set priorities for new infrastructure that improve transit's service advantage wherever possible.

Despite these substantial increases in the role of transit, walking and cycling, there will be significantly higher automobile traffic volumes in every major travel corridor during the peak hours of travel. In this regard, both Official Plans indicate that roadway expansion will also be required at select locations.

7. Analysis Methodology

The following section presents a discussion of the supply and demand conditions at the Interprovincial Screenline. The analysis in this report employs the term passenger car unit (pcu) when discussing auto supply and demand calculations. The pcu provides a common unit of measure that recognizes inherent differences in the composition of the traffic stream. For example, heavy vehicles (i.e. trucks and buses) have significantly different operating characteristics when compared to the automobile. These larger vehicles move more slowly, require more road space and are inherently less mobile.

This analysis generally considers the commuter peak hours of travel, the periods when traffic is greatest and when capacity issues are most evident. Historically, transportation planning in the NCR has used the afternoon peak hour for analysis purposes. However, the latest emme/3 assignments employ the morning peak hour – the values derived for this period are generally more robust because there are fewer types of trips on NCR roadways (i.e. almost entirely work or school related, whereas the afternoon peak hour includes work related, school related, shopping, recreational, and other trip types). Analyses for the previous (afternoon peak hour) and the current (morning peak hour) emme/3 modelling efforts are jointly used in this review.

8. Characteristics of Existing Crossings

Transportation across the Ottawa River is accommodated by way of 5 existing crossings. Each crossing has a finite capacity reflecting the volume of vehicles that can be safely and efficiently serviced in a given time period. All of the crossings link with arterial roads on both sides of the Ottawa River, with the exception of the north leg of the MacDonald Cartier Crossing, which forms part of the provincial freeway system in Quebec. Both the Portage Bridge and the Champlain Bridge also include High Occupancy Vehicle (HOV) lanes. The characteristics of the five existing crossings are itemized in **Table 2**.

| Table 2 Characteristics of Existing Crossings | | | |
|--|-----------------|----------|--------------------------|
| Crossing Name | Lanes/Direction | | Capacity/Direction (pcu) |
| | General | HOV | |
| Champlain Bridge ¹ | 1 | 1 | 2,350 vph ² |
| Chaudière Bridge | 2 | | 1,575 vph |
| Portage Bridge | 2 | 1 | 2,715 vph ² |
| Interprovincial Bridge | 1 | | 1,000 vph |
| Macdonald Cartier Bridge | 3 | | 4,725 vph |
| TOTAL | 9 | 2 | 12,365 vph |

1. Reversible HOV lane
2. Assumes full occupancy of HOV lane

The capacity values listed above are a function of the features of the crossing link (i.e. number of lanes, operating speeds, etc.) and the characteristics of the downstream transportation facilities (i.e. presence of signalized or unsignalized intersections, number of downstream lanes, etc.) Both of these elements govern the volume of vehicles that can be serviced; however, intersections typically create the greatest constraints to mobility because traffic movements are highly controlled through the allotment of time for each approach.

The capacity values listed in **Table 2** reflect local experience and are based on ideal travel and weather conditions. The capacities can be significantly affected (i.e. reduced) by a number of factors including construction, collisions, disabled vehicles, inclement weather or a variety of other reasons. It is noted that bridges require considerable ongoing maintenance, increasing the likelihood that at least one of the five Ottawa River bridges will be subject to construction activities during the limited summer season. Construction activities/needs typically occur in 3 to 4 intervals.

9. Current (2007) Travel Demand and Supply Characteristics

A comparison of the current (2007) demand and capacity for each existing crossing is presented in **Table 3**. The demand values are based on actual counts completed in May 2007.

| Table 3 Current (2007) Supply and Demand/Morning Peak Hour, Peak Direction | | | |
|---|---------------|------------------------|-------------|
| Crossing Name | Demand (pcu) | Capacity (pcu) | Utilization |
| Champlain Bridge | 2,350 | 2,350 vph ¹ | 100% |
| Chaudière Bridge | 1,405 | 1,575 vph | 89% |
| Portage Bridge | 2,715 | 2,715 vph ¹ | 100% |
| Interprovincial Bridge | 1,256 | 1,000 vph | 126% |
| Macdonald Cartier Bridge | 4,064 | 4,725 vph | 86% |
| TOTAL | 11,790 | 12,365 vph | 95% |

1. Assumes full occupancy of HOV lane

In the analysis period, there were 11,790 pcu (includes both autos and commercial vehicles/trucks) travelling across the Interprovincial Screenline. Although there is some variability in utilization by individual crossing, each location generally operates at approximately 90% of available capacity (or higher). Collectively, the five bridges are functioning at 95% of available capacity. It is noted that the City of Ottawa uses a utilization rate of 90% of capacity as the typical threshold for infrastructure improvements.

Table 3 indicates that the crossings are essentially “at capacity”, indicative of very poor travel times, lengthy delays, poor maneuverability and high vehicle densities. The existing crossings cannot accommodate any increase in traffic during the critical commuter peak periods. All vehicles travelling across the Interprovincial screenline including transit, trucks (goods movements) and autos are affected by the poor operation.

Another indication of the operating conditions on the bridges is the extent of the commuter “rush hour”. Over the past decade, the commuter “rush hour” in Ottawa/Gatineau typically encompassed a one-hour period, in both the morning and afternoon, on a typical weekday. The commuter “rush hour” now extends beyond these traditional peak hours whereby each crossing is experiencing substantially increased use in other hours of the day, in particular in those time periods adjacent to the peak hours (see **Table 4**).

| Table 4 | |
|--|--|
| Afternoon Peak Period Traffic Volumes, Peak Direction | |
| 15 Minute Interval | Traffic Volume (Northbound Direction/All Crossings) |
| 3:15 – 3:30 p.m. | 2597 |
| 3:30 – 3:45 p.m. | 2762 |
| 3:45 – 4:00 p.m. | 2782 |
| 4:00 – 4:15 p.m. | 2826 |
| 4:15 – 4:30 p.m. | 2886 |
| 4:30 – 4:45 p.m. | 2746 |
| 4:45 – 5:00 p.m. | 2598 |
| 5:00 – 5:15 p.m. | 2471 |
| 5:15 – 5:30 p.m. | 2590 |

The impact of increased population and employment in both Ottawa and Gatineau and the interchange of trips between the two cities will result in an expanded commuter “rush hour” that will encompass a greater number of hours each weekday.

10. Future (2031) Travel Demand and Supply Characteristics

As stated, transit will accommodate much of the expected growth in travel demand at the Interprovincial Screenline. The City of Ottawa’s 2003 TMP indicates that 36% of person trips in 2021 will occur by way of transit - a substantial increase from the current level of 16%. **Table 5** illustrates the proportion of travel by motorized modes, in the afternoon peak hour/peak direction at all screenlines in the City of Ottawa

| Table 5 Projected Transit Modal Splits — By Screenline (City of Ottawa) | | |
|--|---------------------|------|
| Screenline | Transit Modal Split | |
| | 2002 | 2021 |
| Rideau River | 28% | 50% |
| CPR | 30% | 49% |
| Total: Inner Area Cordon | 29% | 50% |
| Green's Creek | 33% | 41% |
| 417 East (2000) | 0% | 0% |
| Leitrim | 1% | 32% |
| Fallowfield | 9% | 31% |
| Eagleson | 15% | 38% |
| Interprovincial ¹ | 16% | 36% |
| CNR West | 15% | 36% |
| CNR East | 18% | 41% |
| Western Parkway (1996) | 15% | 41% |
| Terry Fox (1996) | 3% | 34% |
| Rideau South | 6% | 25% |
| Bilberry Creek (1996) | 20% | 35% |
| Smyth / Hydro (2001) | 29% | 43% |

Source: City of Ottawa Transportation Master Plan, 2003. Interprovincial screenline projections are preliminary estimates subject to refinement through future work with the City of Gatineau and the NCC.

The projected (2021) travel demand (i.e. person trips) across the Interprovincial Screenline is illustrated in **Table 6**. For comparison purposes, 2002 values are also provided.

| Table 6 Current (2002) And Forecast (2021) Person Trips - Afternoon Peak Hour, Peak Direction Interprovincial Screenline | | | | | | | | |
|---|--------|----------|------------|--------|----------|--------|--------|----------|
| Transit | | | Automobile | | | Total | | |
| 2002 | 2021 | Increase | 2002 | 2021 | Increase | 2002 | 2021 | Increase |
| 2,300 | 10,200 | 343% | 11,900 | 18,100 | 52% | 14,200 | 28,300 | 99% |

Source: City of Ottawa Transportation Master Plan, 2003

The table identifies a 99% increase in person trips across the Interprovincial Screenline from 14,200 person trips in 2002 to 28,300 person trips in 2021. It is projected that transit will accommodate most of the growth increasing to not less than 36% of all person trips at the (i.e. growth of 343%). By 2021, transit will accommodate a total of 10,200 person-trips, while the automobile will accommodate 18,100 person-trips.

It is evident that projected population and employment growth in Ottawa and Gatineau will result in a greater demand for Interprovincial travel. Transit is considered an integral element in satisfying most of the growth in demand, however, if the transit objectives listed in **Tables 5 and 6** are not achieved, the auto demand across the Interprovincial Screenline will increase beyond those values identified above. The increased demands will exacerbate the current capacity deficiency to the extent that interprovincial mobility will be significantly impaired.

The analysis was updated in May 2008 to reflect the emme/3 modelling that has been developed for 2031 using forecast population and employment data provided by the City of Ottawa and City

of Gatineau. This analysis is reflecting the am peak hour in contrast to previous pm hour forecasts. The future forecast demand across the screenline is illustrated in **Table 7** including a range of transit mode splits.

| Table 7 2031 Forecast Person Trips a.m. Peak Hour (Peak Direction) Interprovincial Screenline | | | | | | | | | |
|--|-------------------|----------------------|--------------------|-------------------------------|---------------|-----------------|------------|------------------------------------|---|
| Scenario | Auto Person Trips | Transit Person Trips | Total Person Trips | Vehicle Demand/h ¹ | v/c Objective | Required Supply | Deficiency | Lane Deficiency Note 2 Note 3 | |
| 1. 30% Mode Split | 19741 | 8412 | 28153 | 15840 | v/c= 0.85 | 18635 | 6335 | 5 | 7 |
| 2. 36% Mode Split | 18018 | 10135 | 28153 | 14414 | v/c=0.85 | 16957 | 4657 | 4 | 5 |
| 3. 43% Mode Split | 16048 | 12105 | 28153 | 12838 | v/c=0.85 | 15104 | 2804 | 3 | 3 |

Notes:

- 1) Vehicle occupancy 1.25
- 2) Scenario 1 - Lane capacity 1200 veh/h (low friction approach intersections)
- 3) Scenario 2 - Lane capacity 900 veh/h (greater friction approach intersections)

Based on this review, the total person trips for 2031 is generally equal to previous forecasts (i.e. for 2021) across the Interprovincial Screenline. Using the above values, the total lane deficiency will be 4 or 5 lanes in the peak direction with the most aggressive transit mode split and depending on the efficiency of the downstream intersections should the 36% transit mode share objective be met and 5 to 7 lanes if the transit mode share objective is 30%.

The crossings as currently envisioned will provide 4 lanes of travel (peak hour, peak direction and two crossings). It is therefore imperative that these aggressive transit targets be met and that parallel transit projects be planned across this screenline to achieve this objective.

11. Truck Movements

A key concern identified by both the City of Ottawa and the NCC relates to role of the crossings in heavy vehicle movements in Ottawa's central area. The City of Ottawa's OP specifies that the City will explore alternative means to accommodate interprovincial truck travel to minimize impacts on the Central Area, in particular along and in the vicinity of King Edward Avenue. Upon the completion of a new interprovincial corridor to accommodate trucks in a safe and efficient manner, the City will remove Rideau Street and King Edward Avenue from the City's identified truck route system

The aforementioned document titled '**A Strategic Transportation Initiative for Canada's Capital Region**', published in June 2005 establishes the NCC's role in the planning, development and improvement of the NCR, including the area of transportation. Under its policy Moving People, the NCC's strategy to improve interprovincial integration and continuity, capacity and access is to conduct joint studies. Similarly, to improve goods movement and address the current effects truck

traffic has on established communities, the NCC supports the relocation of heavy truck transport from the core area, in the context of new interprovincial crossings in the NCR.

The current truck route through Ottawa's CBD involves travel on several roadways (King Edward, Rideau, Waller, etc.) and the completion of a number of difficult maneuvers. These roads are not conducive to large vehicle movements because of narrow lanes, tight corner radii and the presence of considerable pedestrian and cycling activity. Additionally, these streets have adjacent land uses that are not compatible with heavy vehicle movements because of noise and vibration impacts. These uses include commercial/retail uses (King Edward and Rideau Streets), residential uses (King Edward, Rideau and Waller Streets) and institutional uses (University of Ottawa area).

The presence of heavy vehicles also affects capacity and operations in Ottawa's CBD due to the following characteristics:

- Poor acceleration and deceleration;
- Extended storage needs;
- Increased vehicle turning needs; and
- Noise and vibration concerns.

Clearly, these characteristics are incompatible with the roadways, communities and other activities that occur in Ottawa's CBD.

12. Summary and Conclusions

The bridges are currently functioning "at capacity" whereby virtually no additional traffic can be accommodated in the extended commuter rush hours (morning and afternoon). In addition, capacity is affected by construction activities, collisions, disabled vehicles, inclement weather and a variety of other reasons. The effects can be significant for both bridge users and downstream transportation facilities.

The current arrangement of crossings also directs interprovincial truck movements through Ottawa's CBD. Both the City of Ottawa and the NCC have expressed a need to eliminate or reduce this condition. The benefits of addressing this problem will be significant both to the local communities (i.e. Lowertown area) and the overall attractiveness and safety of Ottawa's CBD.

A sample listing of the accompanying affects these conditions are profound:

- **Quality of Life:** The lack of adequate crossing capacity will affect the overall quality of life for residents residing in Ottawa and Gatineau. Considerable additional time will be spent on congested roadways.
- **Auto Emissions:** The lack of adequate capacity will increase auto emissions because of lower travel speeds and increased idling. This approach runs contrary to environmental objectives established by the City of Ottawa and the federal government.
- **Delays to Persons:** Considerable delays will be incurred by persons travelling across the Interprovincial Screenline. This equates to an economic loss for Ottawa and Gatineau.
- **Delays to Movement of Goods:** Considerable delays will be incurred by goods travelling across the Interprovincial Screenline. This item is likely more critical than the above, because

of the lack of discretionary travel opportunities - vehicles moving goods in this area may not have flexibility in travel times. This also equates to an economic loss for Ottawa and Gatineau.

- **Delays to Street-Level Transit:** All surface transit routes travelling along these roadways will be subjected to delays on the transportation system. Additional costs may be incurred to further develop Bus Only Lanes or other transit priority measures (beyond those identified in the TMP) to address delays generated by on-street congestion.
- **Fuel Consumption:** The consumption of fossil fuel will increase because of ongoing congestion on the roadways.
- **Tourism and Safety Impacts:** Both the City of Ottawa and the NCC have expressed a need to eliminate or reduce heavy truck traffic in Ottawa's CBD. The removal of some or all of the heavy vehicle traffic would greatly enhance the overall attractiveness and safety of roadways in Ottawa's CBD.
- **Hazardous Goods:** The movement of hazardous goods through the CBD is particularly problematic because of the considerable population and employment activities that occur in this area. In addition, the circuitousness of the truck route, the number of vehicle/pedestrian conflict locations and the poor roadway geometry are also concerns related to the movement of hazardous goods through the CBD.
- **Neighbourhood Impacts:** The reduction of heavy vehicle movements in Ottawa's CBD would reduce noise and vibration impacts, enhance the safety and attractiveness of pedestrian and cycling modes of travel, and improve the street level activities.
- **Economic Development in the NCR:** The attractiveness of development in the NCR may be affected by the lack of adequate transportation facilities.

In summary, additional Interprovincial crossings are currently required to address capacity issues, truck routing concerns and the multitude of other issues listed above. The status quo is not considered a reasonable alternative.