NCC CCN

Transports Québec

INTERPROVINCIAL CROSSINGS ENVIRONRENTAL ASSESSMENT

ÉVALUATION ENVIRONNEMENTALE DES LIAISONS INTERPROVINCIALES

Interprovincial Crossings Environmental Assessment Study

Analysis of Potential Transit Impacts

Final Draft

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1.0 INTRODUCTION

The National Capital Commission (NCC), with the ministère des Transports du Québec (MTQ) and the Ministry of Transportation of Ontario (MTO) are carrying out the Environmental Assessment Study of Future Interprovincial Crossings in the National Capital Region (NCR), in collaboration with the City of Ottawa and the Ville de Gatineau. This study includes a working plan to analyse the effects on public transit resulting from 10 new interprovincial crossings.

This transit evaluation report is structured as follows:

- Transit evaluation methodology;
- Regional portrait of transit for 2005 and 2031;
- Evaluation of interprovincial crossings in relation to transit; and
- Conclusions.

The evaluation of public transit is based on the results of modelling using the regional transport model TRANS, which covers the National Capital Region, developed by the TRANS[1] committee. This model is based on current (2005) and projected (2031) population and employment statistics, and was developed on the EMME 3 platform. The data have been approved by the Cities of Gatineau and Ottawa and the Ministries of Transportation for Québec and Ontario, under the terms of reference of the TRANS committee. Note that the 2031 model incorporates transport network improvements already planned for that horizon. The TRANS model makes it possible to measure the effects of each new crossing on the geographic distribution of transit demand, and the most frequently occurring modal choice, which allows us to evaluate the effect of each link on transit. At the same time, it should be kept in mind that TRANS modelling does not take into consideration the effects created by a new interprovincial crossing on the location of the population or employment; that is, changes in the location of persons or jobs uniquely attributable to the establishment of a new interprovincial crossing cannot be predicted nor modelled.

[1] The TRANS committee was created in 1979 to coordinate the efforts of the main transit planning bodies in the National Capital Region. The six members of TRANS represent the three levels of government: the National Capital Commission, the ministère des Transports du Québec, the Ministry of Transportation of Ontario, the Ville de Gatineau, the City of Ottawa and the Société de transport de l'Outaouais.

2.0 EVALUATION OF INTERPROVINCIAL CROSSINGS IN RELATION TO TRANSIT: METHODOLOGY

This section presents the methodological framework used for modelling as well as the available quantitative data selected to evaluate the ten interprovincial crossings in relation to transit, and the evaluation criteria used to accomplish this.

2.1 Data

The selected available data for evaluating the effect of interprovincial crossings on transit are outputs of the TRANS regional transport planning model developed by the TRANS Committee, as per its mandate, covering the entire National Capital Region.

This regional model was run on an EMME3 platform, to obtain a picture of the geographic distribution of trips and modal split demands over a long-term horizon, according to available transportation alternatives and the location of population and employment, known or planned. This model is particularly used for testing future scenarios using various transportation (infrastructure) alternatives, such as the addition of a new interprovincial highway crossing, as is the case in this present study. The model was recently calibrated by means of supply and demand for the year 2005 using the results of the origin/destination survey and other transportation surveys.

For the purpose of this study, the model was used to simulate the following scenarios:

- 2005: reference year (for calibration);
- Ten (10) 2005 scenarios, each consisting of the inclusion of a single new interprovincial crossing, modelled exclusively as a highway crossing, that is, with no transit route using the crossing (in order to evaluate the maximum automobile load);
- "Forecast 2031" or "do nothing": on the basis of projections relating to location and evolution of population and employment in the study area[2], a forecast was modelled for the 2031 situation to include improvements to the highway network and transit networks currently planned (see section 3.2 for further details);

[2] Sources: for Gatineau: 2005 population demographics from 2001 census, Institut de la Statistique du Québec and employment forecasts from the Liste Industries Québec, City of Gatineau; for Ottawa: demographic forecasts based on post-census estimates by the City of Ottawa and employment forecasts based on the 2005 employment survey.

- Ten (10) 2031 scenarios, each consisting of the inclusion of a single new interprovincial crossing, modelled exclusively as a highway crossing, that is, with no transit route using the crossing (in order to evaluate the maximum automobile demand); and
- Eight (8) 2031 scenarios, each consisting of the inclusion of a single new interprovincial crossing AND a transit route (bus without preferential measures, *à priori*) established over this crossing as defined previously by transit authorities during this study (OC Transpo and Société de Transport de l'Outaouais - STO). These final scenarios are designed to evaluate minimum impacts on reduced ridership of transit networks, and consequently the opportunity of using a new interprovincial crossing for transit.

  Note: New bus routes on crossing 1 – Pink Road-Riddell and 4-Boulevard des Allumettières-Acres-417/416 were deemed irrelevant by the STO and OC Transpo, either because it was clear that the crossing would not service any employment or associated residential zone (crossing 1), or because it was determined that the route was clearly under-utilized (crossing 4).

These new interprovincial routes are, respectively for each crossing, as follow:

Table 1: Transit routes modelled on new interprovincial crossings (TRANS model, 2008)

Scenario	Bus routes modelled on interprovincial crossing
Interprovincial Crossing 1 – Pink Road-Riddell with bus crossing (bridge)	No transit route modelled on this crossing, based on a lack of sufficient zones for service in this specific portion of the NCR.
Interprovincial Crossing 2 – Boulevard des Allumetières-Riddell-March-417 with bus crossing (bridge and tunnel)	Rivermead-Eagleson bus route: from Rivermead Parc-o-bus, west on Aylmer Road, west on the new crossing and Riddell, south on March, south on Teron, Teron Station, east on Campeau, south on Eagleson, to Eagleson Station.
Interprovincial Crossing 3 – (Lac Deschênes) Boulevard des Allumettières-Moodie-417 with bus crossing (bridge)	Rivermead-Bayshore bus route: from Rivermead Parc-o-bus, west on Aylmer Road, south on the new crossing and Moodie, east on Highway 417 or future Transitway, to Bayshore Station.
Interprovincial Crossing 4 – (Lac Deschenes) Boulevard des Allumettières-Acres-417/416 with bus crossing (bridge)	No transit route modelled for this crossing, based on too little demand in this specific portion of the NCR.
Interprovincial Crossing 5 - Kettle Island-50/417 with bus crossing (bridge)	Promenades de l'Outaouais-St Laurent bus route: from Promenades de l'Outaouais Terminus, east on Maloney, south on Paiement, new crossing and Aviation Parkway, west on Ogilvie, south on St Laurent to St Laurent Station.

Interprovincial Crossing 6 - Lower Duck Island-50/417 with bus crossing (bridge)	Lorrain-Blair bus route: from Lorrain (Rapibus) station, south on Lorrain and new crossing, west on Ottawa Road 174 to Blair Station.
Interprovincial Crossing 7 - Gatineau Boulevard de l'Aéroport-174/417 with bus crossing (bridge and tunnel)	Two bus routes: Lorrain-Blair and Masson-Blair: - Lorrain-Blair: from Lorrain (Rapibus) station, east on Maloney, south on the new crossing, west on Ottawa Road 174, to Blair Station; - Masson-Blair: from Encan Larose Parc-o-bus, south on Georges, west on Highway 50, south on the new crossing, west on Ottawa Road 174, to Blair Station.
Interprovincial Crossing 8 - Montée Mineault-Tenth Line-50/417 with bus crossing (bridge)	Two bus routes: Lorrain-Place d'Orléans and Masson-Place d'Orléans: - Lorrain-Place d'Orléans: from Lorrain (Rapibus) station, east on Maloney, south on the new crossing and Tenth Line, west on Ottawa Road 174 or new Transitway, to Place d'Orléans Station; - Masson-Place d'Orléans: from Encan Larose Parc-o-bus, south on Georges, west on Highway 50, south on the new crossing and Tenth Line, west on Ottawa Road 174 or new Transitway, to Place d'Orléans Station.
Interprovincial Crossing 9 - Petrie Island-50/417 with bus crossing (bridge)	Two bus routes: Lorrain-Trim and Masson-Trim: - Lorrain-Trim: from Lorrain (Rapibus) station, east on Maloney, south on the new crossing and Trim, to Trim station; - Masson-Trim: from Encan Larose Parc-o-bus, south on Georges, west on Highway 50, south on the new crossing and Trim, to Trim Station.
Interprovincial Crossing 10 – Masson-Angers-Cumberland-50/417 with bus crossing (bridge)	Masson-Trim bus route: from Encan Larose Parc-o-bus, south on Georges, west on Highway 50, south on the new crossing and Trim, to Trim Station.

These new bus routes were refined further using the following procedure:

- Each of these scenarios was first modelled with high capacities and frequencies (1 bus every minute) for account for maximum demand (without limit) interested in using these new transit routes, to support or fail to support transit inclusion;
- After deciding whether or not to keep the bus route on the crossing, based on the demand observed in the first model, a second model was run, with frequencies and capacities reflecting the anticipated demand based on previous analysis.

The evaluation criteria defined to evaluate the effect of interprovincial crossing options on the transit plan are presented in the following section.

2.2 Evaluation Criteria for Transit (CT)

Evaluation of the effect of crossings on transit was performed using selected evaluation criteria, discussed at the Transit Workshop meeting, held on April 25, 2008 in Ottawa (Appendix 1). These criteria are quantitative measures that came out of the TRANS scenarios' modelling described above.

These criteria measure:

- The absolute variation in **mean travel time per transit trip**, throughout the study area (National Capital Region), at morning peak period, in minutes per trip, between two scenarios (CT1 and CT3 respectively, with and without an interprovincial transit route);

  This first type of measurement allows the quantification of the effect of the new crossing on the **performance or effectiveness** of the transit network, or also the level of utility of this new crossing for transit users. This criterion is to be minimized, since reduced travel time is a benefit to the user;
- The absolute variation in the **number of transit trips taken** in the study area (National Capital Region), during the morning peak period, in number of trips, between two scenarios (CT2 and CT4 respectively, with and without an interprovincial transit route);
- This second type of measurement allows us to quantify the effect of the new crossing on the **use** of transit, since what it measures is the variation in number of transit trips throughout the complete study area. This criterion is to be maximized, since an increase in the number of transit trips is a benefit for transit authorities and, more generally, for society.

Note that use of a model such as TRANS provides for a certain degree of reliability for comparative evaluations of scenarios. Within this framework, variations are considered between scenarios which are representative for the analysis, given the level of refinement of transit networks.

Two series of measurements were carried out to compare the two scenario sets:

- A first series of variations between the scenarios "2031 with highway crossing but without new transit route on the crossing" and the scenario "Forecast 2031"; these variations measure the **net effect of the new highway crossing on transit, when the crossing is not used by transit (CT1 and CT2)**;
- A second series of variations between scenarios "2031 with highway crossing and transit service established on that crossing", and "Forecast 2031"; these variations measure the **effect of transit optimisation of the crossing, in other words, it measures the transit opportunity offered by the new crossing (CT3 and CT4)**.

3.0 TRANSIT PORTRAIT FOR THE STUDY AREA IN 2005 AND FORECAST 2031

Before presenting the results of the transportation evaluation of the new interprovincial crossings, this section provides a portrait of the transit networks and ridership. This portrait is provided for the complete study area, and for the corridors of each interprovincial crossing assessed, for the year 2005 and the "Forecast 2031" produced by the TRANS model, according to the previously described scenarios.

These portraits allow for a better understanding of the evaluation of the impacts of the interprovincial crossings on transit.

3.1 The Study Area in 2005

3.1.1 Current Transit Conditions (2005)

Two urban transit networks exist in the study area: the Société de Transport de l'Outaouais (STO) which serves mainly Gatineau, and OC Transpo which mainly serves Ottawa. These two networks are introduced briefly below. Details on the transit river-crossings provided by OC Transpo and STO will be the focus of section 3.1.1.3.

3.1.1.1 The STO Network

The STO offers transit service across the area of the Ville de Gatineau, Cantley and Chelsea. Some STO routes also serve downtown Ottawa. The following table offers some general characteristics of the STO.

Table 2: General characteristics of the STO Gatineau network in 2007-2008

(source: http://www.sto.ca)

Variable	Value (2007)
Area covered by service	589 km²
Population served	Over 240,000 residents
Bus trips	Over 18 million
Annual variation in ridership	+ 3.6% (2007/2006)
Number of vehicles	259 buses
Number of valid smart cards in circulation	Over 28,000
Number of bus routes offered	In 2008: 57 routes (consisting of: 41 regular and peak routes, 13 express routes, 2 inter-zone routes and the 300 route)

3.1.1.1.1 Service

STO service consists of four types of bus service:

- Regular: regular service at regular intervals;
- Peak period: service offered on weekdays mornings and evenings, in the direction of peak flows;
- Express: service offered only during morning and evening peak periods, consisting of embarking, sealing of doors, disembarking; designed in this way to offer faster service than regular service; and
- Interzone: service using the highway between the Masson-Angers sector and the Hull and Ottawa downtowns;

The complete STO network map is given in Appendix 2.

3.1.1.1.2 Reserved Lanes

The STO network includes about 20 kilometres of reserved lanes. These reserved lanes are located on the following roadways:

- Maisonneuve Boulevard;
- Alexandre-Taché Boulevard;
- Portage Bridge;
- Gréber Boulevard;
- Fournier Boulevard; and
- Aylmer Road.

The location of these reserved lanes is mapped on the STO Internet site (www.sto.ca).

3.1.1.1.3 Parc-o-bus

The STO offers 17 Parc-o-bus lots served by transit, which allow riders to park their vehicles and continue their trips by transit. These Parc-o-bus lots are located at:

- Rivermead;
- Galeries Aylmer;
- Centre Robert-Guertin;
- Les Promenades;
- De la Cité (temporary);
- Freeman;
- Pierre-Lafontaine;
- St-Alexandre;
- Jean-René-Monette;
- Sainte-Rose-de-Lima;
- Lorrain;
- Georges/Highway 148;
- De l'Encan;
- Old Chelsea;
- Gréber/Saint-Louis;
- Saint-Dominique; and

- Hippodrome.

Some of these Parc-o-bus lots are free, while others impose parking fees. The locations of these Parc-o-bus lots are mapped on the STO Internet site (www.sto.ca).

3.1.1.1.4 Rates

Three types of rates apply to STO services: regular, express and interzone rates, depending on the type of service used. The methods of payment available are:

- Cash payment;
- Ticket;
- Transfer;
- Day pass;
- Monthly pass in the format of the Passe-Partout PLUS smart card;
- Loyalty program: annual pass by automatic bank payment;
- The Cam-Puce rate, for adults 21 years of age and older registered in a full-time program of study; and
- Gift card.

The Passe-Partout PLUS smart card is used on a subscriber basis, but can also be used as an identification card to allow the use of a reduced rate ticket, since it is personalized. It can be reloaded at one of many agents' sites.

Reduced rates are offered to the elderly, children, students, groups, persons with impaired vision, and those with invisible handicaps.

Rate integration with OC Transpo allows riders to travel on the STO network with a valid OC Transpo proof of payment, subject to specific conditions depending upon the type of service being used.

3.1.1.2 The OC-Transpo Network

OC Transpo offers transit service to the communities of Ottawa, Nepean, Vanier, Rockcliffe, Gloucester, Kanata, and Orléans, and offers a rural transit service (established in 2002) to the communities of Cumberland Village, Carlsbad Springs, South Gloucester, Kars, Leitrim, Manotick, Munster Hamlet, Navan, North Gower, Notre-Dame-des-Champs, Richmond, Stittsville, and Vars. Certain OC Transpo routes also serve downtown Gatineau. The following table offers some general characteristics of the OC Transpo service as it exists in the year 2006.

Table 3: General characteristics of the OC Transpo Ottawa network in 2006

(source: http://www.octranspo.com)

Variable	Value for year 2006
Area covered by service	413 km²
Population served	760,100 individuals
Total number of bus trips	91.8 million
Average number of trips per weekday	355,100
Total number of passenger-kilometres	835.7 million
Number of bus routes offered (excluding routes operated by rural partners)	238
Number of rail routes offered	1 (O-Train)

3.1.1.2.1 Service

OC Transpo service is structured over two broad service types, which themselves consist of various types of transit routes:

- Downtown routes: consisting of various types of bus routes and the O-Train rail line; and
- Routes serving rural areas, comprising the rural transit service offered by OC Transpo.

The OC Transpo Rapid Transit network extends both into downtown and peripheral rural areas.

The following table brings together the bus routes operated by OC Transpo. The O-Train provides yet another route.

Table 4: Bus routes operated by OC Transpo (source: http://www.octranspo.com, 03/2008)

Type of bus route	Number of routes
Routes serving downtown:	
Rapid Transit Routes	5
Black Routes	61
Red Routes	33
School Routes	88
Early Morning Routes	6
Scotiabank Place Connexion Routes (occasional)	6
SUB-TOTAL	**199**
Routes serving rural areas:	
Green Express Routes (including 8 Rural Express Routes)	39
SUB-TOTAL	**39**
TOTAL	**238**

The complete OC Transpo network map is given in Appendix 3. OC Transpo's rapid transit and rural networks are given in Appendix 4.

O-Train

The O-Train uses a railway line 8 kilometres in length between the Greenboro Station to the south and Bayview Station to the north, and operates to the west of downtown in the City of Ottawa. Five stations receive service, each connected to express and/or regular bus routes, and in particular, the O-Train offers connections at downtown, Carleton University and the Ottawa International Airport (south of Greenboro station).

The O-Train runs Monday through Saturday, with a frequency of between 15 and 30 minutes. It is based on Bombardier Talent equipment furnished with diesel engines at each end, allowing it to travel in either direction without the need for a half-turn. The O-Train has room for 135 seated passengers, with additional standing room for 150 persons. It was launched on October 15, 2001.

Rapid Transit Routes:

5 (five) express bus routes comprise the **Rapid Transit Routes**: routes 94, 95, 96, 97, 101/102, with higher frequencies. The routes taken are listed in Appendix 4.

Regular routes

In parallel to the rapid transit service offered by OC Transpo (5 bus routes and one train route) there are:

- 61 **Black / Regular bus routes**: operate 7 days a week, all day;
- 33 **Red / Peak routes**: operate from Monday to Friday, peak hours only;
- 88 **School Routes**;
- 6 **Early Morning routes**: operate between 4 a.m. and 6 a.m.; and
- 6 **Scotiabank Place Connection Routes** which operate as necessary, depending upon the duration and scope of the event taking place at Scotiabank Place (occasional service).

Rural routes

The rural areas of Ottawa receive the following transit services (Appendix 4):

- OC Transpo, with 39 **Green Express Routes**: operate Monday to Friday at peak hours, serving suburban areas and require a supplementary payment; 8 **Rural Express Routes** are included in this category; and
- Several other bus fleet operators offering 17 **Rural Partner Routes**: operate at a variable rate (variable per operator) and only during peak hours.

3.1.1.2.2 Reserved Lanes – the Transitway

Transit running on dedicated routes in Ottawa includes the O-Train, introduced above, and Transitway routes.

The Transitway is a network comprised of several trunks running through a dedicated corridor for buses (portions of the roadway exclusively reserved for buses), serving downtown

Ottawa. The Transitway makes it possible to offer express, high speed, high frequency bus routes (the 5 **Rapid Transit Routes**). In downtown, 175 buses run on the principal trunks of the Transitway during the peak period. This network, largely completed in 1996 and 31 kilometres in length, connects 38 stops. In addition, 31 **bike & ride** lock-ups are offered (two-wheel lock-ups, to encourage the combined use of bicycles and transit).

3.1.1.2.3 Park&Ride

Park&Ride in Downtown

The OC Transpo network in downtown has 11 Park&Ride lots representing 5100 private vehicle parking spaces. Gold permits allow riders to reserve a spot on a yearly basis at one of these lots.

Park&Ride in rural areas

The OC Transpo network in rural areas also has 14 Park&Ride lots representing approximately 1,225 spaces for private vehicles. Here, Gold permits also allow riders to reserve a spot on a yearly basis.

3.1.1.2.4 Rates

Three types of rates apply to OC Transpo services: regular, express, or rural circuit, depending on the type of service being used. The possible mehtods of payment are:

- Cash payment;
- Orange tickets, that may be purchased at designated sales points;
- The O-Train ticket, which applies solely to use of the O-Train; and
- Monthly passes, the least expensive option when the number of monthly trips so justifies.

In addition, there are:

- Different types of monthly passes, depending on the age of the user, the type of circuit being used, whether or not one is a student, or handicapped, etc.;
- The DAYPASS, a transit pass for the full day;
- ECOPASS, a salary holdback program for employees; and
- GOLD PERMITS to allow one to reserve a place at Park&Ride station.

Rate integration with OC Transpo allows one to travel on the STO network using a valid OC Transpo pass, provided that certain conditions are met, and depending upon the type of service used.

3.1.1.3 River-Crossing Transit Connections

River-crossing transit connections in the study area are offered by ferries on the Ottawa River and by OC Transpo and STO bus routes.

3.1.1.3.1 OC Transpo Interprovincial Transit

6 (six) OC Transpo bus routes offer river-crossing connections (see Appendix 5):

- 4 Red routes (at peak: 40, 88, 105, 180);
- 1 Black route (regular, 8); and
- 1 Green route (suburban route, 27).

3.1.1.3.2 STO Interprovincial Transit

STO bus routes offering a river-crossing connection are (see Appendix 5):

- Over the Champlain bridge: 2 peak routes, namely the 58 Rivermead and Aylmer Road –Tunneys Pasture (Transitway) and the 28 Gamelin-Émond –Tunneys Pasture (Transitway), offering essentially a southbound route during morning peak period and northbound during afternoon peak period;
- Over the Portage, Alexandre and Macdonald-Cartier bridges:
  - 11 regular routes (21, 31, 33, 35, 36, 37, 38, 39, 59, 67, 77);
  - 14 peak routes (1, 5, 20, 25, 26, 27, 29, 40, 41, 44, 46, 45, 47, 48);
  - 15 express and interzone routes (11, 17, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 94, 98).

3.1.2 Transit Trips (2005)

The 2005 origin-destination survey conducted in the study area was interpreted and discussed in the report “2005 Origin-Destination Survey - Summary of Results, National Capital Region”, (TRANS Committee, iTRANS consulting, December 2006). The main observations in 2005 relating to travel were the following:

- A high vehicle ownership rate per household, at 1.41;
- An increase in the number of households and jobs, as compared to 20 years earlier;
- An increase in the number of total trips in the study area , as compared to 20 years earlier, achieving a level of 2.81 million trips per day in 2005;
- The transit trips accounted for 13% of all trips (all modes) over a period of 24 hours and for 19% and 16% respectively for all trips during peak periods in the morning and the afternoon;
- The number transit trips in the study area has increased since 1986, however, the transit modal share has decreased over the same period (dropping from 15.4% to 12.9%);
- The transit modal share relative to all motorized travel modes combined is 24% for trips originating from the study area and 19% for trips with a destination in the study area (at the two peak periods of the day);
- Combining all travel modes, downtown Ottawa is the main destination of all trips (23%) at morning peak period; and
- The greatest interprovincial flows are generated by residents of the Outaouais getting to Ottawa during the morning peak period (43,200 compared to 17,200 heading in the opposite direction) and returning during the afternoon peak period.

A more specific analysis of the data from the 2005 origin-destination survey made it possible to determine the transit modal share of interprovincial trips in the study area (National Capital Region) (Table 5).

Table 5: Transit modal share between the north (Gatineau) and the south (Ottawa) in the study area (National Capital Region), 24h, all motives (source: 2005 Origins Destinations surveys)

	North	South
North	7%	19%
South	16%	14%

The transit modal share is (24 hour period, all motives, based on all travel modes, 2005):

- river-crossings, both directions combined: 18%;
- river-crossings towards the South higher than towards the North, by 3%.

Given that the total number of trips towards the South is higher in absolute value than those towards the North, these figures confirm that Ottawa attracts more trips than Gatineau/Hull and moreover, that transit is more frequently used in the direction of Ottawa than in the direction of Gatineau/Hull.

At the same time, when the modal shares are examined more closely, distinguishing between downtowns, urban peripheries and the rural areas of both sides of the Ottawa River, it becomes apparent (for trips over 24 hours, all motives, 2005) that the highest transit modal shares are observed in the following river-crossing origin-destination pairs:

- Trips between downtown Ottawa and the urban periphery of Gatineau (Plateau, Aylmer, Pointe Gatineau and Gatineau East sectors), with a transit modal share of 34% towards downtown Ottawa and 29% towards the urban periphery of Gatineau;
- Trips between the two downtowns are roughly equal (27% and 28%);
- Trips between downtown Gatineau (île de Hull and Hull periphery) and the urban periphery of Ottawa (Bayshore/Cedarview, Ottawa West, Merivale, Hunt Club, Alta Vista, Orléans, Beacon Hill, Ottawa East sectors), with a transit modal share of 23% towards downtown Gatineau and 24% towards the urban periphery of Ottawa.

3.2 The Study Area in "Forecast 2031"

The study area (National Capital Region) was characterized within the TRANS model in terms of population, employment, and travel by motorized means. Population and employment projections for 2031 came from several sources and are validated projections[3].

The information below regarding transit and projected demand comes from the TRANS model.

3.2.1 Future Transit Conditions (2031)

The transit network modelled in the TRANS model to simulate the "Forecast 2031" is an improved network compared to 2005. The main improvements are listed below.

Ottawa - OC Transpo

The improvements made to transit in the southern portion of the National Capital Region include all of the measures mentioned in the "Transportation Master Plan Ottawa 2020" (TMP), prepared by and for the City of Ottawa in 2003, currently being studied and updated for a new 2008 version. Briefly, this plan proposes six types of strategic actions for transit, taken into consideration in the TRANS model, which are:

- Measures favouring transit accompanying urban development (parking management, transportation demand management, financial incentive initiatives, intermodal integration and the establishment of infrastructure priorities);
- Strategic initiatives in the transit service (network structure, service standards, rates, financing, service to villages and rural regions, interprovincial service and service from outside the City of Ottawa);
- Improvements to accessibility and specialized services for reduced mobility individuals;
- Transit priority measures on major arterial roads;
- Extension of the Rapid Transit Network, especially of the Transitway and the Light Rail System, accompanied by new stations and new Park&Rides; and
- Expansion of the vehicle fleet and replacement of vehicles, integrating greener technologies to reduce polluting atmospheric emissions.

It should be noted that in terms of expansion to the Rapid Transit Network, the scope of the network modelled at the time the TRANS modelling was performed (January 2008) was only a little less than what is proposed in the TMP. Improvements taken into consideration in the context of this study are the following (Appendix 6):

[3] Sources: for Gatineau: 2005 population demographics from 2001 census, Institut de la Statistique du Québec and employment forecasts from the Liste Industries Québec, Ville de Gatineau; for Ottawa: demographic forecasts based on post-census estimates by the City of Ottawa and employment forecasts based on the 2005 employment survey.

- Conversion of the Transitway into a Light Rail System (LRT) between Baseline and Blair (red routes in Appendix 6);
- Extension of the O-Train (LRT) to the south (red routes in Appendix 6);
- Extension of the Bus Rapid Transit (BRT) in rural areas (blue routes in Appendix 6); and
- A few supplementary routes in BRT service from amongst the axes designated in grey in Appendix 6, currently being studied (2008).

Other minor improvements to the transit network in Ottawa have been completed, such as adding short local bus routes to service new rapidly growing zones.

Gatineau – STO

With regards to the STO transit system, the project designed to provide the backbone of the structure of the regional light rapid transport, the Rapibus, was modelled for the 2031 situation (see Appendix 6). The Rapibus project represents the intervention 3.1 of the strategic axis III (a high performance transit network supported by appropriate infrastructure) of the STO strategic plan of 2005-2015. The Rapibus consists of developing a dedicated site in a railway right-of-way in the east-west axis, connecting Gatineau to Hull (downtown), which would nearly double the number of reserved lane kilometres available to transit in Gatineau. An express route (BRT – Bus Rapid Transit) would be dedicated to the Rapibus, and the local routes would provide direct connections to it (draw-downs). According to the TRANS 2031 scenarios modelled in this study, the Rapibus runs from Laurier to Montcalm, integrating a BRT connection to north of Hull.

3.2.2 Transit Trips (2031)

Transit travel data for the “Forecast 2031”situation are the result of TRANS modelling. A few results are presented in this section, characterizing the transit demand in the “Forecast 2031” situation and its comparison with respect to the 2005 situation modelled. The figures given pertain solely to morning peak period.

- Vehicle kilometres in cars increase by 32.5% between 2005 and 2031, while vehicle kilometres in transit increase by 530.4%;
- Transit ridership in the morning peak period (Table 6):
  - Transit ridership increases strongly between 2005 and 2031 over the whole study area: + 75.1%;
  - Increased ridership is greatest on the desire line of the Ottawa River, especially in the direction of Gatineau (+203%), the result of the development of the planned employment centres on that side of the river;
  - Downtown Gatineau sees the number of transit trips in its direction increase (+191.7%) in a more pronounced manner with respect to those towards

downtown Ottawa (+33.8%), although the latter was originally higher (15,442 trips to downtown Ottawa compared to 2,339 trips to downtown Gatineau in 2005);

- Transit modal shares during the morning peak period (modal shares of all trips by motorized means, Table 7):
  - The transit modal share over the entire study area (National Capital Region) increased by 5.6 percent between 2005 and 2031, to reach 25.6%;
  - Note that the transit modal share in the direction of downtown Ottawa is 54% in 2005 and reaches 65% in 2031, while this modal share in the direction of downtown Gatineau (île de Hull) goes from 27% to 43% in 2031.

Table 6: Variation in transit ridership in the study area, between 2005 and 2031, during morning peak, period TRANS model (2008)

Transit ridership (trips) for origin/destination pairs	2005	Forecast 2031		
			Variation relative to 2005	
	Absolute value	Absolute value	Absolute variation	Variation in %
Study area (NCR – National Capital Region)	47,793	83,684	35,891	75.1%
Ottawa River screenline:				
• Ottawa to Gatineau (northbound)	1,868	5,660	3,792	203.0%
• Gatineau to Ottawa (southbound)	5,106	11,903	6,797	133.1%
»Urban centres screenline:				
• Incoming to urban centre of Gatineau (île de Hull)	2,339	6,823	4,484	191.7%
• Incoming to urban centre of Ottawa	15,442	20,664	5,222	33.8%
• Incoming to both urban centres of Ottawa and Gatineau	17,781	27,487	9,706	54.6%

Table 7: Variation in transit modal share (versus motorized trips) in the study area, between 2005 and 2031, during morning peak period, TRANS model (2008)

Transit modal share for the entire study area (NCR—National Capital Region)	2005	Forecast 2031
Value (%)	20.0%	25.6%
Variation relative to Forecast 2031 (point)		5.6

The number of transit trips over the entire study area presented in Table 6 for 2005 and Forecast 2031 are values that contribute to the CT2 evaluation criterion for these two years.

The values of the CT1 criterion, namely, the mean travel time per transit trip, are presented below for those two years. The travel time varies by 2.32% and shows an improvement in 2031, as the level of service of the transit network in 2031 is better than that in 2005.

Table 8: Variation in mean travel time per transit trip in the study area, between 2005 and Forecast 2031, during morning peak period, TRANS model (2008)

	2005	Forecast 2031 (relative to 2005)
Absolute value (minutes/trip)	29.57	28.88
Absolute variation (minutes/trip)		-0.69
Relative value (%)		-2.32%

3.3 Portrait of corridors in 2005 and in "Forecast 2031"

Before presenting the evaluation of the interprovincial crossings in relation to transit, the zones surrounding those new crossings were characterized according to three parameters:

- Total population within a 1 kilometre buffer zone around the proposed crossing (profile);
- Total employment within a 1 kilometre buffer zone around the proposed crossing (profile); and
- Number of currently existing transit routes (2008) within 2 kilometre buffer zone around the proposed crossing (profile).

The population and job buffer areas around the proposed crossings (profiles) allow us to develop a general idea of the potential demand generated (population) and attracted (employment) in the neighbourhood of those crossings. This provides a notion of potential demand that may be attracted by a possible transit crossing on a proposed new highway crossing.

These three parameters, provided for information only, allow overall characterization of the zones in direct contact with the proposed new crossings. In addition, these parameters help to define the new bus routes on the proposed new crossings (scenarios modelled using the TRANS model).

Appendix 7 presents these three parameters on the OC Transpo and STO transit network maps, upon which the outlines of the interprovincial crossings have been drawn.

4.0 EVALUATION OF CROSSINGS IN RELATION TO TRANSIT

The evaluation of the impact of each new interprovincial crossing on transit was conducted for this study using the four evaluation criteria CT1, CT2, CT3 and CT4 defined in section 2.2.

Table 9 presents the results of the transit evaluation. It must be noted that Corridors 2 and 7 are presented as two options, tunnel and bridge, which at this stage of development and for the purposes of this study cannot be differentiated, since the precise terms of these two options have not yet been defined.

These results are discussed below, breaking them down into two groups of effects:

- The effects of each interprovincial crossing on transit, without any transit on the crossings (CT1 and CT2); and
- The effects of the use of each interprovincial crossing by a transit route (CT3 and CT4).

4.1 Net Effect of each Corridor on Transit (CT1 and CT2)

The observations on evaluation criteria CT1 and CT2 are accompanied by observations of other measures stemming from the TRANS model, so that interpretations can be made.

4.1.1 CT1 – Mean Travel Time per Transit Trip

Observations:

- The low variations in mean transit travel time over the study area are explained by the fact that these are variations in means over an entire study area. The conclusions issuing from the analysis of these values must be considered while keeping in mind that the variations are low;
- All of the options modelled for a new interprovincial crossing lead to reduced mean transit travel time over the study area; establishing a new interprovincial highway crossing leads to improved transit travel time across the region, but in a very moderated fashion (gain of 0.21 to 0.54 minutes per trip); and
- The “high performance” crossings, that is, those leading to the greatest reductions in mean transit travel time are Crossings 8, 5, 7, 9 and 6, while those with the least effect are crossings 2, 1 and 10.

4.1.2 CT2 – Number of Transit Trips

Observations:

- All of the options modelled for a new interprovincial crossing lead to reduced numbers of transit trips; the establishment of a new interprovincial highway crossing leads to reduced transit ridership in the region (losses ranging from 740 to 2,271 trips per morning peak period);
- Crossings that result in the greatest reduction in transit ridership are Crossings 6, 7, 5, 9, 8, 4 and 3, in decreasing order of that effect. The crossings furthest from downtown and to the west have less negative effect on transit ridership and are therefore the more interesting options, as they reduce ridership only very slightly.

4.1.3 Interpretation

- The reduced route travel time is accompanied by reduced transit ridership and:
  - In the case of Crossings 1 to 5 and 10, a slight increase in the commercial speed of transit: possibly due to a slight decrease in average distances travelled by transit;
  - In the case of Crossings 6 and 7, a slight reduction in the commercial speed of transit: due to a reduction of transit travel distances;
  - A reduction in the transit modal share, calculated on the basis of total motorized trips (transit and car) in the study area, and a slight increase in the number of trips made by car; therefore, there has been a slight modal transfer from transit in favour of the car, which is explained by the fact that the car derives greater benefit from the establishment of a new interprovincial highway crossing.
- The reduced route travel times are explained by reduced transit ridership on the longest trips, which are now replaced with shorter trips, more accessible to cars by the new river-crossing highway. Moreover, the likelihood of "diverting" certain traffic lanes, and the downtown traffic in terms of number of vehicles (cars, trucks) following the establishment of a new interprovincial highway crossing, would improve traffic conditions in those zones and therefore improve route travel times for transit in those corridors;
- The crossings that would have the greatest effects on route travel time and transit ridership are those located closest to urbanized zones, dense with transit demand, that is, the east and downtown of the study area. The west and exocentric crossings are further away from these zones of dense population, employment and transit routes, explaining the lesser effects.

4.2 Effect of Transit's use of the New Interprovincial Corridor (CT3 and CT4)

Recall that criteria CT3 and CT4 measure the value of travel time and transit ridership for 2031 scenarios with the new crossing AND with a bus route on that crossing (subject to

traffic conditions), compared with the scenario "Forecast 2031". There are no values for corridors 1 and 4 since no bus route was modelled on these crossings, which had previously been determined to be irrelevant (see section 2.1).

It must be noted that the values for criteria CT3 and CT4 are not very different than those for criteria CT1 and CT2, as follow:

- The integration of a new interprovincial crossing in the transit network of the region (by establishment of a bus route with no additional measures, on that crossing) has little effect on ridership losses and average transit travel time in the region, when considering the situation where the new interprovincial crossing exists but is not integrated into the transit network;
- These two criteria offer little additional opportunity for discrimination between criteria CT1 and CT2.

The observations and interpretations below are made by comparing the values of criteria CT1 and CT2, in order to evaluate the benefits or losses resulting from the use of the interprovincial crossing by a transit route.

4.2.1 CT3 – Average Transit Travel Time

Observations:

- The addition of a bus route on an interprovincial crossing reduces very slightly and in a relatively insignificant manner, the average transit travel time over the study area, for most corridors (2 and 6 to 10), in relation to the same situations with interprovincial crossings without bus routes on the crossings; time gains of 0.23 to 0.64 minutes per trip, compared to time gains of 0.21 to 0.54 minutes per trip when crossings are not used by transit;
- Crossings 3 (Allumettières Blvd-Moodie) and 5 (Kettle Island) are the crossings where there is a slight increase in average transit travel time for the study area, in relation to the 2031 situation with a crossing but without bus routes on the crossing; +0.03 and +0.05 minutes per trip, respectively, which is still only a low variation and relatively insignificant when considering the TRANS model;
- The highest performance crossings according to this criterion are Crossings 6 and 7, although it should be noted that the values of this criteria are little different from the values of criterion CT1; the use of a crossing by a new transit route changes little about average transit travel time over the study area.

4.2.2 CT4 – Number of Transit Trips

Observations:

- The addition of a bus route on an interprovincial crossing very slightly and very insignificantly increases or decreases transit ridership over the study area, for all

crossings, in relation to the same situations with interprovincial crossings without bus routes; ridership losses to transit are in the order of 740 to 2,285 trips during morning peak period, while they are in the order of 740 to 2,271 when the crossings are not used by transit;

Note: For information, maximum annual ridership loss (2,285 per peak period – 2 peak periods per day – 5 days per week and 48 weeks per year) is approximately 1,100,100 trips. This value corresponds respectively to 6.1% of total annual STO ridership (2007) or to 1.2% of total annual OC Transpo ridership (2006). Consider too that this interprovincial transit ridership loss would bear more heavily upon the routes serviced by the STO, even though it concerns both the STO and OC Transpo. Most interprovincial transit trips are provided by the STO, who offer more transit routes across the river. Furthermore, to the STO this ridership loss would correspond to about 20% of the anticipated ridership of 11,200 passengers during the peak period in 2011 in the Rapibus corridor[4].

- The eastern crossings (7 to 10) induce lower ridership losses when these crossings are used by new transit routes (compared to situations where they are not used), while the crossings at the centre and in the west induce slightly higher ridership losses; and
- The best performing crossings (resulting in the least transit ridership loss over the study area) are Crossings 1, 2 and 10; that is, crossings situated the greatest distance from the centre of the study area.

4.2.3 Interpretation

- The mere act of integrating the new interprovincial crossing in the transit network of the study area, i.e. adding a bus route on the crossing (without associated preferential measures) has very little impact on transit ridership loss during the morning peak period. The crossing does however offer the benefit of a modest reduction in average transit travel time over the study area, probably associated with that loss of ridership and the shorter travel path.
- Improvements to route travel time remain very low, or may become slight reductions, especially for congested crossings (the most central ones, crossings 3, 4 and 5 in the southbound direction in particular), since the buses on the new transit route will also be subject to peak traffic conditions (no reserved bus lane was modelled over these crossings). It should be recalled however that the differences observed be-

[4] Source: Rapibus – detailed feasibility study – final report, February 2004. The Rapibus would result in an increased ridership of nearly 14% over 24 hours between 2002 and 2011. For this purpose, the ridership of the Rapibus was calculated as representing 14% of annual 2002 ridership.

tween criteria CT1-CT2 and CT3-CT4 are minor, and any conclusions drawn from these comparisons should be interpreted very conservatively.

The crossings with the greatest effects on route travel time and transit ridership are those located closest to urbanized zones showing a high transit demand, that is, the east and centre of the study area. The west crossings and the most exocentric zones are further from these zones of dense population, employment and transit routes, explaining the low effects produced.

In summary, independent of whichever new crossing is under consideration, establishment of transit routes on the new interprovincial crossing has marginal or no effect on ridership losses from this service or to the benefit of car traffic. It is even more evident that when no prioritization of that transit route is made (reserved lane, traffic light priorities, etc.), transit has difficulty competing with car travel. This is most readily verified by examining the results for crossings near the central zones (urbanized and dense in transit routes), with the greatest ridership.

Table 9: Results of evaluation of effects of interprovincial crossings on transit (2008)

	2005	Forecast 2031 (relative to 2005)	2031 - Cx'g 1 Pink Road - Brg	2031 - Cx'g 2 Bvd des Allumettières-Riddell-March-417 - Brg	2031 - Cx'g 2 Bvd des Allumettières-Riddell-March-417 - Tunnel	2031 - Cx'g 3 Bvd des Allumettières-Moodie-417 - Brg	2031 - Cx'g 4 Bvd des Allumettières-Acres-417/416 - Brg	2031 - Cx'g 5 Île Kettle-50/417 - Brg	2031 - Cx'g 6 Île Lower Duck-50/417 - Brg	2031 - Cx'g 7 Bvd de l'Aéroport-174/417 - Brg	2031 - Cx'g 7 Bvd de l'Aéroport-174/417 - Tunnel	2031 - Cx'g 8 Montée Mineault-10th Line-50/417 - Brg	2031 - Cx'g 9 Île Petrie-50/417 - Brg	2031 - Cx'g 10 Masson-Angers-Cumberland-50/417 - Brg
CT1: Variation in mean transit travel time - without transit route on crossing														
Absolute value (minutes/trip)	29.57	28.88	28.65	28.68	28.68	28.46	28.54	28.35	28.43	28.41	28.41	28.34	28.43	28.56
Absolute variation (minutes/trip)		-0.69	-0.24	-0.21	-0.21	-0.43	-0.35	-0.54	-0.45	-0.47	-0.47	-0.54	-0.46	-0.33
CT2: Variation in number of transit trips - without transit route on crossing														
Absolute value (minutes/trip)	47 793	83 684	82 944	82 864	82 864	82 414	82 365	81 624	81 413	81 441	81 441	82 225	82 135	82 744
Absolute variation (minutes/trip)		35 891	-739	-819	-819	-1 269	-1 319	-2 060	-2 271	-2 242	-2 242	-1 459	-1 548	-940
CT3: Variation in mean transit travel time - with transit route on crossing														
Absolute value (minutes/trip)	29.57	28.88	28.65	28.66	28.66	28.48	28.54	28.40	28.25	28.29	28.29	28.36	28.37	28.51
Absolute variation (minutes/trip)		-0.69	-0.24	-0.23	-0.23	-0.40	-0.35	-0.49	-0.64	-0.59	-0.59	-0.53	-0.52	-0.38
CT4: Variation in number of transit trips - with transit route on crossing														
Absolute value (minutes/trip)	47 793	83 684	82 944	82 859	82 859	82 425	82 365	81 593	81 399	81 532	81 532	82 231	82 182	82 838
Absolute variation (minutes/trip)		35 891	-739	-825	-825	-1 259	-1 319	-2 090	-2 285	-2 152	-2 152	-1 453	-1 502	-846

Absolute variations are calculated relative to the scenario "Forecast 2031"

NOTE: Cx'g: "Crossing"
Brg: "Bridge"

Note: The results shown above were developed using the transportation model of the TRANS Committee, May 26, 2008.

5.0 CONCLUSION

This section provides a summary of the interpretations resulting from the evaluation of the impact of interprovincial crossings on transit, presenting the highlights first, and finally offering recommendations stemming from this analysis.

These conclusions are made on the basis of the results of TRANS modelling involving the entire study area - specifically, the National Capital Region, for a weekday morning peak period.

Effects on Transit of new Interprovincial crossing without establishment of new transit line on that crossing:

(Loss of ridership for transit)

- The establishment of a new interprovincial crossing has the effect of significantly reducing the use of transit, with a gain in car use;
- The establishment of a new interprovincial crossing has the effect of reducing route travel time, with those trips that were originally long by transit being those preferentially replaced by new car trips, as being more direct;
- The establishment of a new interprovincial crossing has the effect of reducing (improving) route travel time for transit; this travel, the longest in the absence of a new interprovincial crossing, becomes shorter with the new crossing;
- The negative impacts resulting from a new interprovincial crossing, from the point of view of transit ridership (reduced with gains in use of cars) are more serious for those crossings located near central zones of the region and the areas that are best served by transit (centre and east of the zone);
- The maximum ridership loss anticipated for 2031 corresponds to about 6% of STO ridership during the morning peak period, and 20% of ridership forecast for the Rapibus project of 2011.

The interprovincial crossing having the least negative effect on transit (route travel time and ridership combined) is Crossing 8 Montée Mineault-10th Line-50/417, when no transit route is established on the crossing.

The crossing with the greatest negative effects on transit (route travel time and ridership combined) is Crossing 6 Lower Duck Island-50/417, when no transit route is established on the crossing.

Effects of the establishment of a transit route on the new interprovincial crossing:

(Possibility of new crossing for transit)

Note: transit routes on new interprovincial crossings are modelled without reserved lanes for transit vehicles. Accordingly, these vehicles are subject to traffic conditions.

- The establishment of a transit route on a new interprovincial crossing does little to change or reduce (or improve) the transit route travel time, when compared to the situation with a new interprovincial crossing without a transit route;

- Possible improvements to route travel time and ridership, that would be offered by a transit route on a new interprovincial crossing, are not judged to be sufficiently significant to discriminate between interprovincial crossings on this basis;

- Transit use of a new interprovincial crossing slightly reduces the negative effects of the establishment of the new crossing on transit, but statistical significance is not high. However, in the absence of transit priority measures on the new crossing (reserved lanes, traffic light priority, etc.), this use would not be effective. This is more evident in the case of crossings near central zones (urbanized and dense with transit routes).

The most useful interprovincial crossing for transit is Crossing 10 (Masson-Angers-Cumberland) (positive benefits for route travel time and ridership criteria).

The least useful interprovincial crossing for transit is Crossing 5 Kettle Island -50/417 (no benefits for route travel time and ridership criteria).

Finally, recall that the establishment of a transit route on Crossings 1 and 4 has been deemed irrelevant.

Summary:

- The establishment of a new interprovincial crossing has the effect of significantly reducing the use of transit, with gains in use of the car. This effect is strongest for central crossings (5, 6 and 7, that is, Kettle, Lower Duck and East Lower Duck), since these crossings are surrounded by more densely developed areas, better served by transit.

- This negative effect can be only very slightly mitigated by allowing use of that crossing by bus transit, without accompanying priority measures on or around that crossing. These preliminary results indicate the need to proceed with an in-depth analysis of the recommended interprovincial crossings, independently of the corridor in question, in Phase 2 of the impact study, to consider:

    - Increased integration of routes using the new crossing with the same configuration as existing STO and OC Transpo networks, in order to better mitigate before ridership losses;
    - New optimization measures to accompany the river-crossing service: reserved bus lanes, transit crossing priorities near crossings, other types of transit services, etc., to better mitigate well the ridership losses experienced;
    - Evaluate “local” effects of the new transit crossing more closely, in particular, the effects on users of the new routes in comparison with their travel pathways when no transit route uses that crossing;

- Given the minor distinctions between criteria CT3 and CT4 relative to criteria CT1 and CT2, it may be possible to limit the transit evaluation to criteria CT3 and CT4 since these take into consideration the presence of a transit service.

- According to representative criteria CT3 and CT4, Crossing 10 Masson-Angers-Cumberland-50/417 results in the least negative effects on transit and Crossing 5, Kettle Island-50/417 results in the most negative effects.

6.0 REFERENCES

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- City of Ottawa, **"Transportation Master Plan for the City of Ottawa"**, as adopted by the Ottawa City Council, September 2003, 125p., available on:

  http://www.ottawa.ca/city_services/planningzoning/2020/transpo/7_fr.shtml

- iTRANS consulting for the TRANS Committee, **"Enquête Origine-Destination 2005, Sommaire des résultats, National Capital Region"**, December 2006.

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- Ministry of Transportation of Ontario (MTO Eastern Ontario Regional Office), "**Strategic Transportation Directions, Draft, Eastern Ontario",** January 2002, 19p.

- Ministère des Transports du Québec, Direction générale de l'Ouest, Direction de l'Outaouais, "**Plan de transport de l'Outaouais 1996-2011"**, September 1996, 140p.

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- Société de Transport de l'Outaouais (STO), "**Plan stratégique 2005-2015"**, October 2005, 63p.

Internet Sites:

- Executive Gatineau-Ottawa Airport: http://www.ego-aeroport.ca/
- Ottawa International Airport: http://www.ottawa-airport.ca/
- OC Transpo: http://www.octranspo.com
- STO: www.sto.ca

7.0 APPENDICES

- Appendix 1: Meeting notes, “Transit Team Meeting no. 1” – 25 April 2008, Ottawa
- Appendix 2: STO Transit Network (2008, source: www.sto.ca)
- Appendix 3: OC Transpo Transit Network (2008, source: www.octranspo.com)
- Appendix 4: OC Transpo Rapid Transit (Transitway) and Rural Transit – 2008 – source: **www.octranspo.com**
- Appendix 5: OC Transpo and STO Interprovincial Transit Corridors – 2008 – Sources: **www.octranspo.com** and www.sto.ca
- Appendix 6: Model of 2031 Rapid Transit Network (source: City of Ottawa)
- Appendix 7: Portrait of Corridors for 2005 and Forecast 2031 Scenarios

APPENDIX 1: NOTES OF "TRANSIT TEAM MEETING NO 1" – APRIL 25TH 2008, OTTAWA

INTERPROVINCIAL CROSSINGS ENVIRONMENTAL ASSESSMENT

ÉVALUATION ENVIRONNEMENTALE DES LIAISONS INTERPROVINCIALES

Notes of Meeting

Roche-NCE Joint Venture
15 Fitzgerald Road
Ottawa, ON
K2H 9G1
Telephone (613) 829-2800
Fax (613) 829-8299

Subject:	Interprovincial Crossings Environmental Assessment (EA) Study
Date:	April, 25, 2008
Time:	1:00 pm
Location:	NCC, 3rd floor, Room 324
Meeting:	Transit Team Meeting No. 1

Meeting Purpose

Define the transit evaluation methodology and criteria based on Roche/NCE proposal.

Attendees

Name	Organization	Name	Organization
	City of Ottawa / OC Transpo		MTQ
	STO		MTQ
	STO		Roche-NCE JV
	City of Ottawa		Roche-NCE JV
	Transport 2000		Roche-NCE JV
	City of Ottawa		Roche-NCE JV
	NCC/CCN		Roche-NCE JV
	NCC/CCN		

Distribution

Name	Organization	Name/	Organization

Item		Assigned
1.0	**Presentation of the overall evaluation methodology for criteria** By Steve Taylor	**Roche-NCE**
2.0	**Questions on usual transit opportunity evaluation** By Raynald Ledoux, to all. **How do the STO and OC Transpo usually evaluate new road corridors or modifications to existing road corridors, as possible opportunities for their transit system?** Answers: ▪ OC Transpo: Usually transit evaluation opportunity is based on the residential and commercial developments projects. As road developments follow these developments, the transit opportunity evaluation is usually already completed when road developments are planned – or both are made simultaneously. A cost/benefit analysis is conducted based on the following parameters: changes in transit travel times, changes in transit travel costs (for the users and OC Transpo) and changes in transit ridership. Usually a gain in travel times generates an increase in transit ridership. Comparing costs and benefits leads to a transit planning decision. ▪ STO: a transit opportunity evaluation is often made when new collector roads are planned. If an opportunity for transit occurs, effects of a transit network development are evaluated. A Gatineau's advisory committee reviews all new road developments. This committee is a source of information for the transit planning team. At a more strategic level, i.e. regarding the arterial roads, a transit opportunity evaluation is also made. However, it is known today that on the river crossings, the transit modal split is high and tends to increase, as there is a limited capacity for vehicles on these links. A new river crossing will most probably lead to a decrease of the transit modal split, as capacities for all vehicles (including cars and buses) will increase. The STO notes that there is no specific evaluation tool used for this kind of evaluation at this day, but they intend to use one or more on a more systematic way.	**Roche-NCE**
3.0	**Transit evaluation methodology and criteria – presentation and comments** After a brief presentation on the transit evaluation methodology and criteria proposed by Roche/NCE (which was sent by e-mail prior to the present meeting), a discussion ended up on the following decisions: ▪ The TRANS model simulates 10 2031-scenarios with a new interprovincial crossing, but without any new transit line using it. There is a gap between the information needed to evaluate transit opportunities and the information generated from the current model runs. ▪ After a short discussion, it is decided that 20 new simulations will be run to include a new bus line on the interprovincial crossings. More precisely:	**Roche-NCE and all**

	○ 10 2031-scenarios with a bus route on the new road crossing (1 scenario = 1 new road crossing = with 1 bus route), with a high level frequency and no transfer penalty; ○ 10 2031-scenarios with a bus route on the new road crossing (1 scenario = 1 new road crossing = with 1 bus route), with a revised frequency level better fitting the previously identified transit travel demand. ○ All new bus routes will be simple bus routes linking the 2 crossing ends. ▪ The final transit related criteria would be the following quantitative based evaluation: ○ Changes (between 2031 do nothing scenario or the 10 2031-scenarios without any bus link, and the 20 new scenarios with bus routes on new crossings) in: ▪ Transit travel times (OD transit travel time matrices); ▪ Transit modal split on specific screen lines.	
4.0	**Following actions:** **1. Re-definition of the transit evaluation criteria** **2. Definition of the new bus routes and frequencies on the crossings (to be defined for simulations)** **3. Simulation of new scenarios (20)** **4. Measurement of transit evaluation criteria performance for all 10 new crossings**	**Roche-NCE** **OC Transpo and STO** **City of Ottawa** **Roche-NCE**
5.0	**Next meeting –** • **The next meeting date will be selected when all results will be available and processed.**	**Roche-NCE**
6.0	Adjournment	

Recorded by/Enregistré par: Raynald Ledoux, Nathalie Schaillée

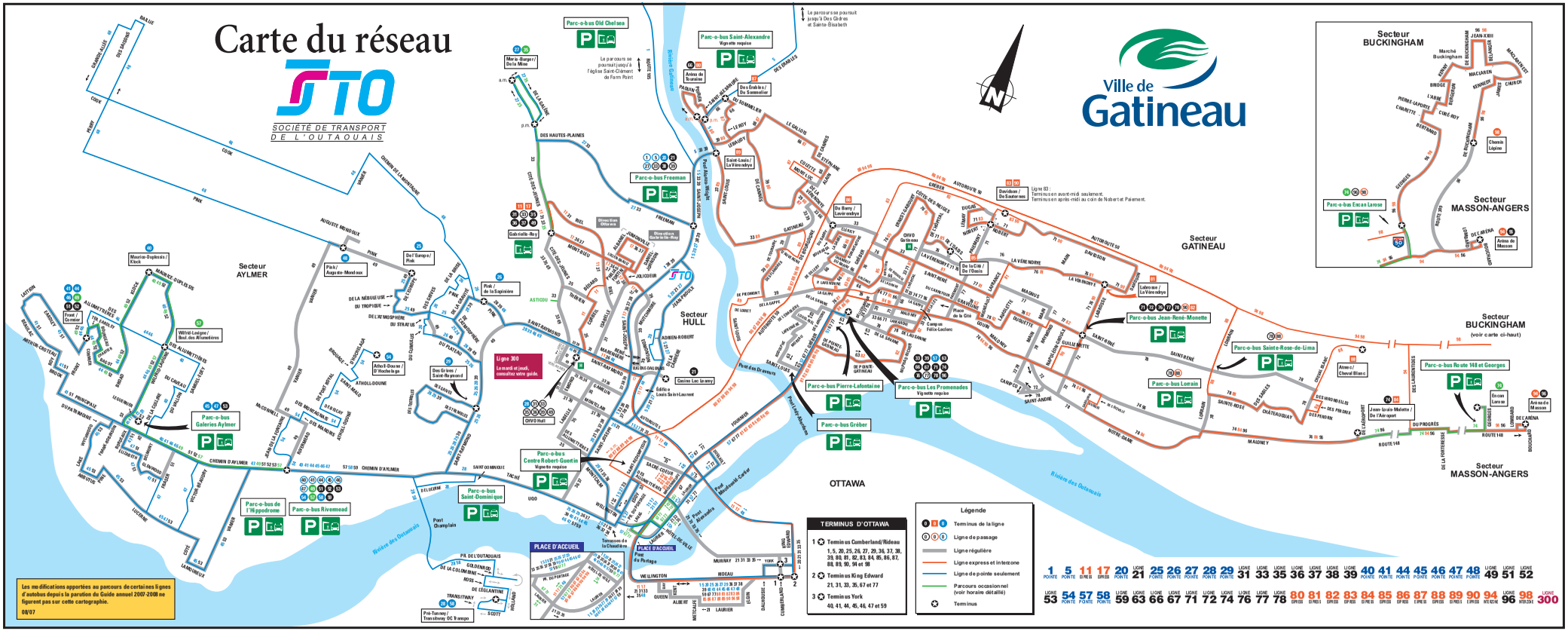
cc. All attending / présents
All absent / absents

APPENDIX 2: STO TRANSIT NETWOR – 2008 SO R E: WWW STO OM

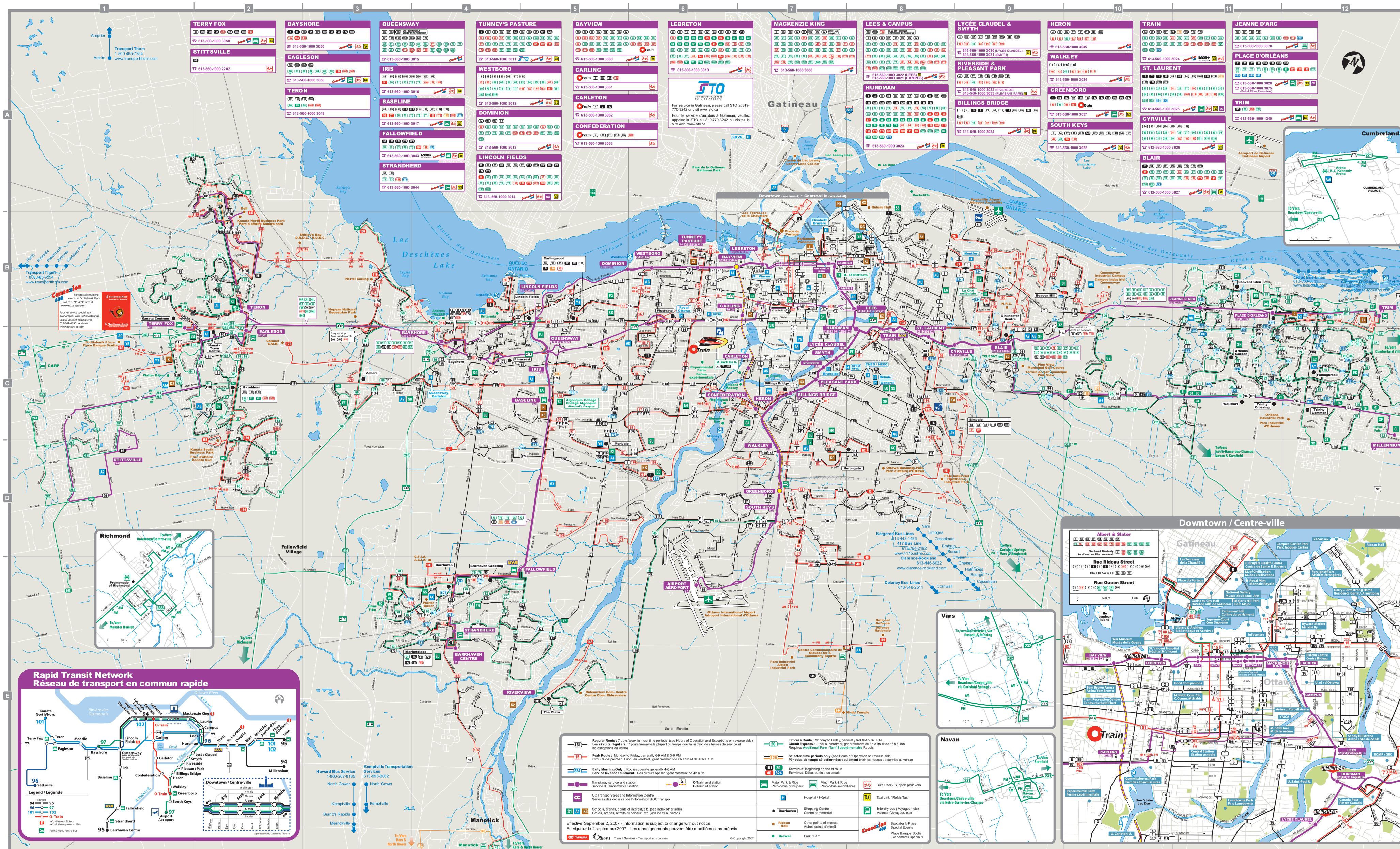
Carte du réseau

STO
SOCIÉTÉ DE TRANSPORT DE L'OUTAOUAIS

Ville de Gatineau



APPENDIX : O TRANSPO TRANSIT NETWOR – 2008 SO R E: WWW O TRANSPO OM


Downtown / Centre-ville
Rapid Transit Network
Réseau de transport en commun rapide
Richmond
Vars
Navan
Cumberland
Manotick
Gatineau
Lac Deschênes Lake
Ottawa River
Rivière des Outaouais
Fallowfield Village
TERRY FOX
STITTSVILLE
BAYSHORE
EAGLESON
TERON
QUEENSWAY
IRIS
BASELINE
FALLOWFIELD
STRANDHERD
TUNNEY'S PASTURE
WESTBORO
DOMINION
LINCOLN FIELDS
BAYVIEW
CARLING
CARLETON
CONFEDERATION
LEBRETON
MACKENZIE KING
LEES & CAMPUS
HURDMAN
LYCÉE CLAUDEL & SMYTH
RIVERSIDE & PLEASANT PARK
BILLINGS BRIDGE
HERON
WALKLEY
GREENBORO
SOUTH KEYS
TRAIN
ST. LAURENT
CYRVILLE
BLAIR
JEANNE D'ARC
PLACE D'ORLÉANS
TRIM
MILLENNIUM
RIVERVIEW
BARRHAVEN CENTRE
AIRPORT
AÉROPORT
For service in Gatineau, please call STO at 819-770-3242 or visit www.sto.ca
Pour le service d'autobus à Gatineau, veuillez appelez la STO au 819-770-3242 ou visitez le site web: www.sto.ca
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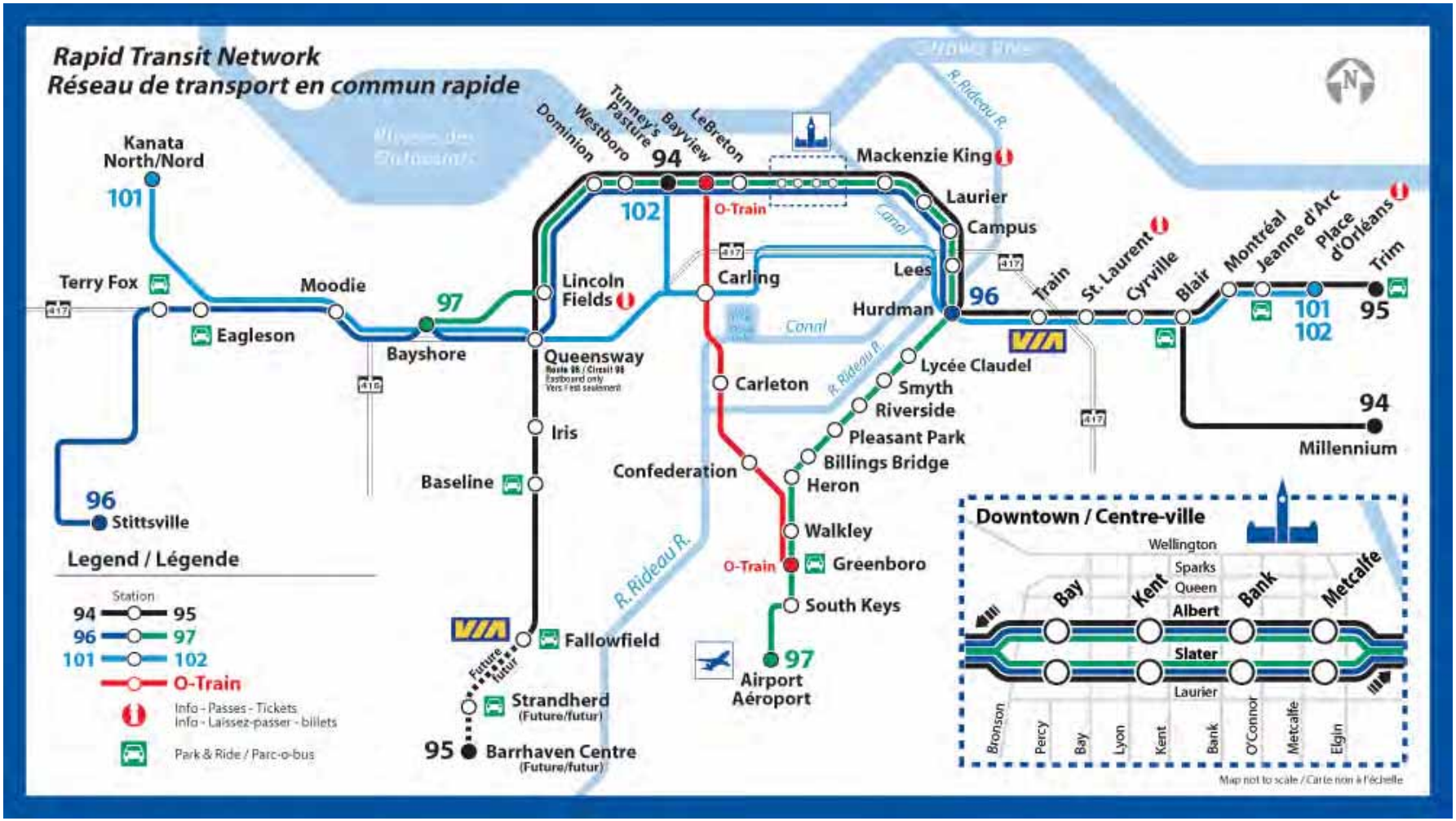
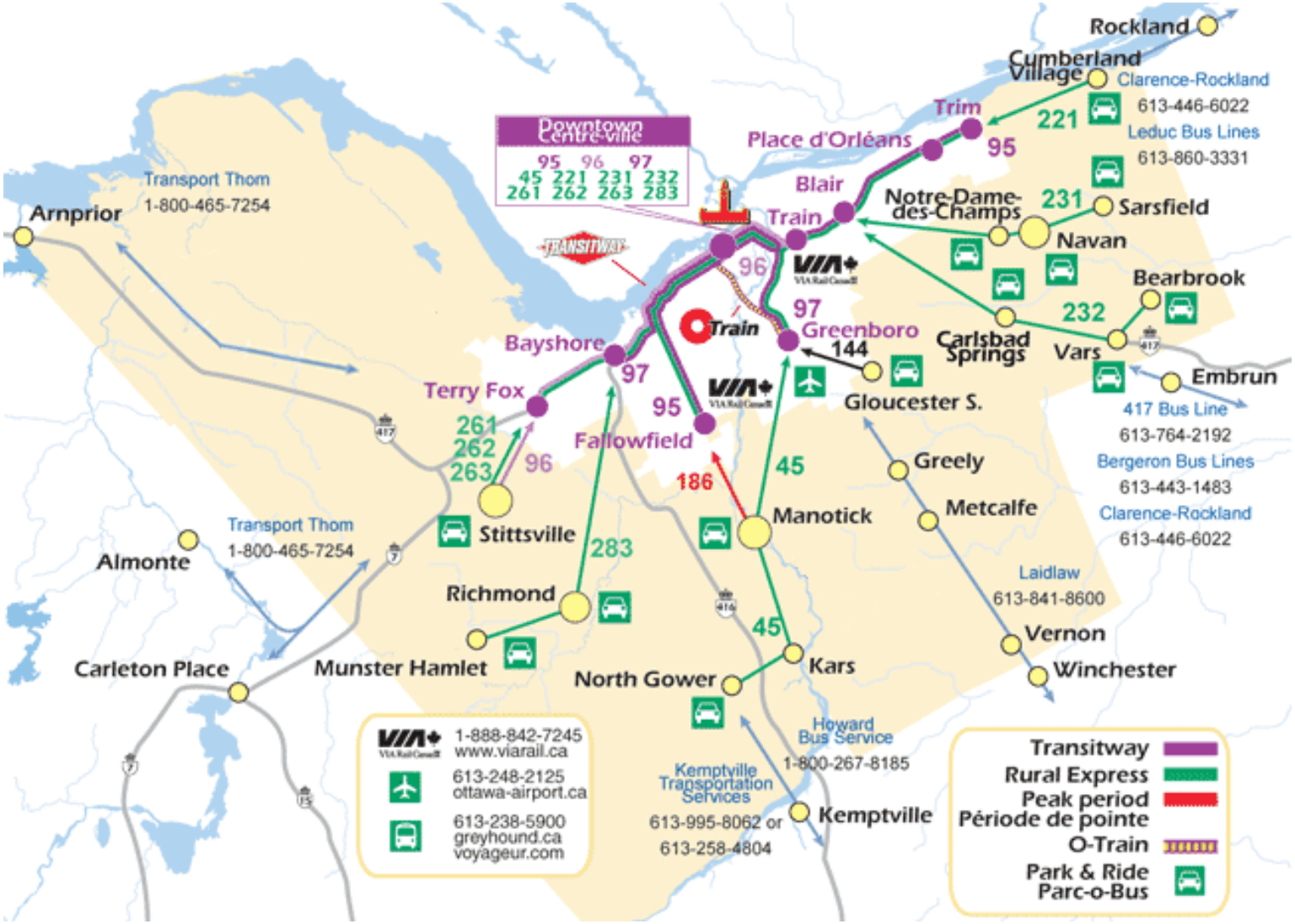
APPENDIX : RAPID AND R RAL TRANSIT NETWOR S OF O TRANSPO – 2008 SO R E:
WWW.OCTRANSPO.COM



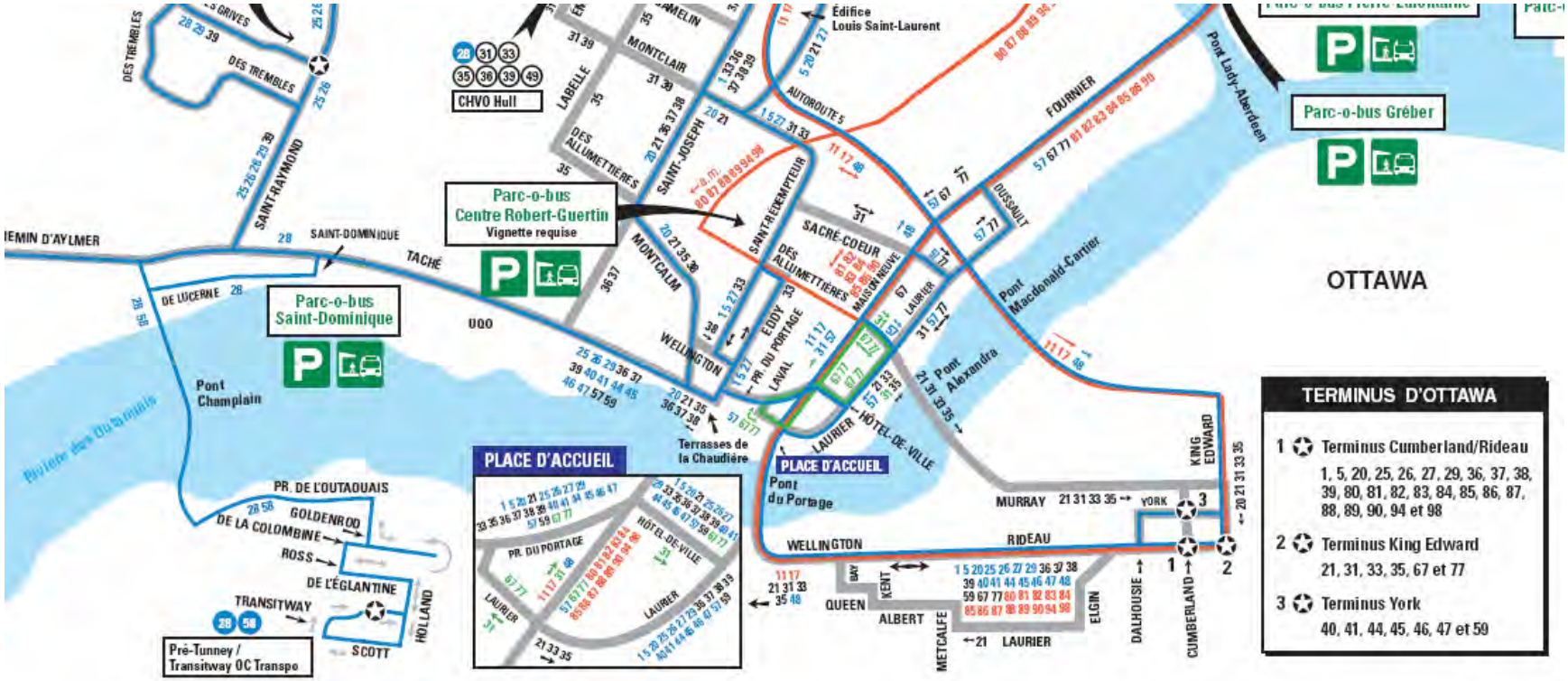
Rapid Transit Network of OC Transpo (source: http://www.octranspo.com)



Rural Transit Network of OC Transpo (source: http://www.octranspo.com)

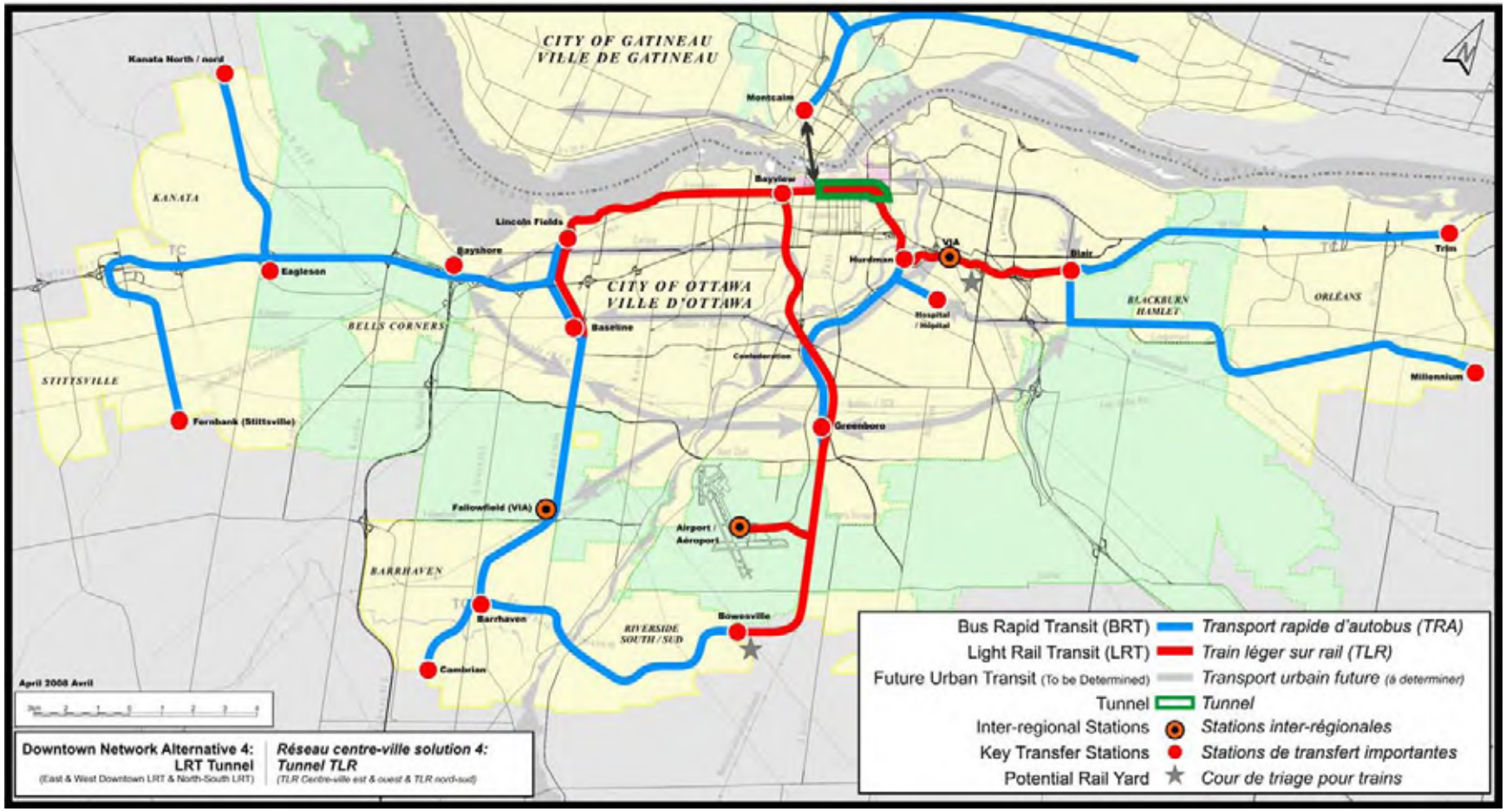
APPENDIX 5: INTERPROVINCIAL TRANSIT ROUTES OF OC TRANSPO AND STO – 2008 (SOURCES : WWW.OCTRANSPO.COM AND WWW.STO.CA)

Interprovincial transit routes of OC Transpo (source: http://www.octranspo.com)



Interprovincial transit routes of STO (source: http://www.sto.ca)

APPENDIX : RAPID TRANSIT NETWOR MODELLED IN 20 1 SO R E: IT OF OTTAWA



Rapid Transit Network in 2031 scenarios (source: City of Ottawa, work on Transportation Master Plan, January 2008)

APPENDIX 7: PORTRAIT OF THE CORRIDORS IN 2005 AND 2031 DO NOTHING SCENARIOS

1. WEST CROSSINGS (1, 2, 3 AND 4)

North side of the west crossings:

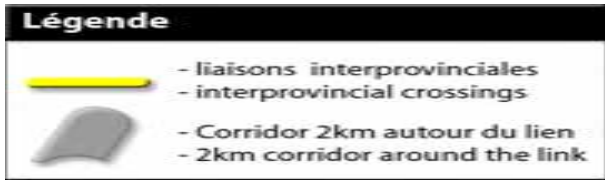
Crossing 1:
Pn: +38,6%
En: +35,3%
Tsto: 0

Crossing 2:
Pn: +26,1%
En: +60,1%
Tsto: 7

Crossing 3:
Pn: +37,8%
En: +90,6%
Tsto: 14

Crossing 4:
Pn: +41,6%
En: +97,3%
Tsto: 14

Legend:
Pn: variation of total population in a 1 km buffer around the north side of the profile, 2005-2031
En: variation of total employment in a 1 km buffer around the north side of the profile, 2005-2031
Tsto: number of transit STO routes in a 2 km buffer around the profile, 2008



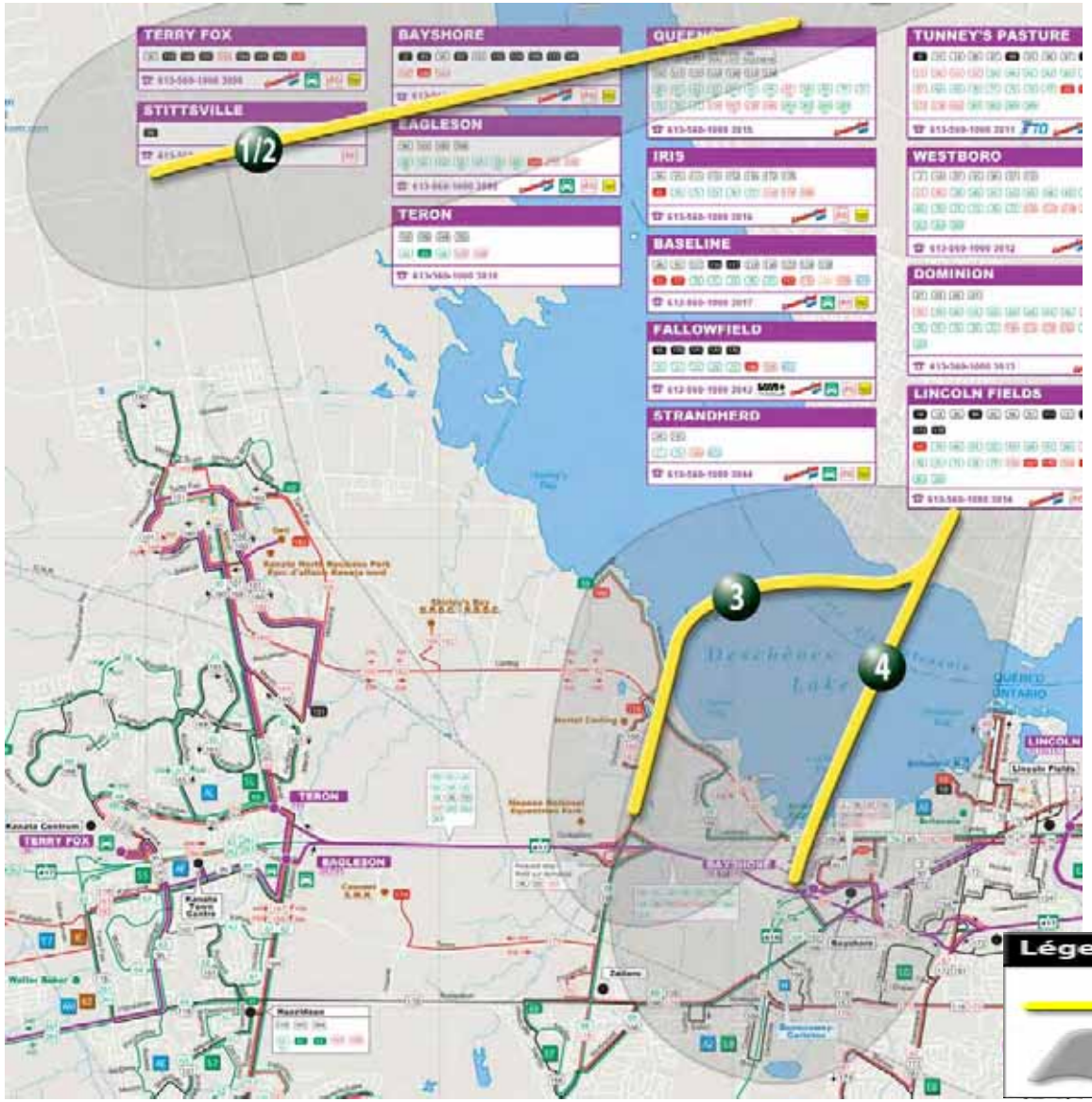
South side of the west crossings:

Crossing 1:
Ps: +34,1%
Es: +64,1%
Toc: 0

Crossing 2 :
Ps: +34,1%
Es: +27,7%
Toc: 0

Crossing 3:
Ps: +1,2%
Es: +33,2%
Toc: 19

Crossing 4:
Ps: -0,1%
Es: +19,6%
Toc: 31



Legend:
Ps: variation of total population in a 1 km buffer around the south side of the profile, 2005-2031
Es: variation of total employment in a 1 km buffer around the south side of the profile, 2005-2031
Ttoc: number of transit OC Transpo routes in a 2 km buffer around the profile, 2008

2. EAST CROSSINGS (5, 6, 7, 8, 9 AND 10)

North side of the east crossings:

Crossing 5:
Pn: +27,9%
En: +42,2%
Tsto: 23

Crossing 6:
Pn: + 15,4%
En: +34,3%
Tsto: 7

Crossing 7:
Pn: + 10,7%
En: +30.3%
Tsto: 6

Crossing 8:
Pn: +16,9%
En: +29,9%
Tsto: 6

Crossing 9:
Pn: +40,8%
En: +39,3%
Tsto: 4

Crossing 10:
Pn: +19,8%
En: 39,2%
Tsto: 4

Legend:
Pn: variation of total population in a 1 km buffer around the north side of the profile, 2005-2031
En: variation of total employment in a 1 km buffer around the north side of the profile, 2005-2031
Tsto: number of transit STO routes in a 2 km buffer around the profile, 2008

South side of the east crossings:

Crossing 5:
P: +32,3%
E: +43,3%
Toc: 11

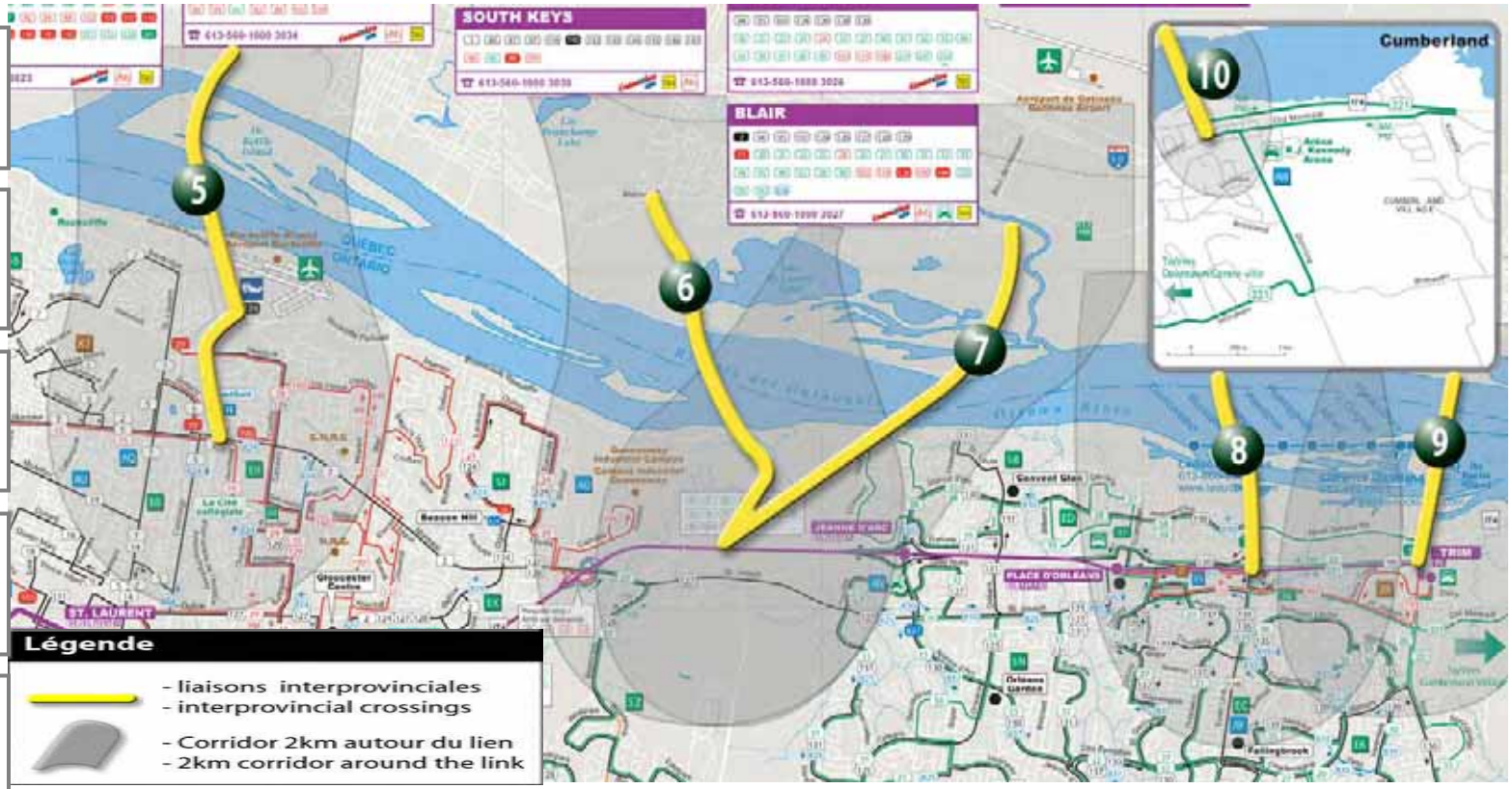
Crossing 6:
P: - 11,3%
E: +18,7%
Toc: 23

Crossing 7:
P: -10,6%
E: +13,3%
Toc: 25

Crossing 8:
P: -1,1%
E: +132,9%
Toc: 20

Crossing 9:
P: +14,6%
E: +178,8%
Toc: 10

Crossing 10:
P: +18,8%
E: +85,8%
Toc: 1



Legend:
Ps: variation of total population in a 1 km buffer around the south side of the profile, 2005-2031
Es: variation of total employment in a 1 km buffer around the south side of the profile, 2005-2031
Ttoc: number of transit OC Transpo routes in a 2 km buffer around the profile, 2008