5 TRANSPORTATION NEEDS ASSESSMENT

As discussed in **Section 1.1**, the Partnership jointly commissioned a *Planning/Need and Feasibility Study (P/NF)* in 2001, which identified a long-term strategy to promote the safe and efficient movement of people and goods between southwest Ontario and southeast Michigan.

Although conducted in a manner consistent with the environmental study processes in both countries, the P/NF Study was not completed within the formal environmental study framework. The findings of the P/NF Study, however, served as an important basis for governments to move forward in the development and improvement of cross-border transportation services, which included proceeding with the environmental study processes in the U.S. and Canada for major transportation improvements at the Detroit River international crossing.

A consultation component was incorporated in the P/NF Study process. Canadian and U.S. government departments, ministries and agencies, local municipalities, First Nations groups, private sector stakeholders in border transportation issues, as well as the general public were engaged in the course of the study.

Throughout the P/NF Study, the Partnership affirmed that the findings of the P/NF Study may be used to initiate environmental studies in accordance with the requirements of the *U.S. National Environmental Policy Act* (NEPA), *Canadian Environmental Assessment Act* (CEAA) and *Ontario Environmental Assessment Act* (OEAA). This step would be followed by completion of the appropriate environmental impact/assessment studies, design of the approved improvements and ultimately, construction.

The transportation problems and opportunities identified during the P/NF Study provided the basis for the Partnership to initiate the environmental study processes for the development and assessment of transportation alternatives at the Detroit River international crossing.

The findings of the P/NF Study were brought forward into the formal environmental study process for consultation. The work completed under the P/NF Study was updated to reflect changes in traffic and network demands. Specifically, changes in travel behaviour and trip patterns across the southeast Michigan/southwest Ontario border have occurred since the P/NF study was undertaken. A decline in the U.S. economy, 9-11, a SARS outbreak in Toronto, the Iraq war, a rising Canadian dollar and the opening of three casinos in Detroit and other events have all contributed to a large decline in cross-border passenger car traffic and has limited commercial vehicle growth. None of these events were reflected in the previous 2000 base year data that provided the basis for the 30-year passenger car and commercial vehicle forecasts prepared for the previous Bi-national Partnership P/NF Study.

The updated transportation problems and needs are documented in the following sections. These sections provide a summary of the key findings of the study. For further details, the reader is referred to the following supporting documents:

- *Draft Feasible Transportation Alternatives (Alternatives to the Undertaking) Report (February 2006);*
- *Transportation Planning and Need Study Report (November 2005);*
- *Travel Demand Forecasts Working Paper (September 2005);*
- *Travel Demand Model Update Working Paper (September 2005); and*
- *Regional and National Economic Impact of Increasing Delay and Delay-Related Costs at the Windsor-Detroit Crossings (August 2005).*

5.1 Transportation Problems and Needs

5.1.1 Transportation Problems

CAPACITY

The current and future deficiencies in the roadway network serving the international border crossings at Windsor-Detroit that are anticipated within the 30-year timeframe are documented in the *Travel Demand Forecasts Working Paper*.

For this study, capacity was defined as the maximum vehicle service flow rate that can be sustained by a facility and represents a severe breakdown in traffic operations. This is a very undesirable condition with long queues and delays.

Although traffic volumes up to the capacity can be accommodated, it was considered prudent to provide a level-of-service that is better than that provided when traffic volumes reach capacity. As such, capacity values within this study were defined as a range, with the upper limit corresponding to the maximum rate (as defined above) and the lower limit corresponding to the flow rate at which traffic operations start to become unstable due to the high number of vehicles using the facility.

Given the high importance of an international crossing, the long lead time to construct/expand a crossing, the large economic costs associated with unstable cross-border traffic and the range of uncertainty inherent in the forecasts (which represent the peak conditions for a typical day and not the periods of extreme traffic volume that inevitably occur from time to time), the lower limit was identified as a practical volume that should not be exceeded for an extended period of time.

This suggested that, while a crossing is able to accommodate higher traffic volumes than the lower capacity limit, those within the range defined by the lower and upper limits are not desirable and a new or expanded crossing is needed before consistently high levels of congestion and unstable operations are reached.

Crossing Capacity

The determination of the upper and lower limit capacities for the Ambassador Bridge and the Detroit-Windsor Tunnel are documented in the *Travel Demand Model Update Working Paper*. **Table 5.1** presents the existing volume and capacity for each bridge/tunnel and the total for the Detroit River crossings.

The roadway crossing upper limit capacities were estimated to be 1,750 PCE/hour/lane for the Ambassador Bridge and 1,500 PCE/hour/lane for the Detroit-Windsor Tunnel. The lower limit capacities are estimated to be 1,450 PCE/hour/lane for the Ambassador Bridge and 1,250 PCE/hour/lane for the Detroit-Windsor Tunnel. Passenger Car Equivalents (PCEs) are a measure of total combined passenger car and commercial vehicle volumes, where commercial vehicles are expressed as a multiple of passenger cars and then added to passenger cars.

Based on fall 2004 peak hour traffic volumes, the volume-to-capacity (v/c) ratio for the Ambassador Bridge was estimated to be 0.67. The Detroit-Windsor Tunnel was found to have a similar v/c ratio of 0.65.

TABLE 5.1 - ASSESSMENT OF EXISTING ROADBED CAPACITY

Measure	Crossing		
	Ambassador Bridge	Detroit-Windsor Tunnel	Detroit River Crossings
Peak Hour Capacity (PCE/h/lane)	1,750	1,500	N/a
Number of Lanes (one-way)	2	1	3
One-Way Capacity (PCE/h)	3,500	1,500	5,000
Peak Hour Demand[1]			
Passenger Cars	1,176	931	2,106
Commercial Vehicles	390	14	404
Peak Hour Total PCE Demand[2]	2,346	973	3,319
Peak Hour & Direction Volume-to-Capacity Ratio	67%	65%	66%

[1] Represents 4 p.m. to 5 p.m. of average Thursday/Friday in September, 2004.
[2] Based on PCE factor of 3.0 for commercial vehicles.

The projected Base Forecast future year peak hour, peak direction traffic volumes and v/c ratios are presented in **Table 5.2**. Based on these results, the year in which crossing capacity is reached is illustrated in **Exhibits 5.1A** and **5.1B**.

The high and low forecast bounds that bracket the Base Forecast line represent the future range of uncertainty in the forecasts. The results show that the Ambassador Bridge has adequate capacity to accommodate growth in cross-border traffic until approximately the year 2020. The lower capacity limit indicates that bridge traffic operations will become unstable by approximately 2011. The Detroit-Windsor Tunnel is not expected to reach capacity until approximately 2035, with unstable traffic operations projected by approximately 2015.

Table 5.5 provides an overall summary of the year that capacity is reached at the two crossings, as well as for the access/egress roads and plazas on the Canadian and U.S. side of the border. These elements are discussed in the following sections.

Canadian Access/Egress Roads

The traffic analysis for the Ambassador Bridge access/egress roads on the Canadian side of the border was based on traffic modelling of the seventeen intersections between Highway 401 and the Ambassador Bridge Plaza. The 2004 base year conditions and future year analyses were based on 2004 intersection counts and traffic signal timings for Huron Church Road and Highway 3/Talbot Road, as obtained from the City of Windsor, as well as from traffic model estimates. The analysis focused strictly on the Canadian side of the border, as the Ambassador Bridge Gateway Project (refer to **Section 1.7**) addressed future access/egress road needs on the U.S. side.

In 2004, adequate road capacity was provided between the Ambassador Bridge Canadian Plaza and Highway 401, with acceptable traffic operations in the afternoon peak hour. This was also verified by observations of current traffic conditions, with queuing of commercial vehicles on Huron Church Road no longer a problem since additional U.S. border processing capacity was provided in June 2004.

By 2015, traffic volumes are projected to be at or above the road capacity for many sections of this corridor, with unacceptable traffic operations in the afternoon peak hour. By 2025, the majority of sections are projected to be over capacity and exhibiting unacceptable traffic operations during both the morning and afternoon peak hours.

Access roads leading to the Detroit-Windsor Tunnel were near capacity during peak hour traffic conditions on the Canadian side of the border based on 2004 traffic counts, with traffic operations at intersections impacted by the high volumes of local traffic travelling through downtown Windsor.

Taking the access/egress road system as a whole, it is projected that capacity will be reached by approximately 2010, although localized intersection improvements at critical locations could potentially extend the timeframe before capacity is reached by several years.

TABLE 5.2 – EXISTING AND BASE FORECAST DETROIT RIVER CROSSINGS VOLUMES AND CAPACITY UTILIZATION

Crossing	Year	PCE Volume (1-way)		Volume / Capacity Ratio	
		AM Peak Hour	AM Peak Hour	AM Peak Hour	PM Peak Hour
Ambassador Bridge	2004	1,930	2,350	55%	67%
	2015	2,510	3,180	72%	91%
	2025	2,900	3,880	83%	111%
	2035	3,300	4,520	94%	129%
Detroit-Windsor Tunnel	2004	900	970	60%	65%
	2015	1,070	1,250	71%	84%
	2025	1,190	1,370	79%	91%
	2035	1,310	1,480	87%	99%
Detroit River Crossings	2004	2,830	3,320	57%	66%
	2015	3,580	4,440	72%	89%
	2025	4,090	5,250	82%	105%
	2035	4,610	6,000	92%	120%

Note: Morning peak direction is Canada to US, afternoon peak direction is US to Canada.

EXHIBIT 5.1A – BASE FORECAST YEAR – AMBASSADOR BRIDGE CAPACITY REACHED

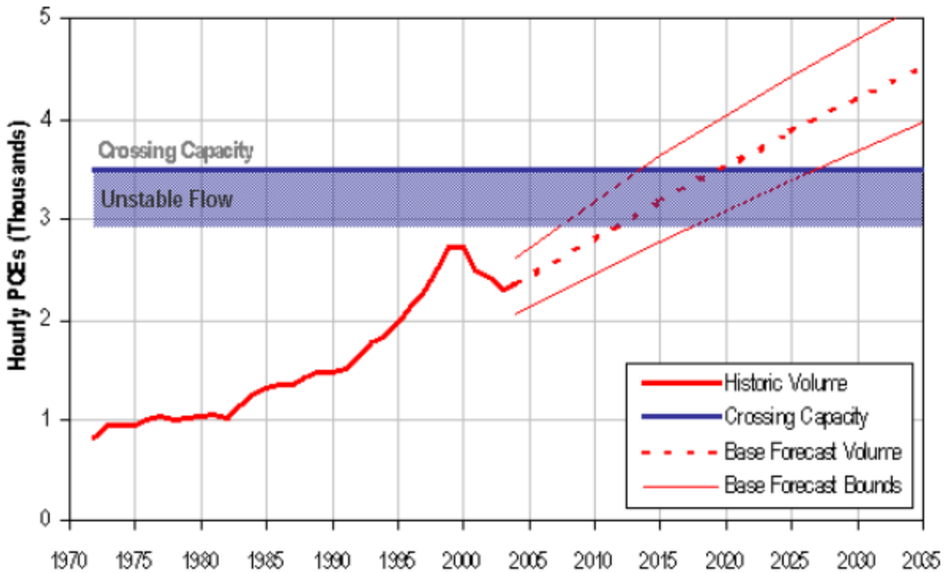
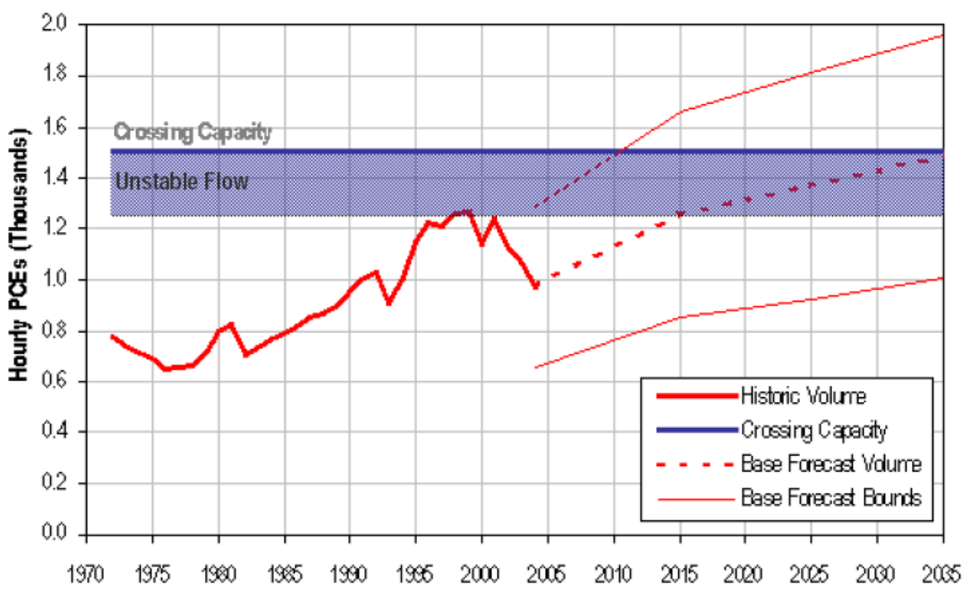


EXHIBIT 5.1B – BASE FORECAST YEAR – DETROIT-WINDSOR TUNNEL CAPACITY REACHED



U.S. Access/Egress Roads

The Ambassador Bridge access/egress road conditions on the U.S. side of the border were addressed by the *Ambassador Bridge Gateway Project*. The project is currently under construction, and is expected to be completed by December 2009.

The project will provide acceptable freeway operations through 2035 according to the Michigan Department of Transportation (MDOT), as documented in the *1999 Final Traffic Report Supplement* and the *2003 Ambassador Bridge Gateway Project Reassessment Final Traffic Technical Report*. Therefore, no further analysis was conducted regarding access/egress conditions on the U.S. side of the Ambassador Bridge.

The Detroit-Windsor Tunnel access/egress road analysis on the U.S. side of the border modelled five intersections adjacent to and connecting the Detroit-Windsor Tunnel with Jefferson Avenue in downtown Detroit.

In the base year (2004), unstable road capacity was evident at the entrance of the Detroit-Windsor Tunnel, with congested traffic operations in the afternoon peak hour, as verified by field observations of current traffic conditions. Detroit Police personnel manage traffic operations at the Detroit-Windsor Tunnel's entrance during recurring periods of high traffic congestion, which typically occur on Thursday and Friday afternoons. Even with managed traffic operations, traffic will frequently back up onto the Lodge freeway under Cobo Hall, and onto I-375.

The capacity and operational issues of the access road into the Detroit-Windsor Tunnel are significantly influenced by the geometric configuration of the Detroit-Windsor Tunnel entrance. Through traffic, moving from southbound Randolph Street to the Detroit-Windsor Tunnel is limited to vehicles enrolled in the NEXUS program. This traffic is provided an exclusive lane through the plaza entrance and exclusive use of a tollbooth.

The roadway immediately downstream from this movement narrows to the equivalent of 1½ lanes due to the exclusive NEXUS lane. This causes frequent backups onto Jefferson Avenue. Queues and delays downstream are not affected by the signal timing at Jefferson Avenue and the Detroit-Windsor Tunnel entrance. Limited sight distance and maneuvering space at the tollbooths exacerbate these delays.

The existing tollbooths on the U.S. side of the Detroit-Windsor Tunnel further limit capacity. During peak-hour traffic conditions, non-NEXUS vehicles are limited to four tollbooths that are unable to process the traffic at a rate that prevents significant queuing. The storage for traffic at the Detroit-Windsor Tunnel entrance is very limited and quickly causes the backup to spill over onto Jefferson Avenue. The U.S. Customs plaza for inbound traffic, the historic Mariner's Church, the Duty Free shop, and the roadway configuration that eventually narrows to one lane as it enters the Detroit-Windsor Tunnel limit possible expansion of the number of tollbooths.

Border Processing

Border processing includes customs and immigration inspection on entry to Canada and the U.S. and is performed by Canada Border Services Agency (CBSA) and U.S. Department of Homeland Security (DHS), Customs and Border Protection (CBP), respectively. Upon entry to the country, vehicles are required to stop at primary inspection where an officer performs checks on the vehicle, driver and passengers. Individuals requiring further questioning or carrying goods requiring further inspection are directed to secondary inspection.

Discussions were held with CBSA and DHS to determine appropriate border processing assumptions for this study. The processing times that were confirmed at that time do not reflect new initiatives/technologies that may result in reductions or increases in these processing times.

The capacity of primary inspection is a function of the number of primary inspection lanes and the processing time per vehicle. There is a high degree of variability in processing times depending on the circumstances of the driver and/or passenger(s) and the nature of the contents of the goods within the vehicle.

The existing number of primary inspection lanes at the Detroit River crossings is shown in **Table 5.3** for travel to Canada and to the U.S.

TABLE 5.3 – NUMBER OF PRIMARY INSPECTION LANES

Facility	To Canada		To US	
	Autos	Trucks	Autos	Trucks
Ambassador Bridge	10 / 16 [1]	10 / 13 / 19 [2]	12	13 [3]
Detroit-Windsor Tunnel	9	3	9	3

[1] The regular number of auto lanes is ten. When required in special circumstances, six truck lanes can be converted to auto lanes for a total of sixteen lanes.
[2] Three new lanes are to be opened in July, 2005. Six additional lanes are to be added in the next two to three years.
[3] 13 lanes are open for primary inspection. A 14th lane is used for trucks exiting from secondary inspection.

Table 5.4 presents the estimated processing time per passenger car and per commercial vehicle at primary inspection.

NEXUS is a joint U.S./Canada program for passenger car travel designed to simplify border crossing for frequent low-risk travellers. At the time of undertaking this analysis of crossing capacity, the average processing time for a passenger car was 15 seconds and approximately 25 per cent of passenger cars travelling during peak periods were enrolled in the NEXUS program.

Regular or non-NEXUS travellers undergo questioning by border inspection officers. As a result, the average processing time per vehicle was estimated at 35 seconds for travel to Canada and 40 seconds to the U.S.

CBSA and CBP consider the existing NEXUS participation rates and overall processing rates to be appropriate in future years, given that NEXUS enrolment has reached a mature state and with dedicated lanes and/or other incentives required to increase participation over current levels.

Commercial vehicle processing times at primary inspection depend on the line release program. Most commercial operators use the Pre-Arrival Review System (PARS), which allows pre-approved shippers/carriers to transmit documents to customs in advance of arrival at the border to expedite border processing.

The U.S. Trade Act (2005) requires all commercial vehicles entering the U.S. to transmit documentation electronically at least one hour in advance of crossing. For travel to Canada, non-PARS commercial vehicles will also be phased out in the near term with the introduction of the Advanced Commercial Information program. The elimination of non-PARS traffic will reduce the number of vehicles referred to secondary inspection given that all documentation will be electronically transmitted resulting in a higher proportion of the inspections occurring strictly at primary inspection. The processing time for PARS commercial vehicles entering Canada was 85 seconds on average and two to three minutes for those entering the U.S.

The Fast and Secure Trade (FAST) program is the commercial vehicle equivalent of NEXUS and provides expedited processing for low-risk pre-approved carriers. The processing time for FAST commercial vehicles entering Canada was estimated to be approximately 30 seconds. Expedited processing is provided to FAST commercial vehicles travelling to the U.S. and also those enrolled in the Pre-Arrival Processing System (PAPS) program, which uses barcode technology for the release of commercial shipments. The average processing time for FAST/PAPS eligible commercial vehicles entering the U.S. was 80 seconds.

Given the projected demand and the processing times per vehicle, **Table 5.5** presents the existing (2004) and projected required future number of passenger car and commercial vehicle primary inspection lanes for the Detroit River crossings.

For passenger car traffic, the existing/planned number of primary inspection lanes is considered sufficient to accommodate future cross-border travel demands in the near term, with capacity increases needed by 2015. Projected commercial vehicle growth will result in the need for additional capacity at primary inspection by 2035 for travel to Canada and before 2015 for travel to the U.S.

Given the above, the improvements required for primary inspection at the Detroit River crossings to meet the projected 2035 demand are as follows, based on existing productivity levels:

- Seven additional auto and one additional commercial vehicle lanes for vehicles entering Canada; and
- Six additional auto and ten additional commercial vehicle lanes for vehicles entering the U.S.

These primary inspection needs would have to be adjusted for new initiatives/requirements that may be implemented in the future.

With regard to secondary inspection, given the direction to pre-clearance and automated commercial inspection, the proportion of commercial vehicles referred to secondary inspection is expected to decrease in the future, thereby reducing secondary inspection capacity needs. As such, existing capacity at secondary inspection is considered adequate to accommodate the long-term capacity needs. However, the existing off-site Canadian secondary inspection location for commercial vehicles raises a number of operational and security issues, and is not an acceptable long-term solution.

TABLE 5.4 – PRIMARY INSPECTION PROCESSING TIMES

A. Autos Passenger Cars

Factor	Type / Country	Year	
		2004	Future
Distribution – Peak Period (Daily)	NEXUS	25% (12%)	25% (12%)
	Regular	75% (88%)	75% (88%)
Processing Times (sec/veh)	NEXUS	15	15
	Regular – To Canada	35	35
	Regular – To US	40	40
Average Time – Peak Period	To Canada	30.0	30.0
	To US	33.8	33.8

B. Commercial Vehicles

Factor	Line Release / Country	Year	
		2004	Future
Distribution by Line Release Program	Non-PARS – to Canada	22%	0%
	Non-PARS – to US	22%	0%
	PARS/ACI – to Canada	66%	85%
	PARS – to US	66%	75%
	FAST – to Canada	12%	15%
	FAST/PAPS – to US	12%	25%
Processing Times (sec/veh)	Non-PARS – to Canada	120	n/a
	Non-PARS – to US	120 – 180	n/a
	PARS – to Canada	85	85
	PARS – to US	120 – 180	120 – 180
	FAST – to Canada	30	30
	FAST/PAPS – to US	80	80
Weighted Average Processing Time (sec/veh)	To Canada	78.4	76.8
	To US	141.6	132.5

Source: Discussions with CBP and CBSA

Toll Collection

The capacity of the toll collection component is a function of the number of toll collection lanes/booths and the time that is required to process each vehicle. Manual collection (e.g., cash, commuter cards) and electronic toll collection utilizing transponders is provided in both directions at the Detroit River crossings. At present, toll collection facilities are able to accommodate peak hour demands and are not a bottleneck in the border crossing system.

Toll collection is the responsibility of the bridge/tunnel operator and it is in the operator's best interest to provide adequate capacity. Given the efficiencies of electronic toll collection and the relatively low cost to increase capacity, it is assumed that toll collection will not be a future constraint to border crossing system capacity and that the appropriate bridge/tunnel operators will make the necessary improvements to ensure that the revenue stream generated by cross-border traffic is not compromised by insufficient toll collection capacity.

Table 5.5 below, summarizes the future capacity deficiencies for the various elements of the overall border crossing system, based on the information provided in the previous sections.

TABLE 5.5 – SUMMARY OF FUTURE DETROIT RIVER CROSSINGS CAPACITY DEFICIENCIES

Crossing	Time Capacity Reached				
	U.S. Road Access	U.S. Border Processing	Bridge/ Tunnel Roadbed[1]	Canadian Border Processing	Canadian Road Access
Ambassador Bridge	Beyond 30 years	5 to 10 years	10 to 15 years	5 to 10 years	5 to 10 years
Detroit-Windsor Tunnel	0 to 5 years	5 to 10 years	30 years[1]	5 to 10 years	5 to 10 years

[1] If no improvements are made at the Detroit River, there would be some diversion from the Ambassador Bridge to the Detroit-Windsor Tunnel. Diversion of car traffic may move the timeframe that capacity is reached to between 25 and 30 years. Physical restrictions of the Tunnel limit the diversion of most types of trucks.

The Ambassador Bridge and Detroit-Windsor Tunnel represent two of the busiest border crossings in North America. In 2006, they carried more than 11 million passenger vehicles and more than 3.7 million commercial vehicles annually and handled 28 per cent of the total surface trade between Canada and the U.S.. The delays and resultant queuing at these crossings will have several negative effects associated with poor transportation network operations, including the following:

- Increased highway safety concerns, including higher potential for collisions at intersections, entrances and queue ends;
- Lost economic opportunity costs;
- Increased air pollution;
- Impacts to access and adjacent land uses in the vicinity of the border crossings;
- Infiltration of cross-border traffic onto local roads;
- Impacts to incident/emergency response;

- Increased vehicle operating costs and fuel consumption; and
- Increased driver frustration.

Over time, the effects of increased congestion and delays will continue to worsen.

Given the importance of this trade corridor and the substantial number of people dependent upon safe, reliable access across the Detroit River on a daily basis, the capacity deficiencies discussed in this section are a serious problem that needs to be corrected.

Recent Trends

As noted previously, the traffic projections used for the DRIC EA are documented in the Travel Demand Forecasts Working Paper, September 2005, which is available on the Partnership's website. The commercial vehicle forecasts in this report were based on Government of Canada trade projections by major commodity group, thereby capturing the different cross-border markets and associated travel characteristics to assess future commercial vehicle demand.

At the present time there is significant economic uncertainty. However, the forecasts were based on reasonable assumptions using the most current information available at the time, with extensive review and scrutiny by modeling experts from the Partnership agencies. This forecasting approach addressed future uncertainty through extensive sensitivity analyses, which capture a realistic range in the forecasts. The low growth scenario was intended to reflect much lower levels of demand which could be brought about by a variety of circumstances including, low economic growth, currency exchange rates, the Western Hemisphere Travel Initiative, City of Windsor or provincial non-smoking initiatives, fuel prices and other such factors. Similarly, high growth scenarios were tested to determine the upside potential in cross-border demand based on more optimistic, yet reasonable growth assumptions.

Since the traffic forecasts were completed, there have been declines in cross border passenger car traffic (see **Exhibit 5.1.C**). However, truck traffic remained fairly stable between 2001 and 2007 (see **Exhibit 5.1.D**) and in fact 2006 represented the peak in commercial vehicle traffic at the Ambassador Bridge**.** The most recent economic downturn will result in a truck volume decline in 2008. The recent declines in passenger car trips across the border coupled with the current economic downturn would indicate that the volumes are tending towards the lower range of the forecasts (see **Exhibit 5.1.E**). It is prudent to assume that even considering some industry restructuring that Canadian / U.S. trade will ultimately recover and grow. Assuming only a very modest economic recovery over the long-term, the existing crossing facilities will reach their practical capacity within the planning horizon.

EXHIBIT 5.1.C. HISTORICAL BORDER CROSSING PASSENGER VEHICLE VOLUMES (SOURCE: BTOA)

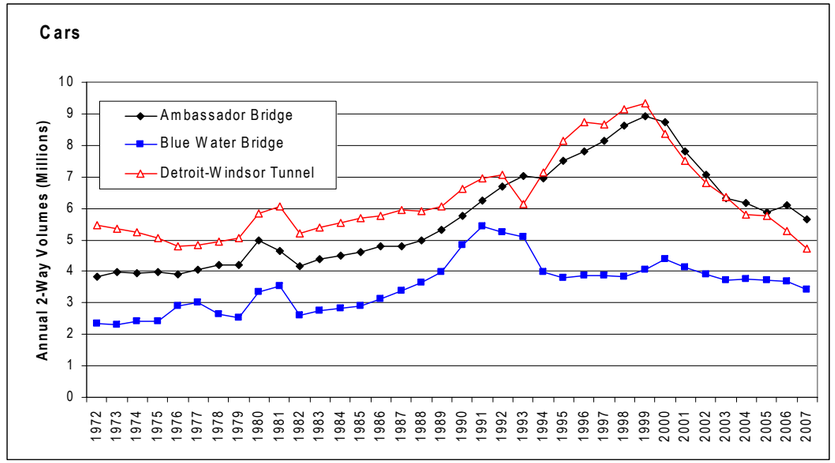


EXHIBIT 5.1.D. HISTORICAL BORDER CROSSING TRUCK VOLUMES (SOURCE: BTOA)

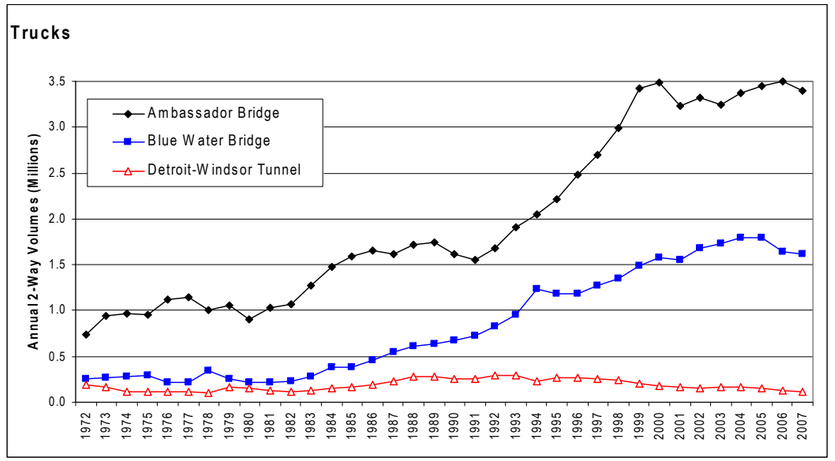
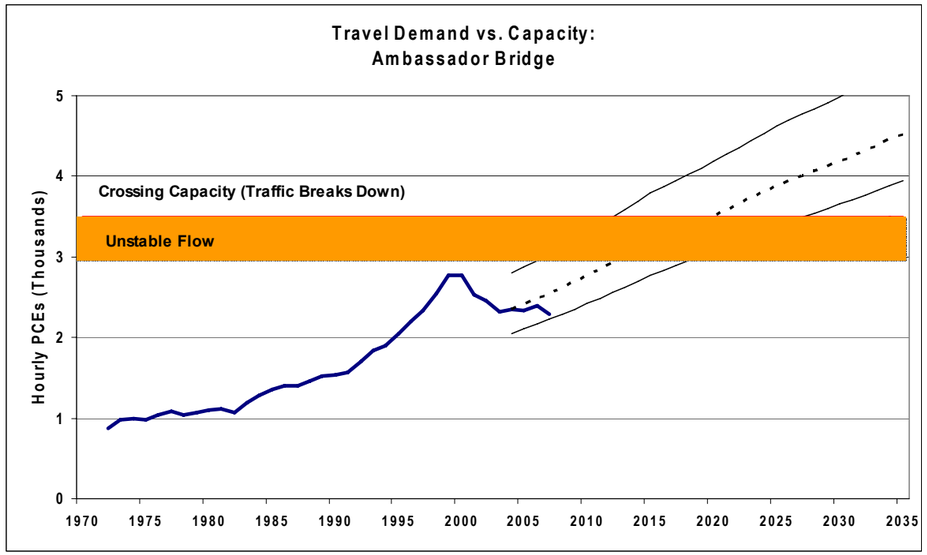


EXHIBIT 5.1.E. TRAVEL DEMAND VS CAPACITY: AMBASSADOR BRIDGE CROSSINGS (REFERENCED FROM DETROIT RIVER INTERNATIONAL CROSSING STUDY, TRAVEL DEMAND FORECASTS PREPARED BY IBI GROUP DATED SEPTEMBER 2005)



SYSTEM CONNECTIVITY

In general, MTO strives to have an interconnected network of highways so that people and goods can move through the province on a continuous and efficient inter-regional transportation system. This is an appropriate way to help minimize long-distance traffic movements (cars and trucks) on local municipal road networks, and thereby reduce traffic-related impacts on local communities, and maximize economic and personal productivity.

As well as being connected throughout the province, it is also important that the provincial transportation network connect directly with the United States. Again, direct connections can help maximize productivity while minimizing negative impacts associated with congested transportation corridors.

The provincial highway network connecting Highway 401 with the Windsor-Detroit crossings is not continuous. In fact, traffic on Highway 401 must travel along Highway 3 and Huron Church Road a distance of approximately 11 km before reaching the Ambassador Bridge. A total of 17 signalized intersections are situated along this section of road, as well as numerous commercial and residential entrances.

At the time of this analysis, travel time along this section of roadway was estimated to be 17 minutes even under relatively non-congested traffic conditions. This represents a delay of approximately 10 minutes compared to a freeway network that would directly connect Highway 401 to the Ambassador Bridge. The increased delay at times increases the traffic congestion and results in queuing, which in turn results in increased noise, air pollution and travel costs for both cars and trucks, and inhibits economic productivity in Ontario and other parts of Canada.

The lack of system connectivity from Highway 401 to the U.S. interstate network system is a serious network deficiency.

BORDER PROCESSING

Addressing issues related to border processing facilities, resources and procedures is not within direct control of the transportation agencies sponsoring this study. This responsibility lies primarily with agencies such as Canada Border Services Agency (CBSA), U.S. Department of Homeland Security (DHS) and U.S. General Services Agency (GSA). However, it is recognized that delays in border processing can result in congestion and delays at the Ambassador Bridge border crossing. Similarly, delays in border processing and lack of capacity at the connections to the plazas at the Detroit-Windsor Tunnel result in congestion and delays at the Detroit-Windsor Tunnel.

During the P/NF study and throughout the Detroit River International Crossing study, border processing agencies have been working to identify issues and concerns related to border processing at the existing crossings, as well as to identify the proposed increases to staffing, improvements to border processing facilities to increase capacity, and programs needed to facilitate border processing procedures.

As a result of the terrorist attacks on the U.S. on September 11, 2001, and of ongoing national security concerns, heightened border security is a new reality facing all border crossings. Security priorities affect border crossing operations. Periods of rigorous inspection of all passengers and goods using border crossings effectively reduce border crossing capacity, and can lead to congestion on the road network in the vicinity of the border crossings. Transportation agencies must develop solutions to accommodate the capacity requirements of international traffic, while ensuring security concerns are also addressed.

The border processing agencies and border crossing owners and operators have moved forward on implementing improvements to the border crossings, to increase capacity and reduce congestion, while maintaining their objectives related to having a safe and secure border. Initiatives such as the Ambassador Bridge Gateway Project and the proposed improvements to the Detroit-Windsor Tunnel plaza are intended to increase capacity of border processing facilities at these crossings.

Similarly, programs such as NEXUS and FAST are reducing processing times for vehicles and cargo crossing the border, thereby increasing capacity and potentially lessening the need for additional staffing at the crossings.

In addition, the U.S. government enacted the *U.S. Trade Act (2005)* which requires all U.S.-bound carriers to provide pre-notification of their shipment to U.S. Customs one hour in advance of their truck arriving at the border (30 minutes advance notice is required for FAST trucks).

The ability of these improvements and programs to meet future travel demand is not certain. Staffing at the border crossings will continue to be of critical importance to the border capacity issue. In addition, at the Ambassador Bridge, expansion of the existing Canadian bridge plaza to accommodate additional primary and on-site secondary inspection is not feasible given the urban constraints surrounding the existing plaza.

The increasing participation rate in the various border crossing programs will have a direct effect on the success of these programs to increase capacity of border processing. Transportation agencies will need to continue to coordinate border processing capacity and security issues with border processing agencies.

NETWORK OPTIONS (REDUNDANCY)

As discussed earlier in this report the international crossings at Windsor-Detroit are vital to the local, provincial and national economies. Although there are two crossings (the bridge and tunnel), the vast majority of trucks use the bridge. This is due to the fact that the tunnel is only one lane per direction with a height restriction that limits the use of many trucks. As well, the dense urban fabric of downtown Windsor and Detroit effectively limits roadway access and the size of the customs plaza.

Therefore, the majority of trade crossing at Windsor-Detroit is dependent on one facility, the Ambassador Bridge. Any prolonged capacity reduction or shut down at the Ambassador Bridge and/or its customs plazas would have serious implications on the national and local economies in both Canada and the United States.

5.1.2 Transportation Needs

In order to relieve the above-noted problems and meet the purpose as defined in **Chapter 1** of this document, the Detroit River International Crossing study has strived to address the following regional transportation and mobility needs:

- Provide new border crossing capacity to meet increased long-term travel demand;
- Improve system connectivity to enhance the continuous flow of people and goods;
- Improve operations and processing capabilities at the border; and
- Provide reasonable and secure crossing options (i.e., network redundancy).

A range of transportation alternatives that could potentially respond to these needs are discussed in the next section of this report.

5.2 Alternatives to the Undertaking

This section describes the transportation planning alternatives (Alternatives to the Undertaking) considered, and the assessment of those alternatives, to address the need for a new international crossing of the Detroit River. For further detail, the reader is referred to the *Draft Feasible Transportation Alternatives (Alternatives to the Undertaking) Report, February 2006*.

Transportation planning alternatives represent reasonable means of addressing the stated transportation problems, as well as meeting the purpose of the undertaking.

5.2.1 Alternatives Considered

The Canada-U.S.-Ontario-Michigan Border Transportation Partnership (the Partnership) prepared a *Planning/Need and Feasibility (P/NF) Report, November 2005* that identified several transportation planning alternatives, which have been revisited in the Detroit River International Crossing study.

The alternatives considered included the following, and are discussed in greater detail in the following paragraphs:

- Do Nothing;
- Improvements to border processing;
- Transportation demand management;
- Transportation systems management;
- New and/or improved rail alternatives including a new and/or expanded international rail crossing;
- New and/or improved transit services;
- New and/or improved marine services;
- New and/or improved road alternatives with a new or expanded international road crossing; and
- Combinations of the above.

The assessment of transportation planning alternatives provided an opportunity to examine fundamentally different ways of addressing transportation problems. In recognition of these fundamental differences among the planning alternatives, it was considered appropriate to assess the effectiveness of each type of alternative in addressing the problems and taking advantage of opportunities at a functional level.

THE "DO-NOTHING" ALTERNATIVE

This alternative was defined as taking no significant action to expand infrastructure, manage demand or improve operations. It included transportation improvements already contained in the existing plans and programs for geographical areas encompassed by the Southeast Michigan Council of Governments (SEMCOG) and the Windsor-Essex area. It did not include improvements to existing border processing capacity.

IMPROVEMENTS TO BORDER PROCESSING

Border processing is a key component in the transportation network in that it can restrict the capacity of the transportation network. Alternatives that improve border processing rates to a level equal to or greater than the flow rate of traffic across the border will to some degree address the transportation problems on the network.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) and Transportation Systems Management (TSM) focus on the optimal use of existing and future infrastructure. These alternatives include measures such as Intelligent Transportation Systems (ITS) technologies as well as transportation and land use policies with incentives to reduce, shift or divert transportation demand, thereby deferring the need for expansion of the transportation network.

NEW AND / OR IMPROVED RAIL ALTERNATIVES WITH NEW OR EXPANDED INTERNATIONAL CROSSING

Rail currently plays a role in the movement of international and inter-regional goods in the area. Improvements to the rail network and/or expansion of the existing rail crossing may address

transportation problems by diverting sufficient truck traffic from the road network to impact the need or timing of roadway-based improvements.

NEW AND / OR IMPROVED TRANSIT AND MARINE SERVICES

Capacity and/or service improvements/expansions to transit and marine services may reduce, shift or divert road-based passenger and freight travel demand.

NEW AND / OR IMPROVED ROAD ALTERNATIVES WITH NEW OR EXPANDED INTERNATIONAL CROSSING

Provincial roads are generally freeways and highways designed to accommodate high volumes of international and inter-regional long distance traffic. Connections between Highway 401 in the Windsor-Essex County area to the interstate freeway system in the Detroit-Wayne County area are required with this alternative to maintain continuity of the freeway network. The highway connections would be designed to appropriate freeway standards.

The Detroit River crossing could be either a new crossing (bridge or tunnel) or an expanded existing crossing. For the purposes of this study, a second span at the Ambassador Bridge crossing was considered to be an expansion of the existing crossing. Converting a rail tunnel to accommodate vehicular traffic was considered to provide a new crossing for road-based traffic.

Operational or structural changes of the existing crossings, such as modifications to plaza layouts or lane configurations were considered as expansion to existing crossings.

COMBINATIONS OF THE ABOVE

This involves the consolidation of the above alternatives to form a transportation network improvement strategy to expand the transportation network and reduce, shift or divert various aspects of travel demand.

The above-noted alternatives were assessed during the P/NF Study. As noted at the beginning of this chapter, the P/NF Study was conducted in a manner consistent with the environmental study processes in both countries, but was not completed within the formal environmental study framework. For the Detroit River International Crossing study, the work completed under the P/NF Study was updated to reflect changes in traffic and network demands.

The transportation planning alternatives were assessed and evaluated using broad factors to determine which alternatives were practical and feasible from a transportation, environmental and border processing perspective.

Evaluation factors were established to achieve the objectives of the Detroit River International Crossing study and were consistent with environmental approval processes in both Canada and the U.S. The factors developed for evaluating the transportation alternatives were as follows:

- Transportation Network Improvement;
- Transportation Opportunities;
- Governmental Land Use, Transportation Planning and Tourism Objectives;
- Border Processing;
- Environmental Feasibility; and,
- Technical Feasibility.

The rationale and method of assessment used in the evaluation are listed in **Table 5.6**.

TABLE 5.6 – EVALUATION FACTORS

Factor	Rationale	Method of Assessment
Transportation Network Improvement	Alternative would be considered feasible only if it enhances the performance of the transportation system with respect to the quality of travel as defined by levels of service and volume/capacity at the crossings of the Detroit River.	Assessment of ability of the alternative to address congestion and provide for continuous ongoing river capacity on the transportation network by improving travel time and reliability for international passenger and freight movement.
Transportation Opportunities	Improvements to transportation efficiency may be gained by improving the utility of inefficient or underutilized transportation corridors as well as making use of planned network improvements.	Assessment of the ability of the alternative to optimize use of existing transportation corridors or planned network improvements.
Governmental Land Use, Transportation Planning and Tourism Objectives	Recognizing the importance and impacts of accommodating the free flow of international passengers and goods, consideration must be given to the degree to which alternatives support local, regional, provincial, state and national planning and tourism objectives.	Assessment of the degree to which the alternative is consistent with approved land use, transportation planning and tourism objectives.
Border Processing	Alternatives would be considered feasible only if the long-term needs of the U.S. and Canadian border processing agencies can be met.	Assessment of the ability of the alternative to meet long-term needs of border processing agencies.
Environmental Feasibility	Consideration of potential impacts to environmental constraints (including natural, social and cultural features) is required under the environmental approval processes in both Canada and the U.S.	Assessment as to whether environmental constraints in the area (including natural, social and cultural features) preclude the alternative.
Technical Feasibility	Alternatives requiring new or expanded facilities would be considered feasible only if technical requirements related to alignment (both horizontal and vertical) and cross-section can be achieved at a reasonable cost.	Assessment of the ability of alternative requiring new or expanded facilities to achieve minimum technical requirements at a reasonable construction/ implementation cost.

The following paragraphs provide a summary of the study team's evaluation of each of the transportation planning objectives based on the broad level evaluation factors in **Table 5.6**. **Exhibit 5.4**, which follows the evaluation summary for each alternative, provides a graphical overview of the evaluation.

DO NOTHING

One objective of the Detroit River International Crossing study was to identify feasible alternatives to address the transportation problems associated with the international road network. Traffic forecasts show clearly that delays and queuing experienced in the past years at the Ambassador Bridge and the Detroit-Windsor Tunnel will return and be significant in the future. Doing nothing will not reduce the likelihood of disruption to the transportation network on this strategic trade corridor, nor will it address the lack of sufficient river crossing capacity to meet existing and future travel demand in the Windsor-Detroit area.

Doing nothing will result in capacity deficiencies and increased travel delays. Extended delays at border crossings and queuing on approach roadways will negatively impact the local communities. The effects of congested border crossings in Windsor-Detroit will extend beyond the border communities to other regions in both countries.

Based on the findings of the *Regional and National Economic Impact of Increasing Delay and Delay-Related Costs at the Detroit River Crossings Report, August 2005*, by 2025, mounting congestion and delay will cost the United States more that $1.4 billion (US) and Canada more than $206 million (CAN) a year in foregone production and output, unless steps are taken to expand infrastructure capacity at the principal border crossings between Michigan and Ontario. Exponentially rising congestion over the subsequent ten years (2025 to 2035) would lead to further production losses of $9.3 billion (US) per year to the U.S. and $ 1.5 billion (CAN) per year by 2035.

Lost production means fewer jobs. Failure to address the congestion problem, and the resulting production losses, means 10,000 fewer jobs in the U.S. and 3,000 fewer jobs in Canada by 2025, rising to more than 94,000 fewer jobs by 2035 in both countries. Job losses on this scale imply sharp reductions in personal incomes and living standards, and lost tax revenues for the provision of public services, particularly in the local jurisdictions of Michigan and Ontario.

The “do-nothing” alternative was not carried forward as a possible solution. However, it was carried forward as a benchmark from which to compare and assess other alternatives.

IMPROVEMENTS TO BORDER PROCESSING

Many of the delays and much of the queuing experienced in recent years on the approaches to the border crossings were related to border processing deficiencies and border security concerns. The issues of border security are anticipated to be ongoing and will require additional efforts among border processing agencies, transportation agencies and local community agencies to accommodate security procedures implemented during periods of high level risk.

In the past, many of the deficiencies in border processing related to improper or inaccurate documentation by drivers, passengers or shippers, a lack of available border processing staff and facilities to accommodate border processing requirements, limited use of Intelligent Transportation Systems (ITS), and a low participation rate in border processing programs. These issues combined to result in delays and queuing at the border crossings.

In recent years, the U.S. government has provided additional staffing at the Detroit border crossings and the launch of the NEXUS and FAST programs is addressing to some degree the need to identify high and low risk border users and ensure proper documentation. In addition, commercial vehicle pre-processing centres have been brought into use in Ontario to ensure the documentation of commercial border users is properly and accurately completed. The Canadian Transit Company, owner of the Ambassador Bridge, has opened such a centre along the Highway 401 corridor west of London, as well as one in Windsor at Industrial Road. The purpose of these facilities is to reduce processing times at the border crossings. In addition, the number of primary inspection booths for trades has been increased to 13.

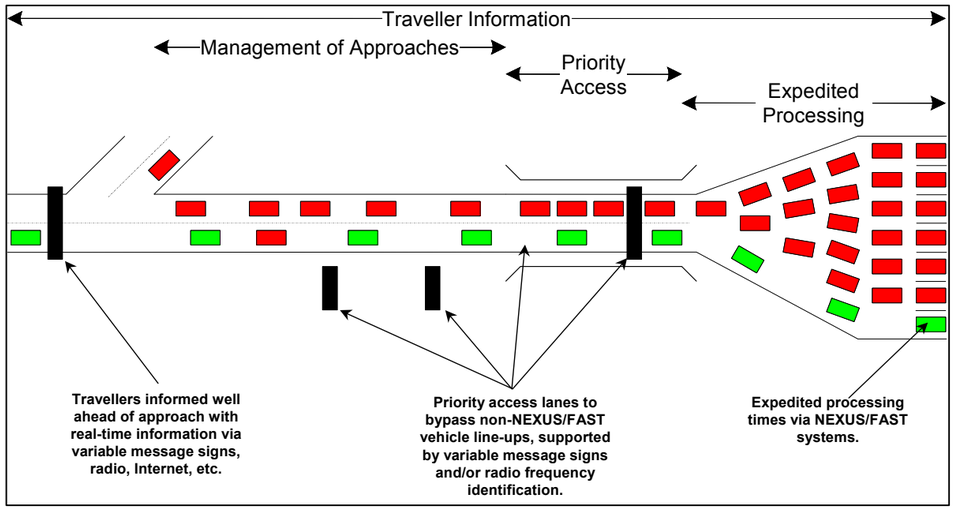
In November 2004, the U.S. Government began enforcing the U.S. Trade Act, which requires all U.S.-bound shipments to forward data to the U.S. port of entry one hour prior to the shipment arriving (30 minutes advance notice is required for FAST trucks). This requirement has reduced the need to send trucks to a secondary inspection area to complete paperwork and has contributed to reductions in extended delays at Ambassador Bridge.

Operators at the existing border crossings have identified additional facilities and additional staffing as being the most important issue facing the border over the short term. Governments have responded and are adding more staff and opening more inspection booths at the border crossings. In the longer term, more inspection facilities, increased staffing and greater use of NEXUS and FAST are seen as being the more cost-effective method of addressing the projected increases in travel demand at the border crossings.

International border crossings present unique opportunities for the implementation of Intelligent Transportation System (ITS) technologies and systems, particularly in terms of improving the security, safety and efficiency of passenger and commercial vehicle processing. In particular, ITS could provide expedited processing, priority access, approach management and traveller information in support of the NEXUS and FAST systems at the Windsor-Detroit crossings.

The NEXUS and FAST systems are designed to expedite inspection and processing times for passengers and commercial vehicles as well as their drivers. Ensuring effective use of these programs and higher participation rates will require that users experience travel time or convenience benefits. This may require infrastructure improvements such as providing priority access lanes for NEXUS and FAST users to get around other vehicles queuing for inspection. ITS applications that can support these lanes include variable message signs (i.e., signs that can be automatically altered) to indicate priority lanes or radio frequency identification (RFID) to enforce their use by NEXUS/FAST participants only (refer to illustration in **Exhibit 5.2**).

EXHIBIT 5.2 – POSSIBLE APPLICATIONS FOR ITS AT BORDER CROSSINGS



The efficient use of a system of several border crossings can be managed well ahead of arrival through the implementation of traveller information systems. Real-time (i.e., up-to-the-minute) knowledge of the conditions at each crossing would allow more effective management of the border crossing system as a whole and provide useful guidance and information to cross-border travellers in determining the time and route of travel. Real-time information can be used to distribute resources and manage traffic at crossings and assist in the staffing of inspection resources. The media that could be used to disseminate this information could include dynamic signs at strategic road junctions, local low power radio (highway advisory radio), Internet information channels (which could be used, for example, by truck dispatchers) and closed-circuit television. Such information dissemination would not only use these diversion strategies but also might influence the timing of arrival at the border.

Improvements to border processing can maximize the use of existing transportation corridors and would be consistent with government planning and tourism objectives in that they lead to improved flow across the border. Less congestion and delay may encourage cross-border travel, which in turn helps the regional tourism industry and the economies in general.

Improvements to border processing facilities may result in impacts to area features. However, the impacts can be avoided, minimized or mitigated through proper development and application of border processing technologies.

Improvements to border processing address one of the four needs of the undertaking as stated in **Section 5.1.2**, and should be a component of any solution to the transportation problems in the area. However, in itself, it cannot meet the purpose of this undertaking and was not considered on its own as an alternative means of addressing the stated problems.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is the application of technologies, policies or other methods to reduce, shift or divert transportation demand.

Canadian residents employed in the U.S. account for the majority of cross-border work and business travel. In 2004, there were approximately 2,000 fall weekday and 4,000 summer weekday vacation trips using the Detroit River crossings. This represented five per cent of the international passenger car traffic on a typical fall weekday. Vacation travel was found to be much less affected by delays at the border as compared to same-day discretionary trips, as delays at the border represent a much smaller proportion of the travel time for longer-distance overnight trips.

There were approximately 15,000 same-day recreation, entertainment, and shopping trips using the Detroit River crossings on a summer weekday and 14,000 on a fall weekday in 2004. This represents 40 per cent of cross-border travel on a summer 2004 weekday, but is a dramatic decrease from 27,000 trips and 49 per cent of summer 2000 weekday trips.

This information, together with the findings of the Travel Demand Study undertaken for this project was used to evaluate the feasibility and practicality of TDM as a transportation alternative.

Demand Reduction Measures

Demand reduction measures for passenger trips in the area, such as ride sharing and use of transit would have little effect on the operations of the transportation network. In 2004, the average auto occupancy for cross-border trips at the Ambassador Bridge was 1.85 and at the Detroit-Windsor Tunnel, 1.75, which suggests that ride-sharing was already being practiced by cross-border travellers (typical occupancy rates for metropolitan areas are around 1.1 persons per vehicle). Further promotion of ride sharing can be expected to yield only marginal reductions in demand on the network.

Demand reduction measures for freight traffic in the area include use of rail and marine. These alternatives are discussed separately in this section.

Challenges and possible benefits of improving transit ridership are discussed under “New and/or Improved Transit and Marine Services”.

Measures to Shift Demand

Shifting travel demand to less busy days of the week or off-peak periods of the day or to other international crossings was also considered. At present, congestion at the border crossings is not severe. However, based on the findings of the *Existing and Future Travel Demand Working Paper – November 2002* (available under separate cover) prepared as part of the P/NF Study, the transportation network exhibited attempts by users at that time to manage demand during peak travel periods throughout the week. For example:

- The number of passenger cars crossing the Ambassador Bridge and Detroit-Windsor Tunnel was greatest on the weekend and Fridays when commercial vehicle traffic is lowest, suggesting drivers were deferring leisure trips to non-workdays;
- Commercial vehicle traffic volumes were found to be relatively low throughout the overnight hours;
- Weekday cross-border passenger car travel was characterized by morning and afternoon peaks; weekday cross-border commercial vehicle traffic was highest during midday periods, suggesting truckers attempted to avoid peak periods for passenger car travel; and,
- Weekday to weekend traffic volume comparisons suggested passenger car traffic diverted to the Detroit-Windsor Tunnel during the week to avoid high truck traffic levels on the Ambassador Bridge.

Given the degree of demand management currently practiced by network users, encouragement of any such measures would be expected to yield only marginal improvements to network operations once congestion becomes a recurring problem.

Measures to Divert Demand

One measure to reduce demand on the traffic network across the Detroit River is to divert travel demand to other international crossings outside of the area. Shifting passenger and commercial traffic to border crossings in the Sarnia-Port Huron area, for example, would preserve capacity on the Windsor-Detroit crossings.

The findings of the Travel Demand Study undertaken for this project identified a significant proportion of commercial vehicle traffic currently using the Ambassador Bridge on a weekday could also use the Blue Water Bridge without significant travel time increases.

There are a number of possible reasons why the Windsor-Detroit crossings are preferred by such trip-makers, including:

- Operators may be more familiar with the routing and comfortable with customs brokers at the Ambassador Bridge, resulting in the formation of travel habits;
- The Blue Water Bridge has experienced queues and delays as well;
- It is easier (or habitual) for the administrative departments of operators to deal with one bridge for matters such as pre-clearance papers;
- Voucher redemption programs and marketing by the Ambassador Bridge;
- Convenient rest stops en route to the Ambassador Bridge;
- There is better access to I-75 south of Detroit via Windsor, as travelling down I-94 via Sarnia-Port Huron requires going through the core of Detroit; and,
- There is a perception of a shorter trip distance via the Ambassador Bridge for more of the total trips between Ontario and Michigan.

Changes to border processing procedures under the FAST program to allow for the use of any border crossing in southwestern Ontario/southeastern Michigan, as well as increased education and awareness programs may encourage long-distance travellers to divert from the Windsor-Detroit border crossings. The findings of the Travel Demand Study indicated that diversion of traffic to the Blue Water Bridge could increase the timeframe at which the Windsor-Detroit crossings reach capacity by about six years. Achieving a high degree of diversion from these candidate trips would defer, but not eliminate the need for improvements to the transportation network across the Detroit River.

Other Measures

Other measures considered to reduce travel demand included:

- Incentives to encourage reduction of trips (e.g., promoting telecommuting); and
- Land use and transportation planning policies and other policies and procedures that result in less single occupancy vehicle use, less commuting, higher transit use, and more efficient use of the transportation network.

The development of effective measures to divert demand away from the Detroit River is made complicated by the bi-national nature of the transportation network. Implementation of some of these measures would require international agreement by various levels of governments in both countries, each with their own legislation and policies to address issues that are unique to them. Nevertheless, measures to reduce or change this aspect of travel demand may be effective in achieving some reduction in the growth of travel demand across the transportation network.

Summary

The nature of international travel demand on the transportation network means that implementing TDM measures alone will not eliminate the need for other network improvements to accommodate the 2035 travel demand. In addition, TDM does not address the need for reasonable options for maintaining the movement of people and goods on the transportation network. However, implementing TDM measures could provide some benefit to network operations, and would support other government and tourism objectives. In addition, TDM could be implemented in conjunction with border processing requirements with minor impacts to environmental features.

Therefore, TDM (including encouraging long distance trips to use the Blue Water Bridge) will be pursued by the Partnership as part of a long-term strategy. However, in itself, TDM is not a long-term solution to the international transportation needs at Windsor-Detroit.

TRANSPORTATION SYSTEMS MANAGEMENT

Transportation Systems Management (TSM) relates to a wide range of systems and technology to improve the efficiency and safety of existing and future highways. Driver messaging and directional signing, traffic metering, and incident monitoring can improve traffic flow during high congestion periods, bad winter weather, traffic accidents, special events, etc.

Operations on the transportation network are carefully monitored by a number of sources, including local media, border agencies, border crossing operators and the trucking community. These various information sources provide updates of border crossing conditions, allowing motorists, and trucking dispatchers, to make informed choices about whether and where to travel. Improving communications and the increased use of technologies to better inform drivers may provide some benefit to network operations, but would not eliminate the need for other improvements, including additional road-based capacity.

Localized improvements, such as improved signal timing and improvements to intersections may better utilize existing facilities and roads by increasing their efficiency, but would similarly yield only marginal improvements to network operations.

NEW AND/OR IMPROVED RAIL ALTERNATIVES

The capacity of the existing rail network has been determined to be sufficient to meet the long-term needs of rail transport. The rail network in the area is capable of accommodating projected 2035 demand, assuming mainline capacity on links outside the area also keep pace with the growth through investment in additions and renewals. Rail alternatives considered in this study were therefore of two types: 1) alternatives that provide new rail service and facilities where not currently provided across the Detroit River, and 2) alternatives that increase the use of rail.

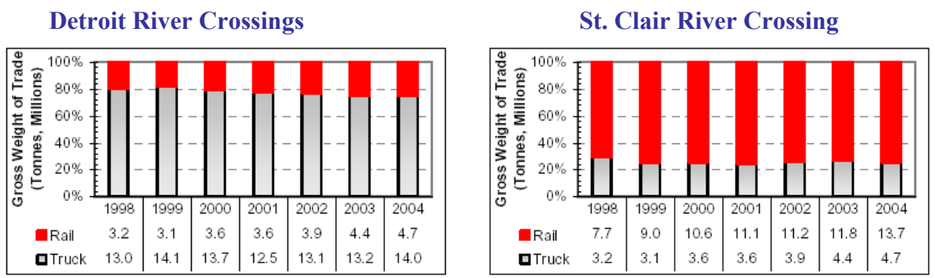
There is no international passenger rail service across the Detroit River, and rail presently carries approximately 20 per cent of the value of international freight. Measures could be introduced to

encourage the use of railway passenger services across the border. At present, there are no known plans for the introduction of passenger rail services across the Detroit River. It is unlikely that such a service could achieve appropriate ridership to sufficiently address network operational needs.

The modest shift of freight transport from truck to intermodal rail observed over the past five years at Detroit River and St. Clair River crossings (see **Exhibit 5.3**) has been supported by significant investment in intermodal facilities infrastructure. Although the existing rail crossing facilities have sufficient capacity, further growth will require continued investment, notably to mainline capacity in Canada, which is currently restricting cross-border intermodal rail growth. CP cancelled its *Toronto-Detroit Expressway* service in 2004.

It is technically feasible to construct rail corridors, and implementing rail improvements would allow for the use of existing transportation corridors. In addition, a new or expanded international rail crossing would provide an option for maintaining the movement of people and goods in cases of disruption to any of the existing border crossings on the transportation network.

EXHIBIT 5.3 - GROSS SHIPPING WEIGHT OF TRADE BY MODE FOR DETROIT AND ST. CLAIR RIVER CROSSINGS, 1998- 2004, CANADA TO US



The truck mode share is anticipated to remain constant over the study horizon. This is based on the relatively mature state of the auto industry's use of intermodal rail, as well as the significant proportion of the machinery and electronics goods that are transported at the border crossing, which are not conducive to intermodal rail.

However, the possible impact of alternatives that could divert demand from over-capacity road-based crossings, to other modes where there is excess capacity available was considered. This would involve fundamental changes in the transportation characteristics and behaviour currently exhibited by the passenger car and commercial vehicle users of the Detroit River border crossing facilities. This corresponds to a shift in the proportion of commercial vehicles to intermodal rail for trip markets that could be diverted where rail transportation has become (or is becoming) competitive with truck transportation in terms of price and service. Divertible traffic generally consists of relatively long-distance trips. The vast majority of traffic at the Detroit-Windsor Tunnel is considered non-divertible.

A scenario involving significant diversion of freight to intermodal rail through major investments and transportation policies was considered and is documented in the *Travel Demand Forecast Working Paper, September 2005*. That paper concludes that, even under such an optimistic diversion scenario, rail improvements would defer, but not eliminate the need for improvements to the transportation network. This alternative would therefore only marginally improve congestion on the road-based transportation network.

As a result, delays and queuing on the road network would continue to occur and gradually worsen as traffic volumes increased. Such delays and queuing on the road-based network of this international trade corridor are not consistent with governmental planning objectives or tourism objectives. Similarly, improvements to rail would only partially address border processing needs. Improvements to rail may assist in the processing of freight traffic, but would have little benefit to truck and passenger vehicle inspection processes on the road network. Rail improvements would likely also result in impacts to environmental features within or adjacent to existing or proposed rail corridors, but these impacts could be avoided or mitigated to the extent possible as with the road alternatives.

As noted in the previously completed *Planning/Need and Feasibility Study*, improvements to rail services were recommended as part of a long-term border strategy. However, diversion of truck and passenger car traffic to intermodal rail will not, in itself, address the identified problems or meet the long-term transportation requirements.

NEW AND/OR IMPROVED TRANSIT AND MARINE SERVICES

Presently, transit and marine services across the Detroit River serve minor roles in the transportation network.

Transit

Currently, the only public transit available between Windsor and Detroit is the Tunnel Bus operated by Transit Windsor. In developing the travel demand projections, increased frequencies of existing services were assumed at levels to support a continuation of current market shares, but no new local or intercity services were included.

However, a number of alternatives for improving transit services can be implemented to provide choices for cross-border travelers. These alternatives include:

- Increase Tunnel Bus services - Current levels of service are rather low and increased services might encourage greater utilization.
- Extend Tunnel Bus or introduce new commuter express services to major destinations - For example, many Windsor residents work at the hospital complex in downtown Detroit. A direct bus to the hospital complex could encourage transfers. Similarly, the other origins and destinations in Windsor-Detroit might be linked with a better bus service.
- Introduction of Ambassador Bridge bus service - Similar to the bus through the tunnel, a bus crossing Ambassador Bridge could provide connections between areas in Windsor and Detroit for local commuters and visitors.
- Alternative public transit systems - These could include new systems such as a gondola system across the river, the introduction of a passenger ferry service (possibly similar to the Seabus service in Vancouver), development of a shuttle rail service through the existing rail tunnel, extension of planned commuter rail services in the Detroit region to Windsor and other measures.

Improvements to transit services are not likely to reduce travel demand on the road network sufficiently to overcome the need for road improvements. Transit improvements could make use of existing transportation corridors and can be implemented, in most cases, at a reasonable cost and in a relatively short timeframe (as compared to major infrastructure improvements).

However, delays and queuing on the road-based network would result even with the transit service improvements. This result is not consistent with planning or tourism objectives. Similarly, improvements to transit services would only partially address border processing needs (for example, transit improvements would only address passenger travel). Transit improvements may result in impacts to environmental features within or adjacent to existing or proposed new transit corridors, but these impacts could be avoided, minimized or mitigated to the extent possible as with other infrastructure improvement alternatives.

Marine

Marine services can be considered as being of two types – long-distance and local. Long-distance marine services are comparable to rail in that such services can reduce travel demand at the Detroit River crossings. Local ferry services are comparable to the Tunnel Bus service for passengers and an alternative road-based crossing for trucks and cars (the ferry terminals are accessed via the road network).

Long-distance shipping on the Great Lakes primarily serves bulk goods transport (e.g. ore, aggregates, salt). In the past, package freighters have operated on the Great Lakes. However, given the "just-in-time" inventory processes now practiced by many North American industries and the time sensitivities to many goods presently being transported by truck, the potential market for long-distance shipping is only a fraction of that which crosses the Windsor-Detroit border today.

The Detroit-Windsor Truck Ferry provides local ferry services. Currently, the truck ferry has a relatively small but vital role. The service is relied upon to ferry oversize shipments and hazardous goods across the Detroit River, but in no way restricts its use to these two markets. At the time of preparing this report, improvements to the terminal area, access road and dock are planned on the Canadian side to enhance the service. There are possibilities to increase the use of the service to divert passengers and other freight services from the bridge and tunnel. The ferry is currently operating at about 25 per cent of capacity. The operation also has the capability of adding barges and tugs to increase its daily operating capacity. Others have expressed an interest in launching new truck and passenger ferry services on the Detroit River.

Adding or improving these marine services is technically feasible, can make use of use of existing transportation corridors along the riverfront and can be implemented, in most cases, at a reasonable cost and in a relatively short timeframe (as compared to major infrastructure improvements). It is possible that these services could be increased to the point that several hundred trucks per day could be transported across the border. This would be an important contribution to the overall capacity of the border crossing system. However, the traffic demand analysis projects an increase of several thousand trucks per day. At full capacity and with additional barges, ferry services alone cannot provide sufficient transportation network improvements to meet the long-term needs of the region.

Delays and queuing on the road-based network would result even with the marine service improvements. This result is not consistent with planning or tourism objectives. Similarly, improvements to marine services would only partially address border processing needs (for example, new ferry services could increase border processing staffing requirements at the border). Marine services would likely also result in impacts to environmental features within or adjacent to existing or proposed marine terminals and facilities, but these impacts could be avoided, minimized or mitigated to the extent possible, as with other alternatives.

NEW AND / OR IMPROVED ROAD ALTERNATIVES WITH NEW OR EXPANDED INTERNATIONAL CROSSING

Expanding the road network will provide an option for maintaining the movement of people and goods and alleviating congestion. The majority of cross-border trips on the network currently use road-based transportation modes. This trend is likely to continue over the planning horizon of this study. Providing additional road-based capacity directly addresses the needs of the network. Through proper planning, such expansion can maximize use of existing corridors and be implemented in a manner consistent with planning and tourism objectives.

New or expanded border crossings must be designed to meet the long-term needs of border processing agencies. These needs include: adequate size and flexibility of plaza area to accommodate border processing requirements, the ability to identify and separate low and high-risk traffic, and security of the primary and secondary inspection areas. These improvements can be incorporated into existing border crossings or a new crossing.

Improvements to the existing crossings can provide some relief but would not fully address the need for reasonable options for maintaining the movement of people and goods in cases of disruption at any of the existing border crossings. Further, while improvements to existing crossings would achieve limited additional road capacity, such improvements are not likely to provide sufficient capacity to address future travel needs. However, improvements to the existing crossings can increase utilization of existing infrastructure and improve operations on the network.

New road alternatives, whether federal, provincial, state or municipally governed, will be designed to comply with design standards. Given the nature and extent of development and other land uses in the area, expansion of the road network will have an impact on natural, socio-economic and cultural features. The four transportation agencies that comprise the Partnership, in consultation with other agencies, government offices and departments, stakeholder groups and the public, will develop and apply methodologies to avoid, minimize or mitigate impacts to the extent possible, as appropriate.

'New and/or Improved Road Alternatives with New or Expanded International Crossing' is a feasible alternative and was carried forward for further study.

COMBINATIONS OF THE ALTERNATIVES

In order to satisfy the study goals and objectives, it is apparent from the traffic analysis, that several of the transportation planning alternatives, implemented in concert will be required to address future transportation needs across the Detroit River.

Border processing improvements will be required on a continuing basis. The implementation of these improvements is not under the direct control of the Partnership. However, the Partnership will continue to work with border processing agencies to encourage and support initiatives that improve border processing at the Windsor-Detroit crossings.

It is also clear that the only combination of alternatives that can practically accommodate a significant amount of increased demand for travel and effectively provide reasonable options for maintaining the movement of people and goods in cases of disruptions at any of the existing border crossings is one which includes the 'New and/or Improved Roads with a New or Improved Crossing' alternative. All other alternatives, even in combination, will not provide sufficient long-term border capacity to meet future needs.

EVALUATION SUMMARY

The evaluation of transportation alternatives is summarized in graphic form in **Exhibit 5.4**.

EXHIBIT 5.4 – SUMMARY OF EVALUATION OF TRANSPORTATION ALTERNATIVES

Factor	Do Nothing	Border Processing	TDM/ TSM (including diversion)	Rail	Transit	Marine	New and/or Expanded Roadways
Transportation Network Improvement	○	◑	◑	◔	◔	◔	●
Transportation Opportunities	○	◑	●	●	●	●	●
Governmental Land Use, Transportation Planning and Tourism Objectives	○	●	◑	◑	◔	◔	●
Border Processing	○	●	◑	◑	◔	◔	●
Environmental Feasibility	◑	◑	◑	◑	◔	◔	◑
Technical Feasibility	N/A	●	●	●	●	●	●

Shading represents the degree to which the alternative addresses each factor, relative to the other alternatives

○ → ● Low High

As illustrated in **Exhibit 5.4** and discussed in the preceding sections, the only transportation planning alternative that can meet the identified needs is one that includes the provision of New and/or Improved Roads with a New or Improved Crossing. This alternative has been identified as the most effective at addressing the transportation network requirements, border processing requirements, and provides the highest overall level of support to planning and tourism objectives. This alternative has a comparable degree of environmental and technical feasibility as the other alternatives on the basis that impacts could be avoided, reduced or mitigated to the extent possible as with other infrastructure improvement alternatives. It is also recognized that improved and expanded border processing capacity is an integral component of this solution.

In terms of addressing transportation network requirements for people and goods movement, a multi-modal approach provides choice for travellers and offers viable mechanisms to reduce auto use.

Although alternatives for travel demand management, rail, transit, ferries, etc., cannot independently address the diverse user needs, sufficiently alleviate traffic congestion on the transportation network or effectively provide reasonable options for maintaining the movement of people and goods in cases of disruptions at any of the existing border crossings, these alternatives should be included as part a multi-modal strategy to meet the medium and long-term needs of the transportation network in the area.