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Canada-United States-Ontario-Michigan Border Transportation Partnership Planning/Need and Feasibility Study

Feasible Transportation Alternatives Working Paper

January 2004

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Preface

The Canadian, U.S., Ontario and Michigan governments are conducting a Planning/Needs and Feasibility Study to provide a long-term strategy that will ensure the safe and efficient movement of people, goods, and services between Southeast Michigan and Southwest Ontario. The study will assess the existing transportation network, including border crossings, and will identify medium- and long-term transportation needs, alternatives, and potential new or expanded crossings between Southeast Michigan and Southwest Ontario.

The objectives of the Planning/Needs and Feasibility Study are as follows:

a) Identify a focused analysis area within which transportation alternatives will be studied.

b) Identify existing and future transportation problems and opportunities with respect to capacity of border crossings, and the linkage to, and capacity of, existing and planned future national, provincial, and municipal transportation systems.

c) Identify and analyze surface transportation alternatives (highway, arterial road, rail and marine) that are practical and feasible from a transportation, environmental, border processing, and financial perspective.

d) Recommend feasible international crossing alternatives that address the identified transportation problems and opportunities.

e) Develop an overall 30-year transportation strategy, which includes implementation strategies for any international crossing alternatives.

The results of the Planning/Needs and Feasibility Study are being used as initial work for the scoping and terms of reference for an environmental study to meet the requirements of the National Environmental Policy Act (NEPA), Canadian Environmental Assessment Act (CEAA), and Ontario Environmental Assessment Act (OEAA).

The Planning/Needs and Feasibility Study incorporates consultation with public and private sector stakeholders and the general public. Additional project information is available through the project web site: www.PartnershipBorderStudy.com.

Feasible Transportation Alternatives Working Paper

List of Exhibits

1. Introduction

The Feasible Transportation Alternatives Working Paper describes the transportation alternative, considered, and the assessment of those alternatives, to address transportation problems and opportunities identified in the Transportation Problems and Opportunities Report, January 2004, and issues identified through consultation on that document.

The report identified that Canada and the United States share the largest bi-national trading relationship in the world. Currently, $146 billion (USD) in surface trade passes between Southwestern Ontario and Southeastern Michigan annually. Approximately 55% of the value of this trade crosses the Detroit River by truck. By 2030, the value of surface trade is expected to increase to nearly $240 billion (USD). This trade benefits the local, regional and national economies. Regionally, the Windsor and Detroit areas share a strong economic bond. Cross-border employment, shopping and recreational opportunities are major benefits for businesses and residents on both sides of the river.

Border processing agencies in the U.S. and Canada are adapting new procedures and programs such as NEXUS and FAST to improve screening at the border and reduce delays for low-risk traffic. However, the movement of people and goods on the trade routes is subject to delays and disruption due to traffic incidents, maintenance operations and security concerns.

Increasing traffic through the Windsor-Detroit border crossings also presents transportation challenges due to the limited capacity of the Ambassador Bridge and Detroit-Windsor Tunnel.

The impacts to the local, regional and national economies of Canada and the United States – as well as other impacts to the border communities – must be addressed. Free flows on the international trade corridors and local access within major metropolitan areas are dependent on efficient border crossings. The terrorist attacks on September 11, 2001 and the post 9/11 security considerations increase the need to address security and redundancy issues in planning for major infrastructure of regional and/or national significance.

Redundancy issues are considered to include the availability of options for maintaining the movement of people and goods in case of major incidents, maintenance operations or congestion at any of the current border crossings. These issues reflect consideration of network reliability, as well as security.

The transportation alternatives considered included roadway and non-roadway alternatives. The process for identifying, assessing and selecting feasible transportation alternatives is represented in Exhibit 1.1.

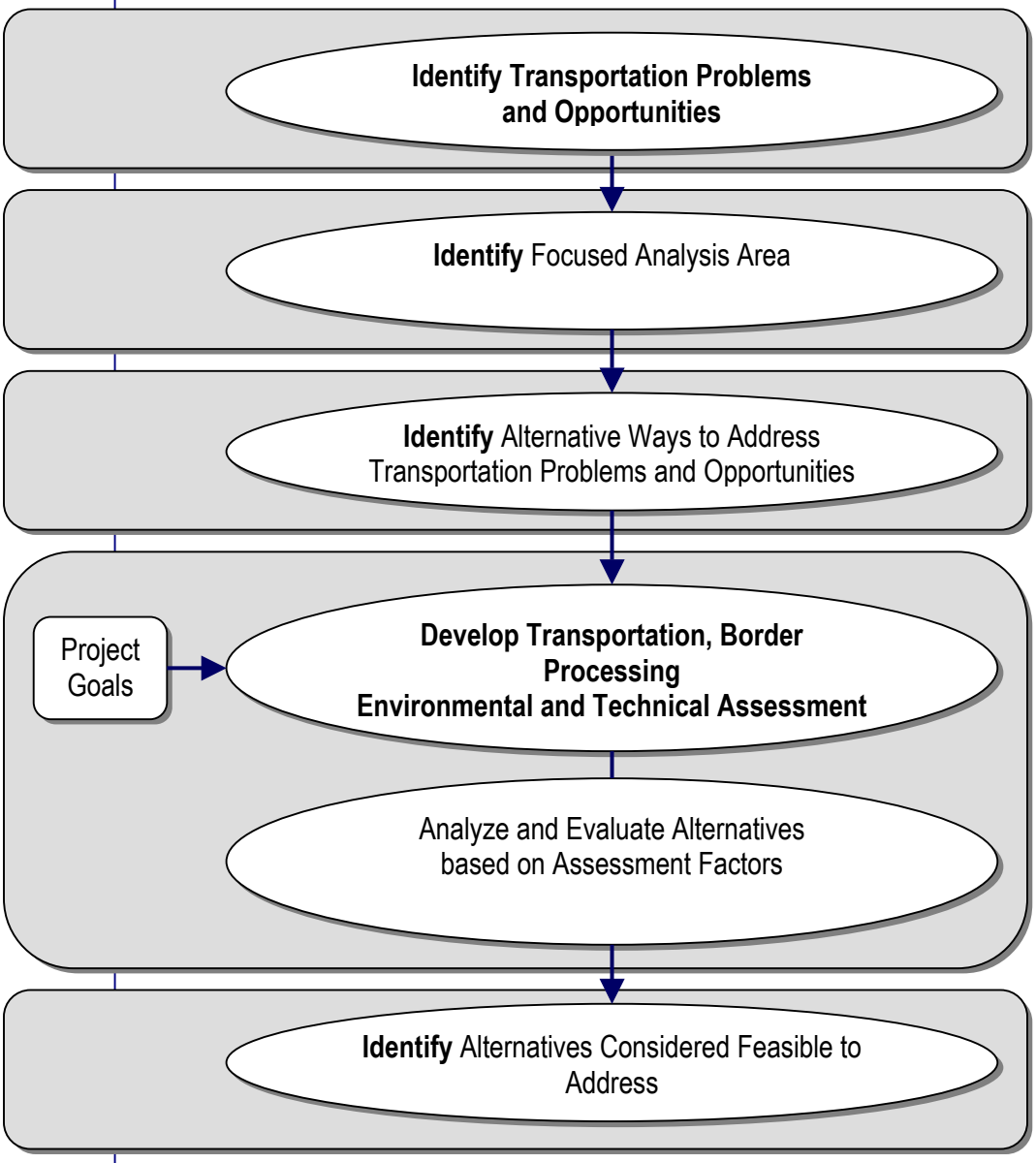
The basis for the identification, assessment and selection of feasible transportation alternatives included:

- work completed to date as documented in the **Existing and Future Travel Demand Working Paper**, **Transportation Problems and Opportunities Report** and **Environmental Overview;**
- additional technical work undertaken by the Project Team on technical and environmental aspects of the alternatives; and,

- input/advice from the public and private sector consultation groups, as well as the general public.

The findings provided in this document will be incorporated in the Planning/Need and Feasibility Study as appropriate, and will be presented as advice to the Partnership.

EXHIBIT 1.1 – PROCESS FOR THE SELECTION OF FEASIBLE TRANSPORTATION ALTERNATIVES



2. Transportation Alternatives

2.1 Description of the Alternatives Considered

The Focused Analysis Area identified in the previous chapter provided the area in which alternatives would be developed to address transportation problems and opportunities. Consistent with environmental approval processes in both Canada and the U.S., the transportation alternatives considered included roadway and non-roadway based options. The transportation alternatives considered are defined as follows:

The "Do-Nothing" Alternative

This alternative was defined as taking no significant action to expand infrastructure, manage demand or improve operations. It includes 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 does 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

Travel demand management focuses on the optimal use of existing and/or future infrastructure. This alternative includes measures such as Intelligent Transportation Systems (ITS) technologies and transportation/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 FAA. Improvements to the rail network and/or expansion of existing crossings 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

Federal/state/provincial roads are general freeways and highways designed to accommodate high volumes of international and/or inter-regional long distance, traffic. Connections between Highway 401 in Windsor/Essex County and the interstate freeway system in Detroit/Wayne County are required with this alternative to maintain continuity of the freeway/highway network. The highway connections would be designed to federal, provincial and/or state standards.

The 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 is considered to be an expansion of the existing crossing. Converting a rail tunnel to accommodate vehicular traffic is 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 are considered as expansion to existing crossings.

Although municipal roads do not typically serve international and/or inter-regional long distance travel, such facilities may address transportation problems by diverting local traffic from other facilities or serving as a connector between national, state and provincial facilities and international crossings.

Combinations of the above

Several of the above alternatives may be consolidated and put forward as a transportation network improvement strategy to both expand the transportation network and reduce, shift or divert various aspects of travel demand.

2.2 Evaluation of Transportation Alternatives

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

The evaluation factors were established to achieve the objectives of the Planning/Need and Feasibility Study and are consistent with environmental approval processes in both Canada and the U.S. The factors developed for evaluating the practicality and feasibility of transportation alternatives are 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 2.1.

TABLE 2.1: 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 travel time, travel speed, delay and reliability during the planning horizon of this study (to 2030).	Assessment of ability of the alternative to address congestion 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 governmental 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 FAA (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.

Do Nothing

One objective of the Planning/Need and Feasibility Study is to identify feasible alternatives to address the transportation problems and opportunities of the international road network in the FAA. Delays and queuing are already frequent occurrences at the Ambassador Bridge and the Detroit-Windsor Tunnel. 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 roadway capacity to meet existing and future travel demand at the Detroit-Windsor crossings.

Doing nothing will result in a deficiency of capacity 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. The Do-nothing alternative will not be carried forward as a possible solution. However,

the Do Nothing or "Base Case" alternative will be carried forward as a benchmark from which to compare and assess other alternatives.

Improvements to Border Processing

Many of the delays and queuing currently experienced on the approaches to the border crossings are related to border processing deficiencies and border security concerns. The issues of border security will be on-going 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.

Under typical operating conditions, the deficiencies in border processing relate 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 elements combined result in delays and queuing at the border crossings.

The U.S. government has recently approved the provision of additional staffing at the Detroit border crossings and the recent launch of the NEXUS and FAST programs are expected to address to some degree the issues of identifying high and low risk border users and proper documentation. In addition, commercial vehicle pre-processing centres are being brought into use in Ontario to ensure 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. The facility serves commercial vehicles destined to either the Ambassador Bridge or Blue Water Bridge. The purpose of these facilities are to reduce processing times at the border crossings.

Operators at the existing border crossings have identified additional staffing as being the most important issue facing the border over the short term. Governments have responded and are adding more staff at the border crossings. In the longer term, 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 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 Detroit-Windsor crossings.

The NEXUS and FAST systems are designed to expedite inspection/processing times for passengers and commercial vehicles and their drivers. Ensuring effective use of these programs and higher participation rates will require that users experience travel time and/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 2.1).

The efficient use of a system of several border crossings can be managed well ahead of arrival through the implementation of traveler 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 travelers in determining the time and route of travel. Real-time information can be used to distribute resources and manage/control traffic at crossings and assist in the staffing/allocation 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.

In the U.S., MDOT and FHWA are finalizing plans for improvements to connections between the interstate freeway system and the Ambassador Bridge plaza. These improvements will provide for some expansion of secondary inspection facilities, a frequent cause of delays for U.S.-bound commercial traffic.

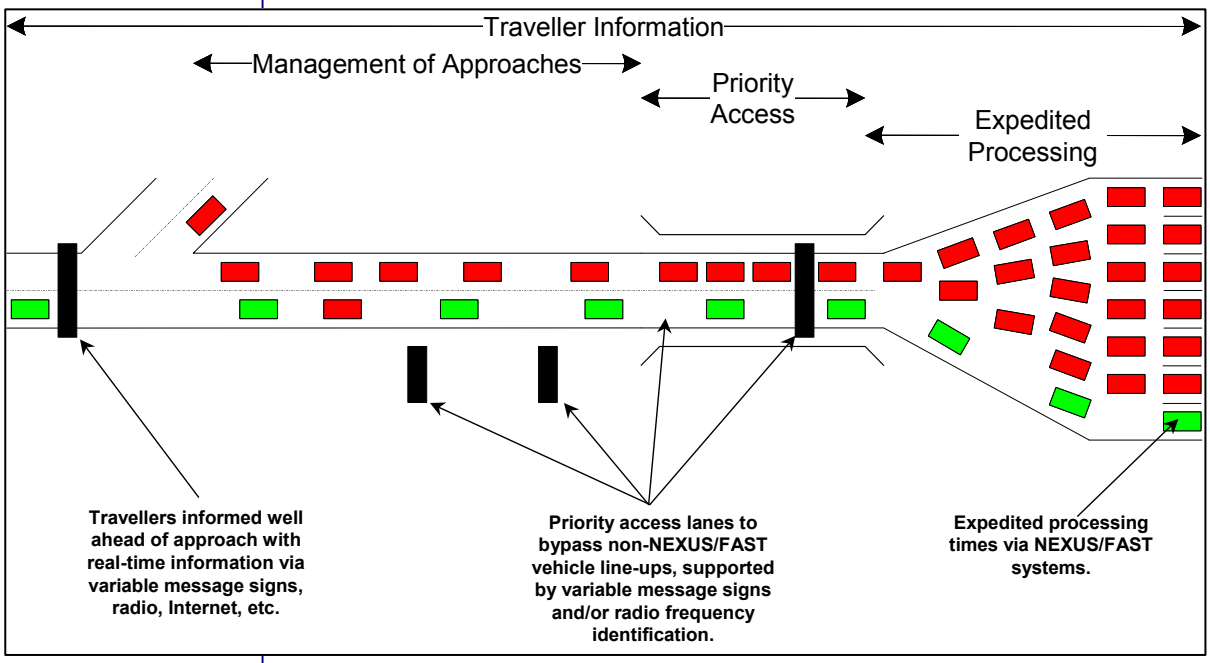
While these measures will assist border processing agencies improve processing rates and reduce the likelihood of extensive queuing and delays, these improvements alone are not sufficient to address the need for reasonable options for maintaining the movement of people and goods and the need for additional network capacity to accommodate future travel demand. It can be expected that, as international traffic volumes continue to grow, additional staffing and facilities improvements will be required in this region.

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.

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

'Improvements to Border Processing' is a component of any solution to the transportation problems in the FAA, although not the only component. This alternative will be carried forward for further study.

EXHIBIT 2.1 – POSSIBLE APPLICATIONS FOR ITS AT BORDER CROSSINGS



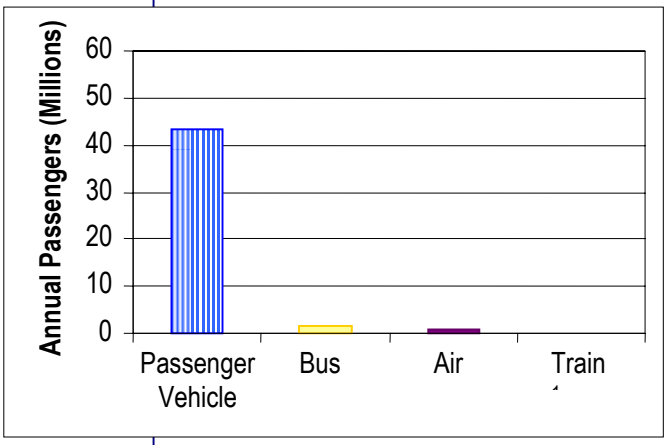
Transportation Demand Management

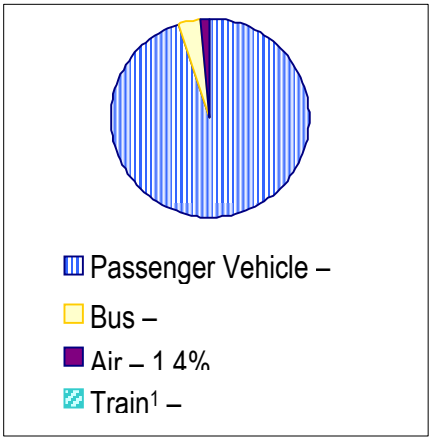
Transportation Demand Management (TDM) is the application of technologies, policies or other methods to reduce, shift or divert transportation demand.

As represented in Exhibit 2.2, the vast majority of international trips in the FAA are road-based. The modal shares depicted in this exhibit are expected to remain relatively constant over the long term, with the exception of a slight shift from truck to inter-modal rail, which will be discussed in a subsequent section of this chapter.

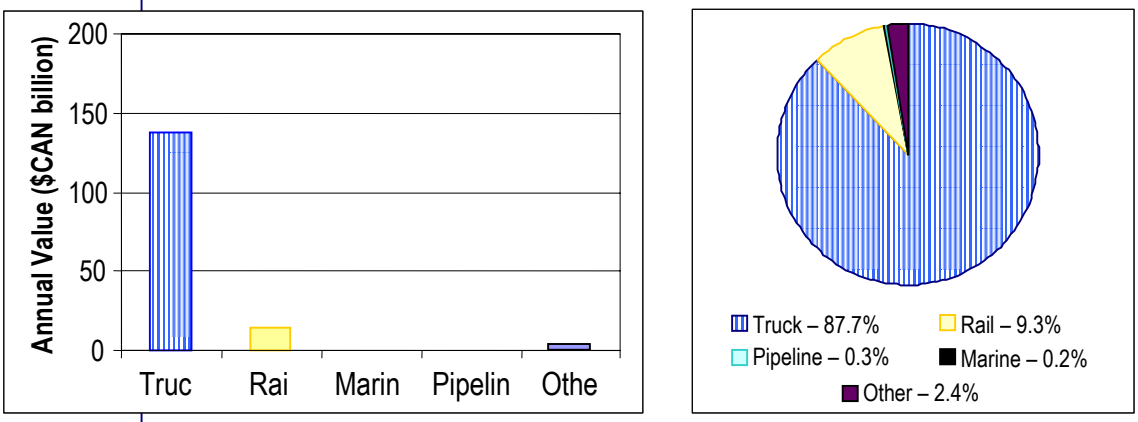
EXHIBIT 7.2 – CROSS-BORDER TRIPS BY MODE (2000)

Cross-Border Person Trips by Mode[1] (Annual 2000)





Cross-Border Value of Goods Transported by Mode (Annual 2000)



Note 1: There is no through passenger rail service provided between Windsor and Detroit. Train trips reported here are deemed to have used the rail service operating between Sarnia-Port Huron.

The most common trip purposes (refer to Exhibit 2.3) are recreational/shopping and work/business/school. Data provided in the *Existing and Future Travel Demand Working Paper, November 2002* identified that peak travel periods for work/business/school trips do not coincide with peak recreational/shopping trips. Recreational/shopping trips are generally at lower levels during the morning and afternoon peak periods and higher in mid-day, evening and weekend periods.

EXHIBIT 2.3 – CROSS-BORDER PASSENGER CAR TRIPS BY TRIP PURPOSE, 2000 WEEKDAY

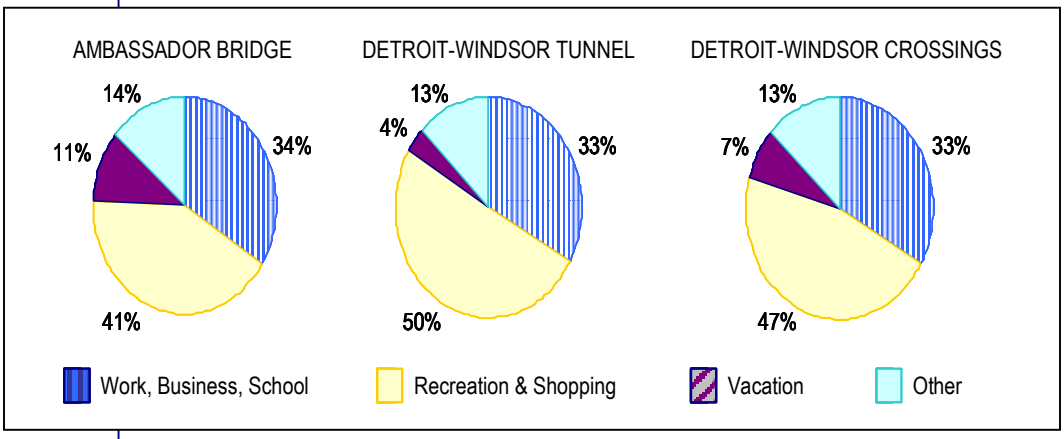


Table 2.2 provides additional information as to the vehicle and trip type (by origin-destination) of these road-based trips. The vast majority of passenger trips are local, defined as beginning and ending in the Windsor/Essex County-Detroit/Wayne County area. A sizable amount of commercial trips are passing entirely through the Windsor/Essex County-Detroit/Wayne County area.

TABLE 2.2 - 2000 DAILY INTERNATIONAL TRAFFIC CROSSING AT WINDSOR-DETROIT BY VEHICLE AND TRIP TYPE

Type of Traffic	Passenger	%	Commercial	%
International Local to Local	40,561	79%	3,083	24%
Local (U.S. side) to Long Distance (Canadian Side)	3,145	6%	1,983	16%
Local (Canadian side) to Long Distance (U.S. Side)	4,882	9%	2,113	16%
International Long Distance to Long Distance	3,003	6%	5,589	44%
Total	51,591	100%	12,769	100%

This information, together with other data presented in the *Existing and Future Travel Demand Working Paper, November 2002*, 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 FAA, such as ride sharing and use of transit would have little effect on the operations of the transportation network. The average auto occupancy for cross-border trips at the Ambassador Bridge is 1.85 and at the Detroit-Windsor Tunnel is 1.75, which suggests that ride-sharing is already being practiced by cross-border travelers (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 FAA 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 other international crossings was also considered. Based on the findings of the *Existing and Future Travel Demand Working Paper – November* 2002, the transportation network exhibits evidence of attempts by users 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 is greatest on the weekend and Fridays when commercial vehicle traffic is lowest, suggesting drivers are deferring leisure trips to non-workdays;
- weekday cross-border passenger car travel is characterized by morning and afternoon peaks; weekday cross-border commercial vehicle traffic is highest during mid-day periods, suggesting truckers attempt to avoid peak periods for passenger car travel;

- weekday to weekend traffic volume comparisons suggest passenger car traffic diverts to the Detroit-Windsor tunnel during the week to avoid high truck traffic levels on the Ambassador Bridge.

Given the degree of demand management already practiced by network users, encouragement of any such measures would be expected to yield only marginal improvements to network operations.

Measures to Divert Demand

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

Work completed as part of the *Existing and Future Travel Demand Working Paper – November 2002*, identified that approximately 7% of passenger car traffic and 30% of commercial vehicle traffic currently using the Ambassador Bridge on a weekday could also use the Blue Water Bridge without significant travel time increases.

The Working Paper identified a number of reasons why the Detroit-Windsor 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 only had increased capacity for a relatively short period of time, not long enough for the increased attractiveness of this crossing to break travel habits;
- it is easier (or habitual) for the administrative departments of operators to deal with one bridge for matters such as pre-clearance papers. Once pre-cleared for a particular crossing, a driver cannot change crossings to avoid delays;
- aggressive voucher redemption program and marketing by the Ambassador Bridge;
- convenient rest stop 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 southwest Ontario-southeastern Michigan, and increased education/awareness programs may encourage long-distance travelers to divert from the Windsor-Detroit border crossings. Achieving a high degree of diversion from these candidate trips would defer, but not eliminate the need for improvements to the transportation network in the FAA.

Other measures to divert demand include:

- 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 in the FAA is made complicated by the bi-national nature of the transportation network. Implementation of such measures would require international agreement by various levels of governments in both countries, each with their own legislation/policies to address issues that are unique to them. As noted previously, travel demand in the FAA relies heavily on road-based transportation for the movement of people and goods. Nevertheless, measures to reduce or change this aspect of travel demand may be effective in achieving a marginal reduction in travel demand across the transportation network.

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/directional signing, traffic metering, incident monitoring can improve traffic flow during high congestion periods, bad winter weather, traffic accident, 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.

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.

Conclusions

The nature of international travel demand on the FAA transportation network means that implementing TDM measures alone will not eliminate the need for other network improvements to accommodate the 2030 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 can provide some benefit to network operations, and they support other government and tourism objectives. In addition, TDM could be implemented in conjunction with border processing requirements with minor impacts to environmental features. TDM, therefore, will also be considered as part of the strategy for improvements to the transportation network.

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 FAA is capable of accommodating projected 2030 demand, assuming main line capacity on links outside the FAA also keep pace with the growth through investment in additions and renewals. Rail alternatives considered in this study are therefore of two types: 1) alternatives that

provide new rail service and facilities where not currently provided in the FAA, and 2) alternatives that increase the use of rail.

As noted earlier in this chapter, there is no international passenger rail service provided in the FAA, and rail presently carries approximately 20% of the value of international freight shipped in the FAA. 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 in the FAA. It is unlikely that such a service could achieve appropriate ridership to sufficiently address network operational needs.

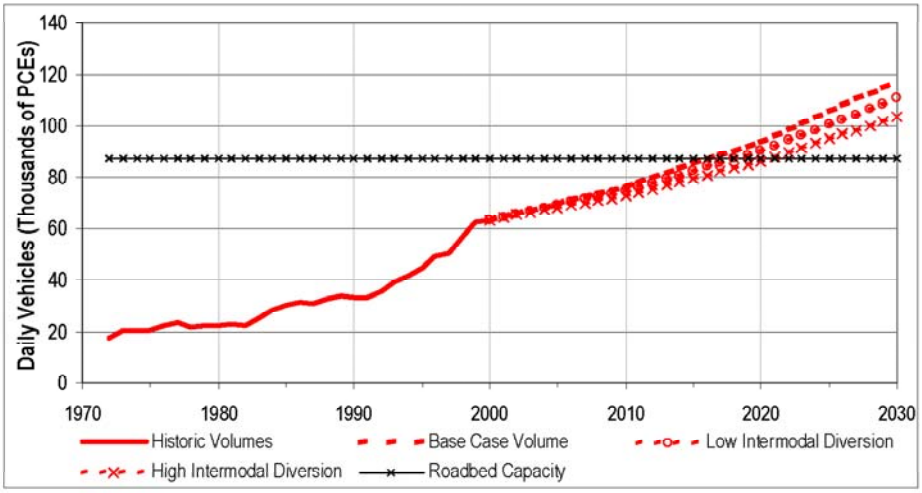
Both CN and CPR have introduced short distance (1,000 km or less) intermodal rail services in the corridor (currently between Montreal/Toronto and Detroit/Chicago). The Detroit Intermodal Freight Terminal project is examining ways to rationalize and improve the capacity and utilization of freight terminals within the Detroit area.

These measures will help to increase the competitiveness and market share of the rail mode. The Base Case scenario for future travel demand used to identify future needs of the network includes an aggressive, but realistic, increase in intermodal rail traffic of 10% by 2010, increasing to 15% in 2020, and 20% by 2030. It should be noted that an increase in intermodal rail traffic of 10% would correspond to a 4.4% decrease in truck traffic on the Ambassador Bridge. A 20% increase in intermodal rail traffic by 2030 would correspond to an 8.9% reduction in truck traffic at the bridge.

To determine the effectiveness of new and/or improved rail alternatives, a scenario was developed which assumed twice the projected increase in the shift to rail, that is 20% diversion of commercial vehicles to intermodal rail by 2010, increasing to 30% in 2020, and 40% in 2030. Similar to the Base Case scenario, the reduction in truck traffic at the Ambassador Bridge would be approximately 8.8% by 2010, increasing to almost 18% by 2030. This scenario is considered very optimistic and an upper threshold on what is possible to achieve under current market conditions. For this level of diversion to occur, significant investment in infrastructure and technology (such as a high clearance rail tunnel and upgrades to rail corridors and intermodal terminals within and outside of the FAA) would be required, along with a change in the current goods movement trends and patterns of which shippers are accustomed. As previously indicated, this investment and change in shipping patterns is already underway to a certain extent, but there is large uncertainty as to the degree of penetration into the commercial vehicle market that can be achieved.

As shown in Exhibit 2.4, 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.

EXHIBIT 2.4 – BENEFITS OF RAIL/INTERMODAL DIVERSION FOR THE AMBASSADOR BRIDGE



From a technical perspective, rail corridors and tunnels are technically feasible to construct 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. However, improvements to rail and more diversion to rail will not significantly reduce the road-based demand on the 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 is 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.

New and/or Improved Transit and Marine Services

Presently, transit and marine services in the FAA serve minor roles in the transportation network. As noted previously in this section, transit served approximately 2% of the annual passenger cross-border trips in the FAA in 2000, while marine served less than 1% of the value of international freight shipments in the same year.

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 Detroit/Windsor 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 the proposed 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 adequately reduce travel demand on the road network sufficiently to overcome the need for road improvements. Transit improvements could make use of use of existing transportation corridors and can be implemented, in most cases, at a reasonable cost and in a relatively short time frame (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 governmental planning objectives 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 would likely also 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 in the FAA. 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 in the FAA).

Long-distance shipping on the Great Lakes primarily serves bulk goods transport (e.g. ore, stone, 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 Detroit-Windsor border today. A feasibility study is expected to be initiated shortly to investigate opportunities for improving navigability on the Great Lakes- St. Lawrence Seaway (GL-STS) System. Issues related to ground-side access

to marine ports have also been identified as constraints to increasing the role of Great Lakes shipping. However, the major impediment to the increased use of marine services is the seasonality of this service. Navigation on the GL-STS System is suspended from the end of December to generally April the following year. Even with improved use of marine services, there will still be a need to provide for ground shipments during the winter months. These issues make it highly unlikely that marine services would be able to provide the necessary transportation network improvements in the FAA.

The Detroit-Windsor Truck Ferry provides local ferry services in the FAA. Currently, the truck ferry has a relatively small but vital role in the FAA. 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. 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% 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.

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 demands 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. 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 time frame (as compared to major infrastructure improvements).

However, delays and queuing on the road-based network would result even with the marine service improvements. This result is not consistent with governmental planning objectives 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. As noted earlier in this chapter, the majority of cross-border trips on the network (97% of passenger trips and 75% of the value of freight shipments) 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: size/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 and additional road capacity. 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 and/or municipally governed, can be designed to comply with design standards. Given the nature and extent of development and other land uses in the FAA, expansion of the road network will generate impacts to natural, social and/or cultural features. The four transportation agencies that comprise the Partnership, in consultation with agencies, other 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 or improved road alternatives with new or improved international crossing' is a feasible alternative and will be carried forward for further study.

Combinations of the Alternatives

In order to satisfy the study goals and objectives, including basic transportation demand (the movement of people and goods), it was apparent from the traffic analysis, that several of the planning alternatives, implemented in concert will be required to address future transportation needs within the FAA. Border processing improvements are required immediately. The implementation of these improvements is not under the direct control of the Partnership. The Partnership, however, is continuing to work with border processing agencies to encourage and support initiatives that improve border processing at the Windsor-Detroit crossings. However, it is also clear that, the only planning alternative 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 the 'new and/or improved roads with new or improved international crossing' alternative. The road improvements 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 government 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.

In terms of addressing transportation network requirements for people and goods movement, a multi-modal approach provides choice for travelers and offers viable mechanisms to reduce auto use. However, alternatives for travel demand management, rail, transit, ferries, etc. cannot independently address the diverse user needs, sufficiently alleviate traffic congestion on the transportation network nor

effectively provide reasonable options for maintaining the movement of people and goods in cases of disruptions at any of the existing border crossings.

2.3 Conclusions

The evaluation of transportation alternatives is summarized in graphic form in Exhibit 2.5.

EXHIBIT 2.5 – SUMMARY OF EVALUATION OF TRANSPORTATION ALTERNATIVES

Factor	Do Nothing	Border Processing	TDM	Rail Improvements	Transit Improvements	Marine Improvements	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

The assessment of transportation alternatives indicates that border processing improvements and roadway additions/improvements with new or improved border crossing must be a part of the network improvements to accommodate the long-term transportation needs in the FAA. However, the analysis also supports the inclusion of travel demand management measures as well as rail, transit and ferry service improvements as part a multi-modal strategy for the medium and long-term needs of the transportation network in the FAA.

Subsequent chapters of this document will discuss the generation and assessment of new and/or improved roadway alternatives with new or improved border crossing. The multi-modal strategy addressing other aspects of improvements to the transportation network is discussed in Chapter 5.

3. Development of Alternative Roadway Corridors

3.1 Alternatives Generation Process

The process used to generate new and/or improved road alternatives and new or expanded international crossings is consistent with environmental approval processes in both the U.S. and Canada. The process consisted of the following steps:

Step 1 – Identify Design Requirements for New/Improved Road Connections and New or Expanded International Crossing

Step 2 - Identify Constraint Areas in the Focused Analysis Area

Step 3 – Develop Opportunity Corridors for New/Improved Road Connections and New or Expanded International Crossing

Step 4 – Assess the Feasibility of the Alternative Opportunity Corridors

3.2 Description of the Roadway Alternatives and New International Crossing

Descriptions of the road connections and international crossing required to meet the needs of the transportation network were developed to provide a basis for assessing the network performance, as well as the technical and environmental feasibility, of alternative alignments.

New or improved road connections between the provincial highway system in Windsor/Essex County and the interstate freeway system in Detroit/Wayne County will be required to provide sufficient capacity to meet the long-term needs of the network. An assessment of future (2030) lane requirements across the Detroit River identified that five traffic lanes per direction are needed. Together, the Ambassador Bridge and Detroit-Windsor Tunnel provide three lanes per direction across the river. Therefore, two additional traffic lanes per direction are required on a new or expanded crossing to meet the needs of cross-border capacity in 2030. In their effort to plan for an international crossing, the governments must seek opportunities, whenever possible, to reflect the fact that such infrastructure, once constructed, will last beyond 30 years. In addition, the governments need to consider the benefits to provide sufficient flexibility at a new crossing to implement various operational improvements (e.g. traffic streaming) and to accommodate maintenance operations. On this basis, a six-lane crossing is being proposed for a new crossing, while a four-lane second span is assumed for the expansion of the Ambassador Bridge. The minimum vertical clearance required for new bridge alternatives over the Detroit River is 46 m (150 ft). It is recognized that the new crossing may also be a tunnel. It is assumed that such a tunnel would be bored under the Detroit River riverbed.

The minimum vertical clearance required for new bridge alternatives over the Detroit River is 46 m (150 ft). It is recognized that the new crossing may also be a tunnel. It is assumed that such a tunnel would be bored under the Detroit River riverbed.

Consistent with the function and projected traffic characteristics of the new road connections leading to a new/expanded border crossing, the new roadway connections will be multi-lane freeways with access provided at interchanges only. Such road facilities typically have the following design characteristics:

- Minimum right-of-way width = 100 m (300 ft)
- Design speed = 120 km/h (75 mph)
- Maximum mainline grade = 3%
- Minimum horizontal curve radius = 650 m (2,130 ft)

As the project proceeds to the preliminary design stage, the design characteristics of the roadway alternatives and new border crossing may be modified to reflect issues specific to the location of the alternative and to reduce impacts.

To meet the needs of the transportation network, the new road connections must connect to the provincial highway system in the Windsor/Essex County area and the interstate freeway system in the Detroit/Wayne County area. Highway 401 is generally an east-west facility terminating at the south end of the City of Windsor. The I-75, which parallels the Detroit River between the Ambassador Bridge and the south limit of the FAA, provides the first opportunity for an interstate connection in the southern portion of the FAA, while I-94 provides such an opportunity in the northern portion.

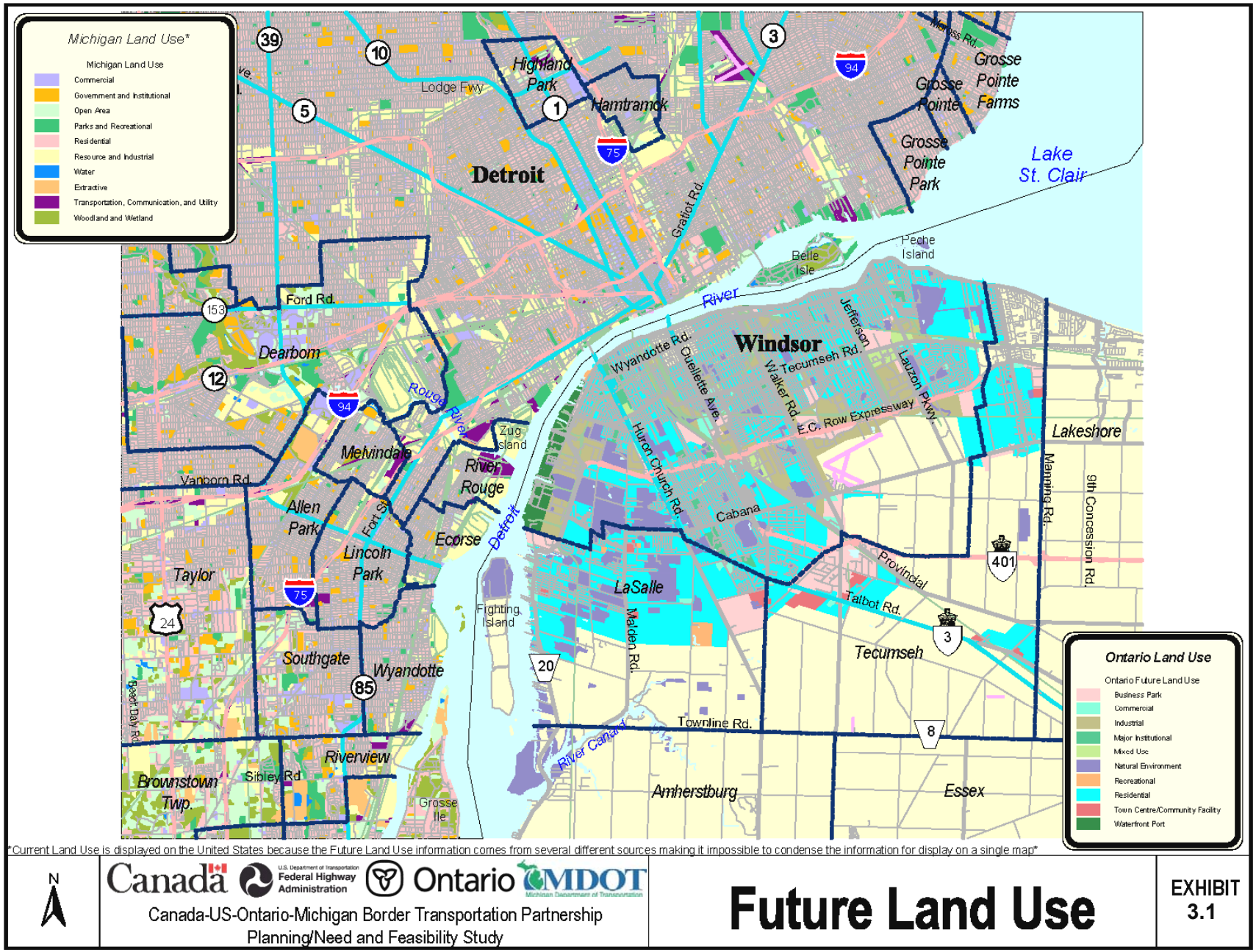
3.3 Identification of Constraint Areas

An environmental overview of the FAA, identifying the general characteristics and significant environmental features of the FAA, was completed based on secondary source information (i.e. publicly available documents). The existing and future mix of land uses on both sides of the Detroit River includes natural areas and agricultural lands, single and multiple family residential neighbourhoods, intensely developed core urban areas and heavily industrialized areas (refer to Exhibit 3.1).

To assist the generation of alternatives that would reduce the overall impacts to the FAA, constraint areas were identified. The constraint areas include residential and commercial areas and significant natural features. Direct impacts to such areas are to be avoided as much as possible.

The constraint areas are shown in Exhibit 3.2. From this exhibit, it is evident that there are no opportunities to locate new/improved roadways or new/expanded river crossings alternatives within the FAA where all constraint areas can be avoided.

As the project proceeds through the environmental studies, constraint areas may be modified to reflect updated conditions and more detailed data obtained for the FAA.



Current Land Use is displayed on the United States because the Future Land Use information comes from several different sources making it impossible to condense the information for display on a single map

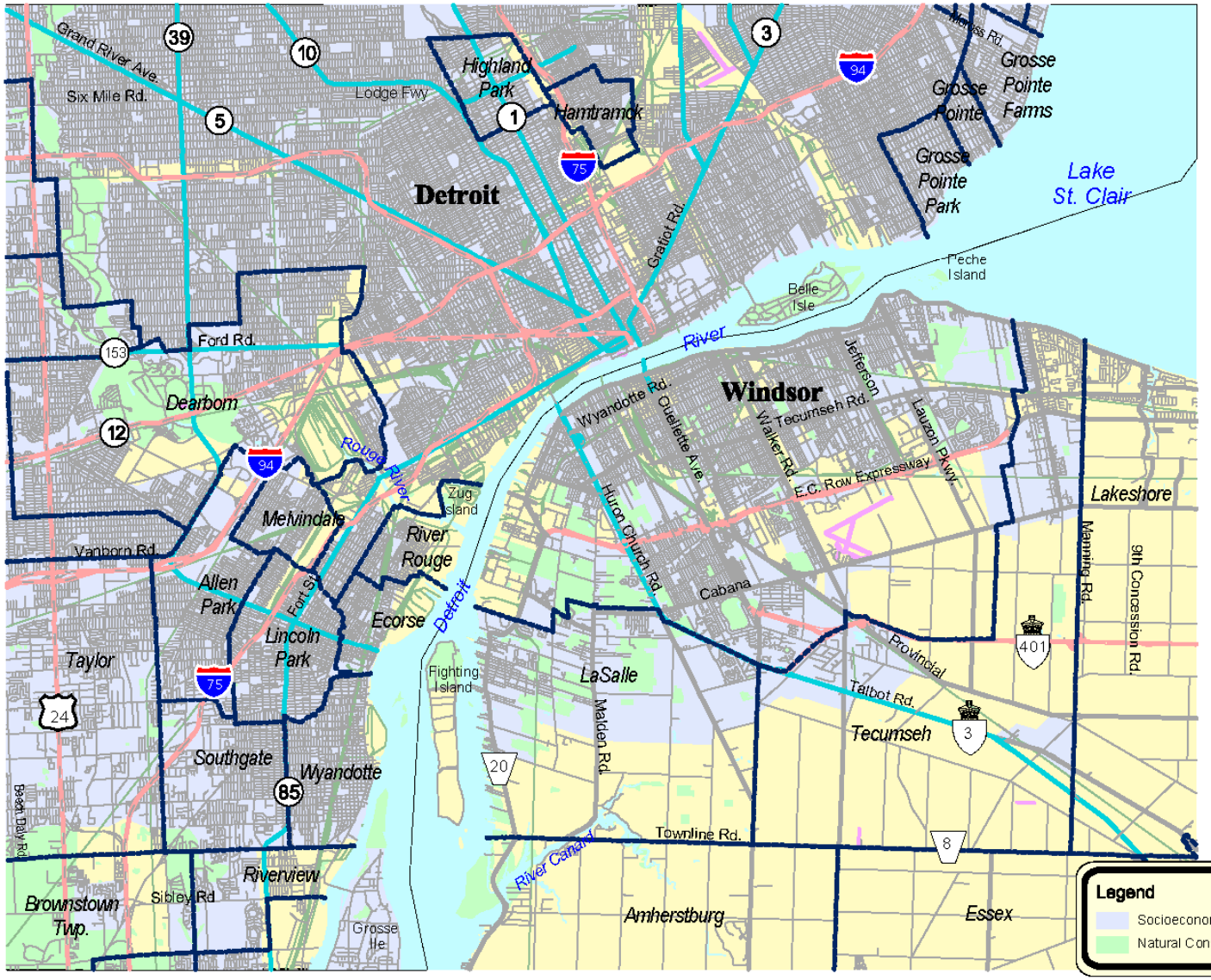
N

Canada U.S. Department of Transportation Federal Highway Administration Ontario MDOT Michigan Department of Transportation

Canada-US-Ontario-Michigan Border Transportation Partnership
Planning/Need and Feasibility Study

Future Land Use

EXHIBIT 3.1



N

Canada | U.S. Department of Transportation Federal Highway Administration | Ontario | MDOT Michigan Department of Transportation

Canada-US-Ontario-Michigan Border Transportation Partnership
Planning/Need and Feasibility Study

Constraint Features

EXHIBIT 3.2

3.4 Generation of Alternative Opportunity Corridors

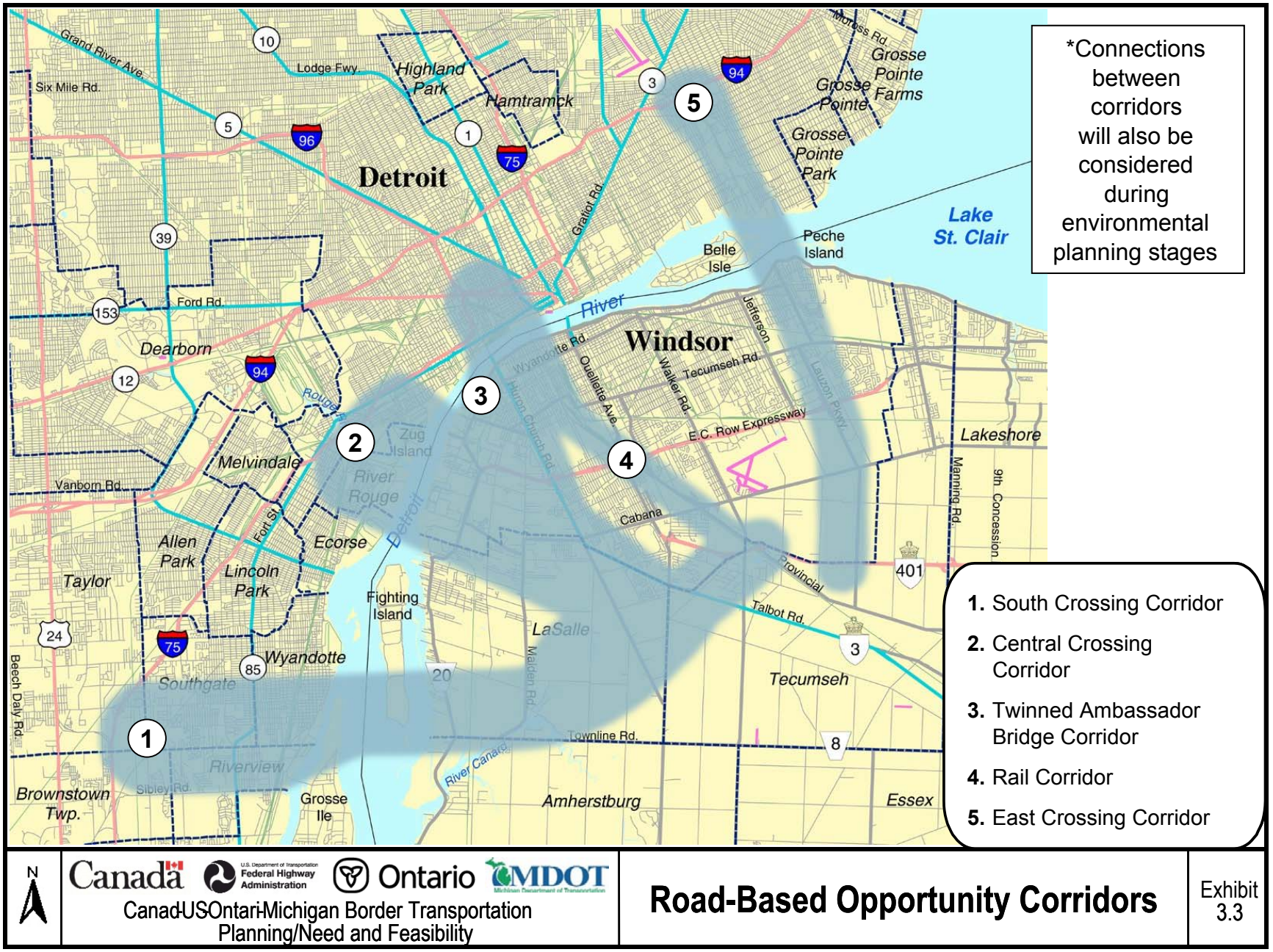
Once the constraint areas were identified, a set of guiding principles was used in developing corridors that minimize impacts to the constraint areas as much as possible. These corridors were referred to as opportunity corridors.

The guiding principles reflect the objectives of the Partnership to address transportation needs and take advantage of transportation opportunities in the FAA, and avoid as much as possible, generating unacceptable impacts related to a new international transportation corridor.

The guiding principles established for the generation of the opportunity corridors were as follows:

- **Utilize existing infrastructure to the maximum extent** - Taking advantage of existing transportation and other linear corridors may improve usage of the transportation network and/or reduce impacts to other land uses.
- **Seek areas or land uses that are compatible, or areas in transition to compatible land uses, with transportation corridors** - Compatible areas are those that are less impacted by new transportation corridors than other land uses; areas in transition allow the opportunity to incorporate new transportation corridors in the area planning.
- **Minimize impacts to significant natural features** - Such features are usually regionally unique, protected by legislation/designations and may preclude a transportation facility.
- **Minimize impacts to city centres** - Such areas generally provide a focus for cultural, social and economic activities.

The opportunity corridors were of sufficient width to allow for flexibility in routing of road alignments to avoid or reduce impacts to significant environmental features which may be identified in later planning stages. Five opportunity corridors were developed based on the guiding principles and a review of current proposals by other proponents (refer to Exhibit 3.3):


*Connections between corridors will also be considered during environmental planning stages
1. South Crossing Corridor
2. Central Crossing Corridor
3. Twinned Ambassador Bridge Corridor
4. Rail Corridor
5. East Crossing Corridor
Detroit
Windsor
Lake St. Clair
Dearborn
Melvindale
Allen Park
Lincoln Park
Taylor
Ecorse
Fighting Island
LaSalle
Amherstburg
Essex
Tecumseh
Lakeshore
Wyandotte
Southgate
Riverview
Brownstown Twp.
Grosse Ile
Grosse Pointe
Grosse Pointe Farms
Grosse Pointe Park
Highland Park
Hamtramck
Belle Isle
Peche Island
Zug Island
River Rouge
Detroit River
Canada
Ontario
MDOT
U.S. Department of Transportation Federal Highway Administration
Canada-US-Ontario-Michigan Border Transportation Planning/Need and Feasibility
Road-Based Opportunity Corridors
Exhibit 3.3

- South Crossing
- Central Crossing;
- Twin Ambassador Bridge;
- Rail Corridor; and,
- East Crossing.

The following sections provide a brief description of each the alternative Opportunity Corridors.

3.4.1 South Crossing

The South Crossing Corridor was generated in an attempt to minimize as much as possible, impacts to the urban areas of metropolitan Detroit and metropolitan Windsor (refer to Exhibit 3.4-A). On the Canadian side, the corridor generally avoids existing built-up areas of Windsor and LaSalle, and includes the lands between LaSalle's urban area boundary and River Canard. The mouth of this river is a designated environmentally significant area. The predominant land use on the Canadian side is agricultural. The distance from the Detroit River to Highway 401 is approximately 12 km (7.5 mi).

On the U.S. side, the corridor attempts to minimize impacts to metropolitan Detroit, but does include portions of the Cities of Wyandotte, Riverview and Southgate, the Townships of Brownstown and Grosse Ile, the majority of which are densely developed urban areas. The width of the corridor on the U.S. side is generally restricted to the north by dense urban development, and to the south by the south limit of the FAA, which was established as the reasonable limit for generating alternatives that would address the problems on the transportation network. The distance from the Detroit River to I-75 is approximately 8 km (5 mi).

The width of the Detroit River in this corridor varies between 3.5 and 4.5 km (2.2 to 2.8 mi.) and includes the southern portion of Fighting Island and the northern section of Grosse Ile. For a bridge alternative, this will likely require in-water work and possible piers in the River, both of which are a concern from a natural environment and marine navigation perspective. The portion of the river in this corridor is designated as an International Wildlife Refuge, and the Canadian shoreline includes several designated environmentally significant marsh areas.

The total length of the corridor is approximately 24 km (15 mi.).

3.4.2 Central Crossing

North of the Grosse Ile and Fighting Island area of the Detroit River, the river narrows and is less environmentally sensitive on both sides. The I-75 freeway is closer to the river in this area, so the impact to the urban area on the U.S. side may be reduced when compared with the South Crossing. Some land uses along the river are compatible with transportation corridors. On this basis, a Central Crossing corridor was developed (refer to Exhibit 3.4-B).


MELVINDALE
RIVER ROUGE
ALLEN PARK
ECORSE
LINCOLN PARK
Detroit River
WINDSOR
LASALLE
TAYLOR
SOUTHGATE
WYANDOTTE
UNITED STATES
CANADA
RIVER ROUGE
BRIDGESTONE TOWNSHIP
GROSSE ILE TOWNSHIP
AMHERSTBURG
LEGEND
CORPORATE BOUNDARY
MAJOR UTILITIES
HYDRO CORRIDOR
ENVIRONMENTAL SITE
WETLAND
DISTINCTIVE NEIGHBORHOODS
NATURAL AREA
SCHOOL, PARK AND CHURCH SITE
CUSTOMS AREA
SCHOOL
CEMETERY
CHURCH
PARK
Canada
Ontario
MDOT
Canada-US-Ontario-Michigan Border Transportation Partnership
Planning / Need and Feasibility Study
SOUTH CROSSING CORRIDOR
EXHIBIT 3.4A


DETROIT
DEARBORN
WINDSOR
MELVINDALE
RIVER ROUGE
ECORSE
LINCOLN PARK
WYANDOTTE
LASALLE
TECUMSEH
Detroit River
UNITED STATES
CANADA
Fighting Island
Canada
Ontario
MDOT
Canada-US-Ontario-Michigan Border Transportation Partnership
Planning / Need and Feasibility Study
CENTRAL CROSSING
CORRIDOR
EXHIBIT
3.4B

The width of the Detroit River in this corridor varies between 0.6 and 0.75 km (0.4 to 0.5 mi.). For a bridge alternative, this creates an opportunity to avoid in-water structures by spanning the entire river. On the U.S. side, the corridor includes a portion of southwest Detroit and a portion of the City of River Rouge. This area of Metropolitan Detroit includes heavy industrialized areas such as Zug Island and the former Solvay lands, but also includes some residential areas. In southwest Detroit, the *Detroit Master Plan* has identified that some of the residential areas will be transitioned to commercial and industrial uses. The distance from the Detroit River to I-75 is approximately 2 to 3 km (1.3 to 1.9 mi).

On the Canadian side, the corridor passes between the core areas of Windsor and LaSalle, but impacts the outer areas of both communities. From Highway 401, access to this portion of the Detroit River can be gained via a number of new and or improved roadway alignments.

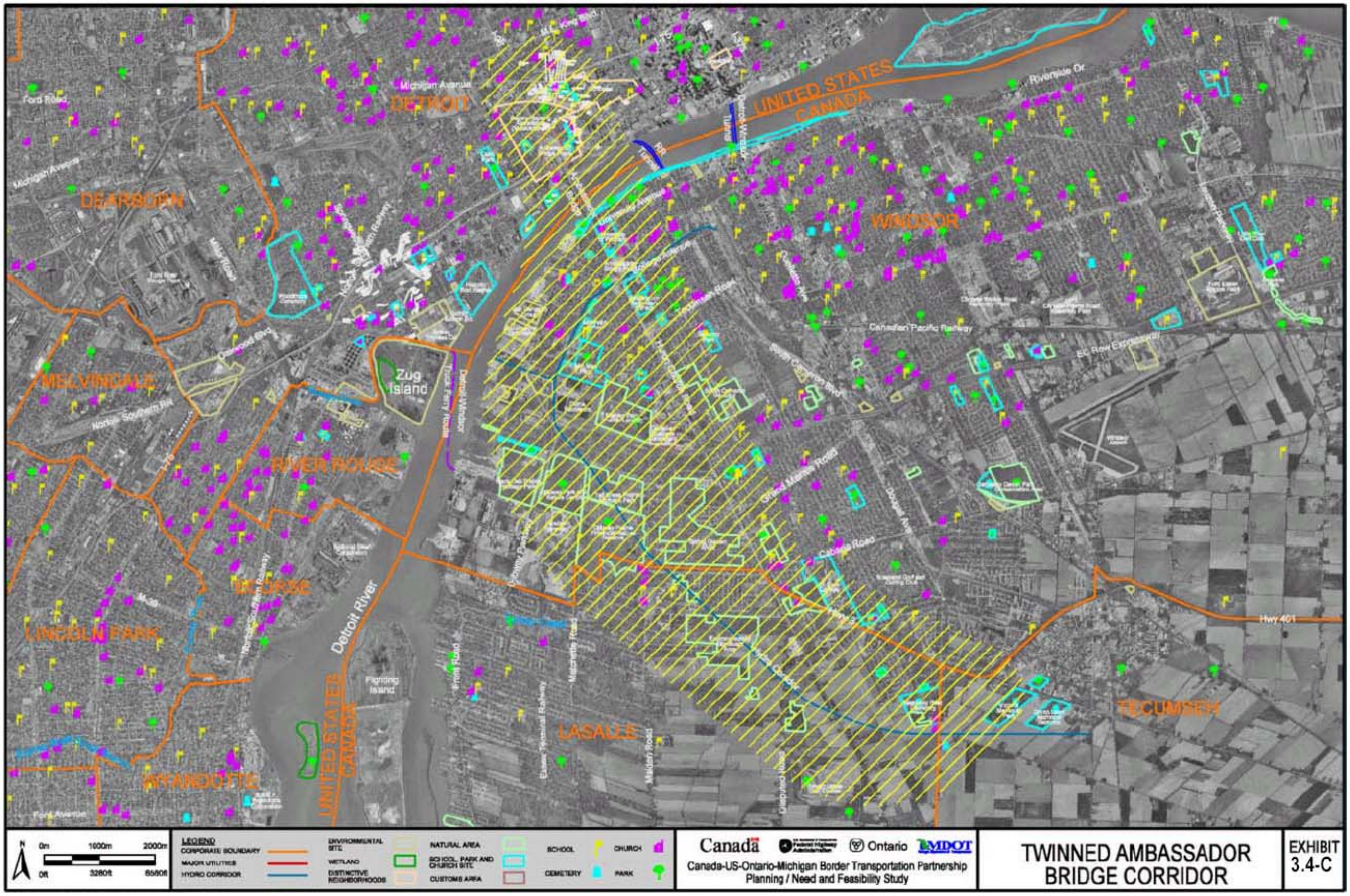
The E.C. Row Expressway is an east-west controlled access facility originally constructed as a partnership between the City of Windsor and the Ontario Ministry of Transportation (MTO). MTO transferred ownership of the Expressway to the City of Windsor in 1997. The Windsor Gateway Action Plan as announced on May 27, 2003, was developed by the governments of Canada and Ontario and proposes to transfer ownership of the Expressway back to MTO, upon successful completion of various environmental assessments. In addition, the Action Plan includes an extension of the Lauzon Parkway between EC Row and Highway 401. If implemented, these two improvements could provide an alternate connecting route from Highway 401 to Huron Church Road. For transportation planning purposes, alternatives to new or improved road connections for the Central Crossing corridor therefore include combinations of east-west and north-south routings from Highway 401 to the Huron Church Road/E.C. Row area along the Huron Church and EC Row corridors.

The land uses in the Central Crossing corridor include residential areas, protected natural areas and industrial areas. The distance from the Detroit River to Highway 401 is approximately 12 km (7.5 mi). The total length of the corridor is approximately 15 km (9.5 mi).

3.4.3 Twinned Ambassador Bridge

The Ambassador Bridge is considered an opportunity corridor because it currently serves as a crossing corridor (refer to Exhibit 3.4-C). The corridor has roadway connections in place leading to a river crossing, although the road connections and the crossing would require improvements to accommodate future travel demand.

The width of the river in this location is approximately 0.6 km (0.4 mi.). Advances in engineering design and materials could enable a second span to be constructed without permanent in-water structures, unlike the existing bridge. A second span would also require improvements and expansions to the bridge plazas to meet the long-term needs of border processing agencies and increased international traffic.


DETROIT
DEARBORN
MELVINDALE
RIVER ROUGE
ECORSE
LINCOLN PARK
WYANDOTTE
WINDSOR
LASALLE
TECUMSEH
Zug Island
Detroit River
UNITED STATES
CANADA
Hwy 401
LEGEND
CORPORATE BOUNDARY
MAJOR UTILITIES
HYDRO CORRIDOR
ENVIRONMENTAL SITE
WETLAND
DISTINCTIVE NEIGHBORHOODS
NATURAL AREA
SCHOOL, PARK AND CHURCH SITE
CUSTOMS AREA
SCHOOL
CEMETERY
CHURCH
PARK
Canada
Ontario
MDOT
Canada-US-Ontario-Michigan Border Transportation Partnership
Planning / Need and Feasibility Study
TWINNED AMBASSADOR
BRIDGE CORRIDOR
EXHIBIT
3.4-C

On the U.S. side, the plans for improvements to the connection between the Ambassador Bridge plaza and the interstate freeway system are being finalized under a separate initiative between Michigan Department of Transportation, Federal Highways Administration and the Ambassador Bridge. This initiative, known as the Ambassador Bridge Gateway Project, provides for improvements to the freeway connections and could accommodate a second span. The twin structures, therefore, would be directly connected to the interstate freeway system at the bridge plaza; there would be little or no additional impacts to land uses in the vicinity of the Ambassador Bridge plaza.

On the Canadian side, the corridor includes portions of the City of Windsor, the Towns of LaSalle and the Town of Tecumseh. Highway 401 is generally an east-west facility terminating at the south end of the City of Windsor. The primary road corridor currently connecting Highway 401 to the Ambassador Bridge is Huron Church Road/Talbot Road, which runs generally north-south. It has been noted previously that this facility in its present form is unsuitable for accommodating increased volumes of international traffic. New and/or improved roads connecting Highway 401 to the Ambassador Bridge would be required.

As with the Central Crossing corridor, various connections between Highway 401 and E.C. Row, along with the Expressway could serve as alternate connecting routes to Huron Church south of Ambassador Bridge. For transportation planning purposes, alternatives to new or improved road connections to the Ambassador Bridge therefore include combinations of east-west and north-south routings along the Huron Church and EC Row corridors from Highway 401 to the Ambassador Bridge.

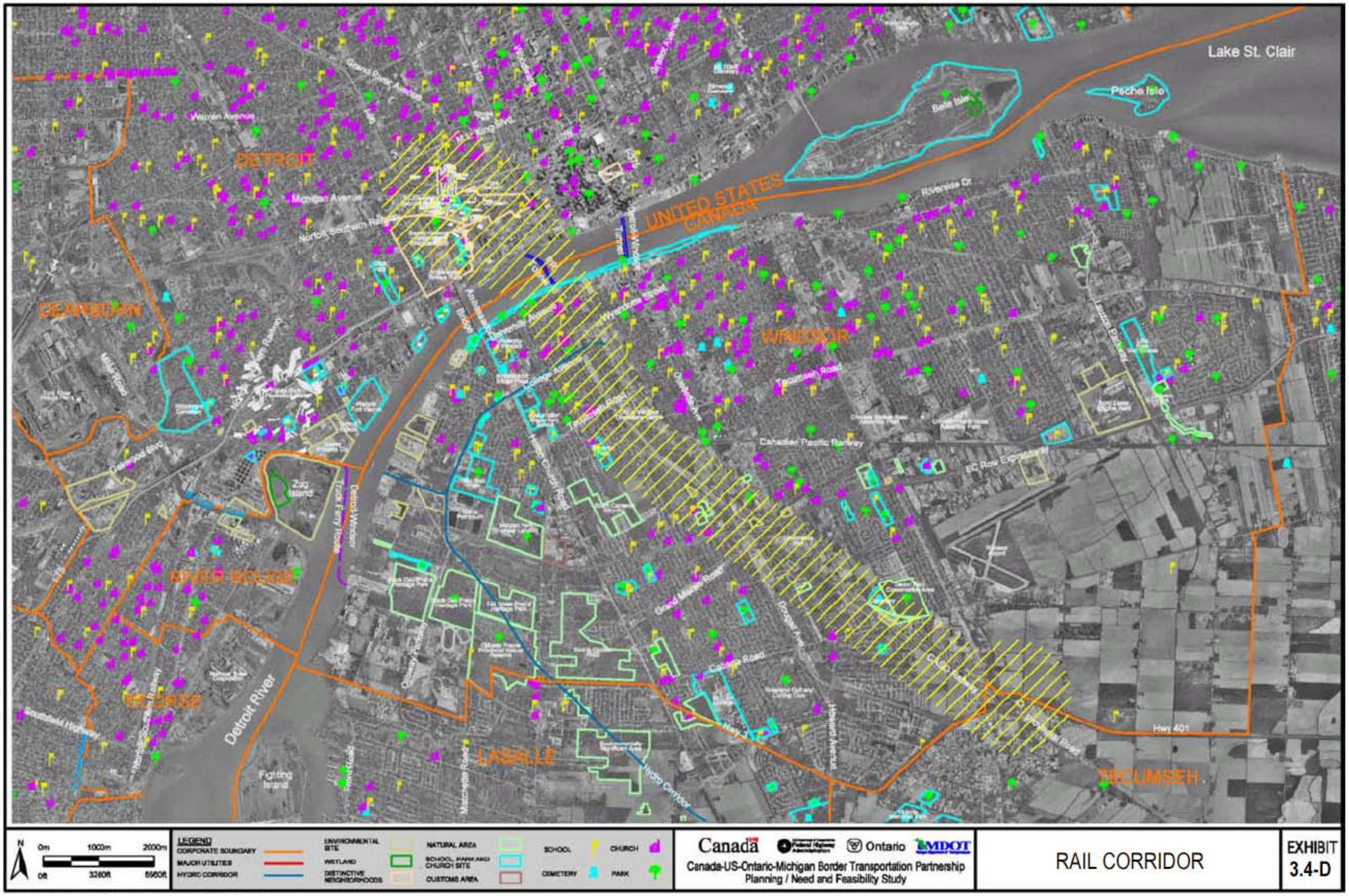
Land uses in the Twinned Ambassador Bridge corridor include residential areas, commercial areas, protected natural areas and industrial areas. The distance from the Detroit River to Highway 401 is approximately 14 km (8.8 mi.).

The total length of the corridor is approximately 15 km (9.5 mi.).

3.4.4 Rail Corridor

This corridor is the focus of a proposal developed by the Detroit River Tunnel Partnership (DRTP). DRTP is a partnership between two major private enterprises, Canadian Pacific Railway and Borealis Transportation Infrastructure Trust. In September 2002, DRTP filed a Notice of Intent to make application to the Canadian Transportation Agency for approval to construct the Canadian portion of the project. DRTP is preparing an environmental assessment in accordance with the Canadian Environmental Assessment Act. This proposal makes use of the existing twin-tube rail tunnel situated between the Ambassador Bridge and Detroit-Windsor Tunnel (refer to Exhibit 3.4-D). The rail corridor leading to the tunnel on the Canadian side extends southerly to Highway 401 and beyond. On the U.S. side, the rail corridor crosses I-75 in the area of the I-75/I-96/I-94 exchange just north of the Ambassador Bridge plaza connection.

Their proposal includes converting the rail tunnels for use by trucks and paving the railroad right-of-way to provide a controlled access roadway between the U.S. and Canada. Border processing facilities would be incorporated in the project on lands owned or acquired by the DRTP. One DRTP proposal features a joint customs facility,


Lake St. Clair
Peche Isle
Belle Isle
DETROIT
DEARBORN
WINDSOR
RIVER ROUGE
ECORSE
LASALLE
TECUMSEH
UNITED STATES
CANADA
Detroit River
Zug Island
Fighting Island
Warren Avenue
Michigan Avenue
Riverside Dr
Tecumseh Road
Canadian Pacific Railway
EC Row Expressway
Hwy 401
Hydro Corridor
N
0m
1000m
2000m
0ft
3280ft
6560ft
LEGEND
CORPORATE BOUNDARY
MAJOR UTILITIES
HYDRO CORRIDOR
ENVIRONMENTAL SITE
WETLAND
DISTINCTIVE NEIGHBORHOODS
NATURAL AREA
SCHOOL, PARK AND CHURCH SITE
CUSTOMS AREA
SCHOOL
CEMETERY
CHURCH
PARK
Canada
Ontario
MDOT
Canada-US-Ontario-Michigan Border Transportation Partnership
Planning / Need and Feasibility Study
RAIL CORRIDOR
EXHIBIT
3.4-D

providing for both Canadian and American border inspection agencies, in Windsor. However, there is presently no legislation to allow for such a border inspection regime.

DRTP is also developing a proposal which provides customs facilities (primary and secondary inspections) on both sides of the border to reflect current border inspection processes.

The Rail Corridor alternative considered in this study, therefore, is based upon a conventional border inspection regime, with inspection facilities provided on both sides of the border. The DRTP proposal also includes construction of a new high-clearance rail tunnel below the Detroit River to maintain a single track within the international rail corridor.

The DRTP proposal provides a single lane per direction for international trucks only, which is insufficient for the long-term needs of the transportation network. However, the proposal provides additional border crossing capacity to the network and provides an alternative crossing for maintaining goods movement across the border. On this basis, the rail corridor was included in the assessment of feasible transportation alternatives.

The corridor for this alternative generally coincides with the existing rail corridor in Windsor and Detroit. Some widening of the corridor and/or easements may be required to accommodate an alternative. Lands adjacent to the rail corridor on the Canadian side include residential, commercial and industrial uses.

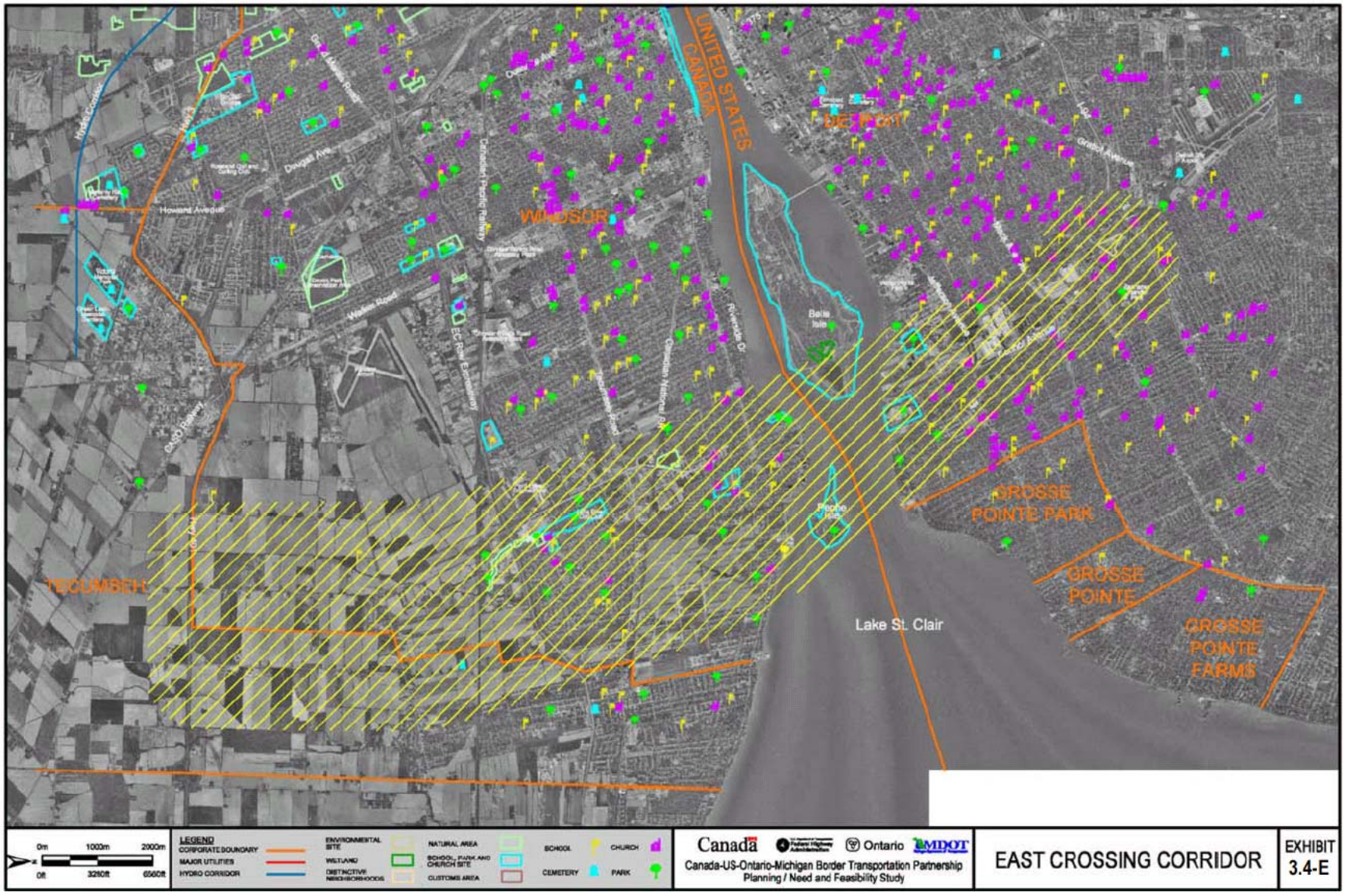
On the U.S. side, the rail corridor is located in southwest Detroit, west of the Central Business District. Land uses adjacent to the corridor are generally light industrial and mixed residential/commercial uses.

The total length of the corridor is approximately 15 km (9.5 mi.).

3.4.5 East Crossing

The East Crossing Corridor represents an opportunity to avoid the city centres of Windsor and Detroit by providing a crossing and road connections east of these areas (refer to Exhibit 3.4-E). This corridor connecting Highway 401 to I-94 is generally centered on Lauzon Parkway/Lauzon Road in Windsor and Conner Avenue in Detroit. This corridor includes, or is in proximity to, a number of automotive manufacturing facilities (potentially major generators of international truck traffic), as well as Windsor Airport and Detroit City Airport. The city centres of Windsor and Detroit bound the width of this corridor to the west. The straits where Lake St. Clair flows into the Detroit River were considered the east limits of the corridor.

On the U.S. side, the corridor includes a portion of the City of Detroit, and includes a mix of heavy industrial use, urban residential subdivisions, and inactive industrial sites. The distance from the river to I-94 is approximately 5.5 km (3.5 mi.).


UNITED STATES
CANADA
DETROIT
WINDOSOR
TECUMSEH
GROSSE POINTE PARK
GROSSE POINTE
GROSSE POINTE FARMS
Lake St. Clair
Howard Avenue
Dougall Ave
Walker Road
Belle Isle
LEGEND
CORPORATE BOUNDARY
MAJOR UTILITIES
HYDRO CORRIDOR
ENVIRONMENTAL SITE
WETLAND
DISTINCTIVE NEIGHBORHOODS
NATURAL AREA
SCHOOL, PARK AND CHURCH SITE
CUSTOMS AREA
SCHOOL
CEMETERY
CHURCH
PARK
0m 1000m 2000m
0ft 3280ft 6560ft
Canada
Ontario
MDOT
Canada-US-Ontario-Michigan Border Transportation Partnership
Planning / Need and Feasibility Study
EAST CROSSING CORRIDOR
EXHIBIT
3.4-E

The river crossing portion of the corridor includes the east end of Belle Isle, a large urban park which is also a National Historic Site, and the west end of Peche Isle, a provincially designated natural area. The width of the river varies from 1.5 to 2.0 km (0.9 to 1.3 mi.), which could necessitate in-water structures for a new bridge crossing.

On the Canadian side, the corridor covers portions of the City of Windsor and the Town of Tecumseh. The portion of the corridor north of E.C. Row Expressway is primarily residential, business park and industrial uses. South of E.C. Row to Highway 401, land use is almost exclusively tilled agricultural fields. The distance from Highway 401 to the Detroit River is approximately 13 km (8 mi.).

The total length of the corridor is approximately 20 km (12.5 mi.).

3.4.6 Other Proposals and Corridors

In addition to the DRTP proposed Rail Corridor, other corporate and private interests have publicly identified a number of specific border crossing proposals. These proposals generally represent planning and engineering efforts undertaken to provide for new or expanded crossings and/or connecting roadway improvements, when needed. These proposals include:

- International Union Bridge – new bridge crossing in the vicinity of the north end of Grosse Ile; this proposal would connect the new crossing to the local road system and does not provide for any direct roadway connections to the interstate freeway; this proposal is located within the South Crossing corridor.
- Mich-Can - proposal for a new bridge crossing downriver of the Ambassador Bridge in the vicinity of the junction of the E.C. Row Expressway and the Ojibway Parkway/Zug Island; this proposal connects the I-75 in Detroit and E.C. Row Expressway in Windsor; this proposal is located within the Central Crossing corridor.
- Ambassador Bridge Parkway Proposal – separate controlled access road connection along Essex Terminal Railway right-of-way between Ambassador Bridge and a new border processing area at E.C. Row Expressway/Huron Church Road; this proposal also includes improvements to the Huron Church/Highway 3 corridor from E.C. Row Expressway to Highway 401; this proposal is located within the Twinned Ambassador Bridge corridor.

It must be noted that the proposals identified by the private and corporate interests are specific route alignments, not broad opportunity corridors.

In addition, the City of Windsor has identified proposed long-term corridor protection areas for future transportation planning flexibility in the Windsor area. These corridors, as identified in the Windsor Area Long Range Transportation Study (WALTS) are:

- Highway 401 East – protects for a future connection between Highway 401 and E.C. Row Expressway east of Windsor Airport; this area generally coincides with a portion of the East Crossing Corridor;
- Highway 401 West – protects for a future connection between Highway 401 and the Ambassador Bridge or a new crossing in west Windsor; this area generally coincides with the Central and Twinned Ambassador Bridge Corridors; and,

- Southwest Corridor – protects for upgrading and extension of east-west arterial routes between Highway 401 and Ojibway Parkway/Essex Road 20; this area overlaps with the Central Corridor.

The City has noted that consideration of any details on these corridors and any specific roadway alignments will require planning and feasibility studies, route planning studies and environmental assessments.

In that the locations of these other proposals and protection areas coincide to some degree with the opportunity corridors identified by the Project Team, it suggests that the guiding principles used to establish these other proposals are similar to those developed by the Project Team.

3.5 Assess the Feasibility of Alternative Opportunity Corridors

The assessment of opportunity corridors was based on a set of factors developed consistent with the environmental approval processes in the U.S. and Canada. The factors reflect the objectives of the Partnership to address transportation and border processing needs and take advantage of transportation opportunities in the FAA, and avoid as much as possible, generating unacceptable impacts related to a new international transportation corridor.

The assessment is intended to confirm the feasibility of the various opportunity corridors. During the environmental study processes, a more detailed analysis and evaluation of opportunity corridors and route alignment alternatives will be undertaken.

The assessment of corridors was carried out using primarily secondary source information on analysis area features, consultation with public and private sector stakeholders and travel demand modelling work. The corridor maps identify the various types of land uses and features potentially affected. The feasibility assessment of opportunity corridors, based on transportation policy objectives, environmental border processing and technical factors, is presented in Chapter 4 of this report. A discussion of the travel demand modelling work used to assess transportation network performance with each of the corridors is provided in the following section.

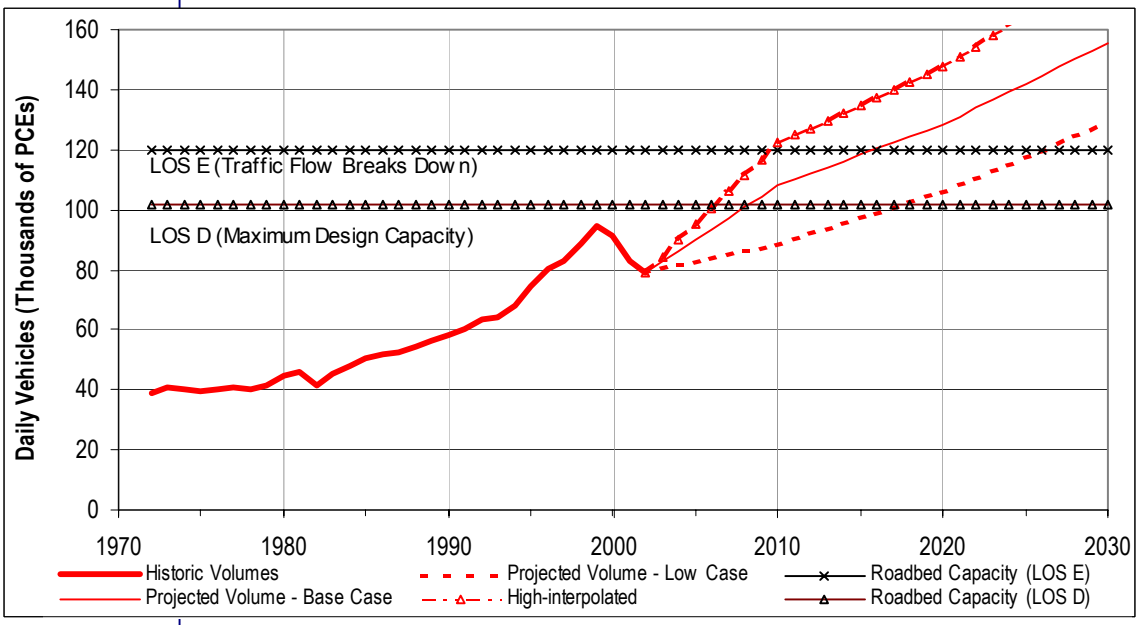
3.5.1 Assessment of Transportation Network Improvements

The assessment of Transportation Network Improvement was based on projected information. This was based on transportation model runs performed for the Base Case and five crossing alternatives for the 2010, 2020 and 2030 horizon years and consider queuing delays at the bridge/customs plaza and congestion impacts on the road network given growth in cross-border and local background traffic.

The transportation model runs performed for each alternative are based on work documented in the Travel Demand Analysis Working Paper and the Existing and Future Travel Demand Working Paper. Future travel demand estimates have been prepared for High, Low and Base Case scenarios, as shown in Exhibit 3.5, to reflect future uncertainties in traffic growth rates. The traffic forecasts and assessments are

presented for the Base Case, which falls in the middle of the range of the future projections and reflects the most probable or likely scenario for planning purposes.

EXHIBIT 3.5 – HISTORIC AND PROJECTED WINDSOR-DETROIT CROSS-BORDER TRAFFIC



The following provides a summary of key transportation model run findings and an assessment of the alternatives. A more complete description of the model run assumptions and findings is presented in Appendix A.

Assessment of Alternatives

Over the 30-year horizon for this study, the cross-border traffic forecasts prepared for this study project an approximate 40% increase in car and 120% increase in truck traffic at the Windsor-Detroit Gateway. This corresponds to an increase in daily cross-border car trips from 52,000 to 70,000 trips and an increase in daily truck trips from 13,000 to 28,000 trips. A summary of the transportation model results is presented in Exhibits 3.6 through 3.12.

In reviewing the assessment of transportation network benefits, it is important to note that, for all alternatives, it has been assumed that border processing staffing and facilities will be available to meet the projected travel demand. The additional requirements for border processing facilities assumed to be in place are identified in Appendix A. It is also important to note that the toll rates were assumed to be the same for all new/expanded crossings. Therefore, no allowances were made for toll rates to influence trip routing decisions.

Exhibit 3.6 presents the projected volume/capacity (V/C) ratio for each crossing for each horizon year. The capacity is based on the bridge/tunnel roadbed capacity. The bridge crossings are assumed to be four-lane cross-sections as suggested by the projected 2030 cross-border demand, while the tunnel crossing is assumed to be a two-lane cross-section as defined in the DRTP proposal. For planning purposes, a V/C ratio

for the bridge/tunnel roadbed based on Level-of-Service D (LOS D) is assumed, with the need for a new crossing indicated when the V/C exceeds 0.83. LOS D has been determined by the Partnership as the appropriate basis for determining future infrastructure requirements, given the importance, lead-time and level of investment associated with a major international crossing. LOS E reflects conditions when traffic flow breaks down.

Exhibit 3.6 graphically presents the travel flows for traffic crossing the border at Windsor-Detroit and the extent of diversion of traffic between crossings. The travel flows are shown from Canada to the US, with the reverse move from the U.S. to Canada similar to those shown. Each exhibit displays car and truck flows in the year 2030 through the use of desire lines, which show travel orientations and patterns associated with each alternative where the thickness of the line is proportional to the traffic flow. From a roadbed capacity perspective, one truck is assumed to be equivalent to three passenger cars.

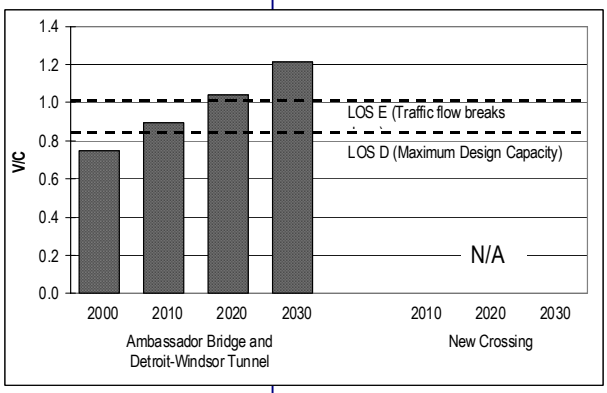
Base Case (No Improvement)

Under the Base Case, with no major network improvements, future cross-border traffic is projected to significantly exceed the existing roadbed capacity of the Ambassador Bridge and Windsor-Detroit Tunnel with a V/C ratio of 1.21 in 2030, establishing a capacity need for a new crossing in the future. Based on LOS D, the need for a new crossing may be justified by the year 2010, when the projected V/C ratios for the Existing Crossings and Huron-Church Road are projected to be 0.89 and 1.00, respectively.

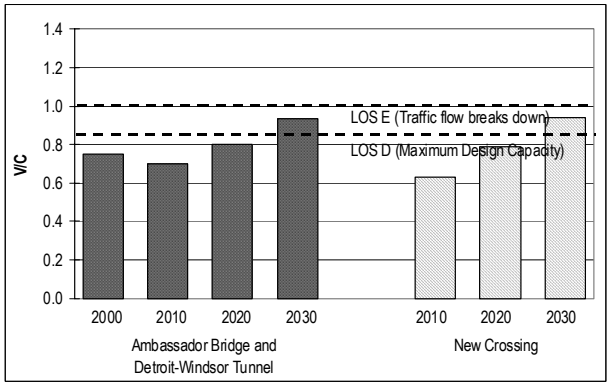
Exhibit 3.7 presents the travel flows under the Base Case Alternative, with the existing Ambassador Bridge and Detroit Windsor Tunnel to accommodate cross border traffic demands. In 2030, 70,200 daily car and 27,800 daily truck trips are projected at the Existing Crossings. The travel flows shown for the Base Case reflect the significant differences in the truck and car markets. The truck movements reflect longer distance travel with the predominant flows between Highway 401 and I-75/I-94. Approximately 75-80% of Ontario based truck traffic is from Highway 401, with the remaining 20-25% from the immediate Windsor area. Among cross-border truck traffic to the US, approximately 50% is destined to I-75 (South to Toledo and beyond), 20% to I-94 (West to Chicago and beyond), 25% to northerly directions via I-75, I-96 and M-10. Car traffic is much more local in nature with the predominant flows between Detroit and Windsor, as reflected in the car desire line flows. Approximately 20% of the Ontario based traffic is from Highway 401 with most of the remaining 80% from the immediate Windsor area. In Michigan, 12% of car traffic is oriented to /from I-75 and 8% to I-94, with most of the remaining 80% to the more centrally located road facilities that better accommodate shorter and more local cross-border trips.

EXHIBIT 3.6 – EXISTING AND PROJECTED ROADBED LEVEL-OF-SERVICE AT INTERNATIONAL CROSSINGS

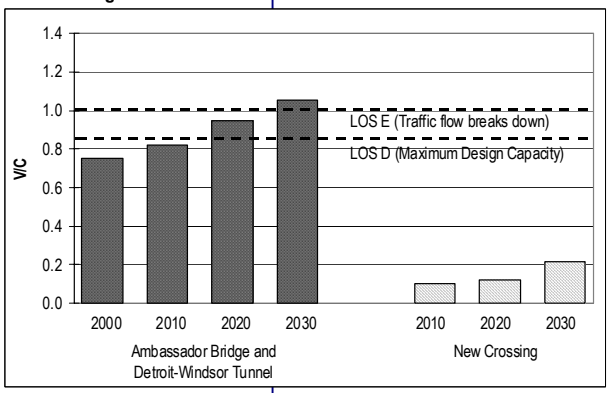
Base Case



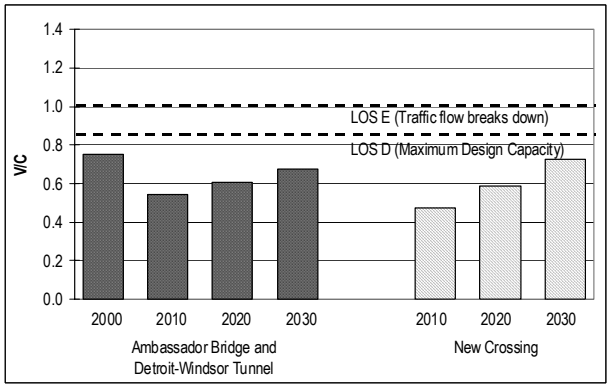
Rail Corridor



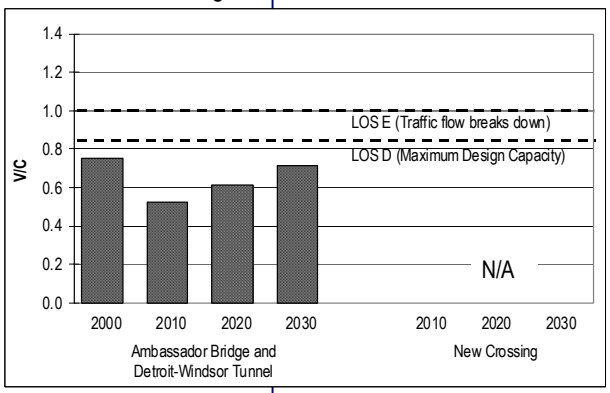
East Crossing



Central Crossing



Twinned Ambassador Bridge



South Crossing

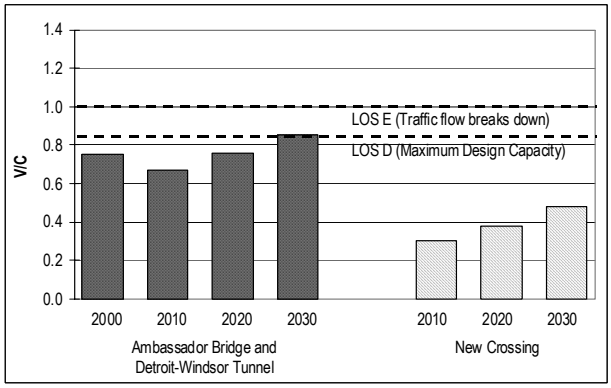
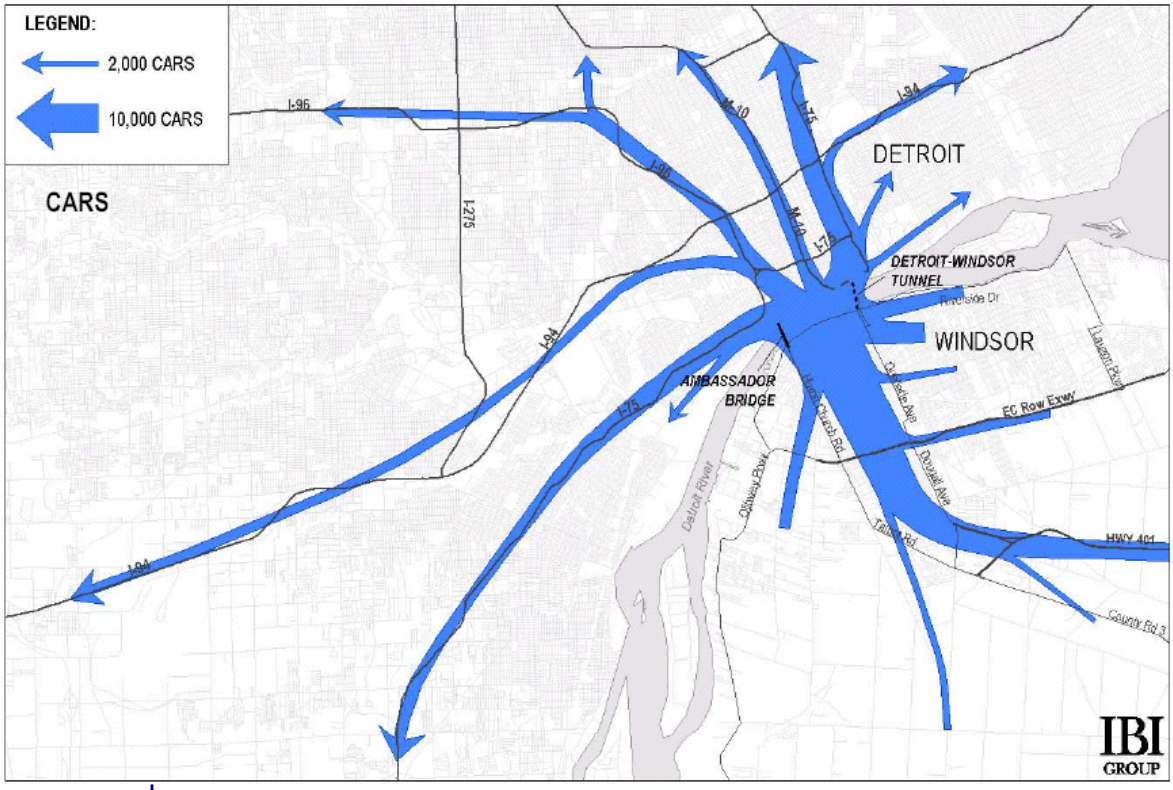
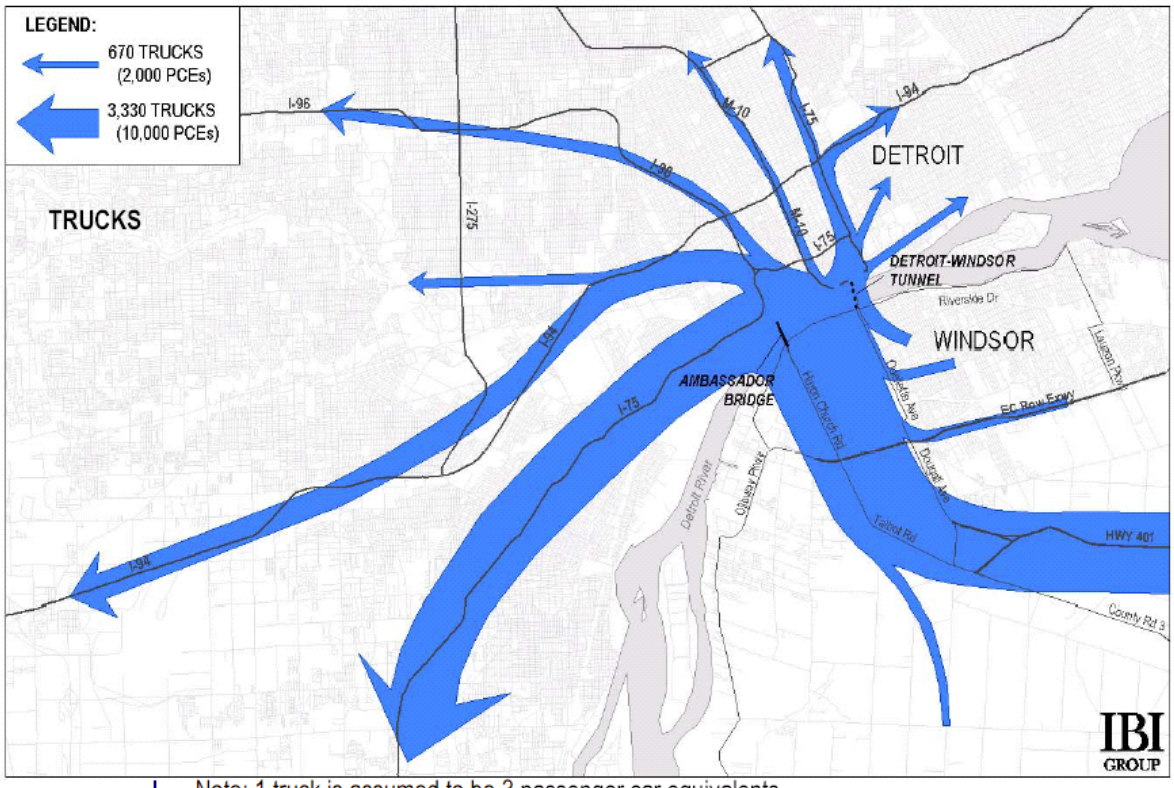


EXHIBIT 3.7: BASE CASE, 2030 DAILY FLOWS





Note: 1 truck is assumed to be 3 passenger car equivalents.

South Crossing Alternative

The South Crossing Alternative, due to a more southerly alignment and a direct connection to I-75, is able to attract significant truck traffic, but much less car traffic from the existing crossings. The estimated travel distance savings for a trip from Highway to I-75 (South to Toledo) is 10.6 kilometres (6.6 miles), providing significant savings for long distance travel, but little benefit for local Windsor-Detroit travel. In 2030, approximately 7,300 daily cars and 18,200 daily trucks are projected for the South.

Crossing, with the V/C ratio estimated to be 0.48 for this new crossing. However, the projected 2030 V/C ratio for the Existing Crossings is estimated at 0.86 and just slightly above the level considered acceptable based on LOS D. The V/C ratio for Huron-Church Road is projected at 0.79.

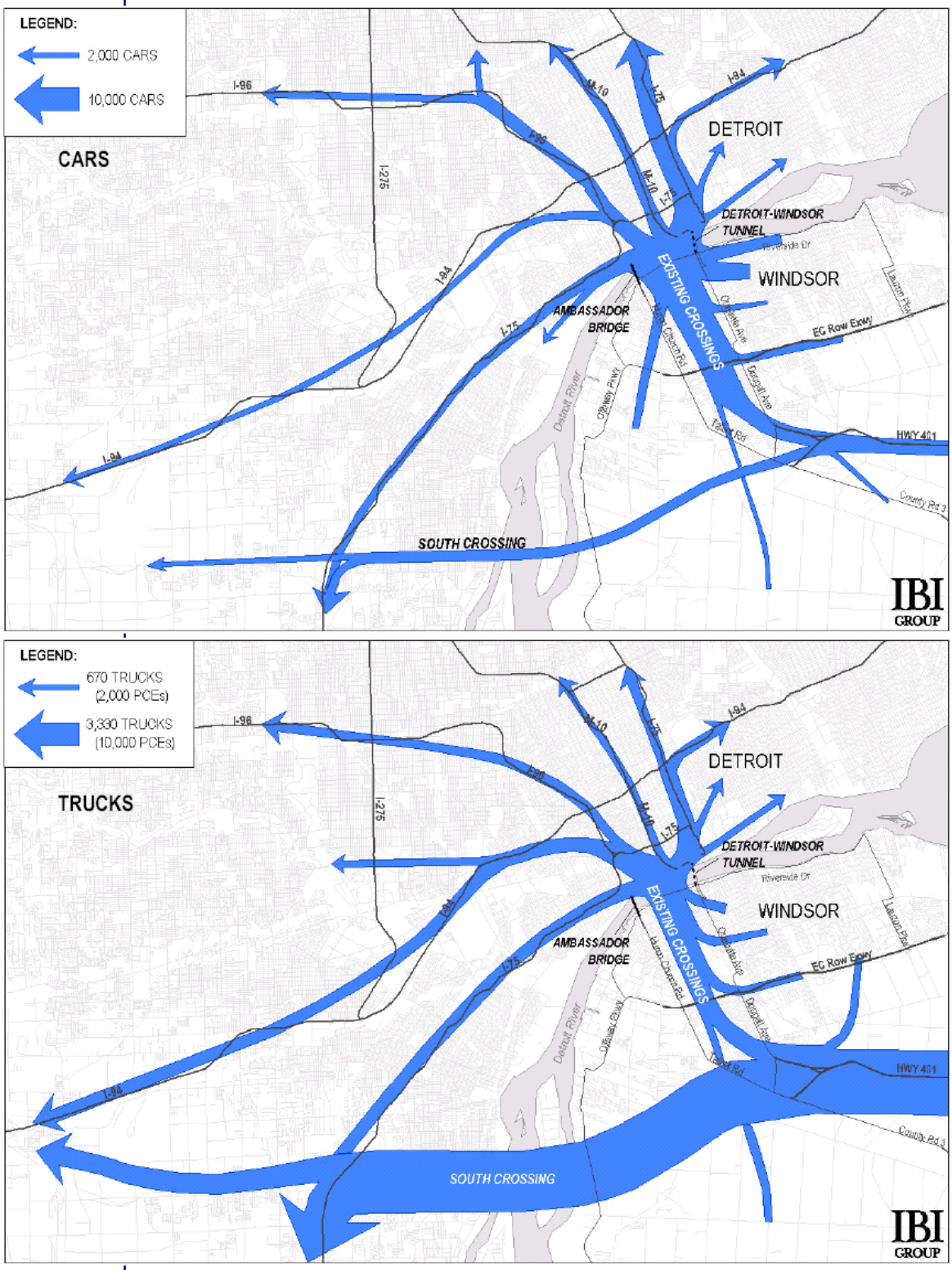
The projected car and truck travel flows associated with the South Crossing Alternative are shown in Exhibit 3.8. This alternative would attract approximately 65% of the truck traffic crossing at Windsor-Detroit. This truck traffic corresponds to approximately 12,500 daily trips to/from I-75 (South to Toledo) and approximately 5,500 daily trips to/from I-94 (West to Chicago). The movement from the South Crossing to I-94 was assumed to be made via an I-75/Eureka Road/I-275 routing, which would involve heavy truck movements on a local arterial road. Improvements/upgrading of local roads and/or designations of truck routes to higher-order facilities connecting to I-94 will therefore need to be considered with this alternative. The car volumes projected to use the South Crossing Alternative are projected to be low, reflecting approximately 10% of the cross-border car market in 2030. The car flows reflect largely long distance travel, similar to truck market for this crossing, travelling to/from I-75 (South to Toledo) and I-94 (West to Chicago).

Central Crossing Alternative

The Central Crossing is projected to have the highest traffic volumes among the alternatives, with an estimated 2030 daily traffic of 16,600 cars and 22,800 trucks. This translates to a 2030 V/C ratio of 0.73 and reduces the V/C ratio for the Existing Crossings to 0.67. The V/C ratio for Huron-Church Road is projected to be 0.49.

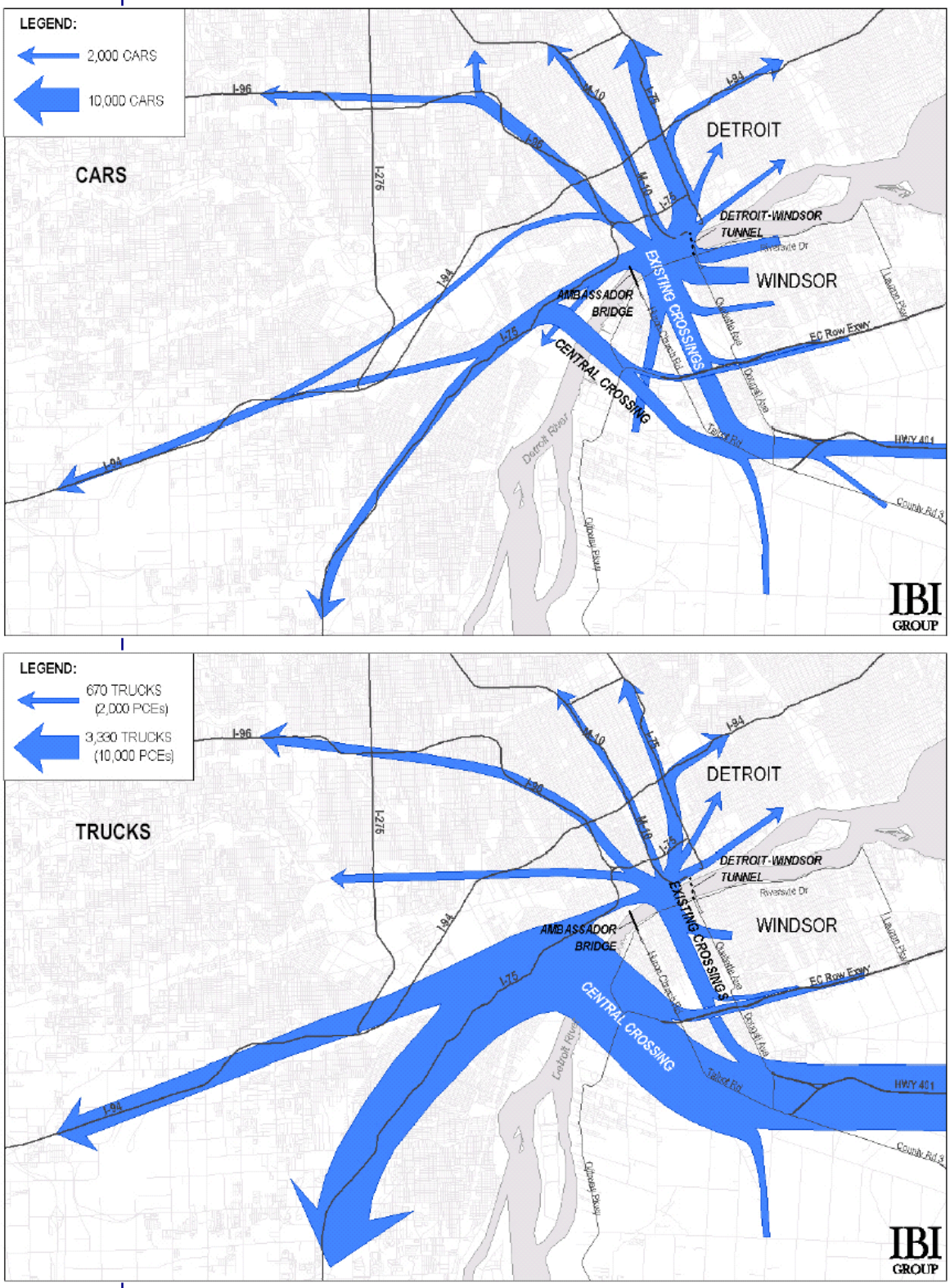
Exhibit 3.9 presents the travel flows associated with a Central Crossing Alternative located in the vicinity of E.C. Row/Ojibway Parkway in Windsor and Zug Island in Detroit. The location of the Central Crossing provides a balance between the westward pull of major truck movements to/from on I-75 (South to Toledo) and west on I-94 (West to Chicago) and the more central Windsor/central Detroit travel orientations associated with the major car movements. For travel between Highway 401 and I-75 (South to Toledo), the Central Crossing Alternative reduces the travel distance by approximately 3.1 kilometres (1.9 miles). For travel between Highway 401 and I-94 (West to Chicago), the distance savings is approximately 5 kilometres (3.1 miles). The ability of the Central Crossing Alternative to serve both car/truck and local/long distance trips results in a significant attraction of traffic while adequately meeting capacity requirements and level-of-service criteria. The Central Crossing Alternative serves approximately 80%

EXHIBIT 3.8: SOUTH CROSSING, 2030 DAILY FLOWS



Note: 1 truck is assumed to be 3 passenger car equivalents.

EXHIBIT 3.9: CENTRAL CROSSING, 2030 DAILY FLOWS



Note: 1 truck is assumed to be 3 passenger car equivalents.

of the truck traffic crossing at Windsor-Detroit, effectively serving almost all cross-border truck traffic to/from I-75 (South to Toledo) and I-94 (West to Chicago). The remaining 20% of the truck traffic using predominantly the Ambassador Bridge is destined to and from northerly locations. In terms of cross-border car traffic, the Central Crossing is able to serve approximately 25% of these trips, comprised largely the long distance car travel component and some local car travel.

Twinned Ambassador Bridge

The Twinned Ambassador Bridge Alternative provides a second span adjacent to the existing bridge, with a controlled access road from Highway 401. While the new roadway does not increase the travel distance for trips between Highway 401 and the crossing, it does increase the length of trips accessing the bridge from Windsor due to the limited number of freeway access points. In 2030, this alternative is projected to have a V/C ratio of 0.67, indicating good utilization with adequate capacity to accommodate future growth and demand needs.

Exhibit 3.10 presents the travel flows under the Twinned Ambassador Bridge Alternative. Given the identical crossing location and similar access/egress road routings relative to the Base Case, the travel flows are similar to those described for the Base Case, as noted above. However, the additional capacity provided by the second span together with the assumed upgrades/improvements to Huron Church Road to address the identified capacity deficiencies would satisfy the long term needs for Windsor-Detroit cross-border traffic.

Rail Corridor Alternative

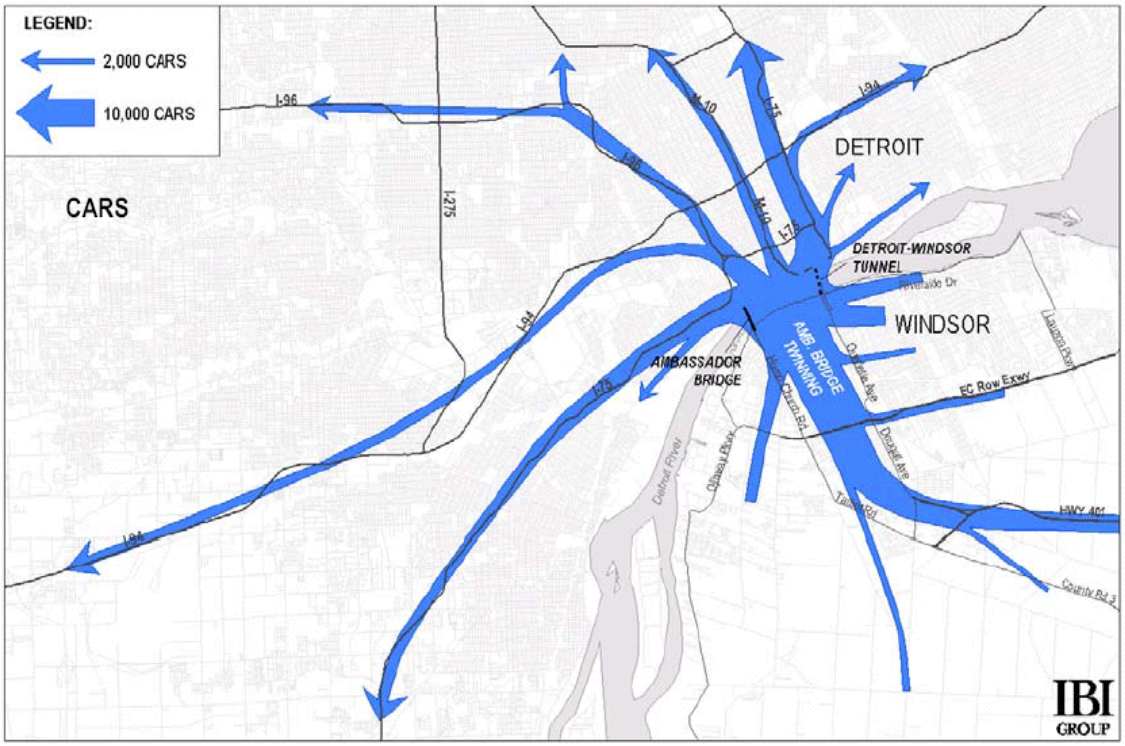
The Rail Corridor Alternative provides one-truck lane of traffic in each direction and is projected to accommodate approximately 19,200 daily trucks in 2030. This provides much needed truck capacity, but is inadequate to provide the total capacity needed to accommodate the growth in demand to 2030, as reflected by a projected 2030 V/C ratio of 0.93 for the Existing Crossings, 0.94 for the Rail Corridor and 0.93 for Huron-Church Road.

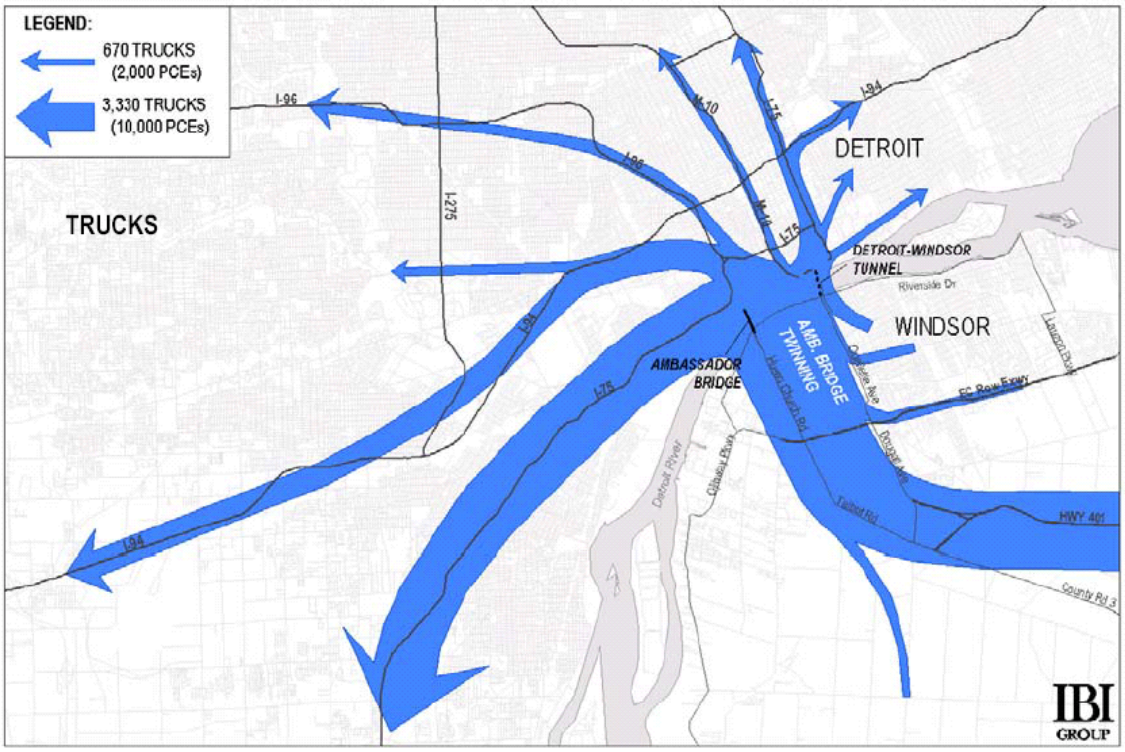
Exhibit 8.11 displays the travel flows that are projected with the Rail Corridor Alternative that uses the existing CASO rail right-of-way and rail tunnel conversion. Given the higher speeds and controlled access to the Rail Corridor provided to/from Highway 401 and I-75, significant volume of trucks are projected to use this alternative, with approximately 70% of daily cross-border truck traffic using the Rail Corridor. This alternative exclusively serves truck traffic.

East Crossing Alternative

The projected traffic on the East Crossing Alternative is the lowest among the alternatives, with a projected daily demand of 8,500 daily cars and 1,800 trucks in 2030, with a V/C ratio of only 0.22. Given this low volume, the V/C ratio for the Existing

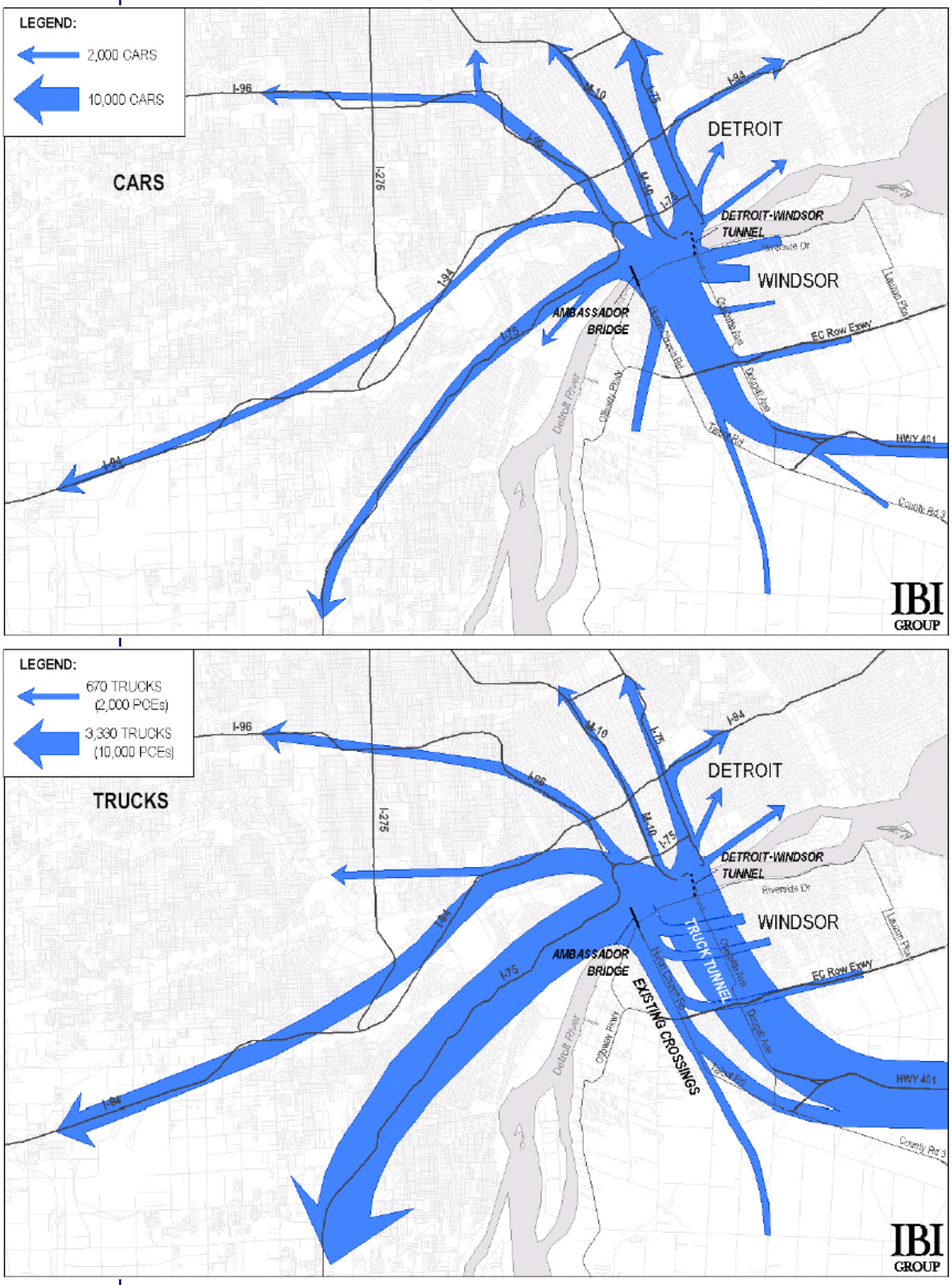
EXHIBIT 3.10: TWINNED AMBASSADOR BRIDGE, 2030 DAILY FLOWS





Note: 1 truck is assumed to be 3 passenger car equivalents.

EXHIBIT 3.11: RAIL CORRIDOR, 2030 DAILY FLOWS



Note: 1 truck is assumed to be 3 passenger car equivalents.

Crossings is projected to be 1.06 and 1.16 for Huron-Church Road.

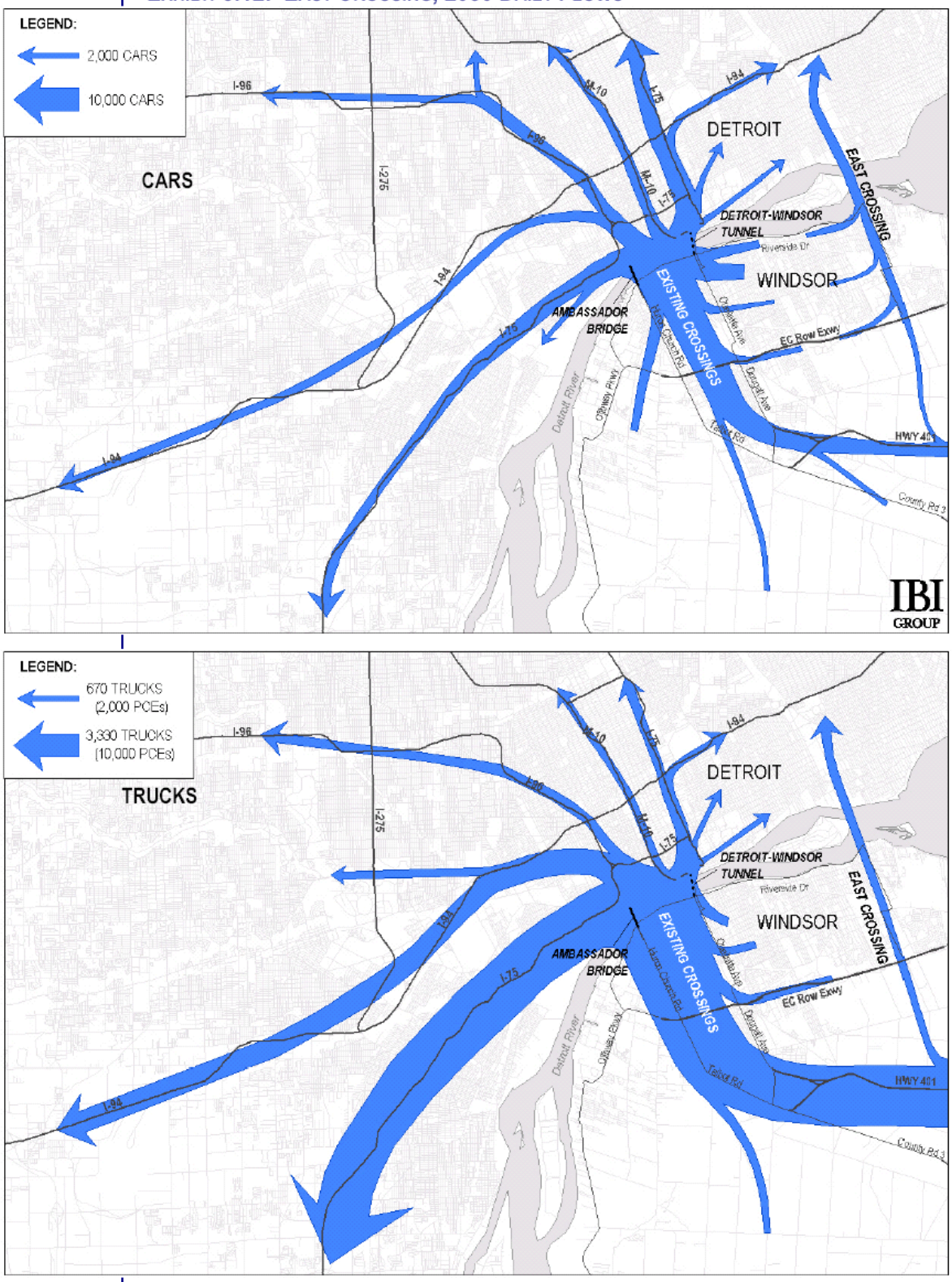
The car and truck travel flows associated with the East Crossing Alternative are shown in Exhibit 3.12. The truck traffic volumes are quite low compared to the other alternatives, reflecting the relatively low truck travel demand between the manufacturing facilities in east Windsor and east Detroit, compared to the large, more westerly oriented flows between Highway 401 and I-75 (South to Toledo) and I-94 (West to Chicago). In 2030, the East Crossing Alternative is projected to only capture approximately 12% and 6% of the car and truck market, respectively. The longer travel distance of 14 kilometres (8.7 miles) for this movement compared to an Ambassador Bridge routing and the congestion on I-75 for east to west travel through central Detroit needed to reach I-75 and I-94 are the main reasons for the low truck attraction with the East Crossing. Also, truck trip destinations to the northeast that may be more conveniently accessed by an East Crossing may also reached via the Blue Water Bridge, which reduces the potential market for this crossing.

Summary

The transportation comparison of alternatives provides an indication of the relative strengths and weaknesses of each alternative based on the transportation measures presented. There is no clear overall best alternative, although the Central Crossing, South Crossing and Twinned Ambassador Bridge Alternatives provide greater benefits to the network than the East Crossing and Rail Corridor Alternatives when assessed on an individual basis. The major findings of the transportation analysis include the following:

- The Twinned Ambassador Bridge and Central Crossing Alternatives best address the future network requirements projected for the Windsor-Detroit border crossings and satisfy future demand based on LOS D.
- The Central Crossing Alternative provides better travel time savings and has a projected higher demand compared to the Twinned Ambassador Bridge Alternative. This is due to its more westerly location, which provides a shorter travel distance for the truck travel flow between Highway 401 in Canada and I-75 Corridor and I-94 Corridor in the US, which is a significant portion of international long-distance truck traffic.
- The South Crossing Alternative diverts a significant proportion of truck traffic from the existing crossings and provides the greatest travel time savings among the alternatives. In terms of car traffic, the southerly alignment does not serve local Windsor to Detroit travel well and therefore the South Crossing is projected to attract very low volumes of local traffic. The overall traffic diversion from Existing Crossings is lower than the Central and Twinned Ambassador Bridge alternatives, but under certain low trade growth scenarios is sufficient to satisfy future network requirements for the next 20 to 25 years based on LOS D.

EXHIBIT 3.12: EAST CROSSING, 2030 DAILY FLOWS



Note: 1 truck is assumed to be 3 passenger car equivalents.

- The Rail Corridor provides significant travel time benefits to cross-border truck traffic and is projected to attract significant truck volumes. However, the additional two-lanes of capacity provided by the tunnel does not meet future network requirements and the 30-year demand need. It will need to be implemented in conjunction with a second new/expanded crossing if the Rail Corridor is to be part of a 30-year strategy for the border crossing.
- The East Crossing is projected to attract low cross border car and truck traffic over the study horizon and is not able to meet future network requirements.

The assessment factors, the results of the assessment and conclusions are provided in the following chapter.

4. Feasibility Assessment of Opportunity Corridors

As discussed in Chapter 3, the generation of opportunity corridors was a four-step process. The fourth and final step was the feasibility assessment. The purpose of the feasibility assessment was to test the technical feasibility of the five opportunity corridors to ensure that each alternative:

- reasonably addressed the transportation and border processing problems and opportunities identified; and,
- was not likely to generate any unacceptable impacts associated with a new international transportation corridor.

In conducting the assessment, a set of factors and measures were developed to identify the transportation benefits and potential impacts of each alternative. Each alternative was assessed and conclusions were documented based on the assessment.

4.1 Assessment Factors and Measures

A preliminary set of factors was presented for comment at the first round of Public Consultation in November 2002. Measures for the factors were developed consistent with the level of detail employed for a feasibility study. The rationale and measures used for transportation network improvement, government/land use/transportation planning/tourism objectives, border processing and technical feasibility factors, are shown in Tables 4.1 A to 4.1-D. In addition, the corridors were assessed based on the degree to which each alternative optimized the use of existing infrastructure. As noted in Section 3.4, taking advantage of existing transportation and other linear corridors may improve usage of the transportation network and/or reduce impacts to other land uses.

As well, the opportunity corridors were assessed on environmental factors. The Partnership's objective is to generate alternatives that reduce the overall impacts to natural, cultural and socio-economic features in the FAA.

As the project proceeds through the environmental approvals processes, factors and measures will be modified as appropriate to reflect the level of information used in decision-making.

4.2 Assessment of Opportunity Corridors

The Opportunity Corridors were developed to be sufficiently wide to accommodate various route alignments for road connections. The assessment of the Opportunity Corridors was based on 'representative alignments' for road connections and border crossings within the corridors. These representative alignments were developed for feasibility assessment purposes only.

As the project proceeds through the environmental approvals process, roadway alignments and new/expanded border crossing locations will be developed based on study area conditions identified at a higher level of detail than that available for this feasibility study.

The results of the feasibility assessment of each opportunity corridor are provided in Tables 4.2-A to 4.2-F.

TABLE 4.1-A – TRANSPORTATION NETWORK IMPROVEMENT FACTORS

Factors	Rationale for Assessment	Measures Considered and Rationale
Support local international traffic	• Presently, the majority of international trips (93% of passenger car and 56% of commercial vehicle trips) have at least one trip end (i.e. origin or destination) in the Detroit/Wayne County-Windsor/Essex County region. These crossings represent a significant amount of trade and other economic activity for the local economies. Support of these movements is assessed on the ability of the alternative to meet the long-term travel demand of these movements.	• ***Travel time on the network aggregated to total vehicle-hrs during the peak hr****: Travel time is a measure of network efficiency; travel time was assessed relative to the base case (do nothing) scenario; the lower the total travel time the less congestion and delay assumed on the network* • ***Travel distance on the network aggregated to total vehicle-km during the peak hr*** *Travel distance is a measure of network efficiency; travel distance was assessed relative to the base case (do nothing) scenario; the shorter the total travel distance, the more efficient the network*
Support long distance freight travel	• Approximately 44% of truck trips crossing the border are passing through the FAA. These movements represent a substantial amount of annual trade between the two nations. Support of these movements is assessed on the ability of the alternative to meet the long-term travel demand of these movements.	
Support long distance passenger travel	• Existing border crossings are an important link between the two countries for passenger travel. Such activity contributes to the local, regional and national economies and enables important social interaction.	
Impacts to access and mobility on local road networks	• Although of major importance, border crossings represent a portion of the economic and social activities in the study area; in developing solutions to border crossing issues, local community access and mobility must be maintained, enhanced and improved wherever possible.	• *Assessment based on assumed road connections, crossings and closures developed for a representative alignment within each corridor*

TABLE 4.1-B – GOVERNMENT, LAND USE, TRANSPORTATION PLANNING AND TOURISM OBJECTIVES FACTORS

Factors	Rationale for Assessment	Measures Considered and Rationale
Support existing land use and future plans	• Once implemented, the improvements to the border crossing(s) could have a long-term effect on the local communities; compatibility with existing land use and future federal, provincial/state and municipal plans can reduce the overall effect on the character, growth and development of the community.	• *Subjective assessment of compatibility with existing land use and public planning documents*
Support the transportation system	• Federal, provincial/state and municipal governments share responsibilities for providing safe, efficient and reliable transportation; improving the transportation system to meet the travel needs of the region is vital to the national, regional and local economies, as well as providing a reasonable degree of access and mobility.	• *Subjective assessment of compatibility with existing road network and public transportation plans and systems*
Maintain security and protect against system vulnerability	• Safe and reliable transportation is vital to the national, regional and local economies, as well as providing a reasonable degree of access and mobility. The additional need to assess and reduce risks and potential weaknesses in the transportation system, given the strategic importance of this international trade corridor, is an important responsibility of all levels of government.	• *Subjective assessment of road network risks/weaknesses*

TABLE 4.1-C – BORDER PROCESSING FACTORS

Factors	Rationale for Assessment	Measures Considered and Rationale
Meet the long term needs for commercial processing and passenger crossings	• Based on discussions with border processing agencies, their long term needs at the border crossings are: • Size/flexibility of plaza area to complete border processing requirements; • Ability to identify and separate high risk traffic from low risk traffic; • Security of primary and secondary commercial inspection areas and associated parking; • Communications with other border crossings; and • Monitoring of border crossing conditions.	• *Subjective assessment of possible border processing issues and constraints associated with each alternative*

TABLE 4.1-D – TECHNICAL FEASIBILITY FACTORS

Factors	Rationale for Assessment	Measures Considered and Rationale
Technical Considerations	• While all alternatives will be constructed to comply with government design standards and requirements in meeting the needs of the project, each alternative will have unique, as well as common characteristics that are worth considering in an assessment of differences and similarities among the alternatives	• *Length of Corridor* • *Length of river crossing* • *Maximum road grade* • *Structure types*
Capital Construction Cost Estimate	• While it is acknowledged that the border crossings in the study area are among the busiest and most strategic for both countries, it is recognized that resources available to address the needs of the network are finite. Minimizing costs in achieving the project objectives is an important consideration	• *$ (2004 base year) Estimated cost to construct a new or expanded international crossing and roadway connections in the Windsor/Essex County and Detroit/Wayne County area*
Constructability and Related Impacts	• Consideration of constructability and related impacts is an essential part of assessing feasibility of any proposed solution. It must be verified that the impacts of implementing a solution do not outweigh the benefits.	• *Subjective assessment*

TABLE 4.2-A – ASSESSMENT OF TRANSPORTATION NETWORK IMPROVEMENT FACTORS

ASSESSMENT OF TRANSPORTATION NETWORK IMPROVEMENT FACTORS							
Factors	**Measures**	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Support local international traffic Support long distance international freight travel Support long distance international passenger travel	• ***Travel time on the network aggregated to total vehicle-hrs during the peak hr****: Travel time is a measure of network efficiency; travel time was assessed relative to the base case (do nothing) scenario; the lower the total travel time the less congestion and delay assumed on the network* • ***Travel distance on the network aggregated to total vehicle-km during the peak hr*** *Travel distance is a measure of network congestion; Travel time is a measure of network efficiency; travel distance was assessed relative to the base case (do nothing) scenario; the lower the total travel distance, the less congestion and delay assumed on the network*	• Alternative will not support international traffic • Without additional capacity, worsening congestion levels at existing crossings lead to increased delays	• Alternative provides limited support to local international traffic; does support long distance travel to I-75 and possibly I-94 • Can provide sufficient additional capacity to meet long-term travel needs of the region • Alternative does not divert sufficient passenger car traffic to relieve congestion at existing border crossings	• Alternative supports local and long distance international traffic • Can provide sufficient additional capacity to meet long-term travel needs of the region • Diverts sufficient traffic to relieve congestion on local road network in vicinity of existing crossings	• Alternative supports local and long distance international traffic • Can provide sufficient additional capacity to meet long-term travel needs of the region • Does not require diversion of international traffic, but requires modifications to local road network to provide additional capacity	• Alternative provides limited support to international truck traffic • Provides additional capacity for network, but capacity provided is insufficient to meet long-term travel needs of the region • Provides capacity and options for maintaining movement of goods as an alternate river crossing for trucks which can indirectly benefit passenger car traffic	• Alternative provides limited support to international traffic • Can provide sufficient additional capacity to meet long-term travel needs of the region • Alternative does not divert sufficient traffic to relieve congestion at existing border crossings
Access and mobility on local road networks	• *Assessment based on assumed road connections, crossings and closures developed for a representative alignment within each corridor*	• Without improvements, congestion and delays at border crossings and connecting roadways will reduce local mobility and access	• Alternative does not attract sufficient international passenger car traffic to relieve congestion at existing border crossings; this could affect local mobility and access • May require modifications to local road network which could affect local mobility and access	• Attracts sufficient international traffic to relieve congestion on local road network in vicinity of existing crossings • May require modifications to local road network	• Maintains existing travel patterns for international traffic • Requires modifications to local road network which could affect local mobility and access	• Capacity provided is insufficient to meet long-term travel needs of the region; as a result congestion on local road network in vicinity of river crossings could affect local access and mobility • May require modifications to local road network	• Alternative does not attract sufficient international traffic to relieve congestion at existing border crossings; • May require modifications to local road network

TABLE 4.2-B – ASSESSMENT OF GOVERNMENT, LAND USE, TRANSPORTATION PLANNING, AND TOURISM OBJECTIVES

ASSESSMENT OF GOVERNMENT, LAND USE, TRANSPORTATION PLANNING, AND TOURISM OBJECTIVES							
Factors	**Measures**	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Support existing and future plans	• *Subjective assessment of compatibility with public planning documents*	• Not compatible with Windsor Area Long Term Transportation Study (WALTS) recommendations, which identifies need for network improvements related to increased cross-border development	• Compatible with existing and future plans in the Canadian portion of the corridor; avoids majority of proposed urban expansion area of LaSalle • Corridor in Wyandotte area includes a heavily developed mix of land uses which are not all compatible with highway uses	• Portion of corridor south of EC Row Expressway in Windsor/LaSalle consistent with WALTS recommendations • Corridor includes a mix of land uses which are not all compatible with highway uses	• Portion of corridor south of EC Row Expressway in Windsor/Lasalle consistent with WALTS recommendations • Corridor includes a mix of land uses which are not all compatible with highway uses	• Compatible with existing and future plans in that it improves use of existing transportation corridor, but adjacent land uses are not all compatible with highway uses • Introduces international truck traffic into areas of Windsor/Detroit currently lesser exposed to such traffic	• Portion of corridor south of EC Row Expressway in Windsor/Tecumseh consistent with WALTS recommendations • Corridor includes a mix of land uses which are not all compatible with highway uses
Support the transportation system	• *Subjective assessment of compatibility with public transportation plans and systems*	• Does not support the transportation system; significant portions of the network will fail by year 2030	• Increases capacity of the existing system but, due to lack of travel demand in this corridor, alternative provides lesser improvements to network operations than other alternatives	• Increases capacity of the existing system and provides greater improvement to network operations than other alternatives	• Increases capacity of the border crossing and provides improvement to network operations in Windsor	• Increases capacity of the border crossing, but does not provide sufficient capacity to meet long-term traffic needs; as a result, alternative provides lesser improvements to network operations than other alternatives	• Increases capacity of the existing system but alternative provides lesser improvements to network operations than other alternatives
Maintain security and protect against system vulnerability	• *Subjective assessment of road network risks/weaknesses*	• No reduction of potential risks/ weaknesses in border crossing network	• Options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings	• Options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings	• Options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings	• Options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings	• Options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings

TABLE 4.2-C – ASSESSMENT OF BORDER PROCESSING FACTORS

ASSESSMENT OF BORDER PROCESSING FACTORS							
Factors	**Measures**	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Meet the long term needs for commercial processing and passenger crossings	• *Subjective assessment of possible border processing issues and constraints associated with each alternative*	• Low-risk traffic mixing with high-risk traffic limits effectiveness/ ability of initiatives to reduce processing times • At Ambassador Bridge, secondary inspection of Canada-bound trucks occurs off-site; at Detroit-Windsor Tunnel, secondary inspection of all trucks occurs off-site; unsecured connections between primary and secondary inspection areas not consistent with long-term needs of border processing agencies	• Existing development in corridor may limit size/flexibility of plaza area to complete border processing requirements	• Existing development in corridor may limit size/flexibility of plaza area to complete border processing requirements	• Existing development in corridor may limit size/flexibility of plaza area to complete border processing requirements	• Existing development around rail tunnel U.S. portal may limit size/flexibility of plaza area to complete border processing requirements • Proposal would provide direct improvements for commercial vehicle processing only; no change from base case for passenger car crossings	• Existing development in corridor may limit size/flexibility of plaza area to complete border processing requirements

TABLE 4.2-D – ASSESSMENT OF TECHNICAL FEASIBILITY

ASSESSMENT OF TECHNICAL FEASIBILITY							
Factors	**Measures**	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Technical Considerations	• *Length of Corridor* • *Length of river crossing* • *Maximum road grade·* • *Structure types*	• N/A	• Total length of corridor (approx.) = 24 km (15 mi) • Length of River Crossing = 3.5 to 4.5 km (2.2 to 2.8 mi) which could necessitate in-water work and structures • (Assumed) max. grade of 3% consistent with highway design standards	• Total length of corridor (approx.) = 15 km (9.5 mi) • Width of Detroit River at crossing (approx.) = 0.6 to 0.75km (0.4 to 0.5 mi) • (Assumed) max. grade of 3% consistent with highway design standards	• Total length of corridor (approx.) = 15 km (9.5 mi) • Width of Detroit River at crossing (approx.) = 0.6 km (0.4 mi) • Max. Grade of 5% on river crossing structure is not consistent with highway design standards but satisfies arterial road design standards	• Total length of corridor (approx.) = 15 km (9.5 mi) • Width of Detroit River at crossing (approx.) = 0.6 km (0.4 mi) • (Assumed) max. grade of 3% consistent with highway design standards; facility would operate at posted speeds more consistent with arterial road in tunnel • Not a direct freeway connection on U.S. side, but this should not limit operations; direct connection is being planned • Emergency services operations/ equipment are limited with tunnel facility	• Total length of corridor (approx.) = 20 km (12.5 mi) • Width of Detroit River at crossing (approx.) = 1.5 to 2 km (0.9 to 1.3 mi) which could necessitate in-water work and structures • (Assumed) max. grade of 3% consistent with highway design standards • Constraints may preclude a direct freeway connection on U.S. side
Capital Construction Cost Estimate	• *$ (2003 base year) Estimated cost to construct new crossing and roadway connection between Highway 401 in Windsor/Essex County and Interstate Freeway System in Detroit/Wayne County*	• N/A	• TBD	• TBD	• TBD	• TBD	• TBD
Constructability and Related Impacts	• *Subjective assessment*	• N/A	• Significant disruptions to vehicular traffic during construction on U.S. side; • Some disruption to marine traffic during construction of river crossing • Minor disruptions to vehicular traffic during construction on Canadian side • Possibility of permanent structures in river which would affect marine navigation in river	• Significant disruptions to vehicular traffic during construction • Some disruption to marine traffic during construction of river crossing • Minor disruptions to vehicular traffic during construction on Canadian side	• Significant disruptions to vehicular traffic during construction in Windsor • Some disruption to vehicular traffic during construction in Detroit • Some disruption to marine traffic during construction of river crossing	• Some minor disruptions to vehicular traffic during construction and conversion of twin rail tunnels	• Significant disruptions to vehicular traffic during construction on U.S. side; • Some disruption to marine traffic during construction of river crossing • Minor disruptions to vehicular traffic during construction on Canadian side • Possibility of permanent structures in river which would affect marine navigation in river

TABLE 4.2-E – ASSESSMENT OF TRANSPORTATION OPPORTUNITY FACTORS

ASSESSMENT OF TRANSPORTATION OPPORTUNITY FACTORS						
Factors	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Optimize use of the existing infrastructure (transportation corridors and facilities)	• No optimized use of infrastructure; with no increases in road capacity, increasing traffic volumes will result in increased congestion, bottlenecks and inefficient use of infrastructure	• Some degree of optimization of existing infrastructure is possible by making use of existing major road and/or rail corridors; • Direct access to I-75; 9 km (5.5 mi) to I-94 (via Telegraph Road), 20 km (12 mi) to I-96 (via I-75)	• Some degree of optimization of existing infrastructure is possible by making use of existing major road and/or rail corridors; • Direct access to I-75; 8 km (5 mi) to I-94 (via Southfield Hwy), 8 km (5 mi) to I-96 (via I-75) • Truck ferry facilities are situated within this corridor; improvements to road network in this corridor may also improve connectivity to ferry	• Some degree of optimization of existing infrastructure is possible by making use of existing major road and/or rail corridors; • Direct access to I-75/I-94/I-96 • Can take better advantage of the U.S. Gateway Project which expands U.S. plaza and improves connections to freeway system • Improvements to road network in this corridor may also improve connectivity to truck ferry.	• Alternative offers some degree of optimization of existing infrastructure by making use of existing rail corridor and tunnel to provide additional capacity and a new crossing for international truck traffic; • Indirect connection to U.S. interstate highway system (I-75); direct connection is being planned • Alternative incorporates a new, larger rail tunnel, which would improve rail facilities at this crossing	• Some degree of optimization of existing infrastructure is possible by making use of existing major road and/or rail corridors; • Direct access to I-94; 6 km (4 mi) to I-75 (via I–94), 11 km (7 mi) to I-96 (via I-94)

TABLE 4.2-F – ASSESSMENT OF ENVIRONMENTAL FACTORS

ASSESSMENT OF ENVIRONMENTAL FACTORS						
Factors	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Natural Features						
Air Quality	• Meets Regional AQ standards	• All new crossings would result in similar Regional Air Quality Impacts				
Ground Water	• No impact	• No significant impact	• No significant impact	• No significant impact	• No significant impact	• No significant impact
Surface Water	• No impact	• New crossings at Detroit River, Canard River tributaries, West Branch Cahill Drain, and Lepain Drain requiring permits	• New crossings at Detroit River, Turkey Creek, Lennon Drain, Cahill Drain, and Lepain Drain requiring permits	• New crossing at Detroit River requiring permits • Crossing at Grand Marais/Turkey Creek requiring permits	• Temporary construction impacts requiring permits	• New crossing at Detroit River requiring permits
Agricultural Lands	• No impact	• Potential to impact agricultural areas	• Potential to impact agricultural areas	• Potential to impact agricultural areas	• No agricultural lands impacted	• Potential to impact agricultural areas
Wetlands	• No impact	• Potential to impact the Detroit River Marsh Wetland Complex Provincially Significant Wetland	• Potential to impact wetland areas	• Potential to impact wetland areas	• No wetlands impacted	• Potential to impact wetland areas
Environmentally Sensitive Areas	• No impact	• Requires a new crossing of Detroit River, which is a designated Heritage River in both U.S. and Canada • Impact upon Detroit River Floodprone Area requiring permits • Potential impacts to Grosse Ile as well as a portion of the Detroit River which are both designated as International Wildlife Refuge	• Requires a new crossing of Detroit River, which is a designated Heritage River in both U.S. and Canada • Potential to impact Ojibway Park and Prairie Reserve area, one of the largest protected prairie and oak savannah habitats in Canada. • Potential to impact Candidate Natural Heritage sites in Windsor	• Requires a new crossing of Detroit River, which is a designated Heritage River in both U.S. and Canada • Potential to impact Ojibway Park and Prairie Reserve area, one of the largest protected prairie and oak savannah habitats in Canada • Potential to impact Candidate Natural Heritage sites in Windsor	• Potential to impact Candidate Natural Heritage site in Windsor	• Requires a new crossing of Detroit River, which is a designated Heritage River in both U.S. and Canada • Potential to impact portion of Detroit River, islands, and adjacent shorelands that are all designated as International Wildlife Refuge • Potential to impact wildlife habitat (Blue Herron lagoon on Belle Isle) • Potential to impact Candidate Natural Heritage sites in Windsor

TABLE 4.2-F – ASSESSMENT OF ENVIRONMENTAL FACTORS CON'T

ASSESSMENT OF ENVIRONMENTAL FACTORS						
Factors	**Base Case (No Action)**	**South Crossing**	**Central Crossing**	**Twinned Ambassador Bridge**	**Rail Corridor**	**East Crossing**
Endangered Species	• No known impacts	• No known impacts – this will be investigated further in next stage of project	• No known impacts – this will be investigated further in next stage of project	• No known impacts – this will be investigated further in next stage of project	• No known impacts – this will be investigated further during next stage of project	• No known impacts – this will be investigated further in next stage of project
Cultural Features						
Historic/Archaeological Sites	• No impact	• Potential to impact historical/ archaeological sites	• Potential to impact historical/ archaeological sites	• Potential impact to Ambassador Bridge	• Potential impact to historical/ archaeological sites within/adjacent to rail corridor	• Potential to impact Belle Isle (Natural Historic Landmark)
National, State, and Local Parks/ Recreation Sites	• No impact.	• Potential impacts to municipal parks and recreation areas	• Potential impacts to recreation areas and local parks	• Potential impacts to municipal parks	• Potential impacts to municipal parks adjacent to rail corridor	• Potential to impact Belle Isle, a Natural Historic Landmark and the largest municipal park in the U.S. • Potential impacts to municipal parks
Socioeconomic Features						
Residential Areas	• Potential impacts to residential areas in communities adjacent to existing crossings and connecting roadways	• Potential impacts to residential areas	• Potential impacts to residential areas	• Potential impacts to residential areas	• Potential impacts to residential areas adjacent to rail corridor	• Potential impacts to residential areas
Commercial/Industrial Areas	• Potential impacts to commercial and industrial areas in communities adjacent to existing crossings and connecting roadways	• Potential impacts to commercial and industrial areas	• Potential impacts to commercial and industrial areas	• Potential impacts to commercial and industrial areas	• Potential impacts to commercial and industrial areas adjacent to rail corridor	• Potential impacts to commercial and industrial areas
Cemeteries, Schools, Places of Worship	• Potential impacts to cemeteries, schools, places of worship in communities adjacent to existing crossings and connecting roadways	• Potential impacts to cemeteries, schools, places of worship adjacent to rail corridor	• Potential impacts to cemeteries, schools, places of worship	• Potential impacts to cemeteries, schools, places of worship	• Potential impacts to cemeteries, schools, places of worship	• Potential impacts to cemeteries, schools, places of worship
Environmental Justice	• No impact	• Corridor includes areas where environmental justice must be considered	• Corridor includes areas where environmental justice must be considered	• Corridor includes areas where environmental justice must be considered	• Corridor does not include areas where environmental justice must be considered	• Corridor does not include areas where environmental justice must be considered
Landfills / Hazardous Waste Sites	• No impact	• Potential impact on gas, oil, and disposal wells • Potential impacts to contaminated sites	• Potential impact upon Malden Park (former landfill) • Potential impacts to oil, gas, or disposal wells • Potential impacts to contaminated sites	• Potential impact upon Malden Park (former landfill) • Potential impacts to contaminated sites	• Potential impacts to active landfill areas • Potential impacts to contaminated sites	• Potential impacts to contaminated sites

4.3 Conclusions of the Feasibility Assessment

The conclusions of the Feasibility Assessment can be summarized as follows:

- Each corridor permits at least one constructible road/river crossing alignment.
- All corridors contain alternatives that satisfy the need for added road capacity and options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings.
- The location of a route and connections to the freeway system determines the degree of benefits to the transportation network.
- All corridors include significant environmental constraints.
- The development and evaluation of specific alignments within the corridors is more appropriately conducted under the formal environmental study processes of Canada and the U.S.

All corridors will be brought forward into the Canadian and U.S. environmental approval processes. The rationale for this action is provided below.

This assessment has identified a number of benefits and impacts for each of the alternative corridors. Technically, it is feasible to construct a new crossing in each of the corridors identified, although the costs and effectiveness of each alternative does vary. Fundamentally, each alternative corridor provides for additional road capacity and provides options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings.

From a transportation benefit perspective, each corridor provides some benefits to the network by increasing capacity. However, each corridor benefits the network to differing degrees. The farther away a corridor is located from the existing crossings, the less local traffic it will attract because of increased travel time. An assessment of travel time, as well as the volume-to-capacity ratio under future traffic conditions was used to assess the degree of network improvement each corridor would provide.

A new crossing located in the South Crossing corridor would attract sufficient traffic from the Ambassador Bridge and Detroit-Windsor Tunnel to alleviate congestion at these two crossings until approximately 2030. After that time, the two existing crossings would experience congestion during peak periods, and additional improvements to the network would be required.

The Rail Corridor directly serves only international truck traffic and can provide one lane per direction across the river. This alternative in itself does not provide sufficient relief to the network to meet long-term travel demand. However, combined with other corridor options, this alternative may provide sufficient relief to the network to meet the travel demand needs to 2030 and beyond.

The East Crossing corridor does not attract sufficient traffic away from the existing crossings to alleviate congestion at these crossings. This would result in continued poor traffic operations at the existing crossings, while the East Crossing would be relatively under utilized. Combining this alternative with other corridor options, however, may provide a solution that meets the requirements of the network.

No corridor completely avoids the constraint areas identified by the Project Team. Specifically, all corridors result in some impacts to residential, commercial, and natural areas in the FAA.

The nature and extent of the impacts associated with each corridor varies, however impacts to social, cultural and natural features within each corridor can be avoided, minimized or mitigated to the extent possible. Selecting which alternatives are to be carried forward for further study based on the impacts of a new crossing within each corridor will require value judgements as to what features or degree of impacts are considered more important. These value judgements require input from the communities involved, as well as consideration of government legislation and policies as well as technical/environmental expertise.

It is recognized that, in deciding upon which alternatives are to be set aside and those that are to be brought forward for further study, the Partnership will be narrowing the range of alternatives to be considered under the environmental processes of both countries.

The significance of this decision is not to be understated; while necessary to provide for the free flow of people enjoying the social, cultural and commercial benefits of a cross-border region and to provide for the movement of goods on a strategic trade corridor, a new international transportation corridor will have long-lasting benefits and impacts to the Windsor/Essex County-Detroit/Wayne County area.

One objective of the P/NF Study was to identify the alternative(s) to be carried forward for study under the environmental approval processes. To achieve this objective, analysis and evaluation of the corridors would be required in accordance with environmental approval processes in both countries. Undertaking this work as part of the P/NF Study would require repeating a large part of this analysis and evaluation work once the formal environmental approvals processes were initiated.

Given the level of detail employed to date in identifying the range of corridors and the significance of any recommendations coming from the feasibility assessment, the most prudent way to give all feasible alternatives due consideration is to initiate the Canadian and U.S. environmental approval processes, which include formal opportunities for public participation and agency concurrence, and formalize the decision-making processes. This will accelerate the planning process for the implementation of a new crossing by avoiding the need to repeat the analysis and evaluation of alternative corridors. The corridors identified in the P/NF Study will be brought forward into the Canadian and U.S. environmental approval processes.

In the environmental study process, more information will be collected to assist in the generation and assessment of alternatives. The work included in this P/NF Study can serve as the basis for developing route alignments within and connecting between the Opportunity Corridors.

5. Potential Elements of the Recommended Strategy

The two Detroit-Windsor Crossings, namely the Ambassador Bridge and the Detroit-Windsor Tunnel, experience congestion today. This congestion can generally be attributed to inadequate resources (staffing and facilities) at border processing on one side of the border or the other and heightened security procedures, not a lack of roadway capacity on the bridge and tunnel. Additional resources are being implemented at the border crossings, however such improvements will not address the medium to long-term needs of the transportation network in the Detroit/Wayne County-Windsor/Essex County area. Specifically, such resources will not address the need to maintain the free flow of people and goods in this strategic trade corridor between Canada and the United States. Nor will such resources provide for sufficient roadway capacity to serve projected travel demand. Analysis of future travel demand identified a need for additional roadway capacity approaching the existing crossings within 5 years and a need for an additional river crossing in 10-15 years.

Travel demand management measures and encouragement of the use of other modes may marginally defer the need for a new crossing, but to provide options for maintaining the movement of people and goods in cases of disruptions to any of the existing border crossings in the transportation network and serve future travel demand, a new river crossing is required.

Based on the work completed on this P/NF Study, the potential elements of a strategy for managing the border crossing needs in the Detroit/Wayne County-Windsor/Essex County area were identified by the Consultant Team. This strategy, presented as advice to the Partnership, includes the following:

1. **Ensure sufficient border processing resources to serve travel demand at the crossings** – this element is required in all cases to ensure the border crossings are functioning efficiently; it includes ensuring staffing and facilities are adequate to serve travel demand, greater use of programs (such as NEXUS and FAST) and technologies, and other measures to reduce demands on border processing resources.
2. **Construct a new or expanded international crossing or crossings connecting the interstate freeway system in Michigan to the provincial highway system in Ontario** – a new crossing is required to add options for maintaining movement of goods to the network as well as provide the necessary capacity to meet future travel needs. Implementing a new crossing can take 8 to 10 years, including the time required for successful completion of environmental processes in Canada and the United States, as well as time to design and construct the new crossing. This element will also consider whether more than one crossing is to be pursued.
3. **Optimize the use of existing network in the short to medium-term** – Implementing a new crossing can require 8 to 10 years; in the meantime, implementing improvements and measures to optimize use of the existing network is required to reduce congestion and related impacts.

4. **Implement travel demand measures and encourage use of other modes to reduce travel demand on the transportation network** – on-going efforts to reduce road-based travel demand during peak travel periods will allow the transportation network to function more efficiently.

The following sections include discussion of potential improvements to address the short, medium and long-term needs of the transportation network.

5.1 Improvements to Border Processing

Border Processing Staffing (on-going)

Presently, the most limiting factor to increased throughput at the border has been identified as the staffing by the border inspection services (U.S. and Canadian Customs and Immigration). Demand has been shown to be predictable and if sufficient resources are available, the inspection services can be prepared for the peak demand periods. While adequate staffing levels will be an on-going need for border crossings, this need is particularly heightened in the short-term. Governments are taking steps to address this need. In the mid to long term, as new technologies are implemented and participation in NEXUS and FAST increases, the demand for additional staff may be more manageable.

- **Partnership agencies (TC, FHWA, MTO and MDOT) to liaise with border processing agencies to identify required staffing and implement technologies/ programs to achieve and maintain a reasonable processing rate under typical operating conditions to avoid queuing on the approach roadways as much as possible.**

Border Processing Facilities (0 – 5 years)

Inspection services require the physical facilities to process cross-border demands, with sufficient number of inspection lanes and booths and office/administrative space. In some cases, this will involve expansion of the queuing areas and plazas on either side of the border to ensure that sufficient capacity can be made available for inspection services and for access to and from the bridge plaza. Such plaza studies are underway at the Blue Water Bridge, Ambassador Bridge (U.S. plaza) and Detroit-Windsor Tunnel.

- **Continue to participate with current plaza studies at the Blue Water Bridge, Ambassador Bridge (U.S. plaza) and Detroit-Windsor Tunnel in partnership with the crossing operators and related government agencies to plan for future land and physical needs related to primary and secondary inspection and access to and egress from the plaza areas.**
- **Participate in similar planning study of Ambassador Bridge (Canadian plaza) with the bridge operator and border processing agencies to identify future access and border processing needs.**

Implement and encourage greater use of NEXUS / FAST and employ new systems to minimize processing time (0 – 5 years)

The NEXUS and FAST programs are designed to reduce processing times by border inspection services for passengers and trucks, respectively. Ensuring effective use of these programs and higher participation rates will require that users experience travel time and/or convenience benefits. This will require actions such as the provision of

exclusive lanes for NEXUS and FAST users to bypass other vehicles queuing for inspection, provisions of sufficient capacity at the NEXUS/FAST booths so that delays are reduced to a minimum, and other measures. Another strategy to encourage greater use of the programs may include providing reduced tolls for NEXUS/FAST users.

- **In coordination with the plaza studies noted above, examine strategies to increase NEXUS/FAST penetration among users, including strategies and infrastructure approaches to provide priority treatment to NEXUS/FAST users at the border. (For example, providing dedicated NEXUS/FAST lanes on Huron Church Road close to the bridge plaza for traffic streaming purposes.)**

Commercial Vehicle Processing Centre (0 – 5 years)

At present, 20 to 25% of trucks to the U.S. do not have complete documentation upon reaching the border, resulting in lengthy processing time for trucks and inefficiencies at both primary and secondary inspection areas. A Commercial Vehicle Processing Centre (CVPC) could improve truck flow into the United States by providing an off-site location for driver or brokers to enter and electronically transmit necessary shipping information in advance of the border. This would ensure that all documentation is complete upon arriving at primary inspection.

A CVPC could possibly serve as a staging point for trucks approaching the border; all international trucks could be held at the CVPC and released only as capacity becomes available. Efforts should build on CVPC experience at the Peace Bridge and the CVPC near London, operated by the Ambassador Bridge.

- **Undertake efforts in partnership with border processing agencies and crossing operators to assess the feasibility of processing centres to reduce processing times at the border;**
- **If the feasibility of processing centres is confirmed, proceed with studies to locate and implement a CVPC in the Windsor/Essex County area and in the Sarnia/Lambton County area.**

Partnership of Municipalities, Transportation and Border Processing Agencies (on-going)

It is recognized that transportation agencies, border processing agencies and border communities must continue to work closely together on transportation issues related to the border, including border processing facility and infrastructure needs and the implementation of programs/technologies (e.g. NEXUS/FAST, ITS) to ensure the efficient and secure movement of cross-border traffic. For example, the existing Windsor-Detroit Border Working Group could be broadened to include the city.

- **A bi-national border crossing committee consisting of municipalities, transportation, border processing and security agencies be established to liaise and coordinate the development and implementation of border crossing protocols and procedures which balance the need to maintain the flow of people and goods, with the need for appropriate security.**

5.2 New/Expanded International Crossing

Initiate Formal Environmental Processes for a New/Expanded Crossing (0 to 4 years)

A new or expanded river crossing and new or improved road connections between the interstate freeway system in Michigan and the provincial highway system in Ontario are the key elements of a long-term strategy for improvements to the transportation network. Implementing a new crossing is a lengthy process consisting of identifying and obtaining environmental approvals, as well as design and construction of the new crossing.

Therefore, the Partnership recommends moving forward with initiation of the formal environmental approval processes on both sides of the border, namely, the U.S. National Environmental Policy Act (NEPA), the Canadian Environmental Assessment Act (CEAA) and the Ontario Environmental Assessment Act (OEAA). Moving forward in this way will allow for the decision-making on the five alternative corridors to be conducted under a full and open public process.

The next steps in the process will be carried out in consultation with stakeholders and community groups. These steps include:

- Satisfying environmental assessment requirements of all four partners;
- Developing the framework for conducting the next stage in the NEPA/CEAA/OEAA process.
- Prepare a Terms of Reference for an Individual Environmental Assessment in accordance with OEAA.

The Partnership will continue looking for ways to accelerate the planning activities, without compromising opportunities for consultation or the environmental approval processes in the United States or Canada.

- **Continue planning for a new crossing in the Detroit-Windsor area including undertaking environmental studies. This process will identify the preferred location and type of new crossing. Once the environmental studies are completed and approved, the land may be reserved for the new crossing and its approaches and design and construction may proceed to meet needs for the medium and long term.**

5.3 Optimize Use of Existing Network

As the planning for a new crossing proceeds, improvements to the existing network will address the short- to medium-term need for improvements to the network to reduce congestion on this strategic trade corridor. On the U.S. side, proposed improvements to the plaza at the Ambassador Bridge will improve the connections with the interstate freeway system. On the Canadian side, the Governments of Canada and Ontario are considering short and medium-term solutions to improve the transportation network.

- **On the Canadian side, proceed with activities that will improve the capacity and operations of the existing network such as the proposals outlined in the Windsor Gateway Action Plan.**

- **On the U.S. side, proceed with activities leading to the implementation of the Ambassador Bridge Gateway Project as finalized by the U.S. federal and Michigan state governments.**

5.4 Travel Demand Management

Effective implementation of the following travel demand management measures will contribute to improved operations on the transportation network. However, these measures will not eliminate the need for a new crossing or short-term improvements. These elements represent sound transportation practices designed to ensure the road, rail, transit and marine facilities serving the travel demand in the FAA are utilized as efficiently as possible.

5.4.1. Road-based Travel Demand

Develop and Implement an intelligent transportation systems (ITS) strategy and Electronic Data Interchange (EDI) to improve traffic operations (0 – 5 years)

At present, the Detroit-Windsor Tunnel, the Ambassador Bridge and the Blue Water Bridge operate independently. Real-time 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 travelers in determining the time and route of travel. Real time regional traffic information can be used to distribute resources and manage/control traffic at crossings and assist in the staffing/allocation 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 other measures. Such information dissemination would not only use these diversion strategies but also might influence the timing of arrival at the border. Users could be alerted in advance of a substantial queue at one crossing, allowing diversion to another.

EDI systems would need to be upgraded to ensure users could take advantage of this information. For example, shipping documentation for a truck is sent in advance to a specific inspection facility to accelerate customs clearance, but this information presently cannot be transferred to another crossing facility if delays suggest use of another crossing.

- **Develop an ITS cross-border strategy and real-time information system, in collaboration with border processing agencies. This will include strategies to increase the efficiency and throughput at border crossings and development of a coordinating mechanism for the collection and dissemination of information among affected federal, state/provincial, and city agencies.**

Encourage use of Blue Water Bridge (on-going)

The Blue Water Bridge has reserve crossing capacity, but border processing capacity, particularly for US-bound trucks, is severely constrained. Once additional border processing capacity is added, additional international traffic, particularly truck traffic, could divert from the Detroit-Windsor crossings. MDOT and MTO are participating with operating agencies of the Blue Water Bridge in planning and implementing plaza and roadway improvements at this border crossing. These efforts must continue with the objective of implementing the improvements to the U.S. side as quickly as possible, and implementing the improvements on the Canadian side to meet traffic demand.

An ITS system capable of reporting on all the border crossings in Southeastern Michigan-Southwestern Ontario can assist in achieving effective diversion. Such a system will need to be integrated with the border processing clearance systems to enable routing of traffic to any crossing in the region.

- **Continue to support the planning efforts currently underway for improvements to plaza facilities at the Blue Water Bridge**
- **Incorporate the Blue Water area in the development of a regional ITS system.**

Education and information dissemination (on-going)

Many drivers arrive at the border without having knowledge of the documentation required to cross the border or of alternative routes and less congested times that might be available. Public information programs which could include improved signage, advertising, internet pages and other measures could provide this information to users.

- **Encourage and support appropriate agencies to develop a comprehensive education and public information program, building on current initiatives available by state, provincial, federal and bridge/tunnel operating authorities.**
- **Explore improvements to border crossing trail-blazing signage on both sides of the border to facilitate the movement of vehicles and increase driver awareness.**

5.4.2. Improvements To Rail Network

Encourage greater use of intermodal rail (5 – 10 years)

Both CN and CPR have introduced short distance (1,000 km or less) intermodal rail services in the corridor (currently between Montreal/Toronto and Detroit/Chicago). A number of measures could be employed to encourage the use of these services to divert freight traffic to the rail mode. Federal and provincial support for infrastructure road-based improvements could be used to encourage expansion of rail terminals, track capacity and/or rolling stock acquisition. An alternative approach could involve rebates on current railway fuel taxes (federal or provincial in Canada) either to the railway or to the shippers when intermodal services are used. For example, a rebate might be provided for every kilometer of truck travel diverted from highways to rail.

- **The federal, state and provincial governments, in partnership with rail operators, shippers and representatives of exporting industries, develop an intermodal rail strategy for Southwestern Ontario and Michigan,**

respectively, to assess its future role and identify strategies and initiatives to promote greater use.

Review and provide support to improvements of rail terminals (5 – 10 years)

The Detroit Intermodal Freight Terminal (DIFT) project is examining methods to improve the capacity and utilization of freight terminals within the Detroit area. This project could encourage the use of intermodal services across the border. Consideration should be given to studying the need for a new intermodal terminal(s) in Southwest Ontario for freight moving into the United States. Alternatively, improvements to terminals in Central Ontario might be considered.

- **The Canadian federal and provincial governments, in partnership with rail operators, shippers and representatives of exporting industries, pursue the potential need for a new intermodal terminal in Southwest Ontario and initiate study, as appropriate. This initiative can be a part of the intermodal rail strategy for southwestern Ontario identified above.**
- **The U.S. federal and state governments will continue to support the planning efforts of the DIFT project, to identify the appropriate intermodal strategy for the Detroit area as soon as possible.**

Encourage and support improvements to Inter-City Passenger Rail (0 – 10 years)

A substantial portion (approximately 80%) of passenger vehicles using the crossing in Windsor-Detroit involves local traffic between Windsor and Detroit, but there are also 20% longer distance passengers. Measures could be introduced to encourage the use of railway passenger services across the border, as currently there is no through passenger train service across the Detroit River and only one train per day across the St. Clair River. VIA Rail and Amtrak could be encouraged to develop new services to provide through cross-border services, diverting some passengers from automobile to inter-city train. Such an initiative could be part of the Mid-West Rail initiative, which is examining improvements in the Chicago-Detroit Corridor.

- **Encourage VIA Rail and Amtrak to pursue the development of new cross-border services through Windsor-Detroit.**
- **Encourage government agencies to consider funding to support infrastructure improvements to facilitate such services.**

5.4.3. Improvements To Transit Network

Encourage New/Improved Transit Services (on-going)

Currently, the only public transit available between Windsor and Detroit is the Tunnel Bus operated by Transit Windsor. A number of measures might encourage a shift to greater public transit use. Current levels of service for the tunnel bus are rather low and increased services might encourage more utilization. For example, many Windsor residents work at the hospital complex in downtown Detroit. A direct bus to the hospital complex could encourage greater public transit use for these commuters. Similarly other major origins and destinations in Detroit/Windsor might be linked with a better bus service.

Similar to the tunnel bus, a bus crossing Ambassador Bridge could provide connections between areas in Windsor and Detroit for local commuters and visitors. Alternative

public transit services could also include new privately operated systems, such as the proposed gondola system across the Detroit 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 or other measures.

- **Encourage and support D-DOT and Transit Windsor in the examination of possible enhancements to the existing tunnel bus service and the provision of new routes and services to serve other major destinations.**
- **Encourage private sector initiatives to provide alternative public transit services, with discussions and study, as appropriate, to determine feasibility.**

5.4.4. Improvements To Marine Services

Encourage Greater Use of Ferry services (0 – 5 years)

Currently, marine service has a relatively small role in the transportation network this area. There are possibilities to increase this role and divert passengers and commercial vehicles from the bridge and tunnel. Encouraging use of the ferry service and utilizing existing/excess capacity can provide immediate benefits to the transportation network.

- **Encourage ferry service operators to work directly with shippers (i.e. through reservations systems) to enhance ferry services.**
- **Encourage ferry service operators to work with local municipalities, province/states to improve access to the ferry terminals.**
- **Encourage private sector initiatives to develop/enhance ferry services to provide alternatives to road-based border crossings.**

Improvements to marine vessel services (5 – 10 years)

Governments should continue efforts to explore possible opportunities to promote short sea shipping as a means of helping alleviate highway congestion, facilitate trade and to improve utilization of waterway capacity. A review of the groundside accessibility to marine ports should be undertaken to identify necessary improvements.

- **Continue to pursue marine opportunities that cost-effectively reduce road-based cross-border demand, as appropriate (e.g. short sea shipping and roll-on/roll-off ferry services.**
- **Undertake a strategic review of groundside access to major ports to identify any required improvements to accessibility and identify other potential sites that may fit accessibility criteria.**

5.5 Summary

The following table (see Table 5.1) summarizes the potential elements for a 30-year strategy to address the medium and long-term needs of the transportation network in southeastern Michigan – southwestern Ontario. These elements were presented for comment at the second round of public consultation in June 2003. Comments received have been considered and incorporated where appropriate in the Planning/Need and Feasibility Study.

The government partners should each consider the potential elements of the recommended strategy and initiate the appropriate programs/funding reviews necessary to implement these elements. Where appropriate, cooperation among the Partners shall be formalized in an effort to continue a comprehensive and consistent approach to cross-border transportation issues and solutions along the U.S./Canadian border.

TABLE 5.1: POTENTIAL ELEMENTS OF A 30-YEAR STRATEGY FOR IMPROVEMENTS TO THE TRANSPORTATION NETWORK IN SOUTHEASTERN MICHIGAN-SOUTHWESTERN ONTARIO

Element	Timeframe	Issues/Challenges
IMPROVEMENTS TO BORDER PROCESSING		
Border Processing Staffing	On-going	Improvements to border processing are not in the direct control of the Partnership; the involvement of the Partnership on border processing improvements is limited to participation and liaison with border processing initiatives. Nevertheless, improvements to border processing are a key element of the 30-year strategy for improvements to the transportation network and must be pursued.
Border Processing Facilities	0 – 5 years	
Implement and encourage greater use of NEXUS / FAST and employ new systems to minimize processing time	0 – 5 years	
Commercial Vehicle Processing Centre	0 – 5 years	
Partnership of Municipalities, Transportation and Border Processing Agencies	on-going	
NEW/EXPANDED INTERNATIONAL CROSSING		
Initiate Formal Environmental Processes for a New or Expanded International Crossing	0 to 4 years	The selection of a preferred location for a new or expanded international crossing will follow environmental processes in both Canada and the U.S. These processes will require up to 4 years to complete. Once completed, design and construction of the new or expanded international crossing can proceed. In September 2002, DRTP filed a Notice of Intent to make application to the Canadian Transportation Agency for approval to construct the Canadian portion of the project. DRTP is preparing an environmental assessment in accordance with the Canadian Environmental Assessment Act.
OPTIMIZE USE OF EXISTING NETWORK		
On the Canadian side, proceed with activities that will improve the capacity and operations of the existing network, e.g. Windsor Gateway Action Plan.	0-5 years	Short-term improvements should not preclude the consideration of alternatives for the long-term needs of the network. Implementing the short-term improvements may require environmental approvals prior to their implementation. Any such approvals processes should be initiated as soon as possible to enable timely implementation of any solutions.
On the U.S. side, implement the Ambassador Bridge Gateway Project as finalized by the U.S. federal and Michigan state governments (construction has been initiated on this project).	0-5 years	

TABLE 5.1: POTENTIAL ELEMENTS OF A 30-YEAR STRATEGY FOR IMPROVEMENTS TO THE TRANSPORTATION NETWORK IN SOUTHEASTERN MICHIGAN-SOUTHWESTERN ONTARIO CONTINUED

Element	Timeframe	Issues/Challenges
TRAVEL DEMAND MANAGEMENT		
Develop and Implement an intelligent transportation systems (ITS) strategy and Electronic Data Interchange (EDI) to improve traffic operations	0 – 5 years	This improvement can benefit both the road network and border processing. Implementation of ITS and EDI should proceed as quickly as possible. Consistency between Canadian and U.S. systems is required.
Encourage use of Blue Water Bridge	on-going	Planning is underway for improvements to the bridge plazas in both Canada and the U.S. These improvements, once implemented, will increase the effectiveness of this crossing; in the meantime, encouraging use of this crossing will also depend on the flexibility of border processes to enable truckers to choose which crossing (Ambassador Bridge or Blue Water Bridge) to use; presently, this choice is restricted by the border processing systems now in use.
Education and information dissemination	on-going	An on-going, dependable and widely available means of providing information on the border crossing conditions may help distribute peak traffic flows more evenly among the crossings; Consistency in the collection and dissemination of the data in Canada and the U.S. is preferred.
Encourage greater use of intermodal rail	5 – 10 years	Improvements to rail services and facilities may improve utilization of the transportation network but will not reduce the need for a new crossing and other road-based improvements.
Encourage and provide support to improvements of rail terminals	5 – 10 years	
Encourage and support improvements to Inter-City Passenger Rail	0 – 10 years	
Encourage new/improved Transit Services	on-going	New/improved transit services and facilities may improve utilization of the transportation network but will not reduce the need for a new crossing and other road-based improvements.
Encourage greater use of Ferry services	0 – 5 years	New/improved marine services and facilities may improve utilization of the transportation network but will not reduce the need for a new crossing and other road-based improvements.
Encourage improvements to marine vessel services	5 – 10 years	