ENTERPRISE Transportation Pooled Fund Study TPF-5 (231)

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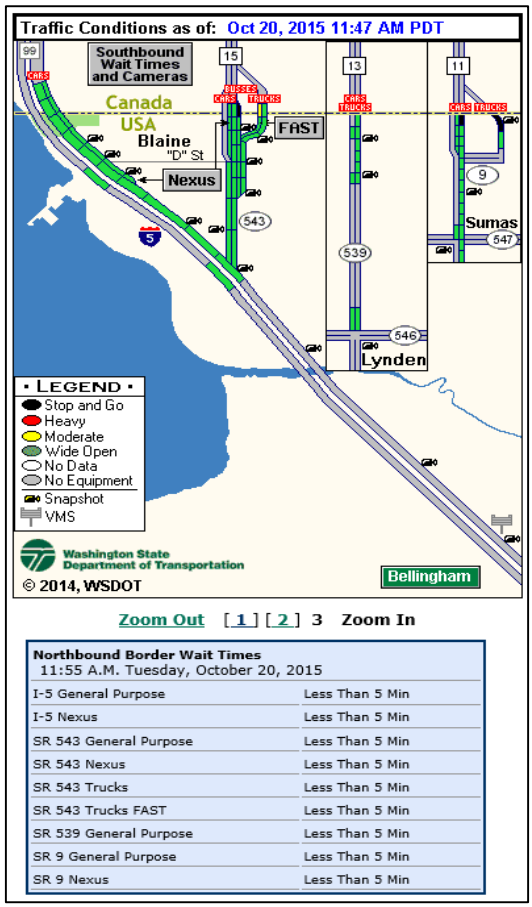

Performance Measures and Reporting for International Border Crossings

FINAL REPORT

Prepared by

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16. Abstract There are several international borders shared among the ENTERPRISE Pooled Fund Study members (Washington State Department of Transportation, Minnesota Department of Transportation, Michigan Department of Transportation, Ministry of Transportation Ontario, and Texas Department of Transportation). These agencies had a shared interest in learning the roles, practices, and technologies for managing traffic in relation to performance measures at international border crossings. To accomplish the objectives of the project, an online search of organizations involved with managing border crossings was conducted. A summary of the current status of U.S. national goal areas were also documented related to border crossings. ENTERPRISE members' roles in and practices with performance management at international border crossings were explored. Online research and interviews were conducted to document ENTERPRISE members' performance management roles, practices, and needs at border crossings including how they currently interact with federal agencies and other entities that deal with transportation management at borders. This also included investigating ITS technologies, such as wait time measurement systems and traveler information mechanisms, used for performance management at border crossings. In addition, coordination opportunities to share project findings with border crossing organizations were identified and documented.			
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The photo on the cover page of this report is a screenshot from Washington State DOT's Canadian Border Traffic web page (http://www.wsdot.com/traffic/border/default.aspx).

Project Champion

Dennis Tessarolo and Mike Barnet, Ministry of Transportation Ontario, were the ENTERPRISE Project Champions for this effort. The Project Champions serve as the overall lead for the project.

Members

The ENTERPRISE Board consists of a representative from each of the following member entities of the program.

- Federal Highway Administration
- Georgia Department of Transportation
- Illinois Department of Transportation
- Iowa Department of Transportation
- Kansas Department of Transportation
- Michigan Department of Transportation
- Ministry of Transportation Ontario
- Minnesota Department of Transportation
- Oklahoma Department of Transportation
- Pennsylvania Department of Transportation
- Texas Department of Transportation
- Transport Canada
- Washington State Department of Transportation

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1.0 Introduction

Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in July 2012, has created a surface transportation program with additional emphasis on performance-based measures. MAP-21 calls for U.S. states to establish performance goals and then report to the Federal Highway Administration (FHWA) on progress towards meeting these performance measures. The United States Department of Transportation (USDOT) has issued several notices of proposed rulemaking that will eventually lead to specific requirements for agencies to measure and report on their performance in the national goals areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and project delivery.

Although notices of proposed rulemaking have not yet been issued for system performance and freight movement, these national goal areas may have implications for performance at international border crossings. In addition to security and safety interests, border crossing wait times are a strong focal point for commercial, passenger, and pedestrian traffic.

There are several international borders shared among the ENTERPRISE members (Washington State Department of Transportation, Minnesota Department of Transportation, Michigan Department of Transportation, Ministry of Transportation Ontario, and Texas Department of Transportation). These agencies had a shared interest in learning the roles, practices, and technologies for managing traffic in relation to performance measures at international border crossings.

The purpose of this project "Performance Measures and Reporting for International Border Crossings" was to:

- *Identify the current aspects of the transportation performance that are monitored at border crossings;*
- *Determine what and how wait time measurement technologies are used to support performance management at border crossings; and*
- *Investigate opportunities for ENTERPRISE to share information about this project's findings with other entities to enhance future interactions.*

To accomplish the objectives of the project, an online search of organizations involved with managing border crossings was conducted. A summary of the current status of U.S. national goal areas were also documented related to border crossings. ENTERPRISE members' roles in and practices with performance management at international border crossings were explored. Online research and interviews were conducted to document ENTERPRISE members' performance management roles, practices, and needs at border crossings including how they currently interact with federal agencies and other entities that deal with transportation management at borders. This also included investigating Intelligent Transportation System (ITS) technologies, such as wait time measurement systems and traveler information mechanisms, used for performance management at border crossings.

Potential opportunities for ENTERPRISE to engage with border organizations on activities related to performance management and technologies at borders were also documented. These engagements were noted as opportunities to share the ENTERPRISE members' roles, practices and wait time

measurement technologies available to manage transportation at border crossings. The purpose of this coordination was to continue working with the federal organizations managing border crossings with Mexico, the United States, and Canada. In addition, funding opportunities for wait time technology deployments were documented.

This report includes:

- Section 2.0 Performance Measures Related to Border Crossings – Summarizes U.S. national goal areas of system performance and freight movement and their potential relevance to performance at border crossings. ENTERPRISE members' documented performance measures that are most related to international border crossings are also included.
- Section 3.0 Border Crossing Organizations – Identifies national organizations (e.g. agencies, working groups) that are involved with managing international border crossings and the key coordination activities of these organizations.
- Section 4.0 Roles, Practices, and Wait Time Measurement Technologies – Provides an overview of the ENTERPRISE member's highway border crossings, agency roles and practices related to performance measurement, and relevant technologies.
- Section 5.0 Border Protection and Border Services Wait Times and Coordination – Provides an overview of the U.S. Customs and Border Protection (CBP) and the Canada Border Services Agency (CBSA) regarding how wait times are determined and displayed to the public, as well as activities conducted to monitor and manage performance.
- Section 6.0 Coordination Opportunities – Identifies outreach coordination opportunities with DOTs and federal organizations to share roles, practices and the wait time measurement technologies available to manage transportation at border crossings.
- Section 7.0 Summary – Provides an overall summary of the national and Department of Transportation (DOT) role with performance measures at international borders, wait measurement technologies used to support performance measures, and coordination opportunities with federal organizations.

2.0 Performance Measures Related to International Border Crossings

This section includes a review of U.S. performance measures relevant to international border crossings as well as performance measures of individual ENTERPRISE member states relevant to international border crossings.

2.1 U.S. Performance Measures

MAP-21 that was signed into law in July 2012, creates a streamlined and performance-based surface transportation program and builds on many highway, transit, bike, and pedestrian programs. Performance Management Notices of Proposed Rulemaking (NPRM)[1] have been issued for:

- Safety;
- Highway Safety Improvement Program;
- Planning; and
- Pavement and Bridge Condition.

Future notices of proposed rulemaking will include:

- Asset management;
- System performance;
- Traffic congestion;
- On-road mobile source emissions; and
- Freight movement.

There are a number of Transportation Performance Management (TPM) resources[2] that are available to support national performance goals as the notice of proposed rule making process moves forward. Resources include presentations and webinars as well as a TPM Digest that highlights new reports, case studies, events, and the NPRM process.

ENTERPRISE anticipates that the future proposed rulemakings for **system performance and freight movement** may be most relevant to international border crossings. This section includes a summary of performance measures related to border crossings, even if they have only been informally identified prior to the official notices of proposed rulemaking.

American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Performance Management

AASHTO had an opportunity to comment on FHWA's rulemaking process on national performance measures. In order to provide a single source of comments, a task force was created to assist the AASHTO Subcommittee on Performance Management (SCOPM). The task force focused on developing a limited number of national performance measures to help prepare AASHTO members to meet new federal performance management requirements.

On November 9, 2012 the AASHTO SCOPM Task Force on Performance Measure Development, Coordination, and Reporting produced SCOPM Task Force Findings on National-Level Performance Measures[3]. The document includes a recommended list of national-level performance measures on six

areas (safety, pavement condition, bridges, freight, system performance, and congestion mitigations and air quality). For each performance measure area additional information was provided including a detailed definition and an example of how to use the performance measure. Of the six areas focused on by the task force, the **freight and system performance** areas are related to international border crossings or may be applicable as performance goals are identified nationally. Performance measures identified for freight and system performance, signified as "Freight System Performance" and "Highway System Performance," are defined in **Table 1** below.

Table 1: Freight and System Performance - Performance Measures

Area	Performance Measure		Definition
Freight System Performance	Delay	Annual Hours of Truck Delay (AHTD)	Travel time above the congestion thresholds in units of vehicle-hours for Trucks on the Interstate Highway System.
	Reliability	Truck Reliability Index (RI_{80})	The RI is defined as the ratio of the total truck travel time needed to ensure on-time arrival to the agency-determined threshold travel time (e.g. observed travel time or preferred travel time).
Highway System Performance	Delay	Annual Hours of Delay (AHD)	Travel time above a congestion threshold (defined by State DOTs and MPOs) in units of vehicle-hours of delay on Interstate and NHS corridors.
	Reliability	Reliability Index (RI_{80})	The RI is defined as the ratio of the 80th percentile travel time to the agency-determined threshold travel time.

Throughout the document the task force does not dictate a specific number or range for thresholds or targets; instead the document notes support of flexibility with individual State Department of Transportations and Metropolitan Planning Organization's (MPOs) setting targets and thresholds for performance measures.

A subgroup of the SCOPM Task Force produced SCOPM Task Force Findings on MAP-21 Performance Measure Target-Setting[4] in March 2013. The document provides additional guidance on target-setting related to national-level performance measures including an overview of target-setting from the perspective of state DOTs, task force findings and recommendations on target-setting to inform FHWA, and updates to the earlier recommendations from the SCOPM Task Force on national-level performance measures regarding target-setting.

Under the freight performance measure area for target-setting there is reference to international borders indicating that targets could be set at major international border crossings for delay and reliability; however, a specific number or range is not provided for a target goal.

While the expected U.S. national performance goals, as measured by delay and reliability, could be transferred to international border crossings, these national goals do not specifically set forth metrics for border crossings. It is also important to note that transportation agencies do not have control over

delay at border crossings as this is a function of the border patrol operations (i.e. dependent upon the amount of time it takes for vehicles to proceed though the security and customs processes), and therefore most transportation agencies do not set any performance or target goals at borders. These agencies, however, may provide a variety of traffic management operations at high volume borders such as posting border wait times, communicating incident information, and providing advanced alerts to vehicles approaching slowing or stopped traffic queues.

2.2 ENTERPRISE Members Performance Measures

For this section of the report, an online search was conducted of ENTERPRISE member agency websites to identify existing performance measures at international border crossings. ENTERPRISE agencies with an international border include Washington State DOT, Minnesota DOT, Michigan DOT, Texas DOT, and the Ontario Ministry of Transportation.

The table below provides an overview of ENTERPRISE agencies' documented performance measures that are most related to international border crossings. Related measures chosen for inclusion in this table include those that measure efficiency, delay, or freight movement performance even if they do not specifically measure performance at international border crossings. These were chosen as "related" due to an emphasis on overall delay and commercial vehicle delay as focus areas of performance measurement stemming from anticipated U.S. Federal Rulemaking in response to MAP-21 legislation.

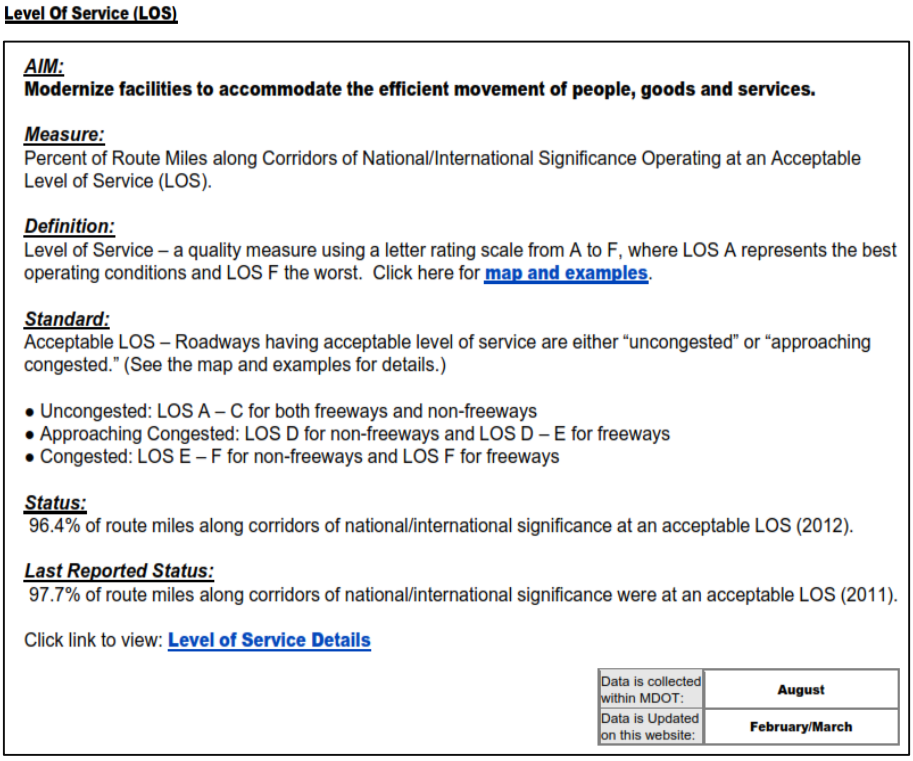
Table 2: Related ENTERPRISE Agency Performance Measures

ENTERPRISE Agency	Performance Measures Documentation	Related Measure(s)
Texas DOT	Preliminary MAP-21 Texas Transportation System Performance Results[5]	**Freight**: • **Hours of Delay:** The time it takes to travel a given roadway minus how long it would take at the posted speed limit if there were no interference or congestion. • **Truck Reliability Index**: The ratio of the 80th percentile travel time to the free-flow travel time. **National Highway System Performance:** • **Hours of Delay:** The time it takes to travel a given roadway minus how long it would take at the posted speed limit if there were no interference or congestion. • **Reliability Index:** The ratio of the 80th percentile travel time to the free-flow travel time. ***NOTE**: These measures match those suggested for MAP-21 Rulemaking.*

Washington DOT	The Gray Notebook - Quarter ending June 30, 2015[6] The 2015 Corridor Capacity Report[7]	**Trucks, Goods, and Freight:** Number of Freight Trucks crossing the Canadian border (into WA from Canada) **Mobility:** Annual (weekday) vehicle hours of delay statewide at maximum throughput speeds. ***NOTE**: WSDOT is awaiting MAP-21 Rulemaking before publishing measures for "System Performance" and "National Freight Movement Program."* **Congestion:** • Annual hours of per person delay on state highways • Total vehicle hours of delay • Cost of delay
Minnesota DOT	2014 MnDOT Annual Minnesota Transportation Performance Report[8]	**Interregional Corridor (IRC) Travel Speed:** Percentage of system miles performing more than 2 mph below target speed.
Michigan DOT	Michigan DOT 2014 System Performance Measures Report[9]	**Level of Service (LOS):** Percentage of route miles along corridors of national/international significance operating at an acceptable level of service. See **Figure 1**.
Ontario Ministry of Transportation	No related measures identified	

As shown in **Table 2** above, many agencies' performance measures resemble those that are likely to emerge from federal rulemaking in response to MAP-21 legislation. Other measures were developed internally within the agency prior to MAP-21. Highlights from review of performance measures documentation include:

- Related measures include hours of delay, truck reliability index, corridor delay, interregional corridor travel speeds, level of service, and number of freight trucks.
- Washington State DOT tracks the number of freight trucks crossing the Canadian border into Washington. For this measure, WSDOT's Gray Notebook - Quarter ending June 30, 2015[6] reports an observed upward trend since 2009 and an increase of 3.3% from 2013 to 2014.
- Michigan DOT has a measure that acknowledges the importance of efficient transport of people, goods, and services along corridors of international significance. The agency measures "Percent of Route Miles along Corridors of National/International Significance Operating at an Acceptable Level of Service (LOS)." **Figure 1** shows an excerpt from the Michigan DOT 2014 System Performance Measures Report[9] which further defines this measure and its status.



Level Of Service (LOS)

AIM:
Modernize facilities to accommodate the efficient movement of people, goods and services.

Measure:
Percent of Route Miles along Corridors of National/International Significance Operating at an Acceptable Level of Service (LOS).

Definition:
Level of Service – a quality measure using a letter rating scale from A to F, where LOS A represents the best operating conditions and LOS F the worst. Click here for **map and examples**.

Standard:
Acceptable LOS – Roadways having acceptable level of service are either "uncongested" or "approaching congested." (See the map and examples for details.)

- Uncongested: LOS A – C for both freeways and non-freeways
- Approaching Congested: LOS D for non-freeways and LOS D – E for freeways
- Congested: LOS E – F for non-freeways and LOS F for freeways

Status:
96.4% of route miles along corridors of national/international significance at an acceptable LOS (2012).

Last Reported Status:
97.7% of route miles along corridors of national/international significance were at an acceptable LOS (2011).

Click link to view: **Level of Service Details**

Data is collected within MDOT:	**August**
Data is Updated on this website:	**February/March**

Figure 1: Performance Measure for LOS along Corridors of National/ International Significance
Source: Michigan DOT 2014 System Performance Measures Report[9]

Review of ENTERPRISE members' performance measures documents indicated very few published metrics specific to international border crossings. Metrics such as delay, reliability, and level of service, which are commonly measured for specific corridors or on a statewide basis, are not measured at borders. Washington DOT's performance measures documentation does reference a metric for the number of freight trucks crossing the Canadian border into Washington and other states may be collecting similar data for planning purposes. However, traffic operations metrics (e.g. delay, reliability, congestion) at border crossings were not found to be measured and monitored. The following sections of this report investigated agency roles at border crossings to reveal why these traffic operations metrics are not typically indicators of performance for the state and provincial transportation agencies that operate highways approaching border crossings.

Delay, reliability, and Level of Service which are commonly measured are not measured at borders.

3.0 Border Crossing Organizations

An online search was conducted to identify organizations (e.g. agencies, working groups) that are involved with managing border crossings. This section includes a summary of the organizations that were identified as well as key coordination activities among these organizations.

3.1 Border Planning and Coordination

The United States, Canada, and Mexico operate entities within their transportation agencies to facilitate the planning and coordination of transportation at border crossings. The United States Department of Transportation's FHWA Border Planning[10] function (within the Office of Planning, Environment and Realty) is the agency's hub for planning and coordination at international borders. Transport Canada's Highway and Border Policy Branch[11] focuses on borders and transportation-related infrastructure and serves as the agency's point of contact for border coordination. The Mexico Secretariat of Communications and Transportation is Mexico's national federal entity that regulates commercial road traffic and broadcasting.

The following working groups have been formed through partnerships among these agencies to coordinate specifically on infrastructure, policy, and research at borders. Similar information on each organization was documented including the purpose of the organization, the tools or resources they provide, and a summary of the work they conduct. In addition, the organization's role in performance tracking and measurement was documented. See **Table 3 - Table 7.**

- U.S./Mexico Joint Working Committee on Transportation Planning
- The Canada-United States Transportation Border Working Group
- Eastern Border Transportation Coalition
- Niagara International Transportation Technology Coalition
- Whatcom Council of Governments - International Mobility and Trade Corridor Program

Table 3: U.S./Mexico Joint Working Committee on Transportation Planning

Organization	**U.S.-Mexico Joint Working Committee on Transportation Planning**[12] *https://www.borderplanning.fhwa.dot.gov/mexico.asp*
Purpose	Promotes effective communication concerning transportation planning between U.S. - Mexico Border States and works to develop a well-coordinated land transportation planning process along the border. Among other efforts, the JWC works to: • Establish methods and procedures to analyze current and future transportation infrastructure needs; • Evaluate transportation demand and infrastructure impacts resulting from future changes in land transportation traffic.
Meetings	JWC meets twice per year. Subcommittees meet and teleconference throughout the year to conduct studies.
Online Tools/ Support Resources	• Border Crossing Information System (BCIS)[13] – Provides expected wait times and expected crossing times (real-time and archived data). Developed as an effort to establish a baseline and ongoing measurement of border wait times. • Maps[14] – Static maps of border regions, major ports, airports, and railroads.

Role in Performance Tracking/ Management	Crossing and wait times for motor vehicles are key indicators of transportation system performance. JWC provides a collection of resources to measure and monitor wait times.
Work Plan	The JWC 2013-2015 Work Plan[15] includes 14 Projects. Four projects are focused on wait times (Border Wait Times Studies, Wait Time Integration, Wait Time Peer Exchange Roundtable[16], Analysis of How to Use and Disseminate Wait Time Data) and two of the projects have an ITS focus (Border ITS Standards Coordination and Transportation Modeling & ITS Capacity Building).
MOU's	• MOU[17] signed in April 1994 that established the JWC • MOU[18] signed in October 2000 to reinforce the working relationship developed over the years and provide direction to the JWC

Table 4: The Canada-United States Transportation Border Working Group

Organization	**The Canada-United States Transportation Border Working Group**[19] *http://www.thetbwg.org/index_e.htm*
Purpose	Facilitate the safe, secure, efficient, and environmentally responsible movement of people and goods across the Canada-U.S. border.
Meetings	TBWG meets twice annually and subcommittees meet throughout the year. There are four subcommittees including a Technology Subcommittee[20].
Online Tools/ Support Resources	• Border Crossing Database[21] (BCD) – includes archived data of traffic volumes at ports • Interactive Border Map[22] – provides information such as border crossing locations, approach roads, and hours of operation • Border Infrastructure Flow Architecture[23] (BIFA) – helps guide inclusion of ITS and other technology into projects • Semi-Annual Newsletter[24] – includes recent and archived TBWG newsletters
Role in Performance Tracking/ Management	TBWG provides a database that contains archived data on traffic volumes at ports.
Action Plan	An Action Plan[25] is developed annually to guide the efforts of the subcommittees.
Memorandum of Cooperation	Memorandum of Cooperation[26] was signed in October 2000. TBWG was formed in 2001. Following is an excerpt related to performance measures and ITS. *The Department of Transportation of the United States of America and Transport Canada intend to enhance collaboration and cooperation on:* • *IV. The development of an ITS architecture for North America which includes common data elements and a common border architecture, intermodal freight architecture, and commercial vehicle architecture; and the use of this architecture to guide deployment of interoperable strategic ITS applications along the border;* • *V. The development of North American standards for intelligent transportation systems which focus on priorities of mutual interest and avoid duplicative efforts*

Table 5: Eastern Border Transportation Coalition

Organization	Eastern Border Transportation Coalition[27] *http://ebtc.info/*
Purpose	EBTC is a non-profit organization dedicated to improving the movement of people and goods between Canada and the United States. EBTC members are the transportation agencies of the Canadian provinces of New Brunswick, Nova Scotia, Ontario, and Quebec and the U.S. states of Maine, Michigan, New York, and Vermont.
Meetings	EBTC members meet annually.
Resources	• Border Resources/Links[28] – includes links to a variety of border enforcement agencies, border coalitions and organizations, trade policy, and other resources.

2015 Issue Priorities	• EBTC developed a Recommendations for Action Plan[29] that includes near and longer term recommendations in 2015.
	• 2015 Issue Priorities
	  • Beyond the Border Issue Paper[30]
	  • Information Needs Issue Paper[31]
	  • Improving Rail Passenger Service Issue Paper[32]
	  • Federal Funding Issue Paper[33]

Table 6: Niagara International Transportation Technology Coalition

Organization	Niagara International Transportation Technology Coalition[34] *http://www.nittec.org/*
Purpose	NITTEC is a coalition of agencies in western New York and southern Ontario designed to assist motorists in reaching their destinations safely and efficiently by providing real-time traffic and roadway information. NITTEC improves traffic flows and enhances emergency assistance for motorists on the regional, bi-national, and multi-modal transportation network including 4 international border crossings.
Meetings	NITTEC members meet annually. NITTEC's 8 committees meet regularly to establish and execute work plans that meet the committee mandates.
Online Tools/ Support Resources	• Traffic Map[35] showing border wait times, roadway traffic speeds, incidents, and construction for the Niagara area • Live Camera View[36] of international bridges and major roadways • Travel Advisories[37] on construction, incidents, congestion, and weather as well as dynamic message sign communications • NITTEC mobile app[38] – provides real-time travel information; available at app stores • Personalized Alert System[39] – provides customized, real-time travel information through text messages, email, or the NITTEC mobile app • 2014 Annual Report[40] - highlights Regional ITS Architecture and Regional Statistics for Traveler Information, Border Crossing Mobility, Incident Management, and Traffic Operations for 2013
Role in Performance Tracking/ Management	• Collect data and report on performance measures identified by Regional Concept for Transportation Operations (RCTO) • Collaborate with the regional Metropolitan Planning Organization, Greater Buffalo Niagara Regional Transportation Council (GBNRTC), and the University at Buffalo in measuring regional delay and develop reports on the effectiveness ITS and operations

Table 7: Whatcom Council of Governments - International Mobility and Trade Corridor Program

Organization	Whatcom Council City of Governments – International Mobility and Trade Corridor Program[41] *http://wcog.org/programs/imtc/*
Purpose	IMTC, a U.S.-Canada coalition, identifies and promotes mobility improvements and border crossing security at 4 border crossings connecting Whatcom County in Washington to the lower mainland of British Columbia.
Meetings	IMTC's Core Group of more than 50 business and government agencies meets twice each year. The Steering Committee is part of the Core Group and meets monthly to work at a more detailed level. The General Assembly, consisting of over 200 border businesses, agencies, and organizations, meets periodically to receive information and provide feedback on border policies and operations.
Resources	2015 IMTC Resource Manual[42] – includes information on border crossings such as border wait times, border metrics, annual and monthly cross border volumes by vehicle type, and freight value by mode and commodity
Role in Performance Tracking/ Management	IMTC provides an archived database of passenger and commercial vehicle wait times and volumes.
2015 Project Priorities	• IMTC participates in construction, operations, ITS, and research projects and maintains a list of future projects. • Current projects that are underway include Dynamic Border Management[43] and Commercial Vehicle Operations Border Evaluation Studies[44]. • Border-related projects completed in 2014 include Border Data Warehouses[45], Sumas Dynamic Routing Signage[46], and Passenger Intercept Surveys[47]. • Unfunded future projects are presented in the IMTC 2015 Project Priorities[48].

3.2 Border Protection/Safety

The United States and Canada operate border agencies that protect ports of entry. These agencies also focus on different aspects of border wait times to move commercial, passenger vehicle, and pedestrian traffic through each port of entry. For a brief summary of the following agencies see **Table 8** and **Table 9**.

- U.S.-Customs and Border Protection (CBP) – Border Wait Times
- Canada Border Services Agency (CBSA) – Border Wait Times

Table 8: U.S.-Customs and Border Protection - Border Wait Times

Organization	U.S.-Customs and Border Protection – Border Wait Times[49] *http://bwt.cbp.gov/index.html*
Purpose	Provide border wait times at ports of entry for Canada and Mexico for commercial vehicles, passenger vehicles, and pedestrians.
Online Tools/ Support Resources	• Border Wait Times Website[49] – provides delay in minutes for a specified time of day (not real time).

Role in Performance Tracking/ Management	Processing Goals at the Primary Inspection Booth CBP has set for travelers are: • NEXUS Lanes (pre-screened, low risk travelers are processed with little or no delay): 15 minutes • Ready Lanes (primary vehicle lanes for travelers with RFID-enabled travel documents): 50% of general traffic lane wait times

Table 9: Canada Border Services Agency - Border Wait Times

Organization	Canada Border Services Agency – Border Wait Times[50] *http://www.cbsa-asfc.gc.ca/bwt-taf/menu-eng.html#_s1*
Purpose	Provides current and forecasted border wait times.
Online Tools/ Support Resources	Border Wait Times[50] • Forecasted Border Wait Times – provides border wait times quarterly based on statistical analysis of past traffic volumes and wait times. • Current Border Wait Times – provides border wait times that are updated at least once an hour. Other websites for border wait times[50] – a listing of other websites that provide border wait times. Twitter[51] – accounts for each port of entry, making it easier for users to receive updates. Border wait time is checked every 15 minutes, CBSA only tweets if there is a change in the wait time.
Role in Performance Tracking/ Management	Service Standards – The estimated wait times for travelers reaching the primary inspection booth, the first point of contact with CBSA when crossing the Canada/U.S. land border. • 10 minutes on weekdays (Monday to Thursday) • 20 minutes on weekends and holidays (Friday, Saturday, Sunday, and holidays)

3.3 Key Coordination Activities Related to Border Wait Times

Measuring wait times at international borders is a critical activity for tracking performance related to delay and reliability. As such, this section highlights a number of key national coordination activities related to border wait times. These activities are primarily led and coordinated by the agencies and organizations described in Section 3.1 and Section 3.2.

U.S.-Canada Coordination:

1) Beyond the Border Action Plan and Infrastructure Investment Plan

In 2011, Canada Prime Minister Harper and U.S. President Obama created a Beyond the Border Declaration[52], announcing a shared vision that set out priorities for perimeter security and economic competitiveness at U.S.-Canadian borders. The Beyond the Border Action Plan[53], released in December 2011, outlines steps to implement this shared vision. A key commitment in the Action Plan was to "implement a border wait time measurement system at mutually determined high-priority Canada-United States land border crossings." Canada and the U.S. agreed to implement these systems at the top 20 high priority Canada-U.S. land border crossings.

Driven by the Beyond the Border declaration and action plan, the Border Infrastructure Investment Plan Canada-United States December 2014[54] establishes a specific infrastructure investment direction at 25 major border crossings and features detailed profiles for each of the 25 major ports of entry as determined by the top 20 crossings for two-way trade and the top 15 crossings based on two-way, non-commercial traffic volume. In particular, the plan includes information on intelligent transportation systems (ITS) projects that impact processing capacity for major crossings. Examples include border wait time measurement technology, traffic management centers, and Advance Traveler Information Systems (ATIS).

2) Regional Roundtable Discussions on Border Wait Time Measurement Solutions

Transport Canada and the USDOT FHWA are hosting Regional Roundtable Discussions on Border Wait Time Measurement Solutions. These roundtables, conducted in a webinar format, were created to forward the commitment to install border wait time measurement systems at the top 20 crossings under the Beyond the Border Action Plan. The purpose of the roundtable discussions is to harmonize efforts on both sides of the border to move forward with deploying wait time solutions at crossings, and to offer education and technical assistance in the development of these solutions.

3) Border Crossing Database

The Border Crossing Database[21], created through an initiative of the Canada-United States Transportation Border Working Group, provides an online searchable mechanism to obtain archived traffic volume data at ports.

U.S.-Mexico Coordination:

1) Regional Border Master Plans

The U.S.-Mexico Joint Working Committee on Transportation Planning is creating a compilation of Regional Border Master Plans[55] with a comprehensive and prioritized assessment of transportation needs along the border including at the Ports of Entry (POE). While these border master plans are broad in nature, the plans contain some initiatives related to performance measurement. For example, the Arizona-Senora Border Master Plan[56] identifies a next step that indicates "ADOT should work with the General Services Administration, Customs and Border Protection, Federal Highway Administration, and their counterparts in Mexico to obtain comprehensive wait time statistics, by travel mode, for each of the nine Land Ports of Entry."

2) Border Crossing Information System

The Border Crossing Information System[13] provides expected wait times and expected crossing times (real-time and archived data). The database was developed as an effort to establish a baseline and ongoing measurement of border wait times.

Canada-U.S.-Mexico Coordination:

1) December 2014 Canada - U.S. - Mexico Border Wait Time Peer Exchange

A tri-national (Canada, United States, and Mexico) peer exchange on border wait times was held in Phoenix, Arizona on December 9-10, 2014. The peer exchange was co-hosted by the U.S.-Mexico Joint Working Committee on Transportation Planning and the U.S.-Canada Transportation Border Working Group. Representatives from organizations in Canada, Mexico, and the U.S. convened to discuss "border wait time," the time that a traveler must wait in order to cross an international border from one country to another. The purpose of the exchange was to help Federal agencies, State and Provincial departments of transportation, local planning organizations, bridge authorities, and other organizations understand the approaches and tools for collecting and using data on border wait time to improve outcomes and achieve performance goals and targets.

The Canada - U.S. - Mexico Border Wait Time Peer Exchange Summary Report[16] documents the event, including technologies used to collect traffic information (advantages/disadvantages), current and emerging hardware technologies, various projects and systems for measuring and communicating wait times, data storage and mining, and lessons learned that can help to inform future efforts.

At the conclusion of the exchange, participants identified key needs and next steps for research and voted on their respective importance. The top needs included the following (with needs most relevant to performance measures/reporting indicated in bold text):

- Accurate, reliable, and complete data on border wait time, including origin and destination data;
- **Common set of metrics, definitions, techniques, and performance measures;**
- Holistic approaches to managing and reducing border wait time;
- **Best practices for disseminating data to the public;**
- Coordination and partnerships; and,
- Agency commitments to use border wait time data to inform decision-making and direct policy.

4.0 Roles, Practices, and Wait Time Measurement Technologies

As noted in Section 1.0, the ENTERPRISE member agencies that operate highways at international border crossings are Washington State DOT, Minnesota DOT, Michigan DOT, Ontario Ministry of Transportation, and Texas DOT. In addition to these ENTERPRISE agencies, Arizona DOT is included in this section of the report to document practices for at least two states that border Mexico (Texas and Arizona). See **Figure 2** below.

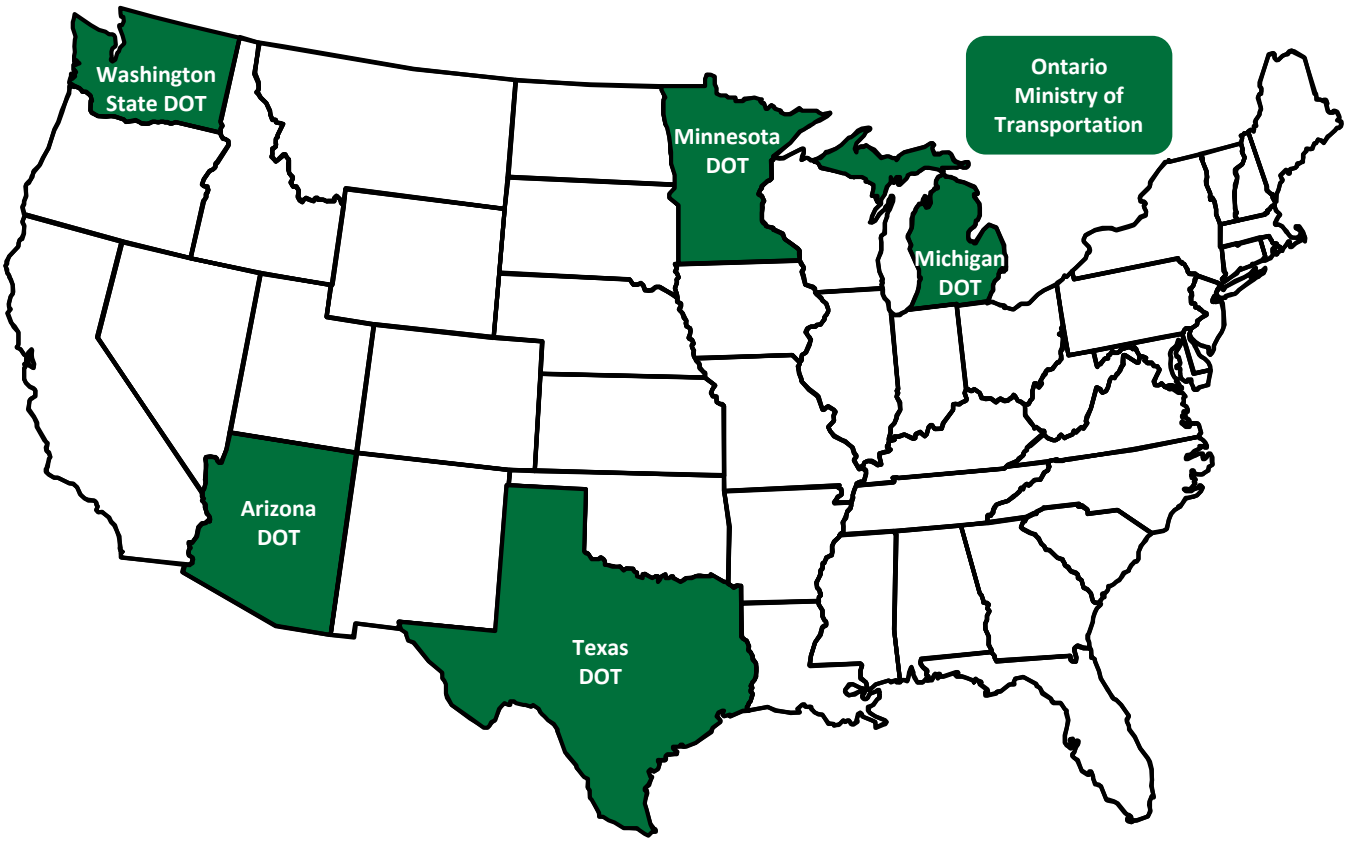


Figure 2: International Highway Border Crossings Practices Documented

This section provides an overview of each of these agencies' international highway border crossings, agency roles and practices related to performance measurement, and relevant technologies. Information in this section was gathered primarily through online research. Additional details were collected during interviews with agency representatives involved with managing traffic operations and technology deployments approaching border crossings.

Transportation agencies typically do not monitor or manage performance for the purpose of setting targets to improve throughput of vehicles across borders.

It is important to note that, consistent with findings documented in Section 2.0, agency representatives confirmed that their transportation agencies typically do not monitor or manage performance for the purpose of setting targets to improve throughput of vehicles across borders. This is because traffic delay approaching crossings is primarily a

function of border patrol operations (i.e. dependent upon the amount of time it takes for vehicles to proceed though the security and customs processes) which are not managed by transportation agencies. Instead, many transportation agencies opt to collect and share data to provide motorists with information to assist with route and time of travel decisions at border crossings. Information available to motorists often includes estimated border wait times posted to roadside Dynamic Message Signs (DMS) and/or traveler information websites, 511 phone, or mobile apps. As such, the ITS technologies included in this section primarily include wait time measurement systems and traveler information systems operated by transportation agencies as briefly described below:

Many transportation agencies opt to collect and share data to provide motorists with information to assist with route and time of travel decisions at border crossings.

- **Wait Time Measurement Systems** – *ITS systems that use traffic detection devices and algorithms to estimate the amount of time vehicles approaching a border crossing can expect to "wait" before crossing the border, at any given time.* Though the exact measurement limits vary from site to site, wait time is typically measured from the end of the traffic queue approaching the crossing to the booth where border patrol operations begin. **Figure 3** shows a diagram of the commercial vehicle inspection process at a U.S. land port of entry from Mexico, with the U.S. Customs and Border Patrol wait time designated as shown. Though this diagram shows a commercial vehicle process, a similar queue and wait time can be experienced by passenger vehicles.

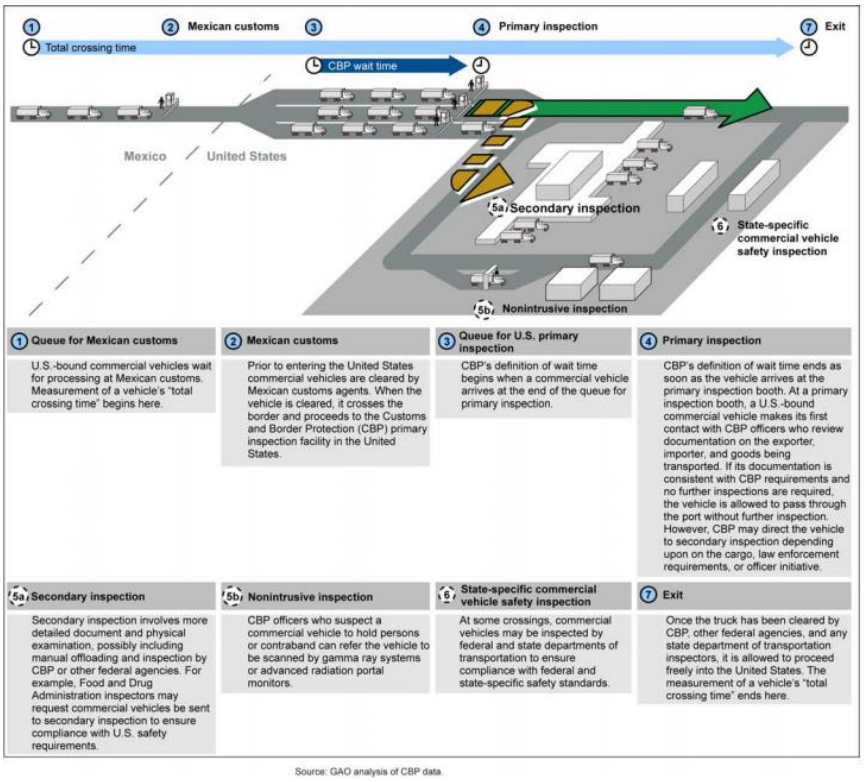


Figure 3: Commercial Vehicle Inspection Process at a Land Port of Entry
Source: U.S.-MEXICO BORDER CBP Action Needed to Improve Wait Time Data and Measure Outcomes of Trade Facilitation Efforts[57]

- **Traveler Information Mechanisms** – *Devices and systems that provide wait times and other relevant information to motorists, to assist with pre-trip or en-route decision making.* These devices and systems can include roadside dynamic message signs that display current wait times or traveler information systems such as agency 511 phone and websites or mobile apps that display current and historical wait time data. **Figure 4** shows border delays for international crossings that connect British Columbia, Canada to Washington State.

Figure 4: Dynamic Message Sign Showing Border Delays
Source: IBI Group "Cross-Border ATIS Expansion" project website[58]

The following sections provide a summary of the roles, practices, and wait time measurement systems at international border crossings for transportation agencies reviewed for this project. Information documented in these sections was gathered from an online search as well as from phone interviews with representatives from the agencies.

- Section 4.1 Arizona Department of Transportation
- Section 4.2 Michigan Department of Transportation
- Section 4.3 Minnesota Department of Transportation
- Section 4.4 Ontario Ministry of Transportation
- Section 4.5 Texas Department of Transportation
- Section 4.6 Washington State Department of Transportation

4.1 Arizona Department of Transportation

This section includes information on international border crossings between Arizona and Mexico. Additional information includes the DOT role at these border crossings, measurement technologies, performance monitoring, and cross border coordination.

To document information regarding international border crossings in Arizona, a number of online resources were reviewed and a phone interview with Rudy Perez from Arizona DOT was conducted.

4.1.1 Border Crossings

Arizona shares its southern border with Mexico and has 9 land ports of entry: San Luis I, San Luis II, Lukeville, Sasabe, Nogales-Mariposa, Nogales-DeConcini, Nogales-Morley, Naco, and Douglas as shown in **Figure 5.**

Figure 5: Arizona Border Crossings
Source: USDOT Border Crossing/Entry Data[59]

Table 10 below shows the number of personal vehicles, trucks, and buses crossing the border by location. Nogales and San Luis each have 2 border crossings for vehicles and the published volumes include vehicle counts for both crossings in each city.

Table 10: 2014 Port Crossing Volumes[60] – Arizona

Port Name	Personal Vehicles	Trucks	Buses	Total
Nogales	3,286,532	312,010	9,423	**3,607,965**
San Luis	3,028,042	31,968	36	**3,060,046**
Douglas	1,571,929	33,104	2,267	**1,607,300**
Lukeville	316,429	68	498	**316,995**
Naco	298,368	3,601	12	**301,981**
Sasabe	17,551	0	0	**17,551**

Arizona currently relies on U.S. Customs and Border Protection to provide crossing volumes at all the Arizona-Mexico border crossings. Border crossing wait times are compiled by CBP through manual observations of the queue, estimating wait times from the end of the queue to the CBP primary inspection booth, and surveying travelers crossing the border regarding their wait time. Information is collected, analyzed, and shared on the CBP website[49] website for the following crossings:

- **San Luis I**
  The San Luis I border crossing is located between Highway 95 in San Luis, Arizona and Calle 1 in San Luis Rio Colorado, Sonora in Mexico.

- **San Luis II**
  Located 5 miles east of the San Luis I border crossing, San Luis II is the port of entry for the Yuma area and a designated commercial super crossing with 3 commercial lanes.

- **Lukeville**
  The Lukeville border crossing is located on Arizona Highway 85 near Lukeville and Mexico's Highway 8 which leads into Sonoyta, Mexico. Many U.S. tourists use this crossing to visit one of Mexico's beaches.

- **Nogales-Mariposa**
  The Nogales-Mariposa border crossing is located between Nogales, Arizona and Nogales, Sonora, Mexico. This border crossing is one of the busiest ports of entry in the United States, handling both passenger and commercial vehicles. To accommodate the large vehicle volumes using this crossing, an expansion increased the crossing to 12 northbound primary lanes for passenger vehicles including Secure Electronic Network for Travelers Rapid Inspection (SENTRI) Ready Lanes. Eight primary commercial lanes with dedicated Free and Secure Trade (FAST) lanes were also added as well as a dedicated bus processing lane and pedestrian lanes where none previously existed. SENTRI lanes expedite wait times into the United States at southern land border ports of entry by allowing pre-screened, low risk travelers to use dedicated primary lanes. FAST lanes expedite wait times at border crossings for commercial vehicles carrying low-risk shipments by clearing truck drivers from the U.S., Canada, and Mexico who have completed background checks and meet eligibility requirements.

- **Nogales-DeConcini**
  Nogales has a second border crossing, Nogales-DeConcini, located on Grand Avenue in Nogales. It utilizes Ready Lanes to expedite crossing times for SENTRI. Ready Lanes are dedicated primary vehicle lanes for vehicles entering the United States with RFID-enabled devices including trusted travel cards such as SENTRI.

- **Naco**
  The Naco border crossing connects Arizona Highway 92 in Naco, Arizona to Mexico Highway 2 at Naco, Sonora. This port of entry handles passenger vehicles and limited commercial traffic.

- **Douglas**
  The Douglas border crossing connects Douglas, Arizona to Agua Prieta, Sonora in Mexico. This is Arizona's easternmost border crossing and has Ready Lanes available.

4.1.2 Measurement Technologies

Wait times at 4 of Arizona's borders crossings including San Luis I, Nogales-Mariposa, Nogales-DeConcini, and Douglas will soon be available using WiFi technology to collect data from vehicles. The crossings were studied and ranked based on need. Installations are scheduled to begin in early 2016 at both Nogales crossings, then at the Douglas crossing, followed by San Luis I. Wait time data based on the new WiFi system will be available to motorists through the U.S. Customs and Border Protection CBP website once the installation is complete and reliable data is available.

In addition to the WiFi system, Radio-frequency Identification (RFID) technology to measure border wait times for commercial traffic with existing RFID tags is being installed from the end of the queue to the CBP primary inspection booth at the Nogales-Mariposa border crossing. When the project is complete, four RFID readers will collect data that can be segmented to provide the desired information. The location of the first reader is at Aduana, Mexican Customs, located 8 miles from the U.S.-Mexico border. The second reader is near the anticipated end of the queue; however, the second reader is being replaced at a new location, approximately .5-mile south of U.S. Customs and Border Protection Primary Inspection. A third RFID reader is in-place at the CBP primary inspection station, and the fourth reader will collect data as vehicles exit the Arizona DOT rapid inspection lanes into Arizona. The system is scheduled to be operational in 2016.

In 2016, Arizona DOT will have near real time (within 7-10 seconds) and archived data (in 15 minute intervals) for both privately owned and commercial vehicles using WiFi at 4 ports of entry as well as for commercial vehicles using RFID technology at the Nogales-Mariposa border crossing. To share border wait times and border crossing times, Texas Transportation Institute is creating a web-based tool for Arizona DOT to store real-time and historical data by mode and type in a Border Crossing Information System (BCIS) similar to the system Texas DOT is using. An example of the type of information Arizona DOT will store in the Border Crossing Information System is shown in **Figure 6.**

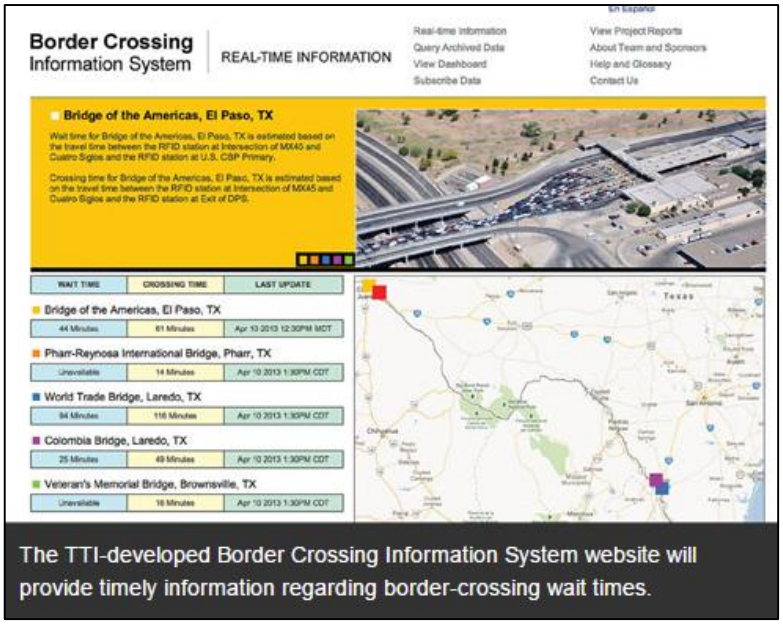


Figure 6: Example data from Texas Border Crossing Information System Proposal
Source: [Texas A&M Transportation Institute Using RFID Readers to Measure Wait Times at the U.S.-Mexico Border][61]

Once border crossing wait time data is collected and analyzed, Arizona DOT will use DMS, smartphone apps, 511 phone, and other mechanisms to communicate the information. Currently, AZ511 phone is being used on highways connecting to the POE but not at the border. Video is being used on I-19 in Nogales and camera images are available from state routes in San Luis and Douglas, however, neither camera images nor video are available at the border.

4.1.3 Performance Monitoring and DOT Role

Performance management for DOTs at border crossings is limited as DOTs have no control over CBP or U.S. Department of Agriculture inspection processes. Arizona DOT would, however, have some control over state-led processes such as safety inspections and can use wait time data to evaluate and improve those processes and ADOT operations.

Arizona DOT collaborates with CBP on border crossing issues and has a good working relationship with both the Tucson CBP field office and the ports of entry. Wait time data is used by CBP to make staffing decisions for peak days, times, and seasons as well as for identifying the correct staffing balance between commercial and passenger lanes. CBP is concerned with border wait time, the time it takes a vehicle to travel from the end of the queue to CBP's primary inspection booth, but state DOTs may want to know the border crossing time, the time it takes a vehicle to complete the entire process from the end of the queue to exiting the inspection facility.

FHWA has a goal for state DOTs to use technology to collect, analyze, and share data gathered at the U.S.-Mexico border for both privately owned and commercial vehicles as well as for pedestrians and bicyclists by 2016. This is consistent with Arizona DOT's goal is to track performance at its borders by implementing technology to collect, analyze, and share data with transportation planners, travelers, or anyone with internet access and an interest.

Wait time data will be accessible through a web-based tool that will include near real time data, time stamps, and a map as well as monthly, weekly, daily, and hourly historical data. This will allow travelers to view their options regarding when and where to cross the border. Once Arizona DOT begins collecting wait time data, CBP is expected to transition away from their manual collection of wait times and instead rely on the automated data for posting on the CBP website. Arizona DOT's role monitoring traffic situations at border crossings will include collecting real time data and disseminating information to travelers through multiple means such as variable message signs, smart phones, and AZ511.

Arizona DOT is also working with their communications department to use social media in addition to as many other options as possible to share the archived data with transportation planners and the trucking industry for planning purposes. Current wait time information could be used to divert traffic between the two Nogales sites or between San Luis I and San Luis II with some operational changes including making San Luis II multi-modal by allowing personal vehicles to cross at San Luis II. If a WiFi system is implemented in Naco, traffic could also potentially be diverted between Douglas and Naco due to their close proximity.

Future considerations for monitoring wait times may include reviewing the RFID and WiFi systems on an ongoing basis and asking stakeholders and the border crossing community for a periodic evaluation to verify that the right technology is being used, determine whether the equipment is installed at the appropriate locations, and identify any changes that need to be made in order to improve the process.

4.1.4 Cross Border Coordination

Arizona DOT participates in the U.S.-Mexico Joint Working Committee on Transportation Planning, a working group of transportation professionals from 10 border states as well as U.S. and Mexico federal agencies. JWC has coordinated border wait time studies with Mexico's Secretariat of Communications and Transportation and the UDOT FHWA. A representative from Arizona DOT attends JWC meetings to coordinate on binational bridge groups and ports of entry from a national level. As mentioned above, Arizona DOT also collaborates with CBP on border crossing issues and has a good working relationship with both the Tucson CBP field office and the ports of entry.

4.2 Michigan Department of Transportation

This section includes information on the border crossings between the State of Michigan and Ontario, Canada. Additional information includes the DOT role at these border crossings, measurement technologies, performance monitoring, and cross border coordination.

To document this information regarding international border crossings in Michigan a number of online resources were reviewed. In addition, a phone interview with Michele Mueller from Michigan DOT was conducted.

4.2.1 Border Crossings

Michigan borders Ontario on the north and east. There are 4 border crossings between Michigan in the United States and Ontario in Canada as shown in **Figure 7.**

The number of personal vehicles, trucks, and buses varies from crossing to crossing as shown in the table below. Note that the Detroit crossing volumes include vehicle volumes from both the Ambassador Bridge and the Detroit-Windsor Tunnel.

Figure 7: Michigan Border Crossings
Source: Transportation Border Working Group – Border Map - Michigan[62]

Table 11: 2014 Port Crossing Volumes[60] **– Michigan**

Port Name	Personal Vehicles	Trucks	Buses	Total
Detroit (Ambassador Bridge and Detroit-Windsor Tunnel)	4,027,427	1,554,152	21,247	**5,602,826**
Port Huron (Blue Water Bridge)	1,975,750	778,268	2,958	**2,756,976**
Sault Ste. Marie	941,615	38,932	3,761	**984,308**

Wait times for all of Michigan's border crossings with Ontario are estimated and published on the U.S. Customs and Border Protection website. These crossings include:

- **Blue Water Bridge (Port Huron, MI)**
  Located at the southern end of Lake Huron, the Blue Water Bridge crosses the St. Clair River and links I-69 and I-94 in Port Huron, Michigan on the west with Canadian Highway 402 in Sarnia/Point Edward, Ontario on the east. The bridge is constructed in 2 spans, one for eastbound traffic and one for westbound traffic. Each span has 3 lanes of traffic. NEXUS and FAST lanes are available at the crossing for prescreened travelers entering the U.S. or Canada. NEXUS lanes expedite wait times into the United States at northern land border ports of entry

by allowing pre-screened, low risk travelers to use dedicated primary lanes. There are 13 primary inspection lanes on the U.S. side and 18 primary inspection lanes on the Canadian side.

- **Ambassador Bridge (Detroit, MI)**
  The Ambassador Bridge is a 4-lane undivided suspension bridge between Detroit, Michigan and Windsor, Ontario. It is jointly owned and operated by the Detroit International Bridge Company (DIBC) and Canadian Transit Company (CTC). The Ambassador Bridge connects U.S. I-75 and I-96 with Ontario Highway 401 and Huron Church Road. There are 32 U.S. primary inspection lanes and 29 primary inspection lanes in Canada. NEXUS and FAST lanes are available in both directions.

- **Detroit-Windsor Tunnel**
  The Detroit-Windsor Tunnel connects Detroit, Michigan with Windsor, Ontario. The tunnel is owned by the City of Detroit and the City of Windsor and is operated under contract by the Detroit-Windsor Tunnel LLC. The crossing has 1 travel lane in each direction and can be accessed through Michigan Highway 10 in the U.S. and Goyeau Street in Canada. Height limitations dictate that only autos and smaller commercial vehicles use the crossing. Each side of the crossing uses 11 primary inspection lanes. NEXUS lanes are available in both directions and a FAST lane is available on the Canada side.

- **Sault Ste. Marie**
  The Sault Ste. Marie International Bridge serves Sault Ste. Marie, Michigan and Sault Ste. Marie, Ontario. It is the only vehicular border crossing within 300 miles and connects U.S. I-75 with Huron Street in Ontario over the St. Mary River. The crossing utilizes 5 primary inspection lanes for vehicles entering the U.S. and 7 primary inspection lanes for passenger and commercial vehicles entering Canada. The Canadian portion of the bridge is owned by the Federal Bridge Corporation Ltd. (FBCL) and the U.S. half of the bridge is owned by the Michigan DOT. FBCL and MDOT created the St. Mary's River Bridge Company (SMRBC) as a separate legal entity to manage bridge operations. The Sault Ste. Marie International Bridge border crossing is FAST equipped and has NEXUS lanes available during limited hours.

4.2.2 Measurement Technologies

The Blue Water Bridge border crossing incorporates a hybrid system using Bluetooth and loop detectors to measure wait times for passenger vehicles and commercial traffic. This hybrid wait time measurement system detects wait times from the end of the queue to the arrival at the primary inspection booth. Wait time data is collected, validated with visual observations, and stored for weekly review to check for accuracy, identify areas of concern, and make adjustments to the system. Though data is not currently available to the traveling public, both Michigan DOT and Ontario's Ministry of Transportation (MTO) are comfortable with the quality of the wait time data and plans are underway to move into the next project phase that will install roadside DMS to communicate wait time information that differentiates between personal and commercial vehicles. Once this occurs, CBP and CBSA will use the data stream to replace their current manual counts.

The Michigan DOT and the Ontario Ministry of Transportation are evaluating whether the additional cost of a hybrid system was beneficial at this crossing. Bluetooth data alone seems to be sufficient for predicting wait times but they are still learning. One challenge for the Blue Water Bridge system was that construction occurred under separate contracts for the U.S. and Canadian sides. Information and lessons learned from the Blue Water Bridge border crossing will be considered during future studies at the Detroit Tunnel, Ambassador Bridge, and Sault Ste. Marie International Bridge to determine the feasibility of similar systems at these locations. Collecting RFID wait time data between Detroit, MI and Windsor, ON at the Ambassador Bridge is also being considered.

4.2.3 Performance Monitoring and DOT Role

The level of active monitoring at border crossings varies greatly. Michigan DOT acknowledges that CBSA has jurisdiction at the crossing but MDOT has the responsibility to move traffic as fast and efficiently as possible including communicating information to commercial and passenger vehicles about crossing delays.

Delays at Michigan's border crossings impact motorists but there are limited crossing options. Therefore, reporting wait times is more useful as a planning tool to allow motorists to schedule the day and time for their trips across the border or to communicate bigger issues such as weather than it is for rerouting traffic. With information on border wait times, however, commercial drivers can make decisions about whether to cross the border if they are nearing the end of their daily driving limit or motorists can determine which side of the border is a better option to stop for a meal based on their personal needs.

Michigan DOT retains staff in the Blue Water Bridge Operations Center which is part of a larger Operations Center in Detroit. The Blue Water Bridge Operations Center focuses on the mobility of traffic and communicating information to travelers. Michigan DOT provides and maintains technology on the U.S. side of the crossing, performs visual checks to confirm Bluetooth data, and monitors construction impacts on the bridge although past construction has not seemed to affect wait time data. Michigan DOT has some tolling control to move traffic faster by adding operators and toll booths, but the customs process is controlled by CBSA.

Michigan DOT utilizes performance targets in the areas it has control over such as monitoring the traffic data and communicating that information to motorists. Data currently being used to evaluate performance targets includes monitoring traffic backup by using a visual reference point to estimate wait time. This is a manual process that helps with traffic management by monitoring events such as incidents or construction. Though wait times are not currently posted, MDOT plans to post traveler wait times using Dynamic Message Signs once the new system data is confirmed.

By the end of 2015, Michigan DOT expects to disseminate information on wait times collected at the Blue Water Bridge through a mobile app. An iPhone app, separate from Michigan DOT's MiDrive app that communicates traffic and construction information to motorists, has already been created and the android app is nearing the end of development. In time, information from the Border Wait Time System will be pushed to MiDrive to expand the audience.

4.2.4 Cross Border Coordination

Michigan DOT shares information regarding border crossings with USDOT, Transport Canada, international bridge boards, cities in nearby geographic areas, CBP, and CBSA. They also assist stakeholders on specific issues such as facilitating commercial vehicles with paperwork to reroute and cross the border at a different border crossing.

Michigan DOT has a good working relationship with MTO and cities near the international border and they collaborate on border crossing projects and traffic issues related to the border crossing. As needs arise, stakeholders meet to resolve issues.

Michigan DOT also participates in the Canada-United States Transportation Border Working Group led by Transport Canada and USDOT.

4.3 Minnesota Department of Transportation

This section includes information on the border crossings between Minnesota in the U.S. and Ontario and Manitoba in Canada. Additional information provided includes the DOT role at or near these border crossings and cross border coordination.

To document information regarding international border crossings in Minnesota a number of online resources were reviewed. Additionally, phone interviews were conducted with Bryan Anderson, Joseph McKinnon, and Darren Laesch from Minnesota DOT.

Figure 8: Minnesota Border Crossings
Source: Transportation Border Working Group – Border Map - Minnesota[63]

4.3.1 Border Crossings

Minnesota's northern border is shared with Ontario and Manitoba in Canada. Minnesota has 4 highway points of entry into Manitoba and 3 highway points of entry into Ontario as shown in **Figure 8.**

Due to the lower volume of passenger vehicles and trucks at border crossings as shown in the table below, there is not a need to provide border wait times to travelers.

Table 12: 2014 Port Crossings Volumes[60] - Minnesota

Port Name	Personal Vehicles	Trucks	Buses	Total
International Falls	511,600	16,528	257	**528,385**
Grand Portage	324,896	16,460	1,325	**342,681**
Baudette	171,583	6,268	44	**177,895**
Warroad	142,242	8,729	414	**151,385**
Roseau	46,235	8,805	0	**55,040**
Lancaster	35,657	5,496	42	**41,195**
Pinecreek	5,811	643	0	**6,454**

However, since projects at Minnesota's most heavily traveled border crossings require coordination with Canada, some information regarding these crossings and examples of border-related traffic situations are included in this report.

- **International Falls**
  The International Falls border crossing connects U.S. Highways 53 and 71 in International Falls, Minnesota with Ontario Highway 71 in Fort Frances, Ontario. The bridge at this crossing crosses the Rainy River and is a private toll bridge that is jointly owned by Boise Cascade and Abitibi

Consolidated. This crossing is the busiest crossing in Minnesota and is used primarily by local residents and vacationers. The bridge is FAST equipped and includes NEXUS lanes in both directions.

- **Baudette**
  The Rainy River International Bridge at the Baudette border crossing connects Minnesota Highway 72 with Ontario Highway 11. The crossing uses RFID technology and is FAST and NEXUS equipped. Local personal vehicles and vacationers are the primary users at this crossing.

- **Warroad**
  This rural border crossing connects Warroad, Minnesota on Minnesota Highway 313 to Sprague, Manitoba on Manitoba Highway 12.

- **Grand Portage**
  Minnesota Highway 61 is a scenic highway that follows the north shore of Lake Superior and crosses the Pigeon River into Canada at Grand Portage, Minnesota, becoming Ontario Highway 61.

4.3.2 Measurement Technologies

No automated wait time systems are in place at Minnesota's border crossings due to low crossing volumes, however, during peak periods motorists may still experience a delay. For example, seasonal delays due to Ontario's fishing opener or summer tourism may occur but this information is largely based on personal experience and not reported formally as it is rare to have long wait times. CBP uses visual observations at the International Falls crossing to estimate vehicle wait times and posts estimated crossing delays on the CBP website.

4.3.3 Performance Monitoring and DOT Role

Minnesota border crossings have good traffic flow so Minnesota DOT district personnel only receive annual feedback regarding wait times at border crossings. Since typically there is no delay at the borders, there is not a need for automated wait time systems, increasing traffic management, or adding lanes at the border. Of greater importance for one northern Minnesota community are delays caused by freight trains that cross the U.S.-Canada border at Ranier, Minnesota. The Ranier railroad bridge handles more rail cars than any other rail border crossing between the U.S. and Canada.

Ranier, a small town of under 200 residents, is located east of International Falls, Minnesota on the Canadian National Railway (CN) mainline. As many as 22 trains of up to 2 miles each cross the border at Ranier every day. Each time a train crosses the border it must stop to change to a train crew residing in the country they are entering. Although legally a train can only block a rail crossing for 10 minutes, freight trains have been observed blocking access roads for residents and emergency vehicles for up to 2 hours while they wait at the border crossing to complete the inspection process. Minnesota DOT is addressing the situation by constructing a new road to reroute traffic during the times Ranier's Main Street rail crossings are blocked. Minnesota DOT is also studying the feasibility of building an overpass for emergency vehicles and posting signs on the TH 11 system to notify motorists of blocked rail crossings, however, some residents will continue to have only one access road option and are impeded

from traveling to or from their home when that road is obstructed by a train. In addition, CN Railway is attempting to improve border crossing efficiency in Ranier by adding track capacity and equipment to reduce the time rail crossings on local roads are blocked during the CBP inspection of freight rail cars.

Another border crossing issue that requires Minnesota DOT's involvement is the Warroad crossing. CBP built their Warroad inspection facility approximately 1-mile south of the border, however, there is a road north of the border station that can sometimes force local residents to travel through U.S. Customs unnecessarily. Minnesota DOT receives feedback from the public on this border crossing infrastructure issue and continues to work with the border station to implement solutions for local motorists.

4.4.4 Cross Border Coordination

Minnesota DOT interacts with other entities on border projects including collaborating with the Ontario Ministry of Transportation on international bridge replacement projects. The Baudette International Bridge project is a joint agreement between Minnesota and Ontario that is in the pre-design phase to address the environmental impacts, public involvement, and location for replacing the bridge at the border crossing. Traffic volumes at this crossing are low, the inspection facilities are fairly new, and the current alignment and number of lanes leading up to the border crossing are sufficient so the bridge replacement will not include any infrastructure redesign and will place the new bridge on the existing bridge alignment. As the project lead, Minnesota will hire and manage the project consultant and MTO will serve as part of the management team. Bridge funding will be 50-50 between the U. S. and Canada. Though Minnesota DOT's first contact with MTO for this project was in 2010, construction of the new international bridge is not scheduled to begin until 2018.

Additional Minnesota DOT involvement at border crossings includes maintenance of the roadways into and out of the border crossing inspection facility. Minnesota DOT maintenance supervisors have a good working relationship with the U.S. Port Director to address issues such as plowing and road maintenance at border crossings; the Port Director addresses any issues with Canadian officials.

One area Minnesota DOT identified as a potential area to partner with Canada on future issues near the border was in detouring traffic across the border. Minnesota DOT district personnel cited instances where a 100-mile detour on Minnesota roads could be reduced to a 10-mile detour if travelers were allowed to drive into and out of Canada while a Minnesota road was under construction. Currently, Minnesota DOT avoids detours that cross the border and extend into Canada because it is challenging to have a contractor on highway projects place traffic control signs in Canada.

4.4 Ontario Ministry of Transportation

This section includes information on border crossings with existing, proposed, or future potential for automated wait time systems between Ontario and the U.S. states of Michigan and New York. Additional information identifying the transportation agency role at these border crossings, measurement technologies, performance monitoring, and cross border coordination is also included.

To document this information regarding international border crossings in Ontario a number of online resources were reviewed. In addition, a phone interview was conducted with Mike Barnet from the Ontario Ministry of Transportation.

4.4.1 Border Crossings

Ontario shares its southern international border with the United States including 3 land border crossings with Minnesota, 4 with Michigan, and 7 with New York as shown in the figures below.

Figure 9: Ontario Border Crossings
Source: [Transportation Border Working Group – Border Map - Ontario](#)[64]

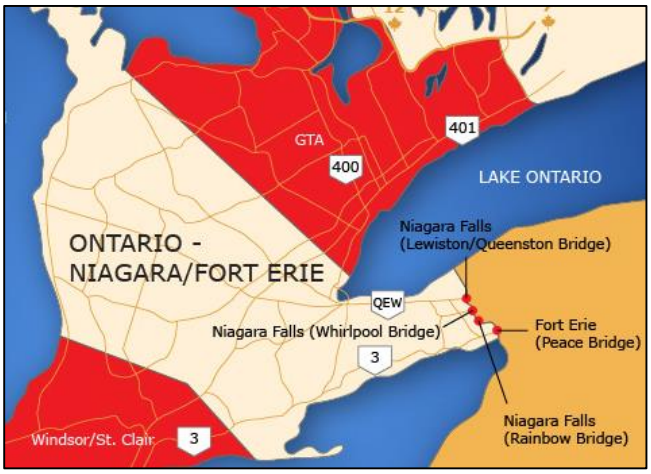


Figure 10: Ontario-New York Border Crossings in the Niagara/Fort Erie Region
Source: Transportation Border Working Group – Border Map – Niagara/Fort Erie[66]

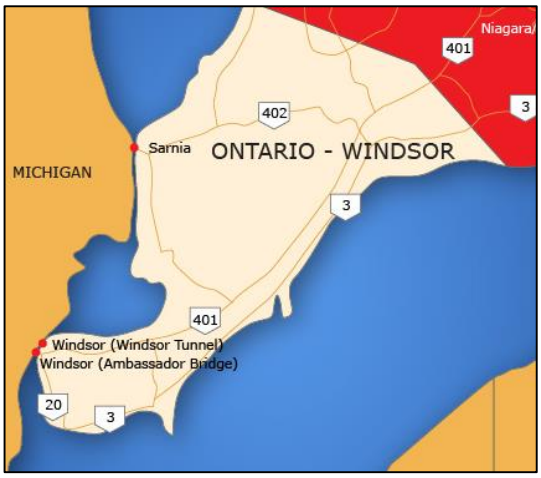


Figure 11: Ontario-Michigan Border Crossings in the Detroit Windsor and Port Huron Areas
Source: Transportation Border Working Group – Border Map – Ontario – Windsor/St. Clair[65]

The number of personal vehicles, trucks, and buses using each land port of entry varies from crossing to crossing. Volumes by each vehicular type are shown for each of Ontario's border crossing regions in the table below. Note that when multiple crossings are located in the same vicinity they are grouped together in the table.

Table 13: 2014 Port Crossing Volumes[60] - States Bordering Ontario

Port Name	Personal Vehicles	Trucks	Buses	Total
Buffalo-Niagara Falls, NY (Peace Bridge, Lewiston/Queenston Bridge, Rainbow Bridge, and Whirlpool Bridge)	5,446,904	962,076	20,298	**6,429,278**
Detroit, MI (Ambassador Bridge and Windsor Tunnel)	4,027,427	1,554,152	21,247	**5,602,826**
Port Huron, MI (Blue Water Bridge)	1,975,750	778,268	2,958	**2,756,976**
Sault Ste. Marie, MI	941,615	38,932	3,761	**984,308**
Massena, NY	912,278	23,188	3,433	**938,899**
Alexandria Bay/Cape Vincent, NY	647,838	192,551	1,726	**842,115**
International Falls, MN	511,600	16,528	257	**528,385**
Ogdensburg, NY	369,556	37,726	179	**407,461**
Grand Portage, MN	324,896	16,460	1,325	**342,681**
Baudette, MN	171,583	6,268	44	**177,895**

Michigan and Ontario share 4 border crossings as shown in **Figure 12.**

Current and forecasted wait times for each of Ontario's border crossings with Michigan are updated hourly and published on the CBSA and CBP websites.

Figure 12: Ontario Border Crossings with Michigan
Source: Transportation Border Working Group – Border Map – Michigan[62]

- **Blue Water Bridge (Port Huron, MI)**
  Located at the southern end of Lake Huron, the Blue Water Bridge crosses the St. Clair River and links I-69 and I-94 in Port Huron, Michigan on the west with Canadian Highway 402 in Sarnia/Point Edward, Ontario on the east. The bridge is constructed in 2 spans, one for eastbound traffic and one for westbound traffic. Each span has 3 lanes of traffic. NEXUS and FAST lanes are available at the crossing for prescreened travelers entering the U.S. or Canada. There are 13 primary inspection lanes on the U.S. side and 18 primary inspection lanes on the Canadian side.

- **Ambassador Bridge (Detroit, MI)**
  The Ambassador Bridge is a 4-lane undivided suspension bridge between Detroit, Michigan and Windsor, Ontario. It is jointly owned and operated by the Detroit International Bridge Company (DIBC) and Canadian Transit Company (CTC). The Ambassador Bridge connects U.S. I-75 and I-96 with Ontario Highway 401 and Huron Church Road. There are 32 U.S. primary inspection lanes and 29 primary inspection lanes in Canada. NEXUS and FAST lanes are available in both directions.

- **Detroit-Windsor Tunnel**
  The Detroit-Windsor Tunnel connects Detroit, Michigan with Windsor, Ontario. The tunnel is owned by the City of Detroit and the City of Windsor and is operated under contract by the Detroit-Windsor Tunnel LLC. The crossing has 1 travel lane in each direction and can be accessed through Michigan Highway 10 in the U.S. and Goyeau Street in Canada. Height limitations dictate that only autos and smaller commercial vehicles use the crossing. Each side of the crossing uses 11 primary inspection lanes. NEXUS lanes are available in both directions and a FAST lane is available on the Canada side.

- **Sault Ste. Marie**
  The Sault Ste. Marie International Bridge serves Sault Ste. Marie, Michigan and Sault Ste. Marie, Ontario. It is the only vehicular border crossing within 300 miles and connects U.S. I-75 with Huron Street in Ontario over the St. Mary River. The crossing utilizes 5 primary inspection lanes for vehicles entering the U.S. and 7 primary inspection lanes for passenger and commercial

vehicles entering Canada. The Canadian portion of the bridge is owned by the Federal Bridge Corporation Ltd. (FBCL) and the U.S. half of the bridge is owned by the Michigan Department of Transportation (MDOT). FBCL and MDOT created the St. Mary's River Bridge Company (SMRBC) as a separate legal entity to manage bridge operations. The Sault Ste. Marie International Bridge border crossing is FAST equipped and has NEXUS lanes available during limited hours.

New York and Ontario share an international border including the heavily travelled Niagara Falls crossings as shown in **Figure 13.**

Ontario's most frequently used border crossings with New York occur in the Niagara Falls area at the Peace Bridge, Rainbow Bridge, Lewiston-Queenston Bridge, and Whirlpool Bridge crossings.

Figure 13: Ontario-New York Border Crossings
Source: [Transportation Working Group - Border Map, New York](#) [67]

- **Peace Bridge (Buffalo, NY)**
  The Peace Bridge border crossing is located between Buffalo, New York and Fort Erie, Ontario and includes 18 primary inspection lanes on the U.S. side and 20 primary inspection lanes on the Canadian side. Vehicles using this border crossing also use I-190 in New York and Highway 2 (also known as Queen Elizabeth Way) in Ontario. NEXUS and FAST lanes are available at the crossing. The Peace Bridge is owned and operated by the Buffalo and Port Erie Public Bridge Authority.

- **Lewiston/Queenston Bridge (Niagara Falls)**
  The Lewiston-Queenston Bridge border crossing is in the Niagara Falls region and connects Lewiston, New York with Queenston in Ontario, Canada. The border crossing is used by vehicles from I-190 in New York and Highway 405 in Ontario. There are 10 primary inspection lanes available for vehicles entering the U.S. and 15 primary inspection lanes for vehicles entering Canada. FAST lanes are available at both sides of the crossing and NEXUS lanes are available on the Canadian side. The Lewiston-Queenston Bridge is owned and operated by the Niagara Falls Bridge Commission.

- **Rainbow Bridge (Niagara Falls)**
  The Rainbow Bridge crossing is a 4-lane crossing over the Niagara River and Niagara Gorge that connects Niagara Falls, New York to Niagara Falls, Ontario using 17 primary inspection lanes entering Canada and 15 primary inspection lanes entering the United States. No commercial traffic is allowed at this crossing. NEXUS lanes are available to vehicles entering both the United

States and Canada and a dedicated Ready Lane for RFID-enabled devices is available. The Rainbow Bridge is owned and operated by the Niagara Falls Bridge Commission.

- **Whirlpool Bridge (Niagara Falls)**
  The Whirlpool Bridge is a NEXUS-only border crossing exclusively for passenger vehicles. The bridge connects the commercial zones and downtown districts of Niagara Falls, New York with Niagara Falls, Ontario over the Niagara River and utilizes 2 vehicle lanes into the U.S. and 1 lane into Canada. The Whirlpool Bridge is owned and operated by the Niagara Falls Bridge Commission.

4.4.2 Measurement Technologies

The Blue Water Bridge border crossing uses a hybrid system for performance measurement and is the first MTO-owned system. Bluetooth and loop detectors measure wait times from the end of the queue to the primary inspection booth for passenger vehicles and commercial traffic on I-69 and I-94 in Michigan and Canadian Highway 402 in Ontario. Wait time data is collected, validated with visual observations, and stored for weekly review to check for accuracy, identify areas of concern, and make adjustments to the system. This process has resulted in a review of the reliability of the loop detectors at the crossing to determine if the wait time data and visual observations match. Also, both loop detectors and Bluetooth technology may not be necessary as the Bluetooth data alone appears to be accurate and is being used as the sole source of automated wait time information. Consequently, the return on investment for loop detectors may not be high enough for future projects.

Though data is not currently available to the traveling public, both MDOT and MTO are comfortable with the quality of wait time data from the Blue Water Bridge crossing and plans are underway to move into the next phase by installing roadside DMS to communicate wait time information to motorists including differentiating between personal and commercial vehicles. Once this occurs, CBP and CBSA will use the data stream to replace their current manual counts.

Information and lessons learned from the Blue Water Bridge border crossing will be considered during future studies at the Detroit Tunnel, Ambassador Bridge, and Sault Ste. Marie International Bridge to determine the feasibility of similar systems at these locations. One challenge for the Blue Water Bridge system was that construction occurred under separate contracts for the U.S. and Canadian sides.

In the Niagara region of New York, Bluetooth wait time measurement systems are in place at the Peace Bridge and Lewiston-Queenston Bridge crossings. The technology calculates average wait times by vehicle type and direction using Traffax readers and FastLane BluFaxWeb software. Wait time data is posted on websites such as the Niagara Falls Bridge Commission[68] website and updated at least hourly to disseminate wait times to the traveling public, incorporating color coding to indicate border crossing wait time status at a glance.

Collecting RFID wait time data between Detroit, MI and Windsor, ON at the Ambassador Bridge is being considered, however, since the bridge is privately owned MTO is sensitive about publishing the data and prefers to only measure wait times on their right of way. Partnering with the city may be one way of attaining wait time information in this situation.

Additional wait time systems between Ontario and Michigan are not actively being considered. However, Ontario will continue to consider systems, based on traffic volumes at the crossings to determine if the crossing warrants the investment. Utilizing third party data to determine wait times at border crossings has also been discussed but since commercial and passenger vehicles cannot be separated in these systems, MTO is seeking an infrastructure system rather than a service solution.

4.4.3 Performance Monitoring and MTO Role

Since bridges and border crossings are not in MTO's jurisdiction and the time it takes vehicles to move across the border is a function of CBP and CBSA, performance measurement is not being completed by MTO. Performance is tracked for functional areas and information such as annual crashes and fatalities are documented in the Road Safety Annual Report, but MTO does not produce a comprehensive agency-wide performance measures document.

Delays at border crossings affect the rest of the traffic network in terms of safety. MTO monitors crossings for safety issues and makes changes as necessary. For instance, to avoid serious rear end collisions due to sudden queue buildups, MTO may designate one lane exclusively for commercial vehicles to allow passenger vehicles to merge and move more freely. As queue warning systems are being deployed, MTO is tasked with determining where to place the technology to provide the best wait time data for motorists.

Performance monitoring at border crossings varies based on the infrastructure. For example, the infrastructure redevelopment at the Blue Water Bridge border crossing added lanes, a lane management system, and a queue warning system while continuing to use cameras although there is limited active management unless there is an incident. The Niagara border crossings have had less activity in terms of infrastructure improvements but the use of traffic management centers facilitates more involvement with active monitoring. These crossings experience longer delays and special events such as sporting events dictate the need for active management and queue warning systems.

Bridge authorities at the Peace Bridge and the Lewiston-Queenston Bridge have their own wait time measurement systems, however, differences in wait time definitions are not always understood in discussions outside their agencies. Bridge authorities only measure the wait time on the bridge so published wait times could be misinterpreted by motorists as the wait times do not take into account the additional time waiting in the queue due to traffic. Also, there are security concerns about publishing data on privately owned bridges.

4.4.4 Cross Border Coordination

Ontario's Ministry of Transportation is part of the Transportation Border Working Group that is led by Transport Canada and FHWA. The Transportation Border Working Group completes tasks related to performance measures at borders such as tracking traffic volumes, border wait times, the amount of time vehicles spend in secondary inspection, the environmental impact from border delays, and information on commercial goods transported through the border. Additional information is shared through the Transportation Border Working Group website.

MTO coordinates on wait time measurement systems with Michigan DOT. The Blue Water Bridge crossing coordination worked well and was without major issues, however, lessons learned include ensuring the appropriate agreements to proceed such as MOAs, MOUs, and data sharing agreements are in place. Active projects in the Niagara region include coordination with the Peace Bridge Authority and the Niagara International Transportation Technology Coalition.

4.5 Texas Department of Transportation

This section includes information on the border crossings between Texas and Mexico. Additional information provided includes the DOT role at these border crossings, measurement technologies, performance monitoring, and cross border coordination.

To document this information regarding international border crossings in Texas a number of online resources were reviewed.

Figure 14: Texas Border Crossings Source: Source: USDOT Border Crossing/Entry Data[59]

4.5.1 Highway Border Crossings

Texas' southern border is shared with Tamaulipas, Nuevo Leon, Coahuila, and Chihuahua in Mexico. There are 28 vehicular border crossings between Texas and Mexico including 13 crossings capable of handling commercial traffic. Border crossing locations are represented by the nearest city and shown in **Figure 14.**

The number of personal vehicles, trucks, and buses varies from crossing to crossing as shown in the table below. Note that when multiple crossings are present in a location their crossing volumes are totaled in the table below.

Table 14: 2014 Port Crossing Volumes[60] - Texas

Port Name	Personal Vehicles	Trucks	Buses	Total
El Paso	11,595,319	759,125	21,554	**12,375,998**
Laredo	5,250,601	1,947,846	41,230	**7,239,677**
Hidalgo	4,565,037	530,093	26,087	**5,121,217**
Brownsville	4,325,554	209,989	7,625	**4,543,168**
Eagle Pass	2,466,385	136,506	1,027	**2,603,918**
Del Rio	1,347,713	69,048	0	**1,416,761**
Progreso	1,174,447	41,416	0	**1,215,863**
Roma	703,473	7,556	429	**711,458**
Presidio	616,002	10,584	553	**627,139**
Rio Grande City	359,642	32,459	0	**392,101**
Fabens	285,918	0	0	**285,918**

Along the Texas-Mexico border there are 7 points of entry measuring wait times for commercial traffic. These border crossings are described below.

- **Veterans International Bridge (Brownsville)**
  The Veterans International Bridge is a 4-lane bridge that connects U.S. Highway 77 in Brownsville, Texas to Matamoros, Mexico using Boulevard Luis Donaldo Colossio which extends

to Ciudad Victoria and Reynosa. This border crossing has FAST lanes in both directions and a dedicated commuter lane using SENTRI.

- **Pharr-Reynosa International Bridge (Hidalgo)**
  The Pharr Reynosa International Bridge is a 4-lane bridge with 3 lanes in the northbound direction and 1 lane in the southbound direction. It connects Highway 281 in Pharr, Texas to Mexico's Highway 2 and the City of Reynosa, Tamaulipas. FAST lanes are available at this border crossing.

- **World Trade Bridge (Laredo)**
  The World Trade Bridge is a commercial bridge over the Rio Grande River between the cities of Laredo, Texas and Nuevo Laredo, Tamaulipas in Mexico. It is owned and operated by the City of Laredo and Mexico's federal Secretariat of Communication and Transportation. The World Trade Bridge is accessed by I-35 in Laredo and Highway 2 in Mexico.

- **Colombia-Solidarity International Bridge (Laredo)**
  The Colombia-Solidarity International Bridge in Laredo, Texas connects Laredo, Texas with Nuevo Laredo, Tamaulipas in Mexico. FAST lanes are available.

- **Camino Real International Bridge (Eagle Pass)**
  The Camino Real International Bridge has 3 lanes in each direction and connects Highway 480 in Eagle Pass, Texas over the Rio Grande to Piedras Negras, Coahuila and Mexico's super highway that extends to Mexico City.

- **Ysleta-Zaragoza International Bridge (El Paso)**
  The Ysleta-Zaragoza International Bridge connects El Paso, Texas with Ciudad Juarez, Chihuahua in Mexico. The border crossing consists of 2 bridges, one for passenger vehicles and pedestrians and the other for commercial vehicles. The bridge used for passenger vehicles consists of 2 northbound lanes, 2 southbound lanes, and 1 lane dedicated for commuter traffic. The commercial bridge consists of 2 southbound lanes and 2 northbound lanes, one of which is a designated FAST lane. Plans are underway to expand the commercial bridge throughput without adding additional width to the bridge by creating 2 southbound lanes and 2 northbound lanes in addition to a northbound FAST lane.

- **Bridge of the Americas (El Paso)**
  The Bridge of the Americas border crossing between El Paso, Texas and Ciudad Juarez, Mexico consists of a northbound structure and a southbound structure and is used by passenger vehicles using Boulevard Ing. Bernardo Norzagaray and Avienda Abraham Lincoln in Mexico and I-110, Highway 54, I-10, and Loop 375 in Texas while commercial vehicles access the crossing from Cuatro Siglos Street and Highway 45 in Mexico and Gateway Boulevard, East Paisano Drive, and Highway 54 in Texas. FAST lanes are available.

4.5.2 Measurement Technologies

RFID-based wait time systems capture commercial traffic using RFID readers installed on both sides of the border to identify transponders on trucks and calculate wait time at the Veterans International Bridge, Pharr-Reynosa International Bridge, World Trade Bridge, Colombia Solidarity International Bridge, Camino Real International Bridge, Ysleta-Zaragoza International Bridge, and Bridge of the Americas. A Bluetooth-based system to measure wait times for passenger vehicles is also installed at the Ysleta-Zaragoza International Bridge in El Paso.

4.5.3 Cross Border Coordination

Texas participates in the U.S.-Mexico Joint Working Committee on Transportation Planning, a group of transportation professionals from 10 border states as well as U.S. and Mexico federal agencies that meets biennially to focus on international border issues such as border wait time, international bridges and cross-border transportation movements.

4.6 Washington State Department of Transportation

This section includes information on the border crossings between the State of Washington and British Columbia, Canada. Additional information provided includes the DOT role at these border crossings, measurement technologies, performance monitoring, and cross border coordination.

To document this information regarding international border crossings in Washington a number of online resources were reviewed. In addition, a phone interview was conducted with Bill Legg, Paul Neel, and Morgan Balogh from Washington State DOT.

4.6.1 Highway Border Crossings

The northern border of the State of Washington is shared with British Columbia, Canada. Washington has 13 highway points of entry into Canada as shown in the **Figure 15.**

Figure 15: Washington Border Crossings
Source: [Transportation Border Working Group – Border Map, Washington](#)[69]

The number of personal vehicles, trucks, and buses varies from crossing to crossing, however the crossings on the western portion of the state have a higher volume as shown in the table below.

Table 15: 2014 Port Crossing Volumes[60] - Washington State

Port Name	Personal Vehicles	Trucks	Buses	Total
Blaine (Peach Arch and Pacific Highway)	4,873,847	367,994	15,284	**5,257,125**
Sumas	1,130,251	149,361	674	**1,280,286**
Point Roberts	1,190,183	18,121	303	**1,208,607**
Lynden	727,189	41,580	4	**768,773**
Oroville	368,260	30,981	163	**399,404**
Laurier	61,454	7,303	27	**68,784**
Frontier	49,743	18,294	107	**68,144**
Boundary	57,882	50	8	**57,940**
Danville	52,971	121	0	**53,092**
Metaline Falls	29,299	5,032	60	**34,391**
Ferry	10,931	849	0	**11,780**
Nighthawk	8,937	0	0	**8,937**

Due to the higher volume of passenger vehicles and trucks at some of the crossings, Washington State DOT provides border wait times to travelers at the following crossings.

- **Peace Arch Crossing**
  The Peace Arch border crossing is located between I-5 in Blaine, Washington and Highway 99 in Surrey, British Columbia. Although not a commercial port of entry, the crossing utilizes 10 primary non-commercial inspection lanes in each direction including NEXUS lanes. NEXUS lanes expedite the border clearance process for low-risk, pre-approved travelers into the U.S. and Canada.

- **Pacific Highway Crossing**
  The Pacific Highway border crossing connects Blaine, Washington with Surrey, British Columbia in Canada. The border crossing is used by commercial and passenger vehicles traveling on Washington Highway 543 and Highway 15 in British Columbia. There are 10 primary inspection lanes on the U.S. side and 14 primary inspection lanes on the Canadian side. NEXUS and FAST lanes are available on both sides of the crossing. FAST lanes expedite the border clearance process for commercial vehicles carrying low-risk shipments when drivers from the United States, Canada, or Mexico have been pre-screened and pre-approved.

- **Lynden Crossing**
  Connecting Washington Highway 539 in Lynden, Washington with British Columbia Highway 13 in Aldergrove, British Columbia, the Lynden-Aldergrove border crossing has 5 primary inspection lanes in each direction including a northbound NEXUS lane.

- **Sumas Crossing**
  Washington Highway 9 and Highway 11 in British Columbia meet at the Sumas-Abbotsford border crossing. The crossing hosts 6 primary inspection lanes in the U.S. and 8 primary inspection lanes in Canada. NEXUS lanes are available to travelers in both directions. Northbound passenger vehicles also have FAST lanes available.

- **Oroville Crossing**
  The Oroville-Osoyoos border crossing is located on U.S. Highway 97/ B.C. Highway 97, a 2-lane undivided highway. The crossing connects Oroville, Washington with Osoyoos, British Columbia and utilizes up to 3 traffic lanes for vehicles entering Canada and 3 multi-purpose lanes for vehicles entering the United States. FAST lanes are also available.

4.6.2 Measurement Technologies

The wait times for the five busiest crossings are available when travelers call 511 and are posted on Washington's website as shown in **Figure 16** and **Figure 17.** In addition, traffic conditions are provided on the website as well as camera images at selected locations. Seven of the thirteen highway crossings in Washington provide camera images of the traffic near the border crossing. The cameras at locations where wait time is not posted provide travelers with a snapshot of the traffic condition.

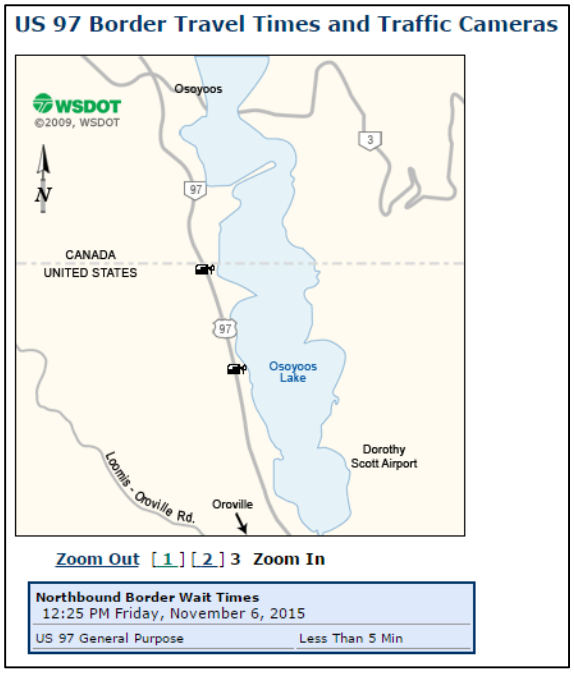


Figure 16: WSDOT Border Wait Times – Oroville Crossing
Source: WSDOT US 97 Border Travel Times and Traffic Cameras[70]

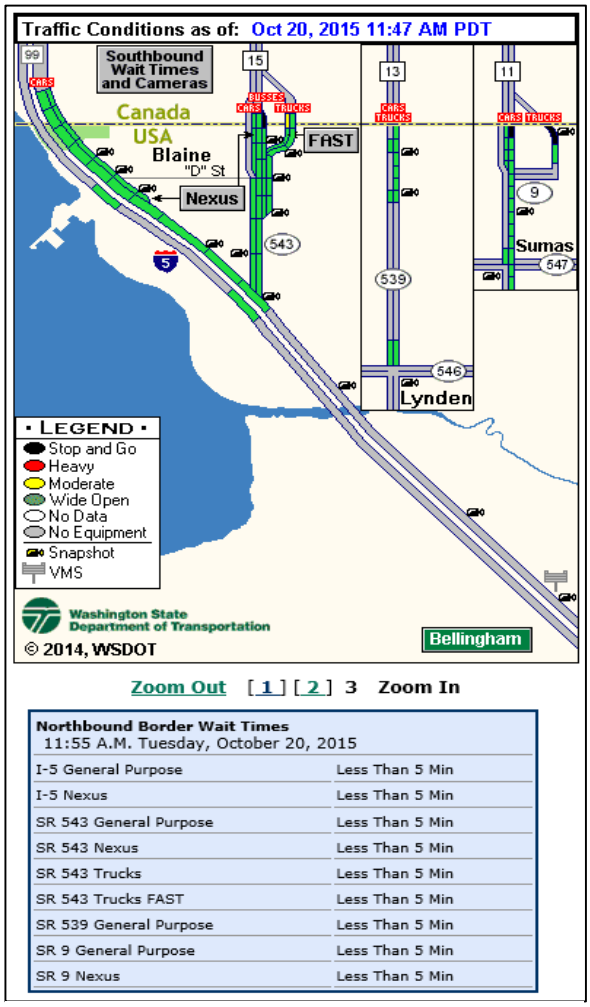


Figure 17: WSDOT Border Wait Times
Source: WSDOT Canadian Border Traffic[71]

Wait times are also provided on variable message signs located along I-5 north of Bellingham and along I-539 approaching the border crossing. The placement of these signs provides travelers with the current wait time as they approach the border in order to make a route adjustment if necessary. It is important to note that the variable message signs do not direct a traveler to a border crossing; rather, the signs provide the wait times to allow the traveler to make an informed decision when selecting a route.

In addition, Washington State DOT provides the wait times on a public Application Programming Interface (API) web page[72] for third party development and use.

To provide wait times, loop detectors near border inspection booths and further up the highways were installed in 2003 at both the Peace Arch and Pacific Highway crossings between Washington and British Columbia. Loop detector systems are also in place at the Lynden-Aldergrove and Sumas border crossings. A smaller wait time measurement system that uses loop detectors and license plate readers is

in place at the Oroville border crossing site. All loop detectors and license plate readers are located on DOT owned and operated roads. These systems use the detection devices (loop detectors and license plate readers, where installed) to estimate the wait times for vehicles crossing the border northbound by using an algorithm to calculate current wait times.

Historical data including wait times, traffic volumes, and service rates are stored at the Cascade Gateway Border Data Warehouse[73] for analysis and will generate an alert when wait times exceed a specified threshold. See **Figure 18.** The warehouse is maintained by the Whatcom Council of Governments[75] under the International Mobility and Trade Corridor Program. This program identifies and promotes improvements to mobility and security for the border crossings that connect Whatcom County, Washington State and the lower mainland of British Columbia. In addition to making the data available publicly, WSDOT personnel use the data to calibrate and troubleshoot the wait time measurement systems. For instance, when data-generated wait times at the crossing site do not accurately reflect actual conditions, WSDOT reviews the wait time measurement systems to identify and resolve the inconsistencies.

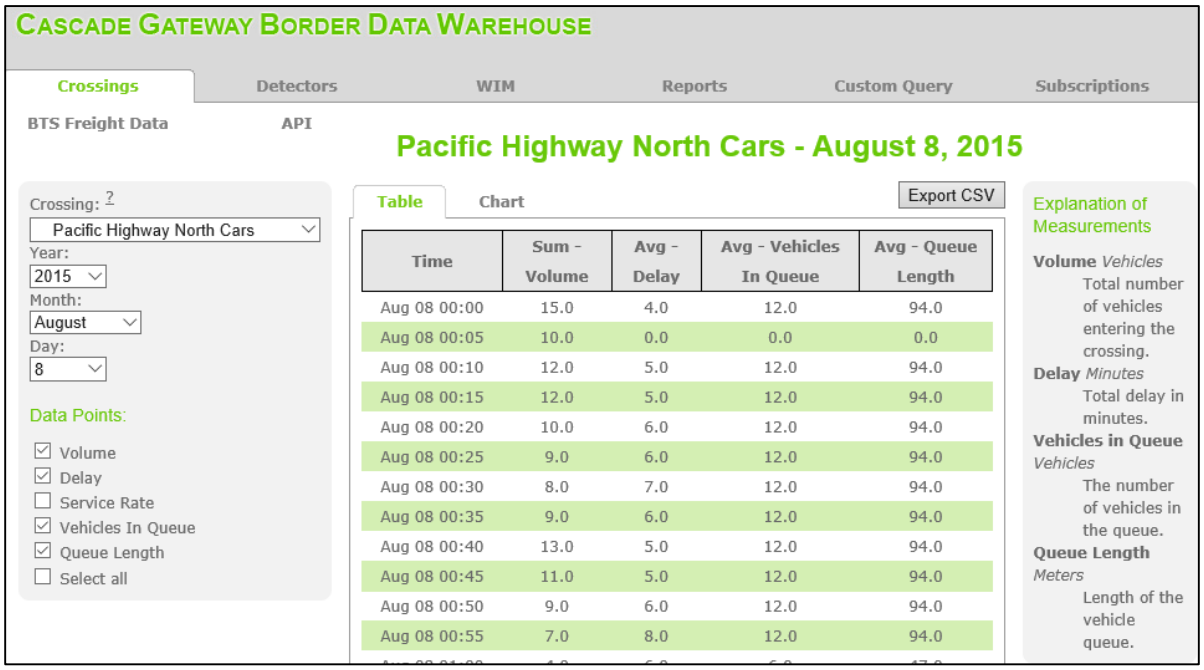


Figure 18: Example data from the Cascade Gateway Data Warehouse
***Source:* *Cascade Gateway Border Data Warehouse – Pacific Highway North Cars – August 8, 2015*[74]**

4.6.3 Performance Monitoring and DOT Role

Washington State DOT does not actively track performance or set performance targets based on loop detector data collected at the borders. The DOT is unable to control the delay that travelers experience when traveling from the U.S. to Canada as this wait time is a function of the time it takes for vehicles to proceed through Canadian border control operations. The data is used by Washington State DOT to provide travelers approaching the border with wait times based on traffic conditions. Archived data is used by Washington State DOT to estimate and post delays on major holidays. The data may also be

used by Canadian border patrol staff to determine staffing plans based on average volumes (e.g. peak, holidays).

4.6.4 Cross Border Coordination

WSDOT participates and coordinates on the following international border groups.

- Canada-United States Transportation Border Working Group[19]
  http://www.thetbwg.org/index_e.htm
- Whatcom Council of Government: International Mobility & Trade Corridor Program[41]
  http://wcog.org/programs/imtc/

Washington State DOT personnel noted that the IMTC, which provides a venue for coordinating cross-jurisdiction issues, has served as an effective mechanism for facilitating interactions on technology-related deployments. The IMTC's extensive membership and regular meetings allow for face-to-face interactions and focused attention on border crossing improvements.

Coordination challenges primarily center on data and infrastructure placement. For example, obtaining data from border patrol agencies and integrating it into existing wait time systems will improve the reliability of wait time results. In addition, physically locating devices and technology infrastructure on Canadian soil can introduce ownership and maintenance challenges.

5.0 Border Protection and Border Services Wait Times and Coordination

This section provides an overview of the U.S. Customs and Border Protection (CBP) and the Canada Border Services Agency (CBSA) regarding how border wait times are determined and displayed to the public, as well as activities conducted to monitor and manage performance.

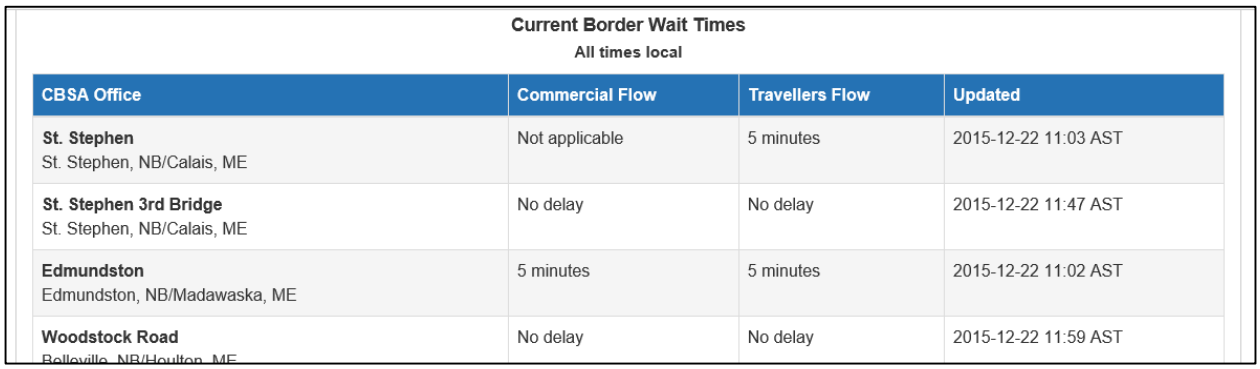
5.1 Canada Border Services Agency

The following information in this section includes a summary of border wait times, service standards and cross border coordination of the Canada Border Service Agency (CBSA). Information was gathered through online sources as well as an interview email with representatives from the Operations Branch, CBSA.

5.1.1 Border Wait Times

Current Wait Times

The CBSA collects and posts current border wait times on the CBSA Border Wait Times[50] web page for 26 land border crossings, as shown in **Figure 19**[50] below. CBSA uses the border wait time data directly from the technology platform itself. The data messages are interpreted by a CBSA platform and then pushed to an application which externally displays the Border Wait Time (BWT) data on the website. If there are issues with the data feed received, the CBSA confirms with other border sites whether there is an operational data feed problem or an issue with the internal server.



Current Border Wait Times

All times local

CBSA Office	Commercial Flow	Travellers Flow	Updated
St. Stephen St. Stephen, NB/Calais, ME	Not applicable	5 minutes	2015-12-22 11:03 AST
St. Stephen 3rd Bridge St. Stephen, NB/Calais, ME	No delay	No delay	2015-12-22 11:47 AST
Edmundston Edmundston, NB/Madawaska, ME	5 minutes	5 minutes	2015-12-22 11:02 AST
Woodstock Road Belleville, NB/Houlton, ME	No delay	No delay	2015-12-22 11:59 AST

Figure 19: CBSA Border Wait Times[50] Web Page

To enhance the dissemination mechanisms of the border wait time data, the CBSA is developing an Android and iOS-compatible application that would display BWT pulled directly from the CBSA Border Wait Times[50] webpage. This application would also display BWT from the United States Customs Border Protection[49] website.

In addition, the CBSA consults a number of other websites for border wait times including the following:

- U.S. Customs and Border Protection Wait Times[49]
- Ontario Ministry of Transportation[76]
- Transports Québec[77]
- Niagara Falls Bridge Commission[68]

- Peace Bridge[78]
- Detroit-Windsor Tunnel[79]
- British Columbia[80]
- Washington State[71]

As appropriate, some of these websites mentioned above are referred to by CBSA to examine the traffic camera feeds approaching the Canadian border, as it provides a good visual depiction of wait times.

Forecasted Wait Times

The CBSA also provides access to a forecasting tool[81] to assist travelers in making travel plans and avoid crossing the border during peak periods when border wait times are longer. An example of the tool is shown in **Figure 20.** The tool was developed as a result of an analysis conducted on historical wait times at Canada's 26 largest land ports of entry. Forecasted data is based on the average quarterly border wait time data from the previous three years and is also available on the Government of Canada Open Data Portal[83].

Day(s)	Average Wait Time	Peak Hours	Peak Hours Wait Time
Monday to Friday	5 min.	2:00 PM - 11:00 PM	15 min.
Saturday	10 min.	1:00 PM - 10:00 PM	25 min.
Sunday	5 min.	1:00 PM - 10:00 PM	15 min.

Statutory Holidays	Day	Peak Hours	Peak Hours Wait Time
Family Day Weekend	Saturday	1:00 PM - 10:00 PM	30 min.
	Sunday	5:00 PM - 10:00 PM	40 min.
	Monday	12:00 PM - 6:00 PM	30 min.
		6:00 PM - midnight	60 min.
Spring Break Week	1st Monday	4:00 PM - 11:00 PM	20 min.
	1st Thursday	2:00 PM - 8:00 PM	20 min.
	1st Friday	4:00 PM - midnight	30 min.
	1st Saturday	10:00 AM - 10:00 PM	40 min.
	1st Sunday	6:00 PM - 11:00 PM	35 min.
	2nd Monday	3:00 PM - 9:00 PM	40 min.
	2nd Tuesday	4:00 PM - midnight	40 min.

Figure 20: Forecasted Border Wait Timed - Pacific Highway (1st Quarter)[82]

Historical Wait Times and Historical Data

Historical border wait time data is used by the CBSA to conduct comparisons to manual counts as well as to optimize resource allocation for high traffic volume periods.

Along the British Columbia and Washington State border, historical data includes wait times, traffic volumes, and services rates that are stored at the Cascade Gateway Border Data Warehouse[73]. The warehouse is maintained by the Whatcom Council of Governments[75] under the International Mobility and Trade Corridor Program. This program identifies and promotes improvements to mobility and

security for the border crossings that connect Whatcom County, Washington State and the Lower Mainland of British Columbia. The data assists CBSA in this region to prepare operational plans by allowing them to analyze wait times, the number of cars in lines, and demand surges during specific time periods.

5.1.2 Service Standards

In February 1999, the Treasury Board of Canada[84] requested that the public be informed of border wait times. In consultation with the regions, the CBSA developed wait time standards based on the results of wait time measurements and focus group testing. The following service standards are noted on the CBSA website as part of the Treasury Board's overall effort to promote quality service to the public:

The estimated wait times for travelers reaching the primary inspection booth, the first point of contact with the CBSA when crossing the Canada/U.S. land border.

- *10 minutes on weekdays (Monday to Thursday)*
- *20 minutes on weekends and holidays (Friday, Saturday, Sunday and holidays)*

CBSA collects border wait times for the top 26 POE and analyzes border wait times on a weekly/monthly basis. The number of occurrences where border wait times exceeded the service standards is recorded and presented to senior management. A performance percentage is assigned based on the ability of the POE to meet its performance target.

In addition to service standards, CBSA also monitors the number of periods where the delay exceeded 60 minutes, the reasons for delays exceeding 60 minutes, and the number of times a POE missed updating the required hourly border wait time.

The Pacific Region utilizes conveyance volume data received from transportation agencies for the completion of some of their monthly reports.

It is also important to note that additional CBSA Service Standards[85] are in place to track and measure performance goals within the agency on a wide range of initiatives.

5.1.3 Cross Border Coordination

The CBSA interacts with Transport Canada, the Canadian lead responsible for installing border wait time technology, as well as the Office of the Privacy Commissioner, U.S. Customs and Border Protection, U.S. Federal Highway Administration, various provincial ministries of transportation, Washington State Department of Transportation, Whatcom Council of Governments, Niagara Falls Bridge Commission, and the International Mobility and Trade Corridor.

5.2 U.S. Customs and Border Protection

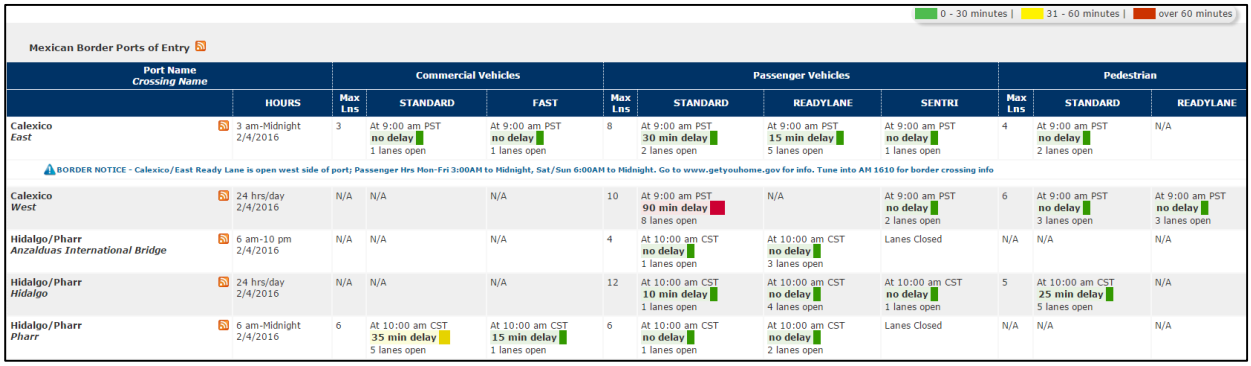
This section includes a summary of U.S. Customs and Border Protection regarding border wait times. The official CBP[49] website was used to assemble the information as well as an interview email with the CBP Office of Field Operations.

CBP facilitates international travel for almost 1 million motorists[86] who travel through CBP inspection lanes into the United States each day. CBP also enhances the U.S. global economy by screening over 67,000 freight containers[86] at U.S. Ports of Entry[87] nationwide.

5.2.1 Border Wait Times

Border wait times, the estimated time it takes for a vehicle to reach primary after entering the queue, are recorded by CBP for 72 border crossings along the northern and southern borders of the United States. All wait times are determined manually (e.g., via line of site/benchmarks, driver surveys and vehicle counts) which and are posted at the top of each hour to the CBP Border Wait Time website. CBP uses Bluetooth-based wait time data for two crossings in the Buffalo region: Peace Bridge and Queenston-Lewiston.

The CBP Border Wait Time website and mobile app provides wait time information for commercial, passenger, and pedestrian crossings. The figure below shows information that can be obtained through the CBP website. Wait times are color coded (green = 0 to 30 minutes, yellow = 31- 60 minutes, red = over 60 minutes) for easy reference with specific times presented in the table. In addition to wait times, the CBP table of information provides the number and type of lanes and their status (i.e., open/closed).



0 - 30 minutes | 31 - 60 minutes | over 60 minutes

Mexican Border Ports of Entry

Port Name / Crossing Name	HOURS	Commercial Vehicles Max Lns	Commercial Vehicles STANDARD	Commercial Vehicles FAST	Passenger Vehicles Max Lns	Passenger Vehicles STANDARD	Passenger Vehicles READYLANE	Passenger Vehicles SENTRI	Pedestrian Max Lns	Pedestrian STANDARD	Pedestrian READYLANE
Calexico East	3 am-Midnight 2/4/2016	3	At 9:00 am PST no delay 1 lanes open	At 9:00 am PST no delay 1 lanes open	8	At 9:00 am PST 30 min delay 2 lanes open	At 9:00 am PST 15 min delay 5 lanes open	At 9:00 am PST no delay 1 lanes open	4	At 9:00 am PST no delay 2 lanes open	N/A
BORDER NOTICE - Calexico/East Ready Lane is open west side of port; Passenger Hrs Mon-Fri 3:00AM to Midnight, Sat/Sun 6:00AM to Midnight. Go to www.getyouhome.gov for info. Tune into AM 1610 for border crossing info											
Calexico West	24 hrs/day 2/4/2016	N/A	N/A	N/A	10	At 9:00 am PST 90 min delay 8 lanes open	N/A	At 9:00 am PST no delay 2 lanes open	6	At 9:00 am PST no delay 3 lanes open	At 9:00 am PST no delay 3 lanes open
Hidalgo/Pharr Anzalduas International Bridge	6 am-10 pm 2/4/2016	N/A	N/A	N/A	4	At 10:00 am CST no delay 1 lanes open	At 10:00 am CST no delay 3 lanes open	Lanes Closed	N/A	N/A	N/A
Hidalgo/Pharr Hidalgo	24 hrs/day 2/4/2016	N/A	N/A	N/A	12	At 10:00 am CST 10 min delay 1 lanes open	At 10:00 am CST no delay 4 lanes open	At 10:00 am CST no delay 1 lanes open	5	At 10:00 am CST 25 min delay 5 lanes open	N/A
Hidalgo/Pharr Pharr	6 am-Midnight 2/4/2016	6	At 10:00 am CST 35 min delay 5 lanes open	At 10:00 am CST 15 min delay 1 lanes open	6	At 10:00 am CST no delay 1 lanes open	At 10:00 am CST no delay 2 lanes open	Lanes Closed	N/A	N/A	N/A

Figure 21: CBP Border Wait Time Web Page Screenshot[49]

If available, CBP POE management may refer to open source tools to verify current border delays. For example, in the Cascade Corridor in Washington state, border traffic wait times, traffic conditions, and cameras are provided on the Washington DOT website and archived wait times are provided on the Whatcom Council of Governments website[45]. Ports have the discretion to use these websites to confirm what they are seeing on the ground at a given time. CBP utilizes historical wait time information in various ways: the port may use historical data for predicative analysis (e.g., daily staffing needs during certain high volume periods or seasonal events where increased volume is anticipated (e.g., holidays, sporting events, etc.). Historical wait times and increased vehicle counts are also used for port infrastructure planning and development.

CBP provides wait time data via a mobile friendly format to assist motorists in making informed decision of when and where to cross the border. An example of the types of data are shown in **Figure 22.**

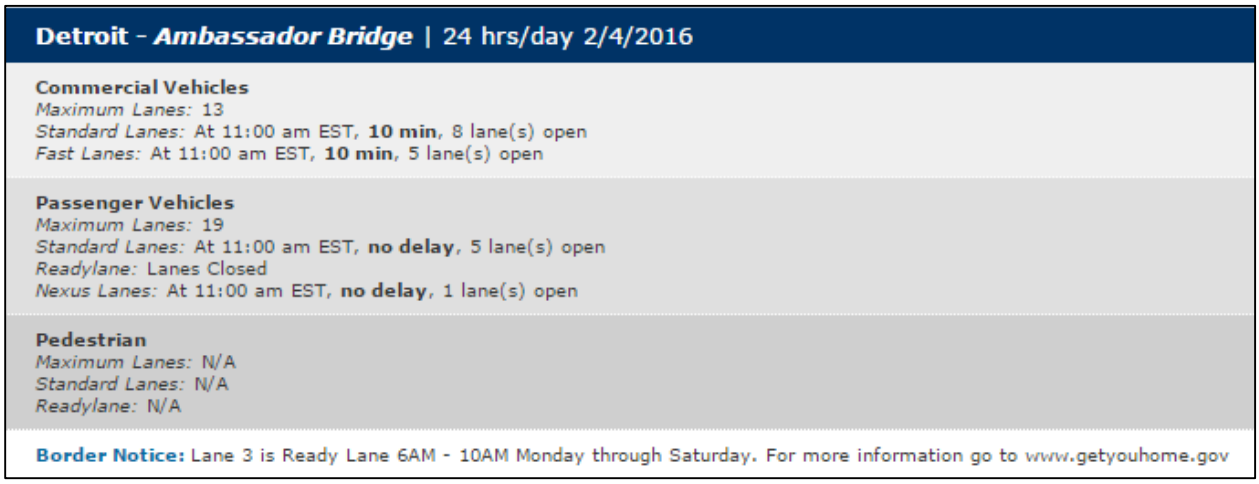


Figure 22: CBP Border Wait Time Mobile-Friendly Page[88]

The CBP Border Wait Time mobile app shown in the figure below provides identical information as the CBP mobile website in addition to mapping information: commercial vehicles, passenger vehicles, and pedestrian wait times and lane types (standard, SENTRI/Nexus, FAST, Ready Lane). CBP provides the free app and is available for download for Android and iOS-phones.

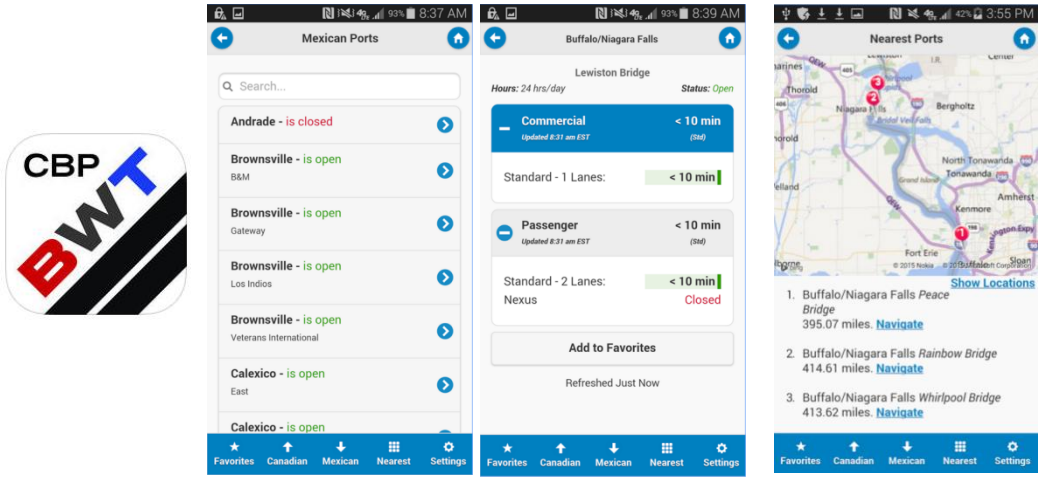


Figure 23: CBP Mobile App[89]

5.2.2 Processing Goals

Committed to improving traveler's experiences, CBP participates in the Trusted Traveler Program, a program to expedite travel at border crossings for low-risk, pre-approved travelers by providing dedicated lanes and kiosks at border crossings. Infrastructure permitting, CBP's service level processing goals for NEXUS and SENTRI Lanes is 15 minutes. This service level threshold was determined based on historical service levels. In addition to the 15-minute maximum wait time goal for NEXUS lanes, CBP also

sets a service level for Ready Lanes of 50% of general traffic lane wait times. Ready Lanes are dedicated primary vehicle lanes for travelers entering the U.S. at land border ports of entry from Canada or Mexico who possess RFID-enabled travel documents, which allow travelers who qualify to use the designated Ready Lane to expedite the inspection process.

CBP also measures processing times to ensure new technology deployments are being optimized and are cost effective. For example, CBP measures improvements in processing times and vehicle throughput as a performance measure. It is important to note, however, that processing times are not included in CBP estimated wait times; they are two different measures.

5.2.3 Cross Border Coordination

CBP interacts with other entities to coordinate traffic management at border crossings. CBP has an ongoing working relationship with FHWA and interacts with border and transportation agencies at the local and national levels on a regular, if not daily, basis. For example, CBP attends the bi-annual Transportation Border Working Group, U.S./Mexico Joint Working Committee, the Canadian/American Border Trade Alliance, and meetings with local Bridge Commissions.

CBP posts current wait times for 72 border crossings to the CBP Border Wait Time website. Wait times can be downloaded for use by other agencies but CBP does not currently receive any border wait time data from other agencies. CBP continues to be proactive in working with its border partners to identify innovative technologies for automating vehicle wait times accurately and in near “real-time.”

6.0 Coordination Opportunities

This section describes opportunities for ENTERPRISE to share the information gathered from this project with federal organizations and DOT agencies with a focus on international border crossings. The purpose of sharing the project's findings with other entities is to further introduce the work of ENTERPRISE to these entities and to enhance further interactions. This section also summarizes wait time technology funding opportunities that were available when this document was published.

6.1 DOTs and National Organizations

In order to coordinate sharing information from this document the following steps were taken. It is anticipated that these opportunities for ENTERPRISE to engage with various groups to share information will encourage additional interactions related to ITS technologies that support performance measures at borders.

- The final report was posted on the ENTERPRISE Pooled Fund Study Website.
- A project webinar was hosted by ENTERPRISE in April 2016 to highlight the efforts of this project. Invitees included ENTERPRISE members as well as the border crossing organizations noted in Section 3.0.
- The final report was posted for distribution to the following border crossing organizations also identified in Section 3.0.
    - U.S./Mexico Joint Working Committee (JWC) on Transportation Planning[12]
    - U.S./Canada Transportation Border Working Group (TBWG)[19]
    - Eastern Border Transportation Coalition (EBTC)[27]
    - Niagara International Transportation Technology Coalition (NITTEC)[34]
    - Whatcom Council of Governments – International Mobility and Trade Corridor Program[41]
    - U.S. Customs and Border Protection (CBP) – Border Wait Times[49]
    - Canada Border Services Agency (CBSA) – Border Wait Times[50]
- In addition, a presentation will be made during the 2016 ITS Canada Annual Meeting to share overall project results in May 2016.

6.2 U.S.-Canada "Beyond the Border Initiative" Funding Opportunities

The Beyond the Border Action Plan, released by the U.S. and Canadian governments in December 2011, outlines steps to implement a shared vision for perimeter security and economic competitiveness at U.S.-Canadian borders. A key commitment in the Action Plan was to "implement a border wait-time measurement system at mutually determined high-priority Canada-United States land border crossings." Canada and the U.S. agreed to implement these systems at the top 20 high-priority Canada-U.S. land border crossings listed in **Table 16**.

Table 16: 20 High-Priority U.S.-Canada Border Crossings for Wait Time Measurement Systems

Border Crossings	
Point Roberts, WA	Peace Arch: Blaine, WA
Pacific Highway: Blaine, WA	Lynden, WA
Sumas, WA	Sweetgrass, MT

Portal, ND	Pembina, ND
International Bridge: Sault Ste. Marie, MI	Blue Water Bridge: Port Huron, MI
Detroit-Windsor Tunnel: Detroit, MI	Ambassador Bridge: Detroit, MI
Rainbow Bridge: Niagara Falls, NY	Queenston-Lewiston Bridge: Lewiston, NY
I000 Islands Bridge: Alexandria Bay, NY	Champlain, NY
Highgate Springs, VT	Peace Bridge: Buffalo, NY
Calais, ME	Madawaska, ME

A series of Regional Roundtable Discussions on Border Wait Time Measurement[20] webinars, hosted by the USDOT Federal Highway Administration (FHWA) and Transport Canada in 2015, reported on the status of wait time technology deployments at these high-priority crossings to date. As of August 2015, the following 7 border crossings had implemented wait time technology: 1) Peace Arch: Blaine, WA; 2) Pacific Highway: Blaine, WA; 3) Lynden, WA; 4) Sumas, WA; 5) Blue Water Bridge: Port Huron, MI; 6) Peace Bridge: Buffalo, NY; and 7) Queenston-Lewiston Bridge: Lewiston, NY.

Funding to support deployment of wait time technologies at the high-priority border crossings is available from USDOT and Transport Canada:

- **Transport Canada Funding:** According to the Border Wait Time Technology presentation[90] shared at the TBWG Fall Plenary Meeting in October 2015, Transport Canada has capital funding available to negotiate agreements for wait time deployments for the remaining 13 crossings that do not already have technology deployed. Eligible costs would likely include hardware, cabling, software, system integration, and field equipment. Ongoing operations and maintenance will be the responsibility of the recipient and will require ongoing dialogue with the Canada Border Services Agency to ensure continued and consistent automated reporting. Transport Canada would like to hold follow-up meetings with Canadian interested parties to further discuss funding requirements, technologies, and timelines.

- **USDOT Funding:** In December 2015, FHWA issued a solicitation to collect applications from State Departments of Transportation, Metropolitan Planning Organizations (MPOs), and Regional Planning Organizations (RPOs) for the Border Wait Time Initiative, which seeks to accelerate the adoption of innovative technology to measure delay and wait times at land border ports of entry. FHWA intends to make up to six awards of up to $100,000 each. The focus of the funding initiative is for the 20 land border crossings identified in the Beyond the Border action plan between the U.S. and Canada (listed in **Table 16)**. All 20 high-priority crossings were identified in the solicitation.

One ENTERPRISE member, Michigan DOT, applied for funding through the FHWA-issued funding solicitation.

7.0 Summary

Performance Measures Related to International Border Crossings

MAP-21 that was signed into law in July 2012 creates a streamlined and performance-based surface transportation program and builds on many highway, transit, bike and pedestrian programs. Performance management notices of proposed rulemaking have been issued for safety, highway safety improvement program, planning, and pavement and bridge condition. Future notices of proposed rulemaking will include asset management, system performance, traffic congestion, on-road mobile source emissions, and freight movement.

While the expected U.S. national performance goals, as measured by delay and reliability, could be transferred to international border crossings, these national goals do not specifically set forth metrics for border crossings.

The review of ENTERPRISE members' performance measures documents indicated very few published metrics specific to international border crossings. Metrics such as delay, reliability, and Level of Service, which are commonly measured for specific corridors or on a statewide basis, are not measured at borders.

It is important to note that transportation agencies do not have control over delay at border crossings as this is a function of the border patrol operations, and therefore most transportation agencies do not set any performance or target goals for traffic throughput at borders. These agencies, however, may provide a variety of traffic management operations at high volume borders such as posting border wait times, communicating incident information, and providing advanced alerts to vehicles approaching slowing or stopped traffic queues.

Border Crossing National Organizations and Coordination

Two working groups (U.S./Mexico Joint Working Committee on Transportation Planning and U.S./ Canada Transportation Border Working Group) have been formed among the United States, Canada, and Mexico to coordinate specifically on infrastructure, policy, and research at borders. Each group meets at least twice a year and subcommittees are often created based on specific needs. The groups each have a work plan that outlines projects and activities as a guide for coming years. Online tools developed by these groups are also available, including maps and wait time information (archived and real-time data) at border crossings. In addition, there are many other consortia and working groups that have been formed through partnerships among these agencies including the Eastern Border Transportation Coalition, the Niagara International Transportation Technology Coalition, and the Whatcom Count of Governments. These groups each provide a role in performance tracking and/or performance tracking by archiving data from border crossings.

- The TBWG provides a Border Crossing Database[21] that contains archived data on traffic volumes at ports.

- NITECC collects data and reports on performance measures identified by the Regional Concept for Transportation Operations.
- NITECC also collaborates with the regional Metropolitan Planning Organization, Greater Buffalo Niagara Regional Transportation Council, and the University at Buffalo in measuring regional delay and develop reports on the effectiveness of ITS and operations.
- The Whatcom Council of City of Governments - International Mobility and Trade Corridor provides an archived database of passenger and commercial vehicle wait times and volumes.

The United States, Canada, and Mexico operate border agencies that protect ports of entry. These agencies focus on different aspects of managing operations that impact border wait times to move commercial, passenger vehicle, and pedestrian traffic through each port of entry. Through the research for this project, the United States and Canada have goals identified related to wait times.

The U.S. Customs and Border Protection processing goals at the primary inspection booth for travelers are:

- NEXUS Lanes (pre-screened, low risk travelers processed with little or no delay): 15 minutes
- Ready Lanes: 50% of general traffic lane wait times

CBSA service standards for the estimated time needed for travelers to reach the primary inspection booth, the first point of contact with CBSA, when crossing the Canada/U.S. land border are:

- 10 minutes on weekdays (Monday to Thursday)
- 20 minutes on weekends and holidays (Friday, Saturday, Sunday, and holidays)

Key coordination activities related to traffic throughput at international borders are many. There is national commitment by governments to advance initiatives that support economic vitality through improved traffic and freight movement across borders. In addition, peer exchanges and roundtable discussions are facilitating coordinated multi-agency efforts such as deploying ITS technologies for measuring performance (e.g. wait times) at international borders. These activities may present opportunities for ENTERPRISE to engage with various groups to share information and consider additional interactions related to ITS technologies that support performance measures at borders.

Roles, Practices and Wait Time Measurement Technologies

An online search and interviews were conducted to reveal why traffic operations measures are not typically indicators of performance for the ENTERPRISE member state and provincial transportation agencies that operate highways approaching border crossings. Agency representatives confirmed that their transportation agencies normally do not monitor or manage performance for the purpose of setting targets to improve throughput of vehicles across borders. This is because traffic delays approaching crossings are primarily a function of border patrol operations (i.e. dependent upon the amount of time it takes for vehicles to proceed though security and customs processes) which are not managed by transportation agencies. Instead, many transportation agencies opt to collect and share data to assist motorists with route and time of travel decisions at border crossings.

The following bullets provide a summary of additional information gathered through the research conducted and interviews held with ENTERPRISE member agencies. The interviews focused on the DOT role, measurement technologies, performance monitoring, and cross border coordination at international border crossings.

- Wait time systems that provide delay times to travelers are typically available at higher volume border crossings. Crossings with low volumes usually do not have congestion or delay and, therefore, there is not a need to provide wait times.
- Wait time measurement systems may use RFID, Wi-Fi, loop detectors, or Bluetooth technologies to collect traffic data to calculate delay times.
- Mechanisms to post delay collected by wait time measurement systems at border crossings include traveler information websites, 511 phone, traveler information apps, and DMS.
- At some border crossings, camera images are available to provide travelers with a snapshot of current conditions.
- DMS that display wait times may be located at key decision points to provide travelers with information to assist in route adjustments if another route is available.
- Agencies that archive data collected from wait time measurement systems use the data to estimate and post typical delay during peak and seasonal times to assist travelers planning a trip.
- At many border crossing locations, the border patrol agencies conduct manual counts to post delay times. As technology-based wait time measurement systems are deployed, the need for manual observations to post delay times will be alleviated.
- All of the agencies interviewed actively participate in a variety of groups that focus on cross border coordination in order to work together on border issues.

Coordination Opportunities

In order to coordinate sharing information from this document, a project webinar was scheduled in April 2016 to highlight project results. Participants invited included ENTERPRISE member agencies as well as border crossing organizations. The report was posted on the ENTERPRISE website for distribution to these border organizations mentioned above. It was anticipated that these opportunities for ENTERPRISE to engage with various groups to share information will encourage additional interactions related to ITS technologies that support performance measures at borders.

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