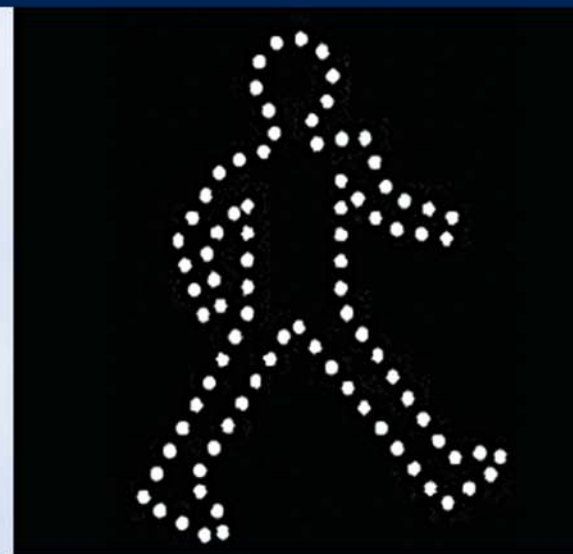




# Transportation System Management

Action Plan - 2012 and Beyond

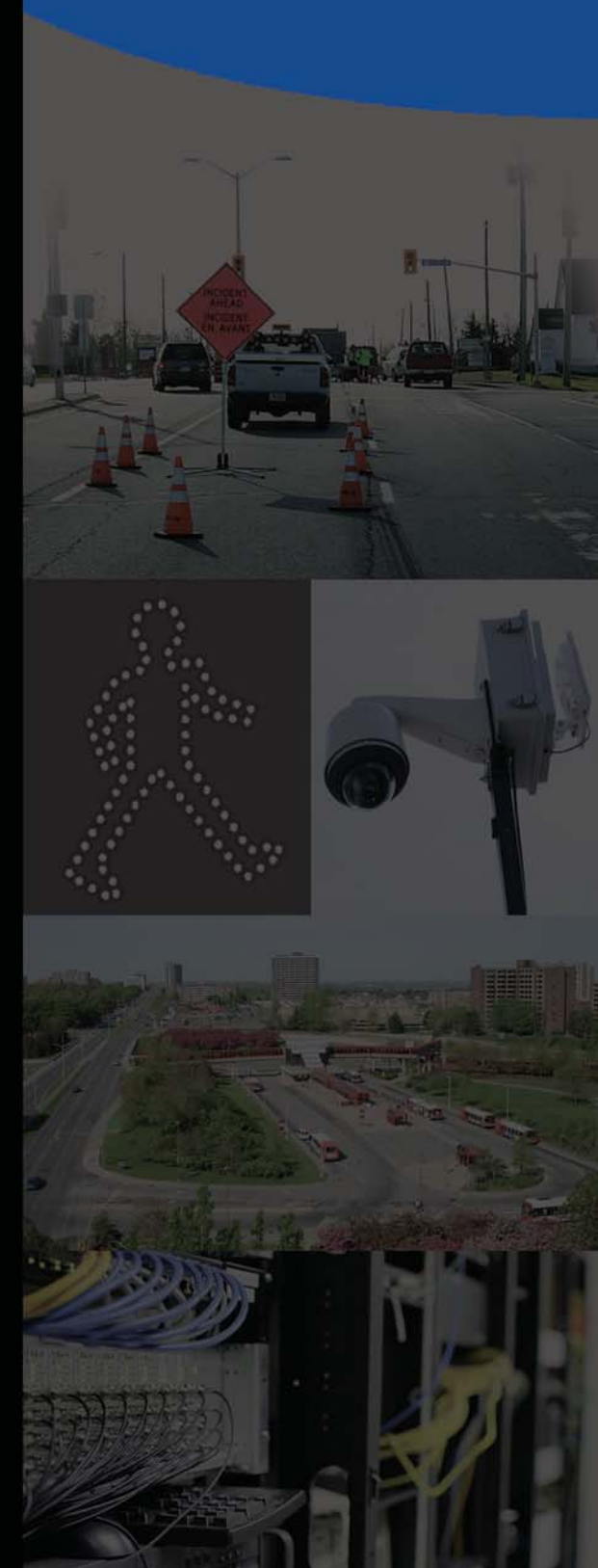


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**DIRECTION**

<b>Vision</b>	To provide citizens and visitors to the Nation's Capital with state of the art transportation management and traveler information systems that supply safe, reliable, and accurate information in a timely and cost effective manner for all modes of travel.
<b>Guiding Principles</b>	<ul style="list-style-type: none"> <li> <b>Integrate and optimize all modes of transportation</b>                      Applying TSM strategies to ensure that all modes of transportation are integrated and optimized into the transportation system. For example, 85% of transit service is delivered on roads operating in mixed traffic. TSM systems are relied upon to ensure traffic movement does not impede transit where no dedicated transit lane or facility can be provided;                 </li> <li> <b>Integrate information systems with all transportation networks</b>                      Ensuring that information systems from all governmental agencies within the National Capital Area are integrated so that regardless of where a user of the transportation network is located within the National Capital Region, they can get access to the same information in real time;                 </li> <li> <b>Develop sustainable transportation alternatives that are affordable and environmentally safe and accessible</b>                      Applying TSM strategies that are aligned with Pedestrian Plan, Cycling Plan and Transportation Demand Management (TDM) Plans and ensuring that the strategies are sustainable, affordable, environmentally friendly, safe and accessible for all users of the transportation network; and,                 </li> <li> <b>Educate residents on how to utilize TSM strategies to enhance safety, efficiency and convenience of the transportation network</b>                      Educating residents on the benefits of TSM strategies and how these strategies enhance safety, efficiency and convenience of the transportation network as well as how the strategies roll into the City's Strategic Plan where Transportation, as one of the nine service priorities, states that the City of Ottawa will strive to manage growing transportation demands in ways that reinforce the values and aspirations of its residents by maximizing the efficiency of existing systems to reduce the need for new infrastructure and services.                 </li> </ul>



## Introduction

As our city grows, there exists the need to be cognisant of the limited resources available for new transportation infrastructure and the requirement to develop strategies to optimize and connect our transportation system by infusing into the existing infrastructure new intelligent transportation strategies. The goal of these strategies is to marry the existing transportation infrastructure with reliable integrated system data and information technology to deliver effective and sustainable low cost improvements that respond intelligently to the needs of the road users while eliminating the need for expensive capital improvements.

This 10 to 15 year plan is based on a citizen centric approach while adopting the concept of a "Smarter City". It will ensure that as we roll out and implement these strategies and initiatives, it will always have the end users in mind, be it pedestrians, cyclists, transit users, motorists, tourists and transportation service providers. This approach will ensure that information and interaction/outcomes with residents are sustainable, provide a high level customer service and a positive experience for users of the system, leading to smarter travel choices and encouraging modal shifts where possibilities exist.

Connecting advanced transportation management systems with traveler information services while continuing to be on the forefront of new and innovative technologies will be the building blocks of a Transportation System Management (TSM) strategy that will include connecting all transportation systems such as roads, transit, light rail, parking and cycling/walking facilities etc.

TSM is an approach in planning, engineering, and communicating aimed at optimizing the safety, efficiency and capacity of the existing transportation system through the use of effective, low cost improvements.

Operating and managing the transportation system is key to the safe and efficient movement of people and goods. Transportation System Management (TSM) strategies and technologies provide transportation solutions that promote multi-modal travel options; reduce fuel consumption and emissions; relieve congestion; reduce operating costs; improve safety and community liveability; and optimize the use of existing infrastructure. TSM strategies can be applied to an entire transportation system, major corridors or individual locations. They include measures like:

- traffic signs, signals, pavement markings and regulations
- computerized traffic signal coordination
- video monitoring of road and transit operations
- incident management tools to deal with weather conditions, collisions or vehicle breakdowns
- traveler information systems using variable message signs or wireless communications
- transit vehicle tracking using on-board computers and global positioning systems (GPS)

This TSM Action Plan lays the groundwork to ensure that the City is well positioned to deal with the impacts that the construction and implementation of the Light Rail Transit will have on how residents travel within the City.

It has been developed in conjunction with staff, subject matter experts, advisory committees and the public. It's focused on but not limited to improvements to better manage the transportation networks for all modes, supporting the pedestrian/cycling/transit and TDM strategic plans and including day-to-day incident and congestion detection and management, as well as traffic signal optimization and prioritization for transit vehicles. It also outlines direction to bring the traveler advisory information system to a higher and more significant level that is integrated and coordinated with other area levels of government to better inform and engage both the public and commercial users of our transportation network.



## Emphasis Area - Advanced Traffic Management System (ATMS)

### CONTEXT

Advanced Traffic Management Systems (ATMS) are the application of emerging technologies (computers, sensors, controls, communications, and electronic devices) in transportation to save lives, time, money, energy and the environment. Smart Growth demands that before investing in additional road infrastructure, and while awaiting the introduction of improved mass-transit systems, every available ounce of capacity must be squeezed out of our existing road network. This can only be done through application of relatively low-cost, Intelligence Transportation System (ITS) enhancements, such as those associated with Advanced Traffic Management Systems.

<b>FOCUS: Pedestrians</b>	<b>DEFINITION</b>  Evaluate and implement initiatives and technologies that assist and enhance pedestrian safety and mobility.	<b>GOAL</b>  To develop TSM strategies that support modal shift objectives by improving safety and convenience for pedestrians.
<b>PERFORMANCE MEASURES</b>  <ul style="list-style-type: none"> <li>Number of technologies evaluated/implemented that will assist pedestrians (such as passive detection, etc.)</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: \$13,630,000 (Capital) FTE Requirement: N/A	<b>COMMENTS</b>



**Focus: Pedestrians**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
1	<b>Pedestrian Countdown Timers</b>  Equip all signalized intersections with Pedestrian Countdown Timers.	Public Works		\$4M			Currently funded through Council approved budget. All traffic signals will have devices in place by 2018 subject to yearly approval of funds in Capital Budget.
2	<b>Audible Pedestrian Signals</b>  Equip all signalized intersections with Audible devices.  Evaluate new accessible push button technology.	Public Works		\$9.280M			Currently funded through Council approved budget. All traffic signals will have devices in place by 2021 subject to yearly approval of funds in Capital Budget.  New advanced technology offers additional features, however at considerably greater costs.
3	<b>Pedestrian Operations</b>  "Advance" pedestrian phasing  Pedestrian "Scramble"  Pedestrian Detection  Pedestrian Signal Timing for Special Events.	Public Works		\$0.35M			Provides priority to pedestrians at selected locations.  Review on case by case basis.  Review opportunities for new pedestrian activation including "passive" detection.  Provide priority to pedestrians during heavy pedestrian movements at special event locations.



<b>FOCUS: Cycling</b>	<b>DEFINITION</b>  Evaluate and implement initiatives and technologies that assist and enhance cycling safety and mobility.	<b>GOAL</b>  To develop TSM strategies that support modal shift objectives by improving safety and convenience for cyclists.
<b>PERFORMANCE MEASURES</b>  <ul style="list-style-type: none"> <li>Number of technologies evaluated/implemented that will assist cyclists</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: \$400,000 (Capital) FTE Requirement: N/A	<b>COMMENTS</b>

**Focus: Cycling**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Bike Signal</b>	Equip pilot intersection with Bike Signal displays containing bicycle silhouette.	Public Works		\$0.20M			Awaiting Provincial approval through Highway Traffic Act amendment. Co-funded by PGM.
2	<b>Bicycle Detection</b>	Evaluate new bicycle detection technologies.	Public Works		\$0.20M			Co-funded by PGM.
3	<b>Bicycle Cross Rides</b>	Equip pilot intersection with Bike Cross Rides.	Public Works					Provides additional set of pavement markings that allow cyclists to cross without dismounting. Funded by PGM.



<b>FOCUS: Transit</b>	<b>DEFINITION</b>  Evaluate and implement initiatives and technologies that assist and enhance transit safety, mobility and performance.	<b>GOAL</b>  To develop TSM strategies that support modal shift objectives by improving the reliability of transit service.
<b>PERFORMANCE MEASURES</b>  <ul style="list-style-type: none"> <li>Number of technologies evaluated/implemented that will assist transit</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: N/A FTE Requirement: N/A	<b>COMMENTS</b>

**Focus: Transit**

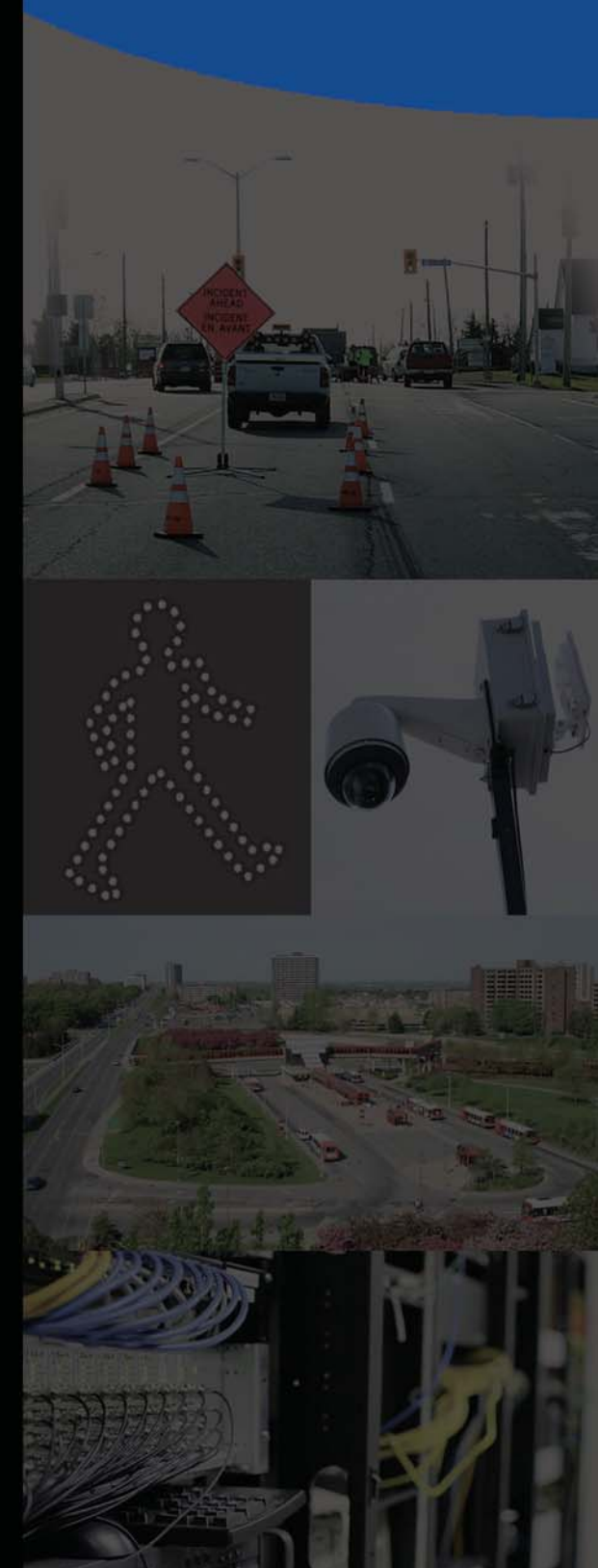
	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Transit Priority</b>	Continue to implement transit priority features at signalized including: signal priority, queue jumps, queue relocation, etc.	Public Works	Planning & Growth Mgmt				Funded through Transit Priority budget.
2	<b>Transit Detection</b>	Evaluate new bus detection technologies.	Public Works	Planning & Growth Mgmt				Funded through Transit Priority budget.
3	<b>Bus Schedule Adherence</b>	Incorporate bus schedule with central traffic system and incident detection and management systems.	Public Works	OC Transpo				Funded through Transit Priority budget.



<b>FOCUS:</b> <b>Traffic Management Centre</b>	<b>DEFINITION</b> <i>A Traffic Management Centre (TMC) is a facility through which management and coordination of transportation resources and technology takes place. The TMC links various elements of Intelligent Transportation Systems such as the traffic signal system, traffic cameras, variable message signs, and incident coordination.</i>	<b>GOAL</b> To evolve and expand the existing Traffic Control Centre to eventually provide a "24/7" facility to manage transportation systems and incidents, and accommodate multiple agencies required at the TMC during critical events and meet the operational needs of the LRT.
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>Incident response times</li> <li>Travel times through corridors</li> </ul>	<b>RESOURCES (2012-2021)</b> Budget Requirement: \$2.88M (Operating) \$1.35M (Capital) FTE Requirement: 4.0	<b>COMMENTS</b>

**Focus: Traffic Management Centre**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Expanded Monitoring/Hours of Operation</b>	Incremental increase in hours of operation to enhance traffic management capabilities resulting from increasing traffic volumes, special events, and emergency road closures and operational needs of LRT.	Public Works			\$2.88M	4.0	LRT construction will require increased traffic monitoring, incident management, etc.
2	<b>Increase/Enlarge Traffic Control Centre</b>	Evaluate and retrofit the floor space to increase the size of the traffic control room to accommodate more traffic monitoring cameras, traffic system infrastructure (servers, modems), multiple jurisdictions/agencies during special events.	Public Works		\$0.75M			LRT construction will require increased traffic monitoring/ability to accommodate multiple agencies.





**Focus: Traffic Management Centre (Continued)**

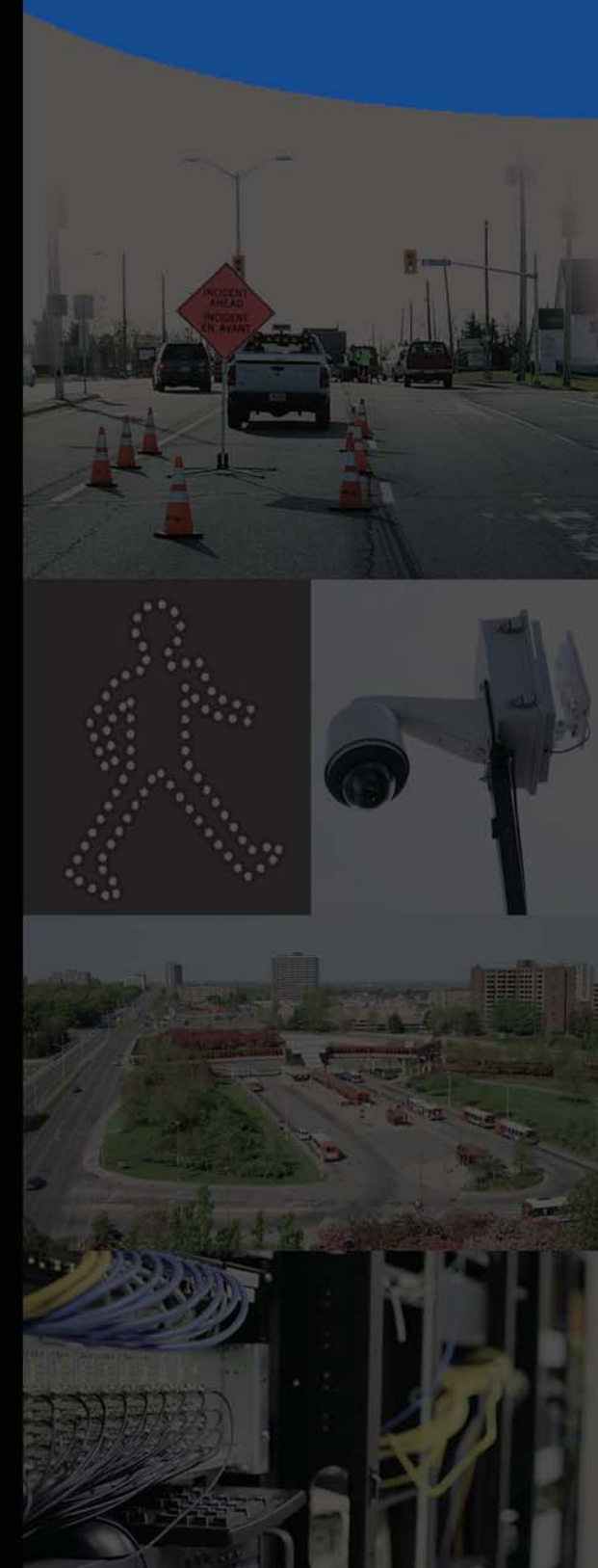
Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
3 <b>Disaster Recovery Plan</b>	Establish a dependable and cost effective "Disaster Recovery" or alternate site in the event the current facility at 175 Loretta is inoperable as requested by Audit.	Public Works		\$0.35M			Recommended through Risk Assessment audit.
4 <b>Outreach &amp; Education</b>	Continue to provide tours of the TCM to interested groups/ members of the public/other cities. Information sessions to schools as to operation of pedestrian signals.	Public Works		\$0.25M			Tours of Branch and participation in "Doors Open Ottawa" provides other agencies and public with understanding of Traffic Operations role.
5 <b>Informing Public on Real-Time Traffic Conditions</b>	Provide public with real time traveler information by updating traveler information website, changing messages on permanent variable message signs, providing update to media on changing traffic conditions as a result of collisions, construction, unplanned events, etc.	Public Works					LRT construction will require increased communication re: traffic condition.



<b>FOCUS:</b> <b>Traffic Signal and Camera Infrastructure</b>	<b>DEFINITION</b> <p>Traffic Signals and their related infrastructure serve to regulate right of way at signalized intersections. Their installation and operation are governed by Provincial and City legislation and guidelines. Traffic cameras assist operators in the Traffic Management Centre in detecting incidents and relieving congestion.</p>	<b>GOAL</b> <p>To maintain and operate new and existing signalized intersections in the safest and most efficient manner possible.</p>
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>• Collisions</li> <li>• Delays</li> <li>• Travel times</li> <li>• Coverage (cameras)</li> </ul>	<b>RESOURCES (2012-2021)</b> <p>Budget Requirement: \$18.958M (Capital) FTE Requirement: N/A</p>	<b>COMMENTS</b>

**Focus: Traffic Signal and Camera Infrastructure**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Communication</b>	<p>Continue to reduce communication costs by eliminating reliance on third parties for traffic signal and camera communications through ongoing expansion of City owned cable network (fibre optic, copper).</p> <p>Research and deploy new reliable and cost effective wireless technologies where feasible.</p> <p>Continue to pursue opportunities with Ministry of Ontario (MTO) to share fibre cable infrastructure along Highway 417.</p>	Public Works	Infrastructure Services	\$4.4M			<p>Current yearly communication costs are approximately \$600,000 for third party leased lines. Maintain/Enhance. Capital funding secured through ISB road reconstruction and Public Works yearly "Life Cycle Renewal Traffic Control Signals".</p> <p>Wireless is considerably less costly although some limitations on bandwidth.</p> <p>Coordinate/leverage with 417 widening.</p>



**Focus: Traffic Signal and Camera Infrastructure (Continued)**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
2 <b>Traffic Cameras</b>	<p>Continue installation of traffic cameras at critical intersections in order to monitor operations and make timing changes due to incidents.</p> <p>Explore opportunities to use traffic cameras to support traveler information systems.</p>	Public Works		\$1.9M			
3 <b>Local Traffic Control Equipment (Hardware and Software)</b>	<p>Continue replacement of aging traffic signal control equipment with new state of the art microprocessor based equipment.</p> <p>Continue development of City designed advanced traffic controller. Features to be developed/enhanced include: Accessible features, Transit Priority, IP communications, LRT, Emergency vehicle pre-emption.</p> <p>Equip critical and remote signalized intersections with Uninterrupted Power Supplies (back-up battery). Approx 5-10% of all traffic signals.</p>	Public Works		\$11.433M			<p>Ensures correct back up signal timing in place in event of loss of communications with central system.</p> <p>Allows for greater flexibility in intersection operation which benefits all users.</p> <p>Results in improved safety as lights remain operational during power loss and reduced service callouts. Currently have piloted UPS at a few selected intersections.</p>
4 <b>Traffic Signal Timing</b>	Update signal timing at every signalized intersection on a five year basis.	Public Works		\$0.4M			
5 <b>Permanent Traffic Count Locations</b>	Establish network of traffic sensors along critical arterial roadways to feed central traffic system. Will allow for more adaptable signal timing.	Public Works		\$0.825M			Allows for year round data gathering versus manual one day "snapshot" data collection.



<b>FOCUS:</b> <b>Central Traffic Control System</b>	<b>DEFINITION</b> <p>A centralized traffic control system allows for traffic signals to communicate with a central computer so that traffic signals can be synchronized, monitored and adjusted.</p>	<b>GOAL</b> <p>To continue to develop and build upon the current traffic system through annual incremental low cost updates.</p>
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>Incident response times</li> <li>Travel times through corridors</li> <li>National Traffic Signal Report Card</li> </ul>	<b>RESOURCES (2012-2021)</b> <p>Budget Requirement: \$4.332M (Capital) FTE Requirement: N/A</p>	<b>COMMENTS</b>

**Focus: Central Traffic Signal Control System**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Adaptive and Demand Responsive Signal Control Systems</b>	Explore traffic signal algorithms that automatically and continuously update traffic signal timing and offsets (synchronization) based on real time demand supplied by traffic sensors.	Public Works		\$1.25M			Will require extensive network of in-field traffic sensors (in-pavement and/or wireless/video).
2	<b>Traffic System Support "Invest in our people"</b>	Continue to invest, develop and train new and existing employees in Traffic Operations (Systems Communications and Video Section) for redundancy support for real time traffic system.	Public Works		\$0.2M			Traffic system developed and supported requires high level of technical expertise to maintain/back-up.



**Focus: Central Traffic Signal Control System (Continued)**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
3 <b>Emergency Vehicle (Fire) Pre-emption</b>	Continue to expand GPS based emergency vehicle pre-emption network.	Public Works	Fire Services	\$0.15M			System developed relies on state of the art GPS tracking technology. Limited to fire vehicles due to their size and manoeuvrability constraints.
4 <b>Traffic System Monitoring</b>	Continue to identify opportunities to improve system monitoring capabilities. This includes ability to determine when traffic signals are affected by "brown outs"/loss of power.	Public Works		\$2.532M			Low cost improvements to system software.
5 <b>Light Rail Transit Compatability</b>	Plan and engineer traffic system compitability to support future "at-grade" Light Rail applications.			\$0.2M			Where applicable, at grade LRT operations must be interfaced with signalized intersections. Co-funded through LRT.



## Emphasis Area - Traveler Information Service

### CONTEXT

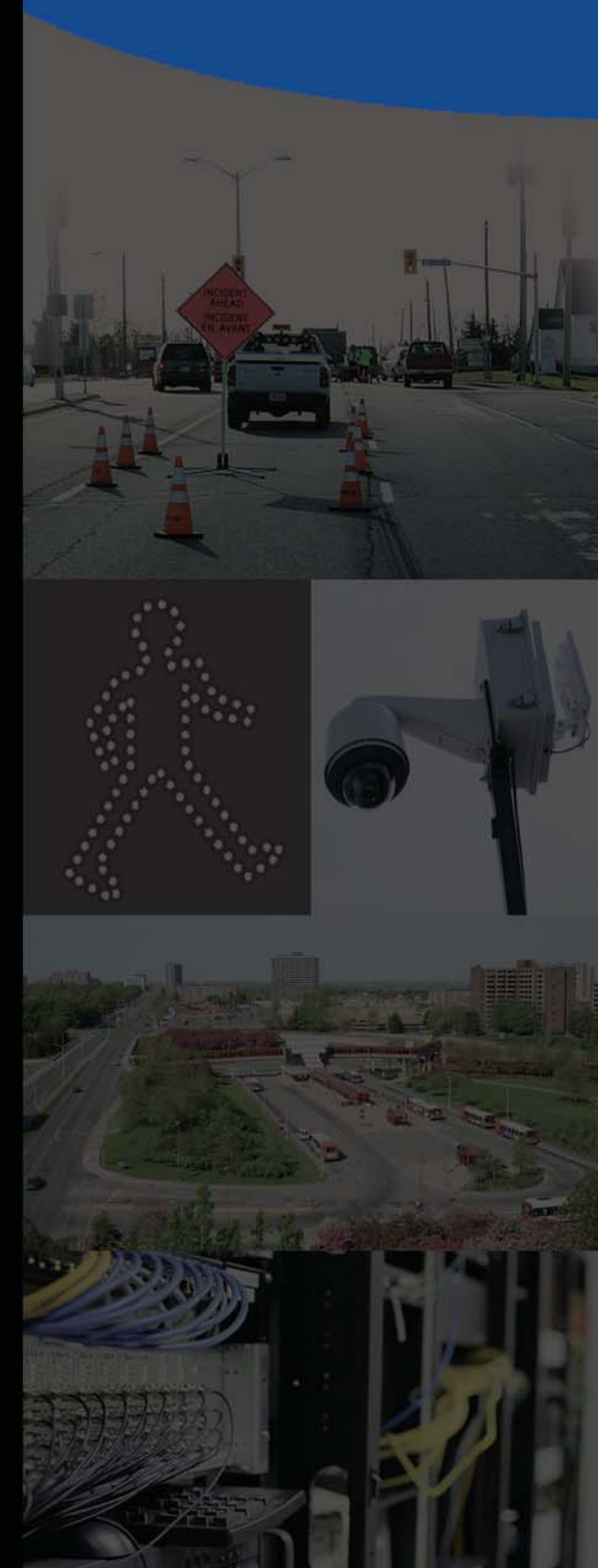
Traveler Information Services (TIS) provide the public with information concerning travel conditions and mobility options to assist in the planning before travel and conduct during travel.

Traveler information represents a tremendous opportunity to improve service to the public, and promote key policies. Comprehensive traveler information services allow travelers to plan their trip with knowledge of available travel options and conditions, and anticipate construction and weather conditions for improved safety. They support efficient operation of the transportation system, encourage modal shift where viable options exist, and increase the safety of the transportation system.

As a result of the impact that the construction of the LRT will have on the Transportation Network over the next decade, it is imperative that a robust and multi-model Traveler Information Service is in place to provide residents with continual updates on impacts of construction to pedestrians, cyclists, transit users, and motorists. All travelers within the City of Ottawa will want to retrieve their traveler information in a succinct manner. They will want to be given information on choices they can make to allow for a positive experience as they travel on the City's Transportation Network. An Interactive Traveler Information Web Service will be developed to provide the traveler with the information they want, when they want it.

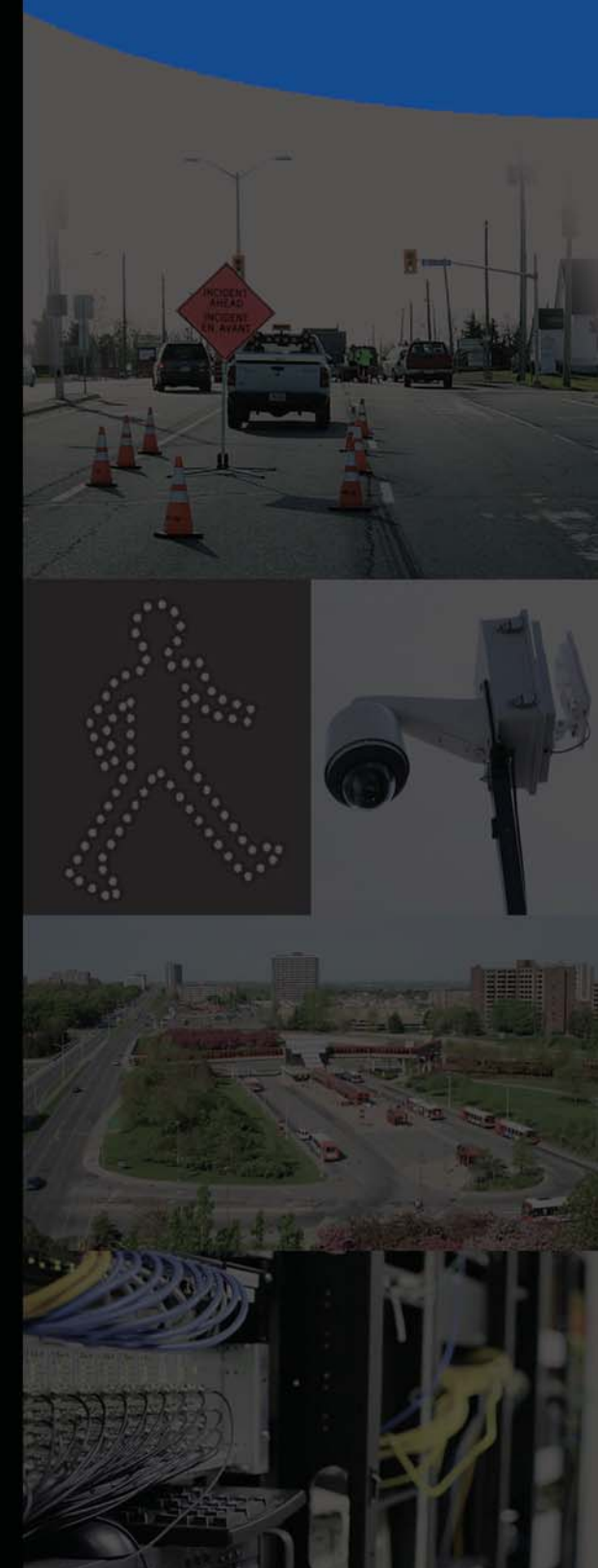
The outcome of this Emphasis Area will be a one-stop-shop of traveler information that will promote the use of non-vehicle modes of transportation and be a spring board to developing a National Capital Region Traveler Information Service that will provide traveler information to all users of the transportation network within the National Capital Area.

<b>FOCUS:</b> <b>Interactive Traveler Information Web Service</b>	<b>DEFINITION</b>  A web service that provides users with a single point of access to information on transportation options and conditions. Users can interact with the different options and services available on the different web services. This web service will be built to City of Ottawa accessibility standards.	<b>GOAL</b>  Provide interactive traveler information site that allows users to plan their travel easily regardless of their method of travel.
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>Site usage</li> <li>Number of agencies providing info</li> <li>Ease of site use</li> <li>Relevancy of info on site</li> <li>How current the info is</li> <li>User feedback</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: \$0.8M (Capital) FTE Requirement: N/A	<b>COMMENTS</b>  It is important to note that the emphasis areas and focuses were selected based on existing services, peer reviews and focus group recommendations on what travelers would like to see on the interactive website.  It is further important to note that this document may be subject to change as emerging issues and technologies evolve, the availability of resources and funding and new opportunities present themselves. Also, initiatives/programs may be subject to revisions or change once Task Teams are formed among service and information providers to plan and develop the interactive traveler website.



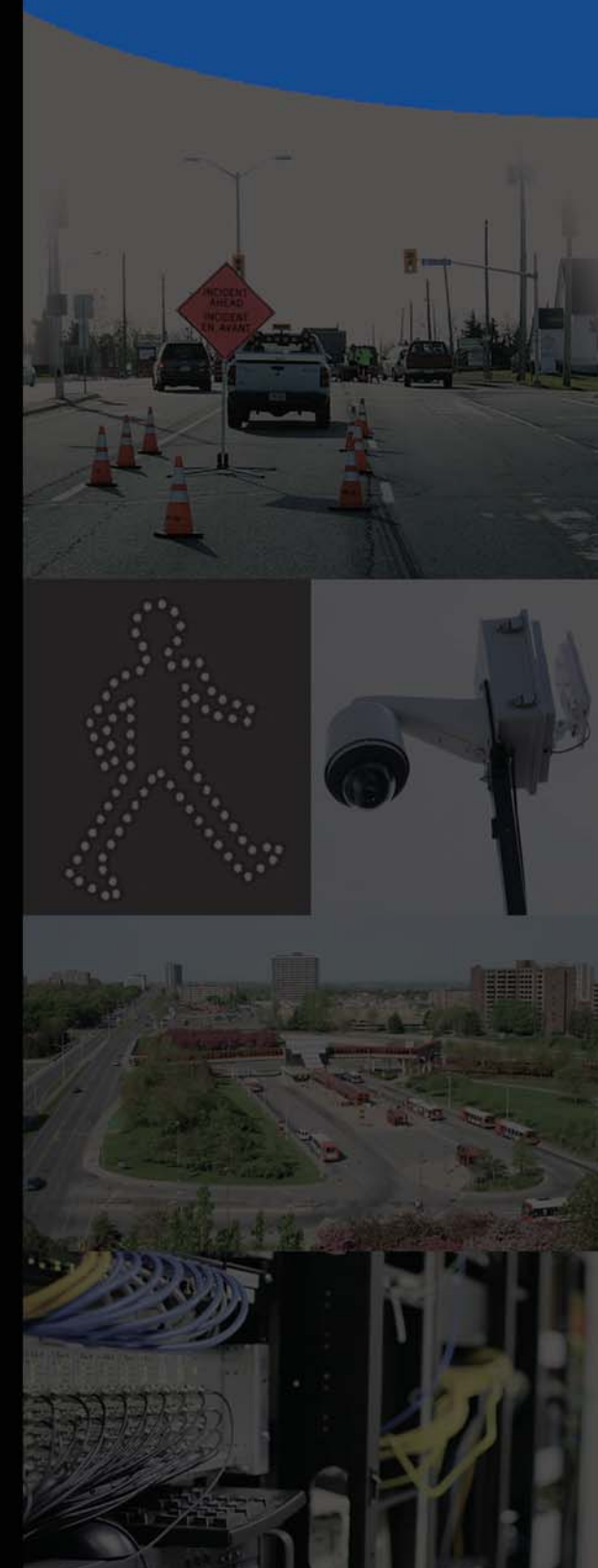
**Focus: Interactive Traveler Information Web Service**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Multi Modal Route Planner</b>	Provide interactive multi modal route planning feature using any mode of transportation.	Public Works	OC Transpo, PG&M				Users will have the choice of planning to travel by one mode or combining several modes. This includes; walking, cycling, transit driving and parking.
2	<b>OC Transpo Service Information</b>	Link to and/or integrate with OC Transpo traveler information service.	Public Works	OC Transpo				
3	<b>Light-Rail Service Information</b>	Link to and/or integrate with Light-Rail traveler information service.	Public Works	Light Rail				
4	<b>Inter-City Bus Travel Information</b>	Link to Inter-City Bus Services websites and information portals (ie. Greyhound Bus Lines).	Public Works	Greyhound				
5	<b>Inter-City Rail Service Travel Information</b>	Link to Inter-City Rail Services websites and information portals (ie. VIA Rail).	Public Works	Via Rail				
6	<b>Airport Information Service</b>	Link to Ottawa Airport traveler website.	Public Works	Ottawa Airport Authority				
7	<b>Color Coded Route Maps</b>	Show color coded roads based on various levels of congestion.	Public Works					At glance. Users will be able to tell the level of congestion of their planned travel route.
8	<b>Specific Route Subscription</b>	Provide a specific travel route real time information push.	Public Works					User will be able to subscribe to specific route and receive real time information when something happens along the route that may impact their travel.



**Focus: Interactive Traveler Information Web Service (Continued)**

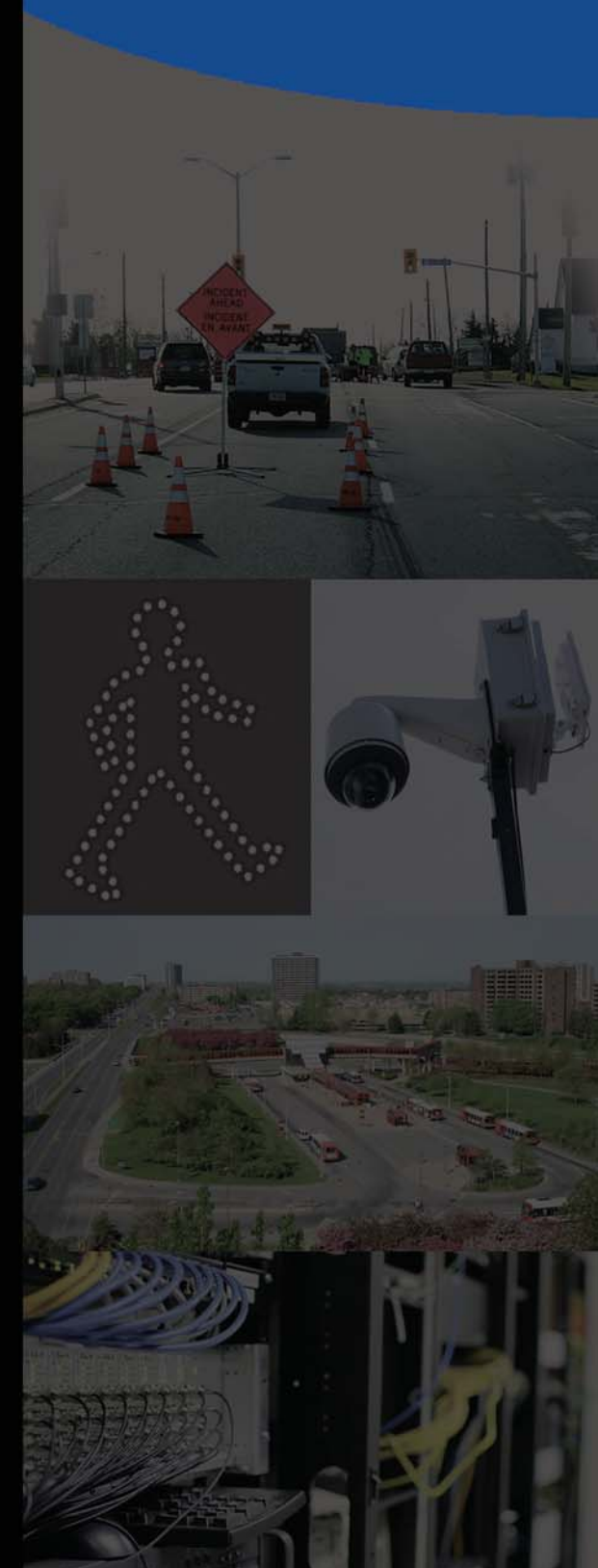
Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
9	<b>Unplanned Road Closures - Incidents</b>	Shows road closures related to unplanned events and incidents.	Public Works				Real time information and impact of unplanned road closures such as collisions, water main breaks, fires, demonstrations, etc.
10	<b>Planned Road Construction - Work Zone Information</b>	Show road closures related to planned construction work zone.	Public Works				Real time information and impact of planned road construction detours, lane closures, etc.
11	<b>Planned Special Events</b>	Show road closures related to planned special events.	Public Works				Real time information and impact of planned special event road closures, detours, lane closures, etc.
12	<b>Traffic Cameras</b>	Show streaming traffic monitoring cameras.	Public Works				Users will be able to see the road conditions along their travel route.
13	<b>Twitter Feeds</b>	Show Twitter posting feed for major construction works and emergency road closures.	Public Works				User will be able subscribe to Twitter notification for road information.
14	<b>Carpooling</b>	Integrate or link to carpooling website.	Public Works				Link to carpool information website.
15	<b>Ridesharing</b>	Integrate or link to ridesharing website.	Public Works				
16	<b>Park and Ride Lots</b>	Show park and ride lot locations and availability of spaces.	Public Works				
17	<b>Bike Share Stations</b>	Show Bike share stations.	Public Works				
18	<b>Car Share Stations</b>	Show Car share stations.	Public Works				





**Focus: Interactive Traveler Information Web Service (Continued)**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
19	<b>Parking By-Laws</b>	Show street level parking by-laws on map.	Public Works				Users will know parking hours/restriction on roads.
20	<b>Parking Facilities Locations and Availability</b>	Show locations of parking facilities and available spots.	Public Works				
21	<b>On-Street Parking Availability</b>	Provide real-time information of on-street parking in pay and display areas.	Public Works				
22	<b>Walking and Cycling Routes</b>	Show up-to-date walking and cycling routes on map.	Public Works				
23	<b>Weather Information</b>	Link to weather information services.	Public Works				
24	<b>Emergency Detour Routes</b>	Show emergency detour routes on map.	Public Works				Users will see where to detour in case of road or highway closures.
25	<b>Tourist Information</b>	Link to tourist information and attractions services.	Public Works				
26	<b>User Feedback Service</b>	Allow users to provide real-time input and feedback.	Public Works				Users will be able to provide real-time input on road conditions and general comments and questions.
27	<b>Create Resident Profiles</b>	Allow residents to create their own personalized TIS profiles from various TIS initiatives or programs.	Public Works				Users will be able to customize their TIS need and get info on their travel choice pushed to them
28	<b>Employer Connection</b>	Allow employers to subscribe to TIS feeds and redistribute it to their employees internally.	Public Works				Employers will be able to pass TIS information to their staff using their internal communication systems.



<p><b>FOCUS:</b> <b>Enhanced Traffic Incident Management</b></p>	<p><b>DEFINITION</b></p> <p>Incident management is defined as the systematic, planned, and coordinated use of human, institutional, mechanical, and technical resources to reduce the duration and impact of incidents, and improve the safety of road users, crash victims, and incident responders. These resources are also used to increase the operating efficiency, safety, and mobility of the highway by systematically reducing the time to detect and verify an incident occurrence; implementing the appropriate response; informing the road users and safely clearing the incident, while managing the affected flow until full capacity is restored.</p>	<p><b>GOAL</b></p> <p>To reduce delay and congestion caused by traffic incidents on roadways and provide travelers with real time information so they can make informed decision on how to get to their destination.</p>
<p><b>PERFORMANCE MEASURES</b></p> <ul style="list-style-type: none"> <li>• Number of incidents responded to</li> <li>• Number of TIMG Activations</li> </ul>	<p><b>RESOURCES (2012-2021)</b></p> <p>Budget Requirement: \$2.2M (Capital) FTE Requirement: N/A</p>	<p><b>COMMENTS</b></p> <p>It is important to note that the emphasis areas and focuses were selected based on existing services, peer reviews and focus group recommendations on what travelers would like to see on the interactive website.</p> <p>It is further important to note that this document may be subject to change as emerging issues and technologies evolve, the availability of resources and funding and new opportunities present themselves. Also, initiatives/programs may be subject to revisions or change once Task Teams are formed among emergency service and information providers to plan and develop the enhanced incident management.</p>

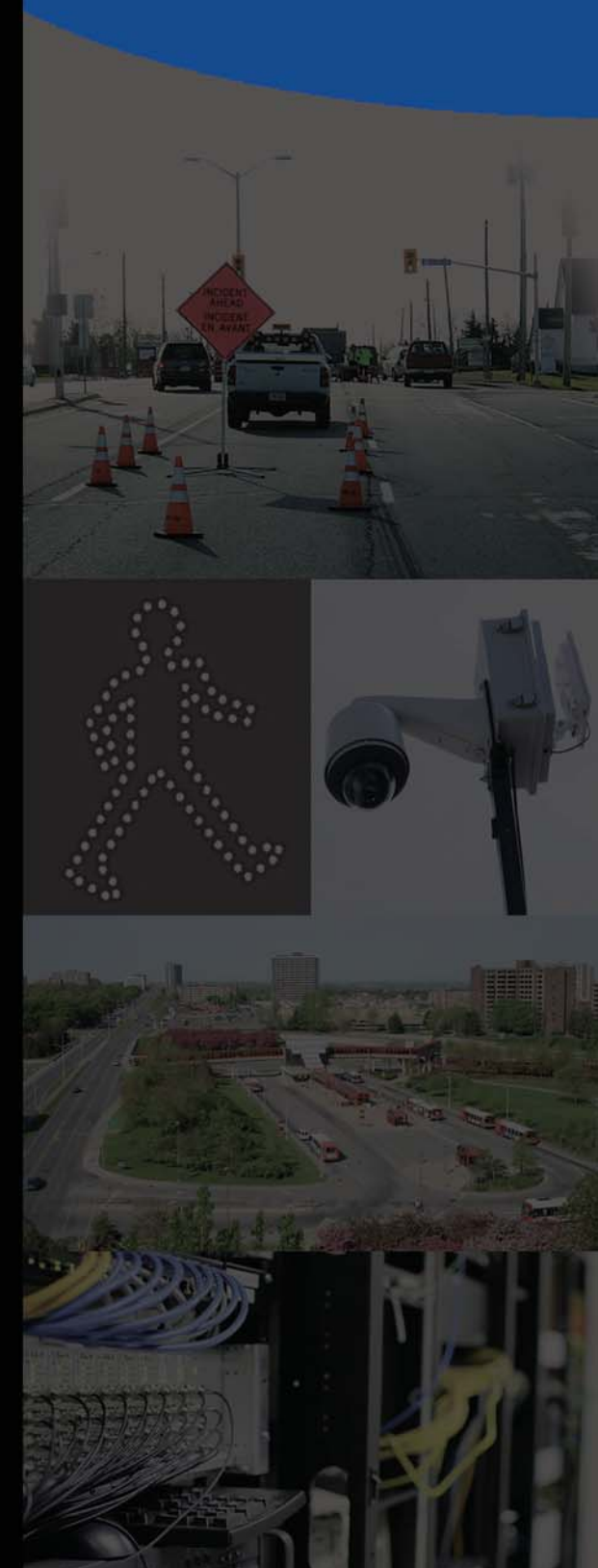
**Focus: Traffic Incident Management**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Incident Detection</b>	Implement real-time incident detection system.	Public Works	TIMG	\$0.10M			
2	<b>Incident Response</b>	Enhance incident response and activation of a planned strategy for the safe and rapid deployment of the most appropriate personnel and resources to the scene.	Public Works	TIMG				
3	<b>Traveler Information</b>	Provide timely, accurate information to roadway users about roadway conditions and alternate routes through the use of Traveler Information Services (TIS).	Public Works	TIMG				



**Focus: Traffic Incident Management**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
4	<b>Incident Clearance</b>	Enhance incident clearance in a safe and timely manner.	Public Works	TIMG				Incident clearance is the safe and timely removal of any stalled vehicles, wreckage, debris, or spilled material from the roadway and its shoulders and the restoration of the roadway to its full capacity.
5	<b>Emergency Detour Routes</b>	Enhance and implement EDR's for major bridge crossings in the city, as well as major railroad level crossings.	Public Works	TIMG	\$0.4M			EDR's minimize the impact of non-recurring incidents through the use of pre-planned alternate routes.
6	<b>Incident Data Software</b>	Procure Incident logging CADD.	Public Works	IT	\$0.10M			Incident data logging software will help with incident data and record management.
7	<b>TIMG Memorandum of Understanding (MOU)</b>	Develop a Memorandum of Understanding (MOU) among TIMG agencies to define roles and responsibilities.	Public Works	TIMG				
8	<b>Cost Sharing</b>	Establish cost sharing formulas and agreements between TIMG members.	Public Works	TIMG				
9	<b>TIMG Benefits Outreach</b>	Develop outreach materials that document the benefits of TIMG.	Public Works	TIMG	\$0.10M			
10	<b>Permanent Variable Message Signs</b>	Installation of signs at strategic locations throughout the city that will allow motorists to make informed decisions on route selection based on current conditions.	Public Works		\$1.5M			



<b>FOCUS:</b> <b>National Capital Region Integrated Traveler Information System</b>	<b>DEFINITION</b> Integrated Traveler Information Services is a system that provides users with a single point of access, by a variety of channels, to information on transportation options and conditions, regardless of the organization providing the transportation service.	<b>GOAL</b> Collaborate with traveler information content and multi modal service providers in the national capital region in order to harmonize and integrate all available traveler information data into one easily accessible point for users of transportation network. Explore the feasibility and merits of collaborating with other agencies in the NCA to develop. If deemed feasible to move forward with ITS with other NCAs the initiative identified below will be implemented.
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>• Service usage</li> <li>• Number of agencies providing info</li> </ul>	<b>RESOURCES (2012-2021)</b> Budget Requirement: N/A FTE Requirement: N/A	<b>COMMENTS</b> It is important to note that the emphasis areas and focuses were selected based on existing services, peer reviews and focus group recommendations on what travelers would like to see on the interactive website. It is further important to note that this document may be subject to change as emerging issues and technologies evolve, the availability of resources and funding and new opportunities present themselves. Also, initiatives/programs may be subject to revisions or change once Task Teams are formed among service and information providers to plan and develop the interactive traveler website.

**Focus: National Capital Region Integrated Traveler Information System**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Multi-Jurisdictional Steering Committee</b>	Explore the feasibility and merits of a steering committee that will develop a one-stop-shop traveler information system for travelers within the National Capital Region.	Public Works					Members would include staff from Cities of Ottawa and Gatineau, Province of Ontario, Quebec, NCC and Public Works and Government Services Canada.
2	<b>National Capital TIS Portal</b>	Explore the feasibility of a complete multi modal traveler information service. A one-stop-shop for traveler information in the National Capital Region.	Public Works	PG&M, OC Transpo, MTO, MTQ, NCC				Information will be provided by multi-modal service providers such as City of Ottawa, Gatineau, Ontario, Quebec, NCC, OC Transpo, STO and vulnerable user partner agencies.



**Focus: National Capital Region Integrated Traveler Information System (Continued)**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments	
				Capital	Operating	FTE		
3	<b>Accessible TIS</b>	Explore a system with no limitations on mediums and methods to deliver a comprehensive and integrated transportation information system to the traveling public.	Public Works	PG&M, OC Transpo, MTO				This information will be available by interactive website, mobile applications for smart phones and tablets, at self-serve kiosks in hotels, airport and public places. Also, this information will be provided by way of interactive voice recording (IVR).
4	<b>Sharing of Real-Time Traveler Information</b>	Developing protocols and procedures that would allow jurisdictions to change information within another jurisdictions roadway informing motorists of real-time traveler information.	Public Works					Although various agencies share their information, the ability to change traveler information on other jurisdiction systems is not in place. This initiative would allow real-time information to be relayed to the travelling public in a more efficient manner.
5	<b>511 System</b>	Working with the Province of Ontario and Quebec to develop a 511 Traveler Information System for National Capital Region.	Public Works					Province has the mandate to develop Regional 511 systems.
6	<b>Pushing Out Traveler Information</b>	Integrating systems to allow traveler information to be pushed out to travelers within the National Capital Region regardless of where they are or want to go.	Public Works					



## Emphasis Area - TSM Innovation, Collaboration and Technology Solutions

### CONTEXT

TSM strategy recognizes the importance of selecting and implementing technologies that are affordable, scalable, proven in real world applications, have recognized standards, with low maintenance and operating costs. The strategy also calls for the building and maintaining of a high-quality, *real-time traffic and traveler data* collection, archiving and management solutions.

Over the next 15 years, new technologies will appear that are not present today. This emphasis area will ensure the City's sustained commitment to continue to be leading edge in TSM in North America. It ensures that innovation is at the forefront and partnerships and collaborations with the private sector and academia in researching and evaluating of new technologies are continually identified and explored.

<b>FOCUS:</b> <b>Collaboration with External Stakeholders</b>	<b>DEFINITION</b>  Collaborating with external stakeholders (private sector or academia) to ensure that the City continues to be at the forefront in its use of TSM technologies.	<b>GOAL</b>  The City will collaborate with external stakeholders on emerging technologies that will enhance TSM in the City of Ottawa.
<b>PERFORMANCE MEASURES</b>  <ul style="list-style-type: none"> <li>• Number of initiatives worked on with private sector</li> <li>• Number of initiatives worked on with academia</li> <li>• Number of Initiatives deployed through partnerships with private sector or academia</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: \$1.0M (Capital) FTE Requirement: N/A	<b>COMMENTS</b>  It is important to note that the emphasis areas and focuses were selected based on existing services, peer reviews and focus group recommendations. This document may be subject to additions/change as emerging issues and technologies evolve, the availability of resources and funding and new opportunities present themselves.



**Focus: Collaboration with External Stakeholders**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
1 <b>TSM Advisory Group</b>	Create a Transportation System Management advisory group that will assist the City to review, evaluate, and pursue emerging technologies that could benefit TSM.	Public Works	EPS, PGM, Advisory Groups, Private Sector, Universities, Research Centers				TSM Advisory group will include all major transportation agencies and service providers in the national capital region, transportation related technology firms, universities pedestrian, cycling and accessibility advocacy groups, etc.
2 <b>Support External TSM Related Projects</b>	Fund and participate on TSM related projects led by external agencies.	Public Works	TAC, ITS, OTC	\$0.1M			Participate the Technical Advisory Committee of TSM projects led by Transportation Association of Canada, ITS Canada, Ontario Traffic Council, etc.
3 <b>Collaboration/ Partnerships with Private Sector</b>	Foster a partnership with the private sector for the research and development of TSM technologies and services.	Public Works	Private Sector	\$0.45M			Controlled partnerships with third party technology solution developers in the private sector are seen as a means to lessen the burden on municipalities to create the perfect application for their data.
4 <b>Collaboration/ Partnerships with Academic Institutions</b>	Foster a partnership with academic institutions for the research and development of TSM technologies and services.	Public Works	Academia Research Centers	\$0.45M			Collaboration with academic institutions fosters innovation, provides forum to test new technologies and fosters new ideas to be thought of.
5 <b>TSM Education/ Awareness Campaign</b>	Raising the awareness of TSM by working in conjunction with the Centre of expertise in Transportation or universities to organize seminars, developing an informative web site, etc.	Public Works					Educating residents on the benefits of TSM strategies and how these strategies enhance safety, efficiency and convenience of the transportation network.



**Focus: Collaboration with External Stakeholders (Continued)**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
6	<b>Third Party Funding of ITS Initiatives</b>	Seeking opportunities to receive grants to undertake ITS initiatives.	Public Works				Identifying opportunities with private sector, Academia, Provincial and Federal Levels of Government to fund City lead ITS initiatives.	





<b>FOCUS:</b> <b>Innovative TSM Technologies and Services</b>	<b>DEFINITION</b> <p>There is an increase in new technologies and services being developed. In some areas, such as <i>mobile apps, travel time, and traffic prediction systems</i>, the private sector is ahead of the public sector agencies. This focus area ensures that the City continues to be at the forefront and leading edge of TSM technologies.</p>	<b>GOAL</b> <p>The City is always evaluating new technologies and services thereby improving TSM outcomes for all users of the road network.</p>
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>Number of evaluation of new technologies</li> <li>Implementation of new technologies</li> </ul>	<b>RESOURCES (2012-2021)</b> <p>Budget Requirement: \$3.025M                      FTE Requirement: N/A</p>	<b>COMMENTS</b> <p>It is important to note that the emphasis areas and focuses were selected based on existing services, peer reviews and focus group recommendations. This document may be subject to additions/change as emerging issues and technologies evolve, the availability of resources and funding and new opportunities present themselves.</p>

**Focus: Innovative TSM Technologies and Services**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Traffic Data Gathering Equipment</b>	Collection of pedestrian, cycling, transit and vehicle data using technologies such as wireless, video, gps, etc.	Public Works		\$0.8M			Utilize video to collect pedestrian, cycling, transit and vehicle data.
2	<b>Incident Detection Systems</b>	Explore systems that will be able to detect incidents automatically and to predict when incidents may occur in the future.	Public Works		\$0.5M			Systems that will be able to detect incidents automatically and to predict when incidents may occur in the future.
3	<b>Highway Advisory Radio Systems</b>	Explore feasibility of using radio system to provide traveller information and to provide real time updates on traffic conditions.	Public Works	EPS	\$0.5M			Opportunity to utilize this system to inform public when an emergency occurs.



**Focus: Innovative TSM Technologies and Services (Continued)**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
4	<b>TIS Information for Pedestrians/ Cyclists</b>	Explore GPS technology to help guide pedestrians or cyclists through the City's recreational pathways.	Public Works				Using technology which could link to a GPS and help guide pedestrians or Cyclists through the City's pathway system using audio prompts.
5	<b>Wireless Data Collection Technology</b>	Explore wireless technologies to collect travel times along arterial corridors.	Public Works				Wireless technologies include Blue Tooth, GPS, Cell Data, Radar, etc.
6	<b>Intelligent Vehicle Technologies</b>	Explore opportunities to leverage advancement in intelligent Vehicle technologies (ie. vehicle to infrastructure and vehicle to vehicle).	Public Works				
7	<b>Data Sharing with External Third Party Application Developers</b>	Sharing data to third party developers to enhance their applications so that travelers of the City have the most up-to-date information.	Public Works	ISD, OPS			Controlled data sharing with third party developers under the Open Data policy. Examples include raw data on construction projects, unplanned road closures, special events, etc.



## Emphasis Area - Minimum Maintenance Standards and Best Practices

### CONTEXT

Minimum Maintenance Standards ("MMS") were implemented by the Province of Ontario in 2002 to assist municipalities with managing risk associated with the maintenance of roads and as a defence from claims citing negligence. If a municipality wishes to use the MMS as a legal defence against statements of claim for non-repair, the municipality must demonstrate that it met the standard of care in the MMS. Ontario Regulation 239/02, along with pursuant amendments, covers among other items maintenance standards for traffic signals and traffic signs. Pavement markings are not covered under minimum maintenance standards.

<b>FOCUS:</b> <b>Traffic Control Signals</b>	<b>DEFINITION</b>  Traffic control signal systems and sub-systems are covered under MMS Ontario Regulation 239/02, s. 13 and 14, respectively. They were enacted in 2002.	<b>GOAL</b>  To maintain and operate traffic signal infrastructure in the safest and most cost effective manner possible.
<b>PERFORMANCE MEASURES</b>  <ul style="list-style-type: none"> <li>• Response times</li> <li>• Risk Management</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: N/A FTE Requirement: N/A	<b>COMMENTS</b>



**Focus: Traffic Control Signal Systems and Sub-Systems**

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
1 <b>Traffic Signal Re-Lamping</b>	City forces currently replace all incandescent signal bulbs, clean signal lens, and inspect signal hardware on an annual basis.	Public Works					Ongoing replacement of incandescent signal bulbs with Light Emitting Diodes (in order to reduce energy consumption) will still require yearly cleaning of signal lens and inspection of hardware.
2 <b>Inspect, Test and Maintain Conflict Monitors</b>	Conflict monitors are installed in all traffic signal controller cabinets and continually check for conflicting signal indications and respond to a conflict by emitting a signal.	Public Works					City forces currently conduct on-site inspection and testing of conflict monitors once per year at all signalized intersections. MMS recommend testing every 5 to 7 months and at least twice per year.
3 <b>LED (Light Emitting Diodes) Replacement</b>	Replacement of LED signal displays.	Public Works					Requirement to start replacing first generation of LED fixtures as they will have reached the end of their warranty period.



<b>FOCUS: Traffic Signs</b>	<b>DEFINITION</b>  Traffic signs are covered under MMS Ontario Regulation 239/10, s. 11. They were enacted in February 2010.	<b>GOAL</b>  To create a traffic sign inventory and traffic sign inspection program.
<b>PERFORMANCE MEASURES</b>  <ul style="list-style-type: none"> <li>Response times</li> <li>Risk Management</li> </ul>	<b>RESOURCES (2012-2021)</b>  Budget Requirement: \$1.5M (Operating) FTE Requirement: N/A	<b>COMMENTS</b>

**Focus: Traffic Signs**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Traffic Sign Inspection Program</b>	Create a traffic sign inspection program. Inspection options include the use of a reflectometer or visual inspection by trained personnel.	Public Works			\$1.25M		The City currently has a limited sign inspection program. Funding for Purchased services & Materials.
2	<b>Traffic Sign Inventory</b>	Create a data management system for traffic signs.	Public Works			\$0.25M		It is estimated that there are upwards of 500,000 signs located on City roads.



<b>FOCUS:</b> <b>Pavement Markings</b>	<b>DEFINITION</b> Roadway pavement markings are not covered under MMS Ontario Regulation 239/02.	<b>GOAL</b> To maintain pavement markings on roads and intersections in order to create a safe environment for pedestrians, cyclists and motorists.
<b>PERFORMANCE MEASURES</b> <ul style="list-style-type: none"> <li>Risk Management</li> </ul>	<b>RESOURCES (2012-2021)</b> Budget Requirement: \$1.5M (Operating) FTE Requirement: N/A	<b>COMMENTS</b>

**Focus: Pavement Markings**

	Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
					Capital	Operating	FTE	
1	<b>Roadway Markings (Longitudinal and Transverse)</b>	All roadway markings are applied once per year. This includes yellow dividing lines, white lane lines, edge lines, bike lanes, and cross hatching.	Public Works					
2	<b>Intersection Markings</b>	Intersections, signalized and unsignalized, are painted twice per year.	Public Works					



### Focus: Pavement Markings (Continued)

Initiative or Program	Action Description	Lead Agency	Support Team	Resources (2012-2021)			Comments
				Capital	Operating	FTE	
3 <b>Water Based Pavement Markings</b>	Environment Canada recently mandated that by 2012 all road paint must have reduced VOC (volatile organic compounds) concentration.	Public Works					Current water based paints cannot be applied during cold weather thereby dramatically reducing seasonal window for application. Explore new thermoplastic pavement markings technologies that offer longer life span (3+ years), albeit at higher costs.

