

Collaborative Intelligent Transportation Systems (ITS) Initiatives with Neighbouring Jurisdictions

Date:	March 21, 2011
To:	Public Works and Infrastructure Committee
From:	General Manager, Transportation Services
Wards:	All
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SUMMARY

The purpose of this report is to provide information on multi-jurisdictional Intelligent Transportation Systems (ITS) initiatives that can benefit the City of Toronto and to seek approval for the City to undertake joint projects with other Greater Toronto Area (GTA) municipalities and the Provincial government in furtherance of the City's ITS goals and objectives.

RECOMMENDATIONS

The General Manager of the Transportation Services Division recommends that:

1. Transportation Services Division staff be authorized to discuss and implement collaborative Intelligent Transportation Systems (ITS) initiatives with transportation and transit agencies of neighbouring jurisdictions such as the Ontario Ministry of Transportation (MTO), the Regional Municipality of York, the Regional Municipality of Peel, the Regional Municipality of Durham, the City of Mississauga, and the City of Brampton;
2. The appropriate City officials be authorized to enter into legal / cost-sharing agreements with transportation and transit agencies of neighbouring jurisdictions to facilitate the implementation of collaborative ITS initiatives; and
3. Any multi-jurisdictional ITS initiatives, which have financial implications, be incorporated into future Transportation Services budget programs and brought forward to City Council for consideration.

Financial Impact

There are no financial implications from the adoption of this report. Any costs associated with collaborating in multi-jurisdictional ITS initiatives will be identified in the Transportation Services Division's future Capital and Operating budget estimates for consideration by City Council.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

Toronto City Council, April 25, 2006, Works Report 2, Clause 3, Status of Intelligent Transportation Systems Technology in the City of Toronto Recommendation No. 1b.

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060425/wks2rpt/cl003.pdf>

ISSUE BACKGROUND

Many road users, including transit vehicles and freight, travel across more than one jurisdiction on a single trip. For instance, a commuter may travel from Highway 7 (York Region) to Highway 404 (Ontario Ministry of Transportation) and down the Don Valley Parkway (City of Toronto) to get to downtown Toronto.

Any traffic management initiatives which facilitate the seamless travel across the boundaries between adjacent jurisdictions in the GTA would be of benefit to all road users and should therefore be supported.

COMMENTS

Overview of Intelligent Transportation Systems (ITS)

Toronto City Council, April 25, 2006, Works Report No. 2, Clause No. 3, Status of Intelligent Transportation Systems Technology in the City of Toronto outlined the benefits of ITS in the City of Toronto.

ITS is one approach to optimizing the use of the existing transportation network in our efforts to maintain acceptable mobility levels. ITS uses technology – computers, communications and sensor technologies - to assist and/or to increase mobility for all users of the transportation network. An example of ITS implemented in Toronto is our Road Emergency Services Communications Unit (RESCU) Advanced Traffic Management System (ATMS). It consists of cameras, large overhead electronic changeable message signs (CMS), vehicle detector systems (VDS), and the communication system infrastructure. The RESCU ATMS reduces incident response time, provides traveler information (via CMS, phone, email, media and website) and reduces motorists' travel times. Other examples are the introduction of pedestrian

countdown signals, the installation of electronic queue-end warning signs on Allen Road, installation of transit priority on some transit routes, etc.

The Need for Multi-jurisdiction Collaboration

As indicated earlier in this report, as our roads are connected seamlessly, motorists do not encounter any physical boundaries when crossing Steeles Avenue to enter into York Region, when traveling on Eglinton Avenue West from Toronto into Mississauga or when crossing the Rouge River from Pickering. As such, ITS initiatives such as traveler information, traffic management, construction planning, adaptive traffic control and signal timing coordination should also be seamless across jurisdictions. These systems can be much more effective when applied region-wide, rather than individually within a jurisdiction. Isolated systems and management/ decision processes generally result in poorer service and increased costs to the travelling public. This could manifest itself in numerous ways. Examples are:

- Increased congestion on the overall network.
- Use of full capacity on some components of the network while others have capacity to spare.
- Overall difficulty in moving transit vehicles effectively through mixed traffic thus reducing the attractiveness of transit.
- Lost opportunities for integrated transit services – crossing boundaries, coordinating routes, integrating fares.
- No cross boundary transit priority or bus-rapid transit service.
- The need for travellers to visit multiple web sites – or call multiple telephone services to access all available information on road conditions for their trips.
- Work zones on parallel or detour routes.
- Differences in traffic signal timing approaches and no synchronization between jurisdictions causing traffic disruption on cross-boundary roads.
- Lost opportunities to take advantage of scale of purchase economies by coordinating among jurisdictions.
- Little priority management of maintenance operations with respect to optimizing traffic conditions.
- Limited traffic related data sharing.

Multi-jurisdiction ITS Initiatives:

There are many traffic management initiatives which are underway or being considered by one or more jurisdictions within the GTA.

Traveler Information Systems (TripInfo / 511)

The City of Toronto has been providing a telephone based advanced traveller information service for over ten years. This service primarily provides traveller information through an Interactive Voice Recognition System for City of Toronto roads. The Voice Message System can currently be accessed by dialling 416-599-9090. In its current form, TripInfo is of limited use to travelers as it covers only City roads. It would provide much better value to travelers if it would include information on provincial roads such as Highway

401, Highway 404, Highway 427 and the Queen Elizabeth Way and main roads in neighbouring jurisdictions.

The MTO is currently developing a province-wide 511 system, whereby travelers will be able to get up-to-date traffic, road and weather information anywhere in the Province by dialing 511. While it is anticipated that the TripInfo system will eventually be integrated into 511, significant work will be required to achieve this. As such, collaboration (e.g., in the 511 Steering Committee) as well as a cost sharing agreement between the City and MTO, will be required to facilitate such integration work. Therefore, until the 511 system is implemented as planned in 2013, there is benefit to include coverage of the province's GTA highways in TripInfo.

Sharing of Traffic Data and Videos

Often, managing traffic in one jurisdiction requires knowledge of traffic conditions in an adjacent municipality. For instance, the City's Traffic Management Centre's operators managing the Gardiner Expressway should be aware of any incidents on the QEW. The QEW is managed by the MTO COMPASS Traffic Management Centre in Burlington. While there is a manual process whereby the TMCs notify each other by phone, such notification could be made seamless and consistent if the TMCs were connected by centre-to-centre technology so that information would flow automatically.

The City is already connected to the MTO COMPASS TMC in Downsview via a fibre-optic link. This link has proved to be effective in helping the City manage major special/emergency events such as the World Youth Days, the SARS Concert, the G20 event and the Sunrise Propane Explosion. Transportation Services wish to expand the connection to Burlington COMPASS, Durham Region TMC and the proposed York Region TMC.

Sharing of Traffic Control Centres Resources

Currently the City of Toronto TMC and MTO COMPASS TMCs in Burlington and in Downsview are all operating 24 hours a day, 7 days a week. With the sharing of traffic data and videos in place, jurisdictions could achieve cost savings by operating only one or two of the TMCs when traffic is light in the region, such as from midnight to 5a.m. It might also be possible to share resources, staff and best practices and to provide back-up emergency coverage if one of the centres is temporarily not available.

Cross-Jurisdiction Travel Time Display on Changeable Message Signs

Many travelers on our major expressways travel to and from other jurisdictions, as such, displaying travel times required to reach other jurisdictions would be quite helpful. For instance, the City's westbound Changeable Message Signs (CMS) on the Gardiner Expressway could potentially display travel times required to reach Mississauga, based on traffic data which is collected from the MTO. Similarly, the MTO could utilize the City's traffic data to determine travel times needed to arrive in downtown Toronto and display that on the CMS on the eastbound QEW.

Construction Planning

The City and MTO meet regularly to discuss road disruption issues, arising from construction activities that may affect each other's highways, thus ensuring that major expressway closures do not occur concurrently. Also, MTO and the City proactively use their CMS to advise motorists of planned or active closures on each other's expressways.

All jurisdictions in the GTA could benefit by a central single database which would be the "master" source of road construction information in the area. Such a master database can facilitate the coordination of road closures so that neighbouring jurisdictions can utilize the same time frame for road closures to avoid the simultaneous closing of two parallel major roads.

Cross-Jurisdiction Traffic Signal Coordination

Traffic signal coordination is necessary to maintain the smooth flow of traffic. Currently signals are coordinated in their respective jurisdictions, usually with no consideration of the signal timing of neighbouring signals in another neighbouring jurisdiction. While the City has worked with York Region to coordinate signals across Steeles Avenue, these initiatives have been limited. Having a cross-jurisdiction project to coordinate signals near the jurisdiction boundaries could have significant benefits in alleviating traffic congestion.

Adaptive Signal Control

The City of Toronto has implemented adaptive signal control (which automatically derives and implements the appropriate signal timings in response to unanticipated variations in traffic) on six routes that either border or cross into adjacent municipalities – Bayview Avenue, Yonge Street, Don Mills Road, Eglinton Avenue, The Queensway and Steeles Avenue. Neighbouring municipalities have expressed interest in expanding adaptive traffic control across boundaries to accommodate the flow of traffic.

Metrolinx ITS Committee

Metrolinx is the provincial organisation that manages road transport and public transportation agencies in the GTA and Hamilton Area. Metrolinx has taken the lead in forming a new multi-agency liaison group called the GTA and Hamilton Area Transportation Coordinating Committee (GTCC) which will address a wide range of ITS deployments in the region. The group is chaired by Metrolinx and comprises all Area municipal traffic and transit managers and MTO. Since the primary focus of the GTCC is related to the business functions of Toronto's TMC, the Manager of Urban Traffic Control Systems is designated as the Transportation Services Division's representative on the GTCC.

CONCLUSIONS

This report identifies multi-jurisdiction ITS initiatives which have strong potential to contribute towards improved transportation mobility, safety and cost savings in the GTA. Region-wide application of ITS technology is particularly valid given the increasing transportation needs with limited opportunity to expand the road infrastructure.

Transportation Services Division staff will continue to work towards these multi-jurisdiction ITS deployments in full collaboration with other City of Toronto stakeholder Divisions and Agencies as well as those of the neighbouring jurisdictions and if approved, enter into appropriate agreements that provide benefit to users of roads in the City of Toronto and across the adjacent boundaries.

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