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INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PROJECTS

The Transportation and Works Committee recommends the adoption of the recommendations contained in the following report, June 1, 2006, from the Commissioner of Transportation and Works:

1. RECOMMENDATIONS

It is recommended that:

1. The appropriate Regional staff be directed to meet with transportation agencies of neighbouring jurisdictions (Ministry of Transportation, City of Toronto, Region of Peel, Region of Durham etc.) to explore collaborative Intelligent Transportation Systems Initiatives in the Greater Toronto Area and Hamilton (GTAH),
2. The Regional Clerk forward this report to the Clerks at the Regions of Peel, Halton, Durham, Minister of Transportation, and Cities of Toronto and Hamilton.

2. PURPOSE

This report provides Council with information related to the Intelligent Transportation System (ITS) projects being completed by the Region.

3. BACKGROUND

Intelligent Transportation System (ITS) technologies provide staff with another tool to monitor, manage traffic flow, manage congestion, and provide alternate route information to travelers, as well as save lives, time and money. ITS technology helps staff collect, analyze, and archive data about the performance of the road system. With this data messages can be relayed to drivers through ITS technologies enhancing traffic operators' ability to respond to incidents, adverse weather or other capacity constricting events.

In November 1999, Transport Canada unveiled Canada's comprehensive ITS strategy. Canada's ITS Vision is to create an environment that will stimulate the collaborative development and deployment of ITS across urban and rural areas. To achieve this vision, Transport Canada established a Strategic Highway Infrastructure Program (SHIP) which provided funding for approved projects of 50%, up to a maximum \$250,000. The Region has been successful in obtaining federal funding for four separate projects for a total \$1.0 million from Transport Canada. Table 1 outlines projects which have been awarded funding within the SHIP program.

Table 1
ITS Projects

Year	Project	Transport Canada 50% Funding
2002	Traffic Responsive Control Signal	Yes
2003	Transit Signal Priority	Yes
2004	Remote PDA	Yes
2005	Adaptive Signal Control	Yes

3.1 Traffic Responsive Control Signal (TRC)

A TRC system was implemented along Jane Street and Weston Road parallel to Highway 400 between Highway 7 and King Road. The objective of this initiative was to design and implement a system capable of initiating appropriate signal timing plans automatically from among a predetermined library of timing plans in response to incidents along Highway 400. In addition a series of closed circuit television (CCTV) cameras were implemented along the corridor to validate incidents. A detailed model comparing TRC and typical signal timing patterns indicate an average reduction in delay of 15% and 25% fewer stops are attributed to TRC. Since the implementation of this system, there have been no major incidents along Highway 400 requiring closure. However, this strategy has evolved into a new more responsive ITS strategy, adaptive signal control the subject of a current Transport Canada funded program.

3.2 Transit Signal Priority (TSP)

TSP reacts to the presence of a bus in near proximity to the traffic control signal and provides transit vehicles with a longer “green” time through congested corridors to effectively decrease transit travel times. This TSP project provided a pilot deployment project along York Region Transit (YRT) route 85/85A, which operates primarily on 16th Avenue/Carrville Road between Mural Street/Vogel Road and Bathurst Street in the Town of Richmond Hill. Having completed this project, staff gained significant experience in the design and deployment of TSP systems. The TSP results showed a reduction in the travel time through the corridor thus reducing the delay at signalized intersections. In addition, this experience allowed the Region to move more effectively towards the design and deployment of a more advanced TSP system, which uses a similar optical based selective detection technology, through the YRTP Quick Start program.

3.3 Remote Access PDA (RAPDA)

The RAPDA project allows staff to resolve concerns reported by the public regarding signal malfunctions and timing quickly. This project allows staff to modify intersection signal timing and analyze data via the latest wireless communication technology to the centralized traffic control system central server. It is expected this project will be completed during the summer of 2006 and provide staff with technology to efficiently and effectively fix malfunctions and change signal timing while at the site.

3.4 Adaptive Signal Control (ASC)

A pilot corridor of ASC is being implemented along Kennedy Road between Avoca Drive and Clayton Drive. ASC accurately monitors traffic patterns and optimizes signal timing parameters in response to changing on-street traffic volume patterns. By comparison, typical traffic control signal timing is pre-determined and defined for traffic control signals along the Regional road network. It is expected this project will be completed during the summer of 2006.

Most recently, on November 28, 2005 the Federal government announced that Transport Canada along with York Region and other municipalities in the Greater Toronto Area (GTA) would be studying opportunities for integrating traffic management systems in the Region. This opportunity is also being funded using the SHIP model.

4. ANALYSIS

During 2006, staff will be conducting an integrated transportation operations project and ITS strategic plan.

4.1 Integrated Transportation Operations

Each road authority within the Greater Toronto Area and Hamilton (GTAH) designs, implements and operate various strategies using ITS technologies. Traditionally, these various technologies operate within their own municipality and are not usually integrated with neighbouring jurisdictions. Because of the lack of integration travellers experience congestion and lack of information along jurisdictional boundaries.

As a result, the Region arranged and hosted an inaugural meeting of all GTAH municipalities. The objective of this meeting was to discuss how various ITS solutions in the GTAH could be integrated to provide effective centre-to-centre communication to manage congestion. The meeting, consisting of staff from all GTAH municipalities, City of Hamilton, Ministry of Transportation (MTO) and Transport Canada, was well received and it was decided to formalize the meetings under the Region's leadership.

The Region, Transport Canada, MTO, and GTAH municipalities have agreed to take part in a collaborative project to examine approaches to ITS integration. The GTAH ITS Integration Committee has a clear mandate to examine how the GTAH region can enhance traffic management initiatives and address issues of urban congestion through integration. The project will outline areas of opportunities for the GTAH to build stronger linkages with different ITS-based transportation operations. This project consists of the following 2-phases:

Phase 1 – Develop Overall Integration Model (Completion Q1 2007)

- Investigate best practices and integration solutions from all over North America and incorporate applicable principles to ITS integration model.

- The strengths and constraints of the “ultimate” theoretical model will be assessed through two expert panel workshops.
- The theoretical model will be refined according to recommendations and findings from expert workshops to develop a functional “interim” model which takes into consideration the current ITS environment and technologies in Ontario.
- Cost-sharing formula between municipalities, MTO and Transport Canada of which the Region’s contribution is approximately \$10,000.

Phase 2 – Development of a Prototype and Deployment Plan (Completion 2008)

- Request for proposal process to provide deliverables required to initiate steps towards the deployment phases of the ITS Integration project.
- Three stages:
 - Update and expand on ITS Inventory in GTAH and develop regional ITS Architecture
 - Deployment plan
 - Business case
 - Stakeholder management plan
 - Prototype

4.2 ITS Strategic Plan

Over the past few years, the Region has been successful in obtaining funding for various ITS projects. Although each of these projects has stood alone and been successful, there is a need to have a strategic plan for the future deployment and integration of ITS initiatives. This strategic plan will also provide for co-ordination of projects and facilitate the integrated transportation study, as discussed in Section 4.1, being conducted.

The ITS plan will identify goals and directions for ITS technologies for the next ten years. The plan will also provide the basis for any future applications for Transport Canada funding initiatives. This ITS strategic plan be completed in the summer of 2007. The benefits associated with completing an ITS strategic plan are consistent with strategic planning projects which include the following:

- Define and establish goals and objectives for implementation.
- Communicate goals and objectives to the organization’s constituents.
- Ensure the most effective use is made of ITS technology by focusing the resources on the key priorities.
- Provide a base from which progress can be measured and establish a mechanism for informed change when needed.

The development of the plan will be lead by a consultant and will include the following:

4.2.1 Coalition Building

For strategic planning on a regional basis, all stakeholders, including the transportation agencies, decision makers, large employers as well as the public are encouraged to buy-in

to the ITS process, and work together as a coalition. They must be afforded the opportunity to provide input into the planning and system design process. The various stakeholders will possess their own agendas, priorities and policies. The pivotal point of the planning will be measured by the success and co-operative manner in which the coalition can work together, share ideas openly and reach compromises.

4.2.2 Opportunities Analysis

The purpose of this task is to review the user services and their relative priorities from an operational perspective to determine how the ITS Strategic Plan is to be deployed, operated and maintained in the short, medium and long terms within the constraints of the Region's jurisdictions and related boundaries.

4.2.3 Develop the Architecture to Support the ITS Program

The Canadian ITS architecture provides a unified framework for integration to guide the co-ordinated deployment of ITS programs within the public and private sectors. The architecture describes interaction among physical components of the transportation systems including travellers, vehicles, roadside devices, and control centres. A York Region architecture will be established which supports the ITS initiatives.

4.2.4 Define Deployment Program

The consultant shall identify strategic projects for deployment by the various sponsoring agencies in the short, medium and long terms. In consideration of the available funding levels, deployment of ITS projects may need to be modular, for implementation as needs develop.

5. FINANCIAL IMPLICATIONS

Funds for both the integrated transportation operations project and ITS strategic plan are included within the 2006 Capital Budget and Business Plan. Future ITS initiatives and deployments are not currently budgeted and would be included within the typical budgeting process.

6. LOCAL MUNICIPAL IMPACT

There are no local implications associated with this report, however the local municipality staff will be invited to participate in the process to develop the Region's ITS strategic plan.

7. CONCLUSION

To integrate ITS technologies, staff will be conducting a detailed strategic plan which identifies goals and deployments of ITS technologies during the next ten years. In

addition, an integrated transportation operations study and pilot is being conducted for the GTAH being chaired by the MTO. These projects and piloting provide a direct relationship for the Region and GTAH municipalities to manage congestion.

The Senior Management Group has reviewed this report.