2
INTELLIGENT TRANSPORTATION SYSTEM (ITS) STRATEGIC PLAN

The Transportation and Works Committee recommends the following:

1. The presentation by Lizuarte Simas, Manager, Traffic Systems and Electrical Operations, Roads Branch, be received;

2. The recommendations contained in the following report, November 16, 2007, from the General Manager, Roads, be adopted subject to Recommendation 2 being amended to include circulation to the local municipalities, so that Recommendation 2 now reads as follows:

2. The Regional Clerk forward this report to the Clerks at the Regions of Peel, Halton, Durham, Minister of Transportation, Cities of Toronto and Hamilton, the Greater Toronto Transportation Authority, and the Clerks of the local municipalities.

1. RECOMMENDATIONS

It is recommended that:

1. Regional Council adopt the Intelligent Transportation System (ITS) Strategic Plan outlined in this report and summarized as *Attachment 1*. A detailed copy of this plan is available upon request.

2. The Regional Clerk forward this report to the Clerks at the Regions of Peel, Halton, Durham, Minister of Transportation, Cities of Toronto and Hamilton, and the Greater Toronto Transportation Authority.

2. PURPOSE

This report provides Council with information related to the Intelligent Transportation System (ITS) Stategic Plan completed by the Region and seeks Regional Council approval.

3. BACKGROUND

ITS technologies provide staff with a proven, rapidly expanding tool to monitor traffic conditions, manage traffic flow, manage congestion, and provide information to travellers, as well as save lives, time and money.

In this information age, York Region residents look to Regional staff to provide information on the status of the transportation networks, and to use an ITS to better manage those networks. This technology helps staff collect, analyze, and archive data about the performance of the road system. With this data, information can be relayed to travellers through different ITS technologies, improving their ability to make informed travel decisions. It also helps York Region staff quickly respond to incidents, adverse weather or other capacity constricting events.

3.1 Intelligent Transportation System Vision

The creation of a comprehensive Intelligent Transportation System Strategy Plan is a structured and detailed process. However, at the core of the plan is the "Intelligent Transportation System Vision", which all stakeholders can identify with, and work towards. During the development of the Strategic Plan, stakeholders assisted in the formulation of the following document. It depicts certain ways in which various components of a comprehensive Regional strategy could improve the travelling experience for a future typical York family.

3.1.1 A 'Day in the Life' of a York Family

Mr. York is a successful business person who uses his automobile to travel around York Region and meet with clients throughout the day. Time is money for him, and it's important that he keeps his busy schedule. Luckily, he can rely on the York Region Intelligent Transportation Systems to help him plan his travels, and keep the road network operating smoothly. Every evening, he checks the York Region website to find out if there are any construction projects that may affect his travels. The next morning, before he leaves his residence, he checks to make sure his personal data assistant is on, because it is a very valuable tool, for two reasons. Out on the road, he subscribes to a text message service that notifies him of major traffic problems. If there is a problem, he check his personal data assistant for video images, or he can phone a traveller information service for more details. His in-vehicle navigation system also receives traffic updates.

Ms. York works in the Leslie Street and Highway 7 area. It used to be a challenge driving to and from work, but not anymore. Last year, she used the carpool website to join a carpool. It picks her up each morning, and the carpool vehicle takes advantage of the diamond lanes to save time. The carpoolers receive traffic updates on the way to work. Today, there's a lane blocked on Highway 7, but there's nothing to worry about. The York Region Traffic Management System has detected the problem, coordinated a response, and adjusted the traffic signals in the area to help clear the traffic jam. They safely arrive at their reserved carpool parking space.

Junior York is a student who uses transit to travel to and from school. Each morning he walks to the local transit stop. The shelter is clean and comfortable. The electronic sign tells him that the next bus will arrive in five minutes. While he waits, he uses his electronic fare card to pay for his trip. When the bus arrives, he steps on and takes a seat. The bus starts moving, but it's approaching a red light, when "presto" the light turns green, and the bus zips through the intersection. He shakes his head in amazement. How do they do that?

Back at the Emergency Command and Operations Centre, they've just received some challenging news. The worst storm in years will be hitting York Region tomorrow. York Region staff quickly swing into action. The roadwork tracking system is used to identify all current projects, and send out emergency notices to get them cleaned up. The staff check the operations of the traffic cameras and electronic signs. A coordination meeting is held with Emergency Management staff, Emergency Services, and transit staff. The Transportation and Works Integrated Operations Centre has links to the provincial COMPASS freeway traffic management system, and the systems in Durham, Toronto and Brampton. Everyone is ready for the coming storm.

These services can be made available through the Intelligent Transportation Systems Strategic Plan.

3.2 Current Intelligent Transportation Systems Initiatives

The implementation of an ITS is not new to York Region. During its meeting of June 22, 2006, Regional Council received an update relating to ITS projects deployed within the Region to support the Centralized Traffic Control System (CTCS), and on-going projects as outlined in Table 1,

Table 1
ITS Projects

Year	Project
2002	Traffic Responsive Control Signal
2003	Transit Signal Priority
2005 and Ongoing	Adaptive Signal Control

3.2.1 Traffic Responsive Control Signal

Traffic Responsive Control changes traffic signal timings automatically to respond to changing traffic conditions. This 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 cameras were implemented along the corridor to validate incidents. A detailed model comparing the Traffic Responsive Control Signal and typical signal

timing patterns indicate an average reduction in delay of 15% and 25% fewer stops attributed to the Traffic Responsive Control Signal. This strategy has evolved into a new more responsive ITS strategy, adaptive signal control which is the subject of a current Transport Canada funded program.

3.2.2 Transit Signal Priority

Transit Signal Priority changes traffic signal timings automatically to help buses travel through intersections more quickly. Transit Signal Priority 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 Transit Signal Priority project provided a pilot deployment project along York Region Transit 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 Transit Signal Priority systems. The 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 Transit Signal Priority system, which uses a similar optical based selective detection technology, through the YRTP Quick Start Program.

3.2.3 Adaptive Signal Control

Adaptive Signal Control changes traffic signal timings automatically to respond to changing traffic conditions. A pilot corridor of Adaptive Signal Control is being implemented along Kennedy Road between Avoca Drive and Clayton Drive. Adaptive Signal Control 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 2007.

3.3 Intelligent Transportation System Strategic Plan Development

In the past few years, the Region has been successful in obtaining funding for various ITS projects. Although each of these projects has been successful, in most cases they have been standalone pilot projects. If York Region is going to be able to capitalize on the full capabilities of ITS to help with congestion management, a strategic plan is needed for the future deployment and integration of ITS initiatives. In addition, this strategic plan will provide for co-ordination of projects.

York Region staff have spent the past year developing this essential Intelligent Transportation System Strategic Plan, following a proven process developed by Transport Canada, and used by Canadian provinces and municipalities. This strategic plan identifies projects to address short, medium and long term goals for the next 10 years and provides the basis for future funding initiatives. The benefits associated with completing an Intelligent Transportation System 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 this plan consisted of the following tasks:

3.3.1 Coalition Building

An ITS can affect travellers, businesses and institutions every day. Therefore, a coalition building plan was created to ensure the Region had up-to-date ITS inventory information; to encourage "hands-on" involvement of stakeholders in the creation of the plan; and, to ensure that input was collected in an efficient and effective manner. Stakeholders, internal and external to the Region, were consulted through surveys, interview and workshops. For strategic planning on a Regional basis, all stakeholders, including the transportation agencies, decision makers, large employers as well as the public were encouraged to buy-in to the ITS process, and work together as a coalition.

3.3.2 Opportunities Analysis

Opportunities can be presented in many ways. The analysis began with a review of the widely recognized transportation needs in the Region and their relative priorities from an operational perspective were undertaken. This was used, to determine how the Intelligent Transportation System Strategic Plan is to be deployed, operated and maintained. It provided input to determine short, medium and long term solutions within the constraints of the Region's jurisdictions and related boundaries. Through discussion with stakeholders, the types of opportunities that were deemed most applicable to the Region were as follows:

- Arterial and freeway traffic management and control;
- Improved response to incidents;
- Personalized and advanced traveller information services; and
- Transit management systems.

3.3.3 Develop the Architecture to Support the Intelligent Transportation System Program

The ITS projects make use of sophisticated hardware, software, and processes. 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 has been now been established, and can be used to guide the Intelligent Transportation System Strategic Plan.

3.3.4 Define Deployment Program

A clearly defined deployment program sets the direction for investment in the ITS over the next 10 years. There are currently a number of ITS projects completed or underway in the Region as previously defined. Building upon this base, strategic ITS projects for deployment by the various departments and branches within the Region in the short, medium and long terms have been defined. In consideration of the available funding levels, deployment of ITS projects may need to staged for implementation as needs develop.

4. ANALYSIS

At the onset of creating an Intelligent Transportation System Strategic Plan, consultant services were required in order to lead the process with internal and external stakeholders. Earlier this year, a request for proposals (RFP) to retain these services was issued. Based upon the submitted proposals, IBI Group was awarded the project to assist staff with completing the strategic plan.

The ITS consists of a broad range of initiatives which may vary from roads to marine to aircraft operations. During the Intelligent Transportation System Strategic Plan process, four main categories were identified based upon projects which the Region could be accountable and facilitate in "managing congestion" which consist of:

- Traveller Information
- Advanced Traffic Management Systems
- Transit
- Roads Integrated Operation

4.1 Traveller Information

An informed traveller is an empowered traveller. Traveller information provides real-time interactive request/response systems and information systems to the traveller. Typically, the traveller can obtain current information regarding traffic conditions, road conditions, transit services, ride share/ride match parking management and pricing information. A variety of interactive devices may be used by the traveller to access information prior to a trip or en-route including a phone kiosk, Personal Digital Assistant (PDA), personal computer and a variety of in-vehicle devices. Successful deployments rely on availability of real-time transportation data.

Projects highlighted within this section include, telephone and web-based traveller information, and travel demand management.

4.2 Advanced Traffic Management Systems

The ITS is capable of far more than just operating traffic signals. Today's advanced traffic management systems are used to improve the efficiency and operation of the

existing surface transportation, arterial roads and highways and create safer conditions for travellers. This can include traffic signal control strategies, dynamic message signs, road weather information systems, and automated enforcement systems. ITS links these together and monitors changes sending messages and adjusting signal timing, etc.

Projects highlighted within this section include area-wide traffic signal control, targeted traffic management systems strategies, and ITS support of enforcement.

4.3 Transit

The ITS can help make public transit a much more attractive mode of travel. York Region Transit is in the process of installing security cameras on buses. This will provide an opportunity to use the recorded video to monitor traffic conditions during various times of the day and take appropriate measures to address traffic congestion.

The Intelligent Transportation System Strategic Plan also takes into account the various on-going ITS transit projects while developing the network architecture.

4.4 Roads Integrated Operation

The ITS can provide essential support to emergency planning and response activities. York Region has established an Emergency Operations Centre. A project has been identified to integrate the Roads Branch operations to provide traffic management functions which support emergency responses. For instance, co-ordination between dispatch functions, and Centralized Traffic Control System supports emergency response to incidents and VIVA operations.

The many ITS projects collect and process valuable data on the state of the transportation systems. This project determines how operations and data can be best managed and shared.

5. FINANCIAL IMPLICATIONS

Funds for both the deployment of Intelligent Transportation System Strategic Plan initiatives will be included within future Capital Budgets and Business Planning process. This 10 year project is estimated to cost $22.2 million based upon funding sources of 88% development charges and the remaining 12% tax levy.

During the deployment of this strategic plan, there may be opportunities for second party funding partnerships with the Greater Toronto Transportation Authority and other government agencies.

6. LOCAL MUNICIPAL IMPACT

There are no local implications associated with this report, however, many local municipality staff participated in the process to develop the Region's Intelligent Transportation System Strategic Plan.

7. CONCLUSION

This report presents a vision for using the ITS to help manage congestion in York Region. To make sound investments in resources to implement and integrate ITS technologies, staff conducted a detailed strategic plan which identifies goals and deployments of ITS technologies during the next ten years. These projects provide a direct relationship for the Region to manage congestion.

For more information on this report, contact Brian Harrison, Director, Operations, Roads Branch at extension 5205 in the Transportation and Works Department.

The Senior Management Group has reviewed this report.

(The attachment referred to in this clause is attached to this report.)