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### **EMERGENCY MEDICAL SERVICES TRAFFIC SIGNAL PRE-EMPTION PILOT PROJECT**

**The Community and Health Services Committee recommends the adoption of the recommendations contained in the following report dated September 2, 2010, from the Commissioner of Community and Health Services and the Commissioner of Transportation Services.**

#### **1. RECOMMENDATIONS**

It is recommended that:

1. Council approve the updated Traffic Control Signal Pre-emption policy (*see Council Attachment 1*) to include Emergency Medical Services vehicles.
2. The Regional Clerk forward this report to the Clerk of each local municipality and the City of Toronto, County of Simcoe, Region of Durham and Region of Peel.

#### **2. PURPOSE**

This report recommends revising the Traffic Control Signal Pre-emption policy approved by Regional Council in 2003 for York Region Transit and Fire Department vehicles to include traffic signal pre-emption for Emergency Medical Services (EMS) vehicles.

#### **3. BACKGROUND**

At its meeting of April 17, 2003, Regional Council adopted Clause 9 of Report No. 4 of the Transportation and Works Committee which updated the 1987 Traffic Signal Pre-emption policy. With this approval, Regional Council assumed responsibility for the installation, maintenance and testing of traffic signal pre-emption from the local municipalities and approved the application of this technology for fire department and transit vehicles.

Commencing in 2011, the Region will be developing a response time performance plan that identifies specific response time commitments for EMS. The investigation of the feasibility of pre-emption for EMS vehicles was undertaken in order to gauge what response time improvements, if any, could be gained in order to support the targets that will be set in the response-time performance plan.

#### **4. ANALYSIS AND OPTIONS**

Typical traffic control signal pre-emption technology enhances time-critical travel by allowing vehicles equipped with the technology to request and receive green indications as they travel along the roadway, thereby improving their on-time arrival and route efficiency. To achieve this, Regulation 34/06 of the *Highway Traffic Act* allows emergency vehicles, public transit agencies and traffic signal maintenance vehicles to use pre-emption devices. In York Region, fire trucks and VIVA buses are equipped with a licensed frequency emitter which requests pre-emption or priority at the traffic control signal equipment.

During the 1980's, fire departments adopted the use of traffic control signal pre-emption to reduce lost time at signalized intersections due to the braking and acceleration of emergency vehicles and to clear the queues of traffic at the approach to traffic signals for the fire vehicle to proceed. Traffic control signal pre-emption interrupts the normal signal sequencing and displays a green indication for the travel direction until the vehicle clears the signalized intersection. Once the emergency vehicle has cleared the intersection, the traffic control signal returns to its normal operation. More recently, transit agencies have used the same technology to hold or extend green indications for a predetermined time interval in order to maintain on-time transit service.

It is important to note that with or without signal pre-emption, Section 144(20) of the *Highway Traffic Act* requires emergency vehicle operators to stop on a red indication prior to proceeding, when it is safe to do so.

##### **The EMS traffic signal pre-emption pilot project measured intersection safety and response time impacts**

Transportation Services and EMS conducted a pilot project to review and evaluate the potential reduction in response time and the safety implications associated with using optical pre-emption technology on EMS vehicles. The IBI Group was retained to assist staff with the evaluation of this pilot project.

The pilot project took place during the fall of 2009 and consisted of a system assessment, pilot vehicle deployment and analysis. During the system assessment phase, technology requirements were reviewed and cost estimates for the pilot deployment were prepared. The pilot deployment equipped ten ambulances with emitters. The equipment required no driver intervention as the system is triggered with the vehicle's emergency lights once the gear is placed in the drive position. The analysis reviewed the response time and safety benefit for each vehicle.

##### **Traffic signal pre-emption improves intersection operations**

Traffic control signal pre-emption provides a green indication for the required direction of travel. To achieve this, the traffic control signal will shorten the green time for other

directions in an attempt to minimize delay for the approaching emergency vehicle. Competing directions of traffic receive a red signal indication and all pedestrians receive "Don't Walk" indications until the approaching emergency vehicle clears the intersection.

### **The pilot study found that traffic signal pre-emption reduced EMS response times**

Response time data was collected from the Ministry of Health and Long Term Care Ambulance Dispatch Download Access System and was analyzed. Response time data was compared between a 3-month pre-implementation and a 3-month post-implementation phase. The analysis showed an average reduction in response time from 8 minutes and 9 seconds to 7 minutes and 11 seconds representing a 12% reduction in travel time. Table 1 illustrates the pilot result findings from the 3-month pre-implementation and the 3-month post-implementation phases.

**Table 1**  
Average EMS Response Times Pre-Implementation and Post-Implementation

| <b>Pre-Implementation Average Response Time</b> | <b>Number of EMS Calls Occurring in the Pre-Implementation Phase</b> | <b>Post-Implementation Average Response Time</b> | <b>Number of EMS Calls Occurring in the Post-Implementation Phase</b> | <b>Change from Pre-Implementation to Post-Implementation Average Response Time</b> |
|-------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 8:09                                            | 2,247                                                                | 7:11                                             | 2,292                                                                 | 58 Seconds                                                                         |

In order to compare these pilot findings to those in other jurisdictions, seven other North American studies regarding the implementation of traffic control signal pre-emption on EMS fleets have been reviewed. The results of these studies indicate the implementation of pre-emption can reduce intersection delay by approximately 25 seconds per intersection. In addition, these studies showed EMS vehicle collisions were reduced from 8 to 3 per year.

The pilot travel delay study indicated a 58 second reduction time.. If a similar reduction region-wide were to be achieved through the addition of new staff and ambulances alone, it is estimated that 3 new 24-hour ambulances would be required at an estimated cost of 3.6 million dollars above the current operating budget annually. The 58 second trip travel time reduction measured during the pilot project is less than the 25 second per intersection reduction measured in other studies. Therefore, the actual benefits for York Region EMS may be higher than what was measured during the pilot project.

### **The study results denote no measurable impact on other road users**

The pilot travel delay analysis indicates there are no measurable negative impacts to other road users such as vehicles, pedestrians or transit services (YRT and VIVA).

### **The EMS vehicle driver training program includes pre-emption awareness**

All York Region paramedics undergo a specialized driver training program and EMS has a dedicated Driver Training and Safety Officer in their Performance & Development Division dedicated to this function. Outside of the existing specialized driver training, there is no additional training needed for using traffic control signal pre-emption as the system operates independently of the vehicle operator.

Specific EMS driver training on the capabilities and operation of the pre-emption system is not recommended. EMS drivers are expected to drive according to conditions regardless of whether or not a particular EMS vehicle or traffic signal is equipped with pre-emption technology.

### **Pre-emption also has time-saving and safety benefits while transporting patients to hospital.**

In addition to the benefits of traffic signal pre-emption received during EMS response, traffic signal pre-emption also has safety and time-saving benefits while emergency patients are being transported to hospital. Although receiving care from the Region's Paramedics, patients suffering life-threatening emergencies are transported to hospital using the lights and sirens. In these cases, the use of pre-emption can reduce the travel time and allow EMS vehicles improved safety crossing intersections while transporting patients to hospital.

## **5. FINANCIAL IMPLICATIONS**

### **Capital funding has been included in the 2010 budget to equip the EMS fleet.**

The 2010 approved Capital budget for EMS includes \$170,000 to equip 50 EMS vehicles with signal pre-emption emitters. By early 2011, the remaining ambulances will have the emitter installed. There is no additional impact to the Capital budget.

### **Operations and maintenance cost remain unchanged as the Region maintains the system currently for fire and transit services.**

Operation and maintenance costs associated with traffic signal pre-emption are included within the Transportation Services approved 2010 budget. Equipment maintenance is required regardless of the number of system users (Fire, EMS, and Transit).

## **6. LOCAL MUNICIPAL IMPACT**

### **The frequency of emergency vehicle pre-emption events remained at similar levels before and after implementation**

During the pilot project, four weeks of before-and-after analysis was conducted to determine the number of traffic control signal pre-emption requests that were received by the traffic control signal equipment. The pre-emption technology is based upon first request is first served. If there are competing requests from emergency vehicles for pre-emption the first vehicle to arrive will have priority.

## **7. CONCLUSION**

The travel time analysis indicates that EMS vehicles can expect a reduction in travel time and travel time variability with the implementation of traffic control signal pre-emption on EMS vehicles. It is anticipated that traffic control signal priority will improve intersection operation for both EMS and other roadway users. As a result, it is recommended that the Traffic Control Signal Pre-emption policy (*see Council Attachment 1*) be adopted by Regional Council.

For more information on this report, please contact Norm Barrette, General Manager, York Region EMS at extension 4709 and/or Steven Kemp, Director, Traffic Management and Intelligent Transportation Systems at extension 5226.

The Senior Management Group has reviewed this report.

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

**STATUS**

|                         |          |          |
|-------------------------|----------|----------|
| <b>Council Approved</b> | <b>N</b> | <b>N</b> |
| <b>CAO Approved:</b>    | <b>N</b> | <b>N</b> |

**DRAFT –PENDING COUNCIL APPROVAL**

|                                                                |                                                                       |
|----------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>TITLE:</b> Traffic Control Signal Pre-emption (TCSP) System | <b>NO.:</b><br><b>Effective Date:</b><br><b>Latest Revision Date:</b> |
|----------------------------------------------------------------|-----------------------------------------------------------------------|

**POLICY STATEMENT:**

This policy considers the installation of traffic control signal pre-emption (TCSP) at Regional signalized intersections along the Regional road network.

**APPLICATION:**

All Regional staff involved in TCSP along the Regional road network.

**PURPOSE:**

This policy provides a consistent process for TCSP system installation at Regional signalized intersections along the Regional road network.

**DESCRIPTION:**

1. TCSP equipment shall be paid for and installed by the Region at signalized intersections along the Regional road network.
2. TCSP equipment shall be tested by the Region in accordance with the manufacturers suggested guidelines.
3. TCSP equipment shall be maintained by the Region, in accordance with the manufacturers suggested guidelines.
4. TCSP equipment shall be implemented for Fire Department(s), York Regional Transit (YRT) and Emergency Medical Services vehicles.

**CONTACT:**

Commissioner of Transportation Services

**APPROVAL INFORMATION**

**CAO Approval Date:**

**Committee:**

**Clause:**

**Report No:**

**Council Approval:**

**Minute No.**

**Page:**

**Date:**