

TORONTO STAFF REPORT

May 18, 2006

To: Works Committee

From: General Manager, Transportation Services
Acting Director, Purchasing and Materials Management

Subject: Pedestrian Countdown Signals
(All Wards)

Purpose:

The purpose of this report is to obtain Council approval to include pedestrian countdown signals as a standard component of all LED traffic control signal installations in the City of Toronto and to obtain approval to purchase the necessary parts and accessories associated with the pedestrian countdown signals.

Financial Implications and Impact Statement:

Funds in the amount of \$2,000,000 have been approved in the Transportation Services Division's 2006 Capital Program to cover the 2006 cash flow for the LED Traffic Signal Lamp Conversion Program under Capital Account CTP705-20. This funding provides for the LED conversion of approximately 270 signalized intersections including the pedestrian "Walk" and "Don't Walk" displays installed at these intersections. The implementation of pedestrian countdown signals concurrently with the LED conversion program would result in no additional costs to this approved Capital Program.

However, the retrofit of 500 intersections completed in 2004/2005 will likely incur significant costs in the future. If Council decides to proceed with the installation of pedestrian countdown signals concurrent with the LED Conversion program, 500 intersections which have already been converted to single section LED pedestrian displays will need to be retrofitted at a total estimated cost of approximately \$3,500,000. It may be possible to achieve cost efficiencies with these intersections and reduce this total, if these retrofits are scheduled to be concurrent with the end-of-life LED lamp replacements expected to commence in 2012.

Recommendations:

It is recommended that:

- (1) Transportation Services Division staff be directed to install pedestrian countdown signals in conjunction with the LED traffic signal lamp conversion program;
- (2) Transportation Services Division staff be directed to include pedestrian countdown signals as an integral component of all new traffic control signal installations;
- (3) Transportation Services Division staff be directed to report back to the Works Committee following the 2006/2007 installation program, with a plan for the timely and cost-effective retrofit of pedestrian countdown signals to the approximately 500 intersections where the LED traffic signal lamp conversion program has already been completed;
- (4) Transportation Services Division staff be authorized to instruct Purchasing and Materials Management Division to solicit competitive bids as and when required for the provision of pedestrian countdown signal modules required for the 2006 and 2007 installation program from Electromega Ltd., Fortran Traffic Systems Ltd., Innovative Traffic Solutions Inc., and Tacel Ltd., the four pre-qualified suppliers of the LED traffic signal lamp modules under Expression of Interest No. 1205-04-0112;
- (5) Transportation Services Division staff be directed to work with staff of the Toronto Transit Commission to review the transit signal priority algorithms to determine how they can be modified to enhance pedestrian signal timing; and
- (6) the appropriate City Officials be authorized and directed to take the necessary action to give effect to the foregoing, including the introduction in Council of any Bills that may be required.

Background:

At its meeting held on March 1, 2 and 3, 2004, under Clause No. 9 embodied in Report No. 2 of the Works Committee, Council adopted the report titled, "Light Emitting Diode (LED) Conversion Program for Traffic Signal Lamps". The report identified the program scope as the conversion of incandescent vehicular and pedestrian displays at signalized intersections to LED technology over an eight-year period from 2004 to 2011.

On June 9, 2004, the City of Toronto issued Expression of Interest No. 1205-04-0112, LED Traffic Signal Lamp Modules requesting respondents to provide technical documentation and product samples to confirm compliance with the City of Toronto Specification No. TS 808.220, "LED Traffic Signal Lamp Modules". The purpose of the Expression of Interest was to provide a pre-qualified list of manufacturers that would be able to supply the City with the traffic signal lamp modules over the eight-year period of the planned signal lamp conversion program. During the period of the conversion program, formal Request for Quotations will be issued to the qualified suppliers to quote on the supply of traffic signal module requirements that are scheduled for each year of the conversion program.

As a result of the Expression of Interest evaluation process, 4 manufacturers were considered compliant to the City of Toronto specification TS 808.220 and approved as suppliers of LED traffic signal lamp modules; Electromega Ltd., Fortran Traffic Systems Ltd., Innovative Traffic Solutions Inc., and Tacel Ltd.

At its meeting held on April 25, 26 and 27, 2006, under Clause No. 3 embodied in Report No. 2 of the Works Committee, Council adopted the report titled, "Status of Intelligent Transportation Systems Technology in the City of Toronto", and amended the clause to include that a higher priority be given to specific Intelligent Transportation Systems strategies including pedestrian countdown signals.

In order to implement this priority into the current conversion program, the Transportation Services Division will have to procure pedestrian countdown signals separately from the LED Traffic Signal Lamp Modules.

Comments:

Opportunity for Cost Savings Due to Installation Efficiencies

The current LED Conversion Program includes the replacement of the standard two-section incandescent pedestrian displays with single section LED displays. There is considerable labour required to remove the existing displays, adjust mounting and wiring and install single section displays. If pedestrian countdown signals are installed concurrently with the LED Conversion program, then the two-section displays are retained and the lower section is used to house the countdown display. The work associated with this is analogous to a lamp replacement, and as a result there is significantly less labour cost.

Table Nos. 1 and 2 outline the costs and activities associated with the installation of pedestrian countdown system versus the current LED Conversion Program. Table No. 1 indicates that, based on engineering cost estimates, the additional cost of a pedestrian countdown system is neutralized by the savings in labour and cost to install pedestrian countdown systems coincident with the LED replacement program.

Table No. 2 indicates the cost to continue with the current LED replacement program and install pedestrian countdown signals at a later date at a cost of approximately \$7,000 per intersection.

Table 1 - *Comparison of Current LED Conversion Program and Proposed Addition of Pedestrian Countdown Signals to the LED Conversion Program*

	Current LED Conversion Program	Proposed Addition of Pedestrian Countdown Signals in LED Conversion Program
Material	<ul style="list-style-type: none"> • LED vehicle and pedestrian modules • Mounting hardware 	<ul style="list-style-type: none"> • LED vehicle and pedestrian modules • pedestrian countdown signals modules
Labour	<ol style="list-style-type: none"> 1. Convert vehicle displays to LED 2. Remove two section pedestrian displays and divide each into two components 3. Remove mounting hardware, adjust wiring, install new mounting hardware 4. Mount single section pedestrian displays 5. Install LED pedestrian module 	<ol style="list-style-type: none"> 1. Convert vehicle displays to LED 2. Convert upper pedestrian display to LED 3. Install countdown modules in lower pedestrian display
Ancillary	Vehicle and equipment costs, paid duty officer, engineering, administration	Vehicle and equipment costs, paid duty officer, engineering, administration
Total Cost	\$7,400 (per typical four-leg intersection)	\$7,400 (per typical four-leg intersection)

Table 2 - *Costs to Add Pedestrian Countdown Signals to an intersection in addition to the LED Conversion Program*

	Addition of Pedestrian Countdown Signals to a New Traffic Signal Installation	Addition of Pedestrian Countdown Signals to an already LED Converted Intersection
Material	<ul style="list-style-type: none"> • pedestrian countdown signals modules • Lower sections for pedestrian displays 	<ul style="list-style-type: none"> • pedestrian countdown signals modules • Lower sections for pedestrian displays • Mounting hardware
Labour	No additional labour necessary	<ol style="list-style-type: none"> 1. Remove pedestrian displays 2. Add lower section 3. Install new mounting hardware and adjust wiring 4. Mount two section display 5. Install countdown modules in lower pedestrian display
Ancillary	No additional ancillary costs	Vehicle and equipment costs, paid duty officer, engineering, administration

	Addition of Pedestrian Countdown Signals to a New Traffic Signal Installation	Addition of Pedestrian Countdown Signals to an already LED Converted Intersection
Total Additional Cost	\$2,500 (per typical four-leg intersection)	\$ 7,000 (per typical four-leg intersection)

Approximately 500 intersections have already been converted to LED displays. The cost to retrofit these intersections is estimated to be \$3,500,000. Another 270 intersections are scheduled to be converted in 2006. If the City decides to deploy pedestrian countdown signals after the LED conversion program is completed at the more than 2000 signalized intersections in the City, the estimated cost would be approximately \$14,000,000 based on a conversion cost of \$7,000 per intersection. However, by including the pedestrian countdown signals as part of the current conversion schedule, approximately \$1,890,000 annually in additional costs will be avoided. Additional costs would then be limited to the 500 intersections already converted in 2004 and 2005.

Benefits of Pedestrian Countdown Signals

Pedestrian countdown signals are relatively new devices that are being installed by many jurisdictions throughout North America to provide more precise information regarding the amount of time available to a pedestrian to cross a roadway. These devices provide a numeric display that counts down the number of seconds remaining before the signal changes to “Don’t Walk”.

A recently completed comprehensive multi-year study by the City of San Francisco included the following conclusions about pedestrian countdown signals:

- Pedestrian countdown signals appeared to reduce pedestrian injuries.
- The proportion of pedestrians completing their crossing on the red was reduced, and there was not a significant increase in the number of pedestrians starting to cross during the pedestrian clearance phase.
- The signals did not result in an increase in drivers running red lights.
- The pedestrian countdown signals were viewed very favourably by pedestrians for providing additional information.

In January 2006, the Transportation Association of Canada’s Chief Engineers Council approved a guidelines document for, “The Optional Use of Pedestrian Countdown Signals.” This document recommends pedestrian countdown signals be implemented at locations that have a high percentage of seniors, children, and other mobility-challenged pedestrians, at locations with a history of high pedestrian-vehicle conflicts and those locations that generate high pedestrian and/or vehicle traffic. The report provides recommended usage guidelines, as well as recommendations for standard layout and configuration, and timing strategy.

Pedestrian Committee Consultation

The Toronto Pedestrian Committee has expressed support for pedestrian countdown signals at various times over the past few years. The feasibility of proceeding with pedestrian countdown signals in 2006, as part of the LED Conversion Program for Traffic Signal Lamps, was presented to the Pedestrian Committee at its meeting on April 20, 2006. Transportation Services Division staff have recently initiated discussions with the Pedestrian Committee on reviewing the operation of traffic control signals, with a goal to identify potential changes in our current practice to benefit pedestrians. The results of this review will contribute to the development of the Pedestrian Master Plan, to be completed in Fall 2007. Providing pedestrian countdown signals also satisfies the following objective of the Toronto Pedestrian Charter: to “provide and maintain infrastructure that gives pedestrians safe and convenient passage while walking along and crossing streets.”

Issues

The safety benefits of pedestrian countdown signals have not been conclusively quantified yet, and although the installations at the remaining LED Conversion intersections can be done within the existing project budget, there will be a replacement cost associated with these supplementary devices when they reach the end of their service life.

Currently, at intersections with vehicular green phase extensions, such as the intersections in the City of Toronto equipped with transit priority, the end of the flashing “Don’t Walk” phase does not always coincide with the end of the parallel vehicular green phase. Since the pedestrian countdown signals provides a countdown of the pedestrian clearance or flashing “Don’t Walk” phase, it is likely that the pedestrian countdown signals will increase pedestrians’ awareness that there is this unpredictable additional green time for transit vehicles and main street vehicular traffic that is not available to them. It is technically possible to provide transit priority, and force the flashing “Don’t Walk” (countdown to zero) to coincide with the end of the vehicular green. However, this mode of operation is less efficient and results in longer average delays to pedestrians, cyclists and motorists wishing to cross the main street. Therefore, it is recommended that Transportation Services Division staff work with T.T.C. staff and consult with the Pedestrian Committee to determine what changes to the current transit priority algorithms provide the best compromise.

Procurement of Pedestrian Countdown Signals

At present, the City does not have a current specification for the supply of pedestrian countdown signals and the scope of Expression of Interest No. 1205-04-0112, LED Traffic Signal Lamp Modules did not include pedestrian countdown signals. Based on Transportation Services Division staff experience with the LED traffic signal lamp modules, the development of the pedestrian countdown signals specification and the normal competitive procurement process will take approximately nine to 12 months to complete. As such, the City would not be able to realize the significant cost savings unless a temporary solution can be found prior to the development of a specification for pedestrian signal lamps.

The best solution at this time is to request formal quotations from the four (4) existing pre-qualified suppliers of the LED signal displays. This solution will allow the pedestrian countdown signals installation to commence in 2006 and significant cost savings can be immediately realized. While the procurement of pedestrian countdown signal components is outside of the scope of the current prequalification process established for the procurement of LED traffic signal lamps, the existing suppliers currently manufacture and supply pedestrian countdown signals that are compatible with the City's current LED signal lamp hardware. Given that there are no available City specifications at this time for pedestrian countdown signals, criteria cannot be developed to evaluate quotations submitted by suppliers other than the existing pre-qualified suppliers.

For 2008 and beyond, a detailed specification for pedestrian countdown signals would be prepared and issued as a request for expression of interest. The specification will address features and requirements that are mandatory to the city. Vendors qualified under that process would then be asked to submit competitive quotations for the supply of pedestrian countdown signals in accordance with the City's Purchasing Policies.

Conclusions:

An opportunity exists now to implement pedestrian countdown signals concurrent with the LED Conversion Program at no additional capital cost to the City due to economies associated with the work activity.

While it is still too early to state with certainty the degree to which pedestrian countdown signals will improve pedestrian safety, it appears certain from other jurisdictions' experience that pedestrians favour the supplemental pedestrian countdown signals information, and that they better understand the device than the conventional "Walk" / "Don't Walk" displays.

If Council decides to proceed with the installation of pedestrian countdown signals concurrent with the LED Conversion program, 500 intersections which have already been converted to single section LED pedestrian displays will need to be retrofitted at a total estimated cost of approximately \$3,500,000. It may be possible to achieve cost efficiencies with these intersections and reduce this total, if these retrofits are scheduled to be concurrent with the end-of-life LED lamp replacements expected to commence in 2012. Transportation Services Division staff will be able to more accurately identify the appropriate schedule and costs for these retrofits after the 2006/7 installations have been completed.

Contact:

Bruce Zvaniga, P.Eng.
Manager, Urban Traffic Control Systems
Traffic Management Centre
Phone: (416) 392-8826
Fax: (416) 397-5777
Email: bzvanig@toronto.ca

Paul Cook
Manager of Purchasing,
Goods and Services
Phone: (416) 392-7316
Fax: (415) 392-1052
Email: pcook@toronto.ca

Gary Welsh, P.Eng.
General Manager, Transportation Services

Gwen Manderson
Acting Director, Purchasing and
Materials Management

BZ/dmb
(p:\2006\wes\tra\wc06007.tmc) – bz