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ADMINISTRATIVE CENTRE LIGHTING IMPROVEMENTS

The Finance and Administration Committee recommends the adoption of the recommendation contained in the following report, November 28, 2005, from the Commissioner of Corporate Services:

1. RECOMMENDATION

It is recommended that this report be received for information.

2. PURPOSE

The purpose of this report is to update Committee and Council of the work being done at the Administrative Centre to reduce lighting consumption and pollution due to interior building lighting.

3. BACKGROUND

The York Region Administrative Centre was constructed in 1993 and is located at 17250 Yonge Street, Newmarket. It is a 497,000 sq ft. building which houses various Regional departments as well as York Regional Police. The Administrative Centre is a public building, and as such is used extensively for special events, particularly after-hours and on weekends.

The building is designed with a high degree of fenestration (i.e. windows). This provides beneficial daylight into the space during the day, but results in light pollution, or light trespass, when the interior lights are on and it is dark outside. There are two problems with light trespass: (1) it is obtrusive light that is unwanted, because of discomfort, distraction and/or a loss of visibility attributes, and (2) the actual or perceived public perception of energy inefficiency.

When the building first opened the emergency lights, which comprise roughly 30% of the entire building lighting load, were not connected to a control system. This meant that they were on continuously (i.e. 24/7) creating a light pollution issue with local residents. Regional staff resolved this issue by adding the emergency lights to the base building lighting control system which allowed for their control on a scheduled basis, thereby reducing the lighting demand in the building.

As part of a corporate-wide Building Energy Feasibility Study (BEFS) initiative, the Region is identifying major energy (including lighting) and water reduction measures

throughout the Regional building portfolio, and is phasing in their implementation beginning with the Administrative Centre in October, 2005.

4. ANALYSIS AND OPTIONS

The following sections describe the nature of the Administrative Centre in terms of space function and occupancy patterns and what is being done to reduce lighting consumption and pollution due to interior building lighting.

4.1 Building Occupancy Schedules

Regional staff occupy space within the Administrative Centre during the core hours of 8:30 a.m. to 4:30 p.m. However, beyond these core office hours there are a number of users:

- York Regional Police occupy approximately 12% or 45,000 ft² of the Administrative Centre (not including parking). Many of the Police functions are operated on a 24/7 basis (e.g. 911 Communications Centre).
- IT undertake many upgrades to the Region's computer system after hours.
- Cleaning staff clean the building between the hours of 4:30 p.m. and 12:00 a.m. each day. They start on the top floor and move their way down while turning off the lights as they leave each floor.
- The Region actively encourages the use of the Administrative Centre by the community and as such, there were 1163 special events in 2004, of which 30% were evening events. Year to date in 2005, there were 1407 special events hosted in the Administrative Centre. Of these reservations, approximately 25% occurred in the evenings.
- Security is responsible for event and meeting room "set-ups" and "break-downs" in the evening hours after the event and overnight for meetings taking place the following day.
- Security conducts continuous patrols of the building throughout the evening and during the night. Lighting is required to ensure the building is safe from intruders and that no facility related issues have arisen (e.g. leaks, equipment failure).

Given the frequency of usage after hours it is inevitable that lights will be visible to the public, especially considering the buildings' high degree of fenestration.

4.2 Lighting Improvements

The BEFS for the Administrative Centre identified a range of energy and environmental improvements under Lighting, Water and Heating, Ventilation and Air Conditioning (HVAC). Based on the results of the BEFS the Region is proceeding with implementation

of various energy saving measures. The benefits of the new lighting technology are described in Table 1.

Table 1
Lighting Improvements

Feature	Benefit
Energy-Efficient Lighting	Improved lighting qualities, efficiency, warm up and re-strike times.
Electronic Ballasts	Reduced lamp flicker, power consumption and maintenance. Longer life.
Dimmable Ballasts	Reduced power consumption and better lighting control.
Occupancy Sensors	Reduced power consumption.
Daylight Sensors	Reduced power consumption and greater occupant comfort.
Lighting Redesign	Improved lighting performance and occupant comfort.
Photoluminescent Exit Signs	Requires no electricity. Uniform illumination across exist sign face. Longer life.

While all lighting improvements listed in Table 1 will reduce energy usage, the reduction in lighting in the common area corridors (e.g. turning out 3 of 4 lights in the evening hours) and installation of occupancy sensors, in particular, will considerably reduce the effect of light pollution after regular office hours. The occupancy sensors will be installed on all perimeter office spaces in the Administrative Centre. The sensors will turn lights on and off as an occupant enters or leaves the workspace. This is in contrast to the conventional approach which requires “banks” of lights on at one time to allow security or cleaners to perform their duties, that often results in a light pollution issue. Note that sensors are “active” 24/7 not just during evening hours.

The lighting improvements also include lighting redesign in certain areas. For example, the Committee Rooms and the York Regional Police 911 Communications Centre will be updated with state-of-the-art lighting technology. The new technology provides better lighting quality, uniform distribution of light and increased lighting control leading to greater occupant comfort.

In conjunction with the lighting improvements, the Region is also upgrading the existing lighting control system. The system enhancements include greater control of lighting throughout the building, energy-saving and various functional schedules as well as activity logging. York Region’s Energy and Environmental Management System (EEMS) in concert with a web-based real-time software system are being used to monitor and track the Region’s utility consumption.

The Administrative Centre experiences significant exposure both day and night from traffic on Yonge Street. The nature and diversity of this traffic introduces a large and geographically diversified audience that requires a unique communication solution. On January 3, 2006 the Region issued a media release highlighting the results of the Administrative Centre energy retrofit. Following approval of this report, staff will prepare an advertisement for the York Region Newspaper Group – Aurora-Newmarket editions which will incorporate content from this report as well as the recent internal Energy User Guide to further communicate the work being done at the Administrative Centre to reduce interior building lighting consumption and pollution.

4.4 Relationship to Vision 2026

These improvements support Goal 2 in Vision 2026 which includes the following:

- Encouraging water conservation.
- Using energy more efficiently in operations of the Regional government.
- Investigating and promoting alternative energy sources.
- Living and encouraging the three Rs: reduce, reuse, recycle.
- Anticipating and responding to climate change.

5. FINANCIAL IMPLICATIONS

The lighting improvements at the Administrative Centre are estimated to result in an annual electricity reduction of 808,570 kilowatt-hours (kWh) and corresponding annual utility savings of an estimated \$75,000. The entire retrofit, including lighting, mechanical and water conservation measures, will reduce annual utility costs by an estimated \$200,000. This equates to annual reductions in greenhouse gas emissions of 900 tonnes. The lighting retrofit, in particular, will also reduce facility maintenance staff time. The total cost of the lighting retrofit was \$400,768.89 (excluding GST), with a payback of roughly 5 years (not including grants).

The Region is the successful recipient of the Federation of Canadian Municipalities (FCM) Green Municipal Funds to cover 50% of the cost of the BEFS to a maximum of \$350,000. The Region is also eligible for 50% funding from Natural Resource Canada (NRCan) EnerGuide for Existing Buildings (EEB), formerly known as the Energy Innovators Initiative.

The Region is using both these funds to 100% leverage the cost of the BEFS initiative. For example, the BEFS conducted on the Administrative Centre at a cost of \$38,000 was completely covered by these two grants. The Region has also entered into a contribution agreement for \$106,290 with NRCan to help offset the costs associated with the implementing the lighting, mechanical and water conservation measures at the Administrative Centre.

6. LOCAL MUNICIPAL IMPACT

There are no local municipal impacts directly associated with this report.

7. CONCLUSION

The Administrative Centre is a large public building that accommodates various after-hour and weekend activities including the following: York Regional Police 24/7 operations; Cleaning; Special Events; and Security. The frequency of usage after hours and high degree of building fenestration (i.e. windows) at the Administrative Centre results in lighting required late into the evenings on a daily basis.

The Region is phasing in major energy and environmental improvements throughout the building portfolio, beginning with the Administrative Centre in 2005. This includes lighting improvements such as energy efficient lamps and ballasts, occupancy and daylight controls, photoluminescent exit signs and lighting redesign. These measures will help reduce electricity demand, while providing better control of lighting that is required, thereby reducing the lighting pollution due to interior lighting.

The lighting improvements amount to an annual energy savings of \$75,000. The installation of the lighting measures began in late October, 2005 and will be completed by December 31, 2005.

The Senior Management Group has reviewed this report.