SUBJECT: Gore Park Tree Lighting System - LED Conversion (PW07008) - (Ward 2)
Public Works Outstanding Business List

RECOMMENDATION:

(a) That staff be directed to include $106,415 as a one time funding item to the 2007 Capital Budget process to replace the existing incandescent tree lighting system in Gore Park and the downtown streetscape with LED lighting system.

(b) That the annualized cost savings of $25,764 (resulting from reductions in energy consumption) be directed to the Street Tree Light Replacement Capital Reserve to be used as an ongoing funding source for future LED lighting system replacement.

(c) That should the LED system installation be approved, that the level of service standard for this program be expanded from the current three month period to a twelve month period.

(d) That the item relating to the Replacement of Downtown Tree Lighting be removed from the Outstanding Business List of the Public Works Committee.

Gerry Davis
Acting General Manager
Public Works
EXECUTIVE SUMMARY:

This report is provided to address the replacement of the Gore Park and downtown streetscape tree lighting systems, as referred to staff at the April 12, 2006, meeting of the Committee of the Whole.

BACKGROUND:

At the November 17, 2005, meeting of the Planning and Economic Development Committee, the recommendations outlined in Report 05-002 of the Task Force on the Cleanliness and Security in the Downtown Core respecting Replacement of Downtown Tree Lighting, were referred to the 2006 budget deliberations for consideration. The recommendations included:

“(i) That Public Works, Operations and Maintenance staff be directed to submit a 2006 Capital Budget request to replace the existing incandescent tree lighting, in the Downtown Core, with L.E.D. lighting with a capital cost of $106,415.

(ii) That Operations and Maintenance staff be directed to establish a capital reserve account to fund lighting replacement on a 6 year cycle to coincide with planned street tree grid trimming maintenance program in the downtown core.

(iii) That the existing energy costs for the tree lighting be utilized to keep the L.E.D. lighting in the Downtown Core on from dusk until 2:30 am during the evening hours throughout the year at an annual cost of $3,684 resulting in annual energy savings of $25,764 to be directed to the Street Tree Light Replacement Capital Reserve.”

Note: Section (ii) of the above quoted reference indicates that the LED lighting system will be replace every six years at the time same time as the tree trimming program. It should be noted that this differs from the four year payback period referenced below.

The above noted recommendations from the Task Force on Cleanliness and Security in the Downtown Core respecting the replacement of the Gore Park tree lighting was subsequently referred to the Gas Tax Sub-Committee and then to the Public Works Infrastructure and Environment Committee for staff to report back to Committee. This report is provided to that end and seeks to:

1. Obtain the required approvals to convert the existing incandescent lighting system in Gore Park and the downtown streetscape to the LED system

2. Outline the benefits of the LED system over the existing incandescent system

3. Obtain the required approvals to change the existing level of service standard respecting the operation of the lighting system from three months annually (current) to a full twelve month program

Current Lighting Systems at Gore Park - Incandescent Lighting

The current incandescent lighting system at Gore Park and the downtown streetscape has serviced the park and downtown area over the last number of years. The lights
(affecting 340 trees) are in operation three months of the year (November, December and January) as part of the downtown Hamilton Christmas displays. While integral to creating a festive holiday atmosphere in the downtown core, the existing incandescent lighting system is showing limitations in terms of efficiency, reliability, life cycle duration and economic feasibility.

The limitations of the current incandescent system are outlined as follows:

- Inefficient - the incandescent system lacks energy efficiency in that only about 10% of the total electrical energy consumed is converted into useful light, whereas the rest of the energy is given off as heat
- Unreliable / Short life cycle - the filaments contained in each bulb are fragile, and have a tendency to break and/or burn out in a relatively short period of time
- Labour intensive - given the short life cycle this system requires extensive ongoing routine maintenance which taxes internal staff and equipment resources
- Economically unfeasible - the energy consumption rates of this system are high and costly averaging $29,448.00 for a three month period

In light of the apparent shortcomings and in the interest of realizing greater efficiencies and quality, staff has investigated alternative lighting systems to potentially replace the current incandescent system. Of the systems investigated, the most noteworthy replacement would be the LED lighting system. This system is explored below in greater detail.

**Comparison of the LED Lighting System and the Incandescent Lighting System**

In comparison to the existing incandescent lighting system, the LED lighting system boasts numerous advantages especially in the areas of: energy consumption, operational efficiencies, life cycle expectation, and cost. These are explored in greater detail below:

- Energy efficient and environmentally friendly - LEDs greatly reduce energy consumption having a low voltage operation
- Safe, secure, and reliable - LEDs produce low levels of heat and low voltages making them a far safer choice for a light source; unlike incandescent bulbs where the filaments are very fragile and easily broken, the LED is typically encased in grade resin where there is no glass or filament to break, making LED light sources ideal for outdoor environments or locations that are hard to reach
- Extensive life span - LEDs can function for several tens of thousands of hours as compared to incandescent bulbs which expire after a few thousand hours
- Economic - LED lighting offers significant cost savings in the long term typically resulting from reduced energy consumption and maintenance costs. The cost of operating the LED system for current Christmas
season (three month period) is $921 as compared to $29,448 for the incandescent system.

Given the cost effectiveness of the LED lighting system, staff would further recommend that the existing level of service standard be changed from the current three month period (November to January annually) to a proposed twelve month (year-round) program. The cost of operating the LED system on an annualized basis is estimated to be $3,684. Even at the expanded program timeframe, the LED lighting system would result in an annualized cost savings of $25,764. Staff is recommending that this surplus be directed to the Street Tree Light Replacement Capital Reserve to be used as an ongoing funding source for future LED lighting system replacement.

**Capital Cost Requirements Associated with the System Replacement**

The LED lighting system comes at an estimated cost of $131,415 (as per quotations received). Costs associated with the removal and installation of the current lighting system will be absorbed within the operating budgets of the Parks and Cemeteries Section, as this work lies within the scope of the current annual work plan for the Section. Horizon Utilities is willing to make a one time contribution of $25,000, to this initiative, thereby reducing the capital costs incurred to the City to the estimated amount of $106,415.

**ANALYSIS/RATIONALE:**

N/A

**ALTERNATIVES FOR CONSIDERATION:**

**Option # 1**

Council may consider maintaining the current 5 watt incandescent system; however the inefficiencies and short-comings far outweigh the benefits of changing the current light system to the LED system. Staff is not supportive of this alternative and would recommend the installation of the LED lights.

**Option # 2**

Council could choose to eliminate the tree lighting portion of the Christmas program in its entirety although the benefits of maintaining the lighting system and the festive environment created by the lights positively impacts the downtown core at Christmas time. Staff is not supportive of this alternative and would recommend the installation of the LED lights.

**FINANCIAL/STAFFING/LEGAL IMPLICATIONS:**

**Capital Cost**

The LED lighting system comes at an estimated cost of $131,415. Horizon Utilities is willing to make a one time contribution of $25,000 to this initiative, thereby reducing the capital costs incurred to the City to the estimated amount of $106,415.
Operating Impact

Should the City choose to install the proposed LED lighting system, an annualized savings of $25,764 would be realized and redirected towards future replacement costs. The current incandescent lighting system costs $29,448 to operate during the 3-month Christmas season as opposed to the LED system which costs $3,684 to operate for a whole year. The identified savings relate to the energy portion of the lighting only. Any savings in staff time would be minimal and would be redirected to other activities.

Payback / Capital Cost Recuperation

With the cost of the proposed LED system being $106,415 (after the $25,000 contribution from Horizon Utilities) and the annualized savings of $25,764, the initial capital purchase would be recuperated over a 4 year period. With the Horizon Utilities contribution being one time in nature, the next capital purchase of $131,415 plus inflation for the LED lights would have a payback period of 5 years.

In order to fund the future capital replacement of the LED system, staff recommends that the savings of $25,764 be redirected to Street Tree Light Replacement Capital Reserve to fund the future replacement of the lighting system.

There are no staffing or legal implications associated with this report.

POLICIES AFFECTING PROPOSAL:

There are no policies affected by this report.

RELEVANT CONSULTATION:

Staff consulted with Finance and Administration, Planning and Economic Development and Horizon Utilities in the drafting of this report.

CITY STRATEGIC COMMITMENT:

By evaluating the "Triple Bottom Line", (community, environment, economic implications) we can make choices that create value across all three bottom lines, moving us closer to our vision for a sustainable community, and Provincial interests.

Community Well-Being is enhanced. ☑ Yes ☐ No
Public services and programs are delivered in an equitable manner, coordinated, efficient, effective and easily accessible to all citizens.

Environmental Well-Being is enhanced. ☑ Yes ☐ No
Consumption of energy is reduced; alternative energy and co-generation are supported.

Economic Well-Being is enhanced. ☑ Yes ☐ No
Infrastructure and compact, mixed use development minimize land consumption and servicing costs.

Does the option you are recommending create value across all three bottom lines?

☑ Yes ☐ No

Do the options you are recommending make Hamilton a City of choice for high performance public servants?

☐ Yes ☑ No

The installation of the LED lighting system will realize a number of benefits which align with the City’s strategic plan and vision including:
- Cost savings
- Reductions in energy consumption
- Creating a safe, secure, and inviting environment in the downtown core
• Potentially reducing the instances of vandalism, graffiti and loitering etc.
The City of Hamilton has and continues to invest in initiatives to revitalize the downtown core. This initiative closely aligns with these efforts, and will help in creating a safe, secure, and people-friendly environment in downtown Hamilton.
Map Outlining Scope of LED Lighting Program - Downtown Hamilton