TORONTO

STAFF REPORT
ACTION REQUIRED

Rainwater Harvesting Project at Exhibition Place

Date:	November 9, 2007
To:	Public Works and Infrastructure Committee
From:	Lou Di Gironimo, General Manager, Toronto Water
Wards:	Ward 19, All Wards
Reference Number:	P:\2007\Cluster B\TW\pw07043 (AFS# 3129)

SUMMARY

The purpose of this report is to seek Council approval to support the implementation of a full scale demonstration rainwater harvesting system at the Automotive Building at Exhibition Place.

RECOMMENDATIONS

The General Manager, Toronto Water recommends that:

1. Funding be provided to Exhibition Place to an upset limit of $600,000 net of GST to support the construction of a full scale demonstration rainwater harvesting system servicing the Automotive Building at Exhibition Place, designed to the satisfaction of the Chief Executive Officer of Exhibition Place, the Chief Building Official, the Medical Officer of Health and the General Manager of Toronto Water.

FINANCIAL IMPACT

Funding of $600,000 net of GST to support the construction of the full scale demonstration rainwater harvesting system at the Automotive Building at Exhibition Place is available in the approved 2007 Toronto Water Capital Budget within WBS Element CWW447-06 WWFMP Implementation.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

City Council, at its meeting of April 25, 26 and 27, 2006, adopted without amendment, Clause 14 of Report 2 of Works Committee, headed "Rainwater Harvesting Demonstration Project at Exhibition Place", which recommended the development of a detailed design project with construction cost estimates and an anticipated implementation workplan and schedule, for a rainwater harvesting system to be constructed at the Better Living Centre at Exhibition Place. A copy of this report can be found at:
http://www.toronto.ca/legdocs/2006/agendas/council/cc060425/wks2rpt/cl014.pdf

ISSUE BACKGROUND

Consistent with the City's Wet Weather Flow Master Plan, rainwater harvesting systems provide an effective "at source" stormwater control alternative. In these systems, the runoff is intercepted and used as a resource for non-potable water use, rather than the traditional practice of directing it to the local sewer system and ultimately impacting the City's receiving waters. These systems provide the added benefit of supporting the objectives of the City's Clean Air and Climate Change Plan and Water Efficiency Plan, by decreasing potable water consumption, and thereby reducing energy consumption and the need for water infrastructure expansion.

While rainwater harvesting is a relatively new concept in Ontario, it has been successfully employed in countries, such as Germany, Australia and the United States, where harvested rainwater is used for both domestic and industrial purposes, including garden and landscape irrigation, toilet flushing, cleaning, laundry, cooling and production processes.

Amendments have recently been made to the Ontario Building Code, permitting the use of non-potable water for limited uses, where a municipal supply of potable water is available.

COMMENTS

The proposed rainwater harvesting system for the Better Living Centre would intercept "roof runoff" to supply water for toilet flushing purposes and would use raw lake water to augment the rainwater source during dry weather periods. As Exhibition Place provides good public access, visibility, and has a high number of visitors, a rainwater harvesting demonstration project at its facilities provides a unique public education opportunity regarding rainwater harvesting systems.

Coincident with the work underway for the design of a rainwater harvesting system at the Better Living Centre, a design was also initiated for the renovations of the Automotive Building at Exhibition Place. In consultation with Toronto Water staff, the design team working on the Automotive Building also incorporated rainwater harvesting system designs into their work. The features of both designs are summarized as follows:

1. Rainwater Harvesting System at the Better Living Centre

A detailed design of the rainwater harvesting system at the Better Living Centre was undertaken in collaboration with the General Manager of Toronto Water and the Chief Executive Officer of Exhibition Place, and in consultation with the Chief Building Official and the Medical Officer of Health. The system is designed to serve as a demonstration project, whereby rainwater is collected from about 7% of the total roof area at a cost of $400,000. Rainwater would be diverted through piping to a sedimentation pit and then to an underground cistern for storage.

Water would be pumped through dedicated non-potable water piping to selected toilets and urinals throughout the building (two washrooms). When the volume of rainwater alone is not sufficient for these fixtures (e.g. during extended periods of dry weather), make-up water from an existing raw water lake feed (currently servicing the irrigation system at Exhibition Place) can be used to maintain minimum water levels in the cistern.

The design of the system guards against the possible contamination of the potable water supply servicing the rest of the Better Living Centre by:

1. Ensuring that there is an air gap between the potable water supply to the cistern and the non-potable water in the cistern (used to augment the rainwater supply during extended periods of dry weather, should the lake-based auxiliary supply fail; and during the winter);
2. Installing a backflow preventer; and
3. Using different coloured and labelled piping, consistent with the design concepts of similar systems used elsewhere in the world.

2. Rainwater Harvesting System at the Automotive Building

The proposed rainwater harvesting system for the Automotive Building is designed to capture rainwater from a roof catchment area six times larger than the Better Living Centre. In current design, rainwater from the roof is collected and filtered prior to being stored in an underground cistern. Water would be pumped through dedicated non-potable water piping to service all toilets and urinals throughout the building (eight washrooms in total).

Similar to the system proposed at the Better Living Centre, when rainwater alone is not sufficient to provide water to these fixtures, make-up water from an existing raw water lake feed is used to maintain minimum water levels in the cistern through the non-winter period and a potable water feed is used as make-up water during the winter months.

The same safeguards, as noted in the designs for the Better Living Centre, have been incorporated into the proposed designs at the Automotive Building to protect the potable water supply system.

The total cost of constructing the above-noted system is estimated at between $700,000 and $935,000. Toronto Water staff are recommending that an upset limit contribution of $600,000 net of GST be provided towards the construction of this project.

The detailed design and construction of the rainwater harvesting system can be undertaken in conjunction with the proposed building renovation works, which are expected to be completed by the end of 2008.

CONCLUSION

Based on the above comparison, and in discussions with staff at Exhibition Place, construction of a rainwater harvesting system at the Automotive Building is the preferred option. While more expensive, this system has a number of advantages including:

(a) The Automotive Building is a higher profile building, used year-round, rather than just seasonally as is the case with the Better Living Centre. This makes it better suited for a demonstration project for public education purposes;

(b) All eight washrooms would be serviced by the system at the Automotive Building rather than only two at the Better Living Centre; and

(c) Installation of a rainwater harvesting system would enable the building to qualify for certification under the Leadership in Energy and Environmental Design (LEED) program at a Silver level.

Therefore, it is recommended that construction of the system be cost-shared by Exhibition Place and Toronto Water, and that Toronto Water's contribution be capped at an upset limit of $600,000 net of GST.

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SIGNATURE

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