



## STAFF REPORT ACTION REQUIRED

### Requiring and Governing the Construction of Green Roofs in Toronto

<b>Date:</b>	June 14, 2007
<b>To:</b>	Planning and Growth Management Committee
<b>From:</b>	Chief Building Official and Executive Director, Toronto Building
<b>Wards:</b>	All
<b>Reference Number:</b>	P:\2007\Cluster B\BLD\CBO Office\PGM007

#### SUMMARY

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Section 108 of The City of Toronto Act provides Council with the authority to pass a by-law requiring and governing the construction of green roofs, as an “exception” to the *Building Code Act, 1992*, which generally prohibits municipal by-laws that exceed requirements under the Ontario Building Code. The Act also provides an opportunity for the City of Toronto to immediately implement the goal of mandatory green roof standards as outlined in the Toronto Clean Air and Climate Change Action Plan.

This report provides an overview of the technical research recently completed for Toronto Building to provide design requirements for a Toronto green roof standard for renovation and new construction of residential, industrial, commercial and institutional buildings.

Section 108 of the Act also provides Toronto with a clear regulatory tool to implement Toronto’s green roof strategy by permitting a city by-law to require green roofs. Further analysis is required in this area to determine where the use of this power would be best used. The attached technical report, *Green “Vegetative” Roof Building Standard for the City of Toronto*, also identifies how potential green roof standards will support the City’s green roof policy objectives and performance criteria.

This report recommends a public consultation on the technical report, *Green “Vegetative” Roof Building Standard for the City of Toronto*. This consultation would also solicit input on when and where green roofs should be required. Based on the outcome of the consultation and peer review of the proposed standard, the Chief Building Official and Chief Planner would report back to Planning and Growth Management Committee in the third quarter of 2007 with recommendations for a Toronto Green Roof By-law for Council’s consideration.

## RECOMMENDATIONS

**The Chief Building Official and Executive Director, Toronto Building recommends that:**

1. The Planning and Growth Management Committee recommend that Council enact the authority of Section 108 of the City of Toronto Act and proceed with the development of a green roof building standard for the City of Toronto, to further implement the recommendations of “Making Green Roofs Happen” and as a means of making this component of the Green Development Standard mandatory.
2. The Chief Building Official:
  - a. Make the technical report on a proposed green roof building standard available for stakeholder and public comment.
3. The Chief Building Official and the Chief Planner, in consultation with other affected divisions:
  - a. Conduct a series of workshops to solicit comments on the proposed green roof building standard and on when and where green roofs could be required in the City of Toronto through a by-law under the City of Toronto Act.
  - b. Report back to the Planning and Growth Management Committee in the third quarter of 2007 with a revised green roof building standard and preliminary recommendations for a green roof by-law.

### Financial Impact

The recommendations contained in this report, to provide the proposed green roof standard for public comment, will have **no** financial impact beyond what has already been approved in the current year’s budget.

The adoption of a green roof standard for the City of Toronto, including the administration and enforcement of a green roof by-law may have financial impacts to be addressed in the report recommended for the third quarter of 2007.

## DECISION HISTORY

### Change is in the Air – Climate Change and Clean Air Action Plan

<http://www.toronto.ca/legdocs/mmis/2007/ex/bgrd/backgroundfile-2428.pdf>

On March 26, 2007, Council’s Executive Committee formally launched the process for engaging the community in developing a climate change and clean air action plan. The framework for public review and engagement recommends, “Mandatory green building standards for new buildings, including businesses and residences, by no later than 2012.”

## **Green Roof Incentive Program**

City Council on May 23, 24 and 25, 2007, authorized the General Manager of Toronto Water to extend the Green Roof Incentive Pilot Program. In considering the report from Toronto Water, the Planning and Growth Management Committee directed that:

(1) Deputy City Manager Richard Butts bring forward the necessary by-law so that green roofs become a requirement of all new large residential and community developments; and (2) Staff to report to the Planning and Growth Management Committee on the environmental impact and recreational benefits of the Green Roof Program.

<http://www.toronto.ca/legdocs/mmis/2007/pg/bgrd/backgroundfile-3302.pdf>

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060425/wks2rpt/cl013.pdf>

## **2006 Ontario Building Code**

In 2006, Council gave Toronto Building direction to “proceed with developing a Toronto green roof construction standard, should Council decide to enact its authority of Section 108 of the Stronger City of Toronto for a Stronger Ontario Act, 2006.”

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060925/plt6rpt/cl017.pdf>

## **The Toronto Green Development Standard 2006**

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060725/pof6rpt/cl001.pdf>

## **Toronto’s Green Roof Strategy - “Making Green Roofs Happen”**

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060131/pof1rpt/cl020.pdf>

## **ISSUE BACKGROUND**

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### **“Making Green Roofs Happen”**

In February, 2006, Toronto City Council adopted Toronto’s green roof strategy. This strategy, “Making Green Roofs Happen” was the outcome of a process which involved extensive stakeholder discussion, a consultant’s study of the costs and benefits of green roofs to the City and a public meeting, hosted by the Mayor’s Roundtable on the Environment. Toronto City Council adopted a series of recommendations, including:

- The installation of green roofs on City buildings,
- Introducing a pilot green roof incentive grant program
- Using the development process to encourage green roofs
- Public education and promotion.

### **Ontario Building Code**

Ontario’s Building Code Act, 1992<sup>1</sup> generally sets out the legislative framework governing the construction, renovation and change of use of buildings in the province. Enforcement of the administration and technical requirements of the Building Code Act,

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<sup>1</sup> [http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/92b23\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/92b23_e.htm)

1992 and the Ontario Building Code is the responsibility of municipalities. The 2006 OBC neither prohibit nor explicitly recognizes the use of green roofs in new construction and renovation.

During the consultation on the development of Toronto's green roof strategy, stakeholders indicated that green roof development could be facilitated in the City by expediting the approvals process for these applications. Each building permit application containing a green roof proposal is reviewed and inspected by Toronto Building staff based on the designs which must be assessed as the equivalent to the requirements of the Building Code, which is more challenging and time consuming than assessing against prescriptive requirements.

Amendments to the Ontario Building Code that came into effect in January 2006 now require that municipalities review a complete building permit application within specific timeframes. The time-frames vary based on building type. They range from 10 days for most residential applications to thirty-days for large complex buildings (Ontario Building Code Part 3). These legislated time frames that apply to all building permit applications either meet or exceed the expedited time frames established in some jurisdictions for the review of "green building permits".

## **City of Toronto Act, 2006**

On January 1, 2007 the province proclaimed the City of Toronto Act. This legislation provides the City of Toronto with broad powers to pass by-laws on matters that range from public safety to the city's economic, social and environmental well being. A number of the new powers in the City of Toronto Act address planning matters specifically. Section 108 of the Act permits the City to require green roofs through a by-law and govern their construction:

### **Construction of green roofs**

*108. (1) Without limiting sections 7 and 8, those sections authorize the City to pass a by-law requiring and governing the construction of green roofs if the provisions of the by-law do not conflict with the provisions of a regulation made under the Building Code Act, 1992 respecting public health and safety, fire protection, structural sufficiency, conservation and environmental protection and the requirements respecting barrier-free access. 2006, c. 11, Sched. A, s. 108 (1); 2006, c. 32, Sched. B, s. 22 (1).*

*Same*

*(2) A by-law under subsection (1) prevails over a regulation made under the Building Code Act, 1992, despite section 35 of that Act. 2006, c. 11, Sched. A, s. 108 (2); 2006, c. 32, Sched. B, s. 22 (2).*

*Definition*

*(3) For the purposes of subsection (1),*

*“green roof” means a roof surface that supports the growth of vegetation over a substantial portion of its area for the purpose of water conservation or energy conservation. 2006, c. 11, Sched. A, s. 108 (3).*

*Repeal*

*(4) This section is repealed on a day to be named by proclamation of the Lieutenant Governor. 2006, c. 11, Sched. A, s. 108 (4).<sup>2</sup>*

Section 108 is a significant “exception” to Section 35 of the Building Code Act, 1992, which generally prohibits municipal by-laws that exceed requirements under the Building Code.

## **Green Development Standard**

In July 2006, Council endorsed the Green Development Standard (GDS) which contains voluntary performance targets and guidelines that relate to site and building design to promote better environmental sustainability of development.. The Standard is a "made-in-Toronto" approach that integrates existing City guidelines and targets with standards from private rating systems such as Leadership in Energy and Environmental Design (LEED) and Green Globes.

Green roofs are one element of the GDS that may be used to address urban heat island reduction. The objective for green roofs is as follows: commercial buildings over 10,000m<sup>2</sup> and residential properties over 20,000 m<sup>2</sup> should install a green roof with 50% minimum coverage; all other development should install a green roof with 50% minimum coverage or install light coloured roofing materials for 75% of the roof or a combination of both for 75% of the roof.

## **COMMENTS**

The City of Toronto Act provides an opportunity for the City of Toronto to immediately implement the goal of mandatory green roof standards as outlined in the Clean Air and Climate Change Action Plan.

The Act specifies two authorities that council may address in a green roof by-law: Requiring green roofs and governing the construction of green roofs. “Requiring” green roofs refers to the by-law establishing where and when green roof construction would be mandated. “Governing the construction” refers to the ability for the City to establish the construction standard to which green roofs must comply for a building permit. The comments below address each of these authorities contained in the Act.

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<sup>2</sup> [http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/06c11\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/06c11_e.htm)

## **Governing the Construction of Green Roofs**

In January, 2006 Toronto Building retained Halsall Associates Limited to provide the technical foundation necessary for the development a green roof building standard for Toronto. A copy of the report *Green “Vegetative” Roof Building Standard for the City of Toronto* is attached to this report as Appendix “A”. The purpose of the study was threefold:

### **1. Identify the components of the Ontario Building Code Act and the 2006 Ontario Building Code that apply to the design and construction of green roofs.**

Halsall and Associates conducted an extensive review of the general requirements of the Ontario Building Code Act and the Ontario Building Code (residential, large buildings and renovation) that apply to the design and construction of green roofs. This analysis was useful in identifying specific considerations that should be taken into account when developing the initial framework standard. For example, if a green roof is to be installed on an existing building a building permit would be required as the green roof would be considered a “material alteration or repair under the Building Code Act. Other considerations included structural and wind loads, fire safety, accessibility and thermal insulation properties.

### **2. Identify the standards and guidelines currently used in other jurisdictions to evaluate and regulate the design, installation and maintenance of green roof systems.**

Toronto Building wanted to adequately assess the potential use of existing green roof standards for use in a Toronto Green Roof Standard. It is apparent from the study that there is no existing standard, guideline or rating system that the City of Toronto could adopt in its entirety for use as the Toronto green roof construction standard.

The Halsall study reviewed the well known German Landscape and Landscape Development Research Society (FLL) *Guidelines for the Planning, Execution and Upkeep of Green-roof Sites*. The FLL guidelines incorporate European testing standards which have presented some difficulty for testing North American roofing products. In response, the American Standards for the Testing of Materials (ASTM) developed guidelines and testing procedures for various green roof products.

Should Toronto adopt a green roof building standard, the City will be a leader in green roof implementation and design ahead of North America or potentially anywhere.

### **3. Develop an initial framework standard and include an analysis of how it would support the City’s key green roof policy objectives and performance criteria.**

The third objective of the study was to establish a preliminary framework for the building requirements that would be incorporated into a Toronto green roof by-law.

Section 108 of the City of Toronto Act authority is clear that a by-law cannot conflict with the minimum provisions of the building code with respect to public health and safety, fire protection, structural sufficiency, conservation and environmental protection and barrier free access. The consultant’s report addresses each of these general considerations in the recommended framework.

The final component of the report is the recommendations for the performance standards and prescriptive measures that could be adopted in preparing a Toronto by-law governing the construction of green roofs.

The standard also includes recommendations to promote achieving the key policy objectives in support the City’s green roof strategy outlined in the “Report on the Environmental Benefits and Costs of Green Roof Technology for the City of Toronto”<sup>3</sup>, which include:

- Reduced Urban Heat Island
- Stormwater Management Implications (Quality and Quantity)
- Energy Budgets of Individual buildings
- Improved Air Quality

As is the case with the Ontario Building Code, the standard is not intended to be a textbook on the design of green roofs, but to provide certainty and clarity for builders, developers, manufacturers, designers and regulators in the design and construction of green roofs in the City of Toronto while maintaining performance levels relative to the City’s policy objectives and the Ontario Building Code.

## **Requiring the Construction of Green Roofs**

When City Council approved the green roof strategy in February 2006, it made a number of recommendations regarding achieving green roofs in the City, including that the Chief Planner ask for installation of a green roof when approving applications for Official Plan and Zoning By-law amendments and Site Plan Approval, and also that green roofs be installed on city owned facilities and those of the City's ABC's where feasible and practical, for new construction and roof replacements.

In addition, based on the results of the City's study on the *Environmental Benefits and Costs of Green Roof Technology*, and given the relatively high cost of green roofs (up to 2 to 3 times the cost of a conventional roof), City Council approved the Green Roof Pilot

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<sup>3</sup> <http://www.toronto.ca/greenroofs/pdf/fullreport103105.pdf>

Incentive Program which will provide \$50 a square metre to property owners towards construction of a green roof.

The new authority under the City of Toronto Act allows the City to go beyond the current program of encouraging green roofs through the development review process and incentive program and provides the City with the authority to require a green roof.

In preparing a by-law that indicates when and where the City might require a green roof, a number of factors need to be considered. For example, the type and size of building, as in the case of the Green Development Standard where commercial and residential buildings over a certain size are required to have a green roof. Also, specific geographic areas of the city could be targeted for green roofs such as areas of combined sewer overflows, areas prone to flooding, areas where urban heat island is a concern or growth areas. Determining where and when green roofs may be required will be based on the inventory of green roofs in the 2005 study on the *Environmental Benefits and Costs of Green Roof Technology for the City of Toronto* (it should be noted that the study only inventoried roofs with a slope of less than 10%) and will be discussed with the public and stakeholders at the proposed workshops. This approach is consistent with the recommendations of the Planning and Growth Management Committee at its meeting Thursday May 3, 2007

## **NEXT STEPS**

### **Public Consultation**

To solicit feedback from the general public, builders, designers and the green roof industry, it is proposed that Toronto Building and City Planning engage stakeholders in a consultation on the proposed framework standard for green roofs and the matter of requiring (the where and when) green roofs, in a series of workshops held jointly by the two divisions. Toronto Building's report, *Green "Vegetative" Roof Building Standard for the City of Toronto* will be posted on the City's green roof website ([www.toronto.ca/greenroofs/](http://www.toronto.ca/greenroofs/)) with information on how to participate in the discussion on the development of the Toronto green roof by-law.

### **Technical Committee**

When construction standards are developed by standards organizations or regulatory development bodies the practice includes establishing a committee of key stakeholders with expertise in the particular disciplines affected by the standard to review and provide advice on technical, building science and enforcement issues that may have an impact on the implementation of the proposal.

To ensure that a Toronto green roof building standard undergoes the same due diligence, it the Chief Building Official will establish a Green Roof Technical Committee of experts in various aspects of building engineering, structural, building envelope, manufacturing and enforcement experience to review the proposed by-law and stakeholder comments.



## **Recommendations for a Green Roof By-law**

Based on the consultation, it is recommended that the Chief Building Official and Chief Planner report to Planning and Growth Management Committee, in the third quarter of 2007 with recommendations for a green roof by-law for implementation in 2008. This report will also address the potential administrative considerations and financial implications of adopting a green roof by-law. These recommendations will reflect feedback on the standard and the proposed requirements for green roofs in the City of Toronto.

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### **SIGNATURE**

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### **ATTACHMENTS**

Appendix "A": Green "Vegetative" Roof Building Standard for the City of Toronto