

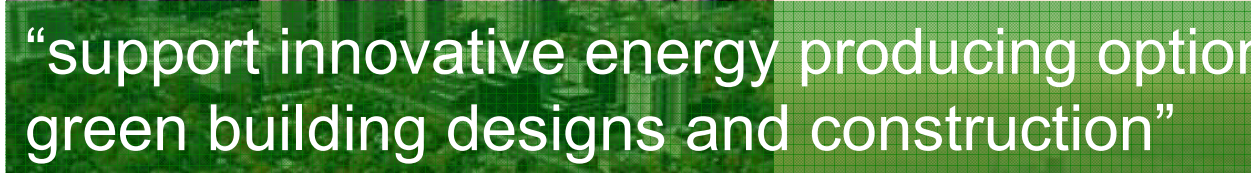
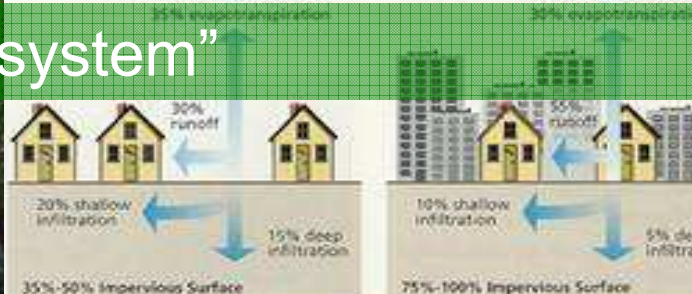
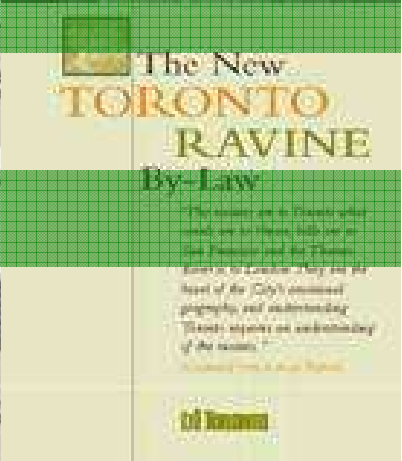
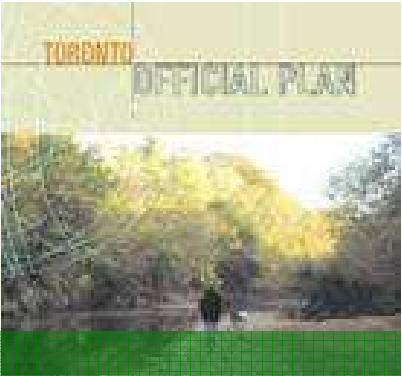
making a sustainable city happen

The Toronto Green Standard
The Green Roof By-law



Municipal Urban Designers Roundtable
Sustainability & Urban Design Initiatives
Jane Welsh, A/Project Manager
Zoning By-law and Environmental Planning
May 22, 2009


OFFICIAL PLAN chapter 3 Natural Environment




GREEN DEVELOPMENT STANDARD

making a sustainable city happen

Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
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Development	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
	Storage and	• Solid Waste Division:	• Install user-friendly	• Addressed by LEED	• Three date

Development	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
	Construction	• [Draft] WWT Interim	• See existing draft	• Addressed by LEED	• Erosion and

Development	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
				

Cost-Benefit Study city happen

making a sustainable city happen

- 
- 2- 7% premium
 - \$1.2 billion avoided costs over 25 years
 - GHG emissions reduced by:
 - typical condo (MURB): 500 tonnes eCO₂
 - typical office building: 300 tonnes eCO₂
 - typical single storey retail building: 300 tonnes eCO₂

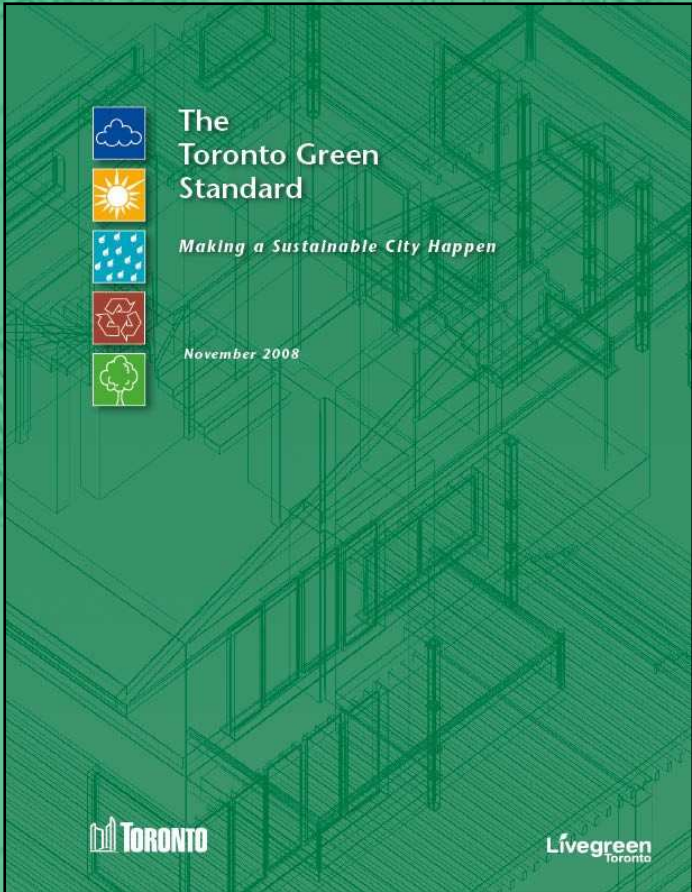
Toronto Green Development Standard COST-BENEFIT STUDY

Ted Kesik and Anne Miller - John H. Daniels Faculty of Architecture, Landscape and Design University of Toronto

City of Toronto
Ontario Centres of Excellence
Federation of Canadian Municipalities



the TORONTO making a sustainable city happen GREEN STANDARD



The cover of the report features a green background with a faint architectural line drawing of a building. On the left side, there is a vertical column of five icons: a blue cloud, a yellow sun, a blue rain cloud with white raindrops, a red recycling symbol, and a green tree. The text on the cover reads: "The Toronto Green Standard", "Making a Sustainable City Happen", and "November 2008". At the bottom left is the Toronto logo, and at the bottom right is the Livegreen Toronto logo.

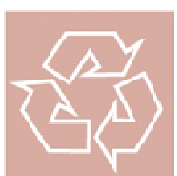
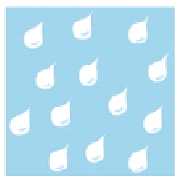
Tier 1 - secure and validate through plan review

Tier 2 – voluntary incentive based 3rd party validation

The Toronto Green Standard

Tier 1

- 20 minimum performance targets secured through Planning Act approval processes (plans and agreements)
- Exterior Sustainable Design Features
- 25% Energy Efficiency above MNECB



WATER QUALITY, Quantity & Efficiency

making a sustainable city happen



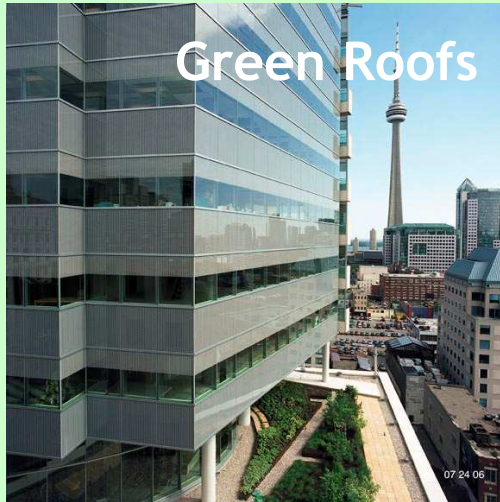
The Green Standard = Existing standard or guideline

- The *Wet Weather Flow Management Master Plan*

Development Feature	Existing City Standards, Guidelines or Targets	Tier 1 Green Standard	Definitions, Specifications and Resources	Possible Implementation Strategies
<p>Stormwater Retention (Water balance) Minimize stormwater that leaves the site</p>	<ul style="list-style-type: none"> • WWF Water Balance: Retention of stormwater on-site to the same level of annual volume of overland runoff allowable under pre-development conditions • Minimum Requirement: Retention of all runoff from small design rainfall events (typically 5 mm) through rainwater reuse, onsite infiltration, and evapotranspiration. 	<ul style="list-style-type: none"> • Retain stormwater on-site to the same level of annual volume of overland runoff allowable under pre-development conditions • Retain all runoff from small design rainfall events (typically 5 mm) through rainwater reuse, onsite infiltration, and evapotranspiration. 	<ol style="list-style-type: none"> 1. See Wet Weather Flow Management (WWFM) Guidelines for required Water Balance targets. http://www.toronto.ca/water/protecting_quality/wfmmp/pdf/wwfm_guidelines_2006-11.pdf 2. Use tree and shrub planting, green roofs and other landscaping, to increase evapotranspiration from the site, and to increase the amount of permeable surfacing on site. <ul style="list-style-type: none"> • These measures come from the WWFM Guidelines which provide stormwater practices so that source control is undertaken as a priority to the extent physical factors allow. When source control practices are exhausted, the WWFM Guidelines provide conveyance and end of pipe practices. 	<ul style="list-style-type: none"> • Green roofs • Rain water harvesting • Permeable pavers, permeable asphalt, permeable concrete for hard surfaces • Greening of impervious areas such as alleyways, fire lanes and parking lots using permeable paving materials, trees and vegetation • Downspout disconnection • Infiltration trenches • Rain gardens/absorbent landscaping

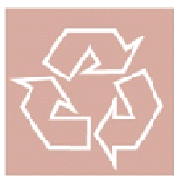
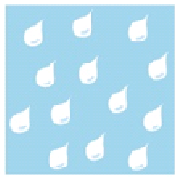
Tier 1 Targets: Minimum Standard

+ 25%
Energy
Efficiency
above
MNECB

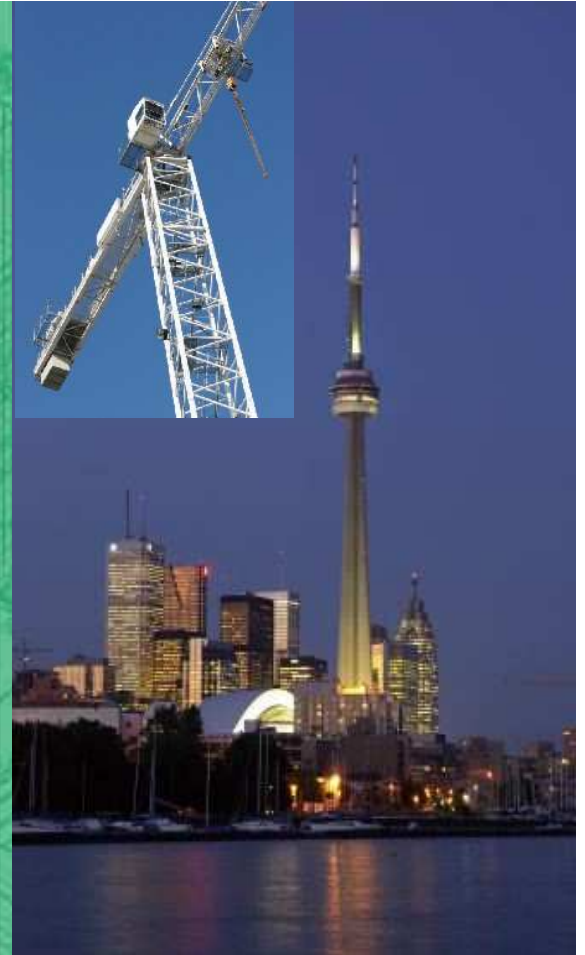


Better Buildings – New Construction Program

making a sustainable city happen



- Part 1- Design phase application
 - Incentive offsets the cost of a design phase energy modeller to a maximum of \$7,000, calculated on gross floor area. Paid direct to modeller.
- Part 2 – Constructed phase application
 - Energy model is revised as required upon building completion to reflect ‘as built’ savings
 - Incentive pays out \$350 per peak kW (or \$0.04 per kWh of annual) electricity savings as compared to Ontario Building Code. Paid to building owner.



The Toronto Green Standard

Implementation



Planning Act
provincial interest
PPS
complete application

City of Toronto Act
Site Plan and Sustainable design

Making a sustainable city happen

Green Development Standard Checklist: ECOLOGY

Toronto Green Development Standard

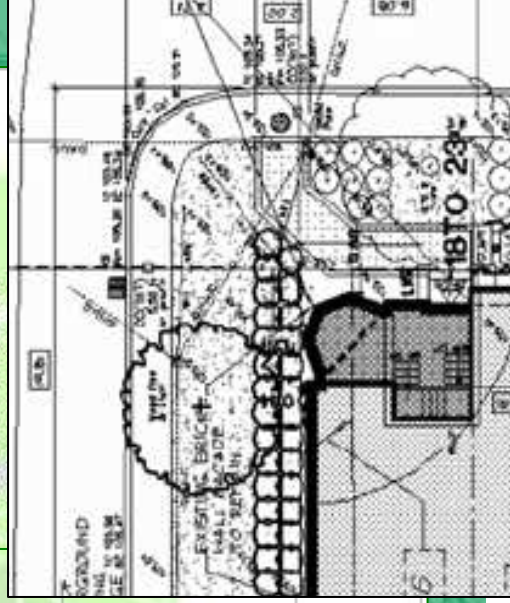
Urban Forest: Site and Adjacent Boulevard

- ▶ All trees that are 30cm or more DBH (diameter at breast height) retained.
- ▶ Each tree provided with a minimum soil volume of 30 m³ of high quality soil.
- ▶ Minimum protection distances and standards for tree protection barriers during construction have been adhered to according to Specifications for Construction Near Trees
- ▶ Native soil retained on site (or replaced, as necessary, with local soil of equal or better quality).
- ▶ Non-potable watering system for all trees provided
- ▶ Large growing, predominantly native shade trees planted to achieve 20% canopy coverage of the site at maturity

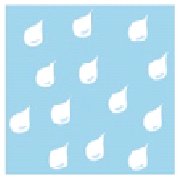
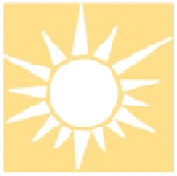
Demonstrate how the Standard will be met through your...

- Site Plan
- Landscape Plan
- Arborist Report
- Tree Preservation Plan
- Natural Heritage Impact Study (where applicable)

Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Positive Strategies to Implement
Urban Forest: Site and Adjacent Boulevard	<ul style="list-style-type: none"> • OP: provide suitable growing environment for trees; increase the tree canopy coverage and diversity; especially long-lived native and shade trees; regulate the injury and destruction of trees. • Our Common Grounds: goal to achieve a sustainable canopy of 30-40%. • Ravine Protection Bylaw: Protect existing trees in the City's Ravines • City Street Tree Bylaw: Protect street trees on the public right-of-way • City Parks Bylaw, Article VII: Protect trees in all City Parks • Private Tree Bylaw: Provides protection for 	<ul style="list-style-type: none"> ▶ Retain all trees that are 30cm or more DBH (diameter at breast height) ▶ Provide each tree a minimum soil volume of 30 m³ of high quality soil. ▶ Adhere to the minimum protection distances and standards for tree protection barriers during construction according to Specifications for Construction Near Trees ▶ Provide a non-potable watering system for all trees ▶ Retain native soil on site, adjust or replace with local soil of equal or better quality. ▶ Plant large growing, predominantly native shade trees to achieve 20% canopy coverage of the site at maturity 	<ul style="list-style-type: none"> • Not addressed by LEED or Green Globes 	<ul style="list-style-type: none"> • Use soil cells, retain native topsoil, construction management plan to avoid site disturbance



The Toronto Green Standard



Tier 2

- Superior performance targets plus 8 additional items added
- 40% energy efficiency above MNECB
- Eligible for 20% DC refund if all Tier 2 targets are met

The Toronto Green Standard

Targets 3 Scales of Development



1. Low-rise non-residential



2. Low-rise residential



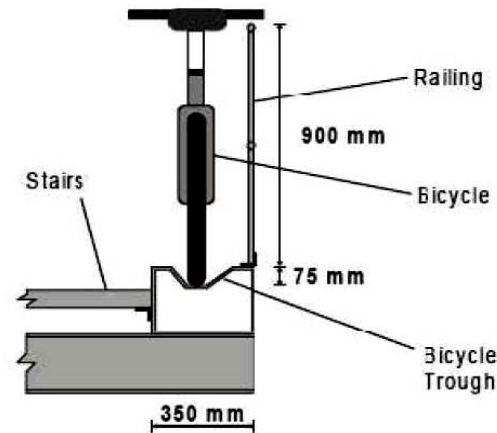
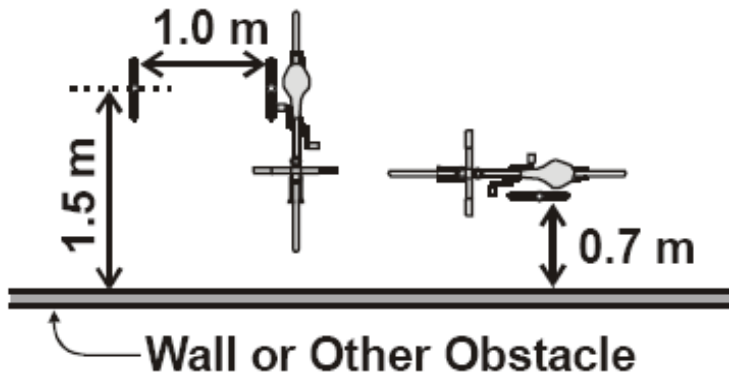
3. Mid-rise to High Rise (any use)



Design Guidelines for Greening SURFACE PARKING LOTS



Bicycle Parking Facility Guidelines



Guidelines for the
Design and Management of
Bicycle Parking Facilities

DRAFT - MAY 2008

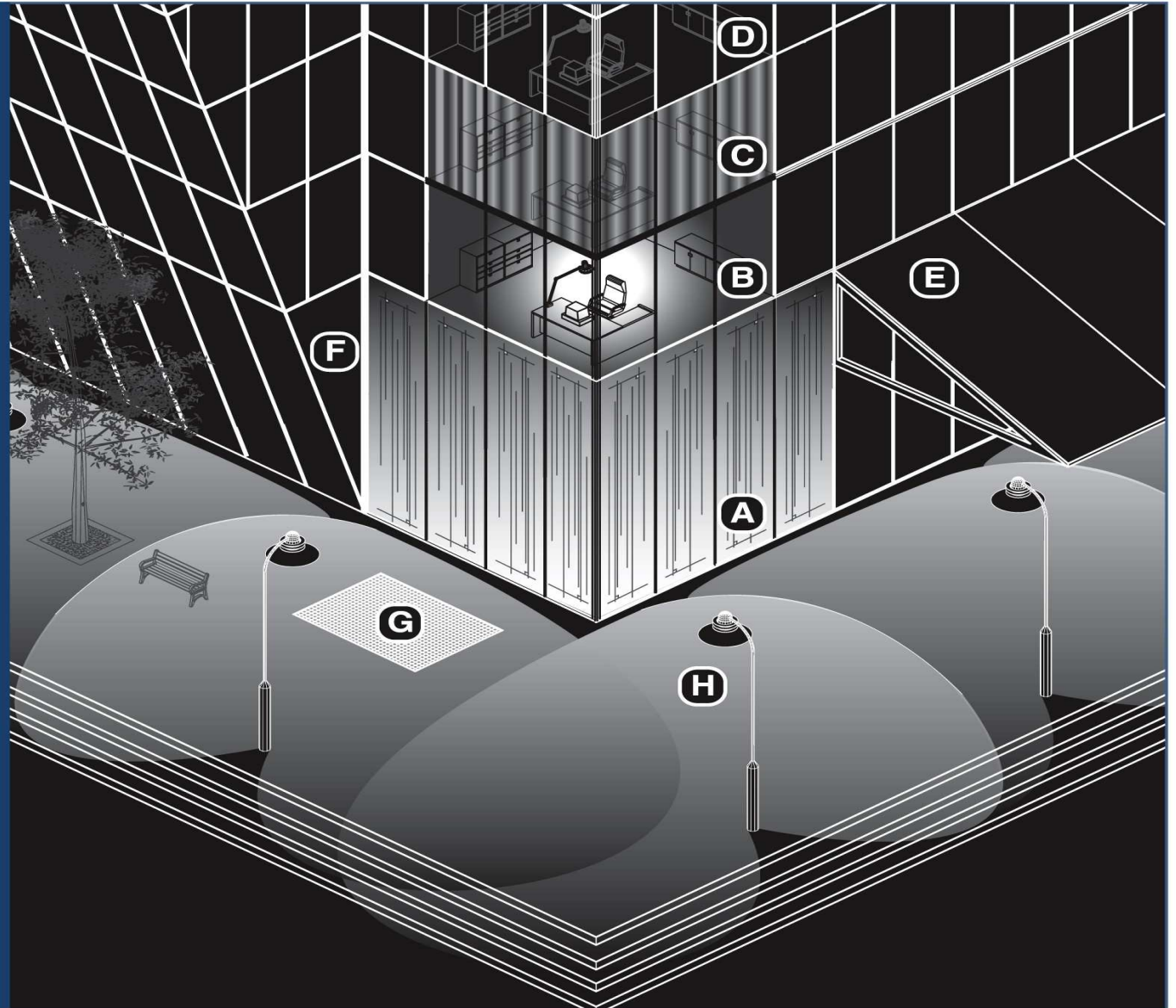


Bird Friendly Development Guidelines

making a sustainable city happen

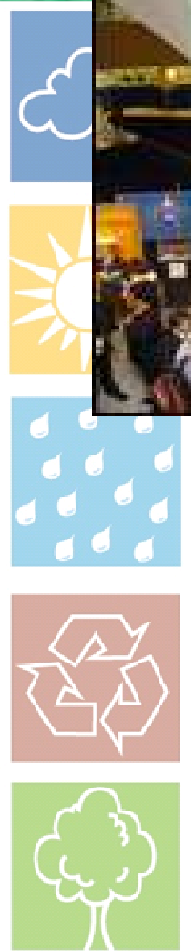
COMPREHENSIVE BIRD-FRIENDLY SITE STRATEGY

- A: Treatment applied to glass projecting enough visual markers to make it visible to birds
- B: Task lighting in use after dark
- C: Blinds drawn after dark
- D: Lights turned off after work hours
- E: Awning for muting reflections on lobby windows
- F: Glass effectively angled to project reflections downward
- G: Bird-friendly site ventilation grates
- H: Use of lighting fixtures effectively projecting light downward



Sustainable Development Training Course

making a sustainable city happen



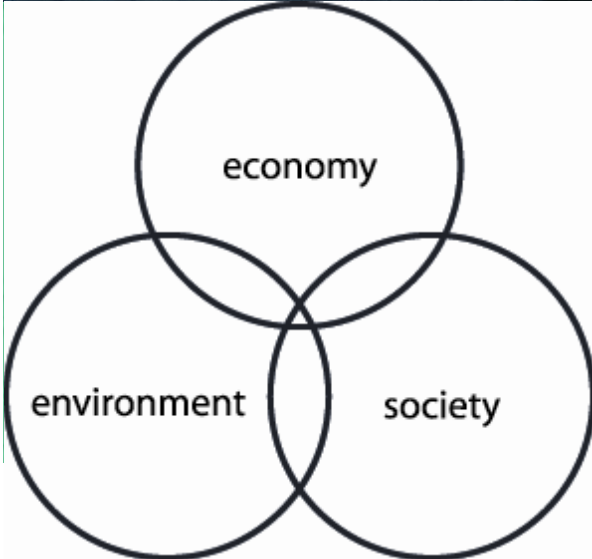
Renewable Energy

By-law making a sustainable city happen



Sustainable Planning Framework

making a sustainable city happen



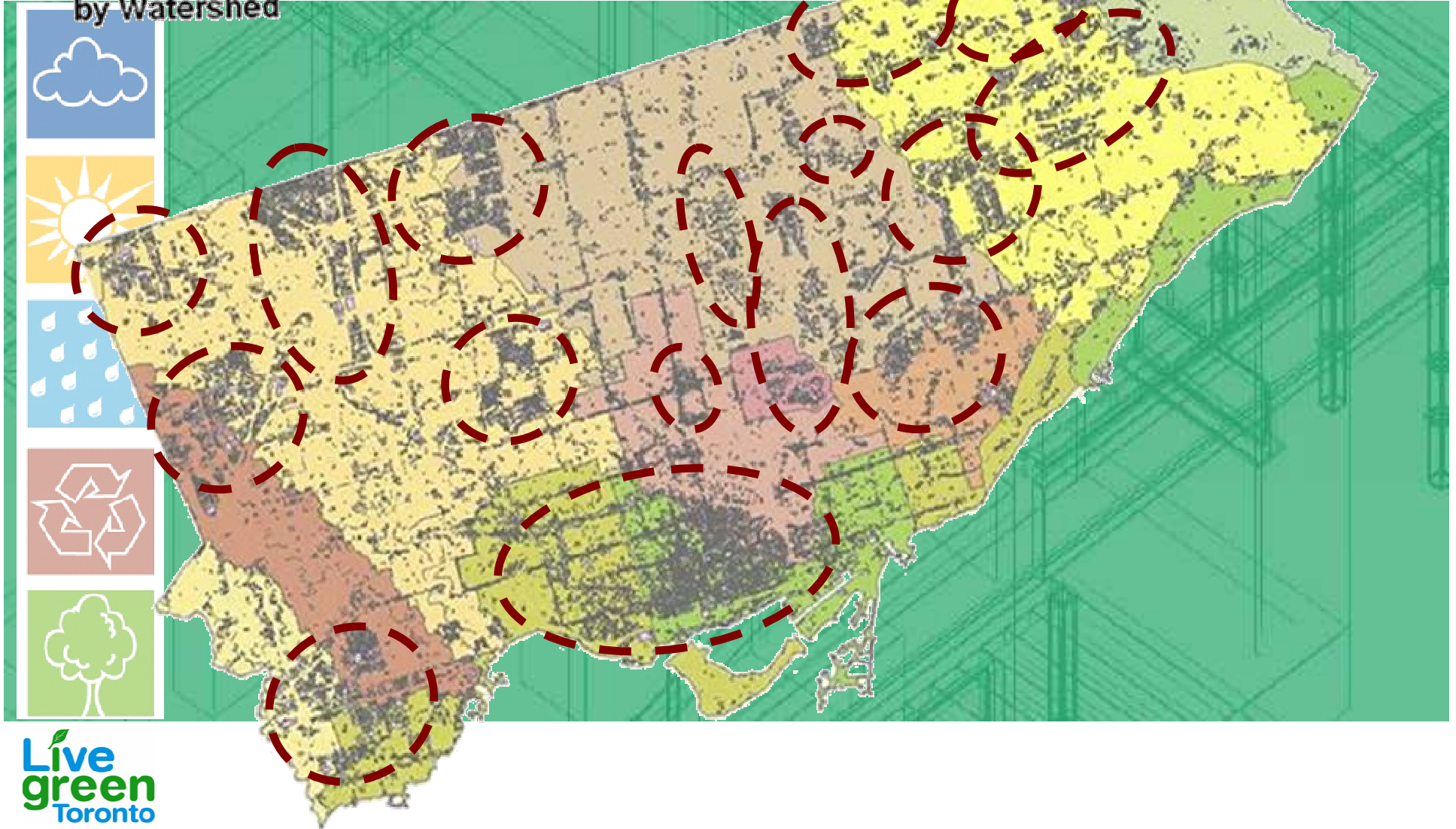
Triple Bottom Line

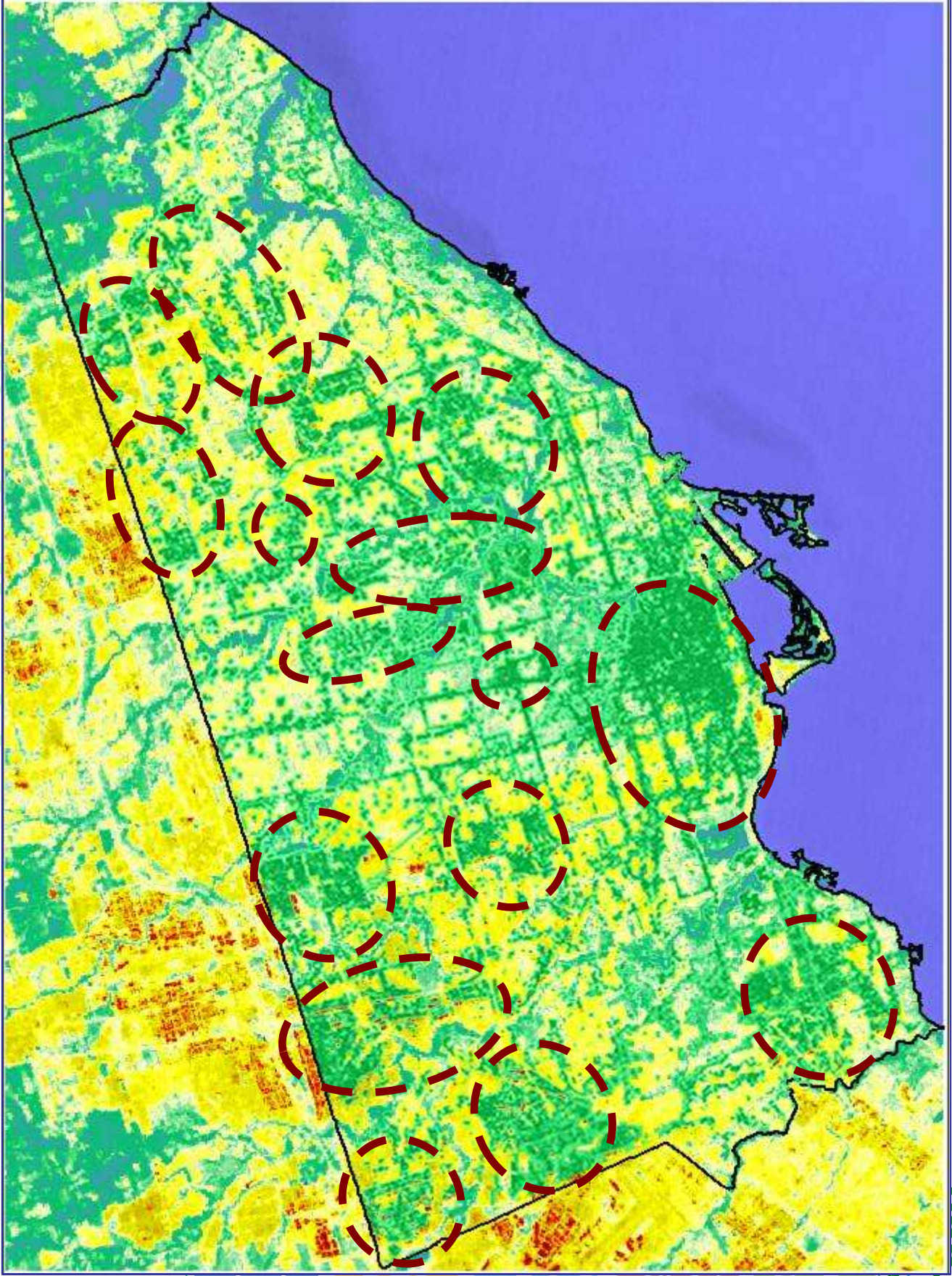


Green Roof Strategy

making a sustainable city happen

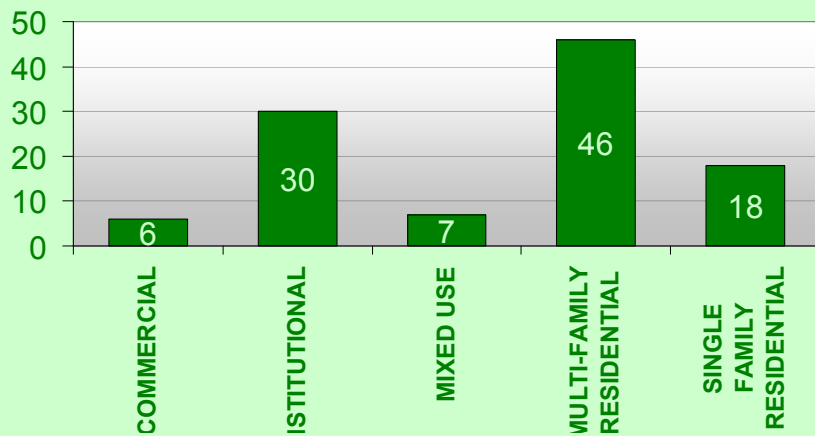
Toronto Greenroof Study
Buildings with roofs over 350 square metres,
by Watershed



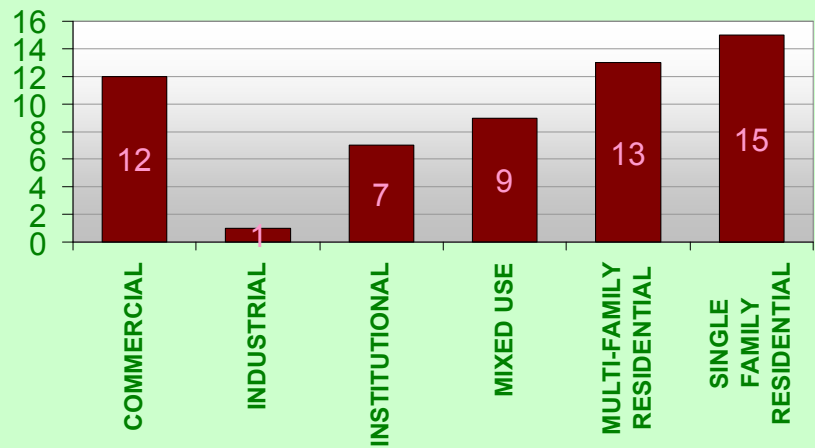


Green Roof Strategy

Built (107)



Planned (57)



Single Family Residence



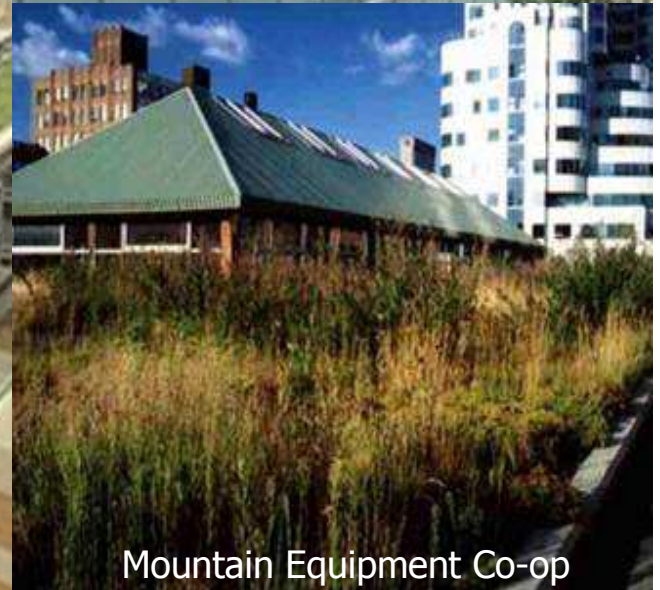
Jackman Public School



Toronto Botanical Gardens



York University



Mountain Equipment Co-op

Green Roof Strategy: **INCENTIVE PROGRAM**

- 2007 Pilot Program: 30 successful projects



The ROM



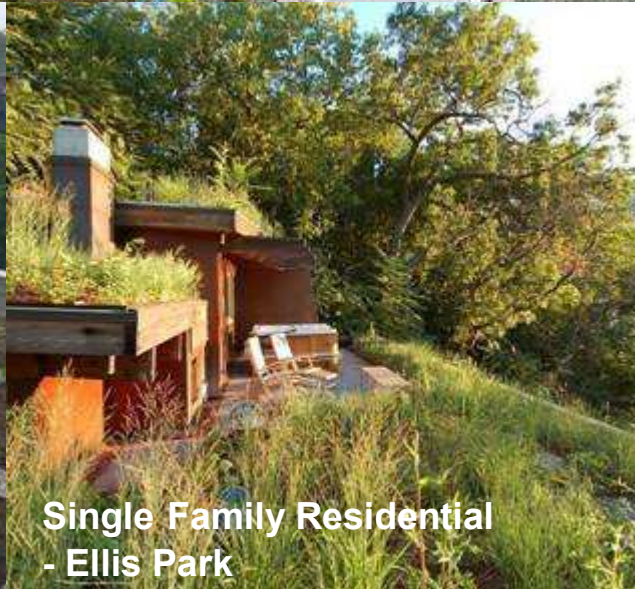
The Toronto Zoo



Single Family Residential - Eastwood



GWL Realty Advisors



Single Family Residential - Ellis Park



Crescent School

Eco-Roof

Incentive Program

inable city happen
www.toronto.ca/livegreen/ecoroofs



green
roof

A green roof supports the growth of vegetation for the purpose of water or energy conservation, and is comprised of a waterproofing membrane, drainage layer, organic growing medium and vegetation.

\$50 / m² (up to \$100,000)



For Industrial, Commercial
and Institutional Buildings

Cool
roof

A cool roof reflects the sun's thermal energy, using either a coating applied over an existing roof or a new roof membrane.

\$2 / m² coating over existing roof

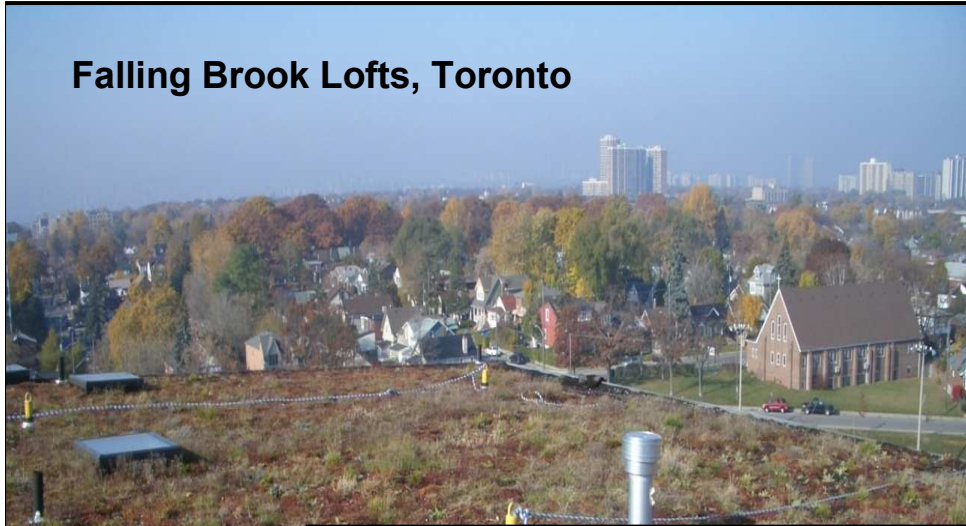
\$5 / m² new roof membrane
(up to \$50,000)



Next Steps: Green Roof **BY-LAW**

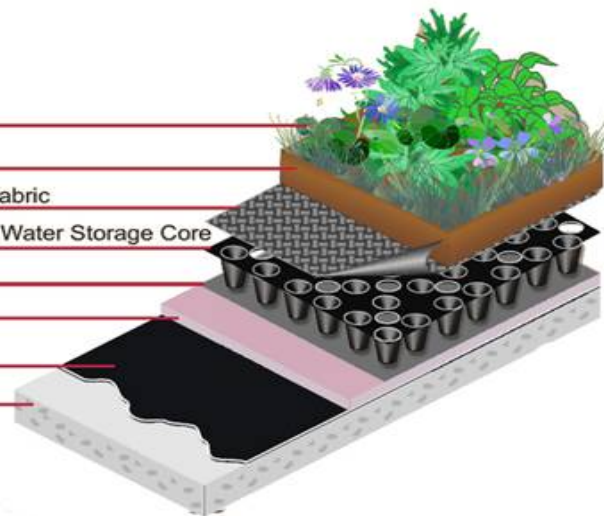
Requiring and Governing the Construction of Green Roofs

Falling Brook Lofts, Toronto



- City of Toronto Act, S. 108
- Requiring green roofs on new construction
- Toronto Green Roof Construction Standard

Vegetation
Growing Medium
Root Barrier Filter Fabric
Drainage, Aeration, Water Storage Core
Separation Fabric
Insulation
Roofing Membrane
Structural Support



MEDIA Coverage

The Toronto Star

Greens, builders both raining on green-roof plan By Vanessa Lu

April 10, 2009

"It's a fairly bold move," said Welsh, noting that the only Canadian municipality with a green roof bylaw is Port Coquitlam, B.C.

The National Post

Toronto wants mandatory green roofs

By Allison Hanes

April 14, 2009

The New York Times

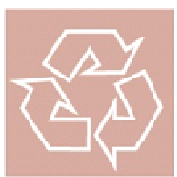
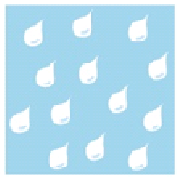
Toronto Mulls Mandatory Green Roofs By John Lorinc

April 16, 2009

Steven Peck, president of the 10-year-old Toronto-based group Green Roofs for Healthy Cities, said the city's efforts could create green-collar jobs and be on the "leading edge" of the technology



Requiring Green Roofs in Toronto



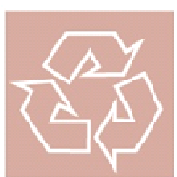
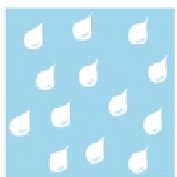
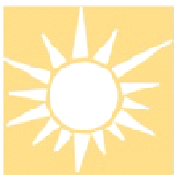
Proposed:

- New buildings over 2,000 sq.m. GFA
- Coverage based on building size
- Cash-in lieu
- City Council May 25, 26, 2009



making a sustainable city happen

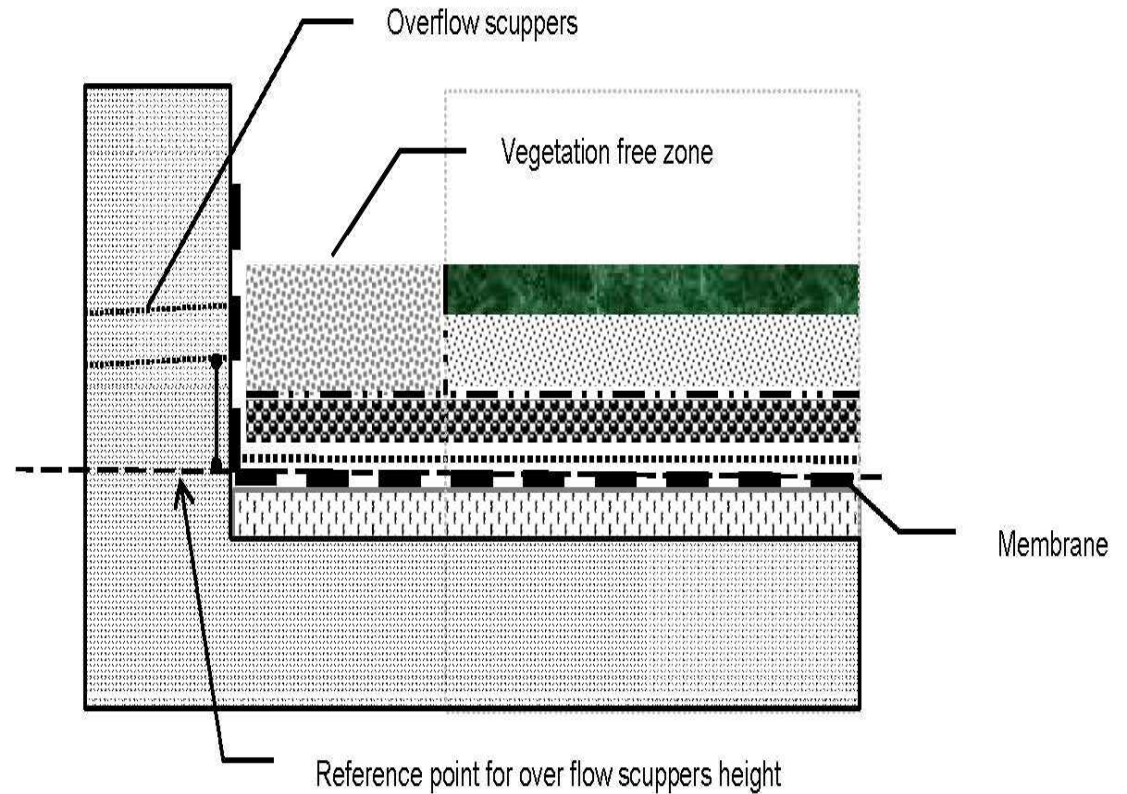
Green Roof Calculation



- Excludes areas devoted to renewable energy devices
- Excludes private terraces
- Encourages green roof installation on the podium of tall buildings

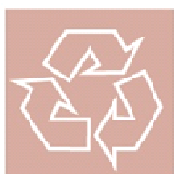
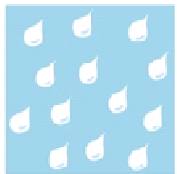
Toronto Green Roof Construction Standard

- Implemented under City of Toronto Act authority to govern construction
- Exception to Ontario Building Code supremacy over municipal bylaws
- Consistent with performance levels set in Building Code



GREEN Contacts

making a sustainable city happen



CITY PLANNING, Zoning By-law and Environmental Planning
sustainablecity@toronto.ca

Jane Welsh
416.392.9709
jwelsh@toronto.ca

Lisa King
416.392.9698
king4@toronto.ca

Shayna Stott
16.392.0171
[sstott@toronto.ca](mailto:sscott@toronto.ca)

Cameron Barker
416.392.4766
cbarker@toronto.ca

Kelly Snow
416.392.4787
ksnow@toronto.ca

Jane Weninger
416.392.0422
weninger@toronto.ca