



GREEN DEVELOPMENT STANDARDS

Going Green in Mississauga



ourfuturemississauga.ca



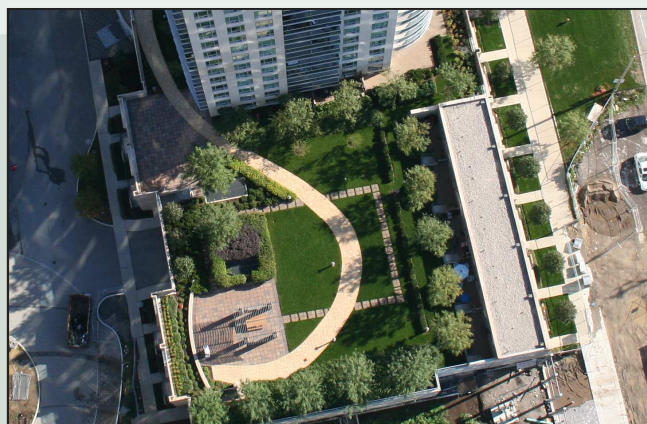
October 2012

Stage One: Green Development Standards

T ABLE OF CONTENTS

In response to City Council direction, this brochure outlines the Stage One Green Development Standards that applicants

Preface	2
1.0 General	3
2.0 L.I.D. Stormwater Retention	4
2.1 Bio-Retention	
2.2 Rainwater Harvesting	
2.3 Permeable Pavement	5
2.4 Grass and Dry Swales	
2.5 Green Roofs	6
3.0 Soft Material Landscape	7
3.1 New Trees	
3.2 Native Vegetation	
4.0 Pedestrian and Cycling Comfort	8
4.1 Pedestrian Walkways	
4.2 Pedestrian Comfort	
4.3 Bicycle Parking	
5.0 Exterior Building Design	10
5.1 Bird Friendly Glazing	
5.2 Site and Building Lighting	
6.0 LEED-NC Requirements	11
Links	12



October 2012

1.0 PREFACE

will need to consider when preparing their site plan and rezoning applications prior to development approval.

On July 7, 2010, City Council adopted the Green Development Strategy, which focuses on achieving sustainability and environmental responsibility in new development in Mississauga. The following key recommendations are now being implemented:

- a Green Development Task Force to implement the "Made in Mississauga" Strategy over five years;
- the third-party green LEED-NC (Leadership in Energy and Environmental Design for New Construction) certified Silver rating system as a guide for development to follow; and
- the 'Made in Mississauga' Stage One Green Development Standards.

The City strongly encourages applicants to incorporate green sustainable elements into proposed buildings, site works, construction methods and long term maintenance programs. Further to the Stage One Standard requirements, the City also asks that applicants pursue LEED-NC credits required to achieve Silver certification.

For more information, visit the Canada Green Building Council for the LEED-NC program, *Sustainable Technologies for the Low Impact Development Stormwater Management Planning and Design Guide*, and the City of Mississauga for the Green Development Strategy websites found on the back of this brochure.

Cover Photos

Top left– Hurontario St., east side

Bottom left– North Shore Condo, Port Credit

Top middle– Swale in Sheridan Park

Second from top middle– Parking island in industrial area

Third from top middle– Pedestrian connection, Downtown

Bottom middle– Example of sustainable techniques

Top right– Go Bus Terminal, Streetsville

Bottom right– Example of Bird-friendly screen design



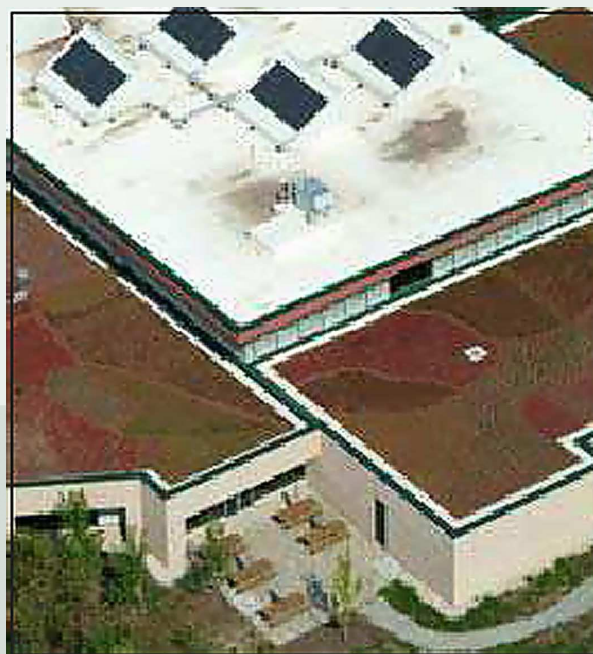
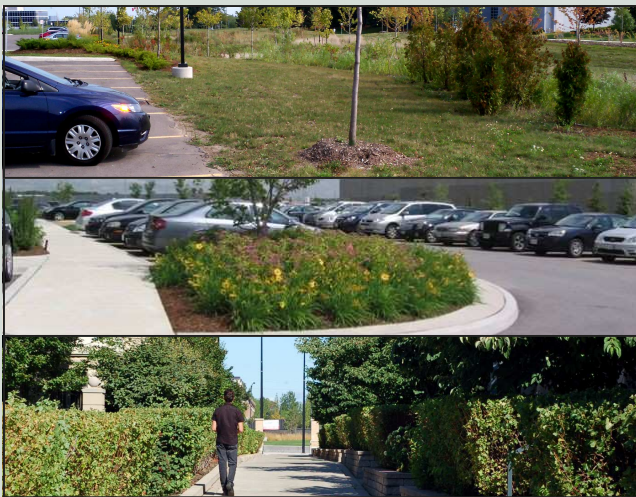
Stage One: Green Development Standards

2.0 GENERAL

All site plan applications will be required, where appropriate, to incorporate technologies that maximize the natural infiltration and retention of stormwater through site development.

Throughout this brochure, the commonly known term, Low Impact Development (LID), is generally used. However, in some cases, these technologies have also been referred to as "Stormwater Best Management Practices".

For further details on the LID techniques found in this brochure (including others that have not been identified, such as downspout disconnection, soakaways, trenches, vegetated filter strips, enhanced grass swales and perforated pipe systems), see the *CVC/TRCA Sustainable Technologies for the Low Impact Development Stormwater Management Planning and Design Guide* now available on-line (see link on page 12).



Top left — Example of grass filter strip before landscape swales

Middle left — Bio-retention island in parking area

Bottom Left— Pedestrian through-block connection

Bottom Right — Example of white roof

October 2012

3.0 L.I.D. STORMWATER RETENTION

General

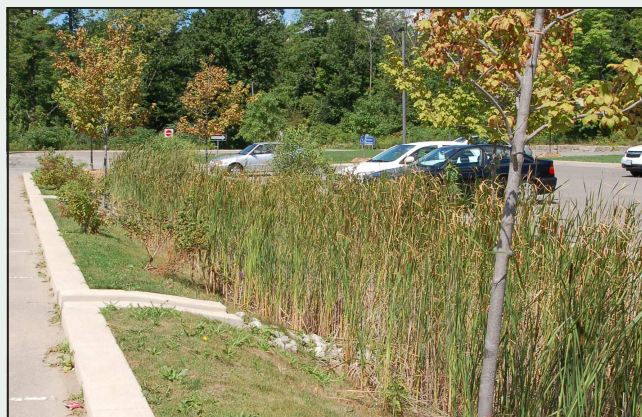
The term "Low Impact Development" is commonly used to describe the technologies employed to retain stormwater on site. The City of Mississauga further defines such techniques as "Stormwater Best Management Practices" that can include implementation on public lands.

3.1 Bio-Retention

Install a bio-retention system to filter and temporarily store, treat and infiltrate rainwater runoff (after a large storm event) to control stormwater quantity and improve its quality prior to release back into the system.

3.2 Rainwater Harvesting

Install rainwater harvesting systems, which intercept, convey and store rainfall for future use.



Top — Typical underground storage tank

Bottom Left — Bio-swales at Riverwood, Mississauga
Credit River Valley

Bottom Right — Typical rain water barrel



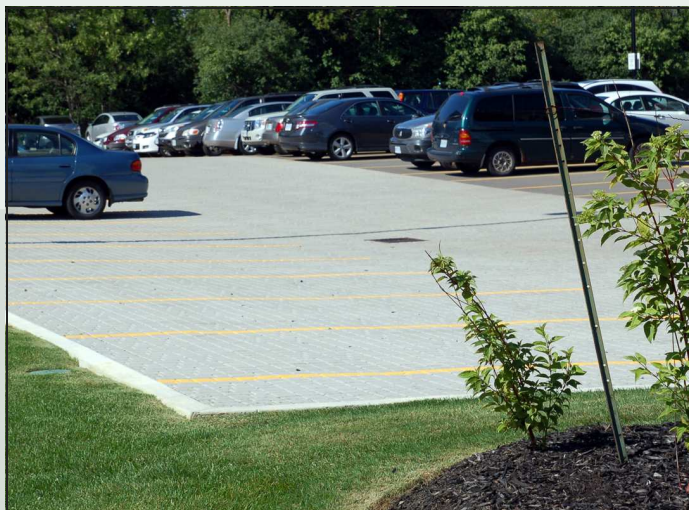
Stage One: Green Development Standards

3.3 Permeable Pavement

Install permeable pavement, as an alternative to traditional impervious pavement (i.e., asphalt) with little or no infiltration characteristics, to allow rainwater to permeate through it and into an aggregate reservoir. This is ideally suited for areas with low level traffic such as private roads, parking lots, walkways, etc. Please note that "Pervious Stable Surface" may also be used to identify areas for permeable 'interlocking' concrete paving, pervious concrete or porous asphalt.



Example of enhanced dry grass swale



3.4 Grass and Dry Swales

- Install vegetated and open "grass swales" (channels) to receive, treat and attenuate rainwater runoff (these are also known as "enhanced" vegetated swales).
- Promote the use of "dry swales" (an enhanced grass swale that incorporates engineered soil filter media or growing media) with optional perforated pipe underdrain or a bio-retention cell configured as a linear open channel.



Middle — Examples of permeable paving set in parking area and walkway

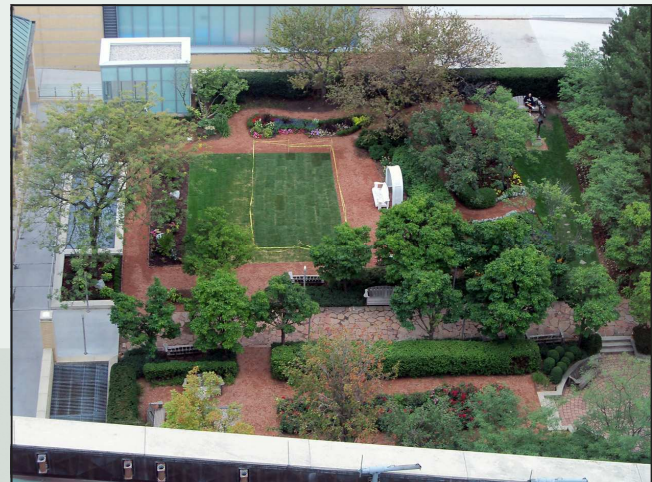
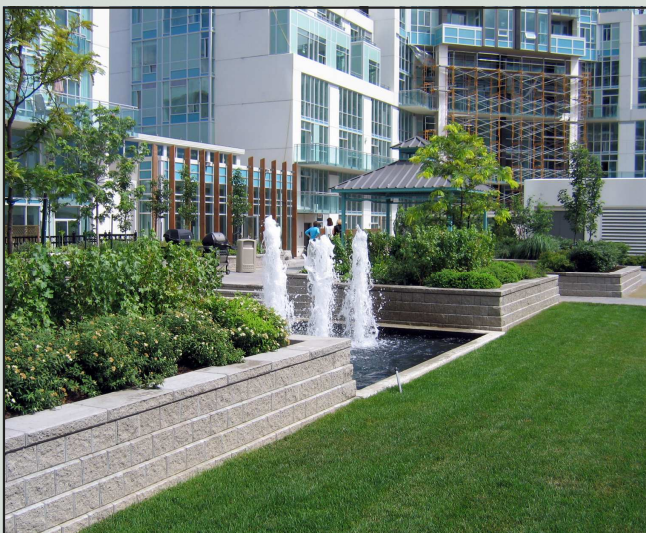
Below — Example of permeable asphalt draining into bio-swale

October 2012

3.5 Green Roofs

Install green-living roofs consisting of a layer of growing medium soil with vegetative material on top of a conventional flat or sloped roof, to improve energy efficiency in buildings, stormwater absorption and quality, reduce urban heat island effects, create green space for passive recreation, and to enhance roof aesthetics. There are two types of green roofs: intensive - providing aesthetic and environmental value), and extensive - or active recreational uses:

- Intensive roofs planted with deeply rooted plants have a deeper soil layer, generally greater than 15 cm (6 in) of growing medium in depth, to allow for deeply rooted plants, and
- Extensive systems on top of roofs consisting of thin layers of soil with herbaceous vegetative cover, generally less than 15 cm (6 in) in depth.



'Intensive' Green Roof sits on parking structure at Mississauga Civic Centre

'Extensive' Green Roof

Right — Mountain Equipment Coop - Toronto

Left — City Gate Condominiums, Mississauga



Stage One: Green Development Standards

4.0 SOFT LANDSCAPE MATERIAL

Plant trees to promote bio-diversity, improve air quality, reduce the urban heat island effect, and increase the aesthetic value within the overall area.

4.1 New Trees

For groups of two or more trees planted primarily in hardscaped areas, provide a minimum volume of 15 m³ (530 ft³) of high quality soil per tree. A single tree planted in hardscape requires a minimum volume of 30 m³ (1060 ft³) of soil.

- Provide trees planted in softscape with a minimum volume of 30 m³ (1,060 ft³) high quality soil.
- Plant "shade trees" approximately 6-8 m (20-27 ft) apart along all street frontages, open space frontages and public walkways.

Bottom Left – New street trees planted in grass

Top Right – Examples of landscaped planting in Street boulevards

Bottom Right – Example of grass swale between parking lot and building

4.2 Native Vegetation

Ensure that a minimum 50% of all proposed plantings are native species, where feasible.



October 2012

5.0 PEDESTRIAN AND CYCLING COMFORT

5.1 Pedestrian Walkways

Design private sidewalks, crosswalks and walkways to be continuous, universally accessible, barrier-free and clearly designated. Connect building entries to pedestrian paths, transit stops and parking areas for both cars and bicycles.

5.2 Pedestrian Comfort

- Locate all air exhaust systems and air intake grates away from pedestrian routes and amenity areas.
- Provide shade trees along pedestrian pathways and in amenity spaces to take advantage of summer shade.

5.3 Bicycle Parking

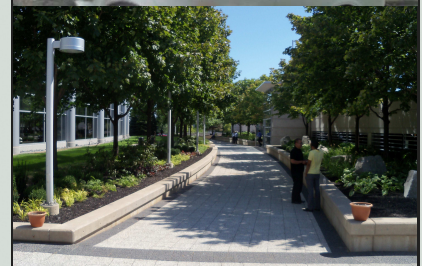
Locate 50 percent of occupant bicycle parking in a secure weather-protected area contained within the development site.



Above — Example of bike storage facility in an underground garage



Top — Example of vertical parking grate screened by landscape



Middle — Walkway in green space



Bottom — Example of landscape planting surrounding parking ventilation

Stage One: Green Development Standards

6.0 EXTERIOR BUILDING DESIGN

6.1 Bird Friendly Glazing

- Treat glass on buildings with a density pattern between 10-28 cm (4 to 11 in) apart for a minimum of the first 10 to 12 m (33-40 ft) above grade,

OR

- Mute reflections for a minimum of the first 10-12 m (33-40 ft) portion of a building above grade. Where a green roof is constructed adjacent to glass surfaces, ensure that the glass is treated to a height of at least 12 m (40 ft) above the level of the green roof, to prevent potentially fatal collisions with windows.

- Where exhaust/ventilation grates cannot be avoided at ground level, design the grates to have a porosity of less than 2 cm x 2 cm (1in x 1in).

6.2 Site and Building Lighting

- Install exterior light fixtures that are properly shielded to prevent glare and/or light to trespass onto any neighbouring properties.
- Avoid up-lighting from exterior light fixtures mounted on buildings unless they are designated as an integral component of a heritage structure.

Example of bird friendly glazing in the City



Below – LED lighting along street, New York City

Above – Green roof on City Hall Building, Chicago, IL



October 2012

7.0 LEED-NC REQUIREMENTS

The City of Mississauga promotes sustainability when planning for new development, and now requests that development applicants achieve LEED silver certification for 'New Construction'. The LEED (Leadership in Energy and Environmental Design) Green Building Rating System encourages sustainable green building and development practices through the creation and implementation of universally understood tools and performance criteria. The Canadian LEED system is tailored specifically for Canadian climates, construction practices and regulations.

LEED is an internationally accepted third-party certification program and benchmark for the design, construction and operation of high performance green buildings. LEED provides building owners and operators with the tools they need to have an immediate impact on their buildings' performance. It promotes a holistic approach to sustainability by considering performance in sustainable site development, water efficiency, energy efficiency, materials selection, and indoor environmental quality regarding human and environmental health.



Silver certification is achieved by scoring 50-59 credits (of a possible 100 base credits, six innovative design and 4 regional priority points) which is assessed by a LEED accredited third party. With four possible levels of certification (certified, silver, gold and platinum), LEED is flexible enough to accommodate a wide range of green building strategies that best fit the context of a particular site and/or project.



**Bottom Left —
Hazel McCallion
Academic Learning
Centre University
Toronto Mississauga
— LEED silver
certified**

**Right — North
Shore Condo —
Planning for LEED**

**Top — Redcliff
Realty Advisors
Inc. — LEED-NC**



Stage One: Green Development Standards

LINKS

See LEED-NC (Leadership in Energy and Environmental Design-New Construction):

<http://www.cagbc.org/Content/NavigationMenu/Programs/LEED/RatingSystems/NewConstruction/default.htm>

See Credit Valley/Toronto Regional Conservation Authority–Low Impact Development Stormwater Management Planning and Design Guide:

www.sustainabletechnologies.ca/portal/aliasRainbow/langen/tabID578/DesktopDefault.aspx

See City of Mississauga Green Development Strategy on both the Living Green and Planning & Building homepages (links below):

www.mississauga.ca/portal/discover/ourfuturegreen

or

www.mississauga.ca/portal/residents/planningandbuilding

October 2012

The Living Green Wall is a City of Mississauga initiative that incorporates innovative technologies and provides environmental benefits.



For more information:

City of Mississauga

Planning & Building Dept.

Development & Design Division

Urban Design

Attention:

Green Development

Project Leader

905-615-4311

urban.design@mississauga.ca

The new Mississauga Official Plan supports the Green Development Strategy and the recommended



officialplan
Mississauga

