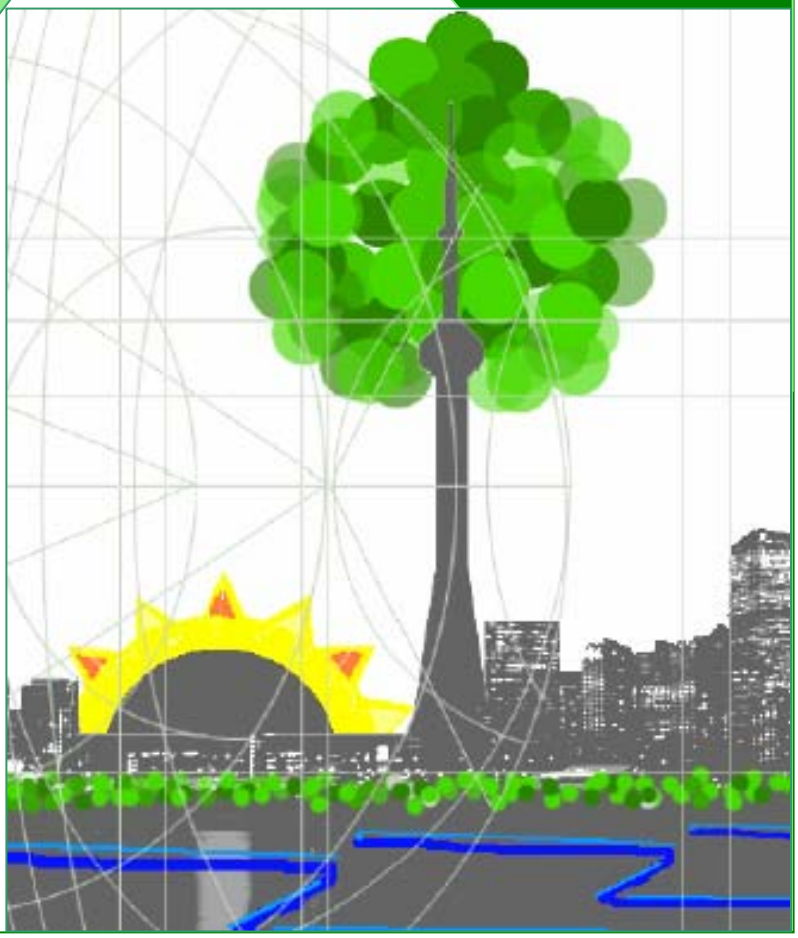
MAKING a SUSTAINABLE CITY HAPPEN

THE TORONTO GREEN DEVELOPMENT STANDARD 2006

June 2006



TORONTO

roundtable
ON THE ENVIRONMENT
TORONTO

Clean City Beautiful City

PREFACE

This report, *Making a Sustainable City Happen: The Toronto Green Development Standard*, proposes the adoption of enhanced targets for site and building design that address matters of sustainability. It proposes an integrated set of targets, principles, and practices to guide the development of City-owned facilities and to encourage green development amongst the private sector. The *Toronto Green Development Standard* was created from a review of City guidelines and targets, private rating systems such as Leadership in Energy and Environmental Design (LEED) and Green Globes, and the experiences of cities from around the world. The *Toronto Green Development Standard* is proposed as a voluntary program, especially in the initial year of implementation, while further study and consultation is conducted.

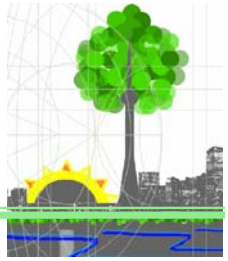


TABLE of CONTENTS

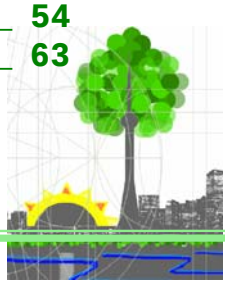
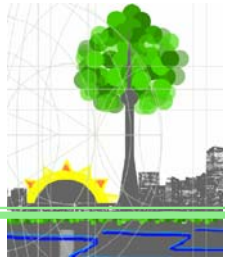


TABLE of CONTENTS



1. WHAT is Green Development?

1.1 Toronto's Environmental Leadership

Toronto has a growing reputation for being a leader in environmental initiatives. In 2005, the David Suzuki Foundation recognized Toronto as the North American leader in addressing climate change, and the Climate Group, an independent, UK-based non-profit group, bestowed a "Low Carbon Leader" Award on Toronto for being one of the top five cities internationally in reducing greenhouse gas emissions. Toronto is leading the way in other areas too. With the introduction of the Green Bin organic waste collection program, Toronto now has the largest, most progressive waste diversion program in North America, allowing participants to divert more than half their household waste from landfill. In 2006, Toronto became the first Canadian city to adopt a strategy to encourage green roofs, as well as a policy advocating better building design and operation to prevent migratory bird deaths and collisions. As part of ongoing City efforts in the environmental field, work is underway to develop a Clean Air Action Plan, a Comprehensive Energy Strategy, a Renewable Energy Action Plan, and a Green Economic Development Strategy. The Toronto Green Development Standard will fuel this momentum, set Toronto apart as an international environmental leader, and lead to a healthier Toronto.

1.2 What is Green Development?

The use of the term 'Green' is intended to be associated with the concept of 'sustainability' or 'sustainable development'. Sustainability was popularized by the 1987 report of The World Commission on Environment and Development titled "Our Common Future" (also called the 'Bruntland Commission Report). In it, the Commission defined sustainable development as "meet(ing) the needs of the present without compromising the ability of future generations to meet their own needs". This often quoted statement captures two important tenets of sustainability; responsibility of one generation to the next and the interdependencies between our social, economic and ecological systems.

"Development... that meets the needs of the present without compromising the ability of future generations to meet their own needs."

– Bruntland Commission

"Doing things better; not doing without."

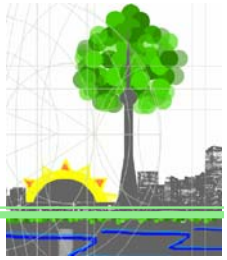
– David Suzuki

While there have been a variety of attempts to define sustainability, there are key principles or factors that are inherent in its application:

- The balanced integration of the economic, social and environmental systems.
- Recognition that the world's resources are finite.
- Caution in the face of high risk and uncertainty in irreversible decisions.
- Inclusion and engagement of all stakeholders.
- Ensuring intergenerational equity.
- Respect for both human and natural capital.

The term 'development' can be applied at various scales. Sustainable Development has been applied anywhere from national programs of renewal to the construction of buildings. While development at the neighbourhood scale is within the City's jurisdiction and interest, this report, as the first step, specifically addresses the components of site and building design that can be made more sustainable. This is accomplished by establishing a series of targets that various site and building features should attempt to attain. In this work, and possible future work to address development at the neighbourhood scale, the objective is not to build bigger or smaller, as the case may be, but rather to build better.

"This report, as the first step, specifically addresses the components of site and building design that can be made more sustainable."



1.3 Overview: Formulating the Toronto Green Standard

Toronto's interest in a green development standard has its origins in the recommendations of its Environmental Plan, the policies of its new Official Plan, the work of the Wet Weather Flow Management Master Plan, and the programs offered by Toronto's Energy Efficiency Office. The Environmental Plan includes recommendations promoting sustainable design and encouraging green roofs, energy efficiency, sustainable development, emission reduction, and re-use of construction materials. Policies in the new Official Plan support and encourage green building design and construction practices in building renovation and redevelopment, as well as innovative energy producing options and green industry. The Wet Weather Flow Management Master Plan codifies the principle that precipitation is most effecively managed where it falls, which has implications for site design and development. The City has also been involved in improving energy efficiency in developments within Toronto. The former City of Toronto required new developments undergoing rezoning to commit to energy efficiency through the submission of Energy Efficiency and Conservation Plans. The Energy Efficiency Office presently offers programs such as the Better Buildings Partnership and the Better Buildings New Construction Program to encourage the design of more energy efficient buildings. This office has also conducted several design charrettes in cooperation with the design and development community, resulting in enhanced energy performance for buildings such as Metro Label, the new Minto Radiance building, and the future Regent Park redevelopment.

These policies and programs have begun to address certain elements of development to make it more sustainable. The decision to formulate a green development standard sought to take the process one step further, by looking to improve the sustainability of all elements in a development. The Green Development Standard would become an integrated set of targets, principles, and practices to guide the construction of City-owned facilities[1], new private development, and retrofits.

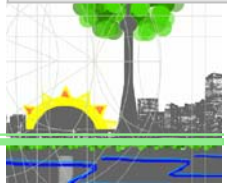
In November, 2004, the Roundtable on a Beautiful City requested that (what was then) Urban Development Services report on the development and adoption of sustainable design principles and standards for Toronto. The City, in partnership with EETech, an Ontario Centre for Excellence, received a grant from the

(2003) Toronto Official Plan
"3.4.1 To support strong communities, a competitive economy and a high quality of life, public and private city-building activities and changes to the built environment, including public works, will be environmentally friendly."

(2000) Toronto Environmental Plan
Contains comprehensive actions to improve the health of our natural environment

(2003) Wet Weather Flow Management Master Plan
This Plan established a hierarchy for managing stormwater. The first priority is managing precipitation where it falls, before it enters the sewer system. If that is not feasible, the next option is to manage storm water during conveyance. "End-of-pipe" storm water management is the final option in the hierarchy.

[1] The City of Toronto has adopted the level of LEED Silver (certification not required) as an interim standard for its own new buildings. Once the Green Development Standard is confirmed and refined, this report recommends that the interim standard be replaced with a selected achievement level of the Toronto Green Development Standard.



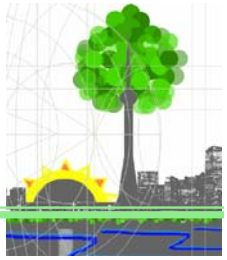
1. WHAT is Green Development?

Federation of Canadian Municipalities (FCM) Green Municipal Funds to help in the preparation of this work. A working group of City staff and representatives of the Roundtable on the Environment and the Roundtable for a Beautiful City was formed to assist in guiding this work.

In Phase I, the City engaged a consultant team led by Halsall Associates to conduct a study of other municipalities, internationally, which are leaders in the formulation and implementation of green development standards, so that Toronto could learn from their experiences. Thereafter, a consultation process was initiated to engage stakeholders on issues concerning the content and implementation of the green development standard. This consisted of an electronic survey of Toronto-area developers, and a set of stakeholder workshops.

This report represents Phase II of the work. Chapter 2 describes the various environmental challenges Toronto faces, which are the reasons for the City's efforts to improve the way development is undertaken. Chapter 3 derives lessons about the content of a green development standard from the Halsall Report and from the consultation process. Chapter 4 proposes a standard that will enable the City to encourage green development. Finally, in Chapter 5, this report describes the barriers and possible solutions to the implementation of more widespread green development in Toronto, and outlines the next steps in the process to refine and effectively implement the Toronto Green Development Standard.

"The Green Development Standard would become an integrated set of targets, principles, and practices to guide the construction of City-owned facilities, new private development, and retrofits."



2. WHY do we need a Green Standard?

Toronto's Environmental Pressures

Toronto, like all built up areas, experiences the environmental impacts of urbanization. These impacts include deterioration of air and water quality and production of large volumes of solid waste. Toronto's infrastructure is also under stress, and is challenged to meet the increasing energy and water demands of a growing population.

Toronto's various environmental pressures, and the recognition that Toronto's buildings and sites play an important role in determining the quality of environment in which we live, have given rise to the desire for Toronto to have a green development standard. At present, the operation of buildings is responsible for 30-40% of energy use, and approximately 30% of greenhouse gas emissions. Also, Toronto's buildings and sites are responsible for much of the 1.23 billion L of water Toronto consumes every day. The careful construction and retrofit of buildings and sites in the city could greatly mitigate the pressures being placed on our resources.

"The operation of buildings is responsible for 30-40% of energy use, and approximately 30% of greenhouse gas emissions. Also, Toronto's buildings and sites are responsible for much of the 1.23 billion L of water Toronto consumes every day."

2. WHY do we need a Green Standard?

2.1 Air Quality and Climate Change

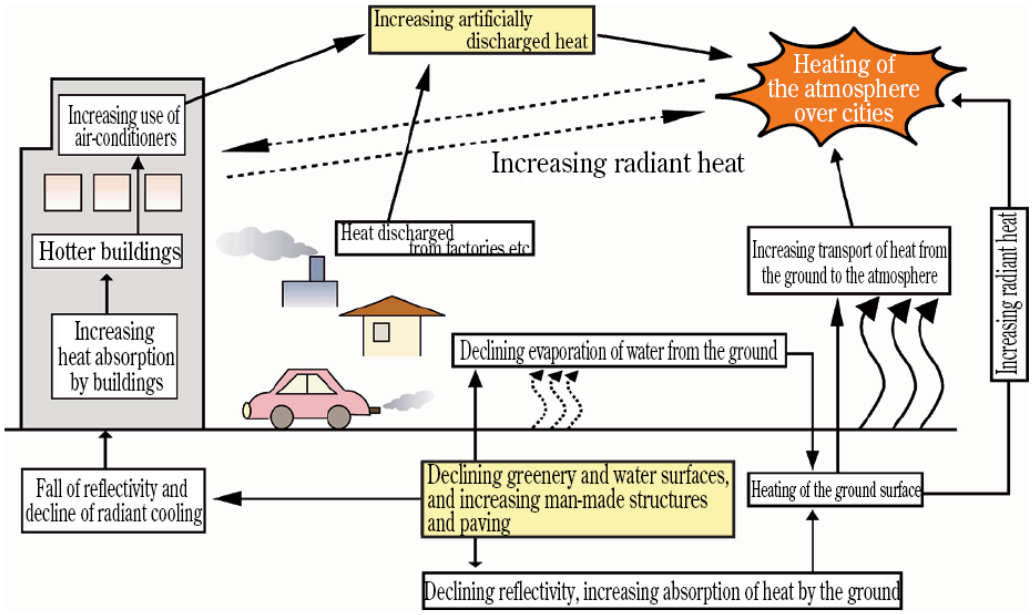
As in many other urban areas, air quality is a concern in Toronto. Toronto's air contains many common pollutants, including carbon monoxide, nitrogen and sulphur oxides, particulate matter, and ground level ozone, all of which are known to have health impacts. These common air pollutants are believed to contribute to about 1,700 premature deaths and 6,000 hospital admissions in Toronto each year, according to the Medical Officer of Health. Nitrogen dioxide, in particular, may be linked to almost 40% of air-related premature deaths.

"...air pollutants are believed to contribute to about 1,700 premature deaths and 6,000 hospital admissions in Toronto each year."

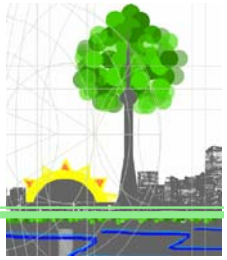
The summer tends to bring particular air quality challenges. Under certain weather conditions most common in the summer, emissions, sunlight and wind patterns combine to create smog, which generally entails high concentrations of ground level ozone, particulate matter, and other pollutants that have respiratory effects. In 2005, Toronto experienced a record-breaking 48 smog days.

"In 2005, Toronto experienced a record-breaking 48 smog days."

As a built up environment, Toronto's ambient temperature in the summer is typically a few degrees higher than that of the surrounding countryside, due to a phenomenon called the urban heat island effect. This occurs when hard, dark-coloured surfaces typical of urban settings, like asphalt paving and tar roofs, re-radiate heat into the surrounding environment. In turn, the raised ambient temperature can aggravate smog. Also, Toronto's electricity use tends to peak in the summer, with increased demand for air conditioning. Since, at present, fossil fuel combustion is one of the primary means of producing electricity for the City,



Source: *To Carry out Heat Island* Measures. City of Tokyo, Environmental Agency. 2000



increased demand for cooling results in more emissions and further air quality challenges. Replacing hard, dark surfaces with light-coloured or "soft" surfaces, like vegetation, can reduce the heat island effect.

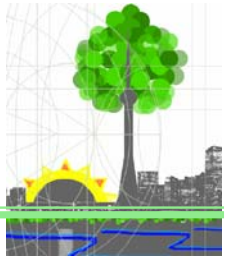
Production of greenhouse gases, particularly carbon dioxide, is also a concern because of the contribution of these gases to climate change, a phenomenon predicted to have far-reaching global impacts. Greenhouse gas emissions are also mainly associated with fossil fuel combustion. With increasing use of cars and trucks for transportation and shipping, vehicular traffic also remains a significant contributor to local emissions.

Addressing air quality and greenhouse gas emissions, therefore, tends to involve improving energy efficiency, reducing the need for energy consumption, or encouraging use of alternative sources of energy.

2.2 Energy Use

In addition to the environmental impacts of energy production, Toronto Hydro has reported that both Leaside and Manby transformer facilities, which supply electricity to the City, are at their peak capacity. Ontario's Independent Electricity System Operator has stated that Toronto could begin to experience rotating power losses in the summer of 2008 if action is not taken to address Toronto's demand-supply balance. As a result, conflict has been brewing over plans to build two new power stations in the Portlands and Mississauga. While new sources of electricity will need to be developed for Toronto, it is clear that we are not in a position to be wasteful with our energy consumption.

"Toronto could begin to experience rotating power losses in the summer of 2008 if action is not taken to address Toronto's demand-supply balance"

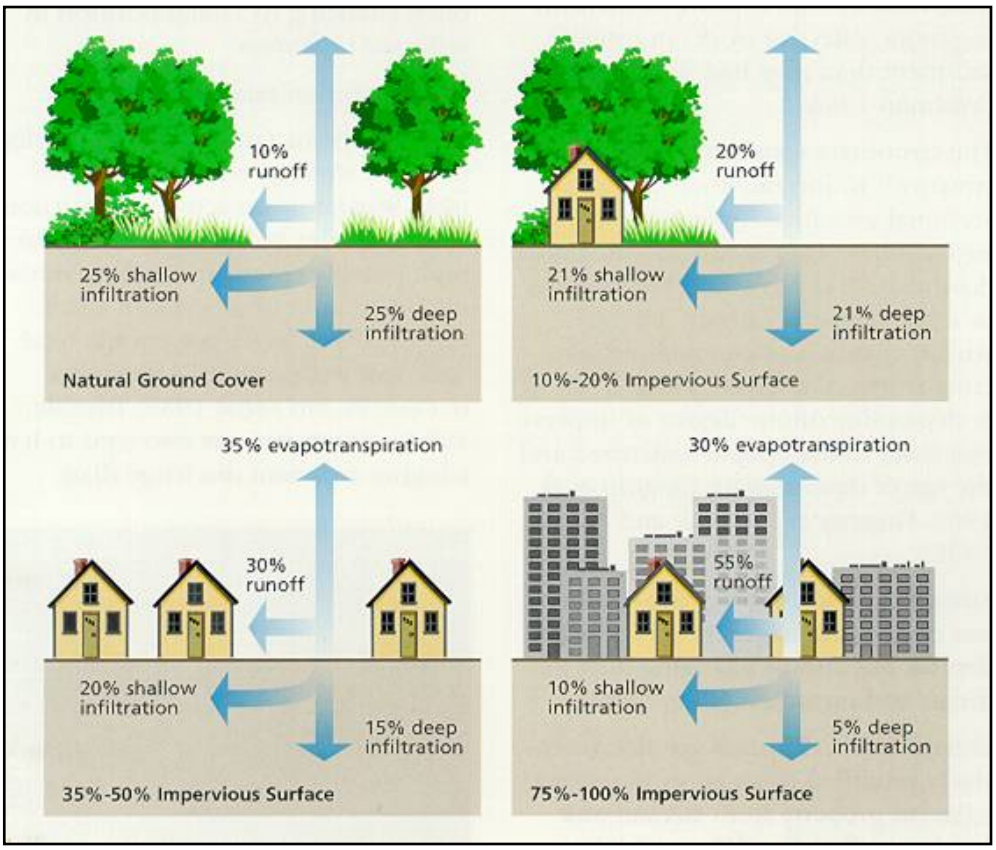


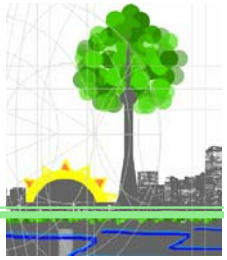
2.3 Water Quality and Efficiency

The diagram below compares what happens to precipitation in undeveloped environments, suburban environments and urban environments. With increasing amounts of paved areas and rooftops, the amount of water infiltrating the ground is reduced, and the volume that runs off over land increases. Since the natural process of infiltration into the ground helps to clean stormwater, increased areas of impermeable surface result in poorer water quality. Moreover, as stormwater washes over land, it picks up contaminants including oil, grit, and animal excrement, which are swept into rivers and the lake.

High volumes of runoff cause flooding and scour stream banks, which in turn causes erosion, damage to infrastructure, poor water quality, and loss of fish habitat. Toronto beaches are closed approximately 30% of potential swim days in a year due to high amounts of E. Coli bacteria.

"Toronto beaches are closed approximately 30% of potential swim days in a year due to high amounts of E. Coli bacteria."





Some of Toronto's stormwater infrastructure, which was put in place in the City's earlier years, permits untreated stormwater to pollute watercourses and the lake's near-shore zone. In some of the older parts of the City, Toronto has a combined sewer system, where storm and sanitary sewers merge. In periods of high runoff, the result is that contaminated waste-water is released into Lake Ontario. In Toronto's Wet Weather Flow Management Master Plan, the City has set, as a priority, managing stormwater at source – at the level of individual properties – to encourage local water infiltration and to reduce the volume of water entering stormwater sewers.

"According to Toronto Water, Toronto residents each use an average of 253 litres of water per day at home."

Improved efficiency of water consumption is also a priority for Toronto. Widespread implementation of water efficiency measures would allow Toronto Water to avoid costly expansion of its infrastructure, including water and wastewater treatment plants. A reduction in water use also translates into less energy use, since energy powers the pumps that send water throughout the city. Finally, in Toronto's areas of combined sewers, a reduction in flow through sanitary sewers would result in fewer combined sewer overflows into Lake Ontario.

2.4 Solid Waste

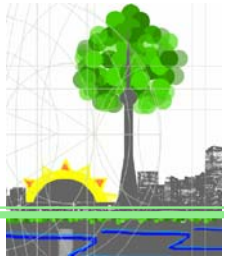
The City of Toronto collects residual municipal solid waste from the residential sector, and also accepts some residual solid waste from the private "Industrial, Commercial and Institutional" ("IC&I") sector for disposal. Since Toronto has no local landfill site, this waste is presently shipped to a landfill in Michigan in the United States. A disruption to the flow of solid waste to the U.S., including a potential border closure, would adversely affect both municipal and IC&I waste management. This possibility, as well as recognition of the resource depletion and environmental damage associated with the highly consumptive nature of modern-day living, has stimulated a variety of efforts in Toronto to encourage diversion of waste from landfill through reducing, reusing, and recycling waste.

"What is the connection between greenhouse gas emissions and recycling? In short, recycling eliminates the emissions associated with raw materials extraction and processing. The primary reason for this is that it requires less energy to recycle an end-of-life product into a new product than it does to make that item from raw inputs, such as ore or trees."

– Natural Resources Canada

While Toronto has made much headway in reducing household waste through progressive recycling and composting programs, there has been less emphasis at the municipal level in reducing waste from construction and demolition. According to Statistics Canada, between 1 and 2 million tonnes of construction and demolition (C&D) waste generated in Ontario is landfilled per year[2]. In Toronto,

[2] *Waste Management Industry Survey: Business and Government Sectors*, 2002, Statistics Canada.



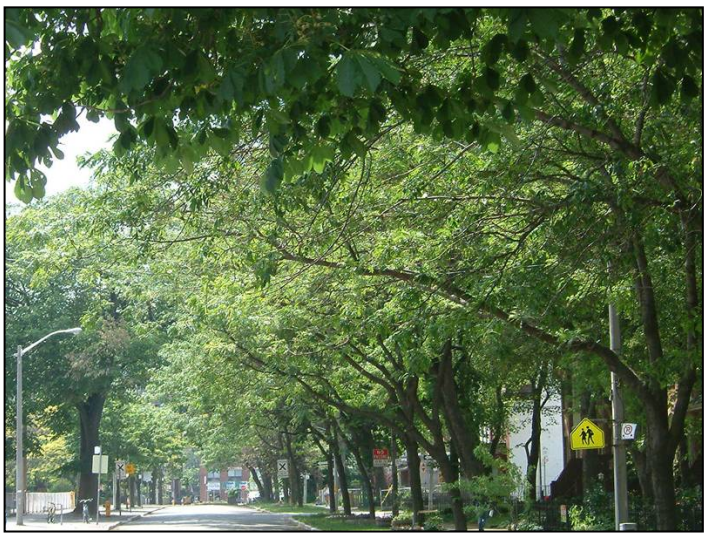
some C&D waste is accepted by the City with other IC&I sector waste, but the majority is hauled to private sector disposal facilities in Ontario and the States of Michigan and New York.

Although the Environmental Protection Act Regulation 102 requires large projects to conduct a waste audit and have waste reduction plans, there are no standards for waste reduction, reuse and recycling at this time. A Green Development Standard that addresses the management of C&D waste, and that supports building design to encourage participation in recycling programs, can help to reduce dependence on disposal in the United States, assist market development for recyclers specializing in C&D resources, and ultimately work to reduce pressure on the resources used for construction and the environmental impacts associated with waste disposal.

"During the redevelopment at Pearson Airport, the GTAA has done much to divert its waste from landfill. For example, it recycled all contaminated soil associated with the project on-site and diverted almost 90% of their construction waste for reuse and recycling. In 2004, the GTAA expects to achieve their goal of diverting over 85% of construction waste. "

– Ontario's Discussion Paper on Waste Diversion, June 2004

2.5 Urban Forest Health, Quality of Wildlife Habitat, Light Pollution

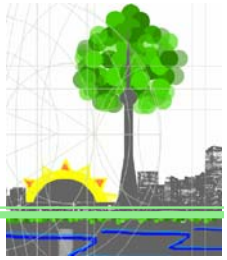


By recent estimates, Toronto's tree canopy covers approximately 17% of Toronto's area. Since trees serve a crucial ecological role, particularly in stressed urban environments, a more extensive, better quality urban tree canopy could help to address several environmental issues simultaneously.

Beyond the clear aesthetic value of urban trees, they can also help to reduce energy demands, improve water quality, and provide habitat for migrating birds and other wildlife. Strategically planted deciduous trees can shade buildings in the summer, significantly reducing the need for cooling. In keeping the sun off paved surfaces, they can also reduce the urban heat island effect. In the winter, deciduous trees mitigate the effects of cold winds while allowing sunlight to passively heat buildings. Appropriately planted trees and other vegetation can also help to improve drainage and reduce stormwater at source.

Our Common Grounds:
We need to implement "an Urban Forestry Management Plan over the next 10 years to create the framework to increase Toronto's current tree canopy coverage of 17 percent to 30 to 40 percent"

The tree canopy within residential areas varies from 0% in new developments to more than 60% in older established neighbourhoods.
The existing average is approximately 17%. The goal is to achieve an average tree canopy of between 30% and 40%.



2. WHY do we need a Green Standard?

In urban environments, the natural ecological balance of species is typically distorted as certain species, like scavengers, tend to thrive, while others tend to dwindle or disappear, often as a result of habitat destruction. Protecting natural features and functions, and careful planning of landscaping can work to restore some balance to an urban ecology by providing refuges and travel corridors for species that are under threat, thereby protecting biodiversity.

Urban environments also have a particular impact on migratory birds. As they pursue their seasonal migration, thousands of birds die in Toronto every spring and fall after they become confused by the lights from high-rise buildings, fly off course towards the lights, and crash into the buildings' windows, which they are unable to see. Bird collisions can be reduced by measures to reduce light pollution.

2.6 Economic and Social Health

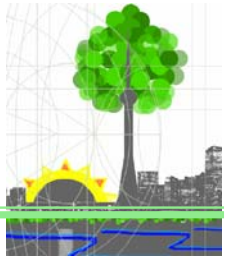
A 'green' city - that is a city with a healthy natural heritage system, an abundant tree canopy, good air and water quality, strong transit, pedestrian and cycling infrastructure, and that is known for its sustainable design of buildings - is attractive to people as a place to live. This reputation similarly attracts businesses and tourists and is good for the economy. Studies have identified the social benefits of 'green' – reduced violence and crime rates and more focused behaviour in children. The economic benefits have also been well documented – a view with trees improves real estate value, daylighting can improve retail sales and a more energy efficient building reduces operating expenses. A 'green' building is also a healthier building for people to work in, resulting in less down time, happier, more loyal employees and more productivity. Some local businesses that have implemented green development in Toronto also believe that their green reputation is an asset that attracts customers. In other words, what is good for the environment is good for people's health, the economy of the city, and even the functioning of local businesses.

"*For the most part – people feel "well" in the building. The year we grew herbs and vegetables on the roof – we were thrilled to see the interest in the café towards these foodcrops – grown on THEIR building! The tenants and visitors feel proud of their space and as such, feel enlivened about coming here*".

- Beth Anne Currie urbanspace PROPERTY Group: Referring to 401 Richmond, a green retrofitted building in downtown Toronto

"Green Value shows that sustainability is not simply an ethic, it's good business"

- Chris Corps in *Green Value: Green Buildings, Growing Assets* (2005), a study directed by the Royal Institution of Chartered Accountants.



2.7 Summary: Why We Need a Green Standard

Toronto's population is expected to grow to 3 million residents by 2031. Maintaining and improving the quality of life in the City requires the more efficient use of finite resources, and protection against rising impacts on the environment. The development of more sustainable buildings and sites could enable the use of less electricity and water, more use of modes of transportation that do not burn fossil fuels, management of stormwater in a way that promotes better water quality, less waste production, and creation of green spaces that are aesthetic and provide habitat for local fauna. A green development standard would identify the criteria for development that fulfill these objectives.

Toronto Official Plan:
"3.4.1 Innovative energy producing options, green industry and green building designs and construction practices will be supported and encouraged in building renovation and redevelopment."

3. WHAT have we learned about Green Development?

The process to define a green development standard for Toronto has been guided by consultation with a number of professionals in green development and important stakeholders. Through consultation, a number of key issues to be addressed in the formulation of Toronto's Green Development Standard have been identified. This chapter describes background research on green development standards, the consultation process, input received concerning the general nature and content of the Toronto standard, and input on how the standard may relate to other green rating systems already in use in the national and international arena. Input about how the standard should be implemented is described in Chapter 5.

3.1 The Process to Develop a Standard

Background Report: Learning from International Leaders

Halsall Associates and GHK International Canada were engaged to conduct a study (Halsall Report) of Green Development Standards implemented by other municipalities around the world. Over 100 cities and regions were scanned to identify jurisdictions comparable to Toronto that have promoted green development. Based on this scan, 12 jurisdictions were selected for further investigation, including Vancouver (Canada), Chicago, Santa Monica, San Mateo, New York, State of Minnesota and Portland (United States), Tokyo (Japan), Malmo (Sweden), Ealing (U.K), Kalundborg (Denmark) and Berlin (Germany). This survey of other jurisdictions provided numerous lessons for Toronto[3], many of which are integrated into the discussion below.

[3] Excerpts of the Halsall Report's Executive Summary are found in Appendix 2 of this report.

3. WHAT have we learned about Green Development?

The Halsall report stressed framing a green development standard by a region's environmental drivers. This enables the careful co-ordination and strategic alignment of various policies and programs and the connection of individual development decisions to broad environmental goals. According to the consultant, regions such as Tokyo, Santa Monica and Berlin, which have clearly stated environmental drivers, have been more effective in greening local development practice. Framing has led to better success in monitoring the effectiveness of green development initiatives as all three of these cities publish an annual report on various indicators related to the drivers. The feedback loop generated through monitoring can help to refine a green development standard and identify which environmental drivers need particular attention.

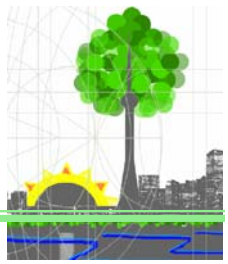
The consultant report also emphasized that early and meaningful participation of stakeholders in the creation of a green development standard helps to ensure acceptance and take-up of incentive programs among the development community. Stakeholders have critical insight into what is feasible and the barriers and solutions to implementation. The advantage of active stakeholder participation in the development of a green standard was evidenced in Vancouver, where the development community has endorsed the standard because they were involved in the process to define it. Portland took an important first step in defining its green standard by asking the local development industry what they are already doing with regards to green building.

In recognition of the value of consultation in this kind of policy development, both internal and external consultation played a key role in the development of the Toronto standard, and will continue to do so as the standard is refined.

Working Group

Staff from Toronto City Planning formed a working group with staff from many other City divisions and related agencies, as well as representatives from the Roundtable on the Environment and the Roundtable on a Beautiful City, to provide periodic input on the development of the Toronto Green Development Standard. The City divisions and agencies represented on the group include Buildings, Economic Development, Facilities and Real Estate and the Energy Efficiency Office, Parks, Forestry & Recreation, Public Health, Solid Waste, Transportation Planning, Technical Services, the Toronto and Region Conservation Authority, Toronto Water and the Toronto Atmospheric Fund.

The working group was involved in several key steps in the development of the standard. Following consultation with this group, Toronto's drivers, which shape



the standard, were identified as: energy efficiency, reduced greenhouse gas emissions, better air quality, improved water quality, water efficiency, reduced solid waste, protection of the urban forest and wildlife habitat, and reduced light pollution.

Members of this group also helped to compile all of Toronto's existing policies, programs and objectives that relate to creating sustainable buildings and sites. This group was also consulted on the approach to external consultation and on the standard itself.

Toronto-Area Developer Survey

In February 2006, City Planning staff sent an electronic survey to 27 Toronto-area developers to learn about their experiences and concerns with respect to green development. Fourteen developers submitted responses. Of those fourteen, thirteen had considered implementing non-mandatory environmental measures in their developments[4].

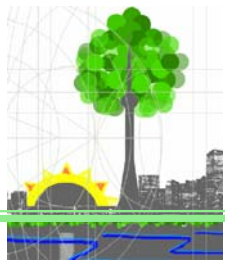
The survey provided a picture of what Toronto-area developers are already doing to make their developments more environmentally friendly, and what issues they have faced when trying to implement better environmental practices. A summary of the results of the developer survey can be found in Appendix 3, and the lessons learned from the survey are described below and in Chapter 5.

Stakeholder Workshops

The City held two stakeholder workshops, on April 3 and 4, 2006, respectively, to guide the formulation of the Toronto green development standard. Invitations were sent to 110 stakeholders. The list of invitees included architects, engineers, developers, builders, environmental groups, and property owners and/or managers (particularly of large amounts of property in Toronto, such as the Toronto District School Board). A total of 39 stakeholders participated in the workshops.

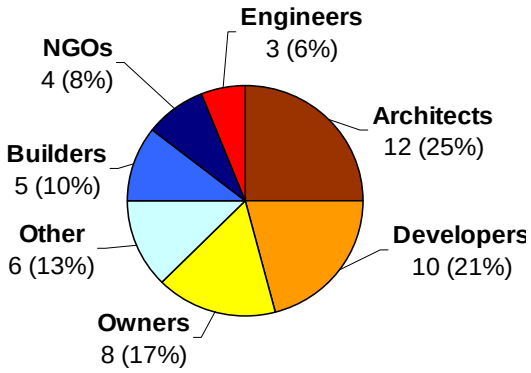
The workshops included a background presentation and facilitated table discussions. Participants were also provided with workbooks for written responses. The workshops were designed to elicit information about participants' experiences,

[4] Eight respondents had actually implemented such measures, and three were in the process of trying to implement such measures, while three had not ultimately implemented any voluntary environmental measures.

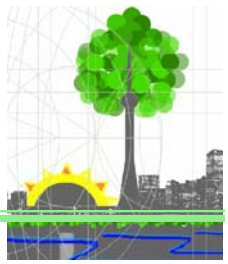


concerns, and expectations, with regard to green development[5]. To this end, there were two parts to the workshop discussion. First, it focused on the content of the green development standard – what the standard should be, and the relative merits and drawbacks of existing standards such as LEED, Green Globes, Energy Star, and others. In the second part of the workshop, the discussion focused on implementation issues, such as barriers and solutions to encouraging green development in Toronto (the results of which are described in Chapter 5).

At the first workshop, one table of participants focused on grade-related residential development (relatively small sites). Otherwise, all workshop discussion focused on mid-high rise residential, commercial, institutional and industrial development (larger sites).



[5] The workshop was not designed to produce consensus. Rather, the objective was to identify common themes in participants' comments. Certain trends were identifiable, particularly on the perceived barriers and suggested solutions for implementation (see Chapter 5), which seemed to be of primary interest to most participants. However, there were many points of discussion where answers were very varied and there was no identifiable trend. Also, the relatively small sample size of participants, and the even smaller number of those who chose to provide detailed comments on the content of a standard, prevented the possibility of a meaningful statistical analysis of responses. Therefore, the analysis in the sections below should be understood as a qualitative discussion on the dialogue at the workshop.



3.2 Qualities of a Good Standard

During consultation on the content of the Toronto standard, it became clear that sustainably oriented development is an emerging field, and so most stakeholders have limited experience implementing projects designed to any kind of green standard (although it is more common to have implemented certain environmental technologies). Therefore, stakeholders provided limited input on technical content and comparisons between different systems of standards. Rather, there were many suggestions as to the general nature of Toronto's standard, and several themes emerged as to what stakeholders consider to be the important qualities of a green development standard.

Flexibility

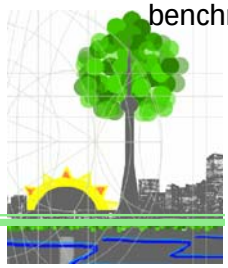
Some stakeholders stressed that Toronto's green development standard should be flexible. This means that it should not stifle innovation by focusing too strongly on specific types of technology. Rather, it should focus on overall performance and encourage innovation in meeting performance targets. Many also considered it important that a variety of options be provided to meet the standard, possibly for each environmental driver. This would encourage more green development, as it would enable designers and development teams to find the most appropriate design for their needs. Several stakeholders also stated that Toronto's green development standard should have graduated levels of achievement to encourage people to do what they can. It is important not to discourage those who cannot implement everything from implementing anything. Finally, some stakeholders also noted that it is important that the standard allow flexibility according to building use. For example, a Seniors' Residence should not be required to have the same amount of bicycle racks as a typical commercial building.

"Several stakeholders stated that Toronto's green development standard should have graduated levels of achievement to encourage people to do what they can."

User Friendliness

Some stakeholders discussed the importance of making the standard clear and easily understandable. Some noted that it should include specific and measurable benchmarks (for example, in energy savings and emission reductions). Some argued that those benchmarks should be set at a level that is widely achievable. Many also stressed that other City policies must be aligned to support the standard, so that the appropriate bylaws, rules and regulations are in place to support and not hinder it.

"Some stakeholders discussed the importance of making the standard clear and easily understandable. Some noted that it should include specific and measurable benchmarks."



Encourage "Green Competitiveness" in the Marketplace

There were several comments about the relationship between a green development standard and the economics of development in Toronto. While some participants stated that the standard must create a level playing field, others emphasized that it should allow for competitiveness amongst developers. It is clear that those developers who have already started to implement green measures would like to be rewarded for their efforts, and to be able to maintain what they see to be their competitive edge in the market with their green efforts. The challenge, then, is to set the standard at a level that is high enough that it pushes the development industry to improve, but still allows for "green competition" between developers, since this is what often spurs innovation and continuing improvement in environmental performance.

During the consultation, concerns were raised – typically from the development industry – about the financial impact of a green development standard. Some advised that the formulation of the standard should take into consideration the cumulative effect, including all costs and benefits, of adopting all the standard's requirements.

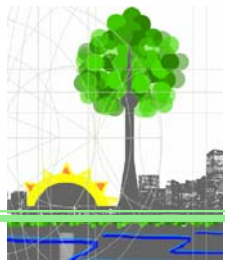
A standard with graduated levels of achievement may help to address both of these issues, by rewarding and publicizing outstanding green developments, while still acknowledging more modest efforts by those who are more limited in their ability to implement green developments.

"Set the bar at a level that pushes developers to go further, but don't push too hard too early or else you'll limit the kind of competition that can lead to market leadership and innovation. If the standards are too challenging and the playing field is too level, then there will be limited differentiation for purchasers who could otherwise influence the market by choosing greener developments. Plus this could have a regressive impact on the cost of buying a home."

- Jamie James, BuildGreen Consulting. Environmental Consultant to Tridel.

Inclusiveness

Several stakeholders noted that the green development standard should not apply only to new development, but also to existing development, which will continue to constitute, by far, the vast majority of Toronto development. Many also urged the City to formulate a green development standard for neighbourhoods, in addition to those for individual sites, as this would allow other important issues, such as transit-supporting densities, to be addressed.



3.3 Compatibility with Other Green Rating Systems

Stakeholders have shown interest in how a Toronto standard would relate to existing green rating systems, particularly LEED, which has been receiving increasing prominence as a way of ensuring a development is green. Amongst those stakeholders who did have experience working to a green standard, almost all had worked with LEED, and so considerable input was received on its strengths and weaknesses. Though it was much more limited, some input was also received on other standards like Green Globes and Energy Star for New Homes. This section discusses the relative strengths and weaknesses of other systems of standards, and the implication of how Toronto's standard should relate to them.

LEED Standard for Large Buildings and Sites

The workshop participants had many comments about LEED, and were able to identify the following strengths and weaknesses.

LEED (Leadership in Energy and Environmental Design) is a green building rating system that is a voluntary standard. It was originally developed by the United States Green Building Council, for developing high-performance, sustainable buildings. The Canada Green Building Council has recently adapted LEED for the Canadian context, and has produced LEED Canada.

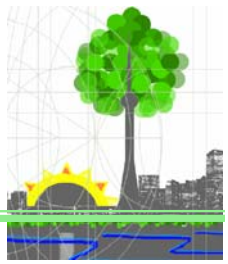
A more detailed explanation of LEED is found in Appendix 1

Strengths

Comprehensiveness: The benefit of LEED most commonly noted by stakeholders is that it is a very comprehensive rating system of rigorous requirements that covers the major issues that should be included in a green performance standard for buildings and sites.

Brand Recognition and Credibility: Many participants stated that LEED is the most recognized of all the green development standards, and that its brand recognition continues to grow rapidly. There are LEED workshops for consultants and general contractors, and this helps to increase the knowledge base for implementation. A consultant participant noted that it is becoming very common for consulting firms to send staff for LEED training, and this will further entrench LEED as the brand leader for green building design. Some stated that they believe LEED is the system best understood by industry, and that it is widely considered to be credible.

Rigorous Verification of Environmental Performance: Some participants considered it very important that LEED follows the design and planning process through with independent certification for post-construction building performance to ensure design specifications are met. They liked the fact that LEED addresses the design, construction, and operation phases of the process. They also approved of the requirement for property owners to maintain their environmental performance to maintain their certification.



Quality Control: Some participants stated that they believe the process to become LEED certified, including detailed documentation, helps to enhance the quality of construction.

Ongoing Improvement: It was noted that LEED Canada is a product of the Canada Green Building Council (CaGBC), which is continuing to improve and develop LEED. The CaGBC is addressing the current weaknesses of LEED Canada, and present difficulties may get ironed out in the future.

Weaknesses

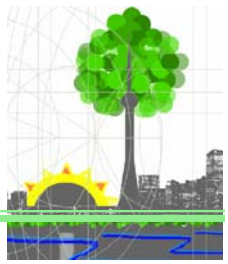
Onerous process without a guaranteed result: A very common concern about LEED is that certification can be a very onerous and complicated process, especially in its documentation requirements. Moreover, with all the work and investment in a project, there is no guarantee that it will qualify for certification during the post-construction testing.

Expensive: Several participants stated their concerns that the general implementation of LEED, and particularly third party verification and commissioning, is very expensive. It was noted that there is minimal LEED support that is free of charge. One participant also stated that some developers have a bad image of LEED, believing it to be for unique projects where costs are not a concern.

Not flexible enough: Several participants believed that LEED is not flexible enough in meeting the objective of producing more sustainable buildings and sites. The LEED point system means that certain green technologies are overlooked for implementation in LEED buildings because they are excluded from the LEED list and do not count towards becoming certified. For instance, LEED does not provide credit for generation of heat (rather than electricity) from renewable sources, such as solar air heating.

Not locally oriented: It was noted that LEED is not necessarily adapted to all local climates, and so does not take local conditions into consideration when setting standards for things like heating. It also includes credits for measures that may not be locally relevant, or for items which may be standard practice in certain jurisdictions.

Not universally applicable: Some participants noted that LEED is not well adapted to health care facilities, which are better suited to another standard (GGHC). It was also argued that LEED favours commercial development.



What Other Municipalities Have Done With LEED

Vancouver, Chicago, New York, Minnesota, Santa Monica, San Mateo and Portland all reference and emphasize LEED to varying extents. For example, Vancouver's approach was to create a clear correlation between LEED and their own green standard built into existing bylaws and codes. This allowed Vancouver to ensure that all new developments automatically achieve a high level of environmental performance equivalent to LEED certification, and within relatively easy reach of LEED Silver (although actual certification is not required). The Chicago approach was to require LEED certification, with the 46 priority standards from LEED that best respond to Chicago's environmental drivers and policy goals comprising "the Chicago Standard". This customization of LEED responded to the criticism that LEED does not prioritize features of design that respond to local environmental conditions.

Green Globes Standard for Large Buildings and Sites

Although participants had far less experience with Green Globes, they were able to provide some comments about its strengths and weaknesses[6].

Green Globes is an online assessment tool that evaluates and rates the environmental performance of new and existing buildings, as well as interior fit-ups. It can be applied to all types of medium to large sized buildings and sites.

A more detailed explanation of Green Globes is found in Appendix 1.

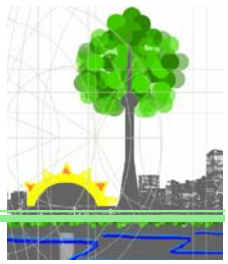
Strengths

It was thought to be advantageous that Green Globes is less expensive than LEED, and that it is more accessible, since it is available on-line. The self-learning promoted through using Green Globes was considered to be strength. Some considered Green Globes to be relatively easy to use and, less overwhelming than LEED because it is set up in incremental stages and linked to the approval process.

Weaknesses

The main criticism of Green Globes is that, since there is no thorough verification that standards have been met, it is not as rigorous as LEED, and it is too easy to receive certification. Some participants also disputed the true sustainability of certain elements of the Green Globes standard, such as the acceptability of forest products that are not certified as sustainable. Another criticism of Green Globes is that it does not engage the design team.

[6] The small number of participants with any experience with Green Globes means that the comments below cannot reflect any trends or the balance of opinion amongst participants.



Standards for Small Residential Buildings and Sites

One table of workshop participants focused exclusively on standards for grade-related residential buildings[7]. They defined what they considered to be the strengths and weaknesses of each of the sets of standards presented at the workshop.

R-2000

It was felt that R-2000's biggest advantage is that it is the most comprehensive existing standard in Canada for homes. Although R-2000 does focus mainly on energy, it has expanded to include provisions for indoor air quality and other environmental features, such as recycled materials.

However, participants believed that R-2000 never really "took off" as a program, possibly because it is too bureaucratic. As such, it is not very well known. Despite being more comprehensive than Energy Star, participants believed it still includes too few aspects of green development (compared to a standard like LEED). Some thought that R-2000 suffers from no longer being "new and exciting".

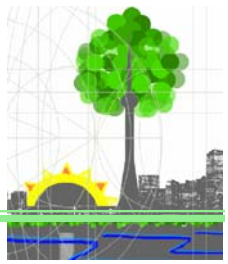
LEED for Homes

Participants liked LEED for Homes[8] for being the most comprehensive standard of all, going well beyond the relatively minor non-energy requirements of R-2000. Some participants also thought that the well-recognized LEED brand name would help LEED for Homes take off when it becomes finalized after its pilot phase.

The biggest disadvantage of LEED for Homes is that it is still under development as a pilot project in the United States, and thus not ready for use in Toronto. Even when the pilot phase is finished, the standard will have been designed for the United States, and will still need to be adapted for Canada. The participants also noted that LEED for Homes would suffer some of the same weaknesses as LEED-NC, such as the lack of predictability about whether the standard will be met in the end.

[7] Some of these participants had considerable experience working with certain sets of standards currently in use in Ontario (R-2000 and Energy Star). Descriptions of these standards are found in Appendix 1.

[8] Since LEED for Homes is still a pilot project in the US, nobody had experience working with it, but participants felt able to comment on it due to their other experience.



Energy Star

Participants believed that one of Energy Star's key strengths is that it has the greatest brand recognition amongst homeowners, and is growing in popularity. Most of them were satisfied with the level of energy savings achieved by Energy Star. They also liked that it is predictable as to whether the standard will be met.

Participants noted that Energy Star's biggest disadvantage is that its focus is almost exclusively on energy. One participant also did not like Energy Star's focus on specific technologies and lack of flexibility in reducing energy needs, making it unsuitable for rating innovative designs that could have better results.

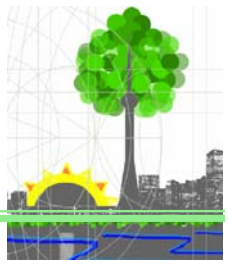
3.4 A Made-In-Toronto Approach

The existence of several well-recognized private green development standards calls into question whether Toronto should adopt one or more of those standards as its own, rather than trying to "reinvent the wheel". Some stakeholders were concerned that, with the increasing popularity of programs like LEED and Energy Star for Homes, it would be a waste of time and money, as well as counter-productive, to set up what may be seen as yet another competing green development standard.

It became clear through the consultation process that the Toronto Standard should not compete or conflict with other popular standards, especially since there is clear value in the increasing popularity of standards like LEED. As several other North American municipalities have done, it is appropriate to pay close attention to credible green rating systems when developing a customized standard. Compatibility with systems like LEED can serve as an incentive to build green, due to LEED's growing market recognition.

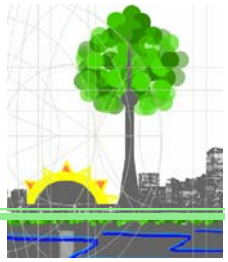
On the other hand, the existing systems of standards have clear weaknesses, as described above. Of particular interest to the City of Toronto is that any green development standard it adopts and promotes must address its key environmental drivers. The standard should reflect the City's climate, geography, urban infrastructure, and legislative context, and help Toronto achieve its own particular environmental objectives. A detailed comparison of LEED, Green Globes, Energy Star for Homes, and R-2000 against Toronto's environmental drivers showed that each of these systems had deficiencies in fully addressing Toronto's key environmental needs. In addition, simply adopting a private standard would place responsibility for verfication and the setting of targets in the hands of a private third

"Of particular interest to the City of Toronto is that any green development standard it adopts and promotes must address its key environmental drivers. The standard should reflect the City's climate, geography, urban infrastructure, and legislative context, and help Toronto achieve its own particular environmental objectives."



party agency. Certification and verification can be very costly and, for a system like LEED it occurs 3 months after a building is constructed meaning there is no recourse for the municipality if all of the intended objectives are not met. Finally, the standards in third party programs may not always keep up to date with the City's evolving environmental objectives and require no consultation with the municipality on which categories are included and where targets are set.

The approach taken in formulating the Toronto green development standard, therefore, is to note compatibility and equivalencies with LEED and Green Globes for large developments, and with R-2000, Energy Star for Homes and LEED for Homes for grade-related residential development. This enables those who want to build to LEED, for example, to ensure that they can meet the Toronto green development standard at the same time.



4. The TORONTO GREEN Standard

4.1 Explanation of the Standard

The Toronto Green Development Standard is presented in the two charts in the following pages. The first chart is for mid- to high-rise residences, commercial industrial and institutional development, and the second chart is for grade-related residential development. This Standard is rooted in the key environmental drivers for the City, as described in Chapter 2. These are:

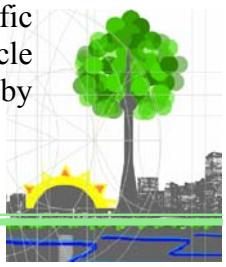
- Better air quality
- Reduced greenhouse gas emissions and urban heat island effects
- Greater energy efficiency
- Improved water quality and water efficiency
- Less solid waste
- Protection of the urban forest and wildlife habitat
- Reduced light pollution

The Standard is based on a number of principles, many of which were identified in consultation with key stakeholders (see Section 3.2 – the Qualities of a Good Standard): The principles are that the standard be:

- measurable (e.g. plant shade trees to provide a 20% canopy at maturity);
- performance orientated (e.g. achieve 25% energy savings above the Model National Energy Code) to allow for flexibility such that innovation is encouraged to meet performance targets;
- focused on the design and construction of the built form (not on building operations or workplace programs that could also influence environmental performance);
- user friendly, and
- set high enough to raise the bar on environmental performance but still allow for green competition amongst developers.

The first column in the charts identifies the development features (building and site elements) that can affect Toronto's environmental drivers. Examples include ventilation, energy efficient fixtures and appliances, and building orientation.

The second column identifies existing City standards, targets or guidelines for specific development features. Examples include standards such as the provision of bicycle parking found in the Zoning By-law, the target to increase sustainable tree canopy by



30-40% as identified in *Our Common Grounds*, and guidelines such as the interim Wet Weather Flow Management Guidelines.

In reading the chart, it should be noted that the Ontario Building Code is the existing baseline standard for many of the development features. Recently, the Province proposed changes to the Building Code that raise the bar on energy efficiency and remove barriers to green technologies. Toronto City Council supported the most aggressive of these options at its meeting in April, 2006. The proposed Green Development Standard meets or exceeds the proposed amendments.

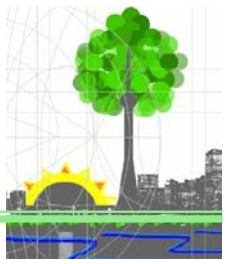
The third column identifies the Toronto Standard or level for 'green' for each development feature. The Toronto Green Development Standard is intended to reflect an enhancement over current City requirements and business practices. It is based on input from the stakeholder workshops and consultation with the Green Development Standards Working Group. It is also based on proposed enhanced City guidelines and/or practices and on a comparative analysis with other well known standards such as LEED and Green Globes for each development feature. In other words, each standard has a basis in an existing City guideline or practice, and/or in an existing green building standard such as LEED, Green Globes, and Energy Star.

"Within the third column, elements of the Standard marked with the symbol "►" indicate the core or minimum requirements."

Within the third column, elements of the Standard marked with the symbol "►" indicate the core or minimum requirements. The other elements identified in the Standard are considered to be enhancements that would further improve the sustainability of a development beyond the basic Green Standard. Where appropriate, graduated levels of achievement (minimum, preferred, excellent), have been identified.

The fourth column of the chart identifies the equivalent or related standard for each development feature set by LEED, Green Globes, Energy Star, and other rating systems.

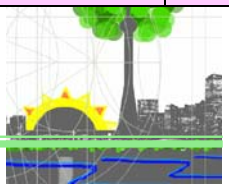
The fifth column identifies some possible strategies to implement the proposed standard, including technologies and products, and provides some examples of where the strategies have been used in green development in Toronto.



4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

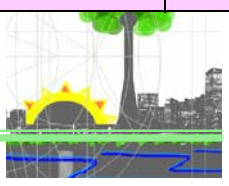
	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Air Quality O.P., Environmental Plan, Air Quality Strategy	**Automobile Infrastructure** Discourage single-occupancy automobile use	• **Zoning Bylaw:** Studies are currently underway to determine minimum and in some cases maximum parking standards for downtown office and residential buildings. Standards for shared parking to be incorporated into the zoning by-law.	• ► As required by current Zoning Bylaw. • Mixed use developments should include shared use of parking among uses that have different peaking characteristics. • Dedicated parking spaces for carpool ride sharing. • Dedicated parking spaces for high efficiency or hybrid vehicles.	• Addressed in LEED Sustainable Sites (SS) Credits 4.3 and 4.4 • Addressed in Green Globes Energy C.5 • Addressed in Canadian Institute of Transportation Engineers (CITE): Promoting Sustainable Transportation Through Site Design Guidelines	• Carpool parking spaces, shared parking with adjacent properties.
	Cycling Infrastructure Encourage cycling as a clean air alternative	• **Zoning Bylaw (former City only):** provide 0.75 bicycle spaces per unit for buildings with more than 10 units and 1 parking space for every 1250 sq metres of non-residential floor space (6 spaces minimum). [under review].	• ► As required by current Zoning Bylaw. • Bicycle storage, shower and change facilities for workplaces.	• Addressed in LEED SS 4.2 • Addressed in Green Globes Energy C.5 • Addressed in CITE Guidelines	• Bicycle racks, secure storage, shower and change facilities
	Public Transit Accessibility Encourage public transit as a clean air alternative	• **O.P.** policies encourage transit-oriented development	• Where feasible, integrate transit facilities directly into the development or locate major entrance within 200 metres of a transit stop.	• Addressed by LEED SS 4.1 Addressed in CITE Guidelines	• Integrated design, transit shuttle.
	Pedestrian Infrastructure Encourage walking as a clean air alternative	• **O.P.** policies promote a beautiful, comfortable and safe public realm with accessible streets, parks and open spaces. • **Urban Design Guidelines**: Provide guidelines for orienting buildings and improving the public realm. • **Urban Design Streetscape Manual**	• ► Priority should be given to compact design and human scale orientation including direct integration with existing pedestrian routes, adequate signage and lighting, appropriate grading and surface treatment and reduction of vehicular route conflicts.	• Addressed in CITE Guidelines	• Pedestrian-scaled building design, landscaping, lighting and signage.

* The symbol "►" identifies the core, minimum requirements of the Toronto Green Standard.

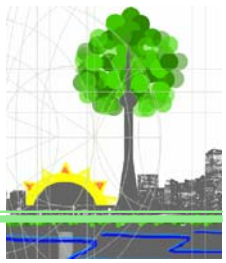


4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Air Quality O.P., Environmental Plan, Air Quality Strategy	**Construction Activity** Minimize air pollution from construction and demolition	• **City Building Permit Construction and Demolition, Article 363 By-law 598-2005**: requires identification of method for handling air and dust emissions, recognizing on-site resources, in compliance with sections 6 and 11 of regulation 346 made under the EPA.	• ► For construction and demolition, identify method for minimizing air and dust emissions. • For construction and demolition, identify method for minimizing VOC emissions.	• Addressed in LEED SS Prerequisite 1	• Air and Dust Emissions Control Plan
	Urban Heat Island Reduction Reduce ambient surface temperatures	• **Green Roof Performance Criteria:** 6 inch depth, 50% coverage, non-monoculture.	• ► For the non-roof portion of site, provide natural cover, including trees, that shade at least 30% of surface parking areas and other hard surfaces • ► Use light coloured materials for 50% of the hardscape. • ► For the roof, install a green roof designed to the City's performance criteria with 50% coverage) OR use light coloured roofing materials with a Surface Reflexivity Index (SRI) greater than 78 and emissivity greater than 0.9 according to ASTM Standard 408 for 50% of the roof, OR a combination of both for 75% of the roof.	• Satisfied by LEED SS 7.1 or 7.2 • Satisfied by Green Globes Site B.2 • Satisfied by Energy Star	• Minimizing building footprint, soft landscaping, green roofs, natural shading, light-coloured materials
	Ozone Protection Minimize contributions to ozone depletion from HVAC&R Equipment	• **Toronto Atmospheric Fund:** LEED Energy and Atmousphere (EA) Prerequisite 3.	• ► Zero use of CFC-based refrigerants and Halons in fire suppression	• Satisfied by LEED EA Prerequisite 3 • Satisfied by Green Globes Emissions, Effluents and Other Impacts F.1 and F.2	• Install HVAC equipment that uses no CFC refrigerants

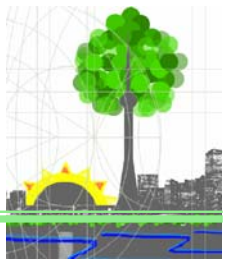


	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Air Quality O.P., Environmental Plan, Air Quality Strategy	**Local Materials** Avoid long-distance shipping of building materials	• None	• ► Minimum: Require 10% (based on cost) of materials to be sourced within 800 km of project. Preferred: 20% locally sourced materials.	• Satisfied by LEED MR Credit 5.1 • Addressed in Green Globes Resources E.2	• Identify materials and suppliers that can help to achieve this goal.
	Indoor Temperature Ensure a comfortable indoor climate	• Compliance to ASHRAE 55-2004 Thermal Comfort standards for City-owned and leased buildings.	• ► Compliance to ASHRAE 55-2004 Thermal Comfort standards.	• Satisfied by LEED Indoor Environmental Quality (EQ) Credit 7.1 • Satisfied by Green Globes Indoor Environment Credit G.4	• Design building envelope and HVAC system to maintain specified comfort ranges
	Indoor Ventilation and Filtration Ensure clean and fresh indoor air	• Compliance to ASHRAE 62-2004 Ventilation standard for City-owned and leased buildings. • Smoke Free Bylaw	• ► Minimum: Compliance to ASHRAE 62-2004 Ventilation standards Preferred: Outdoor ventilation rates 30% above minimum required by ASHRAE 62.1-2004.	• Satisfied by LEED EQ Prerequisite 1. Preferred satisfied by LEED for Existing Buildings IEQ Credit 2. • Satisfied by Green Globes Indoor Environment Credit G.1	• Design according to ASHRAE specifications, Bio-walls (e.g. Guelph-Humber Building, Etobicoke campus)
	Indoor Low-Emitting Materials Minimize sources of air contaminants	• None.	• Use low-emitting materials, including adhesives and sealants, paints and coatings, carpet systems, composite wood and agrifiber products and control fungus, mold and bacteria. ► Minimum: 45% Preferred: 75% Excellent: 90%	• Addressed by LEED EQ Credit 4.1 – 4.4. LEED enhanced credit would require additional fungus, mold and bacteria control. • Addressed by Green Globes Indoor Environment G.2	• Specify low-VOC materials in construction documents, provide manufacturer literature identifying emissions



4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Greenhouse Gas Emissions / Energy Efficiency O.P., Environmental Plan, Energy Plan, Air Quality Strategy	**Minimum Energy Performance** Minimize demand for energy through efficient building design	• **Toronto Energy Efficiency Office BBP:** target for a minimum of 25% savings above Model National Energy Code for Buildings (MNECB).	• New construction: ► Minimum: 25% improvement over the MNECB. Preferred: 40% improvement Excellent: 60% Improvement • Retrofits: ► Minimum: 10% improvement over the MNECB.	• Minimum satisfied by LEED EA Prerequisite 2 and Green Globes C.1 • Preferred and Excellent targets addressed by LEED Credit 1 (5 points for 40% target and 10 points for 64%) Preferred target addressed by Green Globes Energy C.1 (50% target)	• Use computer modeling to determine most energy efficient design solutions
	Energy Efficient Fixtures and Appliances Minimize appliance energy demands	• None	• ► 70% of fixtures are to be Energy Star compliant. • ► Where the developer is supplying appliances, 70% are to be Energy Star compliant.	• Satisfied by LEED for Commercial Interiors EA Credit 1.4 • Addressed in Green Globes Credit C.3	• Energy Star appliances
	Green Energy Reduce demand for energy from the grid and encourage renewable energy production	• **Environmental Plan:** Purchase 25% of energy needs for City buildings through green power (and encourage same of ABCs)	• Where feasible, provide on-site renewable energy to self-supply 5% -10% of requirements. • Where feasible, purchase 25% of energy needs through grid-source renewable energy.	• Satisfied by LEED EA Credits 2.1 / 2.2 and 6 • On-site generation target addressed in Green Globes Energy C.4	• Wind turbines, photo-voltaics, solar thermal technologies, geothermal, biogas.



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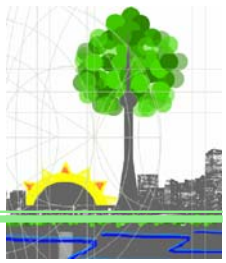
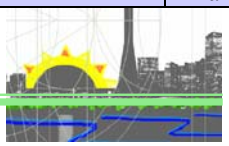
	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Greenhouse Gas Emissions / Energy Efficiency O.P., Environmental Plan, Energy Plan, Air Quality Strategy	**Daylighting / Building Orientation** Minimize energy demand through passive solar heating and lighting	• None	• Orient and design the building to take advantage of passive solar heating. • Orient and design the building to take advantage of natural lighting so that ambient daylight in 75% of the internal space is 250 Lux.	• Satisfied by LEED Indoor Quality Credit 8.1 • Satisfied by Green Globes Indoor Quality G.3 Meets requirements in Illuminating Engineering Society of North America (IESNA) Lighting Handbook, 2000.	• Shallow floor plates, permanent shading devices, high performance glazing (e.g. SAS , 280 King St E)
	Systems Commissioning Ensure building systems function properly	• None	• ► Ensure the building's energy related systems are installed, calibrated and perform according to the owner's project requirements, based on design and construction documents	• Satisfied by LEED Canada Energy and Atmosphere (EA) Prerequisite 1 • Satisfied by Green Globes Project Management A.3	• Engage a 3rd party commissioning authority.
	Measurement and Verification Confirm energy performance	• None	• Request a Measurement and Verification report after one year of post-construction occupancy.	• Satisfied by LEED EA Credit 5	• Install equipment to measure performance.



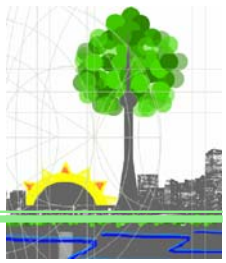
4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Water Quality O.P., Environmental Plan, Wet Weather Flow Management Master Plan, Toronto Region Conservation Authority Generic Regulation	**Construction Activity** Ensure protection of water quality during construction and demolition	• **[Draft] WWF Interim Stormwater Management Guidelines:** Adherence to Greater Toronto Area Conservation Authorities on-site Erosion and Sediment Control Guidelines during construction and demolition activities. Long-term average removal of 80% of suspended solids from run-off.	• ► See existing draft guideline.	• Addressed by LEED for Homes Sustainable Sites 1	• Erosion and sediment control plan, silt fencing, sediment traps, sediment basins
	Stormwater Run-Off Manage and clean stormwater that leaves the site	• **[Draft] WWF Suspended Solids Removal:** Remove 80% of total suspended solids on an annual loading basis from all runoff leaving the site	• ► See existing draft guideline.	•	• Mechanical or natural treatment systems such as constructed, vegetated filter strips, bio-swales. sediment traps
		• **[Draft] WWF Disinfection:** Disinfect runoff from the site which discharges directly into Lake Ontario or Waterfront areas	• ► See existing draft guideline.	•	
		• **[Draft] WWF Erosion Control:** Adherence to TRCA erosion control criteria for individual sites which discharge directly or are in close proximity to natural watercourses	• ► See existing draft guideline.	• Addressed by LEED for Homes Sustainable Sites 1	• Erosion and sediment control plan, sediment traps, sediment basins
	Stormwater Retention (Water balance) Minimize stormwater that leaves the site	• **[Draft] 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.	• ► See existing draft guideline.	• Addressed by LEED for Homes Sustainable Sites 4	• Green roofs, rain barrels, permeable paving (e.g. eco stone, turfstone), green streets instead of curb and gutter, downspout disconnection, infiltration trenches, absorbent landscaping



4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Water Efficiency O.P., Environmental Plan, Water Efficiency Plan	**Low-Water Landscaping** Create natural landscapes that require little irrigation.	• None	• Use drought-resistant plant material.	• Satisfied by LEED Water Efficiency Credits 1.1. and 1.2 • Addressed by Green Globes Water Credit D.2	• Native plants, rainwater harvesting, high efficiency irrigation systems, drip irrigation
	Rain Water Harvesting Use stormwater as a resource to reduce demand for potable water	• None	• Capture, store, treat and use rain water for irrigation and/or flushing.	• Addressed by LEED Water Efficiency Credits 1.1. and 1.2 • Addressed by Green Globes Water Credit D.2	• Rain barrels, storage cisterns
	Grey Water Re-use Re-use waste water to reduce demand for potable water	• None	• Integrate a system for collecting and treating laundry and bathing grey water for use in flushing, irrigation, janitorial cleaning, cooling and car washing. Where feasible, integrate a biological waste treatment system for the site.	• Addressed by LEED Water Efficiency Credit 2 • Satisfied by Green Globes Water Credit D.3 • The Canadian Standards Association is currently developing a new grey-water standard (June 2006).	•
	High Efficiency Fixtures and Appliances Reduce demand for potable water through greater efficiencies	• **Toronto Water:** The City has rebate programs for low flow toilets and urinals and washing machines that use 40% less water.	• ► Install water efficient fixtures including low-flow toilets (6.0 l) urinals (3.8L) and faucets (9.5L/min). • ► Where provided, install water efficient dishwashers (38L) and washing machines that use 40% less water. • Install individual faucet metering (0.95 L / cy)	• Satisfied by LEED Water Efficiency Credits 3.1 and 3.2 • Addressed by Green Gloves Water Credit D.2	• Composting toilets, waterless urinals

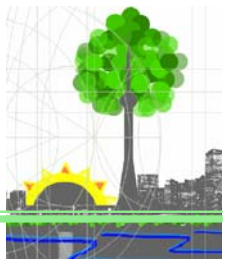


4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Solid Waste O.P., Environmental Plan, Solid Waste Management Diversion Goals	**Storage and Collection of Recyclables** Facilitate waste reduction and efficient processing	• **Solid Waste Division:** Mandatory participation in recycling collection for residential buildings. Commercial Waste Diversion Program provides free recycling and organic collection for participating businesses.	• ► Install user-friendly and accessible handling and storage facilities that provide for recyclable materials and organic waste.	• Addressed by LEED Materials and Resources Prerequisite 1 • Addressed by Green Globes Resources Credit E.7	• Three chute system, aluminum can crushers, cardboard balers.
	Construction Waste Management Reduce waste going to landfill and reduce demand for new materials	• None	• ► Minimum: Recycle and/or salvage at least 50% of non-hazardous construction and demolition debris. Preferred: Recycle and/or salvage at least 75% of non-hazardous C&D debris.	• Satisfied by LEED Materials and Resources Credit 2.1 • Addressed by Green Globes Resources Credit E.6	• Construction waste management plan, designated area on site for recyclable materials.
	Reuse of Building Materials Reduce waste going to landfill and reduce demand for new materials	• None	• Preferred: Ensure that at least 5% of a project's materials (based on value) comprise salvaged, refurbished or reused materials. Excellent: 10% re-used materials	• Addressed by LEED Materials and Resources Credits 3.1 and 3.2 • Addressed by Green Globes Resources Credit E.3	• Use salvaged beams, posts, flooring, paneling doors, frames, cabinetry, furniture, bricks and detailing.
	Use of Recycled Materials Reduce demand for new materials and increase market for recycling	• None	• Recycled content defined by CAN/CSA-ISO 14021-00 Environmental Labeling and Advertising Guidelines Preferred: Ensure that at least 7.5% of a project's materials (based on value) are comprised of recycled content Excellent: 15% recycled content	• Addressed by LEED Materials and Resources Credit 4.1	• Identify recycled materials suppliers, require manufacturer documentation
	Durable Buildings Minimize need to replace materials and assemblies	• None	• Compliance to CSA S478-95 (R2001) guideline for durable buildings	• Addressed by LEED Materials and Resources Credit 8 • Addressed by Green Globes Materials Credit E.4	• Shading screens, eaves, overhangs, durable surface materials, drained walls.

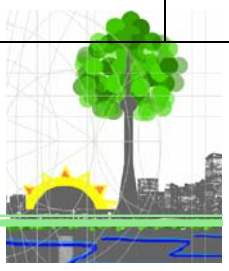
4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Urban Forest O.P., Environmental Plan, Our Common Grounds: Tree Canopy, Tree Protection Policy and Bylaws	**Site and Adjacent Boulevard** Preserve and enhance the urban forest	• **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%. • **Private Tree Bylaw:** Protect existing trees on private property that are 30cm or more DBH (diameter at breast height) • **Tree Protection Policy and Specifications for Construction Near Trees:** Guidelines specifying minimum protection distances and standards for tree protection barriers during construction • **Draft Streetscape Manual:** Construct walkways and driveways in a manner that permits the growth of trees by providing a continuous sub-grade that supports root growth. Provide a reliable watering system	• ► See Private Tree Bylaw • ► See draft Streetscape Manual guidelines • ► See existing guidelines in Specifications for Construction Near Trees • Retain native soil on site, adjust or replace as required • Plant large growing, predominantly native shade trees. Preferred: 20% canopy coverage of the site at maturity Excellent: 40% canopy coverage of the site at maturity. • ► Provide each tree a minimum soil volume of 30 m^3 of good soil.	• Not addressed by LEED or Green Globes	• Minimizing building footprint and parking areas, use of soil cells, retention of native topsoil, construction management plan to avoid site disturbance



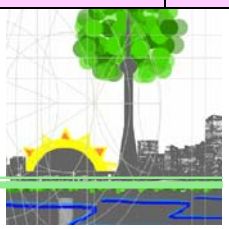
4.2 Toronto Standard for Mid to High Rise Residences, Commercial, Industrial and Institutional Development

	Development Feature	Existing City Standards, Guidelines or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Wildlife Habitat O.P., Environmental Plan, Ravine Protection By-law, Migratory Bird Policy	**Site** Protect and enhance natural habitat	• **OP:** policies support bio-diversity and ecological improvement for habitat for native flora and fauna and aquatic species. • **OP** policies generally prohibit development in designated Parkland and Open Space Areas and in the Natural Heritage System. When development is permitted, it will minimize adverse impacts and restore and enhance the natural heritage system	• Plant native trees, shrubs and ground cover. Preferred: 50% coverage of site area (excluding building footprint) Excellent: 75% coverage of site area (excluding building footprint). • ► No planting of invasive species on streets or properties adjacent to ravines and natural area parks	• Addressed by LEED Sustainable Sites Credits 1, 5.1 and 5.2 • Addressed by Green Globes Site B.1	• Minimizing building footprint and parking areas, planting native species, construction management plan to avoid site disturbance
	Glass and other design features Glass and building features that reduce reflectivity to protect migratory birds	• Under development.	• "Bird friendly" guidelines for buildings (when complete)	• Not addressed by LEED or Green Globes	• 'Visual noise' elements can include patterned glass, film treatments on windows, overhangs
Light Pollution	**Lighting** Recognize needs of migratory birds and reduce nighttime glare from outdoor lighting	• Under development	• "Bird friendly" guidelines for buildings (when complete). • ► Avoid directly lighting the sky	• Addressed by LEED Sustainable Sites Credit 8 • Addressed by Green Globes Site Credit B.2 and Indoor Environment G.3	• No vanity lighting, motion sensor lighting, overhangs

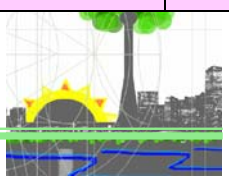


	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Air Quality O.P., Environmental Plan, Air Quality Strategy	**Pedestrian Infrastructure** Encourage walking as a clean air alternative	• **O.P.** policies promote a beautiful, comfortable and safe public realm with accessible streets, parks and open spaces. • **Urban Design Guidelines**: Provide guidelines for orienting buildings and improving the public realm. • **Urban Design Streetscape Manual**	• ► Priority should be given to appropriate grading and surface treatment and reduction of vehicular route conflicts.	• Addressed in Canadian Institute of Transportation Engineers: Promoting Sustainable Transportation Through Site Design Guidelines	.
	Construction Activity Minimize air pollution from construction and demolition	• **City Building Permit Construction and Demolition, Article 363 By-law 598-2005**: requires identification of method for handling air and dust emissions, recognizing on-site resources, in compliance with sections 6 and 11 of regulation 346 made under the EPA.	• ► For construction and demolition, identify method for minimizing air and dust emissions. • For construction and demolition, identify method for minimizing VOC emissions.	•	• Air and Dust Emissions Control Plan
	Ozone Protection Minimize contributions to ozone depletion from HVAC&R Equipment	• None	• ► Zero use of CFC-based refrigerants and Halons in fire suppression	• Satisfied by LEED for Homes EA 11	Install HVAC equipment that uses no CFC refrigerants
	Ventilation Optimize performance of ventilation system to avoid leakage	• None	• Principle Venting Capacity (PVC) = 15cfm X (#bedrooms +1) • Forced air distribution required to be interconnected with operation of PVC fan.	• Satisfied by Energy Star	•

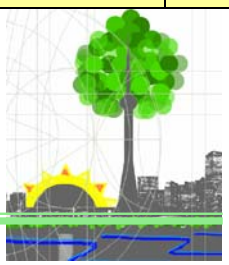
* The symbol "►" identifies the core, minimum requirements of the Toronto Green Standard.



	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Air Quality O.P., Environmental Plan, Air Quality Strategy	**Urban Heat Island Reduction** Reduce ambient surface temperatures	• **Green Roof Performance Criteria:** 6 inch depth, 50% coverage, non-monoculture.	• ► See existing standards under proposed front yard parking by-law. • ► Non-roof portion of site: provide natural cover, including trees, shading (at maturity) at least 30% of hard surfaces OR use light coloured materials for 50% of hardscape. • Roof: install green roof designed to City's performance criteria (50% coverage) OR use light coloured roofing materials with SRI greater than 78 and emissivity greater than 0.9 (50% coverage), OR combination of both (75% coverage).	• Satisfied by Energy Star • Satisfied by LEED for Homes Sustainable Sites 3	• Minimizing building footprint, soft landscaping, green roofs, natural shading, light-colored materials
	Local Materials Avoid unnecessary long-distance shipping of building materials	• None	• ► Minimum: Require 10% (based on cost) of materials to be sourced within 800 km of project. Preferred: 20% locally sourced materials	• Addressed by LEED for Homes Materials and Resources 3	• Identify materials and suppliers that can help to achieve this goal
	Indoor Air Quality Ensure a comfortable indoor climate, ensure clean and fresh indoor air and minimize sources of air contaminants	• Compliance to ASHRAE 55-2004 Thermal Comfort standards for City-owned and leased buildings. • Compliance to ASHRAE 62-2001 Ventilation standard for City-owned and leased buildings.	• Compliance to ASHRAE 55-2004 Thermal Comfort standards. • Compliance to ASHRAE 62-2004 Ventilation standards • Use low-emitting materials, including adhesives, sealants, paints, coatings, carpet systems, composite wood and agrifiber products. ► Minimum: 45% Preferred: 75% Excellent: 90% • Control fungus, mould and bacteria.	• Satisfied by LEED for Homes Indoor Environmental Quality (IEQ) 3 • Satisfied by LEED for Homes IEQ 4, 5, 6 and 7 • Addressed by LEED for Homes IEQ 8	• Design according to ASHRAE specifications, specify low-VOC materials in construction documents, provide manufacturer literature identifying emissions



	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Greenhouse Gas Emissions / Energy Efficiency O.P., Environmental Plan, Energy Plan, Air Quality Strategy	**Insulation** Maximize performance of the thermal envelope	• None	• ► Insulate walls, floor and ceiling to the following Energuide standards: ◦ Ceiling w/ attic: R40 ◦ Ceiling no attic: R31 ◦ Exterior walls: R19+5 ◦ Basement walls: full height, R+10/R13 ◦ Exposed floors: R31 Slab w/o infloor heating: ◦ If >2ft below grade: uninsulated ◦ If <2ft BG: R+10, edge	• Satisfied by Energy Star • Addressed by LEED for Homes Energy and Atmosphere (EA) Credit 2	•
	Air tightness / air leakage Minimize energy wastage from air leakage	• None	• ► Minimize air leakage at doors and windows to less than 2.0 in^2/100ft.	• Satisfied by Energy Star • Addressed by LEED for Homes EA 3	•
	Windows and doors Optimize performance	• None	• ► Install Energy Star certified windows	• Satisfied by Energy Star • Satisfied by LEED for Homes EA 4 • Satisfied by R-2000	•
	Ducts Minimize energy wastage from leakage in heating and cooling systems	• None	• ► Seal ductwork in basement. Ducts located in heated boundary	• Satisfied by Energy Star • Satisfied by R-2000 • Addressed by LEED for Homes EA 5	•
	Space heating and cooling Optimize performance of HVAC equipment	• None	• ► Install an Energy Star heating and air conditioning system	• Satisfied by Energy Star • Satisfied by LEED for Homes EA 6	•
	Water Heating Optimize performance of water heating system	• None	• ► Install a high efficiency boiler or tankless water heater and comply with Canada's energy efficiency regulations.	• Satisfied by Energy Star • Addressed by LEED for Homes EA 7	• Solar thermal water heating, tankless water heating.



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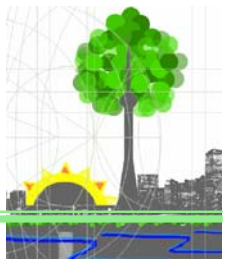
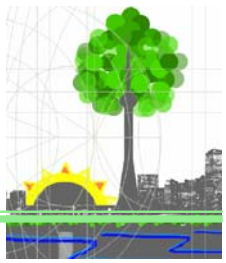
GHG Emissions / Energy Efficiency O.P., Environmental Plan, Energy Plan, Air Quality Strategy	**Light fixtures and home appliances** Minimize appliance energy demand	• None	• ► All appliances and fixtures are to be Energy Star compliant.	• Satisfied by Energy Star • Satisfied by LEED for Homes EA 9 • Satisfied by R-2000	• Energy Star appliances and fixtures
	Green Energy Reduce demand for energy from the grid and encourage renewable energy production	• **Environmental Plan:** Purchase 25% of energy needs for City buildings through green power (and encourage same of ABCs)	• Where feasible, provide on-site renewable energy to self-supply 5% -10% of requirements; • Where feasible, purchase 25% of energy needs through grid-source renewable energy.	• Addressed by LEED for Homes EA 10	• Wind turbines, photo-voltaics, solar thermal water heating, geothermal, biogas
	Daylighting / Building Orientation Minimize energy demand through passive solar heating and lighting	• None	• Orient and design the building to take advantage of passive solar heating and natural lighting.		• Permanent shading devices, high performance glazing
	Measurement and Verification Confirm energy performance	• None.	• ► Insulation, Envelope air leakage and Exhaust air flow rate out of home are to be 3rd party tested.	• Satisfied by Energy Star • Satisfied by LEED for Homes EA 1 • Satisfied by R-2000	• Install equipment to measure performance.

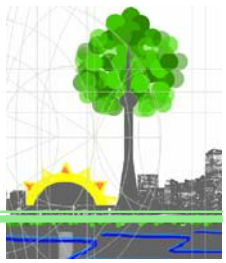


	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Water Quality O.P., Environmental Plan, Wet Weather Flow Management Master Plan, Toronto Region Conservation Authority Generic Regulation	**Construction Activity** Ensure protection of water quality during construction and demolition	• **[Draft] WWF Interim Stormwater Management Guidelines:** Adherence to Greater Toronto Area Conservation Authorities on-site Erosion and Sediment Control Guidelines during construction and demolition activities. Long-term average removal of 80% of suspended solids from run-off.	• ► See existing draft guideline.	• Addressed by LEED for Homes Sustainable Sites 1	• Erosion and sediment control plan, silt fencing, sediment traps, sediment basins
	Stormwater Run-Off Manage and clean stormwater that leaves the site	• **[Draft] WWF Suspended Solids Removal:** Remove 80% of total suspended solids on an annual loading basis from all runoff leaving the site	• ► See existing draft guideline.	•	• Mechanical or natural treatment systems such as constructed, vegetated filter strips, bio-swales. sediment traps
		• **[Draft] WWF Disinfection:** Disinfect runoff from the site which discharges directly into Lake Ontario or Waterfront areas	• ► See existing draft guideline.	•	
		• **[Draft] WWF Erosion Control:** Adherence to TRCA erosion control criteria for individual sites which discharge directly or are in close proximity to natural watercourses	• ► See existing draft guideline.	• Addressed by LEED for Homes Sustainable Sites 1	• Erosion and sediment control plan, sediment traps, sediment basins
	Stormwater Retention (Water balance) Minimize stormwater that leaves the site	• **[Draft] 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.	• ► See existing draft guideline.	• Addressed by LEED for Homes Sustainable Sites 4	• Green roofs, rain barrels, permeable paving (e.g. eco stone, turfstone), green streets instead of curb and gutter, downspout disconnection, infiltration trenches, absorbent landscaping

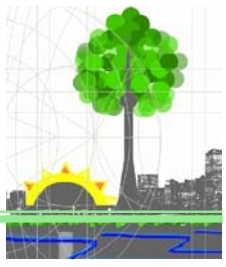
	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Water Efficiency O.P., Environmental Plan, Water Efficiency Plan	**Low-Water Landscaping** Create natural landscapes that require little irrigation.	• None.	• Use drought-resistant plant material	• Addressed by LEED for Homes Sustainable Sites 2 and Water Efficiency 2	• Native plants, rainwater harvesting, high efficiency irrigation systems, drip irrigation
	Rain Water Harvesting Use stormwater as a resource to reduce demand for potable water	• None	• Capture, store, treat and use at least 50% of rain water for irrigation and/or flushing.	• Satisfied by LEED for Homes Water Efficiency 1	• Rain barrel
	Grey Water Re-use Re-use waste water to reduce demand for potable water	• None.	• Integrate a system for collecting and treating laundry and bathing grey water for use in flushing, irrigation, cleaning and car washing.	• Satisfied by LEED for Homes Water Efficiency 1 • The Canadian Standards Association is currently developing a new grey-water standard (June 2006).	•
	High Efficiency Fixtures and Appliances Reduce demand for potable water through greater efficiencies	• **Toronto Water:** The City has rebate programs for low flow toilets and washing machines that use 40% less water.	• ► Install water efficient fixtures including low-flow toilets (6.0 l) and faucets (9.5L/min). • ► Where provided, install water efficient dishwashers (38L) and washing machines that use 40% less water. • Install individual faucet metering (0.95 L / cy)	• Addressed by LEED for Homes Water Efficiency 3 • Satisfied by R-2000	• Composting toilets, low flow toilets and faucets



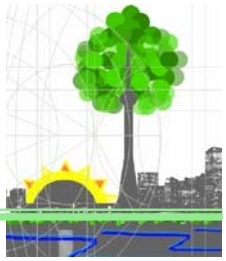
	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Solid Waste O.P., Environmental Plan, Solid Waste Management Diversion Goals	**Construction Waste Management** Reduce waste going to landfill and reduce demand for new materials	• None.	► Maximum of 2.5 Lbs /sq foot of construction waste sent to landfill	• Satisfied by LEED for Homes Materials and Resources 6	• Construction waste management plan, designated area on site for recyclable materials.
	Reuse of Building Materials Reduce waste going to landfill and reduce demand for new materials	• None.	• Preferred: Ensure that at least 5% of a project's materials (based on value) comprise salvaged, refurbished or reused materials. Excellent: 10% re-used materials	•	•
	Use of Recycled Materials Reduce demand for new materials and increase market for recycling	• None.	• Recycled content defined by CAN/CSA-ISO 14021-00 Environmental Labeling and Advertising Guidelines Preferred: Ensure that at least 7.5% of a project's materials (based on value) are comprised of recycled content Excellent: 15% recycled content	• Addressed by LEED Materials and Resources 5 • Addressed by R-2000	• Identify recycled materials suppliers, require manufacturer documentation
	Durable Buildings Minimize need to replace materials and assemblies	• None.	• Compliance to CSA S478-95 (R2001) guideline for durable buildings	• Addressed by LEED for Homes Materials and Resources 4	• Shading screens, eaves, overhangs, durable surface materials, drained walls.



	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Urban Forest O.P., Environmental Plan, Our Common Grounds: Tree Canopy, Tree Protection Policy and Bylaws	**Site and Adjacent Boulevard** Preserve and enhance the urban forest	• **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%. • **Private Tree Bylaw:** Protect existing trees on private property that are 30cm or more DBH (diameter at breast height) • **Tree Protection Policy and Specifications for Construction Near Trees:** Guidelines specifying minimum protection distances and standards for tree protection barriers during construction • **Draft Streetscape Manual:** Construct walkways and driveways in a manner that permits the growth of trees by providing a continuous sub-grade that supports root growth. Provide a reliable watering system	• ► See Private Tree Bylaw • ► See draft Streetscape Manual guidelines • ► See existing guidelines in Specifications for Construction Near Trees • ► Retain native soil on site, adjust or replace as required • Plant large growing, predominantly native shade trees, in back-yards, front yards and along streets that achieves a 40% canopy cover at maturity. • ► Provide each tree a minimum soil volume of 15 m^3 of good soil.	• Addressed by LEED for Homes Sustainable Sites 1	• Minimizing building footprint and parking areas, retention of native topsoil, construction management plan to avoid site disturbance



	Development Feature	Existing Standards or Targets	The Toronto Green Standard 2006*	Relationship to Other Standards	Possible Implementation Strategies
Wildlife Habitat O.P., Environmental Plan, Ravine Protection By-law, Migratory Bird Policy	**Site** Protect and enhance natural habitat.	• **OP:** policies support bio-diversity and ecological improvement for habitat for native flora and fauna and aquatic species. • **OP** policies generally prohibit development in designated Parkland and Open Space Areas and in the Natural Heritage System. When development is permitted, it will minimize adverse impacts and restore and enhance the natural heritage system	• Plant native trees, shrubs and ground cover. Preferred: 50% coverage of site area (excluding building footprint) Excellent: 75% coverage of site area (excluding building footprint). • ► No planting of invasive species on streets or properties adjacent to ravines and natural area parks	• Addressed by LEED for Homes Sustainable Sites 1	• Minimizing building footprint and parking areas, planting native species, construction management plan to avoid site disturbance
	Glass and other design features Glass and building features that incorporate 'visual noise' to reduce reflectivity to protect migratory birds	• Under development.	• For homes adjacent to ravines and natural areas: "Bird friendly" guidelines for buildings (when complete).	•	• 'Visual noise' elements can include patterned glass, film treatments on windows, overhangs



5. WHERE do we go from here?

The consultation process identified some of the existing barriers to widespread green development in Toronto, and possible solutions that may help to overcome the barriers and facilitate the successful implementation of the Toronto green development standard. This section presents the input relating to implementation barriers that was received from the survey of Toronto-area developers and from the stakeholder workshop. It also describes options available to address barriers to green development, as suggested through the consultation process and the Halsall report. Finally, it outlines the next steps that need to be taken to define and implement the Toronto Green Development Standard.

5.1 Implementation Barriers

Costs vs. Savings from New Technology

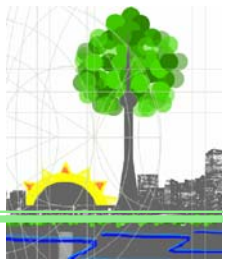
Many stakeholders opined that the business case for green development is yet to be convincing for many property owners and developers, and that widespread implementation will occur only when there is a business case to support it. Design, installation and construction costs of many green technologies are typically higher than those for conventional equipment[9], and maintenance costs are sometimes higher too. Some environmental technologies are believed to pay for themselves over time, and some environmental practices and technologies provide benefits in the less tangible form of added value for building occupants or the surrounding community. However, these benefits are often not enough to make a business case, for at least three reasons:

"Some environmental technologies are believed to pay for themselves over time, and some environmental practices and technologies provide benefits in the less tangible form of added value for building occupants or the surrounding community."

- *Uncertainty about new technologies:* Since many environmental technologies are relatively new, with less market history than conventional technologies, many property owners and developers are concerned that the payback will not be as promised, and that these technologies will not be as reliable and effective as conventional equipment. Some participants stated that cost-benefit information for many environmental technologies is still being defined. In addition, since the "value benefits" of green development are generally intangible, they are typically excluded from developers' own cost-benefit analyses[10].

[9] It should be noted that in some cases the additional expense is due to the fact that the technology is new and not widely produced. It is expected that relative costs would come down as these technologies became more common.

[10] However, where green developments have been built in Toronto, such as the SAS Building and Metro Label, the value benefits were fundamental to the decision to go green.



- *The payback period is considered too long for most property owners and developers:* While input varied about a generally acceptable payback period, the answers were mainly in the range of 3 years for most people, and 5 to 7 years for those who are more environmentally motivated. While some environmental technologies with shorter payback periods are beginning to emerge on the market (for example, some heat recovery systems), and more will do so as energy prices continue to rise, the payback period for many technologies is still considerably longer than many people find acceptable. For example, the payback period for some renewable energy sources, like solar and wind, may be in the order of 15 and 30 years, respectively.

- *Distinction between who pays and who benefits:* There are a variety of scenarios where, under conventional arrangements, the party who would implement environmental technologies has no incentive to do so, as the benefits of the technology accrue to other parties. This is often the case for condominium development, where the developer would pay, but the owners would benefit (from, for example, lower energy and water bills)[11]. In other scenarios, such as stormwater control measures, the cost is exclusive to the property owner, while the benefit is diffused to society in general.

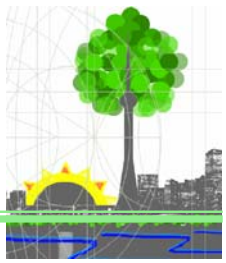
Perception of a Lengthened Process

Along with the perception that green technologies are more costly and risky than conventional equipment, there is also a common perception that green development is more expensive because it takes longer to implement. From seeking qualified professionals, to creating and obtaining approval for an unconventional design, to finding different kinds of materials, many people see hurdles at every stage of the development process that they believe can only lengthen the implementation period. While certain individual cases show that this is not always the case, the perception that the implementation process for green development will be longer, and therefore costlier, creates a disincentive to "go green".

It is worth noting that there is a particular concern that approval of a green design would be delayed due to lack of experience amongst municipal staff in processing alternative types of developments, and even due to certain municipal policies that discourage environmental features.

"There is particular concern that approval of a green design would be delayed due to lack of experience amongst municipal staff in processing alternative types of developments, and even due to certain municipal policies that discourage environmental features."

[11] In this case the developer can choose to raise the unit costs.



Shortage of Qualified Professionals and Trades

Since "building green" is not the conventional way to build in Toronto, it generally requires an additional set of skills amongst the designers, planners, and tradesmen involved. Many stakeholders stated that there is a shortage of professionals and tradesmen with the appropriate qualifications, skills and experience to implement green development on a widespread basis in Toronto. The areas of design and materials supply were identified as areas of particular concern.

Some property owners and developers expressed distrust of many industry representatives who are pushing green technology, noting there is a need for independent evaluation and standards for environmental technology, to reduce the perceived risks, and to help purchasers choose amongst the growing variety of products.

Low Awareness of, and Demand for, Real Green Development

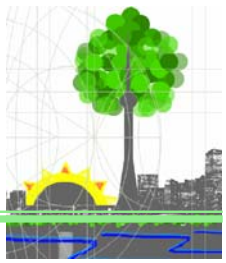
Although there is increasing public awareness of the benefits of certain environmental development features, many participants stated that awareness is still well below the "tipping point" that would create high enough demand to stimulate large-scale green development. Although some property owners and developers have voluntarily started to implement environmental technologies because they believe these features give them a market edge, many others do not believe that purchasers will be willing to pay a premium for these technologies.

"Green development is a complex field, and it is difficult for consumers to be able to determine the true environmental impact of their properties and homes."

There was also a concern amongst some participants about "green washing" – using green features as a marketing tool when the actual environmental benefits may be negligible. Green development is a complex field, and it is difficult for consumers to be able to determine the true environmental impact of their properties and homes.

Perceived Barriers in the Ontario Building Code

Some participants stated that the Ontario Building Code (OBC) can discourage certain environmental technologies. In spring 2006, the Ontario Ministry of Municipal Affairs and Housing consulted on proposed changes to the OBC to increase its energy efficiency provisions and remove perceived barriers to "green technologies". In that consultation, the City of Toronto responded supporting the strongest options in energy efficiency improvement. This is consistent with previous City Council directions that have requested the Province to implement at least 25% higher energy performance than the Model National Energy Code for



Buildings. The City of Toronto's response also encouraged the Province to consider further removal of perceived barriers to environmental technologies and practices, such as enhancing provisions on non-potable water systems to allow the use of surface water from Lake Ontario.

5.2 Implementation Solutions

This section outlines the variety of options available to Toronto to facilitate green development, based on Halsall's work and the consultation process, and discusses the implications of choosing amongst these options. The recommended process to implement suitable options will be discussed in the following section, "Recommended Next Steps".

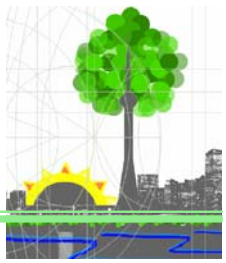
The case studies in the Halsall Report provide examples of both mandatory/regulatory approaches and voluntary or incentive-based approaches to implementing a green development standard amongst the private sector. Municipalities such as Vancouver, Santa Monica, Tokyo, Ealing, Malmo, Minnesota and Berlin have used their legislative authority to impose mandatory green requirements for private sector development by amending local building codes or requiring certain green development features during planning approval. The advantage of this approach is that it raises the bar for all development. The other municipalities studied have instead created green standards as a voluntary guideline for private sector development and offered various incentives (as mentioned below) to encourage compliance.

At this point, Toronto does not have the authority to require developers to meet the green development standard[12]. Therefore, the focus at this time is on ways that the City can encourage green development.

Fast-track Applications Designed to Meet Toronto's Green Standard

The consultant's study suggested that developers prefer a process that speeds up planning approvals, as compared to cash incentives, which typically represent a very small percentage of the total project costs. This was observed in Santa Monica, which initially offered grants of up to $30,000 to developers for designing to LEED standards. After very little take-up, Santa Monica recently readjusted

[12] While several participants were strongly in favour of the City seeking the authority to require green development, this option was not well supported at all by most developers consulted.



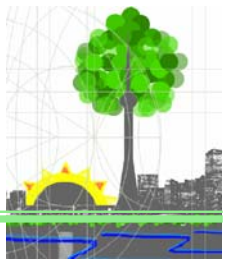
their approach to offer fast-tracked approvals and have already received a favorable response. The consultation process supported this finding, with the proposed solution that received the broadest and strongest support being fast-tracking applications for developments that would meet Toronto's green standard. The vast majority of stakeholders in every category gave this the highest approval rating.

A faster approvals process can reduce the financial risks and costs associated with project delays. A fast-track process for green buildings also has the added benefit of developing greater in-house expertise within a municipality to negotiate with developers for green features. However, fast-tracking in and of itself does not guarantee success. Chicago has been unable to stimulate significant private sector green development, even though it has a fast-track program for buildings registered for LEED certification.

Fast-tracking of applications is difficult to achieve in Toronto because there may be any of a number of development approval processes that might apply to a given situation, each with its own limitations. For example, a zoning by-law amendment must be approved by Council, include public input, and is subject to third party appeal at the Ontario Municipal Board. This means that it is almost impossible to predict a consistent timeframe for approval.

In theory, Site Plan Approval should be more predictable in its timeframe for approval because the project must be compliant with zoning, and hence there is no zoning amendment or variance process required. Also, it is a delegated approval, for the most part, and therefore no Council approval is required. However, Site Plan Approval lacks the legislative authority to secure in an agreement the many development feature enhancements contemplated by the Toronto Green Development Standard.

Finally, there is the building permit process. Under the Building Code Statute Law Amendment Act, 2002, municipalities in Ontario are required to issue a building permit, or provide a decision on the permit within a prescribed time-frame. These time-frames range from five days for stock plans to 30 days for complex buildings. Other municipalities that have introduced programs to fast-track "green permits" have performance targets which are about equivalent or slower than the "normal" permit streams in Toronto. For example, the City of Chicago performance target for a "green permit" is 30 days.



5. WHERE do we go from here?

While the prospect of using fast-tracking as an incentive for green development may seem poor at this time, changes to the development approval process do hold some promise for reconsideration of this matter in the future. For example, the introduction of the Development Permit System or the potential new authority for Conditional Zoning (being considered in connection with Bills 51 and 53) may provide the City with the ability to secure matters such as green development features as a condition of any development, without the need of a zoning by-law amendment process. Under such circumstances, the timing of approvals may become more predictable.

Provide Relief of Taxes or Development Charges

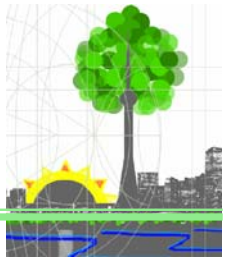
In the consultation process, there was also considerable support, particularly amongst developers and builders but also amongst other stakeholders, for relief of taxes and development charges for developments that meet Toronto's Green Standard. The rationale for providing this relief would be to acknowledge the additional private expense incurred for the public good, particularly where the City may receive measurable benefits.

In order for Toronto to consider relief of taxes or development charges, there must be a review of the City's legal ability to undertake such measures, and the legal and financial ramifications of such an action. Also, it would be important that the public benefits of green development be specifically quantified, so as to determine the appropriate level of reduction in tax or development charge. Such a study is discussed more below, and further consideration of tax and/or development relief should take place when that analysis is complete.

Provide Grants for Green Development

Although there was less support in the consultation process for providing grants for green development, as compared to other incentives such as fast-tracking applications and relief of taxes or development charges, it is still an option worth considering as part of a package of incentives. Portland's Green Investment Fund ($2.5 million over 5 years, but no indication of individual grant amounts) has served well to stimulate private sector green development.

It is clear from the Halsall report and the consultation process that if grants are to be an effective incentive, they need to be large enough to constitute a significant proportion of total project costs, or at least be part of a package of incentives that would tip a property owner's cost-benefit analysis in favour of green development. It would certainly be a challenge for Toronto to find a revenue source for large



grants for green developments. Also, in order to determine the suitable size of grants, there should be a cost-benefit study of the green development standard to both the private and public sector. Such a study is discussed more below, and further consideration of City-provided grants should take place when that analysis is complete.

Provide Density Bonuses

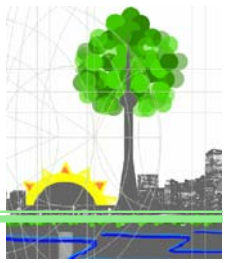
Density bonuses can be provided as an incentive for the developer to contribute certain community assets. In Toronto, this is accomplished through Section 37 agreements. Although some stakeholders in the consultation process thought density bonuses would be a good incentive, as a whole, density bonusing received relatively low levels of support, as compared to other incentives.

In Toronto, the main difficulty in providing density bonuses is that green development is not considered a community benefit for the purposes of Section 37, as defined in the Official Plan. To introduce the Toronto Green Development Standard as a Section 37 benefit requires that a public benefit be demonstrated. Conceptually, this has already been achieved in Chapter 2 of this report. However, the measurable public value of any of the improved development features in the Toronto Green Development Standard is still unknown. As mentioned below, a cost-benefit analysis of the various development features listed in the Standard is proposed. When this work is complete, a better understanding of the costs of each feature and the benefit to both the building owner and the City as a whole will be understood.

Negotiate Better Financing Rates

The Halsall Report identified another approach to address the financial concerns of implementing a green development standard. Officials in Tokyo were able to negotiate with local banks to offer alternative, more advantageous financing rates for buildings that achieve the Tokyo green standard. Halsall identified this as a key opportunity for Toronto to take a leadership role as the country's major banking centre.

It is recommended that this option be further explored in cooperation with the Toronto Financial Services Alliance and the Toronto Atmospheric Fund, which has been involved in the implementation of special financing for the Verve project, a new green development in Toronto.



Conduct a Cost-Benefit Analysis of the Green Development Standard

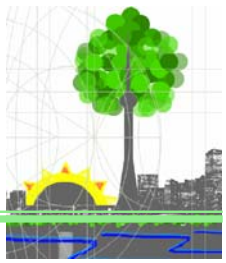
Undertaking a cost-benefit analysis of the various features of the green development standard can address developers' concerns about the costs versus savings of implementation, and can help the City to identify appropriate levels of incentives, as described above. The study would work to clarify the financial impact of the standard on the development community, and may help to refine the level at which the standard is set, so that it is effective but also attainable for many developers. It would also help to ensure that the standard does not unfairly disadvantage firms unable to absorb or pass off the higher costs of construction, and that green development does not become a luxury item for purchasers. Ongoing monitoring of green development costs could also provide vital feedback to refine the standard over time.

The City of Vancouver is currently conducting a cost-benefit analysis for its package of green building requirements to ensure that the standard remains feasible for developers. Portland's experience has been that the incremental costs for LEED construction are negligible and decrease with experience, whereas New York has estimated that incremental capital costs for green development run 2-3% higher than conventional development.

The City of Toronto has received a grant from the Federation of Canadian Municipalities' Green Municipal Fund to undertake a feasibility study of green development, including a cost-benefit analysis of the Green Development Standard. For features of the Toronto Standard that are based on private third-party standards, the consultant will be requested to compare them with alternative existing standards to determine if the appropriate choice has been made. This work is expected to begin in 2006, with a report to City Council in 2007.

Take Advantage of Rezoning Opportunities

Rezoning applications and official plan amendments provide a unique opportunity to negotiate for higher building standards. Once Toronto's standard is in place, this is an area its planners could certainly use to facilitate more green development. Several municipalities have been very successful in leveraging greener development this way. Vancouver's success is due in part to its use of discretionary zoning tools that allow planners to attain public benefits in exchange for any additional development rights granted. Green building features have been achieved in every rezoning during the previous 1½ years, with most major projects negotiated to achieve LEED Silver standards. Similarly, Santa Monica typically



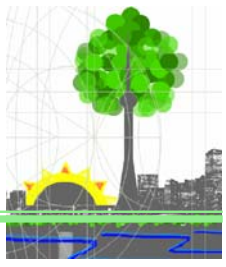
negotiates for a LEED Silver requirement when permitting rezoning applications. Officials in Chicago have also attempted (though with less success) to secure green features through negotiations during the planning approval process for "planned development" sites.

As a first step, it is recommended that every rezoning applicant be requested to consider complying with the Toronto Green Development Standard. During this initial phase, verification of implementation would be self-administered by the applicant. The City should then monitor the uptake of the use of the standard, or any component thereof. Following the completion of the cost-benefit study described above, it is recommended that staff report back to Council on minimum green requirements for every rezoning application. That report would include recommendations for administering verification of the implementation of minimum green requirements. This information could also form the basis for the development of any "conditional zoning" that might be provided for under the new City of Toronto Act.

Bill 51 amendments to the Planning Act allow for zoning with conditions, provided a city has included policies in its Official Plan governing the use of this new authority. Bill 53, the new City of Toronto Act, introduces the same provision. Moreover, the New City of Toronto Act confirms the City's authority to pass bylaws with respect to the economic, social and environmental well-being of the city. Conditional zoning will be enacted by regulation passed under either Act. Once passed, the City should be able to enact by-laws requiring a property owner to meet certain conditions as part of a development proposal. The legislation also provides for agreements that can be registered on title to secure the conditions. While this may appear more onerous for some property owners, this approach does create certainty with respect to City requirements. In addition, conditional zoning allows for predictability in the timing of development approval.

Survey Green Development Skills in Toronto and Work to Fill Gaps

The consultation process has suggested that there is a shortage of professionals, labour and suppliers in Toronto that would prevent the implementation of widespread green development in the short term. A survey of the skills and resources necessary to implement green development would verify whether this is, in fact, the case. It would also help to identify more specifically the gaps and presence of green development skills and resources in Toronto so that a strategy could be developed to fill the gaps.



5. WHERE do we go from here?

The City of Toronto is to participate in a study conducted by the Clean Air Partnership and the Canadian Urban Institute on *Construction Skills for Energy Efficiency*. The study will identify the skills required for energy efficient construction in the Greater Toronto Area, analyze the gaps in skills and training programs for sustainable construction, and identify barriers and opportunities to filling those gaps.

The City is also developing a Green Economic Development Strategy, which will seek to foster growth in the energy efficiency, renewable energy, sustainable design and construction sectors.

Train City Staff

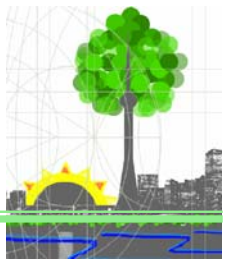
In order to address concerns that building green would take longer than conventional development, the Halsall Report emphasized training of City staff and the development of in-house expertise with regard to green technologies and green building design. This would facilitate the timely review of development applications and allow for ongoing education of the development community.

Staff training has been an important component of the green building strategies in Vancouver, Chicago, San Mateo, New York and Portland. For example, in Portland the Office of Sustainable Development's "G-Rated" program acts as a central resource for green building initiatives, assisting with outreach, technical assistance, policy research and staff training. The expertise developed under this program allows officials to offer appropriate direction to designers and developers on green building technologies and Portland's green policies.

It is recommended that specially trained "green" resource people be appointed for each district and/or relevant division to assist in guiding applications for green developments through the approval process. It is also recommended that staff training sessions be held for staff of all affected divisions to promote their awareness and understanding of the green development standard, and to ensure that staff promotes the standard to the development community.

Show Public Leadership

In the consultation process, there was fairly strong support amongst stakeholders for the City to lead by ensuring that all buildings it owns would meet Toronto's Green Standard. This would demonstrate the feasibility of meeting the standard, as well as help to stimulate the local market for environmental technologies, and provide opportunities to produce case studies that could further research on green



development in Toronto. Public sector leadership is a way to leverage buy-in to the green development standard so that the financial risks associated with innovative development are not borne only by the private sector.

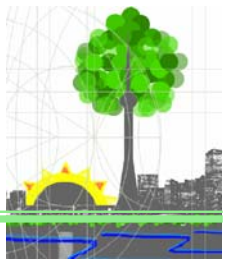
A number of municipalities have established mandatory green requirements for public buildings and have funded green demonstration projects. In nearly all cases, the jurisdictions studied have adopted strong policies to ensure that publicly funded buildings lead the way, often achieving a higher green standard than expected of private developers. Examples of this include Vancouver, Tokyo, Portland and Santa Monica. Public leadership can also play an important role in shaping the international image of a city, as has been observed in Chicago.

It is recommended that a commitment be made to applying the Toronto green development standard to all new City buildings. Further, it is recommended that the possibility of building a demonstration development be explored. Such a development could showcase innovative environmental designs, products and technologies. It could also provide an opportunity to monitor the environmental performance of the development and its features. The results of such monitoring would be useful in the ongoing refinement and review of the Toronto Green Development Standard.

Educate the Public

Public education about green development has been an important component in several of the case studies from the Halsall Report. The purpose of public education is to create better informed consumers who will demand better products from developers and stimulate more green development. Information on savings can potentially also increase a consumer's willingness to pay so that developers are able to invest more heavily in green technologies that might have a longer return period. Examples of educational initiatives include green resource centres (Chicago, Santa Monica), design competitions and demonstration projects (Chicago, San Mateo), how-to green guides and informational brochures (Chicago, Portland, Berlin), information sessions / workshops (Vancouver, Santa Monica, San Mateo, Portland, Berlin), green building expositions and tours (Santa Monica, Portland), webpages (Chicago, Santa Monica, San Mateo, Malmo), labelling programs (Tokyo) and school participation (Berlin).

Overall there was moderate support in the consultation process for the City to work to educate the market about the benefits of green development. It is clear that education should be a component of the City's effort to promote green



development, but that education alone would not be adequate to make a significant difference.

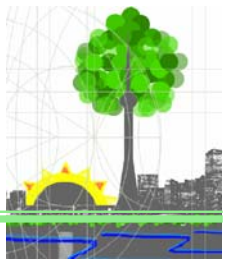
It is recommended that an awareness and educational campaign of the Toronto Green Development Standard be launched. This campaign should communicate the standard's purpose and content. The campaign should focus firstly on the development community, to inform them of the City's ideals, and to get them to consider building green. It should also focus on the public, to inform them of the benefits of living and working in green buildings and developments, to promote enhanced demand for buildings that meet the standard.

Communicate the Standard on the Web

Web-based communication can be a very effective way to make information on the green development standard readily available to designers, developers, industry representatives and members of the public. The flexibility of webpages allows for the cross-referencing of information so that explanatory notes for green building guidelines can be easily provided and the framing of the standards by the region's environmental drivers can be more clearly understood.

The Halsall Report provided numerous examples of municipalities that have developed high-quality webpages to communicate critical information on green development standards and related environmental policy goals. For example, San Mateo's webpage (www.recycleworks.org/greenbuilding/gbg_checklist.html) effectively communicates their green checklist through visual illustrations and clear explanations. Santa Monica also has a very strong webpage that provides information on the green development standard and green technologies (www.greenbuildings.santa-monica.org). The webpage seamlessly integrates green building requirements with explanations of how building systems connect to environmental drivers.

It is recommended that a web page be established on the City's web site that would serve as a "one-stop shop" for all green related policies and programs that affect development in Toronto. It would communicate the purpose of the standard, provide some explanation of the content, and provide answers to frequently asked questions about implementation of the standard.



Develop a Green Labeling Program

Labelling programs are a way of creating private sector incentives by generating market advantages and educating the public to demand higher quality and greener buildings. The mandatory green condomimium labelling program in Tokyo supports buyers' awareness of environmental performance. The labelling program is related to Tokyo's simplified green standard by rating buildings in four categories.

It is recommended that a Toronto green development standard labeling program be established, with graded levels of achievement, based on the number and degree of targets achieved. A logo should be designed for the program, and developments meeting the standard would be permitted and encouraged to display the logo prominently, to promote their achievement. Consideration should be given to presenting an annual award to an outstanding green development that had met the Toronto Green Development Standard.

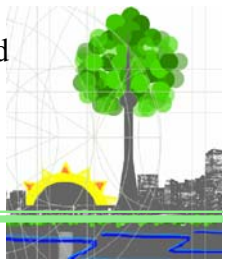
5.3 Recommended Next Steps

The purpose of the Toronto Green Development Standard is to generate awareness of green development practices, and to inspire more developers to build green. To that extent, a measure of its success will be the proportion of developments in Toronto that incorporate its various features. Another challenge for the Standard is remaining current. Our understanding of how to lessen the impact of urban development together with technological changes will require updating of the Standard from time to time. As such, the recommended next steps in the process are:

1. Adopt the Toronto Green Development Standard – 2006.

The Green Development Standard is being proposed as a voluntary commitment at this time. The work in this report represents a best effort to date in the formulation of the various targets and practices that are considered achievable in today's market place. As a voluntary program, the true test of applicability will be its uptake by developers, builders and homeowners. As such, the Green Standard should be adopted for immediate implementation with the understanding that further comment and changes are still possible. In this regard, the following program of further review and improvement is proposed:

(i) Circulate the Standard to key stakeholders and make the Green Standard widely available to the public and encourage comment.



(ii) Report back to City Council following the completion of further work (as discussed below) and include stakeholder and public feedback.

(iii) Review the Standard on an annual basis through preparation of a monitoring report. This would allow for changes and updates to the targets in the Standard as current conditions make appropriate.

2 Establish a Green Development Labeling program

A Toronto green development standard labeling program, with graded levels of achievement, should be established to promote green buildings in the city. Currently, the Standard labels the minimum level required to be considered 'green'.

3. Apply the standard to all new City of Toronto buildings

A commitment should be made to applying the Toronto Green Development Standard to all new City buildings, once the Standard has been refined and the various levels of achievement defined. The Standard for City buildings should be chosen following the completion of the cost benefit study discussed below. Until then, the interim standard for new City-owned buildings should remain LEED Silver.

4. Explore the possibility of building a demonstration site

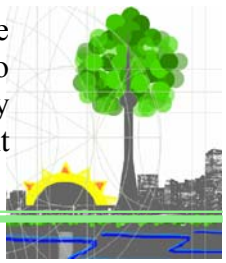
The possibility of building a demonstration development should be explored as an opportunity to showcase innovative environmental designs, products and technologies, and to monitor environmental performance.

5. Work toward using rezoning to encourage green development

As a first step, every rezoning applicant should be requested to consider complying with the Toronto Green Development Standard. During this phase, verification of implementation would be self-administered by the applicant. Following monitoring of the uptake of the standard and the completion of the cost-benefit study, there should be a report back to Council on minimum green requirements for every rezoning application, including recommendations for administering verification of the implementation of requirements.

6. Train City staff and Identify 'Green' Resource People

Staff training sessions should be held for staff of all affected divisions to promote their awareness and understanding of the green development standard, and to ensure that staff promotes the standard to the development community. Specially trained "green" resource people should be identified in each district within relevant



divisions to assist in guiding applications for green developments through the approval process.

7. Develop a website to promote and explain the standard

A Toronto green development web page should be established on the City's web site to serve as a "one-stop shop" for all environmentally-related policies and programs that affect development in Toronto.

8. Launch an awareness and educational campaign

An awareness and educational campaign of the Toronto Green Development Standard should target the development community and the general public.

9. Undertake a Cost-Benefit Study

The City of Toronto has received a grant from the Federation of Canadian Municipalities' Green Municipal Fund to undertake a study of green development, which includes the Halsall study, as well as a cost-benefit analysis. Work on the cost-benefit analysis is expected to begin in 2006, with a report to City Council in 2007.

10. Undertake a Green Skills Study and Green Sector Growth Strategy

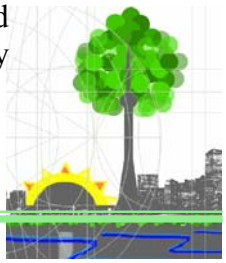
The City of Toronto will be participating in a study conducted by the Clean Air Partnership and the Canadian Urban Institute on *Green Construction Skills Project*. The City is also undertaking the Green Economic Development Strategy.

11. Review special financing in conjunction with TFSA and TAF

Special financing of green developments should be further explored in cooperation with the Toronto Financial Services Alliance and the Toronto Atmospheric Fund, which has previous experience arranging special financing for green development.

12. Review the legal and financial ramifications of tax and development charge relief

In order to explore the possibility of providing relief of taxes or development charges for developments that meet Toronto's green standard, a legal review should be undertaken to determine whether Toronto has the authority to do so, and what other legal ramifications this option may entail. The financial impact of any resultant program would also need to be assessed.



Appendices

APPENDIX 1: Existing Notable 3rd Party Standards

A.1a LEED (Leadership in Energy and Environmental Design) for Mid- to High-Rise Residential, Commercial, Institutional and Industrial Buildings and Sites

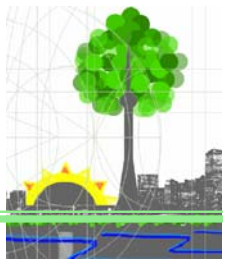
The LEED Green Building Rating System® is a voluntary standard, developed by the United States' Green Building Council (GBC), for developing high-performance, sustainable buildings. LEED has been developed, and continues to be refined, by the GBC's members, who represent all sectors of the building industry in a consensus-based process.

The LEED system is a rating system that provides points for building features that fall into six categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Air Quality, and Innovation and Design Process. LEED has certain prerequisites that must be met for certification, along with numerous optional credits for each category, which earn the building additional points. The number of points a building earns determines its LEED rating. The LEED ratings are levels of achievement, which include basic LEED certification, LEED Silver, LEED Gold, and finally, LEED Platinum as the highest level.

To achieve LEED certification, buildings must undergo a thorough third party verification process that all intended features have been implemented and are working according to plan. A building receives certification only after the construction and commissioning process is complete.

LEED for New Construction and Major Renovations (LEED-NC) is a green building rating system that was designed for commercial and institutional projects, with a focus on office buildings. Practitioners have also applied the system to K-12 schools, multi-unit residential buildings, manufacturing plants, laboratories and many other building types.

In recent years, the Canada Green Building Council (CaGBC) has developed LEED Canada for New Construction and Major Renovations version 1.0. This is an adaptation of the US LEED, and has been tailored specifically for Canadian climates, construction practices and regulations.



The US GBC has also developed LEED rating systems for Existing Building Operations and Commercial Interiors Projects. It is in the process of developing LEED rating systems for Core and Shell Projects, Homes, and Neighbourhoods.

A.1b Green Globes for Mid- to High-Rise Residential, Commercial, Institutional and Industrial Buildings and Sites

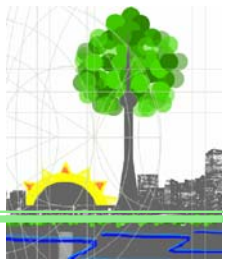
Green Globes is an online assessment tool that evaluates and rates the environmental performance of new and existing buildings, as well as interior fit-ups. It can be applied to all types of medium to large sized buildings and sites. Green Globes also functions as a design guide to assist design professionals to integrate green principles through the project delivery stages. It is based on an on-line questionnaire of approximately 150 questions. Green Globes considers education in environmental design principles to be a key part of the process in building green.

Actual assessment occurs at both the design and construction phase, which parallel the development approval process, in order to allow municipal authorities to verify that environmental claims are being met as the project develops. A preliminary score is provided at the design stage, and the score is finalized at the completion of contract documents. The system can be self-administered, but official certification requires engaging a third party to verify the design.

The Green Globes rating system has seven areas of building environmental performance, which form categories under which all building features fall. These include: Project Management; Site, Energy; Water; Resources; Emissions, Effluents & Other Impacts; and Indoor Environment. Like LEED, Green Globes assigns points for implementation of each building feature, or meeting specific targets. It has five levels of achievement, ranging from One Green Globe (lowest) to Five Green Globes.

A.1c R-2000 for New Homes

R-2000 is a voluntary national Canadian standard for the construction of new, single-family homes that was developed by Natural Resources Canada's Office of Energy Efficiency. It mainly addresses energy efficiency, but also touches on some other green elements, such as indoor air quality and use of recycled materials. It sets criteria for how a home must perform, allowing the designer and builder to



choose how to build it. An R-2000 home typically uses 40% less energy than other new homes.

The R-2000 standard has specified requirements, and then has an indoor air quality "pick list" and an environmental "pick list" from which a certain number of features must be chosen. R-2000 requires 2 "environmental features" from the environmental "pick list".

Builders must be trained in R-2000 to build homes that meet the standard. Licensed R-2000 evaluators are also involved before, during and after construction in verifying that the home meets the R-2000 standard. Final verification includes inspection and air leakage testing.

A.1d Energy Star for New Homes

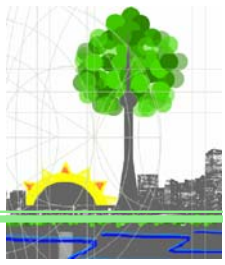
Energy Star for New Homes is also a program of Natural Resources Canada. It applies to all low-rise, residential building types regulated by the Ontario Building Code, Part 9, regardless of building orientation, distribution of windows, building size and eligible heating system. The program's focus is almost exclusively on energy efficiency. New homes that meet the Energy Star standard will be 40% more energy efficient than homes built to minimum building code standards.

Energy Star for New Homes is in a 2 year pilot phase in Ontario, running until April 1, 2007. The Energy Star system includes Building Packages for two Ontario climate zones, with optional trade-offs for each package to provide the builder with compliance choices. All trade-offs have been pre-determined to meet or exceed specified performance levels.

Energy Star is linked to the EnerGuide program. To be Energy Star qualified, a new home must score 78 on the EnerGuide for new houses scale. To meet the Energy Star standard, homes must undergo third party verification.

A1e LEED for Homes

LEED for Homes is under development by the US Green Building Council. It is in a pilot phase that was launched in September 2005, with the US GBC currently calling for projects to pilot test the rating system. Like LEED for commercial buildings, the standard has certain prerequisites for certification, along with many optional features which earn credits that raise a home's LEED rating. The initial phase of the pilot is focusing only on new single family homes



APPENDIX 2: Details of Feedback on Implementation Solutions

A.2 Consultant's Report (Excerpts)

The following are excerpts from the Executive Summary of the Halsall Report, which was Phase 1 of the work on the Toronto Green Development Standard. They provide some of the context for the work undertaken, and summary and analysis of findings.

[Methodology]

Literature Search

A literature search was carried out to identify comparable municipal initiatives to promote green development. Examples were obtained from over 100 cities and regions on five continents. The idea that cities should promote green building in their jurisdictions is widely accepted throughout much of the world.

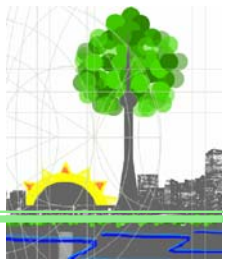
Case Studies

The initiatives identified in the literature search were reviewed, and those that appeared to be the most relevant to the City of Toronto were selected for further study. Relevance was based on:

• Similarities in population and density of development;
• Similar Environmental Drivers;
• An overall range of mandatory vs. voluntary approaches;
• A high quality of information available; and
• Apparent success at achieving their stated objectives.

The green development initiatives of 12 cities/regions were selected for further investigation as case studies:

- Canada – Vancouver
- USA - Santa Monica, San Mateo, Minnesota, New York City, Chicago, Portland
- Europe – Berlin, Ealing-UK, Malmö-Sweden, Kalundborg-Denmark
- Asia - Tokyo



Appendices

[Findings and Analysis]

Summary of Green Building Initiatives and Standards

There is a broad range of initiatives undertaken in the city/regions investigated, but we identified the following common strategies, which were adopted in varying combinations:

a) Incentives – including cash, expedited approvals, or zoning variances such as increased densities;
b) Education – including permanent information centres, online resources, help lines, and seminars;
c) Public Sector Leadership – including mandatory green requirements for all public buildings, publicly funded green demonstration projects or public-private partnership projects; and
d) Mandatory Requirements – including modified building code and by-law requirements, and mandatory green development standards.

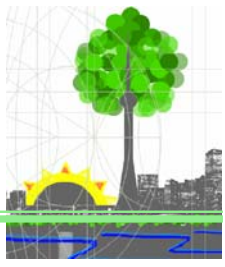
Regulatory Tools

The different jurisdictions reviewed were obviously working within different regulatory frameworks. As a result, some of the tools used elsewhere are not available to the City of Toronto. The following is a summary of regulatory initiatives used in the Case Studies, with commentary on how they relate to Toronto's opportunities.

a) Building Codes

A number of cities included in the case studies for this report have the ability to modify their State or Provincial Building Codes to meet local objectives or pass their own Building Codes outright. These cities have used, or are planning to use, their authority to strengthen their Code requirements related to green buildings and green building technologies. This is useful where green development is concerned since most green building initiatives relate to Building Code issues. The City of Toronto does not have this power or authority to require higher standards than exist in the Building Code. This may change with the new C.oT. Act. The cities with these powers include:

- Vancouver (has a Charter which allows it to pass its own Code and is now working to incorporate green building efficiencies into their Code);
- Chicago (has Home Rule, but its Code varies little from the Illinois Code);
- Santa Monica (has modified the California state-wide Building and Energy Efficient Standard to encourage green building);
- New York (includes some limited green development initiatives—have mostly removed obstacles from the Code to achieving green development); and



- Malmö, Sweden (which has the ability to modify the National Building Code).

b) Re-Zoning

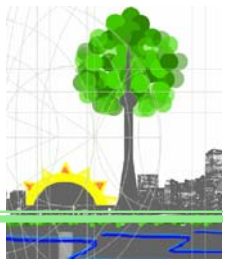
Development proponents can apply for a rezoning and/or an Official Plan amendment to obtain permission to proceed with development that does not meet all of the provisions of the Zoning Bylaw, and in some cases the Official Plan. The rezoning process (which includes site plan control) provides municipal staff with the authority they would otherwise not have to require and achieve green development initiatives. This power is used routinely in Vancouver and Santa Monica to achieve green development initiatives, over and above other requirements (for example, achieving a LEED® Gold building). In Toronto, green building initiatives do not appear to be routinely either sought or secured as part of the rezoning and/or Official Plan amendment process. To do this would require training staff, or providing technical support related to green building initiatives, or a combination of the two.

c) "Discretionary" Zoning

A number of cities have introduced a type of discretionary zoning where developments are entitled to greater densities over a certain threshold provided a number of public benefits are met. This is similar to using the bonusing authority available to the City of Toronto under Section 37 of the Planning Act, but directly incorporates the process into the Zoning Bylaw (having two density limits in one zone—one purely as of right; the other subject to provision of public benefits). Alternatively, these zones define classes of uses or developments that must be negotiated with City staff. These types of zoning initiatives exist in Vancouver (called discretionary zoning which includes securing environmental improvements as a public benefit) and Chicago (called "planned development" through which some limited green initiatives are secured, including green roofs).

d) Site Plan Control

Many cities have broader authority for site plan control than the City of Toronto. This allows them to secure a greater range of green development initiatives through the approval process than is currently possible in Toronto. For example, Chicago's "planned development" process, which is really a cross between discretionary zoning and site plan control, provides a broader range of powers, extending beyond the limited powers in Section 41 of the Ontario Planning Act. In the United Kingdom (Ealing), municipalities also have a broader range of discretion when it comes to development control. In Tokyo, the municipality has an extensive authority to require green development initiatives for developments over 10,000 square metres in size.



Learning Opportunities

All of the Case Studies represent groundbreaking initiatives that have generally been adjusted over time to reflect lessons learned. They create an excellent opportunity for Toronto to learn from other municipalities' experience. We believe the following are key lessons identified in the Case Studies:

- *Use Pilot Projects:* Start with small incremental steps—do not try to do everything at once. Pilot projects are an effective way to get started as they provide opportunities to test ideas and build awareness and comfort in the industry.

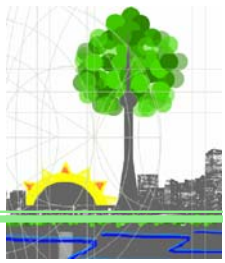
- *Engage Stakeholders:* Communicate the objectives and the procedures to all parties involved. Other cities report a higher level of acceptance, particularly from developers, when they were involved in the process of establishing the standard.

- *Educate:* There is a demand at the consumer level for education on green buildings. A number of the Case Studies have some level of education directed at consumers. Santa Monica, in particular, has focused on education and report high levels of participation.

- *Streamline Approvals:* As incentives, developers prefer fast tracked approvals to cash. Santa Monica offered up to $30,000 in cash to developers for designing to LEED® standards and none of the developers took the incentive. They are soon to offer fast track approvals and have already received a favourable response.

- *Monitor Achievements:* Monitoring city wide environmental indicators provides feedback regarding priorities for a green development initiative. Tracking the indicators provides the rationale for the standard. Some cities used a set of mandatory requirements (simpler to implement) which are focusing on a short list of key Environmental Drivers. Tokyo's is the best example of a city using this strategy. Ealing's checklist also created a simple, targeted test of a development's alignment with the region's sustainability objectives.

- *Competition:* Unique competitions yield marketing and educational benefits, which can lead to political change. San Mateo's Green Dollhouse design competition has generated publicity all across North America. The success of this unusual initiative gave politicians the opportunity to embrace green building.



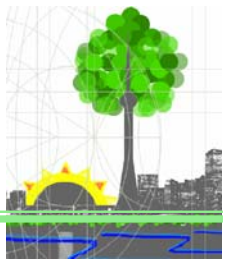
- *Training:* Active training of City staff is an important component of any initiative. Rezoning applications create an opportunity for the City to raise the bar. However, the Building Department must understand the value to green development issues in order to negotiate rezoning agreements effectively.

- *Visibility:* Visible initiatives such as green roofs and at-grade landscaping have a significant impact on the city's image as a green community. Chicago focused on these highly visible aspects of green building first and generated both public support and recognition. Certain highly visible projects (i.e. fuel cell technology) increase public awareness but may not provide other direct benefits.

- *Show Commitment:* Publicly funded buildings, and the lease or sale of public lands, present opportunities for increasing building performance requirements without the need for regulatory changes. Most of the jurisdictions have implemented some form of increased standards for public buildings. As pilot projects, maintaining ownership allows the City to confirm performance over the long term and fine-tune their standard to be cost effective.

Some specific initiatives related to funding that are probably applicable to Toronto include:

- San Mateo uses a surcharge on landfill tipping fees to fully fund their green building initiative. This initiative could provide an opportunity for Toronto to create budget neutral funding.
- Work with banks to provide better financing rates to buildings that meet the City's performance standard could help to overcome the perception that green costs more. Toronto, being the largest city in the country and home to the head offices of the major banks, seems well suited for exploring such an opportunity.

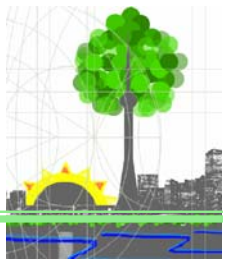


A.3 Toronto Area Developer's Survey

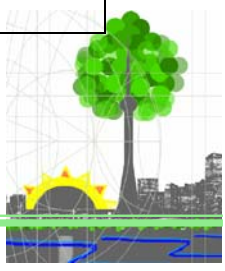
In February 2006, Toronto City Planning staff sent an electronic survey to 27 Toronto-area developers to learn about their experiences and concerns with respect to green development. Fourteen developers submitted responses.

The tables below summarize the survey responses. The survey's questions were grouped in three categories, as per the tables below. The first set of questions addressed the developers' experiences with green development. The second set addressed how the City could encourage green development. The third set addressed the availability of information about green development. The numbers in the tables indicate the number of developers who provided the answer indicated.

Developers' Experiences	
Have you considered implementing non-mandatory green measures?	• Yes: 13 • No: 1 (Reason: would add to building construction cost)
Did you implement any of them?	• Yes: 8 • Not yet / in process: 3 • No: 3

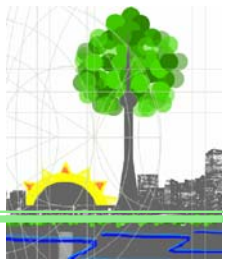


Developers' Experiences (continued)	
Which measures have been implemented? (List of all measures mentioned).	• Recycling facilities • Green roofs • Shading devices • Sustainable materials • Upgraded electrics • Energy Management Systems (automation) • Individual metering for suites • Tri-sorter garbage • High efficiency boilers • Motion detectors • Stormwater retention • Energy efficient lighting • Smart meters • Geothermal heating (1 in process; 2 didn't work out) • Deep lake water cooling (in process) • District Energy (in process) • Heat recovery vent (in process) • Dual flush toilets (in process) • Low-flow shower heads (in process) • Low VOC paints & finishes (in process) • High efficiency fans, motors & elevators (in process) • Better window assemblies (in process) • High performance glazing (in process) • Foam insulation (in process) • Car pooling/ autoshare (in process) • High efficiency appliances (in process)
Measures that were considered but didn't work out. (List of all measures mentioned).	• Geothermal heating (full conventional backup system required; too much technical risk) • Green roofs (capital cost premium prohibitive; benefits could be achieved through other means) • Solar & PV (cost prohibitive with negligible benefits for highrise)
Common obstacles faced	• Shortage of knowledgeable consultants • Municipal resistance when lack of familiarity with technology (esp re geothermal heating) • Uncertain risks • Delayed construction

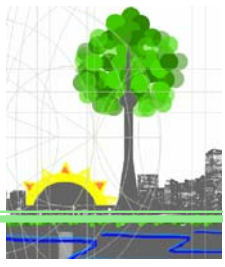


Developers' Experiences (continued)	
Motivation for implementing green measures	• Corporate environmental philosophy: 4 • Market demand: 4 • Anticipated market demand: 1 • Reduced operating costs: 4 • Improved design practice: 3 • Market leadership: 2 • Better value for buyer: 2 • Higher energy prices: 1 • Tenant requirement: 1 • Need to be competitive on certain RFPs: 1

How to Encourage Green Development	
Best ways for City to encourage green development	• Fast-tracking (green team esp for green apps): 7 • Tax/DC relief: 6 • Educate the market: 5 • grants: 3 • City take the lead: 3 • Section 37: 3 • Reduce parkland requirements (for GR): 2 • Train City staff so they don't delay/discourage or have a "green team" familiar with tech 1 • Reduce parking requirements: 1 • Special loans: 1 • Set minimum stds that are achievable: 1 • Arrange longer mortgages: 1 • Offer consumers a financial incentive to drive demand 1
Prefer voluntary or regulatory?	• Voluntary: 8 • Regulatory: 1 • Mix: 1



Getting information on Green Development	
Do you know where to find information on green development?	• Yes: 9 • No: 2 • A bit: 2
Where do you find information?	• Consultants (engineers, landscape arch): 8 • Internet: 4 • Industry/Trade publications: 3 • Trade shows/conferences: 2 • Canada Green Building Council: 2 • Product suppliers: 2 • In-house team: 2 • Sustainable Building Canada: 1 • TRCA: 1 • Ask around the industry: 1 • Contractors: 1 • City of Toronto webpage: 1 • Municipal staff: 1
Is there a shortage of info?	• Yes: 7 • No: 6 (but some concerns about reliability of info)
Types of info needed:	• Statement of what constitutes a green building: 4 - Meaningful, achievable targets - Incentive-based flexible framework - Based on performance • Case studies (especially local): 3 • Objective data on cost vs benefits, risks, reliability: 3 • Practical resource centres: 1 • List of qualified consultants 1 • Supplier options 1

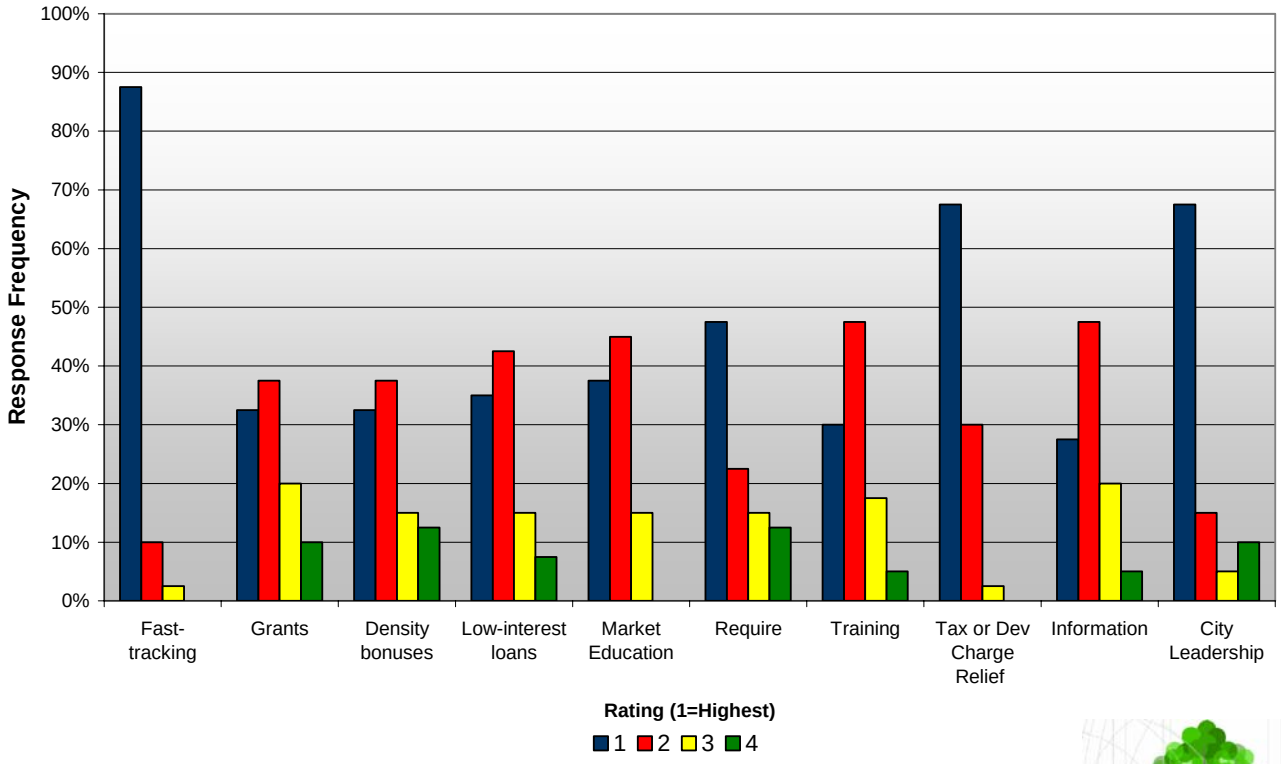


A.4 Workshop Feedback

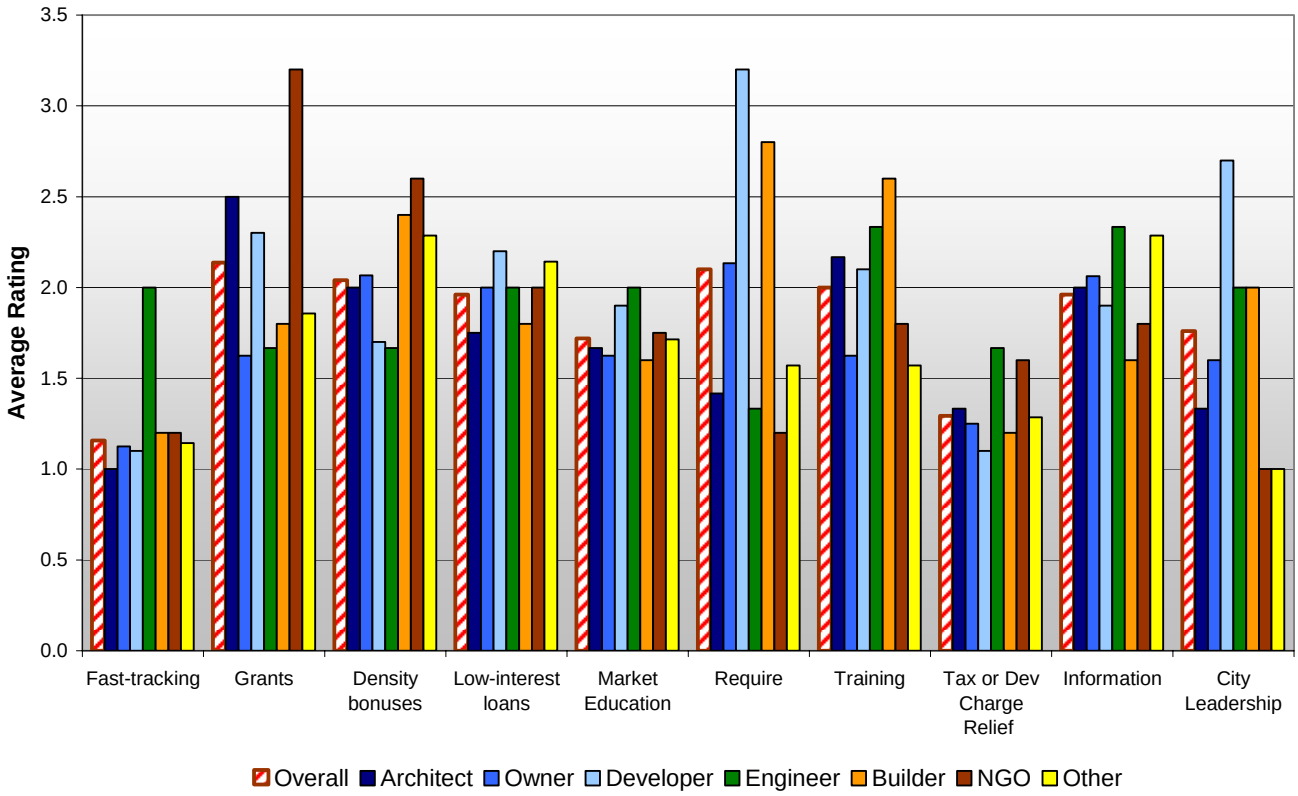
The charts below show the breakdown of responses of workshop participants to different options to overcome the barriers to green development. Participants were provided with a list of possible solutions and rated them, with the highest rating being "1", and the lowest rating being "4".

The first chart below is a frequency distribution of responses as per the ratings given to each solution. The second chart shows the breakdown of responses by sector. It is noteworthy that the small sample size means that the results portrayed in these charts are subject to be skewed by individual responses.

GDS Implementation Solutions: Frequency Distribution of Ratings



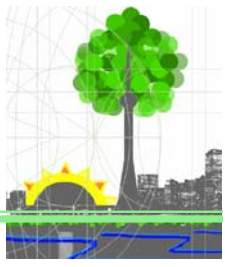
GDS Implementation Solutions: Breakdown by Sector



Workshop participants also included their own suggestions to address the barriers to green development which they had identified. These were not rated by other participants, so all additional suggestions are simply listed below:

- Metering should be posted in public buildings;
- The City should promote early adopters/pioneers in green development;
- Monitor costing of public green buildings (including design, construction and operation) to build up a knowledge base about costs versus benefits of green development;
- Tie incentive programs together to make it more easy to apply for incentives;
- If grants are provided for green development, the grants must be meaningful to the size and expense of the project to which it is applied;
- The City should pay for LEED verification;
- The City should work with the financial sector to encourage green mortgages;

- Provide more information supporting the return on investment for green development;
- Focus on technologies that provide good return on investment and are already widely available ("state of the shelf");
- Involve real estate agents to help facilitate public education (provide training that gives them the credits they need);
- Work with other municipalities in the GTA so that policies are harmonized.



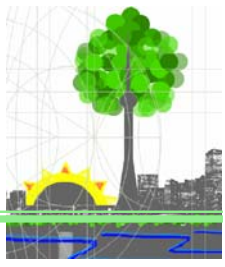
A.5 Toronto Green Building Examples

SAS Canada 280 King St E
(2005 - Norr Architects and Engineers)

- Applying for LEED certification (anticipating Silver)
- 30 – 50% less energy consumption than comparable buildings achieved through high efficiency shell design, HVAC system, elevators, and fixtures
- Rainwater harvesting and treatment for use in flushing and washroom fixtures
- Light coloured roofing materials to reduce the urban heat island
- Individual environmental controls (temperature and lighting)
- Maximum day lighting through central atrium space, and floor to ceiling glass walls
- Recycled concrete
- Low VOC emitting, environmental friendly and locally sourced finishing materials
- Bicycle parking, showers and change room facilities
- Construction management programs to control air pollution

Mountain Equipment Co-op 400 King St W
(1998 – Stone Kohn McQuire Vogt Architecture)

- Built pre-LEED but currently applying for certification
- Energy efficient design including HVAC system, computerized building management for lighting and thermal comfort, window glazing, wall and roof insulation, fluorescent lighting, office and washroom motion sensor lighting, LED exit signs
- Demonstration photo-voltaic electric generation
- Environmental friendly paints, flooring and finishing products
- Optimization of day lighting
- 900 square metre extensive green roof with native species
- Rainwater harvesting
- Planted street trees
- Re-used structural timbers, used recycled steel framing, steel components, wall and roof insulation, concrete, certified wood
- Local sourcing of materials
- Durable building design
- Cycling facilities, carpool parking spaces and participation in Autoshare program.

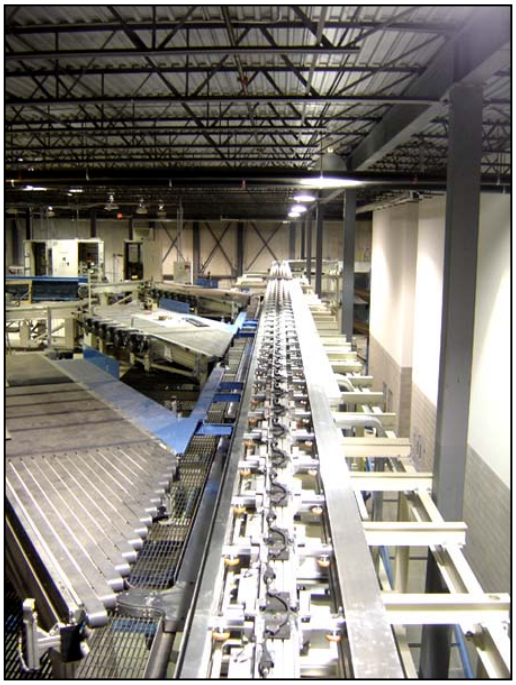


Metro Label 999 Progress Avenue (North Scarborough)
(2005 – Barry Bryan and Associates with Enermodal Engineering Ltd)

- Industrial building applying for LEED certification.
- Building oriented to maximize day lighting
- Harvest snow and rainwater to flush toilets
- Waterless urinals
- Insulated duct work
- Used materials made from recycled products and natural fibres
- Recycled 75% of construction waste including concrete, asphalt, paper and metal.
- Used EcoLogo paints and low VOC-emitting materials
- Cycling facilities (showers and lockers)
- High efficiency light fixtures, daylight sensors, and energy efficient building design to achieve a 34% improvement over the Model National Energy Code for Buildings
- Planted drought resistant shrubbery
- Located new plant in close proximity to old one to minimize additional travel for employees
- Installed a heat recovery system to recycle energy emitted from industrial processes.

CanPar South Etobicoke employment lands
(2006 – Jacques Whitford and Maple Reindeers)

- Developed on a former brownfield site in co-operation with the Toronto Economic Development Corporation
- Industrial building applying for LEED certification
- Rainwater collection for use in bathrooms and landscaping irrigation
- Improved insulation to compensate for loading docks
- Mechanical exhaust system captures heat from vehicle exhaust and uses it to heat the building



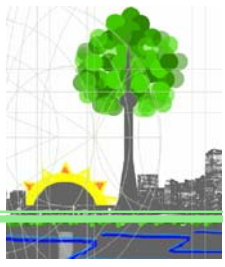
Appendices

Radiance Yonge and Sheppard
(2006 – Minto Urban Communities)

- LEED Silver Certified
- Building designed to be 33% more energy efficient than Model National Energy Code for Buildings, saving $200,000 in common-area costs during the building's first year of occupancy.
- Innovative indoor air quality system which integrates a fan coil unit with a heat recovery ventilator.
- Waterless urinals and composting toilets.
- "All-off" energy switch in individual suites.
- Water meters in each suite which have resulted in 50% savings
- Located in close proximity to transit stations, provides secure storage for 200 bicycles, participates in autoshare program for use of hybrid car
- Used 40% local materials in construction
- Installed recycling chutes on each floor, reducing waste volume destined for landfills by 70%.

The Verve Wellesley and Jarvis
(2005 – Tridel)

- Pursuing LEED certification
- Developed innovative financing method in partnership with the Toronto Atmospheric Fund
- Waterless urinals and composting toilets
- High efficiency faucets and showers
- Individual suite monitoring for electricity, water, heating and cooling
- Central heat recovery ventilator system
- Compact fluorescent lighting
- High efficiency Energy Star appliances
- Low maintenance plank floors
- Landscaped rooftop terrace
- Optimization of daylighting
- Recycling facilities
- Low VOC carpeting, wall coverings, adhesives, coatings and paints
- Durable building with use of salvaged and recycled materials



Appendices

York University: Computer Science Building

(2002 - Busby + Associates/ Van Nostrand Di Castri Architects)

- First sustainably designed academic building for a northern climate
- 50% more efficient than Model National Energy Code for Buildings (received a 2004 Ministry of Natural Resources Energy Efficiency Award)
- Extensive use of exposed 50% flyash concrete
- Sunshading devices to reduce passive solar gain
- Passive ventilation system with operable windows and thermal chimneys
- Environmentally friendly finishing materials
- Extensive green roof
- Atrium to allow for day lighting.

York University: Pond Road Student Residence

(2004 – architectsAlliance)

- First "green" student residence in Ontario
- In-slab heating and cooling that uses concrete structure as a heat sink
- High performance curtain wall with sunshade devices
- Heat recovery on all exhausts
- Green roof

University of Toronto: Terrence Donnelly Centre for Cellular and Biomolecular Research

(2005 - Behnisch Architects with architectsAlliance)

- Multi-storey gardens that act as lungs for the building
- Naturally ventilated office / administration areas
- Exposed concrete to maximize heating and cooling efficiency
- Double glass façade to improve energy efficiency
- Daylighting

Appendices

Toronto Botanical Gardens
(2006 – Montgomery and Sisam)

- Extensive green roof
- Used recycled materials
- Local manufactured materials
- High-efficiency mechanical equipment
- Captures and stores rainwater for use in irrigation
- Fritted glass, sunshading
- Reused stone and steel structure from old buildings
- 30% more energy efficiency than Model National Energy Code for Buildings
- Indigenous plants and landscaping.

401 Richmond
(Retrofit: 1994 to Present – urbanspace PROPERTY Group)

- Recycling separation and pick up
- Green roof (including food growing)
- Electronic Waste collection twice yearly
- Vermiculture and composting
- Promotion of Bike Use
- Green Globes audit – sets an environmental benchmark in terms of energy efficiency and performance metrics
- Energy retrofit – lighting
- One waterless urinal
- Heritage building - Ecologically restorative, making use of embodied energy.

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