

# **INNOVATIVE SUSTAINABLE DEVELOPMENT APPROVALS PROJECT**

## **A Market-based Approach to Stimulate Innovative Water-Conscious Design / Build in New Development**



The Regional Municipality of York, in partnership with the Town of Newmarket, Lake Simcoe Region Conservation Authority (LSRCA), Toronto Region Conservation Authority (TRCA) and Mosaik Homes tested a fast-track municipal review and approvals process titled *Innovative Sustainable Development Approvals* (ISDA) as a market-based incentive for water conservation and stormwater quality and quantity management practices in new construction. This project received funding support from the Government of Ontario. Such support does not indicate endorsement by the Government of Ontario of the contents of this material.

### **Outcomes**

- 25 per cent reduction per home in indoor water use over the Ontario Building Code (OBC)
- 25 per cent reduction per home in energy use over the OBC
- 8 per cent further reduction over current provincial requirements for pre-post phosphorus in stormwater
- 10 per cent to 16 per cent further reduction over current provincial requirement (80 per cent) for the removal of total suspended solids (TSS) in stormwater
- Capture of 9.5 mm or less event-based rainfall, accounting for about 82 per cent of rainfall events (1981-2011).

## **Motivation for the project**

Water conservation is a key priority in York Region, which to date has saved approximately 25.8-million litres per day through its *Water for Tomorrow* program. Ambitious water saving targets are set out in the Region’s Long Term Water Conservation Strategy for the next 40 years. Meeting these targets requires innovative and progressive efforts across all sectors. A primary Regional goal of the ISDA project was to reduce indoor water use per household by a minimum of 25 per cent above the Ontario Building Code.

In addition to water savings, other shared goals of all public partners in the ISDA project were:

- Eliminating need for a stormwater management pond
- Protecting watersheds and surface waters throughout the Region
- Mitigating nutrient loadings to surface waters, in particular, phosphorus loadings to Lake Simcoe
- Reducing stormwater overland flows through enhanced at-source infiltration

## **A market-based approach**

Market-based programming is the cornerstone of new water conservation efforts in York Region. It provides the impetus for testing an expedited municipal review and approval process as a driver for innovative, water-conscious design and build for a new home development.

Municipal incentives to drive beyond-code ‘green’ construction for new development were reviewed, specifically:

1. Reduced development charges
2. “Bonusing” – increased allocation

3. Tax rebates / reduced property taxes
4. Fast-track review and approval

Through interviews with builders/developers, a review of the Canadian Water and Wastewater Association’s market transformation study<sup>1</sup>, and research into leading North American jurisdictions in green building, a fast-track municipal review and approvals approach was consistently identified as the most effective means of stimulating innovative, beyond-code development. Table 1.0 provides a summary of the advantages of fast-track review and approvals for municipalities, conservation authorities and builders/developers.

**Table 1.0 - Advantages of a Municipal Fast Track Review and Approval Incentive**

<b>Municipality and Conservation Authority</b>	<b>Builder/Developer</b>
<ul style="list-style-type: none"> <li>• Drives sustainable building by supporting competition for green building within the industry</li> <li>• Supports innovation in the marketplace</li> <li>• Reduces onus of prescriptive management from government agencies</li> <li>• Places onus on the marketplace to develop solutions that are acceptable and approvable</li> <li>• Encourages development that creates socially and ecologically vital communities</li> <li>• Generates economic return for the municipality</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces approval times and associated carrying costs, liabilities, project management and administrative costs</li> <li>• Competitive advantage with early-to-the-market return on investment</li> <li>• Reduced time means fewer regulation and political changes over the course of a project</li> </ul>

## **Project organization and process**

In order to test a municipal expedited review and approval process, several key players were brought together, specifically, a local municipal partner (Town of Newmarket), a

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<sup>1</sup> Canadian Water and Wastewater Association and the National Water Efficiency Committee; *Water Conservation & Efficiency Market Transformation Study*. Prepared by Freeman Associates. June 2010.

residential developer (Mosaik Homes), the conservation authorities (LSRCA and TRCA) – who bring expertise on stormwater management and watershed protection – and York Region. Representatives from these organizations, along with supporting project consultants, formed the ISDA Project Committee. Chart 1 illustrates the ISDA project organization and process.

The key municipal approval agencies, specifically, the Town of Newmarket, LSRCA, York Region and TRCA<sup>2</sup>, developed performance targets for water conservation, stormwater quality and quantity management and energy conservation (in conjunction with Enbridge). Table 2.0 provides a summary of the performance targets for the Mosaik Home residential development.

With performance targets established, the ISDA project committee participated in an Integrated Design Process (IDP) session in conjunction with Enbridge’s “*Savings by Design*” charrette. The goal of this session was to scope the project and identify design and technology options for meeting the established project targets.

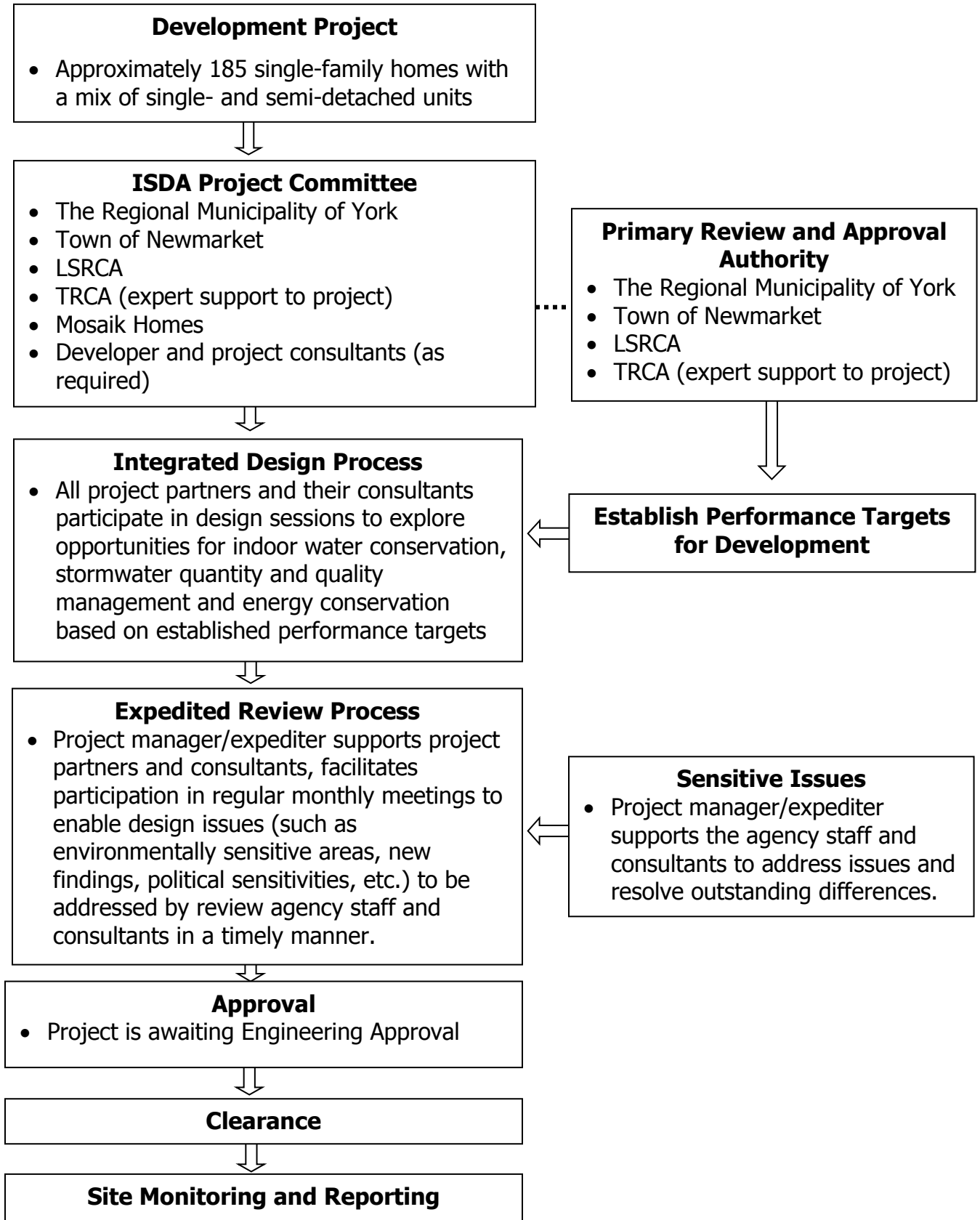
Subsequent to the IDP session, regular bi-monthly meetings of the ISDA project committee were held to track the project, address issues as expeditiously as possible and to ensure all reviewers were aware of changes or modifications to the development application. The chairperson for the committee was responsible for setting meeting agendas, ensuring minutes were taken and circulated and keeping the development application moving through the review and approval process.

The Mosaik Home development application required several engineering submissions to the Town of Newmarket before being approved by the town.

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<sup>2</sup> Although TRCA had no approval authority for this project, they provided expert guidance on stormwater management approaches and technology.

**Chart 1: ISDA Process and Organization**



**Table 2.0: Summary of Performance Targets for the Mosaik Residential Development**

CATEGORY	CURRENT REQUIRED	FAST TRACK APPROVAL MINIMUM TARGET	EXPECTED TO BE ACHIEVED <sup>3</sup>
Stormwater:			
Quality – Phosphorous	Level 1 / pre=post phosphorus (whichever is lower) Pre=4.2 kg/yr and Post=1.8 kg/yr	Further 10 per cent reduction	Up to 8 per cent reduction (74 per cent to 88 per cent removal of phosphorus)
Quality – Total Suspended Solids	80 per cent removal of TSS	Further 10 per cent reduction	Up to 16 per cent reduction (80 per cent to 96 per cent removal of TSS)
Quantity – Runoff	Two to 200 year post-to pre- control	Same	Equivalent
Quantity – Erosion	Five mm Rainfall runoff criteria	25mm Rainfall runoff criteria	8mm for impervious 11mm for pervious
Quantity - Infiltration	Water balance – maintain existing infiltration	Same	Exceeded
Water Conservation	Ontario Building Code	Minimum 25 per cent reduction over Ontario Building Code standard	TBD
Energy Conservation	Ontario Building Code	Minimum 25 per cent reduction over Ontario Building Code standard	TBD

### Description of the Mosaik residential development

The development is located in the Town of Newmarket, on the southeast corner of Davis Drive and Bathurst Street. Davis Drive is the main east-west street running through Newmarket and Bathurst Street parallels the western border of the Town (See Schematic 1). The location is the western gateway to Newmarket – a significant factor in the design of the site.

<sup>3</sup> Expected performance based on modeling. Home and site monitoring will provide in-field performance data.

The Mosaik development is comprised of 185 total lots with 123 single-family detached homes and 62 single-family semi-detached homes (See Schematic 1). The homes will be outfitted with the following water and energy saving features:

- 3.8 litre toilets
- Water saving, whole-home, furnace-mount humidifier
- ENERGY STAR rated front-load clothes washers
- On-demand hot water recirculation system
- Programmable thermostat
- Drain water heat recovery system
- Additional insulation

**Figure 1 – Mosaik Homes Development Layout**



The site itself includes a 3.3 acre open space block that incorporates a ‘natural wetland feature’ in place of a conventional stormwater management (SWM) pond (Schematic 2). An underground SWM tank has been added as a back-up system to mitigate risk of flooding from high volume 100-year storm events.



**Figure 2: Natural Wetland Feature and Park**



Several Low Impact Development (LID) features are incorporated in this development to both eliminate the need for a conventional SWM pond and to meet project targets for stormwater quantity and quality (See Schematic 3). The LID features incorporated into the site are as follows:

- Bioswales (bio-filters) – Located at the northern end of window streets (streets looking onto Davis Drive) at the northern portion of the site, eliminating the need for storm sewers on these streets; Figure 3 provides a surface visual example of a bioswale
- Rain gardens - Eight rain gardens are located at the corner of each window street to capture roof leader runoff of corner-lot homes and to showcase the beauty of rain gardens; Figure 4 provides an example of a rain garden
- Exfiltration system – Sub-surface perforated pipe located under the storm sewer within the roadway is embedded in a specialized media (pre washed 20 mm clear stone) allowing retention and slow infiltration of stormwater below ground (See Figure 5)
- Soil management – Topsoil management on the site will be accomplished via a two-step process. The first step will involve stripping and storing the nutrient-rich topsoil to a depth of about 30 cm; the second step will involve stripping/moving subsoil layers as required to reach grade. The topsoil will be stored in small windrows (vs. a traditional large pile) to reduce nutrient degradation and maintain a higher quality topsoil. The topsoil will be tested prior to reapplication on the site and nutrient levels will be improved if necessary. Topsoil will be reapplied on site to an average depth of 30 cm, twice the standard depth of application. The added depth and improved quality of the topsoil will enhance storage volume and infiltration, and provide an improved growing media for planted vegetation.



**Figure 3 – Bioswale**



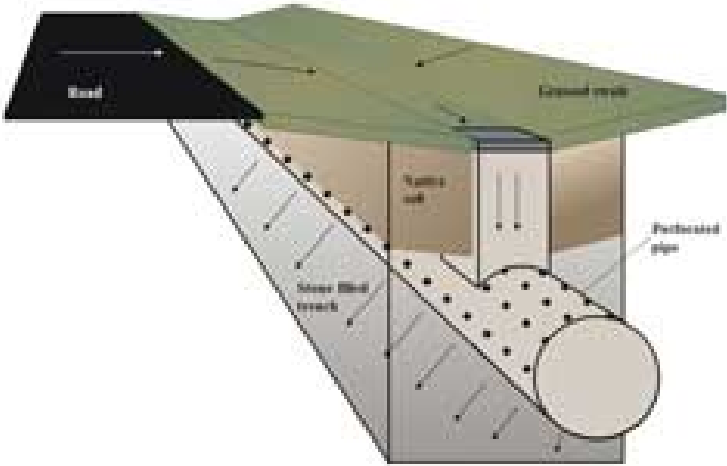
[http://water.epa.gov/infrastructure/greeninfrastructure/gi\\_what.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm)

**Figure 4 – Rain Garden**



<http://www.ci.burnsville.mn.us/DocumentCenter/Home/View/449>

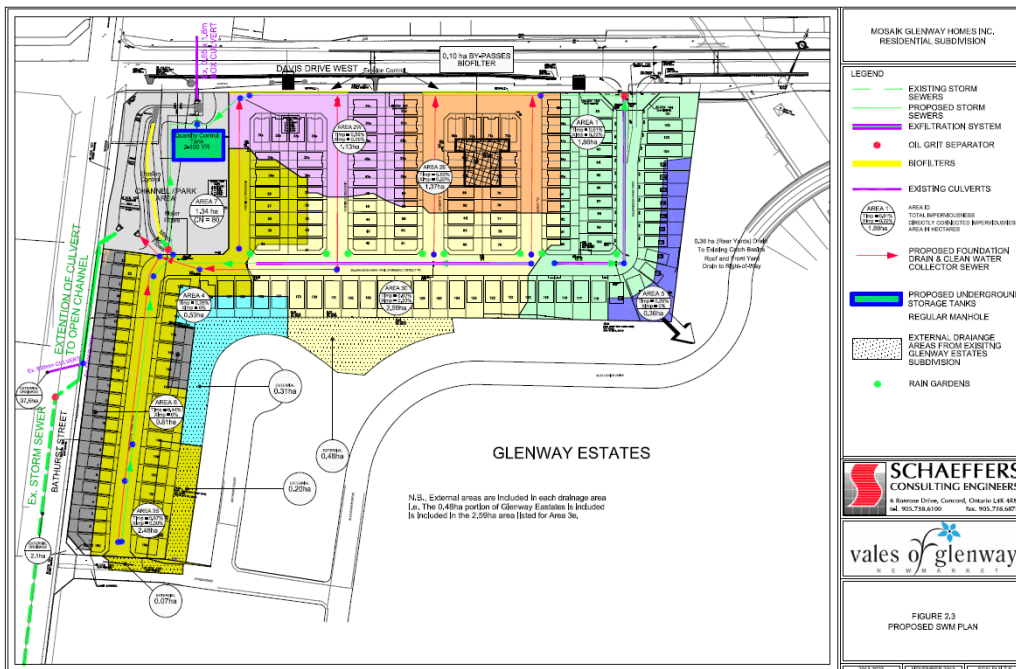
**Figure 5: Exfiltration System**



Source: Sustainable Technologies Evaluation Program 2013  
<http://www.sustainabletechnologies.ca/wp/wp-content/uploads/2013/02/Perforated-Pipe-Systems.pdf>

Figure 6 provides a site-wide schematic of the LID features and conventional stormwater management elements to be incorporated into the development.

**Figure 6: Site Features**



## Project Results

The Mosaik Home development application is pending engineering approval and clearance. Many insights have been garnered into the current municipal approval process; the potential of expedited approvals as a market-based incentive for green building in Ontario; what constitutes “green building” and the expectations, roles and perspectives of all players in development review and approvals.

### Overview of what worked well

1. Establishing performance targets: By establishing performance targets, the builder/developer has the freedom to choose the design, technology, approaches and equipment they prefer to meet the targets. The onus is placed on the builder/developer to provide sufficient verification that their selected design features will meet all performance targets. This approach is less prescriptive than requiring specific measures with assigned point scores as is common with municipal sustainable building programs or third party green building initiatives. This market-based approach also reduces the administrative and know-how

burden on municipal staff to prescribe and evaluate a wide range of measures. The onus is placed in the marketplace.

2. The integrated design process: All key review agency staff and project consultants come to the table to review and discuss options for meeting performance targets and to identify potential hurdles or issues at the outset of the project. This not only accelerates the process, but provides for greater co-operation and innovation.
3. ISDA Committee: A committee of key review agency core staff and consultants meeting on a bi-monthly basis throughout the project (up to first engineering submission) kept the project moving through the process, ensuring any issues or concerns were addressed expeditiously. Having all core decision-making parties at the table enabled quick resolution of problems and avoided the typical “back and forth” that occurs between agency reviews in the current municipal review and approval processes.

## Overview of challenges

1. Review and approval process (post first engineering submission): Once the Mosaik Home application reached engineering approvals, the review and approval process that had initially moved along expeditiously and effectively, slowed significantly. A degree of inertia entered the process following engineering submission that may be attributable in part to the end of the regular bi-monthly meetings of the ISDA committee. At this point in the process, the Town of Newmarket and its engineering consultant, the developer and consultants entered into the standard back-and-forth process of multiple engineering submissions and reviews. Multiple iterations of the engineering design unfolded as a result of the limited exposure of Newmarket’s review and approval staff and consultants to the non-conventional LID techniques in the submitted site design. This speaks to the problem posed by lack of experience of review and approval agency staff and/or their consultants with non-traditional approaches as discussed in the second bullet below, and the need for provincial guidance, support and resources for green building and innovative development.
2. Perception of “unproven” or “innovative” approaches: Although there are sufficient in-field studies proving the efficacy of non-conventional technology and approaches, such as exfiltration system and engineered wetlands, there is a perception within some engineers that these approaches are un-proven and therefore, represent an unacceptable level of risk. This can be seen in some engineering and planning departments, as well as in consulting companies providing expert advice to municipal review and approval staff.

3. The lack of dedicated review and approval agency personnel with specific expertise in green building: The demand on human resources within review agency departments is significant and despite the expertise of staff within these agencies, overall they have limited knowledge and experience with many of the green development technologies, equipment and approaches, leading to an understandable resistance towards them.
4. Voluntary targets: There was a significant opportunity for project partners to “reconsider” their original commitment to the site design and features and to opt to take a more conventional approach. Many of the more innovative elements originally included in the site design and homes have been excluded, such as the site-wide use of rain gardens on home properties and on the municipal right-of-way, more extensive use of bioswales, the use of permeable hardscapes, and the use of drought-tolerant grass seed in place of sod. The voluntary approach was selected as this was a pilot project, site-specific conditions were not yet known and there was limited experience within some review agencies and their consultants with LID technologies and practices.
5. Lack of provincial policy, guidance and regulatory support for green building: The policy and regulatory environment in Ontario is not conducive to innovation or, for that matter, building beyond the minimum Ontario Building Code requirements. Current regulations contribute to a more adversarial or challenging municipal review and approval process and create unintentional barriers for beyond OBC green development projects.

## **Considerations**

A review of leading jurisdictions in green building and integrated water management identified key drivers for green building, including the following:

- Visionary leadership is the common element within all top performing green building jurisdictions in North America and indeed, the world over - the commitment to green building starts at the top and is fostered throughout the organizations
- Investment in personnel, training and skills development, and access to external experts is a consistent theme among leading jurisdictions in green building
- In the United States, State-level support - financial, policy and regulatory, and guidance – provides a foundation and in some cases, impetus for the green building initiatives in leading local jurisdictions

- Innovation is encouraged and associated risks are evaluated and managed. Resources are brought to bear, for expert evaluation, testing and monitoring. Innovation committee, comprised of experts representing a broad range of fields with access to external expertise, is utilized by several of the leading jurisdictions.
- Fast tracking of municipal review and approvals is the most effective non-regulatory mechanism for driving beyond jurisdictional requirement building. A review of leading jurisdictions in both green building and integrated water management in North America indicates that nine out of the top 12 (New York City represents two as it is divided into downtown and mid-town), provide an expedited review and approval process for green buildings<sup>4</sup>. More than 45 jurisdictions in the US offer fast track or priority review and approval for green buildings. In Canada, only Ottawa has established a formalized fast track process for green buildings. It is worth noting that San Francisco was the first city in the US to establish an expedited approval process for green building and is considered the leading jurisdiction in North America, as well as the top city in the world for green building policy by the World Green Building Council. San Francisco was also the first jurisdiction to establish specific, site-based water conservation and LID requirements for all buildings.<sup>5</sup>

## **Recommendations**

With the goal of encouraging innovation in water management approaches and technologies among builders/developers and, in turn, spurring innovation in the Ontario marketplace, the following recommendations are the result of the ISDA pilot project:

1. Municipal incentives for green building have potential but they require top down commitment to green building, which is fostered and supported by provincial guidance and regulations, to drive innovation (or even progressive approaches) in the new building sector and the larger supplier marketplace.
2. There should be consequences for builders/developers for non-compliance with performance targets and/or specific green building measures. Leading jurisdictions in green building and water conservation, such as Chicago and San Francisco, require modeled performance targets to be met and/or specific measures to be included in the final application prior to approval. Post construction inspections of green buildings in these jurisdictions must verify the equipment, materials and appliances in place as approved or the builder/developer forfeits their deposit. In

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<sup>4</sup> Cushmans and Wakefield's Green Building Opportunities Index

<sup>5</sup> San Francisco's Mayor's Energy Task Force Recommendation Report (2011)

conjunction, many of the leading jurisdictions are now requiring energy benchmarking and annual reporting to ensure energy performance is met.

3. Municipal guidance and training on innovative (and proven, non-conventional) technologies and approaches for water management in new construction would foster greater acceptance among municipal review and approval staff and supporting consulting personnel.

## **Summary**

Growth in York Region is projected to increase by 800,000 people over the current level of approximately 1.1 million in the next 40 years. Green building represents a significant opportunity to drive economic prosperity through the development of markets for green building products and services (water, energy, transportation, etc.), lower the burden on Regional and local municipal infrastructure and resources and create vigorous and more sustainable neighbourhoods. Green building demands the use of new technologies and approaches and drives innovation, which in turn creates opportunities within the manufacturing and service sectors and the post-secondary institutions which supply the workforce. Achieving green development may challenge current thinking and resources, but the opportunities it represents are undeniable and substantial.