

Low Impact Development Series

Kleinburg Starbucks Fusion Garden Retrofit

In September 2015, The Regional Municipality of York debuted it's first Fusion Gardening® demonstration garden during the Binder Twine Festival in the historic Village of Kleinburg. Located on the main street, the site is highly visible in the community at the village's largest franchise – Starbucks. Fusion gardens are eco-friendly, using a mix of native and ornamental plants and water-retaining features. They are not only water efficient but also allow for stormwater to be managed effectively on site. As a result the gardens require little to no supplemental irrigation in a typical year.

York Region began the Fusion Gardening® program as part of it's Long Term Water Conservation Strategy, which encourages all residents and businesses to conserve water. York Region is the third largest municipality in Ontario, and continues to grow at a rapid pace, placing significant pressure on water resources. To meet the current and future water supply needs, implementing water conserving practices must be a priority. Peak water demands typically occur due to excessive landscape irrigation during periods of hot and dry weather. To reduce these demands, York Region has moved towards a market-based approach as part of it's Outdoor Peak Demand Reduction Strategy. This approach is at the core of Fusion Gardening®; it uses joint ventures with key community organizations and relevant service providers to cost effectively influence the water use of end users. A large concern is not only reducing the amount of water consumed, but matching the quality of water to the intended use, i.e. discouraging the use of potable, treated water to irrigate lawns and gardens.

Kleinburg, in the City of Vaughan, was chosen for this pilot because of its recorded high peak water use. The City of Vaughan already restricts outdoor water use from May to September each year. It is hoped that in addition to a targeted marketing campaign, demonstration gardens like this will inspire residents to adopt Fusion Gardening® practices on their own properties.

York Region's new Fusion Landscape Professional Certification Program aims to make Fusion landscapes an industry standard by training and certifying landscape designers and installers on this innovative, water efficient approach to landscaping.



Commercial land Featured practices:

- Fusion garden
- Rain garden
- Permeable pavement

Groups involved:

- Regional Municipality of York
- Piques and Valleys
- Kleinburg Business Improvement Association

Other notables for garden retrofit:

- Budget: \$40,000
- Construction: August 2015

STUDY SITE

The Fusion Gardening® demonstration site is located on the west and south sides of the Starbucks property in the centre of Kleinburg. York Region approached the Kleinburg Business Improvement Association (KBIA) for possible locations for a demonstration garden, and Starbucks was selected as it is one of the most frequently visited businesses in the community and is located in a highly visible area. The owners were happy to take part in the pilot project as the existing gardens were in need of an upgrade. The Fusion Gardening® concept allows for a beautiful tailored aesthetic for the owner, while also serving as a more absorbent landscape that reduces stormwater runoff and conserves water. The garden uses an infiltration trench for irrigating the planting bed and permeable pavement on the pedestrian paths and seating area.

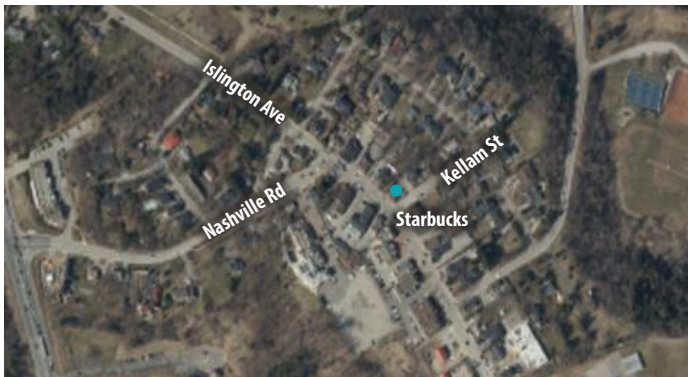


Figure 1. Study site location

Project Objectives

York Region initiated the Fusion Gardening® program to:

- showcase that eco-friendly gardens can be beautiful and reduce irrigation demands;
- demonstrate that these types of landscapes can increase on-site infiltration of stormwater, thereby reducing runoff;
- improve the streetscape and neighbourhood appeal; and
- transform the market.

PLANNING AND REGULATIONS

York Region has identified water conservation as being integral to their Strategic Plan which supports community health and well-being, as well as managing environmentally sustainable growth. Water conservation efforts have been implemented by York Region since 1998 through the “Water for Tomorrow” program, a Long Term Water Conservation Strategy, which identifies new approaches to water efficiency and conservation.

One such approach is the Fusion Gardening® program, which involves the community, area garden centres, local landscape designers, and contractors in a multi-year initiative to reduce peak water use. The aim of the pilot program is to increase adoption of water efficient and sustainable landscapes. The KBIA was happy to partner with York Region for the Fusion Gardening® Program as it would help with their goal of improving the streetscape in the village. Through the program, the Region hopes to showcase the beauty of eco-friendly

gardening through demonstration sites. The garden has been well received by stakeholders and the community. The business owners were happy with the garden refresh, and were especially pleased the design allowed for the use of rainwater for irrigation and kept stormwater on site with the rain garden and permeable pavers.

DESIGN

Fusion Gardens are water efficient and can incorporate Low Impact Development (LID) practices such as rain gardens, bioretention swales, increased vegetative cover (including tree canopy), dry river beds, and soakaway pits. With proper design, this type of garden requires little to no supplemental irrigation once established. The LID features also work to reduce stormwater runoff and contaminant loads to receiving water bodies, help mitigate flood risk, and enhance vegetative cover.

For specific information on the design of individual LID practices please refer to the *LID Stormwater Management Planning and Design Guide* (TRCA and CVC, 2010) and the *Greening Your Grounds Guide for Homeowners* (TRCA, 2013).



Figure 2. Roof runoff enters the system via rain chains to a small catchbasin

Rain garden

The Fusion Garden at the Kleinburg Starbucks was designed by Piques and Valleys in partnership with the York Region in August 2015. The final design directs water from the roof to two separate areas, the northwest and south sides of the building. The eavestroughs are sloped to direct more water to the larger garden on the south west side of the building. The roof runoff enters the system via rain chains that are above small catchbasins which are connected to a perforated pipe. The perforated pipe is wrapped in geotextile and embedded in a gravel-filled trench that temporarily stores water until it infiltrates into the ground. With this design, potable water use for irrigation is reduced since the roof water is available to irrigate the above ground plants via upward capillary movement through the soil. The infiltration trench is covered with river stone cobbles, and the plants are a mixture of native and other ornamental plants (non-harmful invasives) that are quite hardy and require minimal attention.



Figure 3. Roof runoff catchbasin

Permeable pavement

Interlocking permeable pavement pathways were installed to give customers defined pathways into and out of the Starbucks. These pathways also provide another opportunity for rainwater to infiltrate into the ground instead of becoming runoff.



Figure 4. Permeable pavement (image courtesy of Piques and Valleys)

CONSTRUCTION AND COMMISSIONING

Piques and Valleys not only designed the garden but constructed it in August 2015. They were working on a strict timeline as the demonstration garden was scheduled to be promoted at the Binder Twine Festival on Saturday September

12th. All materials were pre-delivered to ensure construction could proceed quickly and smoothly once they began. The site presented a bit of a challenge as they had to deal with existing structures including two mature trees that have extensive root systems, however the project was well staffed and the garden was completed in one week without any issues. The plants were only watered for approximately four to six weeks as they became established, and irrigation was not continued thereafter. The first full summer following the planting of the garden provided an excellent test of plant hardiness because it was very hot and dry. Though some plants showed signs of stress, only 5 percent of the total plants were lost. More plants had to be replaced due to customers walking through the gardens instead of using the defined pathways than from the lack of additional irrigation. Monitoring of the site indicated that in its first full growing season, all stormwater was managed on site.



Figure 5. Rain garden - signs of heat stress during summer

OPERATION AND MAINTENANCE

Proper maintenance of LID practices is crucial for optimizing performance, cost effectiveness, and aesthetics, especially during the initial establishment of vegetation. It may be necessary to follow-up with the contractor to ensure the activities specified within the maintenance agreement are taking place.

For specific information on individual LID practices please refer to the *LID Stormwater Management Practice Inspection and Maintenance Guide* (TRCA, 2016).

If properly designed, Fusion Gardens do not require more maintenance than a typical garden, and in fact generally require less irrigation. With proper plant selection and appropriately sized rain water collection catchments, Fusion Gardens can thrive with only the water provided from rain events. One maintenance challenge at the site was pedestrian traffic damaging the garden, resulting in the need to replace several plants.

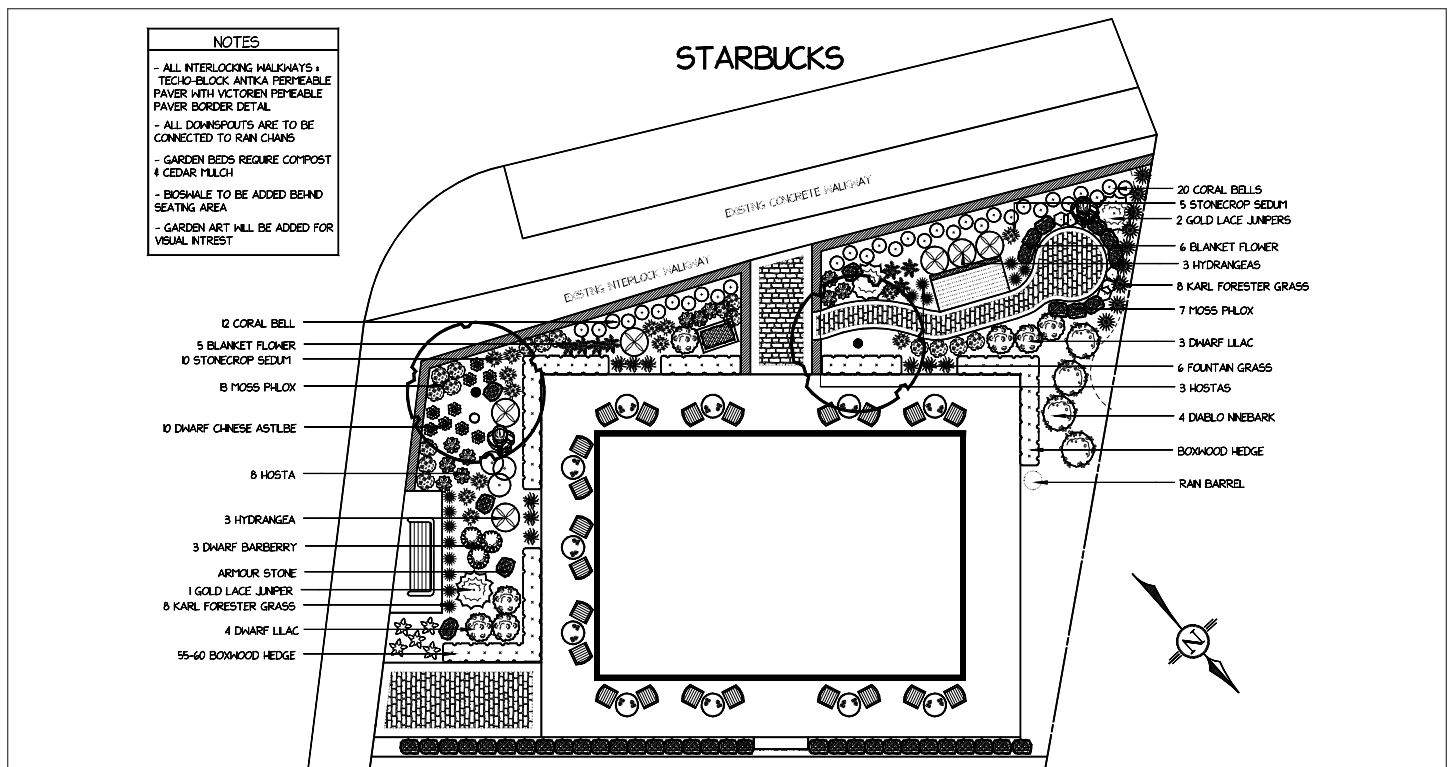


Figure 6. Planting design (image courtesy of Piques and Valleys)

ACHIEVEMENTS

Aesthetic value. The Fusion Garden provides a fresh look with bright colours, interesting textures and innovative water features.

Stormwater management benefits. Incorporation of a Fusion Garden results in more sustainable stormwater management by managing the stormwater on site.

Joint partnership. All partners worked together to ensure the success of this project.

Innovative project. The Kleinburg Starbucks Fusion Garden is the first one York Region has established as part of the Fusion Gardening® pilot project.

LESSONS LEARNED

- Monitor the maintenance of the garden more regularly to ensure York Region standards are being met. Due to the hot and dry summer, some of the plants were visibly stressed, which negatively impacted the gardens aesthetics.
- Selecting a location that has less foot traffic could be more suitable for this kind of demonstration to avoid plant damage, provided that the site is still visible enough that people could still enjoy the views of the garden.
- The establishment period for the Fusion plants was longer than expected. A more realistic time frame for establishment is one to two years.
- After completing the stormwater monitoring study, it was identified that some elements (i.e. shrubs) should be relocated to take full advantage of the stormwater runoff design. It was also determined that stormwater should be directed closer to the surface to improve moisture availability.

REFERENCES

- Credit Valley Conservation and Toronto and Region Conservation (CVC & TRCA). (2010). *Low Impact Development Stormwater Management Planning and Design Guide (Version 1.0)*. Toronto, Ontario.
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