

GUELPH WATER CONSERVATION PROGRAMMING

SECTOR	DEPARTMENT	ADAPTATION TYPE	DRIVER	FUNDING SOURCE
<ul style="list-style-type: none"> <input type="radio"/> Food <input type="radio"/> Health <input type="radio"/> Infrastructure <input type="radio"/> Natural Systems <input type="radio"/> Planning <input checked="" type="radio"/> Water Conservation 	<ul style="list-style-type: none"> <input type="radio"/> Communications <input checked="" type="radio"/> Environment <input type="radio"/> Finance/Purchasing <input checked="" type="radio"/> Infrastructure <input type="radio"/> Parks & Rec <input checked="" type="radio"/> Planning <input type="radio"/> Public Health <input checked="" type="radio"/> Water/Stormwater 	<ul style="list-style-type: none"> <input type="radio"/> Decision Support Tools <input type="radio"/> Delivery of Adaptation Options <input type="radio"/> Plans + Policies <input checked="" type="radio"/> Programs + Initiatives 	<ul style="list-style-type: none"> <input checked="" type="radio"/> Anticipatory <input type="radio"/> Reactive 	<ul style="list-style-type: none"> <input type="radio"/> Federal <input checked="" type="radio"/> Municipal <input checked="" type="radio"/> Other <input type="radio"/> Private <input checked="" type="radio"/> Provincial

PROFILE *The City of Guelph has established an extensive suite of adaptive water conservation programs, incentives and regulations to prevent municipal water shortages. Though water use within the municipality has historically been sustainable, City Planners and decision makers are aware that water availability will continually be at risk under increasing demand associated with a growing population and economy. Changing climate conditions will put additional strain on the system, exacerbating the issue.*

While the project was not designed as a climate change adaptation measure, it does help the City build resilience to a changing climate by managing competing demands for water and ensuring a secure, sustainable source of water for Guelph. To provide an overarching framework for the project, Guelph developed a Water Supply Master Plan. This document provides a strategy for municipal water conservation efforts to ensure that Guelph can adapt to meet existing and future water demands. Most importantly, the strategy commits the City to achieving a 20% reduction from 2006 average daily water consumption by 2025. Building on the WSMP, the 2009 Water Conservation and Efficiency Strategy Update, recommends a proactive suite of conservation projects needed to accomplish this task.

GEOGRAPHIC CONTEXT The City of Guelph (population 120,000) is located in Southeastern Ontario roughly 90km northwest of the City of Toronto. By 2030, Guelph is projected to grow to approximately 176,000.

Not being located on or near a significant body of surface water, Guelph relies on local finite groundwater sources for its water needs including, residential, industrial, institutional and municipal use. The municipality’s water source consists of 18 urban supply wells, as well as water from the Arkell Spring Grounds (located outside of the City’s urban boundary). This groundwater source leaves the City vulnerable to drought. Guelph’s reliance on ground water and its growing population contribute to the City’s vulnerability to water shortages.

CLIMATE CHANGE CONTEXT Within the last 15 years, Guelph has experienced steadily increasing temperatures and periods of drought. Though short-term reductions in pre-

cipitation and heat events do not generally have any impact on groundwater levels, they can negatively impact the quality and quantity of available water, when prolonged. Between 1997 and 2003, Guelph experienced drought conditions. Since then, the City has also experienced dry years in 2007 and 2011, demonstrating an ongoing threat to municipal water sources.

Under a rapid growth emissions scenario that reflects current trends (A1B)¹, Guelph’s annual average temperature is expected to increase by about 2.7°C by the 2050’s. Under the same scenario, annual average precipitation is expected to increase by 42.7mm by the 2050’s, though the majority of the increase will be observed in winter and spring, with a

¹ The A1B scenario assume rapid population growth and reliance on a variety of energy sources thus producing a medium level of greenhouse gas emissions.

small decrease expected during the summer months. These projections correspond with the weather trends that Guelph has experienced over the last 15 years.

ISSUE Though Guelph has historically had ample water available, the fact that they are totally reliant on a limited supply of ground water has been an ongoing concern. In 1990, the City initiated a multi-phase Water Supply Study to analyze the water system and determine its current and future capacity. The study, completed in 1991, identified four focus areas for the City, including:

- Water conservation
- Water supply/distribution expansion
- Water resource evaluation
- Water resource protection

Setting the stage for a concerted municipal effort, Guelph launched a series of studies and environmental assessments. The studies helped municipal staff to establish a basic understanding of their current water use, supply and capacity, prompting staff to focus on water conservation and supply expansion.

In 1998, following public and stakeholder consultations, City staff developed a comprehensive Water Conservation and Efficiency Plan. The Plan, the City's first attempt at a cohesive water management strategy, recommended several water conservation programs and tools to be implemented over subsequent years. The Water Conservation and Efficiency Plan was never approved by Council and received only \$250,000 per year to plan and execute water conservation programs. Despite these limitations, several successful programs were initiated under the Plan, including:

- *Outside Water Use Program (2001)*: A ban on outside water use during peak summer hours. This program faced initial resistance from the public, but has since been accepted as an important water saving measure.
- *Royal Flush Toilet Rebate (2003)*: Since it was established in 2003, the City's toilet replacement rebate program has processed 12,778 rebates. In 2011 alone, it encouraged 2500 multi-residential homes and 1100 single-family homes to convert to a low-flow appliance.

Early planning and program efforts by the City filled knowledge gaps and expanded existing programs to capitalize on early success. Existing and future climate conditions, well interference and water quality degradation were highlighted as factors that could reduce the water yield from the system. Moreover, rising population levels and continuing develop-

ment represented exacerbating issues that Guelph needed to consider in their planning.

Recognizing these additional challenges, the City of Guelph developed the Water Supply Master Plan (WSMP) in 2006 to establish a sustainable water supply that would continue to serve the City's growing needs. As a first step toward this overall goal, the WSMP clearly states Guelph's commitment to reduce total water usage by 20% before 2025. Following this, the WSMP outlines a strategy to reach the goal, based on several key tools:

- Public education and awareness
- Water audit programs
- Rebate programs to encourage water conservation
- Regulations, including by-laws

Since 2006, the City of Guelph has initiated several programs recommended in the WSMP that complement existing conservation and efficiency activities. These programs have achieved measurable success resulting in an 11% reduction of overall water-use between 2006 and 2011 alone.

Among the more successful programs are:

- *Residential Water Conservation Programs*: The City's Grey-water Re-use, Home Humidifier and Smart Wash washing machine rebate were very successful. In 2011 alone, the programs were responsible for saving approximately 460m³ of water per day.
- *Leak Detection Pilot Program*: Assessing over 250km of municipal water mains, this program repaired 11 leaks, conserving 1300m³ of water capacity daily.
- *Industrial, Commercial and Institutional Efficiency Audits and Incentives to reduce water demand*: In total, these efforts have reduced water use by approximately 700m³ per day.
- *Civic Facility Water Efficiency Retrofits*: To lead by example, the City of Guelph is retrofitting municipally owned facilities including the Guelph Transit Bus Wash, civic arenas and improvements to irrigation systems at City run sports fields to reduce the amount of water required for operation.

In addition to these savings, water conservation programs result in further savings of \$250,000 annually in chemicals and electricity that the City would have spent on water treatment. They have also been able to delay the \$19 million expenditure required to expand the City's water and wastewater systems by reducing volumetric loading at the plant and preserving this previously utilized capacity for new growth.

Since the 1990s Guelph's water conservation programming has ensured a secure source of water for the City, produced significant economic savings for both the public and municipality, and protected Guelph from climate related water shortages.

PROCESS After the limited success of the Water Conservation and Efficiency Plan, the City developed the WSMP as a detailed blueprint for the municipal water system. In 2006, the WSMP was endorsed by Council and City staff began to implement the extensive strategy. To ensure co-operation for the water conservation measures from the public, stakeholders and key municipal departments, staff initiated an Advisory Committee made up of representatives from local businesses, residents, NGO's, universities, community groups, developers and the Grand River Conservation Authority. Meeting monthly, this group reviewed the draft plans during the development of the Water Conservation and Efficiency Strategy Update in 2009. Since then, this group has been formalized as the City's Water Conservation and Efficiency Public Advisory Committee with staff continuing to consult this Committee on conservation programming. Because public engagement is critical to the success of wa-

ter conservation programs, the City of Guelph has continued to focus significant time and resources fostering it, including:

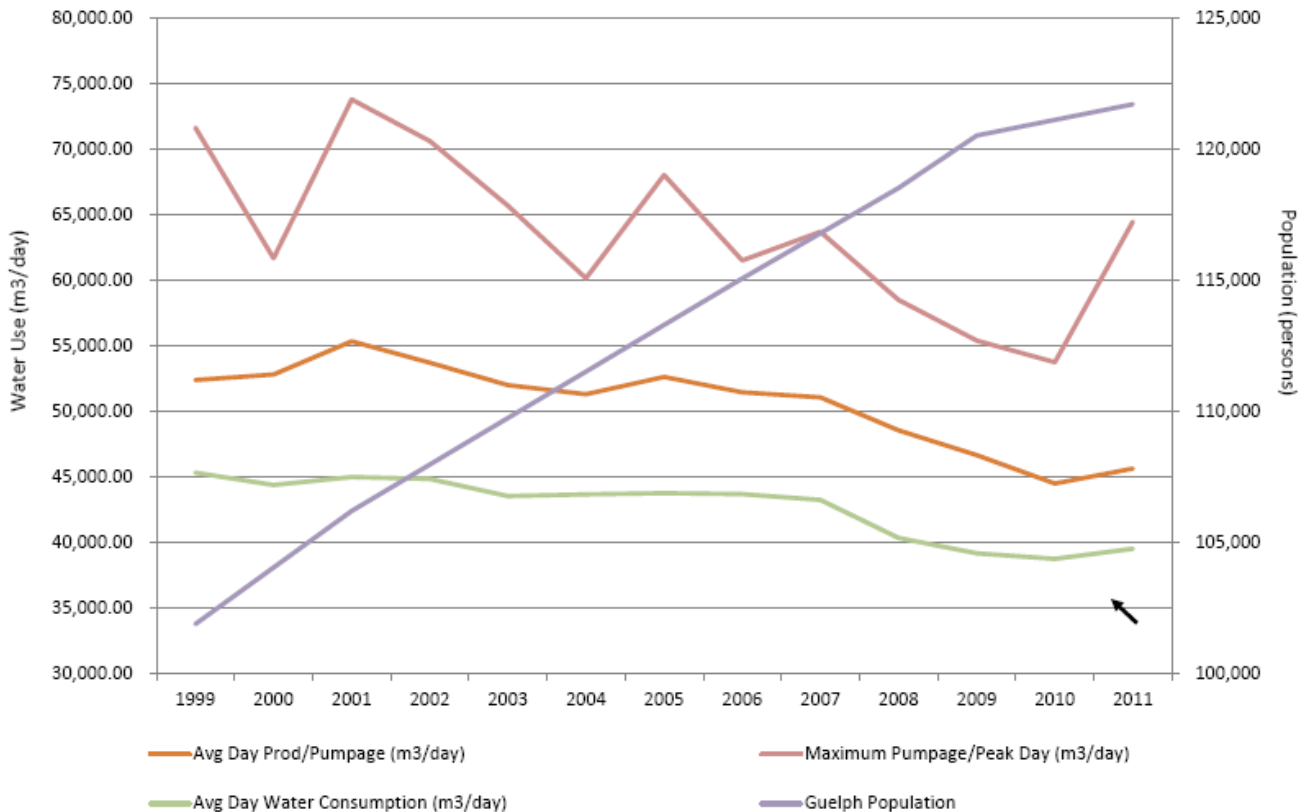
- Establishment of information centres focused on water conservation
- Release of the WSMP for public comment
- Creation and maintenance of the Advisory Committee

FINANCING The City's Water Conservation Program, as approved by Council through the 2009 Water Conservation and Efficiency Strategy Update, has a total annual budget of \$1.8 million that is funded by water and wastewater user rates.

An additional \$300,000 is obtained annually from charges on new development within Guelph. A portion of the total development costs is committed to water conservation programming, especially with regard to rebates on inefficient toilets and washing machines.

Finally, the City of Guelph has received significant external funding from the Federation of Canadian Municipalities (FCM) and the Government of Ontario. In 2009, FCM con-

Guelph Water Production vs. Water Consumption vs. Population



tributed \$70,000 to the field test for the Greywater Re-Use Program. The City has also attained \$89,000, from Ontario's Showcasing Water Innovation Program, towards the integration of water reuse and rainwater harvesting at the City's transit bus-washing operations, and \$920,000 towards a reducing energy demands and water loss associated with the production and transmission of potable water.

CHALLENGES The City of Guelph has encountered a number of challenges in the implementation of its water conservation programming including:

Public Perception Water conservation relies on actions by the public and industry and can be subject to conservation fatigue in desired audiences. Under these circumstances, it is difficult to ensure engagement of public and industry on an issue that the public may not always greatly understand.

Leading the Way Many of the programs and regulations that Guelph initiated were the first of their kind in Canada and North America. This meant that the City researched new technologies and developed new standards with little external support and was unable to benefit from lessons learned from others experiences.



Water Supply Master Plan strategies

LESSONS LEARNED *There were several important lessons learned by the City of Guelph throughout this process. These include:*

- Since public participation is essential to the success of a program of this nature, **public consultation must take place early in the process.** Sharing details about program direction, implementation and impact on individuals can help engage both residents and industry.
- **Planning is critical to the success of the program.** With continually changing demand for water, the development of the WSMP allowed the City to weigh different growth scenarios and determine the best strategy to address them.
- **Opinions can change.** When the Outside Water Use By-law was introduced, there was significant public resistance. Since then, the social norm has changed and the by-law has become a successful water conservation tool.
- **Base programs on good data.** The development of the WSMP helped Guelph develop a solid base of data regarding water availability and use. This process allowed Guelph to create forward looking programs that will reduce water consumption over the long-term.

IMAGES All images courtesy City of Guelph

SOURCES

Statistics Canada. 2012. Guelph, Ontario (Code 3523008) and Wellington, Ontario (Code 3523) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released February 8, 2012.(Accessed April 2, 2012).
 City of Guelph. (2005) Newsletter: Water Supply Master Plan. Accessed April 2, 2012
 Guelph Water Conservation and Efficiency Strategy Update (2009)
 Guelph Growth Management Strategy
 Water Supply Master Plan
 Water Supply Master Plan Fact Sheet



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