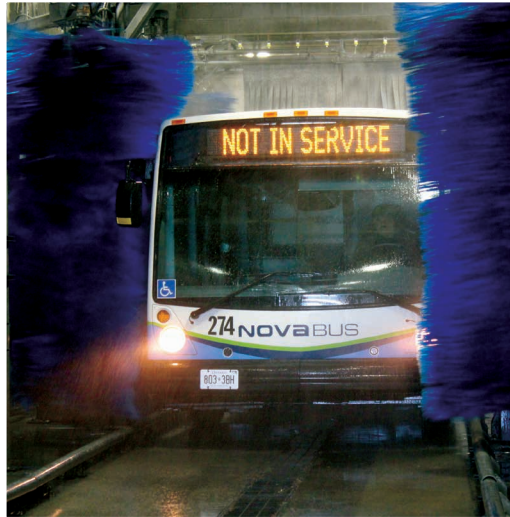


CITY OF GUELPH

2016 WATER EFFICIENCY STRATEGY UPDATE Summary

September 2016

Alternate formats are available as per the Accessibility for Ontarians with Disabilities Act by contacting Water Services at 519-822-1260 extension 5627.



This report was prepared for the City of Guelph by the following team:



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1

GUELPH: A LEADER IN WATER EFFICIENCY

Water is important to Guelph. We are one of the largest communities in Canada that depends on groundwater for our water supply. Protecting this water resource by using and wasting less water makes sense – for us, for the environment, and for the future.

Since 1998, Guelph has been running a wide range of programs to conserve water. We are recognized as a water conservation leader because of the success our programs have in reducing the water we use. But our work is not done. Being even more water wise means we are protecting the environment, saving money, and extending the life of our water infrastructure.

The Water Efficiency Strategy Update is a toolbox of programs to help each of us in Guelph use and waste less water. Through these programs, we can all play a role in water conservation and help protect our water resources for the future.

Why We Need an Updated Water Efficiency Strategy

Much has happened in the six years since our last Water Efficiency Strategy, making it important to update our plan:

- We have new water use targets from the Council-approved 2014 Water Supply Master Plan;
- Guelph's population is expected to grow 43 per cent between 2013 and 2038, bringing new people and businesses with water needs;
- Some of Guelph's current water programs have done all that they can do, and need to be retired or adapted; and
- There are new technologies for water efficiency that we can adopt or explore.

Guelph's Water Conservation Achievements

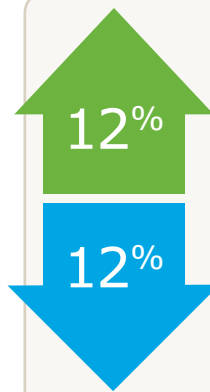
Average amount of water used each day:



by residents of Guelph



by residents of Ontario



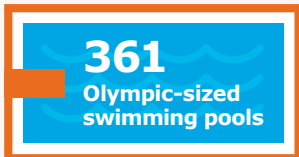
Amount Guelph's **population increased** between 2006 and 2014

Amount Guelph's **water production decreased** between 2006 and 2014

Amount of water saved...

... from leak finding programs between 2011 and 2015

Equivalent to:



... each year through rebate programs

Equivalent to:



... with the ICI Capacity Buyback program between 2006 and 2012

Equivalent to:



It takes **2.5 million litres** or **2,500 m³** of water to fill one Olympic-sized swimming pool.

Money saved...

The City of Guelph spent **\$10.2 million** on water conservation programs (2006-2015)



\$40.6 million

City of Guelph's **savings on** water and wastewater infrastructure because of water conservation (2006-2015)

\$534,000

Money the City of Guelph **saved each year** in operating our water system because of water conservation (2006-2015)

Guelph's Outside Water Use Program

The City's Outside Water Use Program is a successful and recognized water conservation program, both in Ontario and beyond, thanks to the support of Guelph residents. Recent studies show that 97 per cent of residents follow the three water use levels:

- 0 Blue**
(careful use)
- 1 Yellow**
(reduce outdoor use)
- 2 Red**
(reduce and stop non-essential use)

The program is designed to reduce high water use days. People tend to use more water on hot, dry summer days which puts a strain on Guelph's water system. To help during dry periods, the City asks residents to use less water outside and use all water wisely.

What the Strategy Will Do

The tools and programs in our updated Water Efficiency Strategy are designed to:

- Reduce the amount of water used each day in Guelph to meet the target set out in the 2014 Water Supply Master Plan;
- Delay the need for costly new source water and wastewater treatment infrastructure as long as possible, which keeps water rates low;
- Help sustain our local groundwater resources; and
- Engage all Guelph community members in understanding and acting on their role in conserving our water.

Continuing to Lead

Guelph is known as a water conservation leader because we deliver cost-effective programs that maximize our water savings for the amount we spend. In 2015, the amount of money put into water conservation programming was one quarter the amount of money saved from these programs.

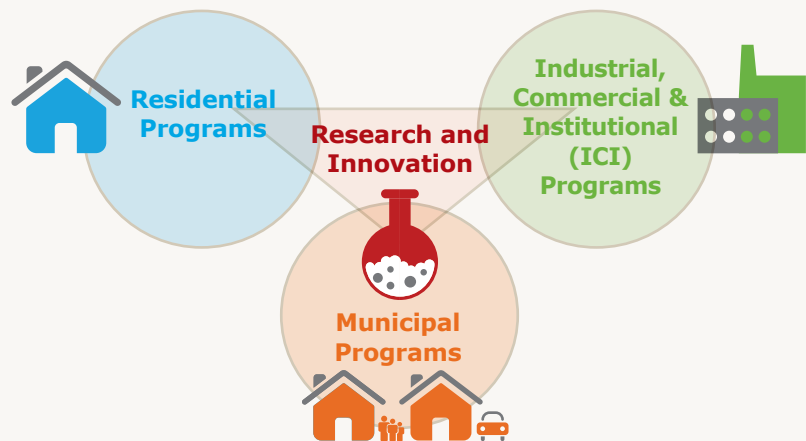
That is why our Strategy recommends continuing many of these successful programs, with a few adjustments to make them even better. The Strategy also recommends investing more on research and innovation to evaluate new water efficient technologies and the potential these technologies have to save us even more water and money in the future. The City of Guelph worked closely with the community to ensure the Strategy reflects their priorities including: reducing water use as part of new growth, piloting new technologies and ensuring new technology is proven and easy to implement, reducing water use in existing buildings, stimulating the Guelph economy, and minimizing costs to the City.

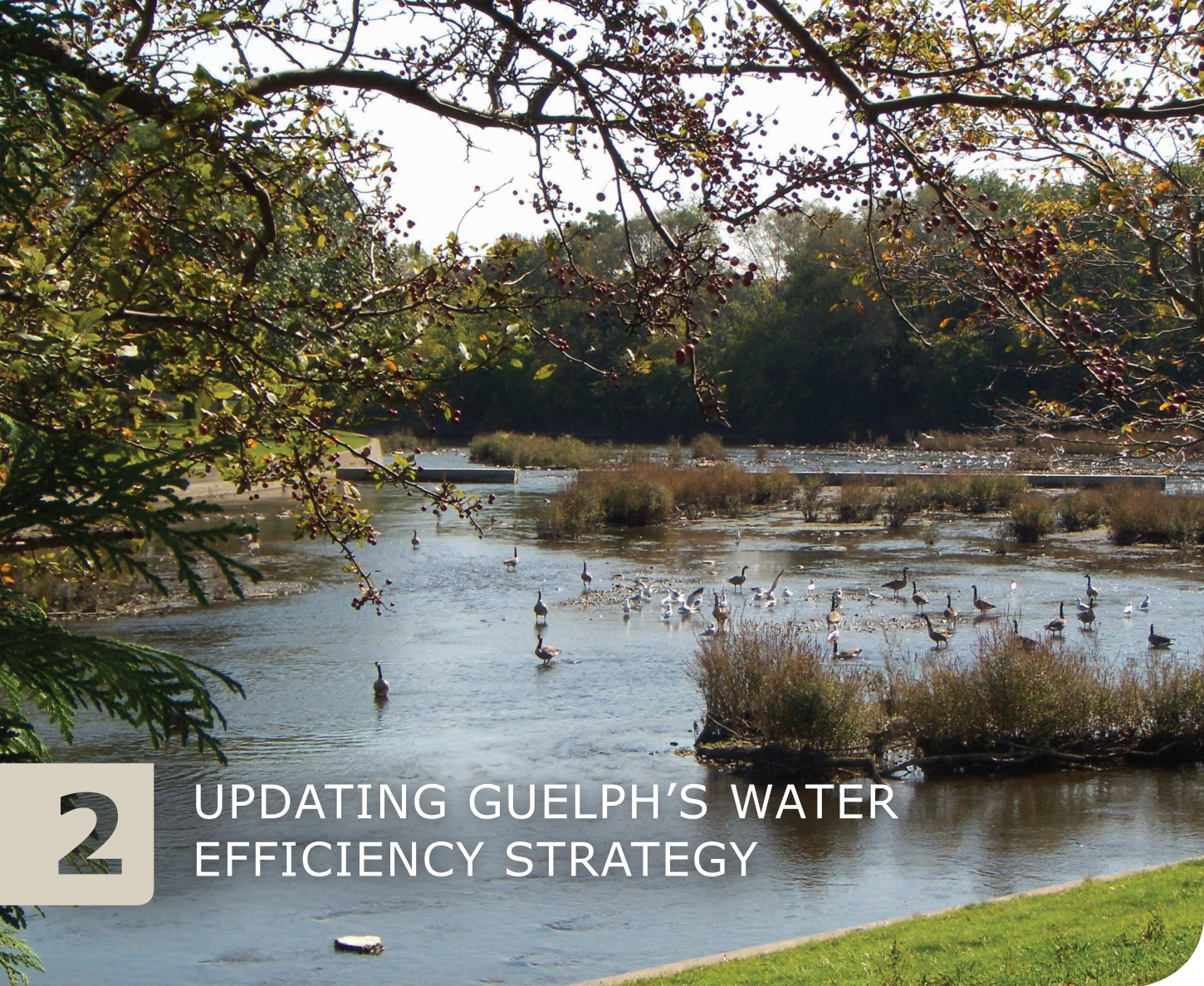
About Our New Strategy

This report describes how our updated Strategy was developed (Section 2), and the recommended water conservation programs in four categories (Section 3).

The report finishes with a look at how water conservation and our updated Strategy benefits community members, the City, and the environment (Section 4), and a description of how the Strategy will be put into action (Section 5).

4 CATEGORIES OF WATER CONSERVATION PROGRAMS





2

UPDATING GUELPH'S WATER EFFICIENCY STRATEGY

Collecting Information

The Water Efficiency Strategy was updated in three phases from 2015 to 2016 (see figure on Page 5). Throughout each phase, ideas and suggestions from residents, a Community Liaison Committee (CLC), businesses, industries, institutions, and City staff were collected and used to create a long list of 80 potential programs. The three activities in the boxes below were instrumental to collecting the information needed to develop the Strategy.

Background Research

- Analysis of past and current water use
- Success of existing programs
- Best practices in using and wasting less water
- Market research with residents
- Interviews with local businesses, industries, and institutions

Meetings

- Five meetings with the Community Liaison Committee
- Regular meetings with Guelph staff and stakeholders
- City Council

Community Conversations/Engagement

- Two community Open Houses
- Online feedback through MindMixer
- Conversations at local public events and locations
- Public review of the Draft Strategy

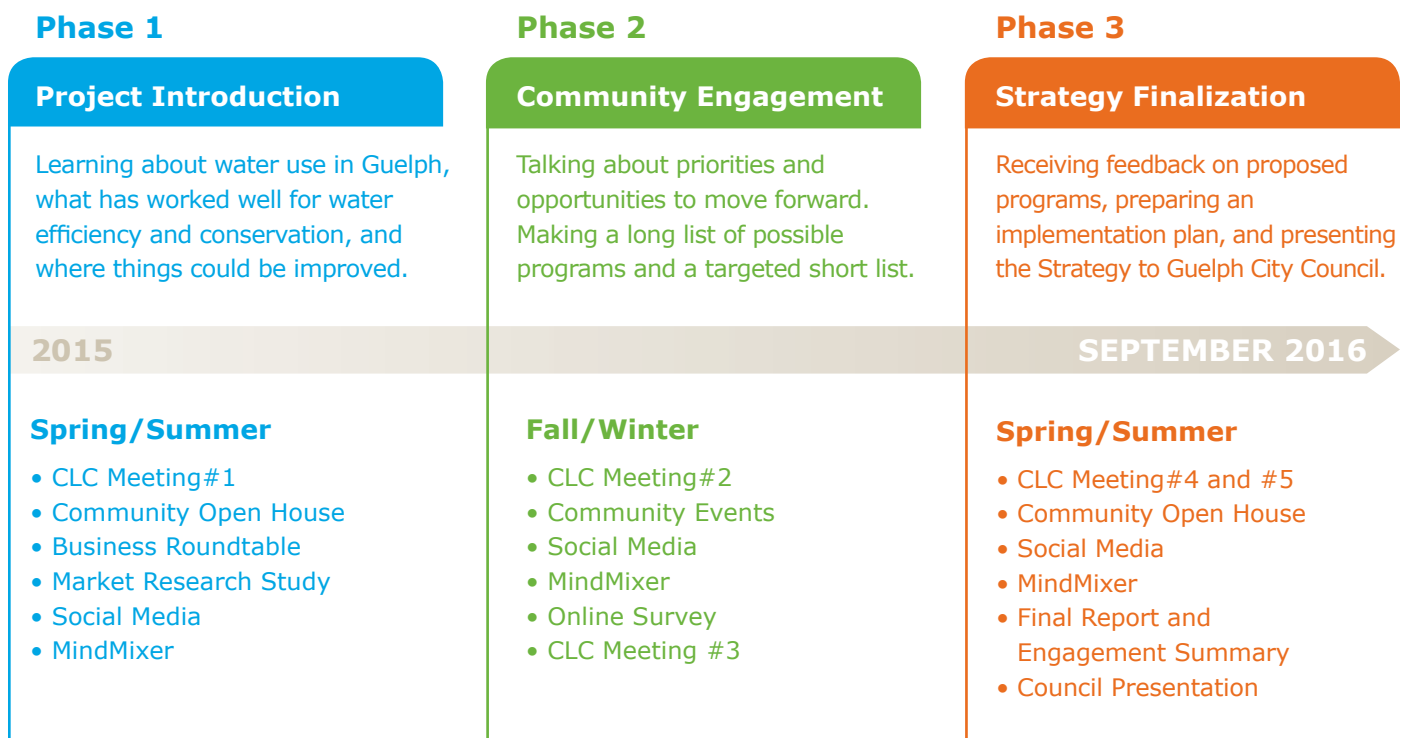
Creating the Toolbox

Each program on the long list was rated using criteria developed in consultation with the CLC, residents, stakeholders, and City staff. Residents contributed factors they felt were important in deciding if a program should or should not be included. After a weighted evaluation process using these criteria, the list of programs was again assessed by:

1. Cost of the program;
2. How much water it will save; and
3. How easily it can be done in Guelph.

The final list of recommended programs came out of this evaluation and assessment process. More information about the scoring and evaluation process can be found in the *Program Alternatives Report* at guelph.ca/wesu.

Three Phases of Updating the Water Efficiency Strategy

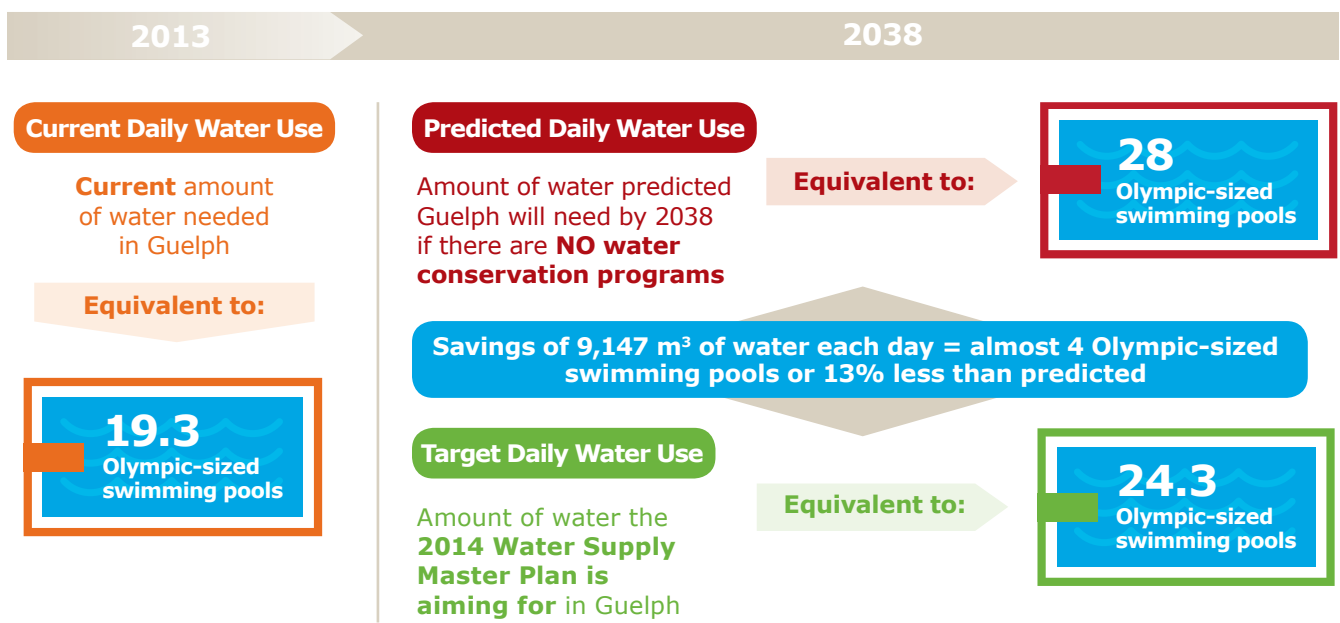




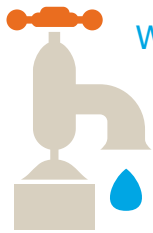
3 OUR STRATEGY – TARGETS AND RECOMMENDED PROGRAMS

Water Use Targets

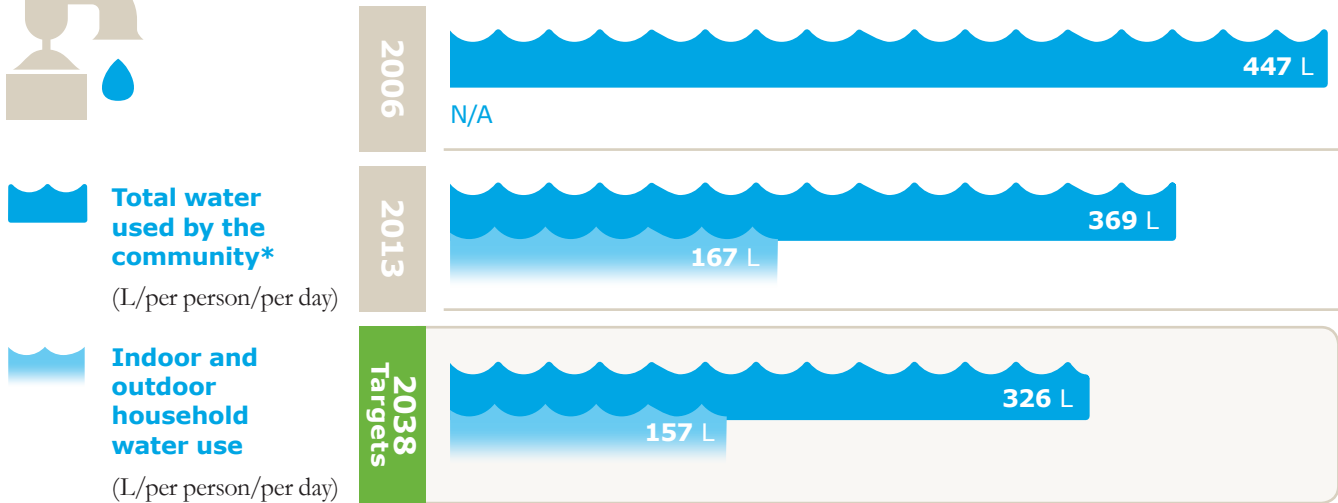
Our updated Strategy is one piece of the puzzle to reach the 2014 Water Supply Master Plan water use targets: **to use 9 million litres less water each day by 2038.**



It takes **2.5 million litres or 2,500 m³ of water** to fill one Olympic-sized swimming pool.



Water Use Targets for 2038



* Total water use = water used by residents, businesses, institutions, and industry, as well as water lost through leaks, unaccounted for, or not billed. This total is then divided by the number of people living in Guelph.

Recommended Programs at a Glance

The list below shows the recommended programs (both continuing and new) as well as proposed research and innovation efforts for the next ten year planning period. It is anticipated that programs will run from the start of the 10-year planning period unless otherwise noted by a date in brackets.



Residential Programs

- Royal Flush Toilet Rebate
- Blue Built Home
- Home Visits and Water Audits
- Healthy Landscapes Home Visit
- Public Education
- (NEW) Mobile Water Use App
- (NEW) Water Efficient Landscaping Incentives (2021)
- (NEW) Multi-Residential Audit
- (NEW) Multi-Residential Sub-Metering



Industrial, Commercial & Institutional (ICI) Programs

- Water Smart Business
- Healthy Landscapes Visit
- Education Programs
- Royal Flush Toilet Rebate



Research and Innovation

- Water Softener Study and Rebate (2022)
- Automated Meter Reading Study (2019) and Installation (2022)
- Link between Water and Energy Study (2019)
- Water Conservation and Rebound Effects Study
- Water Reuse and Demand Management Study
- Municipal Upgrades Best Practices Study
- Cooling Tower Audit/Rebate Study (2022)
- Irrigation System Audit and Rebate (2022)
- Distribution System Pressure Management (2022)



Municipal Programs

- Upgrades to City Buildings
- Water Loss Management



Residential Programs

Residents account for 51 per cent of water used in Guelph. The City’s water conservation and efficiency programs help residents use and waste less water both inside and outside their homes. These programs have been very successful in reducing water use. The Strategy recommends continuing these programs, and includes suggestions on how they can be made even better to help reach 2038 water use goals. The following are part of the 5-year program plan.

Royal Flush Toilet Rebate



Currently, residents get \$75 back for replacing an old 13L flush toilet with one that is more water efficient (dual-flush, 4.8 L or 3 L per flush). The Strategy recommends updating the program so that rebates are provided for replacing 6-litre or more flush toilets with those that have a 4.8 L flush volume or less. The rebate amount will be lowered to \$50 to keep the program cost-effective. The program will be modified to ensure it is more accessible to the general public.

Blue Built Home



Blue Built Home is a three-level certification program (Bronze, Silver, Gold) for new homes. Homes are certified when they use high quality water fixtures and appliances designed and tested to save water and reduce utility bills by as much as 62 per cent. The Strategy recommends updating the program to a one-level program where rebates are offered for a variety of water saving fixtures and appliances to both existing and new homes and multi-residential communities. Homes would be certified when they reach 150 litres per person per day or less. Examples for water-saving fixtures that may be eligible for rebates include hot water re-circulation systems, waterless floor drains, rainwater harvesting systems, and greywater reuse systems.

Home Visits and Water Audits



The Strategy recommends continuing with free one-hour home visits to residents to talk about how they can save money in their home and be more water-wise. Currently these visits are administered with eMERGE, a program that looks at sustainability in many different parts of household living, including water use, energy, and waste.

Healthy Landscapes Home Visit



This program provides a free home visit to residents to learn about how to use less water outside their home. The Strategy recommends adding a water bill analysis to the program, so residents can see clearly how much water they are using and where they can save water and money.

Public Education



Guelph will continue to run a diverse set of activities that help people become more aware of their water use. This includes the Water Wagon and Resources for Youth, fun and educational activities that teach youth about Guelph’s water and how to protect our precious water resources. Activities that will be looked at for the future include Water Reduction Challenges, education campaigns that reach out to renters and students, and activities to learn about water leaks in a house and how to find them.

(NEW) Mobile Water Use App



This new program is about creating a mobile phone ‘app’ for residents that calculates and provides information about their average water use. *Watr* will help residents understand their own household water use and see how it compares to others in their neighbourhood.

(NEW) Water Efficient Landscaping Incentives



This program includes a set of activities to help residents use less water outside their home by planting native and water efficient plants instead of lawns.

(NEW) Multi-Residential Sub-Metering



A new program will provide cost-sharing and/or rebates to companies to install permanent sub-metering in multi-residential buildings. Opportunities to participate in this program will be identified as part of the Multi-Residential Audit Program on a building-by-building basis where plumbing layouts are favourable. For example, condos and row houses typically have piping infrastructure that is favourable to sub-metering individual living units while the plumbing infrastructure in high-density multi-residential buildings is generally not conducive to sub-metering.

(NEW) Multi-Residential Audit



This program will involve outreach with property managers and owners, giving them free water use analyses of their buildings. These will point out water and cost saving potential, giving property owners the information they need to make positive changes related to water use. Metering or sub-metering opportunities will be recommended on a case-by-case basis where plumbing layouts are favourable.



Industrial, Commercial and Institutional (ICI) Programs

Businesses, industries, and institutions want to ensure that any activities to reduce water use make economic sense for them and that they see savings for their investment within three years. The Strategy responds to these priorities with programs that help businesses, industries, and institutions see where they can save money while saving water.

Other programs available as described in the Residential Program section:

- Royal Flush Toilet Rebate
- Healthy Landscapes Visit
- Education Programs

Water Smart Business



Currently, the City of Guelph shares the cost of an in-depth look at water use with businesses, industries, and institutions through the ICI Capacity Buyback program. The City then gives rebates and incentives for updates that permanently reduce water use. To attract more businesses to the program, the program will be renamed to “Water Smart Business”. The Strategy recommends increasing the incentive from \$0.30/L to \$0.75/L, exploring opportunities for sub-metering, and linking with other City programs.





Municipal Programs

The City of Guelph has been actively working to upgrade municipal buildings to be more water efficient and reduce the amount of water leaks in the municipal water system. The Strategy recommends continuing with these best practices in water conservation.

Other programs as described in the Residential Program section:

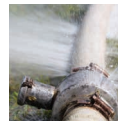
- Royal Flush Toilet Rebate
- Healthy Landscapes Visit
- Education Programs

Upgrades to City Buildings

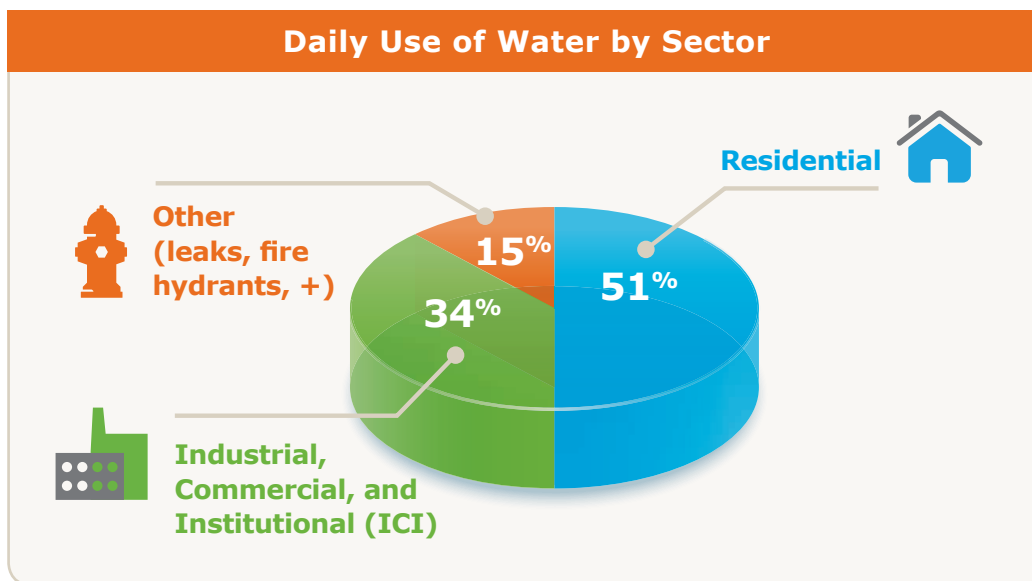


The City will continue to lead by example and make water-saving upgrades in municipal buildings and conduct water use audits. The City will look at trying out new water technology in municipal buildings to showcase the technology and study how much water it saves.

Water Loss Management



This program includes activities to find and stop leaks in the water system. This includes the design of district metered areas (DMAs) where flow meters are put in defined areas of the water system to better track leaks. The City is currently working to implement 27 DMAs to manage leaks, which is considered an industry Best Management Practice. Other options for leak management will also be considered.





Research and Innovation

Guelph takes great pride in being a progressive and innovative leader in water efficiency. The City will continue to actively engage in research on new water conservation technology to better understand potential water savings and other benefits and be ready for the next update to this Strategy. The initiatives in this category will evolve over time to ensure they are responsive to continually emerging new technology.

Water Softener Study and Rebate



Water softeners take out hard minerals usually found in groundwater. This results in less scale building up on appliances and taps, which means water-using appliances work better and the water feels more pleasant. Some types of water softeners use a large amount of water when they recharge, water which goes down the drain. In this study, water-efficient alternatives to current water softeners will be tested, building on the current pilot of non-ion exchange water softeners. If supported by the research, the Strategy recommends offering a rebate of \$200 to residents who install approved non-salt based water softeners or efficient low-salt use ion exchange softeners (starting 2022). The City of Guelph will also continue to collaborate with the Region of Waterloo on other water softener studies and activities, such as the watersoftenerfacts.ca website.

Automated Meter Readings Study and Installation



This study will pilot a small-scale automated meter reading installation in a new development. If this research supports the benefit of this approach, the City will install automated meters starting in 2022. These meters can be a great tool for providing in-depth information about leakage and notifying homeowners about potential leaks. It can also be an educational tool, allowing customers to have water use readings available to them in real time.

The Link Between Water and Energy Study



Energy and water are tightly linked – energy is used to pump water through the water system, heat the water we use for showers, run dishwashers and washing machines, and operate industrial processes that need water. Using less water in many cases also means using less energy. This study will look at how programs that encourage using less water can better link with programs to use less energy. It will also look at how the City can use less energy in the water distribution system.

Water Conservation and Rebound Effects Study

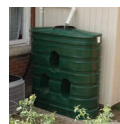


This study will look at the extent of benefits of water conservation on the water supply and the capacity of our wastewater treatment. It will also look at whether individuals who save water in one area end up using more water in another.

Water Reuse and Demand Management Study

This study will include research in two main areas:

Rainwater Harvesting



Guelph currently offers rebates for residents who install rainwater harvesting systems (up to \$400 for seasonal outdoor systems and up to \$2000 for all season indoor-outdoor systems). The Strategy recommends: 1) re-launching a study to test out rainwater harvesting system technology for homeowners and/or businesses, industries, and institutions, and 2) reviewing by-laws and regulations regarding rainwater collection networks.

Greywater Reuse



Greywater reuse systems reduce the amount of treated drinking water used for activities like flushing toilets, by replacing it with water already used for other purposes such as washing. The City currently offers a \$1000 rebate for residents who install an approved greywater system. The Strategy recommends: 1) re-launching a study to look at household greywater reuse systems over the long-term, and 2) exploring opportunities for municipal water reuse projects.

Municipal Upgrades Best Practices Study



This study will look at other cities across Canada and worldwide to find the best practices for upgrading and renovating City buildings to be more water efficient. Findings can be used to guide construction of future municipal facilities.

Cooling Tower Audit/Rebate Study



In many cases, water for cooling tower purposes can be taken from water already used for other equipment in the same building. This program will provide free cooling tower audits and pilot a proposed \$1000 rebate for conductivity meters that can improve water efficiency in cooling towers. Participation, cost, and water savings will all be tracked.

Irrigation System Audit and Rebate



In 2022 the City will begin implementing Landscape Ontario's *Water Smart Irrigation Professional* program. This program involves offering qualified irrigation professionals training on how to design personal irrigation plans for customers based on the type of landscape they have and other factors. Contractors that pass the course will be advertised as Water Smart Irrigation Professional-Certified contractors. The contractor will have to follow Water Smart Irrigation Professional protocol and provide the City with an audit report for each property showing the water savings achieved. The Strategy also recommends that starting in 2022 the City offer a \$300 rebate towards the purchase of 'smart' weather-based controllers for automatic sprinkler systems. These controllers save water by stopping the sprinkler system from turning on during or immediately after rainfall.

Distribution System Pressure Management



The Strategy recommends studying the potential for pressure management when designing future pressure zones within the City's water system. The opportunity for a pilot pressure management program is during a five to ten year window in future Pressure Zones 2 and 3 East.





4

BENEFITS OF REDUCING WATER USE

Implementing the programs and initiatives in the Strategy and saving water has many benefits for community members, the environment, and the City of Guelph.

Water Conservation Saves Money

Since 2006, our water conservation programs have saved 8,135 m³ each day. This has allowed the City to delay spending \$40.6 million on expanding our water and wastewater infrastructure. This was accomplished with an investment of only \$10.2 million in water conservation programming.

The Strategy will enable us to continue to save money by deferring the need for infrastructure expansion. Implementing the recommended programs will delay spending an estimated \$29 million on water and wastewater capacity expansion over the first 10-year planning period.

Water Conservation Saves Energy

Energy use is directly connected with water use in three main ways. It takes energy to:

- Pump water to consumers and wastewater away from consumers;
- Treat drinking water and wastewater; and
- Heat water for home use (e.g., showers, dishwashers, laundry, etc.).

Using less water therefore means energy savings for the City, residents, businesses, and industry.

Between 2006 and 2014, the City of Guelph has saved an estimated \$850,000 on energy because of the water saved from our water conservation and leak detection programs. This avoided the release of 1,923 tonnes of greenhouse gases to the atmosphere – that's equivalent to taking 405 cars off the road for an entire year¹.

When energy savings are added from heating less water in homes, businesses and industry, over \$1.4 million has been saved and 5,297 tonnes of greenhouse gases were avoided (the equivalent of taking 1,115 cars off the road for a year!).

Water Conservation Protects the Environment

Reducing our water use helps the environment by reducing the amount of chemicals needed for water and wastewater treatment. There are also fewer disturbances to natural areas by delaying the need to construct new infrastructure for water supply, distribution, and wastewater treatment.

Water conservation helps Guelph carry out our responsibilities to comply with Provincial legislation, including Source Water Protection, the Water Opportunities and Conservation Act, and permits to take water under the Ontario Water Resources Act. This Strategy is also tightly linked to other plans in Guelph designed to protect the environment, including the Source Water Protection Plan, Stormwater Master Plan, Natural Heritage Strategy, and many others.

Water Conservation Keeps Water Rates Affordable

Using water efficiently reduces operating and maintenance costs and slows down wear and tear on the water system. It also defers millions of dollars of investments for new water and wastewater infrastructure. While increases in electricity, gas, and goods and services cause water and wastewater rates to rise, being water smart helps keep water rates more affordable.

¹ The U.S. Environmental Protection Agency (EPA) calculates a passenger vehicle emits 4.75 metric tons of equivalent CO₂ each year.

How much water will we save?

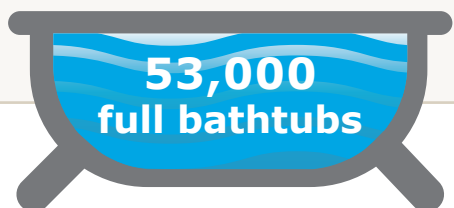
By implementing the programs outlined in the Strategy, Guelph will contribute significantly to the 2038 target of saving

9,147 cubic metres (m³)

of water each day.

That is over

**53,000
full bathtubs**





5

MOVING FORWARD

Implementing our updated Strategy will be guided by a detailed 10-year plan that outlines the order of delivery of programs, timing, and costs. An overview is provided below, and full details can be found in the *2016 Water Efficiency Strategy Update* at guelph.ca/wesu.

Phased Approach

The programs outlined in the Strategy will be implemented in a phased approach over a 10-year period (2017 to 2026). If appropriate, other programs not included in the current Strategy will be re-evaluated for inclusion during the implementation period.

Cost

The Strategy has been designed to be a more cost-effective option for meeting the City's growing water demands than the supply-side alternative of expanding infrastructure and taking more water from the aquifer. The overall 10-year program cost is \$2,170 per cubic metre saved, which is less than the City's current estimate of the cost for water and wastewater expansion (\$4,684 per cubic metre).

Measuring Progress

To make sure the Strategy is on track and helping to meet our water reduction targets, various measures will be tracked. These include water savings and costs associated with each program as well as the combined costs and impacts of all water conservation measures. City staff will continue to track water production and water demand on an annual basis. As part of the monitoring program, City staff will review customer feedback on our water conservation programs.

Working Together

The recommended programs in our updated Strategy will help all of us be more water wise and reach Guelph's 2038 water use goals. But having an updated Strategy does not mean our work is done. We will continue to look at Guelph's water use and ways to be more water efficient, adapting to new opportunities, growth, and other factors that will happen over the next few decades. Together we can protect our water resources and continue to be a recognized leader in water conservation in Canada...and beyond.



MORE READING

More information about the Water Efficiency Strategy Update process and programs can be found in the following background, technical, and community meeting reports. All of these documents can be found on the Water Efficiency Strategy website at guelph.ca/wesu.

Final Strategy

- 2016 Water Efficiency Strategy Update

Background Research Reports

- Literature Review: Best Practices of Water Conservation and Efficiency (2015)
- Business Research Report (2015)
- Homeowner Research Report (2015)

Technical Reports

- Residential Water Softening and Salinity Water Use Reduction: September 2015
- Water Reuse and Demand Substitution Technologies
- Industrial Consumptive Cooling Process and Water Conditioning Technology Efficiencies
- Mass Fixture Retrofit Programs for Multi-Residential Settings
- Private Customer Leak Detection Notification Technologies
- On-Bill Efficiency Repayment Systems, Local Improvement Charges Financing & Other Alternate Incentive Models for Water Efficiency Programming
- New Construction Based Irrigation System Design and Construction Standards
- Program Alternatives Report

Community Engagement Materials

- Terms of Reference for the Community Liaison Committee
- CLC Meeting #1 (June 2015) Discussion Guide and Minutes
- CLC Meeting #2 (September 2015) Discussion Guide, Presentation, and Minutes
- CLC Meeting #3 (January 2016) Discussion Guide, Presentation, and Minutes
- CLC Meeting #4 (March 2016) Presentation and Minutes
- CLC Meeting #5 (May 2016) Minutes and Presentation
- Open House Poster Boards
- WESU Questions and Answers