To:	**Emily Stahl**	Company:	**City of Guelph**
From:	**Sam Ziemann**	Our File:	**75-41-151088**
Cc:	**Wayne Galliher**	Date:	**March 23, 2016**
Subject:	**Summary Report of Program Alternatives**		

CITY OF GUELPH

SUMMARY REPORT OF PROGRAM ALTERNATIVES

C3 WATER INC.

23 March 2016

VERSION	DATE	DESCRIPTION OF REVISIONS	REVISED BY	REVIEWED BY
1	December 9, 2015	Draft Summary Report of Program Alternatives	Andrea Williams	Bill Gauley Tracy Patterson Sam Ziemann
2	February 8, 2016	Draft Summary Report of Program Alternatives	Andrea Williams	Bill Gauley
3	March 23, 2016	Final Summary Report of Program Alternatives	Andrea Williams	Bill Gauley

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1.0 INTRODUCTION

As one of Canada's largest communities reliant on groundwater for its community water supply needs, water conservation is a top priority for the City of Guelph. The City's Water Supply Master Plan has identified water conservation as the most cost-effective and immediately available method of reclaiming water supply capacity. The 2014 Water Supply Master Plan Update recommends the City's demand reduction target be revised to achieve an average day production of 60,725 cubic metres per day by 2038, a reduction of 9,147 cubic metres per day from the projected average day production (coinciding with the timelines of the City's Official Plan).

In order to achieve the water demand reduction targets, the City is currently updating its Water Efficiency Strategy which has directed current programming since Council approval in 2009. As available markets, technology, and regulations and standards change over time, it is important to review options and evaluate new opportunities to identify measures and approaches which may have emerged to secure additional water savings in the years ahead.

This report provides a comprehensive list of potential water conservation measures developed from research findings (technical memorandums), consultation with stakeholders (public, residential and business), and consultation with City staff. Also included are the scores of measures/programs that were considered to merit further consideration. Each measure was scored based on the developed evaluation criteria (see separate technical memorandum). Further, this report details the recommended measures/programs to be included in the 2016 Water Efficiency Strategy Update. Measures/programs were shortlisted based on evaluation criteria scores, financial and feasibility evaluations and the magnitude of water savings.

2.0 COMPREHENSIVE LIST OF WATER EFFIENCY MEASURES

2.1 *Source of Information*

The background information utilized to develop water efficiency programs is described in the following sections. For reference, outcomes of these consultations and other study materials may be viewed on the 2015 Water Efficiency Strategy Update website at www.guelph.ca/wesu.

2.1.1 Background Research

The project team reviewed available literature and information regarding current municipal best practices in water conservation and efficiency. A summary of the findings is presented in the report 'Literature Review on Best Practices of Water Conservation and Efficiency'. A series of technical memorandums (listed below) were prepared discussing the extent of current municipal practice, market potential and local feasibility of water conservation and efficiency technologies and programs for the Guelph community.

- Technical Memo #1: Residential Water Softening and Salinity
- Technical Memo #2: Water Reuse and Demand Substitution Technologies
- Technical Memo #3: Industrial Consumptive Cooling Process and Water Conditioning Technology Efficiencies
- Technical Memo #4: Mass Fixture Retrofit Programs for Multi-residential Settings
- Technical Memo #5: Private Customer Leak Detection Notification Technologies
- Technical Memo #6: On-bill Efficiency Repayment Systems, Local Improvement Charges Financing & Other Alternate Incentive Models for Water Efficiency Programming
- Technical Memo #7: New Construction Based Irrigation System Design and Construction Standards

2.1.2 Public Consultation

To date, members of the public and local stakeholders have provided feedback through the following engagement forums:

- Community Liaison Committee Meeting #1: June 2, 2015
- Open House #1: June 23, 2015
- MindMixer Tool Online Engagement #1: June 25 to July 31, 2015
- Community Liaison Committee Meeting # 2: September 29
- Community Engagement at Local Public Events;
    - Jazz Festival, September 19, 2015
    - Vegfest, September 20, 2015
    - Village Fall Fair, September 26, 2015 and
    - Run for the Cure, October 4, 2015.
- MindMixer Tool Online Engagement #2: September 24 to October 15, 2015

2.1.3 Research Surveys

As part of the Water Efficiency Strategy Update, market research of local residents and businesses was conducted to provide insight into new opportunities for water efficiency programing. Strategically engaging the marketplace can magnify the impact of municipal programs, leverage limited resources and, most significantly, move the marketplace toward desired water management practices. Over the longer term, and if leveraged successfully, market transformation will occur and water efficiency and conservation practices and technologies become imbedded in the marketplace; in other words, it becomes the way business is done.

Residential Survey

In order to develop a full understanding of residents' values, perceptions, and beliefs as they pertain to water efficiency and conservation, a market research survey was undertaken with 32 local resident on June 26, 2015. The methodology employed as part of this session provided focus to the intrinsic values of residents living in single-family housing and sought their viewpoints on water conservation. For reference, this report is titled 'Homeowner Research Report'.

Business Survey

Business owners and managers have a significant role to play in achieving water use reductions. With this consideration in mind, key informant interviews were conducted from August to October 2015 with a representative sample of business owners and managers. Interviews included various representatives of local sectors and relevant service providers in the City, including:

- Industrial – Owens Corning Canada, Gay Lea Foods, LPP Manufacturing, Blount International, and Skyjack
- Commercial – Primaris
- Institutional – Schlegel Villages and St Joseph's Health Centre
- Builders/developers – Sloot Construction and Gemini Homebuilders
- Plumbers – Jim-L Plumbing & Heating Inc. and Wellington Plumbing & Heating Ltd.
- Landscaping architects, contractors and retailers – The Landplan Collaborative Ltd., Brydges Landscape Architecture Design, and Royal City Nursery
- Water softener retailer - AquaMaster

The findings from the business research, including opportunities and constraints for future water efficiency programming, are found in the 'Business Research Report' which can be found on the City's website, along with the Residential Research Report www.guelph.ca/wesu.

2.2 ***Results***

Research findings of public consultation are used to inform the direction for future water efficiency programming that will be considered as part of the Water Efficiency Strategy Update development. All suggested program measures identified through consultation were recorded and are provided for reference in Table 1.

This summary gives the source of the measure, describes the water efficiency measures and the result of preliminary vetting by the consultation team. If the measure was considered to impact similar sectors/customers as another listed measure, they were grouped together for further/future consideration. A response of 'Yes' in the column 'Merits Further/Future Consideration?' indicates that the measure will be scored through the criteria, but does not automatically short-list the measure for financial modelling.

Table 1: Comprehensive List of Water Efficiency Measures

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
Indoor				
1	Royal Flush Toilet Rebate Program	Current Program	Replace up to 2 old inefficient toilets (13 litres or larger) with a new WaterSense®-approved dual flush or high efficiency model and receive a $75 rebate. Commercial facilities and multi-residential buildings can also apply for $75 rebates and are not limited in the number of rebates. Further information: www.guelph.ca/royalflush	Yes
2	Greywater Reuse Rebate Program	Current Program	Greywater is the wastewater from bathing, and showering. Home systems collect and utilize the treated greywater to flush toilets within the home. Under the Ontario Building Code this water source can also be reused to water lawns. The City of Guelph currently offers $1000 towards the installation of an approved greywater reuse system in your home. Further information: www.guelph.ca/greywater	Yes
3	Smart Wash Washing Machine Rebate Program	Current Program	Replace your old top-loading washing machine with a new Energy Star rated model and receive a $100 rebate from the City of Guelph. Commercial laundries can receive up to a $200 rebate. Further information: www.guelph.ca/smartwash	Yes
4	Rainwater Harvesting System Rebate Program	Current Program	Rainwater harvesting systems are direct method for storing rainwater for future use. Collected water is stored in tanks and can be used both inside (toilet flushing) and outside the home (gardening). The City of Guelph currently offers up to $400 for a seasonal outdoor system and $2,000 towards an all-season indoor//outdoor system. Further information: www.guelph.ca/rainwater	Yes
5	Home Visits/Audits (eMERGE)	Current Program	These one–hour consultations are coupled with a free retrofit package and on-site expert advice to provide information, resources and practical recommendations for living lighter every day. The program focuses on viewing the home as a whole system by looking through the lenses of energy, waste, water, alternative transportation and sustainable food choices. The goal is to remove barriers to help resident's access knowledge, and to inspire action. Further information: www.emergeguelph.ca/	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
6	Blue Built Home Water Efficiency Standards and Rebate Program	Current Program	Blue Built Home is a certification program for new homes that uses an approved set of high quality home fixtures and appliances designed and third-party tested to save water and reduce utility bills by as much as 62 per cent. Blue Built Homes are certified according to three water efficiency standards—Bronze, Silver or Gold. The City of Guelph administers the Blue Built Home program which is supported by Tarion–registered home builders. Further information: www.guelph.ca/blue-built-home	Yes
7	Tiered Toilet Rebate Program	City Stakeholder	Toilet rebate program where the amount of rebate provided is based on the water savings gained. This program will include the replacement of First Generation Ultra Low Flush models.	Yes
8	Dishwasher Rebate	City Stakeholder	This rebate program could be a combined effort with Guelph Hydro to encourage the replacement of old in-efficient dishwashers with energy-star, WaterSense® models.	Not considered - Dishwashing accounts for only about 1.4 percent of typical residential indoor water use. Most new models meet Energy Star requirements. Very little savings available.
9	Water Softener Rebate	City Stakeholder	Ion-exchange water softeners are common in areas where groundwater is used to service the community because of the high levels of calcium and magnesium in the water. Water softeners need to recharge on a regular basis and water is used during the recharge cycle. Most new softeners recharge based on the volume of throughput versus a timer. This program could provide a rebate for the replacement of old in-efficient water softeners with water efficient models. Of note are commercial grade brine reuse systems. Although not currently used in the residential sector, brine reuse systems could have future potential for both water and salt savings. Alternative non-recharging technologies, such as template-assisted crystallization, are being evaluated but have not yet been proven as a replacement for ion-exchange systems. Further information: www.watersoftenerfacts.ca	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
10	Flapper Replacement Program	City Stakeholder	Toilet Flappers can be given to residents as part of a toilet leak detection/prevention package. Mail out packages can target high water users.	Not considered – Installing the wrong flapper model or improper installation could result in leaks, an increased flush volume, or the reduction of flushing performance and invalidation of warranty.
11	On-Demand Hot Water Re-circulation Systems Rebate	City Stakeholder	Having hot water promptly available at fixtures helps save energy and water. An on-demand recirculating system brings hot water close to each plumbing fixture and returns the ambient temperature water in the line to the water heater rather than wasting it down the drain.	Yes
12	In-home Leak Detection System Rebate	City Stakeholder	Rebate for devices that can detect leaks in the home. When a potential leak is identified, the device can automatically send a text alert to a smart phone and/or automatically shut off the water supply to the home. While these devices often cost $2000 or more, a new device is expected to be available mid-2016 at a cost of less than $300.	Yes
13	In-home Performance Dashboard Rebates	City Stakeholder	A visual summary of real-time water usage. Extra tools could include: leak detection notification, an interactive water-savings recommendation library, personalized action plan of pledged savings, dynamic estimates of savings potential in litres per day and dollars per year, long-term trend tracking, highlighted local programs, events, and reminders.	Not considered - Not cost-effective.
14	Waterless Floor Drain Rebate	Community Liaison Committee	Waterless floor traps are an alternative to the common floor traps that require periodic 'top up' of water to replace the water that has evaporated to maintain a seal. The waterless traps rely on a pressure seal to allow the flow of water into the pipe while preventing gases from entering the home/building.	Not considered - Cost of program implementation compared to water savings. Also, limited market found through initial piloting locally (2010 – 2012)

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
15	Composting Toilet Rebate	Community Liaison Committee	Human waste can be composted just like any other organic matter. Human waste is about 90 percent water, which means that one of the primary functions of a composting toilet is evaporation. Bulking material and microbes are added to break down the remaining minerals. Composting toilets typically cost over $1000.	Not considered - Not cost-effective. A rebate is unlikely to persuade someone to install a composting toilet if they were not already so inclined. Also, there are health concerns for waste disposal and the unknown market research for the effect on home resale.
16	Water Softener Tank-exchange System Rebate	Technical Memo #1	Promotion of and/or offering rebates to customers that convert from using self-generating ion exchange water softeners to tank-exchange systems where the softener's resin tank is exchanged periodically by a service provider for a new tank.	Not considered - Proven technology, however, the popularity of tank-exchange softeners is much lower now than it was 30 years ago. Further research is needed regarding program costs and availability for Guelph customers.
17	Nucleation-assisted Crystallization System Rebate	Technical Memo #1	Promotion of and/or offering rebates to customers that convert from using self-generating ion exchange water softeners to nucleation-assisted crystallization systems that do not require regeneration.	Not considered - This technology is relatively new and requires further research to prove that it's able to meet the soft water needs of residential customers.
18	Targeted Audit/Retrofit Program	Residential Research Report	Advertise home water audits through billing stuffers sent to high water use residential customers.	Yes
19	Plumber Assisted Water Efficiency Rebates	Business Research Report	Certified plumbers will provide customers a rebate for purchase and installation of approved water efficient measure(s).	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
Outdoor				
20	Healthy Landscapes	Current Program	Healthy Landscapes provides a free home visit to residents to discuss methods to reduce outside water use. On average, water use in Guelph increases by about 5 or 6 per cent during the warmest months of the year. From installing a rain barrel to choosing native or drought tolerant plants or adjusting lawn care practices, there are many simple ways to decrease outside water use. Further information: www.guelph.ca/healthy-landscapes	Yes
21	Low Impact Development Rebate	Open House, City Stakeholder	Low Impact Development employs principles to manage stormwater on site, such as preserving or recreating natural landscape features, the use of permeable hardscapes, bioretention basins or rain gardens, vegetated rooftops, and rain barrels. Rebates could be available to all customer sectors and would focus on on-site stormwater management. By implementing Low Impact Development principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Further information: www.guelph.ca/stormwater-management	Yes
22	Removal of Turf Rebate	City Stakeholder	A turf removal rebate program offers rebates to customers that replace water-intensive turf with a non-water-using landscape.	Incorporated with "Water Efficiency Landscaping Incentives"
23	Tree Planting Rebate	Community Liaison Committee, City Stakeholder	Trees stabilize soil with their extensive root systems, reducing soil erosion and runoff and thus improving water quality. Wooded areas conserve and naturally filter water, recharging the ground water supply and preventing the transport of sediments and chemicals into streams.	Incorporated with "Water Efficiency Landscaping Incentives"
24	Passive Rainwater Harvesting Rebate	Open House, City Stakeholder	Passive rainwater harvestings involves containing rain or storm water on site long enough to allow it to soak into the ground. Vegetative swales, wetland ponds, dry creek beds, green roofs and pervious concrete or pavers are some examples used to keep the water on the land longer and out of sewer or stormwater systems.	Incorporated with "Low Impact Development Rebate"

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
25	Remote Sensing of City	City Stakeholder	Use sensors through the community to determine areas of high water use based on grass/ lawn health. Once determined, these households would be targeted for outdoor water use programs.	Not considered - Able to encourage reduction through rebate programming and education.
26	Landscape Contractor Training Program	City Stakeholder	Landscape professionals trained in water conservation.	Not considered – Service providers were found to have a high level awareness of water efficient measures (Business Research Report)
27	Irrigation System Rebates	City Stakeholder	Rebates are provided to homeowners that install water efficiency upgrades to their existing irrigation system, for example, weather-based controllers, rain sensors, soil moisture sensors, or connecting to a central control system.	Incorporated with "Irrigation Audit"
28	Irrigation Removal Rebate	City Stakeholder	Homeowners are paid a set rebate for the removal/ disconnect of their irrigation system.	Not considered - Costly for the homeowner with no return on investment. Most customers that would participate in this program would likely use their irrigation system rarely or not at all.
29	Rain Garden Incentives	Open House	Provide a rebate or award for residential rain garden installations.	Incorporated with "Low Impact Development Rebate"

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
30	Irrigation Audit	Technical Memo #7, Residential Research Report	Using lawn irrigation best practices, homeowners can reduce their seasonal water use. Examples of best practices include rain gauges, rain or soil moisture sensors, weather-based controllers, central control systems, and the use of a master valve. For example, Landscape Ontario's Water Smart Irrigation Professional program trains contractors how to calculate the optimum level of irrigation for each zone based on plant type, micro-climate, soil type and slope, etc., using a custom-designed computer program. The qualifying contractors are paid a set fee, depending on the location of the customer, to audit and optimize their customers' irrigation systems. Customers receive a report showing how much water and cost savings they will achieve each year with an optimized system.	Yes. While the average summer day demand in Guelph is only about 5 or 6 percent higher than the average winter day demand, customers with automatic irrigation systems generally use much more water during the irrigation season.
31	Water Efficient Landscaping Incentives	Open House, Residential Research Report	Drought tolerant landscaping can save a significant amount of water during the high water demand season. Planting alternatives to turf, such as native groundcover and garden areas containing water-efficient plants, can reduce the amount of watering that is needed. This measure can be encouraged with audits, workshops, demonstration gardens and community partners.	Yes
Multi-residential				
32	Metering and sub-metering	City Stakeholder	Multi-residential buildings are metered and sub-metered to determine water consumption on per building and per unit basis. Guelph has water meters on all its customers' water service connections. Plumbing in high- density multi-residential buildings are generally not conducive with sub-metering. Townhouses would benefits from sub-metering if not already implemented.	Yes
33	Installation/Bulk Procurement Program	City Stakeholder	The City will purchase, in bulk, water efficient fixtures and appliances that will be installed by plumbers that have bid and won tender packages from the City.	Yes
34	Rainwater Harvesting Program/Rebate	MindMixer, City Stakeholder	Rainwater harvesting is the collection and storage of rainwater to be used at a later time to offset the use of potable water.	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
35	Water Reuse Program/Rebate	City Stakeholder	Water reuse systems collect and treat wastewater (including greywater) on site and reuse it to offset potable water demands. With current technology, almost any quality of wastewater can be treated to a 'fit for purpose' level.	Yes
36	Multi-Residential Audit/Retrofit Program	Technical Memo #4	Any rebate provided by the City to multi-residential customers for the replacement of inefficient plumbing fixtures with high-efficiency models will reduce upfront purchase and installation costs; the resulting water savings (from reduced flow rates, flush volumes, and leakage) will reduce the customers' ongoing utility costs.	Yes
Industrial/Commercial/Institutional				
37	Water Smart Business - Capacity Buyback	Current Program	The Industrial/Commercial/Institutional Capacity Buyback Program provides industrial, commercial and institutional water consumers with financial assistance for facility water use audits and one-time financial incentives (based on the volume of water saved) for the implementation of retrofits to permanently reduce water use.	Yes
38	Restaurant Audit/Rebate Program	City Stakeholder	Restaurants receive free audits to identify potential water efficiency as well as rebates to replace inefficient products. The City previously piloted a restaurant pre-rinse spray valve replacement program. An example of a similar program is the Region of Waterloo's Restaurant Certification Program.	Incorporated with "Water Smart Business - Capacity Buyback"
39	Cooling Tower Audit/Rebate Program	City Stakeholder	Cooling towers help regulate temperature by rejecting heat from air conditioning systems or by cooling hot equipment. Water is lost through evaporation and bleed-off (which reduces mineral build-up). Often, water from other equipment within a facility can be reused for cooling tower purposes with little or no treatment.	Yes
40	Process Water Reuse	Technical Memo #2	Many Industrial/Commercial/Institutional facilities have water uses that can be met with non-potable water. For many processes, filtered but otherwise untreated water can be used. Rinse water from laundry facilities and car washes, for example, can sometimes be reused in the same process or, alternatively, on applications like irrigation.	Incorporated with "Water Smart Business - Capacity Buyback"

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
41	Capacity Buyback Program with Increased Incentive	Technical Memo #6	Capacity Buyback Program with increased rebate amount per litre per day of water saved. The City estimates that it costs about $4.68 for every litre per day of supply capacity they add to their system. While any rebate of less than $4.68 may be considered cost effective, it is anticipated that an incentive of about $0.75 per litre per day of savings will be used (versus the current rate of $0.30 per litre per day). The higher rate level will reduce the payback period for many water efficiency options, hopefully resulting in more options being implemented.	Yes
42	Drip/Micro-Irrigation System	Technical Memo #7	Small diameter tubing with regular openings, either immediately above or below ground level, minimizes evaporation and the distance water needs to travel to reach the vegetation's root zone and, therefore, improves water efficiency and reduces energy costs.	Incorporated with "Water Smart Business - Capacity Buyback" or 'Water Efficient Landscaping Incentives'
43	Cooling tower with alternative makeup supply	Technical Memo #2	Some municipal programs offer rebates to industrial customers that reduce their potable water demands. The rebate level can be based on the volume of water saved (e.g., Capacity Buyback Program), the cost of implementation to achieve the savings, or simply a pre-set value. Some programs require a minimum volume of savings to qualify for a rebate. The volume of cooling tower makeup water can be reduced by augmenting or replacing the potable water supply of the cooling system with an alternative supply, such as rainwater, recycled wastewater, or reverse osmosis concentrate. When using or adding alternative water supplies it is important to monitor and treat the chemistry of the recirculation water to minimize the potential for scaling or fouling. Some programs offer rebates up to 100 percent towards the installation of a conductivity meter on the cooling system. A cost-effectiveness evaluation should be done on a case-by-case basis.	Incorporated with "Cooling Tower Audit/Rebate Program"
44	Capacity Buyback Program with On-bill Financing	Technical Memo #6	While on-bill financing may be better suited to the industrial, commercial, and institutional customer, unlike a capacity buyback program, it is difficult to link the City's cost of financing to the volume of water saved on an individual customer basis. However, the City should investigate including an on-bill financing option with their current capacity buyback program to help link program costs with program water savings. Combining financial rebates with on-bill	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
			financing might also help increase the number of industrial, commercial, and institutional sites participating in the capacity buyback program.	
45	Waterless Urinal Rebate	Community Liaison Committee	Waterless urinals are designed to operate and function without water while maintaining a sanitary standard. The urine drains through a liquid chemical trap/seal to eliminate odours. Ongoing maintenance is required to ensure that the liquid chemical is replenished.	Not considered - many sites have removed waterless urinals because of buildup of struvite in drain line (blocked drains) - liability to city.
Public Outreach/Education				
46	Resources for Youth	Current Program	The City of Guelph offers interactive and educational activities to teach youth about Guelph's water, including the protection and conservation of precious water resources. These include: • The Yellow Fish Road Program • Grade 2 and 8 School Education Programs • Children's Groundwater Festival • H2Awesome Further information: www.guelph.ca/resources-for-youth	Yes
47	Community Organization Support	City Stakeholder	Provide funding for like-minded projects/campaigns.	Yes
48	Business Labelling/Certification Program	City Stakeholder	A recognition program to identify water reduction business initiatives within the community.	Yes
49	Public Education	Community Liaison Committee, Residential Research Report	This measure can be targeted at many different sectors such as: residential, industrial, commercial, and institutional, and school programs. It is an attempt to alter people's attitudes and habits about water use in hopes that they adopt a more water-efficient behaviour. Some of the habits that can be affected include: turning faucets off when washing dishes or brushing teeth, fixing leaking fixtures quickly, and reducing lawn-watering frequency. Public education can include school programs, workshops, newspapers and flyers, audits, websites, television and much more.	Yes
50	Reduction Challenge	Community Liaison	Customers can set water reduction targets. Guelph will publicize updates on how they are achieving their goals and final results.	Incorporated with "Public Education"

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
		Committee		
51	Importance of Water Campaign	Community Liaison Committee	Broad range of education messaging for publication (e.g., stories from people who had frozen pipes during the winter - how they realized the importance of water).	Incorporated with "Public Education"
52	Campaign Collaboration	Business Research Report	Collaborate with regional and municipal water efficiency initiatives to provide a more unified message to Guelph and surrounding communities.	Incorporated with "Public Education"
53	Plumber Training Program	Business Research Report	Promote/support plumbing professionals though training programs (e.g., Green Plumbers course).	Not considered – the perceived importance of the Green Plumbers Program has declined in recent years, even in the United States of America.
54	"WET challenge"	Literature Review	The Region of Waterloo has adopted the Alliance for Water Efficiency's home waterworks Water Calculator and re-branded it as "the WET challenge" for use in the Region. The calculator is an online self-auditing tool where single-family residents input certain data (e.g., how often they shower or wash clothes, if they have a dishwasher, what is the flush volume or age of their toilets, etc.) and the program provides them with an estimate of how much water they use. If the resident "scores" over 240 litres per person per day they qualify for a free in-home consultation with a goal of reaching 165 litres of water consumption per person per day.	Not considered - Lack of interest in Waterloo's site and Residential Research results show that residents do not consult City websites for information on water efficiency.

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
55	Passive Leak Detection	Technical Memo #5	Information to help customers find and repair leaks can be found on municipal websites, including the City of Guelph's Fix a Leak Web page (can also be advertised on radio, TV and in magazines), and included with customer water bills. Messages can include: • Identifying average per capita or per household water demands within the community; • Noting the customer's current demand is higher than their average demand for the same time of year to prompt the customer to check for leakage within the home; • Noting the customer's demand is higher than the average demand in their neighbourhood to prompt the customer to check for leakage within the home; • Noting that an unusually high water bill may be the result of a leak; and • Explaining how to use the water meter to check for leaks.	Incorporated with "Public Education"
56	Mobile Applications	City Stakeholder. Community Liaison Committee	The City is currently developing a mobile water engagement platform with a local startup company Focus21. The Watr app is one tool in the toolbox of public engagement activities. Watr will allow users to see their water consumption data with respect to their peer grouping. Challenges to reduce consumption will be presented along with conservation messaging through push notifications.	Yes
By-law/Regulations				
57	Restricted Covenant on Residential Title	City Stakeholder	Restricted covenants on title to ensure changes to landscape are maintained. For example removal of lawns, installation of low impact development features (e.g. rain gardens).	Incorporated with "New Development Standard"
58	New Development Standard	City Stakeholder	New home construction must meet Blue Built Homes Bronze level regarding toilets and floor drains as a minimum (build above current Building Code). Include increased requirements for Low Impact Development as well (build above Planning Act standards).	Yes
59	Water Efficient Irrigation	City Stakeholder	By-law enforcing lawn irrigation best practices. Examples of best practices include use of rain gauges, rain sensors, soil moisture sensors, weather-based controllers, and the use of a master valve.	Incorporated with "Community Improvement Planning"

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
60	New Construction Landscaping Program	Literature Review, City Stakeholder	Regulations on the amount of topsoil and water conservation methods used in new development.	Incorporated with "New Development Standard"
61	Community Improvement Planning	City Stakeholder	Establish a Community Improvement Plan under the Planning Act. Supports heightened water efficiency construction standards for new growth.	Yes
62	Density Bonus Program	Literature Review	A Density Bonus Program can be used for new development where indoor and outdoor water conservation measures were registered to each parcel through a restrictive covenant.	Incorporated with "New Development Standard"
63	Expedited Permitting Process	Business Research Report	An incentive for builders applying for building permits to implement water efficient measures.	Incorporated with "New Development Standard"
64	Irrigation System Design and Construction Standard for New Construction	Technical Memo #7	The information contained in the Standard will help educate key market players and generate customer demand for efficient systems. It is anticipated that this program will improve the efficiency of new systems (including design, operations, and maintenance) and potentially the efficiencies of existing systems (related to maintenance and operation) as contractors become more familiar with the requirements set out in the Standard.	Yes
65	Rainwater Collection Network Regulations	Open House	Rainwater collected from one building may be used by another building. Further investigation regarding the liability and legality aspects of this program is required.	Yes
Innovation/Future Studies				
66	Rebound Analysis	City Stakeholder	Fund a study to evaluate the potential for rebound in water demands after water efficiency changes have been implemented. For example, do customers that save water in one area tend to use more water in other areas (Jevons paradox)?	Yes
67	Greywater Reuse Pilot Study	City Stakeholder	Fund a study that determines the long-term feasibility of residential greywater reuse systems, e.g., cost effectiveness, maintenance requirements, energy use, health and safety, etc.	Yes
68	Water Conservation Grant	City Stakeholder	A program to foster innovation. A grant could be provided to selected participants on a yearly basis. Possibly a City-wide competition with grant recipients in each customer sector.	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
69	Water Conservation Effects Study	City Stakeholder	A review of unintended consequences of water conservation programs (e.g., impact on wastewater plant, water supply infrastructure, wastewater collection infrastructure, etc.).	Yes
70	Water/Energy Nexus	City Stakeholder	Review of potential co-programming with Guelph's Energy initiative - GEERS Program (Guelph Energy Efficiency Retrofit Strategy)	Yes
71	Composting Toilet Pilot Study	Community Liaison Committee	Guelph residents who volunteer for the study will be provided with a composting toilet, with the obligation of providing valuable feedback to their satisfaction with the system.	Not considered - Not cost-effective - difficult technically. Also, there are health concerns for waste disposal and the unknown market research for the effect on home resale.
72	Water Softening Pilot Study	Technical Memo #1	Nucleation-assisted crystallization systems pilot study. Guelph residents who volunteer for the study will be provided with a system in return for allowing the City to monitor their water quality and for providing feedback regarding their satisfaction with the system.	Yes
73	Best Practices for Municipal Upgrades Document	City Stakeholder	Develop a document outlining best practices for facility upgrades. Potential to coordinate document with the Community Energy Plan.	Yes
Municipal Operational Efficiency				
74	Water Loss Management	Current Program	The City actively pursues efficiency in its own operations. Water loss in the distribution system is managed with annual leak detection activities including sonic leak detection in metal pipes and the installation of district metered areas.	Yes
75	Municipal Facility Upgrades	Current Program	The City continues to upgrade its water-using equipment and to implement other water-savings measures each year in municipal facilities. An example is the recent rainwater harvesting system installed for the bus washing at the City's Transit Facility.	Yes
76	Automated Meter Reading Installation	Technical Memo #5, City Stakeholder	Advanced Metering Infrastructure allows residential and business water meters to be read remotely via a regular radio frequency transmission sent directly from each individual meter. The City can use this information to refine their water loss management program and to inform customers of potential leakage in their home/facility.	Yes

Potential Measure #	Water Efficiency Measure	Source Of Measure	Description	Merits Further/Future Consideration?
77	Distribution System Pressure Management	Literature Review	There are three basic types of controls for distribution system pressure management: fixed outlet (uses typical pressure reducing valve), time-based flow (pressure reducing valves are controlled by a timer to reduce system pressure during the same hours each night), and flow modulated (outlet pressure is automatically adjusted based on flow rates - lower pressures during low flow periods regardless of the time of day). Lower system pressures helps reduce leakage and increase life of infrastructure elements (e.g., water mains).	Yes
78	Water Reuse Aquifer Recharge	Technical Memo #2	Recharging an aquifer with suitably treated wastewater effluent for later use.	Yes
79	Water Reuse Program	MindMixer Idea	Treated wastewater effluent can be used for many municipal operations in the City. A portion of the treated effluent that is currently is pumped into the Speed River could be used for street cleaning, flushing storm and sanitary sewers, cleaning catch basins, dust control etc., instead of using potable water.	Yes

3.0 PROGRAM SCORING

Water efficiency measures were scored utilizing the evaluation criteria developed from consultation with the community liaison committee, City Stakeholders, Guelph residents and the Project Team. Table A1 in Appendix A illustrates the alternative measure's weighted score for each program identified as "Merits Further/Future Consideration". Advantages and disadvantages for each scored measure/program are described in Table A2 in Appendix A.

3.1 *Threshold Score*

A threshold score of 6.0 was used to short-list potential measures. With the exception of the Public Outreach/Education measures, the following programs in Table 2 received a Water Efficiency Measure Score above 6.0. The complete list of ranked water efficiency measures is provided in Table A3, Appendix A.

Table 2: Water Efficiency Measures that Scored Above 6.0 and Public Outreach/Education Measures

Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category
30	Irrigation Audit (WSIP)	12.6	Outdoor
64	Irrigation System Design and Construction Standard for New Construction	12.0	By-law/Regulations
58	New Development Standard	11.4	By-law/Regulations
6d	Blue Built Home Water Efficiency Standards and Rebate Program 2.0	10.8	Indoor
5	Home Visits/Audits	10.5	Indoor
21	Low Impact Development Rebate	10.4	Outdoor
31	Water Efficient Landscaping Incentives	9.7	Outdoor
20	Healthy Landscapes	8.6	Outdoor
68	Water Conservation Grant	8.5	Innovation/Future Studies
79	Water Reuse Program	8.0	Municipal Operational Efficiency
77	Distribution System Pressure Management	7.7	Municipal Operational Efficiency
19	Plumber Rebate Program	7.1	Indoor
65	Rainwater Collection Network Regulations	6.6	By-law/Regulations
44	Capacity Buyback Program with On-bill Financing	6.5	Industrial/Commercial/Institutional
41	Capacity Buyback Program with Increased Incentive	6.4	Industrial/Commercial/Institutional
18	Targeted Audit/Retrofit Program	6.2	Indoor
33	Installation/Bulk Procurement Program	6.2	Multi-residential
72	Water Softening Pilot Study	6.2	Innovation/Future Studies
32	Metering and Sub-metering	6.1	Multi-residential
46	Resources for Youth	2.0	Public Outreach/Education
47	Community Organization Support	2.0	Public Outreach/Education
49	Public Education	2.0	Public Outreach/Education
56	Mobile Applications	2.0	Public Outreach/Education
48	Business Labelling/Certification Program	1.9	Public Outreach/Education

4.0 MEASURE/PROGRAM EVALUATION

The Water Efficiency Measure Score was not the only criteria used to evaluate future water efficiency programming. The following criteria was used to score and rank measures to form a short-list of measures/programs for immediate implementation:

- Evaluation criteria selection via feedback from the Community Liaison Committee, the community outreach, the City's Internal Stakeholders Group.
- Water Efficiency Measure Scores (Section 3.0)
- Financial Evaluation – Each measure was evaluated based on the cost of implementation and amount of potential savings versus the cost of increased expansion of the existing water and wastewater systems.
- Feasibility Evaluation – Each measure was evaluated on whether the measure/program would have potential in Guelph's marketplace and be technically viable in Guelph's climate.
- Magnitude of Water Savings / Contribution to Achieving Guelph's 2038 target – Each measure was assessed based on its estimated uptake by residents and businesses and if the program/measure had quantifiable savings that could be accounted towards the City's goals.

Details of all measures and programs assessed are shown in Appendix B, Table B1: Summary of Water Efficiency Measure/Program Recommendations.

5.0 RECOMMENDATION OF MEASURES/PROGRAMS

Guelph's 2014 Water Supply Master Plan identifies an average annual day water production reduction of 9,147 cubic metres per day (13 per cent) in 2038 from 2006 values, despite an increase in population of about 30 percent. This reduction equates to a reduction in gross per capita day demands from 369 litres per capita per day 2013 to only 326 litres per capita per day 2038. The current (2014) gross per capita water demand rate of 341 litres per capita per day puts the City ahead of schedule to meet its 2038 demand target. In fact, achieving a gross per capita water demand rate of 341 litres per capita per day was not expected until 2026. For more information, please see the report summarizing the water demand analysis.

In order to continue Guelph's success in water efficiency conservation programming, the following sections describes proposed water efficiency measure to be considered for implementation in the immediate, 5-year, 10-year and 20-year planning horizons, as well as those that were discarded as a result of the evaluation process.

5.1 *Water Efficiency Measures – Immediate Implementation*

The measures/programs that are recommended for immediate implementation fall into three categories:

1. **Direct Savings Measures**: expected to contribute significant water savings in a cost-effective and quantifiable manner.
2. **Indirect Savings Measures**: expected to support the achievement of Guelph's 2038 target but water savings are estimated or not quantifiable.
3. **Research and/or Pilot Study Measures**: measures that may have potential in the future to contribute water savings but that are not currently cost-effective to implement, or risk may be present in utilizing technology that is currently unproven.

5.1.1 Direct Savings Measures

The following measures are based on proven technology and will contribute to direct savings. These measures have been supported by one or more of the following groups: the Community Liaison Committee, public consultation, city staff and/or the consulting team. All of these measures and programs are cost-effective for the City to implement, i.e., the value of the water savings achieved by the measure exceeds the implementation costs borne by the City. These measures are expected to save significant volumes of water and have a high consumer uptake. Rather than implement a large number of measures with limited savings potential, it is recommended that Guelph implement a few comprehensive measures expected to achieve a level of savings in line with the City's savings target, thereby creating a toolbox of programs to achieve the 2038 savings target.

5.1.1.1 Residential

- Royal Flush Rebate Program – Transition existing rebate program to only rebate WaterSense®-certified toilets with effective flush volumes of 4.0-litres or less. Rebates will be available to customers replacing toilets flushing with 6 litres or more, rebate will be available to all customer sectors, with no limits on number of rebates (except for single-family residential customers).
- Blue Built Home Water Efficiency Standards and Rebate Program 2.0 – Recommend transitioning from a three-level program where certain elements are mandatory for each level, to a single level Blue Built

Home program where homeowners and builders can select options in an 'al la carte' manner from a wide variety of measures (including low impact development measures that may have little or no impact on water demands). The Blue Built Home program would also focus on research and pilot studies. Aspects are expected to include measures such as hot water delivery, greywater reuse, rainwater harvesting, etc. The City could offer rebate levels for each measure that is cost-effective (or only marginally not cost-effective for research measures) and use the customer participation and water savings data generated from these programs to guide the development of future programs. The City could also allow existing homes the ability to become certified as a Blue Home when a minimum water savings is reached through inefficient change outs. The inclusion of existing homes would increase participation in the program because more homeowners would be eligible for certification.

- Home Visits/Audits – Continue existing program (currently with eMERGE) with recommendation to conduct water auditing and/or complete a customer water bill data analysis to verify water savings achieved by program. Ensure fixtures being installed exceed water sense max flows. Analysis of residential buildings pre- and post-1996 (when the Ontario Building Code mandated 6 litre toilets in new construction) suggests that audits should focus on single-family homes built post-1996, medium density homes building built pre-1996, and high-residential buildings built post-1996 (see Analysis of Water Demand and Consumption by Sector at www.guelph.ca/wesu).

5.1.1.2 Multi-residential

- Multi-residential Rebate Program – City will offer to data log water demands of high-density residential buildings at no cost to the customer. Customers to receive 24-hour diurnal water demand analysis and an estimation of potential water savings related to installing efficient fixtures and/or fixing leaks. This information will provide property managers/owners with the knowledge to make sound decisions on whether or not to proceed with a building retrofit of water fixtures and appliances or to determine if leaks exist. Opportunities to recommend metering and/or sub-metering would be identified in buildings 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.

5.1.1.3 Industrial/Commercial/Institutional

- Water Smart Business - Capacity Buyback with increased incentive – Recommend looking into the inclusion of on-bill financing when the GEERS program begins to roll out. Metering and sub-metering opportunities may also be identified in large facilities.

5.1.1.4 Municipal Operational Efficiency

- Municipal Facility Upgrades – The City will continue to lead by example and retrofit existing facilities in a cost-effective manner. There is also the possibility to conduct pilot/research projects within municipal facilities (e.g., rainwater harvesting and wastewater reuse).
- Water Loss Management – As system leaks are repaired, new leaks form. As such, system leakage must be managed on an ongoing basis and the water savings from leak repairs cannot be added in a cumulative manner. The City's goal is to reduce the average annual day leakage rate to the lowest economical leakage level and then to maintain it at that level. The City utilizes district metered areas (industry Best Management Practice) to manage leakage in the system where possible. However,

because of the system layout, the need to maintain minimum fire flows and system pressures, etc., it is not possible to use district metered areas in all sections of the system. In these areas, the City must consider other options including annual sounding/correlation programs and the use of field sensors and triangulation technologies. The City should also consider developing infrastructure design standards that better facilitate the use of district metered areas.

5.1.2 Indirect savings measures

These measures are largely education-based and outreach-based. They support the City's overall water efficiency strategy by helping to increase public awareness of City programs. Although it is not possible to quantify the water savings achieved by these measures, in some cases it is possible to determine an approximation of water savings. While these measures are not expected to contribute significant water savings on a per-measure basis, they are important to the Water Conservation Programming and messaging across the City. Without education and outreach, influencing behavioural/ social changes is not possible.

5.1.2.1 Outdoor

- Healthy Landscapes – Recommend transitioning the site audits from City summer staff to landscaping companies. Recommend completing customer water billing analysis to quantify savings.

5.1.2.2 Public Outreach/Education

- Resources for Youth
- Public Education
    - Reduction Challenge
    - Importance of Water Campaign – Focus on renters; students that do not pay water bills (on/off-campus housing)
    - Campaign Collaboration
    - Passive Leak Detection
- Community Organization Support
- Mobile Applications – watr app, a method for people to better understand their water bill and how their use compares to their neighbours

5.1.3 Research and/or Pilot

Guelph takes great pride in being progressive and innovative, and in being a leader in water efficiency. In fact, the City is actively looking to engage in innovative projects. Some of the measures included in this category were included as direct savings measures in the previous version of the water efficiency strategy (as noted in the draft Program Alternatives Report). For example, greywater reuse and rainwater harvesting for single-family homes were both included in the City's Blue Built Home program, however, because of a low uptake by home buyers, a low level of interest by homebuilders, and because these measures are not currently considered cost-effective, they have been moved to the Research and/or Pilot Program section.

While pilot and research projects in and of themselves do not typically generate a vast amount of water savings, testing new technology provides an opportunity to evaluate future savings potential. As technology improves, the cost to implement these types of water saving measures generally decreases and community appetite grows. As such, the City may eventually move some of these measures back to the direct savings

category. Because the City is currently ahead of schedule to meet its 2038 target, it does not need to rely on measures that are unproven, not cost-effective, or not generally supported by the public or homebuilders to save water.

Recommended research/pilot programs include:

- Rainwater Harvesting System Rebate Program – Pilot programs on both residential and large-scale levels to determine where greatest level of savings can be achieved to reduce return on investment.
- In-home Leak Detection System Rebate – Recommend pilot to verify costs, savings and technical feasibility.
- Irrigation Audit (Water Smart Irrigation Professional) – Recommend a pilot program to determine contractor and customer participation levels, as well as costs and water savings. Link with Irrigation System Rebates.
- Greywater reuse- Potentially re-launch a pilot program to test new technology or focus this program at municipal/community buildings (i.e., larger-scale projects).
- Water Conservation Effects Study – To evaluate the effects of water conservation on the wastewater plant, water supply infrastructure, wastewater collection infrastructure, etc.
- Water/Energy Nexus – Piggy back on federal/provincial energy programming and create the link for customers on how water reduction can reduce your energy use.
- Water Softening Pilot Study – Build off current work of piloting the nucleation-assisted crystallization technology in the residential sector. Continue to collaborate with the Region of Waterloo on future studies.
- Best Practices for Municipal Upgrades Document – Used for municipal facility upgrade and new facility construction. This could be coordinated with Community Energy.
- Advanced Metering Infrastructure – Recommend possible pilot study with new developments or within established district metered areas.

5.2 *Water Efficiency Measures – Future Consideration*

Other measures were evaluated but were found to not meet an area of local need for immediate implementation in the City. These programs should be re-evaluated and considered for implementation in the estimated timeframes.

5.2.1 5-Year Implementation Measures/Programs

- Hot Water Re-circulation Systems Rebate – The current high cost of installation and the uncertain level of water savings makes this program less desirable for immediate implementation. Future reduction in purchase and installation costs may make program more cost-effective for the customer.
- Plumber Rebate Program – This program requires time for development with input from local service providers. Transition existing Royal Flush Program to include a $20 rebate to a plumber for the sale and install of WaterSense®-certified toilets with effective flush volumes of 4.0-litres or less. It is recommended that the City not conduct publicity blitzes at home improvement stores due to negative comments from plumbers in the Business Research report (plumbers typically mark-up cost of toilet to customer – having customer purchase own toilet for plumber to install reduces revenues for plumbers).

- Low Impact Development Rebate – Further programming may not be required for new development since the 2014 Planning Act and the City's Official Plan already have policies in place. Also, program does not provide any direct water savings.
- Water Efficient Landscaping Incentives – Only available to customers from service providers – nurseries, landscaping companies.
- Installation/Bulk Procurement Program – Possible logistics concerns associated with keeping inventory and choosing specific fixture makes and models (sole sourcing). Continue to look into potential collaboration or partnership with the proposed GEERS Program.
- Cooling Tower Audit/Rebate Program – Recommend piloting conductivity meter rebates and assess participation, cost and water savings.
- Capacity Buyback Program with On-bill Financing – Possible inclusion with the potential GEERS program on-bill financing.
- Irrigation System Design and Construction Standard for New Construction – Investigate feasibility of developing a standard with consideration of the City's Planning Department that would incorporate aspects of the City's water budget requirements.
- Rainwater Collection Network Regulations – Requires standards, program development and collaboration with planning department. Limited savings potential at this time.
- Rebound Analysis – Potential future research.
- Distribution System Pressure Management - Existing system is not conducive to pressure management due to large pressure zones, possible 5-10 year program in future pressure zones.
- Water Reuse Program (Municipal Operational Efficiency) – Further research required regarding health and safety implications. Potential for a pilot study in the future.
- Water Softener Rebate – Potential program if the efficiency of water softeners improves and appropriate certification criteria is developed.

5.2.2 10-Year Implementation Measures/Programs

- Targeted Audit/Retrofit Program – Targeting high residential users may provide challenges when considering privacy. Requires confirmation that the program will not impede on the public's privacy of information rights via the Freedom of Information Act.
- Multi-residential Water Reuse Program/Rebate – Future consideration is based on results of a proposed University of Guelph's pilot study.

5.2.3 20-Year Implementation Measures/Programs

- Community Improvement Planning – For future consideration with coordination with Guelph's Planning Department.
- New Development Standard – Standards above the current Ontario Building Code and planning acts would require additional coordination with provincial and federal levels of government. Not a viable option for immediate implementation.
- Water Reuse Aquifer Recharge – Future consideration when cost and availability of supply make recharge a viable option.

5.3 *Water Efficiency Measures - Discarded*

Other measures were evaluated for inclusion that failed to make the grade either because they were not suitable for inclusion in the City, they were not cost-effective, they could be included as part of another measure, the expected savings was minimal, or they were not based on proven technology.

- Smart Wash Washing Machine Rebate Program – Sunset program at the end of 2016, marketplace change to ENERGY STAR® washers.
- Tiered Toilet Rebate Program – Recommend remaining with the simplicity of the Royal Flush Rebate program but only rebating toilet models that flush with 4.0-litres or less.
- Business Labelling/Certification Program – Recommend focusing resources on an increased incentive for the Industrial/Commercial/Institutional sector.
- Water Conservation Grant – There are grants available to the community currently (e.g., Community Wellness, open government, Innovation Guelph). Council may question need to offer yet another financial support vehicle.

6.0 SUMMARY

The recommended programs are estimated to achieve a water savings of approximately 1,344 cubic metres per day each year (1,090 cubic metres per day for water loss management and 254 cubic metres per day for the remaining programs). The following table highlights which sectors the recommended programs target for water savings (residential, Industrial/commercial/institutional, and/or non-revenue water).

Table 3: Recommended Measure/Program Summary

Program/Measure	Residential	Industrial/ Commercial/ Institutional	Non-Revenue Water
Direct Water Savings			
Royal Flush Toilet Rebate Program	■	■	
Home Visits/Audits	■		
Blue Built Home Water Efficiency Standards and Rebate Program 2.0	■		
Multi-residential Rebate Program	■		
Water Smart Business		■	
Municipal Facility Upgrades			■
Water Loss Management			■
Indirect Water Savings			
Healthy Landscapes	■		
Resources for Youth	■		
Community Organization Support	■		
Public Education	■		
Mobile Applications	■		
Pilot/Research			
Rainwater Harvesting System Rebate Program	■	■	
In-home Leak Detection System Rebate	■		
Irrigation Audit (WSIP)	■	■	
Greywater Reuse Pilot Study	■	■	
Water Conservation Effects Study	■	■	■
Water/Energy Nexus	■	■	■
Water Softening Pilot Study	■	■	
Best Practices for Municipal Upgrades Document			■

7.0 NEXT STEPS

The recommended programs will undergo further financial analysis including financial modelling of when to implement programs over a ten-year planning horizon and be vetted through public consultation. The final list of programs will be presented in the Final Report, which will be available on the City's website (www.guelph.ca/wesu).

8.0 REFERENCES

AECOM and Golder Associates. (2014). *Water Supply Master Plan Update.* City of Guelph.

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Resource Management Strategies Inc. (2009). *Water Conservation and Efficiency Strategy Update.* Guelph: Guelph.

Appendix A – Program Alternatives Scoring

	CRITERIA	Indoor													
		1. Royal Flush Toilet Rebate Program		2. Greywater Reuse Rebate Program		3. Smart Wash Washing Machine Rebate Program		4. Rainwater Harvesting System Rebate Program		5. Home Visits/Audits		6.a Blue Built Home Water Efficiency Standards and Rebate Program - Bronze		6.b Blue Built Home Water Efficiency Standards and Rebate Program - Silver	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	-2.00	-2.0	2.00	2.0	-2.00	-2.0	2.00	2.0	-2.00	-2.0	2.00	2.0	2.00	2.0
2	Measure is innovative.	-2.00	-1.9	1.00	0.9	-2.00	-1.9	1.00	0.9	1.00	0.9	-2.00	-1.9	1.00	0.9
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
4	Maximize social benefits.	2.00	1.8	-2.00	-1.8	1.00	0.9	-2.00	-1.8	2.00	1.8	0.00	0.0	0.00	0.0
5	Measure based on proven technology.	2.00	1.7	1.00	0.9	2.00	1.7	1.00	0.9	2.00	1.7	2.00	1.7	2.00	1.7
6	Measure has positive environmental benefit.	-1.00	-0.9	1.00	0.9	-1.00	-0.9	1.00	0.9	1.00	0.9	1.00	0.9	1.00	0.9
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	-1.00	-0.8	1.00	0.8	-1.00	-0.8	1.00	0.8	1.00	0.8	1.00	0.8	1.00	0.8
8	Easy for customer to implement.	0.00	0.0	-1.00	-0.8	0.00	0.0	-1.00	-0.8	2.00	1.6	2.00	1.6	2.00	1.6
9	Benefits local economy.	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5
10	Cost-effective to City vs. expanding supply.	-1.00	-0.7	-2.00	-1.4	-1.00	-0.7	-2.00	-1.4	2.00	1.4	1.00	0.7	0.00	0.0
11	Reduces water and/or wastewater infrastructure costs.	-1.00	-0.7	1.00	0.7	-1.00	-0.7	1.00	0.7	1.00	0.7	1.00	0.7	1.00	0.7
12	Cost-effective to the customer.	2.00	1.1	-2.00	-1.1	1.00	0.5	-2.00	-1.1	2.00	1.1	1.00	0.5	1.00	0.5
13	Minimize administrative burden for City.	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	0.00	0.0	-1.00	-0.5	-1.00	-0.5
	Totals	-1.00	-1.3	1.00	2.1	-3.00	-2.8	1.00	2.1	14.00	10.5	10.00	8.1	12.00	10.2

	CRITERIA	Indoor													
		6.c Blue Built Home Water Efficiency Standards and Rebate Program - Gold		6.d Blue Built Home Water Efficiency Standards and Rebate Program		7. Tiered Toilet Rebate Program		9. Water Softener Rebate		11. Hot Water Re-circulation Systems Rebate		12. In-home Leak Detection System Rebate		18. Targeted Audit/Retrofit Program	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	2.00	2.0	2.00	2.0	-2.00	-2.0	-2.00	-2.0	2.00	2.0	0.00	0.0	-2.00	-2.0
2	Measure is innovative.	1.00	0.9	-1.00	-0.9	0.00	0.0	1.00	0.9	1.00	0.9	2.00	1.9	1.00	0.9
3	Focus is on high water users.	0.00	0.0	1.00	0.9	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	2.00	1.8
4	Maximize social benefits.	0.00	0.0	2.00	1.8	2.00	1.8	1.00	0.9	-2.00	-1.8	2.00	1.8	-1.00	-0.9
5	Measure based on proven technology.	1.00	0.9	2.00	1.7	2.00	1.7	2.00	1.7	1.00	0.9	-1.00	-0.9	2.00	1.7
6	Measure has positive environmental benefit.	1.00	0.9	0.00	0.0	-1.00	-0.9	1.00	0.9	1.00	0.9	1.00	0.9	0.00	0.0
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	1.00	0.8	1.00	0.8	1.00	0.8	1.00	0.8	1.00	0.8	0.00	0.0	0.00	0.0
8	Easy for customer to implement.	0.00	0.0	1.00	0.8	0.00	0.0	0.00	0.0	2.00	1.6	2.00	1.6	2.00	1.6
9	Benefits local economy.	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	0.00	0.0	2.00	1.5
10	Cost-effective to City vs. expanding supply.	-2.00	-1.4	2.00	1.4	1.00	0.7	-1.00	-0.7	-1.00	-0.7	0.00	0.0	1.00	0.7
11	Reduces water and/or wastewater infrastructure costs.	1.00	0.7	1.00	0.7	1.00	0.7	1.00	0.7	1.00	0.7	0.00	0.0	1.00	0.7
12	Cost-effective to the customer.	-2.00	-1.1	1.00	0.5	2.00	1.1	1.00	0.5	-1.00	-0.5	0.00	0.0	1.00	0.5
13	Minimize administrative burden for City.	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5
Totals		4.00	4.7	13.00	10.8	7.00	5.0	6.00	4.8	6.00	5.8	5.00	4.8	8.00	6.2

		Indoor		Outdoor								Multi-residential			
CRITERIA		19. Plumber Assisted Water Efficiency Rebate		20. Healthy Landscapes		21. Low Impact Development Rebate		30. Irrigation Audit (WSIP)		31. Water Efficient Landscaping Incentives		32. Metering and Sub-metering		33. Installation/Bulk Procurement Program	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	-2.00	-2.0	0.00	0.0	1.00	1.0	-2.00	-2.0	1.00	1.0	1.00	0.9	1.00	1.0
2	Measure is innovative.	2.00	1.9	1.00	0.9	2.00	1.9	2.00	1.9	2.00	1.9	1.00	0.9	0.00	0.0
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	2.00	1.8	0.00	0.0	2.00	1.8	0.00	0.0
4	Maximize social benefits.	2.00	1.8	1.00	0.9	1.00	0.9	-1.00	-0.9	1.00	0.9	0.00	0.0	0.00	0.0
5	Measure based on proven technology.	2.00	1.7	1.00	0.9	1.00	0.9	2.00	1.7	1.00	0.9	2.00	1.7	2.00	1.7
6	Measure has positive environmental benefit.	-1.00	-0.9	2.00	1.7	2.00	1.7	2.00	1.7	2.00	1.7	0.00	0.0	0.00	0.0
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	-1.00	-0.8	1.00	0.8	1.00	0.8	1.00	0.8	1.00	0.8	0.00	0.0	0.00	0.0
8	Easy for customer to implement.	2.00	1.6	2.00	1.6	0.00	0.0	2.00	1.6	0.00	0.0	0.00	0.0	-1.00	-0.8
9	Benefits local economy.	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	0.00	0.0	2.00	1.5
10	Cost-effective to City vs. expanding supply.	2.00	1.4	0.00	0.0	2.00	1.4	2.00	1.4	1.00	0.7	1.00	0.7	2.00	1.4
11	Reduces water and/or wastewater infrastructure costs.	1.00	0.7	1.00	0.7	1.00	0.7	2.00	1.4	1.00	0.7	0.00	0.0	1.00	0.7
12	Cost-effective to the customer.	1.00	0.5	0.00	0.0	0.00	0.0	2.00	1.1	0.00	0.0	0.00	0.0	2.00	1.1
13	Minimize administrative burden for City.	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	1.00	0.5	-1.00	-0.5	0.00	0.0	-1.00	-0.5
Totals		9.00	7.1	10.00	8.6	12.00	10.4	17.00	12.6	11.00	9.7	7.00	6.1	8.00	6.2

		Multi-residential						Industrial/Commercial/Institutional							
CRITERIA		34. Rainwater Harvesting Program/Rebate		35. Water Reuse Program/Rebate		36. Muiti-residential Rebate Program		37. Water Smart Business Capacity Buyback Program		39. Cooling Tower Audit/Rebate Program		41. Capacity Buyback Program with Increased Incentive		44. Capacity Buyback Program with On-bill Financing	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	2.00	2.0	2.00	2.0	-2.00	-2.0	-2.00	-2.0	-2.00	-2.0	-2.00	-2.0	-2.00	-2.0
2	Measure is innovative.	1.00	0.9	2.00	1.9	0.00	0.0	1.00	0.9	1.00	0.9	1.00	0.9	2.00	1.9
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
4	Maximize social benefits.	-1.00	-0.9	-1.00	-0.9	-1.00	-0.9	-1.00	-0.9	-1.00	-0.9	-1.00	-0.9	-1.00	-0.9
5	Measure based on proven technology.	1.00	0.9	1.00	0.9	2.00	1.7	2.00	1.7	2.00	1.7	2.00	1.7	1.00	0.9
6	Measure has positive environmental benefit.	1.00	0.9	1.00	0.9	0.00	0.0	1.00	0.9	0.00	0.0	1.00	0.9	1.00	0.9
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	1.00	0.8	1.00	0.8	0.00	0.0	1.00	0.8	0.00	0.0	1.00	0.8	1.00	0.8
8	Easy for customer to implement.	-1.00	-0.8	-1.00	-0.8	0.00	0.0	0.00	0.0	2.00	1.6	0.00	0.0	0.00	0.0
9	Benefits local economy.	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5	2.00	1.5
10	Cost-effective to City vs. expanding supply.	0.00	0.0	0.00	0.0	2.00	1.4	2.00	1.4	1.00	0.7	2.00	1.4	2.00	1.4
11	Reduces water and/or wastewater infrastructure costs.	1.00	0.7	1.00	0.7	1.00	0.7	2.00	1.4	1.00	0.7	2.00	1.4	2.00	1.4
12	Cost-effective to the customer.	-2.00	-1.1	-2.00	-1.1	2.00	1.1	1.00	0.5	1.00	0.5	2.00	1.1	2.00	1.1
13	Minimize administrative burden for City.	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5
Totals		4.00	4.5	5.00	5.4	5.00	3.1	8.00	5.9	6.00	4.4	9.00	6.4	9.00	6.5

	CRITERIA	Public Outreach/Education									
		46. Resources for Youth		47. Community Organization Support		48. Business Labelling/Certification Program		49. Public Education		56. Mobile Applications	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
2	Measure is innovative.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
4	Maximize social benefits.	1.00	0.9	1.00	0.9	0.00	0.0	1.00	0.9	1.00	0.9
5	Measure based on proven technology.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
6	Measure has positive environmental benefit.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
8	Easy for customer to implement.	2.00	1.6	2.00	1.6	2.00	1.6	2.00	1.6	2.00	1.6
9	Benefits local economy.	0.00	0.0	0.00	0.0	1.00	0.8	0.00	0.0	0.00	0.0
10	Cost-effective to City vs. expanding supply.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
11	Reduces water and/or wastewater infrastructure costs.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
12	Cost-effective to the customer.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
13	Minimize administrative burden for City.	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5
Totals		2.00	2.0	2.00	2.0	2.00	1.9	2.00	2.0	2.00	2.0

CRITERIA		By-law/Regulations							
		58. New Development Standard		61. Community Improvement Planning		64. Irrigation System Design and Construction Standard for New Construction		65. Rainwater Collection Network Regulations	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	2.00	2.0	-2.00	-2.0	2.00	2.0	2.00	2.0
2	Measure is innovative.	0.00	0.0	0.00	0.0	1.00	0.9	2.00	1.9
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
4	Maximize social benefits.	1.00	0.9	1.00	0.9	-1.00	-0.9	1.00	0.9
5	Measure based on proven technology.	2.00	1.7	1.00	0.9	2.00	1.7	0.00	0.0
6	Measure has positive environmental benefit.	1.00	0.9	1.00	0.9	1.00	0.9	1.00	0.9
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	1.00	0.8	1.00	0.8	1.00	0.8	1.00	0.8
8	Easy for customer to implement.	2.00	1.6	1.00	0.8	2.00	1.6	0.00	0.0
9	Benefits local economy.	0.00	0.0	0.00	0.0	1.00	0.8	0.00	0.0
10	Cost-effective to City vs. expanding supply.	1.00	0.7	1.00	0.7	2.00	1.4	-1.00	-0.7
11	Reduces water and/or wastewater infrastructure costs.	1.00	0.7	1.00	0.7	1.00	0.7	2.00	1.4
12	Cost-effective to the customer.	2.00	1.1	0.00	0.0	2.00	1.1	0.00	0.0
13	Minimize administrative burden for City.	2.00	1.0	-1.00	-0.5	2.00	1.0	-1.00	-0.5
Totals		15.00	11.4	4.00	3.2	16.00	12.0	7.00	6.6

		Innovation/Future Studies													
CRITERIA		66. Rebound Analysis		67. Grey Water Reuse Pilot Study		68. Water Conservation Grant		69. Water Conservation Effects Study		70. Water/Energy Nexus		72. Water Softening Pilot Study		73. Best Practices for Municipal Upgrades Document	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	0.00	0.0	2.00	1.9	0.00	0.0	0.00	0.0	1.00	1.0	1.00	1.0	-2.00	-2.0
2	Measure is innovative.	2.00	1.9	1.00	0.9	2.00	1.9	2.00	1.9	2.00	1.9	2.00	1.9	1.00	0.9
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	1.00	0.9
4	Maximize social benefits.	1.00	0.9	-1.00	-0.9	1.00	0.9	2.00	1.8	2.00	1.8	0.00	0.0	1.00	0.9
5	Measure based on proven technology.	0.00	0.0	1.00	0.9	1.00	0.9	1.00	0.9	2.00	1.7	-2.00	-1.7	1.00	0.9
6	Measure has positive environmental benefit.	0.00	0.0	2.00	1.6	1.00	0.9	0.00	0.0	0.00	0.0	2.00	1.7	0.00	0.0
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	0.00	0.0	0.00	0.0	1.00	0.8	0.00	0.0	0.00	0.0	1.00	0.8	1.00	0.8
8	Easy for customer to implement.	0.00	0.0	-2.00	-1.5	0.00	0.0	0.00	0.0	0.00	0.0	1.00	0.8	0.00	0.0
9	Benefits local economy.	1.00	0.8	1.00	0.7	1.00	0.8	0.00	0.0	0.00	0.0	1.00	0.8	0.00	0.0
10	Cost-effective to City vs. expanding supply.	0.00	0.0	-1.00	-0.7	2.00	1.4	0.00	0.0	0.00	0.0	1.00	0.7	2.00	1.4
11	Reduces water and/or wastewater infrastructure costs.	0.00	0.0	1.00	0.5	2.00	1.4	0.00	0.0	0.00	0.0	1.00	0.7	1.00	0.7
12	Cost-effective to the customer.	0.00	0.0	-2.00	-1.0	1.00	0.5	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
13	Minimize administrative burden for City.	0.00	0.0	-1.00	0.0	-2.00	-1.0	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5
Totals		4.00	3.6	1.00	2.4	10.00	8.5	4.00	4.1	6.00	5.9	7.00	6.2	5.00	4.1

		Municipal Operational Efficiency											
CRITERIA		74. Water Loss Management		75. Municipal Facility Upgrades		76. Automated Meter Reading Installation		77. Distribution System Pressure Management		78. Water Reuse Aquifer Recharge		79. Water Reuse Program	
		Score	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**	**Score**	**Weighted Score**
1	Focus is on new construction.	-2.00	-2.0	-1.00	-1.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
2	Measure is innovative.	-1.00	-0.9	0.00	0.0	1.00	0.9	0.00	0.0	2.00	1.9	2.00	1.9
3	Focus is on high water users.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
4	Maximize social benefits.	2.00	1.8	0.00	0.0	2.00	1.8	2.00	1.8	2.00	1.8	2.00	1.8
5	Measure based on proven technology.	2.00	1.7	2.00	1.7	2.00	1.7	2.00	1.7	1.00	0.9	1.00	0.9
6	Measure has positive environmental benefit.	2.00	1.7	1.00	0.9	0.00	0.0	2.00	1.7	2.00	1.7	2.00	1.7
7	Reduces energy use and greehouse gas associated with water & wastewater system operation.	1.00	0.8	1.00	0.8	0.00	0.0	1.00	0.8	0.00	0.0	1.00	0.8
8	Easy for customer to implement.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
9	Benefits local economy.	0.00	0.0	1.00	0.8	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
10	Cost-effective to City vs. expanding supply.	1.00	0.7	1.00	0.7	0.00	0.0	2.00	1.4	-2.00	-1.4	0.00	0.0
11	Reduces water and/or wastewater infrastructure costs.	1.00	0.7	1.00	0.7	0.00	0.0	1.00	0.7	0.00	0.0	2.00	1.4
12	Cost-effective to the customer.	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
13	Minimize administrative burden for City.	-1.00	-0.5	-1.00	-0.5	-2.00	-1.0	-1.00	-0.5	-1.00	-0.5	-1.00	-0.5
Totals		5.00	4.1	5.00	4.1	3.00	3.5	9.00	7.7	4.00	4.4	9.00	8.0

Potential Measure #	Water Efficiency Measure	Advantages	Disadvantages	Water Efficiency Measure Score
Indoor				
1	Royal Flush Toilet Rebate Program	Toilet rebates are one of the most popular water efficiency programs and installing an efficient toilet will save significant volumes of water.	The shift in marketplace to only efficient models (WaterSense) means that rebates are not required and participants would be free riders.	-1.3
2	Greywater Reuse Rebate Program	Ability to use non-potable water for non-potable uses. Reduces the overall water demand of the system where implemented. This type of program shows leadership by the City. While not necessarily cost-effective for the city or the customer, providing a rebate will assist very "green" customers that might not necessarily be concerned with cost savings to install a system.	Greywater reuse systems are generally not very well accepted in Ontario due to fear of cross contamination and hygiene reasons. The biggest barriers against this measure are regulatory and cost effectiveness. Pilot study in Guelph identified average savings of 16.6 litres per capita per day - equates to about $60 per year in savings, equating to a payback of more than 25 years even with the $1000 rebate. The installation of a greywater reuse system is really only viable in new construction. City's current rebate level is approximately 4 times higher than what would be considered cost-effective for the City.	2.1
3	Smart Wash Washing Machine Rebate Program	Efficient washing machines can save 25 litres per person per day versus older inefficient top-loading models.	Most clothes washers available today are Energy Star certified and are therefore efficient. As such, rebates may not be necessary and may include a large percentage of free ridership.	-2.8
4	Rainwater Harvesting System Rebate Program	Rainwater can be used for non-potable needs such as toilet flushing and irrigation, helping to reduce both average annual day and peak summer day water demands. This type of program shows leadership by the City. While not necessarily cost-effective for the city or the customer, providing a rebate will assist very "green" customers that might not necessarily be concerned with cost savings to install a system.	The installation of a rainwater harvesting system is really only viable for new construction. The payback period for such a system is expected to exceed 25 years even with the City's rebate.	2.1
5	Home Visits/Audits	This program provides an opportunity for "green" customers to learn more about water efficiency opportunities. The program is sponsored by a number of entities and, therefore, the City of Guelph is not responsible for the entire program cost.	The program focuses on energy, food, transportation, waste, and water. Impact may be less than if program focus was on water alone.	10.5
6a	Blue Built Home Water Efficiency Standards and Rebate Program - Bronze	Program helps move the home building industry "beyond code". Program shows leadership by the City.	Some home buyers already have a clothes washer and may not want to accept the model offered by the builder. Most clothes washers available today are Energy Star certified and are therefore efficient. As such, requiring an Energy Star machine may not actually result in additional savings. The level of water savings associated with a bronze Blue Built Home is minimal. In 2015, there were 3 Bronze level homes certified.	8.1
6b	Blue Built Home Water Efficiency Standards and Rebate Program - Silver	Program helps move the home building industry "beyond code". Program shows leadership by the City.	Marketplace demand for water efficient hot water delivery system is low.	10.2
6c	Blue Built Home Water Efficiency Standards and Rebate Program - Gold	Program helps move the home building industry "beyond code". Program shows leadership by the City.	At this time few homeowners appear to be interested in installing greywater or rainwater systems. There are 3 Gold level homes under construction at the time of this report.	4.7
6d	Blue Built Home Water Efficiency Standards and Rebate Program 2.0	This program will include both new construction as well as retrofitting. The homes that install a WaterSense toilet, a WaterSense washing machine and a waterless floor drain at a minimum, will qualify for Blue Home Certification.	Some home buyers already have a clothes washer and may not want to accept the model offered by the builder. Most clothes washers available today are Energy Star certified and are therefore efficient. As such, requiring an Energy Star machine may not actually result in additional savings. The level of water savings associated with a bronze Blue Built Home is minimal. In 2015, there were 3 Bronze level homes certified.	10.8

Potential Measure #	Water Efficiency Measure	Advantages	Disadvantages	Water Efficiency Measure Score
Indoor				
7	Tiered Toilet Rebate Program	Will allow the majority of Guelph customers to improve their water efficiency. This program will include the First Generation Ultra Low Flush models.	The shift in marketplace to only efficient models (WaterSense) means that rebates are not required and participants would be free riders.	5.0
9	Water Softener Rebate	Softeners that use less salt and reduce the frequency of recharging will save water.	The City will have to supply a list of water softeners that are approved for rebates. In doing so, the City is both endorsing ion exchange softeners as well as the appliances on the list. Significant effort would be required to prepare the preferred water softener list.	4.8
11	Hot Water Re-circulation Systems Rebate	Less water is wasted while waiting for hot water. Also, having the convenience of hot water when you need it.	Initial cost of the system and installation. Electricity costs may be greater than cost of water saved. Heat loss from constantly heated pipes can also be a disadvantage.	5.8
12	In-home Leak Detection System Rebate	The device will alert customers of water leaks. Can raise awareness of water use.	The device will only provide water savings if there is a leak to detect.	4.8
18	Targeted Audit/Retrofit Program	Targets high water users, making program as cost effective as possible.	Program is only available to residents that are above-average water users. Does not reward low water users with the ability to participate.	6.2
19	Plumber Rebate Program	Plumbers would encourage the use of water efficient appliances and fixtures. Plumbers would only endorse models that were both water efficient and that would provide customer satisfaction.	Plumbers will only endorse products that provide quality and results. This is only a disadvantage when marketplace does not supply products up to the individual standard of each plumber.	7.1
Outdoor				
20	Healthy Landscapes	Provides awareness in water efficient landscaping for residential homeowners with a yard.	Program is not available to all water users in Guelph, only residents with a yard. No way of knowing which suggestions are implemented. Also, program participation is not based on high outdoor water users, therefore minimal overall outdoor water savings is likely.	8.6
21	Low Impact Development Rebate	Applied on a broad scale, low impact development can maintain or restore a watershed's hydrologic and ecological functions. Low impact development has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.	Program is not available to all water users in Guelph, only residents with a yard. Also, program participation is not based on high outdoor water users, so participants may not be able to improve their seasonal water demand.	10.4
30	Irrigation Audit (WSIP)	The average water savings during the pilot study for the Water Smart Irrigation Professional program saved 10,000 litres per day per acre of landscape (a reduction in depth of water applied of about 17mm per week) without compromising the health and beauty of the landscape.	Requires participation from leading Irrigation Professionals. A Guelph customer could employ an irrigation professional from outside of the City, where they are not required/or aware of the irrigation program.	12.6
31	Water Efficient Landscaping Incentives	Promotes a holistic approach to water conservation. Benefits extend to other municipal departments (e.g. stormwater management).	The City does not have a large outdoor water use demand. Resources may be better spent on programs that focus on more high demand sectors/areas.	9.7
Multi-residential				
32	Metering and Sub-metering	Potential for high water savings due to the volume of water use per building.	Configuration of plumbing requires many meters to be installed.	6.1
33	Installation/Bulk Procurement Program	Increases local economy if focused on local manufacturers of water efficient products and local tradespeople. Possible partnership with the Guelph Energy Efficiency Retrofit Strategy.	City will have the burden of financing the bulk procurement of the water efficient fixtures and appliances. Increased resources for storing and managing inventory.	6.2
34	Rainwater Harvesting Program/Rebate	Provides an alternate source of water for non-potable uses (e.g. toilet flushing, irrigation). Program shows leadership by the City.	Areas of concern include existing codes and regulations, health and safety, and property rights.	4.5

Potential Measure #	Water Efficiency Measure	Advantages	Disadvantages	Water Efficiency Measure Score
Multi-residential				
35	Water Reuse Program/Rebate	Ability to use non-potable water for non-potable uses. Reduces the overall water demand of the system where implemented. Program shows leadership by the City.	Water reuse systems are generally not very well accepted in Ontario due to fear of cross contamination and hygiene reasons. The biggest barriers against this measure are regulatory and cost effectiveness.	5.4
36	Multi-Residential Rebate Program	Payback periods of less than two years are easily achievable for toilets and showerheads. The installation of new fixtures may also increase tenant satisfaction and the value of the property.	The shift in marketplace to only efficient models (WaterSense) means that rebates are not required and participants would be free riders. Payback periods for clothes washers are typically greater than 7 years.	3.1
Industrial/Commercial/Institutional				
37	Water Smart Business - Capacity Buyback	Accountable water savings are beneficial to both the businesses where water efficient measures are implemented and the City.	Water efficiency projects will compete for businesses resources for whether a water or energy retrofit will be implemented. Companies are able to receive up to 50 percent of the cost of the project for energy retrofits.	5.9
39	Cooling Tower Audit/Rebate Program	Water savings from reduction of cooling water will also reduce wastewater charges that are considered unfair by businesses since the City does not treat the water lost to evaporation.	Liability for process issues that may develop from implementing suggestions from the audit (e.g. fouling, corrosion).	4.4
41	Capacity Buyback Program with Increased Incentive	The increased rebate amount allows for implementation of water efficiency measures that fit within the 3 year payback required by the Industrial/Commercial/Institutional sector. The increase will likely increase participation in the program and lead to more water savings for the City.	Increased capital investment in water efficiency. Potentially restricted due to budgetary constraints.	6.4
44	Capacity Buyback Program with On-bill Financing	Will be able to customize a water efficiency plan for any businesses' return on investment requirement.	Will require additional buy-in from the City to provide the upfront costs of implementing the measure. There are risks involved if business closes without fulfilling the terms of the financing agreement. Increased administration costs to be considered.	6.5
Public Outreach/Education				
46	Resources for Youth	Educate each generation of the importance of water conservation.	Difficult to know whether the program is cost-effective. Cost related to implementation is not easily accounted for by cost benefits of program.	2.0
47	Community Organization Support	Ability to fund "Out-of-the-box" Innovation.	City staffing requirements to evaluate submissions and assign funding when justified.	2.0
48	Business Labelling/Certification Program	Highlights ways to reduce water consumption within the business sector. Free publicity for the business and would encourage participation in the Industrial/Commercial/Institutional Buyback program (if continued).	Increased City involvement in advertising and marketing.	1.9
49	Public Education	Public education and awareness can also increase the effectiveness of other measures when paired together. For example, most residents will be more willing to install a water-efficient showerhead after a city wide “Water Conservation Week” has taken place.	Difficult to know whether the program is cost-effective. Cost related to implementation is not easily accounted for by cost benefits of program.	2.0
56	Mobile Applications	The watr app focuses on behavioral changes and provides education and marketing for the City's Programs.	Does not directly save water; replies on behavioral changes and widespread use of the app.	2.0

Potential Measure #	Water Efficiency Measure	Advantages	Disadvantages	Water Efficiency Measure Score
By-law/Regulations				
58	New Development Standard	New construction was highlighted as an area of focus for residents. The City's growth, as outlined in the Places to Grow Act, is seen as an opportunity to implement progressive water efficiency measures.	Ability for the City to mandate/enforce requirements beyond the Ontario Building Code.	11.4
61	Community Improvement Planning	Utilizes City resources to consider water conservation in all City planning capacities.	Requires increased communication within departments.	3.2
64	Irrigation System Design and Construction Standard for New Construction	Potential to reduce outdoor water demand.	Only applicable to customers that will install an irrigation system.	12.0
65	Rainwater Collection Network Regulations	Could provide a framework for new construction in the City. Could result in a new Building Standard for commercial and multi-residential buildings.	Increased liability for the City.	6.6
Innovation/Future Studies				
66	Rebound Analysis	Tailor programs that promote long term savings. Enable to better quantify water savings from public awareness campaigns.	Will require additional resources from City staff.	3.6
67	Greywater Reuse Pilot Study	Allows for collaboration with surrounding Municipalities/Regions.	Previous studies and reports have been conducted previously confirming the long period for return on investment.	2.4
68	Water Conservation Grant	Ability to fund "Out-of-the-box" Innovation.	Will require additional resources from City staff.	8.5
69	Water Conservation Effects Study	Considers a holistic approach to municipal operations by considering the affects of water conservation on other departments.	Will require additional resources from City staff.	4.1
70	Water/Energy Nexus	Links water conservation with energy conservation. May be able to provide further insight on collaboration and pooling of resources.	Completed studies may be sufficient in providing information on ways to combine water conservation with energy savings.	5.9
72	Water Softening Pilot Study	Has the potential to affect the majority of water customers in the City.	Unknown whether study will results in water savings.	6.2
73	Best Practices for Municipal Upgrades Document	Guidance document to standardize and prioritize water efficient upgrades.	Document must be implemented correctly to provide actual water savings.	4.1
Municipal Operational Efficiency				
74	Water Loss Management	Program currently operating in conjunction with the City's infrastructure maintenance department. A combined effort with resources from the Water Efficiency Strategy results in in increased water savings.	Continual water loss within the system through leaks and breaks require continued effort and resources. Unable to quantify water savings from reducing leakage or preventing leaks through increased maintenance.	4.1
75	Municipal Facility Upgrades	The City shows leadership by implementing water efficient measures into municipal buildings.	Cost of installation and City resources to implement project.	4.1

Potential Measure #	Water Efficiency Measure	Advantages	Disadvantages	Water Efficiency Measure Score
Municipal Operational Efficiency				
76	Automated Meter Reading Installation	Benefits associated with using automatic meter reading include; providing better demand data for hydraulic modeling or demand forecasting, customer leak detection, lowering meter reading costs, vehicle fuel and maintenance costs, and associated greenhouse gas emissions, better customer service, and better enabling use of seasonal water demand rates, excessive daily demand rates, or even time-of-day rates.	Cost of installation, time required if agreed to only install when meters require replacement. Public safety/liability concern with automated devices catching on fire (hydro meters in Saskatchewan).	3.5
77	Distribution System Pressure Management	Reduction in effort required by leak surveys crews to identify leaks. Faster response to leaks results in fewer litres lost.	Cost of installation of network of district metered areas.	7.7
78	Water Reuse Aquifer Recharge	Provides an alternate source of potable water. The quality of the reclaimed water improves as it passes through the natural environment – as such, less intensive treatment is required at the water treatment plant. Aquifer recharge is a well established method with generally positive public perception when combined with educational programs.	More expensive than direct potable reuse, possible contamination of the groundwater aquifer, potentially high levels of organic chemicals in treated wastewater and their toxicological effects and potentially high levels of total dissolved solids, nitrates, and pathogens in treated wastewater. There are also public concerns due to health related issues.	4.4
79	Water Reuse Program	Provides an alternate source of non-potable water for non-potable uses. Success of this program could easily lead to further City applications (e.g. irrigation of City property) and also resale of wastewater to the private sector (i.e. golf course irrigation).	Public health concerns. Aerosolization of waterborne pathogens.	8.0

Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category
30	Irrigation Audit (Water Smart Irrigation Professional)	12.6	Outdoor
64	Irrigation System Design and Construction Standard for New Construction	12.0	By-law/Regulations
58	New Development Standard	11.4	By-law/Regulations
6d	Blue Built Home Water Efficiency Standards and Rebate Program 2.0	10.8	Indoor
5	Home Visits/Audits	10.5	Indoor
21	Low Impact Development Rebate	10.4	Outdoor
6b	Blue Built Home Water Efficiency Standards and Rebate Program - Silver	10.2	Indoor
31	Water Efficient Landscaping Incentives	9.7	Outdoor
20	Healthy Landscapes	8.6	Outdoor
68	Water Conservation Grant	8.5	Innovation/Future Studies
6a	Blue Built Home Water Efficiency Standards and Rebate Program - Bronze	8.1	Indoor
79	Water Reuse Program	8.0	Municipal Operational Efficiency
77	Distribution System Pressure Management	7.7	Municipal Operational Efficiency
19	Plumber Rebate Program	7.1	Indoor
65	Rainwater Collection Network Regulations	6.6	By-law/Regulations
44	Capacity Buyback Program with On-bill Financing	6.5	Industrial/Commercial/Institutional
41	Capacity Buyback Program with Increased Incentive	6.4	Industrial/Commercial/Institutional
18	Targeted Audit/Retrofit Program	6.2	Indoor
33	Installation/Bulk Procurement Program	6.2	Multi-residential
72	Water Softening Pilot Study	6.2	Innovation/Future Studies
32	Metering and Sub-metering	6.1	Multi-residential
70	Water/Energy Nexus	5.9	Innovation / Future Studies
37	Water Smart Business - Capacity Buyback	5.9	Industrial / Commercial / Institutional
11	Hot Water Re-circulation Systems Rebate	5.8	Indoor
35	Water Reuse Program/Rebate	5.4	Multi-residential
7	Tiered Toilet Rebate Program	5.0	Indoor
9	Water Softener Rebate	4.8	Indoor
12	In-home Leak Detection System Rebate	4.8	Indoor
6c	Blue Built Home Water Efficiency Standards and Rebate Program - Gold	4.7	Indoor
34	Rainwater Harvesting Program/Rebate	4.5	Multi-residential
39	Cooling Tower Audit/Rebate Program	4.4	Industrial / Commercial / Institutional
78	Water Reuse Aquifer Recharge	4.4	Municipal Operational Efficiency
75	Municipal Facility Upgrades	4.1	Municipal Operational Efficiency
73	Best Practices for Municipal Upgrades Document	4.1	Innovation / Future Studies
74	Water Loss Management	4.1	Municipal Operational Efficiency
69	Water Conservation Effects Study	4.1	Innovation / Future Studies
66	Rebound Analysis	3.6	Innovation / Future Studies
76	Automated Meter Reading Installation	3.5	Municipal Operational Efficiency
61	Community Improvement Planning	3.2	By-law / Regulations
36	Multi-residential Rebate Program	3.1	Multi-residential
67	Greywater Reuse Pilot Study	2.4	Innovation / Future Studies
4	Rainwater Harvesting System Rebate Program	2.1	Indoor
2	Greywater Reuse Rebate Program	2.1	Indoor
46	Resources for Youth	2.0	Public Outreach / Education
47	Community Organization Support	2.0	Public Outreach / Education
49	Public Education	2.0	Public Outreach / Education
56	Mobile Applications (watr)	2.0	Public Outreach / Education
48	Business Labelling/Certification Program	1.9	Public Outreach/Education
1	Royal Flush Toilet Rebate Program	-1.3	Indoor
3	Smart Wash Washing Machine Rebate Program	-2.8	Indoor

Appendix B – Recommendations

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Recommend Immediate Implementation / Direct Savings	1	Royal Flush Toilet Rebate Program	-1.3	Indoor	$ 2.82	Yes	Yes	30.2	Phase out rebates for WaterSense® 4.8 litres toilets end of 2016, change to WaterSense® 4.0 litres (save 2 litres per flush times 5 flushes per capita per day times 3 people times 67 percent to account for multiple toilets (more than 1 toilet in a single family) equals 20 litres per day.
	5	Home Visits/Audits	10.5	Indoor	$ 1.79	Yes	Yes	16.2	Educational, savings should be verified: Cost, City pays $65 per visit (City), Savings, eMERGE report states that 10-20 percent water savings achieved with each visit (180 litres per capita per day, 3 people per house, 10 percent equals 54 litres savings per home visit)
	6d	Blue Built Home Water Efficiency Standards and Rebate Program 2.0	10.8	Indoor	$ 11.31	No	Yes	3.4	Water Savings from City website (save $83.57 per year, divided by 365 days, divided by current water rate ($3.32 per cubic metres times 1000 equals 69 litres per day) (Toilet, washing machine and floor drain).
	36	Multi-residential Rebate Program	3.1	Multi-residential	$ 34.81	No	Yes	6.8	City could offer funding to companies to complete multi-residential building audits or do them internally like Capacity Buyback audits, include 24-hour baseline monitoring. Assume save 10 percent of demand (25 suites * 1.5 persons per house *180 litres per capita per day * 10 percent). *includes Installation/Bulk Procurement Program (5 year)
	41	Water Smart Business	6.4	Industrial / Commercial / Institutional	$ 1.98	Yes	Yes	150.0	Cost estimate include $5,000 for audit and $0.75 per litre buyback for water saved, includes cooling towers and all other Industrial/Commercial/Institutional indoor measures.
	75	Municipal Facility Upgrades	4.1	Municipal Operational Efficiency	$ 2.74	Yes	Yes	22.0	Cost is the average cost per year, savings are the average savings per year (both provided by City).
	Total Direct Demand Water Savings							228.5	
	74	Water Loss Management	4.1	Municipal Operational Efficiency	$ 0.21	Yes	Yes	1089.9	Water savings and cost are the average savings and cost per year (provided by City).
	Total Direct Non-revenue Water Savings							1089.9	

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Recommend Immediate Implementation / Indirect Savings	20	Healthy Landscapes	8.6	Outdoor	$ 48.27	No	Yes	0.2	Unknown Savings, recommend to transition to service providers (co-ops for landscaping program), cost of co-op and supervisor. Recommend doing customer water billing analysis to quantify savings if any. Assume 27 litres per day outdoor use during summer (5 percent * 180 litres per capita per day * 3 persons per house indoor use) = 9 litres per day average over yearr, assume save 30 percent = 3 litres per day
	46	Resources for Youth	2.0	Public Outreach / Education	N/A	N/A	Yes	0.0	
	47	Community Organization Support	2.0	Public Outreach / Education	N/A	N/A	Yes	0.0	
	49	Public Education	2.0	Public Outreach / Education	N/A	N/A	Yes	0.0	
	56	Mobile Applications (watr)	2.0	Public Outreach / Education	N/A	N/A	Yes	0.0	
	Total Indirect Demand Water Savings							0.2	

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Recommend Immediate Implementation Pilot / Research	2	Greywater Reuse Rebate Program	2.1	Indoor	$ 10.00	No	Yes	0.2	Return on investment for customer and City has remained low.
	4	Rainwater Harvesting System Rebate Program	2.1	Indoor	$ 25.43	No	Yes	0.2	Return on investment low for both customer and City, however the City and community would like to include. 200 litres per day from City website based on savings, calculated with an efficient toilet equals 4.8 litres times 5 flushes per capita times 3, plus 180 times times 3 times 5 percent times 90 summer days divided by 365 days.
	12	In-home Leak Detection System Rebate	4.8	Indoor	N/A	N/A	Yes	0.0	Recommend pilot to verify technical feasibility and savings.
	30	Irrigation Audit (Water Smart Irrigation Professional)	12.6	Outdoor	$ 0.23	Yes	Yes	9.9	
	34	Rainwater Harvesting Program/Rebate	4.5	Multi-residential	$ 8.33	No	Yes	3.6	Multi-residential building with 100 units times 1.5 times 24 litres saved.
	67	Greywater Reuse Pilot Study	2.4	Innovation / Future Studies	$ 138.89	No	Yes	0.1	72 litres per day for toilet flushing. Cost of monitoring/pilot program, potential research study for graduate student from University of Guelph.
	69	Water Conservation Effects Study	4.1	Innovation / Future Studies	N/A	N/A	Yes	0.0	
	70	Water/Energy Nexus	5.9	Innovation / Future Studies	N/A	N/A	Yes	0.0	
	72	Water Softening Pilot Study	6.2	Innovation / Future Studies	N/A	N/A	Yes	0.0	Further consideration; pending results of Waterloo research study.
	73	Best Practices for Municipal Upgrades Document	4.1	Innovation / Future Studies	N/A	N/A	Yes	0.0	
	76	Automated Meter Reading Installation	3.5	Municipal Operational Efficiency	$ 20.61	No	Yes	11.2	A great tool to provide info for ILI calcs and to notify homes of potential leakage but might not be cost-effective at this time. Possible near-future pilot studies in new developments. Provides an education tool.
	Total Pilot/Research Water Savings							25.1	

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Recommend 5 Year Implementation	11	Hot Water Re-circulation Systems Rebate	5.8	Indoor	$ 3.33	Yes	Yes	0.6	Estimate savings of 10 litres per capita per day times 3 persons per homes equals 30 litres per home per day times $4.682 per litre per day equals $140 rebate. Assumed a cost of $800 to install.
	19	Plumber Rebate Program	7.1	Indoor	$ 3.50	Yes	Yes	20.0	Will require development of the program with input from service providers and City administration staff. Plumber gets $20 for installation of an efficient toilet.
	21	Low Impact Development Rebate	10.4	Outdoor	$ 18.52	No	Yes	0.1	Seasonal - Savings weighted for summer. Bioswales, rain gardens - in line with upcoming stormwater charges, focus on existing homes/building, incorporation of low impact development in development application is already required - Provincial Policy Statement, 2014 Planning Act and the City's Official Plan.
	31	Water Efficient Landscaping Incentives	9.7	Outdoor	N/A	N/A	Yes	0.0	Only offered by service providers -nurseries, landscaping companies. Recommend customer water billing analysis to quantify savings if any. Plants and flowers.
	33	Installation/Bulk Procurement Program	6.2	Multi-residential	$ 3.99	Yes	Yes	26.3	Same rebate as for residential 4.0-litre or less toilets at $70 per fixture, not a separate program. Unnecessary effort from City to store and maintain supply. Future potential programming with GEERS.
	39	Cooling Tower Audit/Rebate Program	4.4	Industrial / Commercial / Institutional	$ 8.00	Yes	Yes	5.0	Recommend pilot conductivity sensor/meter rebate. Study 5 buildings in order to verify savings and cost effectiveness of program.
	44	Capacity Buyback Program with On-bill Financing	6.5	Industrial / Commercial / Institutional	$ 1.25	Yes	No	250.0	Capacity buyback with increased incentive, recommend on-bill financing phase in (5-year) if GEERS program has proceeded with on-bill financing.
	64	Irrigation System Design and Construction Standard for New Construction	12.0	By-law/Regulations	$ 0.68	Yes	Yes	1.1	Seasonal - Savings weighted for summer. Create a By-law; could incorporate with existing new development regulations. Water savings: half acre lot (2,020 square metre) times 50 percent landscape times 4,400 litres per day (25 milimetre per week, an inch a week), save ten percent equals 440. (cost of by-law over 10 year).
	65	Rainwater Collection Network Regulations	6.6	By-law/Regulations	N/A	N/A	Yes	0.0	Cost is based on cost of regulating/allowing for rainwater collection networks, not implementing harvesting unit and piping required to distribute (liable for contamination).

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Recommend 5 Year Implementation	66	Rebound Analysis	3.6	Innovation / Future Studies	N/A	N/A	Yes	0.0	Incorporate with Water Conservation and Effects Study.
	77	Distribution System Pressure Management	7.7	Municipal Operational Efficiency	$ 0.60	Yes	No	20.0	Existing system is not conducive to pressure management due to large pressure zones, future pressure zones 3 and 2 East merit consideration for pilot study. Pressure management only viable until water tower storage is complete.
	79	Water Reuse Program	8.0	Municipal Operational Efficiency	N/A	N/A	No	0.0	Pilot study with the University of Guelph, if York feedmain proceeds with upgrades to wastewater treatment, program would be for municipal operations only, with potential pilot programs with customers (golf courses) following initial implementation.
	9	Water Softener Rebate	4.8	Indoor	$ 14.29	No	No	0.7	Requires water softeners to have water efficiency ratings - marketplace change. 400 Litres every two weeks, times 50 percent more efficient (culligan website) equals 13.14 litres per day. Must replace a timer based softener with a through put softener.
Recommend 10 Year Implementation	18	Targeted Audit/Retrofit Program	6.2	Indoor	N/A	N/A	No	0.0	Requires research and development of Program - Freedom of Information. Aspect of unfairness (rebating inefficient customers).
	35	Water Reuse Program/Rebate	5.4	Multi-residential	$ 8.33	N/A	No	3.6	Future consideration based on research results from University of Guelph's pilot study. Unknown savings due to dependence on size of multi-residential building and number of units.

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Recommend 20 Year Implementation	61	Community Improvement Planning	3.2	By-law / Regulations	N/A	N/A	No	0.0	Future development with the City's Planning Department.
	58	New Development Standard	11.4	By-law / Regulations	N/A	N/A	No	0.0	A Standard is not mandatory but could include recommendations for depth and quality of topsoil, rough-in for hot water recirc., 4-L toilet, changes that require changes to the Ontario Building Code, will be recommended for the 10-20 year window.
	78	Water Reuse Aquifer Recharge	4.4	Municipal Operational Efficiency	N/A	N/A	No	0.0	Recommended for future review when cost and availability of supply make recharge a viable option. Support further study as described in the 2014 Water Supply Master Plan. Does not help the City achieve their water savings target.
Revised/Incorporated Measure/Program	6a	Blue Built Home Water Efficiency Standards and Rebate Program - Bronze	8.1	Indoor	$ 2.61	Yes	Yes	1.4	Water Savings from City website (save $83.57 per year, divided by 365 days, divided by current water rate ($3.32/cubic metres times 1000 equals 69 litres/day) *Revised Blue Built Home Program 2.0
	6b	Blue Built Home Water Efficiency Standards and Rebate Program - Silver	10.2	Indoor	$ 1.11	Yes	Yes	1.7	Water Savings for toilet (123 litres per day - City), washing machine (77 litre per day - City), waterless floor drain (43 litres per day - City), hot water delivery system (100 litres per day - estimate) *Revised Blue Built Home Program 2.0
	6c	Blue Built Home Water Efficiency Standards and Rebate Program - Gold	4.7	Indoor	$ 7.93	No	Yes	0.6	Recommend greywater and rain water harvesting pilot projects to validate water savings and cost for customer. *Revised Blue Built Home Program 2.0
	32	Metering and Sub-metering	6.1	Multi-residential	$ 14.81	Yes	Yes	3.4	City could offer funding to companies to install sub-metering in Multi-residential building. Assume save 5 percent of demand (25 suites * 1.5 persons per house *180 litres per capita per day * 10 percent). *Multi-residential Rebate Program
	37	Water Smart Business - Capacity Buyback	5.9	Industrial / Commercial / Institutional	$ 0.80	Yes	Yes	200.0	Increase incentive to encourage participation from business sector. *Revised Water Smart Business

	Potential Measure #	Water Efficiency Measure	Water Efficiency Measure Score	Category	Cost per Litre per Day	Financial Feasibility (≤$4.68 L/d)	Guelph Feasibility	Magnitude of Savings (cubic metres per day)	Comments
Discarded Measure/Program	3	Smart Wash Washing Machine Rebate Program	-2.8	Indoor	$ 5.56	No	Yes	1.8	Phase out rebates end of 2016. Assume 25 litres per day savings as the difference between efficient and non-efficient models.
	7	Tiered Toilet Rebate Program	5.0	Indoor	$ 3.21	Yes	Yes	24.1	Royal Flush only - reduces administrative burden for the City.(estimated savings are half 4.8 litres toilets and half 4.0 litre toilets, save 2 or 1.2 litres per flush times 5 flushes per capita per day times 3 people times 67 percent to account for multiple toilets (more than 1 toilet in a single family) equals 16 litres per day.
	48	Business Labelling/Certification Program	1.9	Public Outreach/Education	N/A	N/A	Yes	0.0	Companies are not motivated by City Programs, they have their own Company Guidelines that have green initiatives like water efficiency that motivate them - Business Research Report.
	68	Water Conservation Grant	8.5	Innovation / Future Studies	N/A	N/A	Yes	0.0	Other funding vehicles available; City already has various funding streams like: Community Wellness, open government, and Innovation Guelph Water Group.