Clause 11 in Report No. 4 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on March 24, 2016.

11

Long Term Water Conservation Strategy Update

Committee of the Whole recommends adoption of the following recommendations contained in the report dated February 11, 2016 from the Commissioner of Environmental Services:

1. Council endorse the 2016 Long Term Water Conservation Strategy as part of the 5 year update to the February 17, 2011 Council endorsed strategy; and for the Clerk to forward a copy of this report to the Ministry of the Environment and Climate Change.

2. The Clerk circulate this report to the Clerks of the local municipalities.

3. Council authorize entering into an agreement with Landscape Ontario Horticultural Trades Association to deliver the Water Smart Irrigation Professional and Fusion Gardening® market transformation programs for a term of one year with the option for the Region to renew for up to four additional years.

4. The Commissioner of Environmental Services be authorized to execute the contract, and any renewal agreements on behalf of the Region.

Report dated February 11, 2016 from the Commissioner of Environmental Services now follows:

1. Recommendations

It is recommended that:

1. Council endorse the 2016 Long Term Water Conservation Strategy as part of the 5 year update to the February 17, 2011 Council endorsed strategy; and for the Clerk to forward a copy of this report to the Ministry of the Environment and Climate Change.

2. The Clerk circulate this report to the Clerks of the local municipalities.

3. Council authorize entering into an agreement with Landscape Ontario Horticultural Trades Association to deliver the Water Smart Irrigation Professional and Fusion Gardening® market transformation programs for a term of one year with the option for the Region to renew for up to four additional years.

4. The Commissioner of Environmental Services be authorized to execute the contract, and any renewal agreements on behalf of the Region.

2. Purpose

The purpose of this report is to request Council endorsement of the updated five year Long Term Water Conservation Strategy. An update of the Strategy is required to fulfill the conditions set by the Minister of the Environment and Climate Change (MOECC) for approval of the Southeast Collector Trunk Sewer Individual Environmental Assessment in 2010 as well as the Intra-Basin Transfer in 2010.

3. Background

York Region has implemented water conservation programming since 1998

York Region's Strategic Plan priority areas include supporting community health and well-being and managing environmentally sustainable growth. Water conservation is integral to supporting these two priority areas. Since 1998, York Region has implemented water conservation initiatives through the *Water for Tomorrow* Program. This successful water conservation program has raised awareness of the benefits of water conservation throughout the Region. York Region has been ahead of the curve in planning and implementing best practices for water conservation and efficiency programs for over the past 16 years. In total an estimated 26.2 million litres per day (MLD) of water has been saved, as a result of the Region's water conservation programs and recent North America-wide improvements to the efficiency of water fixtures.

Long Term Water Conservation Strategy is required to fulfil conditions of approval for Southeast Collector and Intra-Basin Transfer

Water conservation became a regulatory requirement for York Region in 2010, when the MOECC approved the Southeast Collector Individual Environmental Assessment study. The approval was contingent on a number of conditions,

including submission of a Long Term Water Conservation Strategy, to be updated every five years. On February 17, 2011, Council endorsed the first Long Term Water Conservation Strategy for submission to MOECC.

Water conservation is also a condition of the MOECC approval of the Region's Intra-basin Transfer application. In 2008, the Region submitted a Permit to Take Water application under the 1985 Great Lakes Charter, requesting an intra-basin transfer of up to 105 MLD of Lake Ontario-based drinking water to support long term growth in Aurora, Newmarket and East Gwillimbury, located within the Lake Huron watershed.

As required under the Great Lake Charter, the Region's intra-basin transfer proposal underwent consultation of bi-national jurisdictions around the Great Lakes. In September 2010, MOECC consented to the requested volume of intra-basin transfer, and extended the Southeast Collector conditions of approval pertaining to water conservation to the intra-basin transfer approval.

Strategy Update reviews best-in-class practices and past achievements to set new direction for water conservation

In compliance with the Minister's conditions, the Long Term Water Conservation Strategy requires an update every five years. The update is due on March 31, 2016. Based on input from MOECC, the Strategy Update undertook the following steps:

- Review and update best-in-class water conservation and efficiency measures
- Update performance targets and timelines
- Consult with stakeholders throughout the Region, local municipal partners, Water Conservation Advisory Committee, Ministry of Environment and Climate Change Central Region Office, and Canadian water efficiency and conservation experts

In 2015, the Region embarked on a process to update the Long Term Water Conservation Strategy. Building on 18 years of progressive water conservation and efficiency programming, the updated strategy assessed successes and challenges over the past five years. Industry's best practices and new direction for water management as well as targets, activities, timelines and specific measures to be developed and implemented in the next five years were included.

The Final Draft Long Term Water Conservation Strategy Update Executive Summary, which includes all updated strategy enhancements is attached for reference (Attachment 1).

4. Analysis and Options

Changes in the water industry since 2011 shape the direction of the 2016 Strategy Update

Since completing the first Strategy in 2011, some impactful changes have taken place that influences the future direction of the Region's water conservation and efficiency initiatives. These include:

- The U.S. Environmental Protection Agency's WaterSense and Energy Star programs have significantly improved the efficiency of residential plumbing fixtures and appliances over the last decade. As a result, indoor residential per capita demands have declined and lower per capita demands are expected for several more years

- The change in the Provincial building code (effective in January 2014) that mandated more efficient water fixtures, including toilets for new homes be 4.8 litres per flush or less

- The phasing out of the Region's residential rebate programs on water efficient fixtures, recognizing that the greatest impact from the rebate programs had been achieved and effectiveness of these programs going forward was limited. The single family toilet rebate program was phased out in 2013, as referenced in the March 20, 2013 Long Term Water Conservation Strategy Implementation report to Council. Overall, the Region is moving to implement more market transformation programs that target broader market–based changes, through joint ventures with key community organizations and service providers such as landscape contractors

- Emergence of the One Water concept in the water industry recognizes the cross functional nature and emphasizes a holistic approach to water management. The One Water concept is adopted by the 2016 Strategy Update as the guiding approach to develop new programs and initiatives

Partnership with Peel and Landscape Ontario recommended to reduce highest outdoor water use through market transformation

As outlined in the March 20, 2013 Long Term Water Conservation Strategy Implementation report to Council, strategic market partnerships are critical to long term water conservation. In York Region, research shows that many high water users hire service sector professionals, rather than using a do-it-yourself approach. To target these high water users in combination with strategic market intervention, innovative programming, like the Water Smart Irrigation Professionals (WSIP) certification program, was developed.

Long Term Water Conservation Strategy Update

In 2014 and 2015, York Region, in partnership with the Region of Peel, piloted the WSIP program with Landscape Ontario Horticultural Trades Association (Landscape Ontario). The goal of the pilot was to transform the market place to encourage water efficient products and practices. Irrigation contractors learned to conduct assessments to optimize existing irrigation systems and encourage clients to install smart or central controllers. Through this practice, irrigation contractors are beginning to transform the market and create an irrigation industry that is not only more understanding of, but also will promote water efficiency. Through the Water Smart Certificate pilot, 0.1 MLD of water savings (approximately 10,000 litres per day on an average industrial commercial institutional property) have been projected as a result of assessments completed by certification certified contractors to date.

Certificate program helps accelerate market transformation to achieve goals

The certification program is an example of how working with service sector partners can accelerate market transformation and assist municipalities in meeting water conservation goals at a faster rate and with less overall cost. In the Sustainability Alignment Manual recently published by the University of Waterloo, it is documented that by local government "…increasing their use of market based instruments, there is a potential to simultaneously address their environmental, spending and revenue challenges."

Fusion Gardening is a new landscaping pilot

In 2016, York Region is recommending a second pilot program for landscape designers, landscape installers, and landscape maintenance staff. This second certification program, entitled Fusion Gardening, will teach service sector staff about designing, installing and maintaining water efficient landscapes.

The term Fusion Gardening has been tested through several market research projects completed across the GTA. The name is a highly effective marketing tool for residential audiences. It was originally used for the City of Mississauga and for the Region of Peel's garden visit program. It has since gained traction and is now being used by Durham Region, York Region, Canadian Mortgage and Housing Corporation and by Landscape Ontario.

Agreement with Landscape Ontario proposed to deliver the Water Smart Irrigation Professional certification and Fusion Gardening programs

Landscape Ontario is the trusted provider of professional development programs for the service sector industry in Ontario. They provide the opportunity to liaise directly with irrigation contractors, landscape designers, landscape installers, landscape maintenance staff, distributers and suppliers.

Landscape Ontario has successfully delivered the Water Smart Irrigation Professionals program on behalf of York Region and the Region of Peel. They own and operate facilities appropriate for delivering both in-class and hands-on components of the courses.

Best-in-Class research and review of prior successes and challenges informed Strategy Update

The 2016 Strategy Update process commenced with a review of best-in-class practices of leading jurisdictions in water conservation and efficiency, as well as a review of successes and challenges during the last five years in implementing the first Strategy. Results of this review confirmed that recent changes in the water industry and changes in the Region's programs as described above were relevant the Strategy Update; this review led to the identification of the One Water approach and a market-based approach which became the cornerstones guiding the 2016 Strategy Update. A summary of key initiatives recommended in the 2016 Strategy Update is provided in Table 1.

Table 1
Key Initiatives Recommended in the 2016 Strategy Update

Program Initiatives	Description
Expanded Analytics	Greater integration of water supply and water demand data across Regional and local municipalities to maximize water system efficiency and assist in planning and decision making.
Water Reuse Plan	Water reuse is part of the Region's long term strategy for achieving its ambitious targets. The Upper York Sewage Solutions Project has proposed exploring opportunities for water reuse. A pilot project involving water reuse for irrigation from a Water Resource Recovery Facility will be explored.
Water Efficiency Upgrades in New Construction	Explore the inclusion of water efficiency requirements in new developments and the addition of new requirements in the Servicing Incentive Program such as individual household grey water recycling systems and fusion landscaping.

Long Term Water Conservation Strategy Update

Program Initiatives	Description
Water Efficiency and Water Reuse Standards for all Regional Buildings	Develop requirements for all new and redeveloped housing to require 4.0 litre or less toilets, water efficient fixtures, fusion landscaping and water reuse where viable and feasible. This would optimize in-ground irrigation systems at all regional facilities.
Capacity Buy Back Program	Continue to implement the Capacity Buy Back Program providing Industrial Commercial Institutional customers with financial incentives on water savings.
Risk based Asset Management for Pipe Replacement	Enhance the risked based pipe replacement program through adopting advanced condition assessment technology, data collection improvements, municipal partnerships and research on pipe deterioration curves.
Development-scale water reuse, grey water and/or rainwater harvesting	Work with local municipalities and the development industry to identify water reuse or grey water opportunities for development scale projects.
Market-Based Programming	Continue to pursue marked-based programming to drive water conservation and efficiency to transform the marketplace.
Water Smart Irrigation Professional Program	Involves training and certification of irrigation contractors who then qualify for an incentive to optimize efficiency of existing automatic irrigation systems.
Fusion Gardening Program	Fusion landscapes are water efficient and incorporate low impact development/green infrastructure features. Implement Fusion Gardening program using landscape design, installation and maintenance service providers to train and certify landscape designer and landscape installers on Fusion Gardening.

Provincial guidance on water reuse is essential to achieve 2051 goal

York Region, in partnership with the nine local municipalities, established a comprehensive database to assist in the collection, management and analysis of residential, commercial and institutional water consumption data. Data collected indicated that the 2014 residential consumption rate is approximately 200 litres per capita per day (LCD).

The 2011 Strategy set a residential water consumption target of 150 LCD to be reached by 2051. It should be noted that 150 LCD is a household consumption target and does not include non-revenue water use such as flushing and leakage.

Table 2 shows the projected per capita water consumption rates from 2021 to 2051 under three water savings scenarios. Scenario 1 represents consumption rates that can be achieved through Region's water conservation programs only. Scenario 2 represents consumption rates that can be achieved through the Region's water conservation programs plus additional water savings from provincial legislation such as mandating water efficient fixtures in new homes. Scenario 3 represents a 2051 target consumption rate of 150 LCD and requires implementation of water reuse. Achieving the scenario 3 target will also require provincial guidance and an approval framework on water reuse applications.

Table 2
Residential Water Consumption Targets and Timelines

Water Savings Scenarios	2014	2021	2031	2041	2051
	Residential Consumption Rate (LCD)				
Scenario 1 Regional Programs	200	192	185	179	173
Scenario 2 Regional Programs + Existing Provincial Programs and Legislation		190	183	176	170
Scenario 3 Regional Programs + Existing Provincial Programs and Legislation + Water Use +Provincial Guidance and Legislative Changes on Water Reuse			180	165	150

Implementation of the 2016 Strategy Update measures and programs over the next five years, coupled with Provincial legislation that is currently in place to reduce water consumption such as the new building code (effective in January 2014); is expected to provide enough water savings to position the Region to achieve the 2021 water consumption rate target of 190 LCD.

Piloting water reuse projects within the next five years is essential to prepare for implementation of water reuse measures that are required in 2021 and beyond to achieve the ultimate water consumption target rate of 150 LCD in 2031. The Region will continue to track progress of Strategy efforts and water savings under each of the three scenarios over the coming years and will review and update the water conservation programs as required.

In consultation with the Province, the Region will also continue to explore options to achieve its aspirational long term goal of "No New Water" as envisioned in the 2011 Strategy. The 2016 Strategy Update recommends the Region form a team to develop a water reuse plan, including providing support and input to implementation of water reuse in the proposed Upper York Water Reclamation Centre, and working with the Province on policy and regulatory changes to permit large scale water reuse.

Link to key Council-approved plans

Water conservation is a key element in supporting the Region's 2015-2019 Strategic Plan priority areas of managing environmentally sustainable growth and providing responsive and efficient public services.

The Region's 2016 Water and Wastewater Master Plan Update currently underway has identified that water conservation is part of the recommended servicing alternative to service the Region's growth to 2041. Achieving objectives set in the 2016 Long Term Water Conservation Strategy Update is essential to support the Region's growth plan.

5. Financial Implications

The 2016 capital plan includes a total expenditure of $12.1 million over the next ten years for the *Water Conservation and Efficiency Program*. A capital spending authority of $1.205 million was approved in the 2016 budget process. Over the next decade conservation program expenditures are planned in the following areas:

- Capacity Buy Back Program
- Education and Outreach Program
- Fusion Gardening Program
- Water Efficiency Standards and Upgrades in New Construction
- Water Smart Irrigation Professional Program
- Program Management, including reporting and analysis
- Development of programs and pilot projects involving water reuse, grey water and/or rainwater harvesting

Long Term Water Conservation Strategy Update

The 2016 Ten-Year Capital Plan budget reflects phasing out residential rebate programs and shifting the focus to new programs that target market transformation and high water peak demand users. Forecast expenditures in the 2016 capital plan are aligned with the program initiatives recommended in the Strategy Update, and will be reviewed annually as part of the budget process.

Partnership with other municipalities is being explored to cost share Fusion Gardening Program

Delivery of the Water Smart Irrigation Professional program in 2016 will cost $51,185, inclusive of HST. Development and delivery of the Fusion Gardening program in 2016 is not to exceed $327,000, inclusive of HST. Partnerships are currently being developed with other municipalities including Peel Region to cost-share this amount. Terms of each of these contracts will be for a period of one year, commencing after council approval, with an option to renew for up to four additional years, provided that the cost of each renewal term shall not exceed the cost of the initial term.

Under the Purchasing Bylaw, Council approval is required for direct purchase of services which are not being offered to other providers under a competitive procurement. The agreement with Landscape Ontario is recommended for approval on the basis that they are the only entity reasonably capable of providing the deliverables.

6. Local Municipal Impact

26.2 Million Litres of water saved per day over last 18 years, equates to water consumed by 127,000 people

In partnership with local municipalities, 26.2 million litres of water per day had been saved since the implementation of the Water for Tomorrow Program in 1998. Local municipal staff have been involved in developing the 2016 Strategy Update. Implementation of many programs in the Strategy requires full support from and coordination with local municipalities. This partnership is essential to achieve the goals of the 2016 Strategy Update, and position the Region to achieve long term sustainability in water services to residents and businesses.

7. Conclusion

Completion and submission of the Long Term Water Conservation Strategy Update to the Ministry of the Environmental and Climate Change fulfills conditions of approval for both the Southeast Collector Trunk Sewer Individual Environmental Assessment and the Intra-basin Transfer requirements.

More importantly, the Strategy provides direction on developing and implementing future water conservation and efficiency measures that are essential to the sustainability of the Region's water services. The Region's Water and Wastewater Master Plan Update identifies water conservation and efficiency as a key element in supporting the Region's long term servicing strategy to provide sustainable water supply to service our communities in a cost effective and environmentally responsible manner. Updating the Strategy ensures that current programs are reviewed and enhanced to remain effective in achieving the long term sustainability goal.

The Strategy Update identified new and innovative approaches to water conservation and efficiency. Piloting and implementing these initiatives in York Region will demonstrate even greater municipal leadership and help ensure that Water for Tomorrow programing continues to be an award winning program.

For more information on this report, please contact Stephen Fung, Director Infrastructure Asset Management at ext. 73025.

The Senior Management Group has reviewed this report.

February 11, 2016

Attachment

#6597208

Accessible formats or communication supports are available upon request

Attachment 1

York Region

LONG TERM

Water Conservation Strategy

MARCH UPDATED 2016

EXECUTIVE SUMMARY

AURORA · East Gwillimbury · GEORGINA · KING · MARKHAM · Newmarket · Richmond Hill · VAUGHAN · Whitchurch-Stouffville

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LONG TERM WATER CONSERVATION STRATEGY UPDATE

1.0 EXECUTIVE SUMMARY

In 2011, York Region developed its Long Term Water Conservation Strategy (Strategy). Building on more than a decade of progressive water conservation programming, the strategy provided a framework and overarching guidance for continuing sustainable water management in the Region to 2051.

The Strategy was one of the conditions of approval of the Ministry of the Environment and Climate Change (Ministry) for expanding sewage flow capacity and for an intra-basin transfer of drinking water from Lake Ontario to the communities of Aurora, Newmarket and East Gwillimbury. Annual reporting and updating of the Strategy on a five-year timeframe was an additional requirement set out by the Ministry. This 2016 Long Term Water Conservation Strategy Update is the first update of the original strategy that was conducted back in 2011. It provides an assessment of the successes and challenges of the initial five years, the new direction for water management, water conservation programming at the Region and the specific measures and tactics to be developed and implemented from 2016 through 2020.

1.1 BACKGROUND AND CONTEXT

Centrally located in the Greater Toronto Area (GTA), York Region is one of the fastest growing regions in Canada. The Region is the only municipality in the GTA without direct access to Lake Ontario for its drinking water supply and, therefore, secures its water from water supply agreements with the City of Toronto and Region of Peel (90%), as well as from Lake Simcoe and groundwater sources (10%). The population of the Region is currently just over 1.1 million and is projected to increase to about 1.8 million by 2041[1]. Without conservation, demand for drinking water and wastewater treatment will increase significantly as the population grows.

1.2 THE REGIONAL WATER SYSTEM

York Region is an "Upper Tier" municipality that wholesales water to its nine local municipalities: the Towns of Aurora, East Gwillimbury, Georgina, Newmarket, Richmond Hill, Whitchurch-Stouffville, the Township of King and the Cities of Markham and Vaughan. The local municipalities are responsible for their own distribution networks and end-user customer water billing.

1.2.1 Water Conservation and Sustainable Growth

Water conservation will continue to be integral to sustainable growth in the Region. As per the Ontario government's direction under the Places to Grow legislation, York Region adopted an Official Plan that directs how the Region will

[1] "Amendment 2 To The Growth Plan For The Greater Golden Horseshoe" *https://www.placestogrow.ca/index.php?option=com_content&task=view&id=398&Itemid=14*

grow and how that growth will be distributed to 2031. The focus of the York Region Official Plan (YROP – 2010) is on sustainable growth and creating of healthy, livable communities and a resilient natural environment. Water conservation and source water protection are integral to sustainably meeting the demands of a growing population.

1.2.2 Current and Historical Water Conservation Programming

Since implementing York Region's 1998 Long Term Water Supply Master Plan, water conservation planning has been integral to the Region's drinking water supply strategy. York Region has been ahead of the curve in water conservation programming. Over the past 16 years water demands in the Region have declined by an estimated 26.2 million litres (ML) per day as a result of York's Water for Tomorrow program and North American-wide improvements to the efficiency of plumbing fixtures and appliances, such as toilets and clothes washers. In 2011, York Region developed its first Long Term Water Conservation Strategy. The strategy expanded on existing Regional plans, strategies and programs, and set the stage for innovative and jurisdiction-leading water conservation programming for the next 40 years. Prior to the 2011 Strategy, the Region focused much of its water conservation efforts on Demand Side Management – reducing demands through the use of water efficient technologies at the consumer or demand end of the supply system. Rebates for water saving toilets, fixtures, appliances and equipment were offered to residents and businesses in York Region. As a result of the Regional rebates, 106,000 water efficient showerheads were installed, 95,000 inefficient toilets were replaced and 245,000 toilet flappers were replaced with water-saving early-closing flappers. Significant water savings were achieved as a result of the high uptake of these rebates by water customers. Following Ministry approval of the 2011 Strategy, the Region completed an analysis of rebate programs and other Demand Side Management initiatives. The marketplace has adopted the latest provincial Building Code by moving toward water efficient fixtures and appliances. This shift in the marketplace meant that Regional rebates could be phased-out with little impact on water conservation.

The first five years of the Strategy (2011 to 2015) involved analyzing Regional water conservation programs, developing new tactics and measures to drive further savings, implementing planning based on best-in-class practices, reviewing the cost-effectiveness of individual measures, and testing new measures through pilot and demonstration projects. Figure 1 provides a summary of key actions by phase.

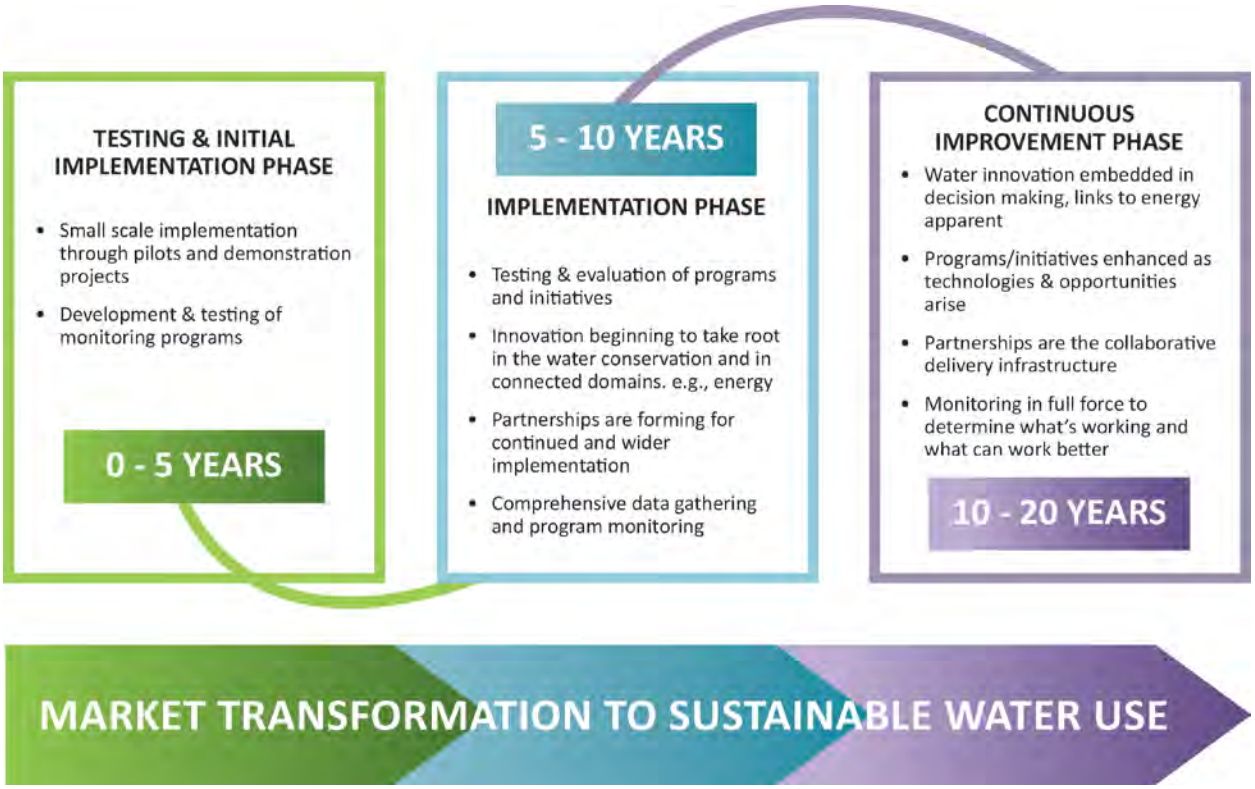

Figure 1 – Summary of Key Actions by Phase Commencing in 2011

In 2012 the Region embarked on a new direction for water conservation programming; phasing out rebates and implementing targeted, marketplace-based programs. This new direction focused Regional resources on high water users in the residential and the industrial, commercial and institutional (ICI) sectors and strategically engaged the marketplace, including the retail and service sectors and community organizations that deal directly with water customers – to cost effectively target water conservation programming. Retailers and service providers, such as landscape design and installation contractors, plumbers or automatic irrigation system contractors have regular and direct access to water using customers and, as market research studies have shown[2], are trusted sources of products and services. Community groups operate on a daily basis in neighbourhoods throughout the Region and regularly engage residents on issues of importance in their communities. Working in partnership with service providers and community organizations expands the scope and reach of Regional programs, serves as an economic stimulus for local businesses and reduces long-term costs to Regional taxpayers for water conservation programming.

[2] Halton (2007), TRCA (2008), City of Mississauga (2009), City of Toronto (2010), City of Kitchener (2015), City of Guelph (2015)

1.2.3 One Water: The Path to Sustainable Water Services

Over the past few years the Region has adopted a "One Water" approach to water management. This approach builds on past successes and provides an adaptive platform to respond to change and evolving conditions. With dynamic and evolving markets, increasing weather variability, emerging technology, population growth and changing demographics, new development with intensification in the corridors of southern York Region municipalities and greenfield growth in the more northern municipalities are all future trends that must be addressed through this approach. A summary of the key attributes of One Water is provided in Table 1.

One Water is a holistic approach that considers the cross-functional nature of water management, including water conservation. Via One Water, the Region is building on over 15 years of previous efforts to ensure water management programming is complementary and responsive to change.

Table 1 – Key Attributes of the One Water Approach

ATTRIBUTE	DESCRIPTION
Collaboration	With a wide variety of stakeholders and engagement with the community
Integration	Of the entire water cycle with planning and other services
Economics and Finance	That recognize the true cost of water and price it accordingly
Green Infrastructure	That works with and mimics nature
Closed Loop Systems	That enhance nutrient and energy recovery and are flexible to allow for innovation and adaptation
Built Environment	That supplements the function of the natural environment
Enabling Environment	That fosters innovative institutional and management arrangements

1.2.4 Regional Guidance

Guidance for sustainable growth in the Region is embedded in York's Vision 2051 strategy, the 2015-2019 Strategic Plan, the Regional Official Plan (2010) and the Water and Wastewater Master Plan (2009). A summary of this Regional guidance is provided in Table 2.

Table 2 – Regional Guidance for Future Growth and Infrastructure

GUIDANCE	DESCRIPTION
Vision 2051	• Vision 2051 is a blueprint for York Region's future. • A Regional Council and community initiative that articulates an integrated pathway to achieve a desired collective future. • Advances sustainability efforts, fosters health and well-being of our residents, and liveability of our communities.
2015-2019 Strategic Plan	• Operationalizes Vision 2051. • Aligns with the Regional Council four-year term. • Sets out a road map for Regional priorities over the five years. • Identifies areas requiring critical focus, including the need to protect and sustain the natural and built environment and reduce ecological impact.
Regional Official Plan (2010)	• Describes plans to accommodate future growth and development while meeting the needs of existing residents and businesses in the Region. • Sets out directions and policies that guide economic, environmental and community planning decisions. • Identifies several policies directly related to water conservation, specifically to: o develop a long-term, innovative strategy for water conservation; o reduce the amount of water used in the Region's construction projects; o investigate innovative wastewater treatment technologies and approaches including greywater reuse, naturalized wastewater treatment, and water recycling in residential, commercial, institutional and industrial uses; and, o pursue, with local municipalities and conservation authorities, implementation of water conservation initiatives, such as water reuse systems, rainwater harvesting and innovative storm water management.
Water and Wastewater Master Plan (2016)	• A strategy for providing water and wastewater services to York Region residents and businesses. The last Master Plan Update was completed in 2009. • Ensures services are provided in a sustainable and safe manner and in compliance with appropriate legislation and regulations while protecting the environment. • The plan is currently being updated and will provide guidance for water and wastewater services to the year 2041.

Regional guidance provides a framework for water conservation planning, including the Strategy (2011), Peak Demand Reduction Implementation Plan (2011), Average Annual Day Demand Reduction Plan (2012), and the current update of the Strategy (2016).

1.2.5 Provincial Guidance

The primary provincial guidance for water conservation in Ontario is the *Water Opportunities Act*, *2010*. The Act implemented changes related to water conservation in a number of existing acts. For example, the *Water Opportunities Act* amended the Building Code Act (1992) to include consideration of water conservation in the Minister of Municipal Affairs and Housing's review of the Ontario Building Code. In addition, the Act includes amendments to the *Capital Investment Plan Act* (1993), *Green Energy Act* (2009) and *the Ontario Water*

Resources Act (2009). This Act is intended to foster innovative water management technologies, services and practices, create opportunities for economic development and clean-technology jobs in Ontario, and conserve and sustain water resources for present and future generations.

Provincial guidance specific to development of the 2011 Strategy and this 2016 Strategy Update is through conditions of approval from the Ministry of the Environment and Climate Change. Through an individual environmental assessment under the *Environmental Assessment Act* (EA Act) the Region proposed twinning of the Southeast Collector Trunk Sewer (SEC) for additional sewer flow capacity. A condition of the Minister's 2010 approval for the Southeast Collector was preparing and implementing a long-term water conservation strategy. Around the same time, the Region also worked with the MOECC and the Ministry of Natural Resources and Forestry to submit a request for an increased intra-basin transfer of water under the 1985 Great Lakes Charter Prior Notice and Consultation Process. In 2010 the Ministries provided notice this process had been completed successfully for the Region's intra-basin transfer of up to 105 MLD of Lake Ontario-based water. This transfer volume was secured to support long term growth in Aurora, Newmarket and East Gwillimbury, located within the Lake Huron watershed. The Ministries' notice letter included water conservation strategy requirements, similar to those imposed under the Southeast Collector approval. Under these conditions, the preparation and implementation of a long-term water conservation strategy must include the following:

- global best-in-class review of leading jurisdictions in water conservation;
- consultation with public, stakeholders, local municipalities, the Ministry, conservation authorities and other relevant public committees and agencies;
- expert peer review of the strategy;
- implementation monitoring and annual reporting on progress; and
- completion of a review and update of the strategy every five years.

1.2.6 The Value of Water Savings

Benefits of water savings are many. Deferral of capital projects to service growth and reduction of operational costs provide financial benefits. Water conservation enables growth to occur in an environmentally sustainable manner. A summary of the benefits is provided in Table 3.

The Regional Water and Wastewater Financial Sustainability Plan, endorsed by Regional Council in October 2015, provides for water rate increases to achieve full-cost recovery pricing by 2021 based on detailed analysis of water demands, population growth, maintaining existing assets, day-to-day operations, and building reserves for future asset rehabilitation and replacement.

The Financial Sustainability Plan supports water conservation through raising public awareness of the cost and value of water.

Table 3 – Savings and Benefits of Water Conservation

CATEGORY	DESCRIPTION
Capital Works Savings	• Financial savings related to deferring, downsizing, or eliminating the need to expand capital works projects (e.g., water treatment capacity) is one of the largest savings related to reducing system water demands (infrastretching). • York Region is financially responsible for its share of the costs of any plant expansions in Toronto and Peel Region to supply the Region with drinking water. By reducing demands, the Region meet the water needs of its nine municipal customers while minimizing the need to expand water treatment facilities in Toronto or Peel Region beyond what is currently committed under existing agreements.
Operational Savings	• Energy and chemicals are used to produce potable water; energy is used to pump and distribute water to customers; energy is used to pump wastewater; and energy and chemicals are needed to treat wastewater. • Reducing water demands results in reduced energy and chemical requirements.
Environmental Benefits	• Some of the many environmental benefits of water conservation are: o reduction in energy, chemical requirements, and greenhouse gas emissions, o protection of water quality in natural environment, and o maintenance of water quantity in aquifers, lakes, and rivers
Societal Benefits	• Water saved represents new supply that can be dedicated to other users. • Deferring or reducing infrastructure needs results in less construction and disruption in the community. • Market-based programming provides an economic stimulus. • Water reuse, system optimization, new water conservation technology and processes, low impact development (LID) and other such initiatives help create economic development opportunities and more sustainable communities.

1.3 VISION

The 2011 Strategy has led to creation of a future vision of "No New Water" until 2051 that included two separate targets:

- Reduce average annual day *residential water demands* to 150 LCD by 2051
- Use no more water in the Region in 2051 than was used in 2011 despite the expected growth in population

1.3.1 Objectives

While many objectives in the 2011 Strategy remain relevant today, new conditions and circumstances have evolved since the development of the 2011 Strategy. For example:

- Advancements in technology: Virtually all new plumbing products are being developed to meet the water efficiency certification requirements of WaterSense® and ENERGY STAR - as such, it is becoming increasingly difficult to purchase inefficient toilet and clothes washer models, thus eliminating the need for and benefit associated with offering rebates towards the purchase of these products.

- Increasing variability in weather: Climate change is expected to increase the likelihood and intensity of extreme and variable weather such as droughts and flooding events.

- Changing water demands: Because of the improvements in the efficiency of clothes washers) as well as a growing public awareness of the importance of using our natural resources more efficiently, water demands in most communities in North America are declining on an annual basis.

To reflect current conditions, new objectives were added to guide development of the 2016 Strategy Update. Figure 2 provides a summary of the 2011 Strategy objectives and additional objectives for this Strategy Update.

ORIGINAL OBJECTIVES 2011 STRATEGY

1. Be a municipal leader in water conservation and efficiency.
2. Maximize sustainability of water supply through applying best in class technology and practices.
3. Minimize energy consumption and reduce the Region's carbon footprint.
4. Maximize use of energy efficient technologies, processes and practices.
5. Minimize financial costs to York Region water customers.
6. Maximize partnerships with local municipalities and utilities for cost-effective delivery of Region's water conservation and efficiency programs.
7. Maximize reliability of water supply system.
8. Minimize risk of water service disruptions.
9. Maximize system flexibility to respond to change.
10. Ensure Region's drinking water supply meets all existing and future regional, provincial and federal public health and drinking water quality standards.
11. Ensure the Region meets any future provincial standards for water reuse for non-potable or potable purposes.
12. Align with York Region strategic goals as set out in the Regional Official Plan and the Water and Wastewater Master Plan.
13. Deliver effective water conservation and protection outreach and education programs to York Region residents, students and the business community.
14. Develop and deliver multicultural water conservation and protection programming and resources to effectively engage the Region's diverse demographics.

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ADDITIONAL OBJECTIVES

1. Enhance integrated water management planning under the Region's "One Water " approach
2. Integrate water and energy conservation to mitigate climate change impacts
3. Enhance and expand data analytics, and improve Data Quality Assurance and Quality Control (QA/QC) process
4. Enhance water conservation tracking and reporting framework
5. Strengthen and establish strategic partnerships, committees and working groups to foster innovative ideas in water conservation
6. Increase water efficiency in new developments/ buildings
7. Increase focus on water reuse

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2016 STRATEGY UPDATE

Figure 2 – 2011 and 2016 Long Term Water Conservation Strategies

1.3.2 Research for the Long Term Water Conservation Strategy Update (2016 to 2020)

The 2016 Strategy Update commences with a best-in-class research on water conservation and efficiency. Best-in-class research involved a global review of practices of leading jurisdictions in water conservation. New directions and trends were identified for overall water management, and for water conservation in particular.

Best-in-class research focused on those measures and approaches suitable for use in York Region, specifically adaptable to the Region's climate and water sources, and its two-tier municipal structure. Two significant changes from the 2011 Strategy informed best-in-class research for the 2016 Strategy Update, specifically:

1. The Region's "One Water" perspective was applied, expanding the scope of the best-in-class research to consider efficiency on a system-wide and function-wide basis. One Water enables an integrated analysis across water management portfolios.
2. A research focus was placed on practices that strategically target high water users and that have the potential to leverage resources via market-based programming to cost-effectively embed water conservation in the marketplace.

1.3.3 Consultative Research

Consistent with the One Water approach, interviews were conducted with senior management and program staff representing multiple disciplines/divisions in both the Region and the nine local municipalities. Also, the Region consulted with members of the Region's multi-stakeholder Water Conservation Advisory Committee including representatives from various sectors such as residential, industrial, commercial, institutional, Conservation Authorities, and Ministry.

Interviews explored Regional and local municipal staff experience over the first five years of implementation of the 2011 Strategy. Insights into past, present and future challenges and opportunities related to water management, growth and development, infrastructure planning, financing, etc., were secured through the interviews. Throughout development of this Strategy Update, meetings with Advisory Committee members were held to secure input, feedback and guidance on the direction forward.

1.3.4 Evaluating Water Conservation Measures

Screening and evaluation criteria specific to York Region were developed to assess and rank viable measures for inclusion in the 2016 Strategy Update.

Detailed implementation plans with full cost-benefit analysis are required for many of the measures that passed the screening process prior to determining their inclusion in Regional water conservation programming.

1.4 UPDATING THE LONG TERM WATER CONSERVATION STRATEGY

The Ministry requires the Strategy to be reviewed and updated every five years. This Strategy Update also integrates with the 2016 updates of the *Water and Wastewater Master Plan* and the *Inflow and Infiltration Reduction Strategy*.

1.4.1 2011 Strategy Implementation and Lessons Learned

The years 2011 through 2015 were focused on testing and implementation of the initial Strategy. During this timeframe some impactful changes occurred which have influenced Regional water conservation programming and informed evaluation of potential measures for inclusion in the 2016 Strategy Update. These changes are as follows:

- The U.S. Environmental Protection Agency's WaterSense® and ENERGY STAR programs have significantly improved the efficiency of residential plumbing fixtures and appliances over the last decade. These improvements have resulted in an unparalleled decline in indoor residential per capita demands; this decline is expected to continue for several more years.
- The quality of water supply and water demand data has improved significantly since development of the 2011 Strategy.
- The value of broad-based water conservation programming has declined due to changes in the marketplace. Changes include federal and regional requirements for water efficient toilets, fixtures and appliances. The reduction in lot sizes of single-family homes results in lower water use for irrigation. Also, growth in high rise condominiums results in lower discretionary outdoor water use in the residential and manufacturing sectors.
- Continued emphasis by the Region and local municipalities to operate their water supply and wastewater systems on a full-cost recovery basis.

These changes led to a shift from some previous water conservation programs and adjusting others during the first five years of the 2011 Strategy. Below is a summary of the programs and projects implemented over the testing and implementation phase (years 0 through 5) of the original strategy.

- Data Quality Assurance and Quality Control (QA-QC): The Region focused resources on securing quality water demand and water system data. Many of the local municipalities put significant effort into capturing customer water billing data and providing quality, usable data to the Region. Analytics capabilities at the Region improved in concert with collection of quality data.
- The Region conducted a cost-benefit assessment of its residential rebate programs in light of marketplace changes to more water efficient fixtures and appliances. As a result of this assessment and the recognition that the greatest impact from the rebate programs had been achieved, residential rebates were phased out in 2013.
- With over a decade of water conservation programming in place, the Region has already captured significant savings. It was recognized that the earlier savings came more readily than future savings

would. Implementation planning undertaken in 2011 and 2012 set the stage for targeted water conservation programming aimed at high water users in Industrial, Commercial, and Institutional (ICI) and residential sectors.

- In combination with targeted programming focused on high water users, the Region moved toward a market-based approach to program delivery. A market-based approach uses joint ventures with key community organizations and relevant services providers – landscape contractors, garden retailers, and automatic irrigation system contractors – and strategic incentives to cost effectively influence the water use of end users.

- The Region designed and implemented two pilot projects to study market-based programming:

  - In the community of Kleinburg, the Region is delivering a 3 – 4 year peak water reduction pilot project in concert with the community, area garden centres, local landscape designers and contractors. The pilot project, called Fusion Gardening®, is designed to secure uptake of water efficient and sustainable landscapes through service industry participation, training of landscape designers and contractors and targeted marketing.

  - The peak water demand in any year is generally the result of excessive irrigation demands occurring during an extended period of hot and dry weather. Peak day water demands can be 150 percent or more of the average winter day demand. Water supply facilities are designed to meet peak demands – demands that only occur for a few days each year – and landscape irrigation is a significant component of peak water demand. By moving the landscaping industry towards Fusion Gardening, i.e., landscapes that require little or no supplemental irrigation, significant reductions in peak water demand could be realized.

  - A Fusion Gardening pilot project being implemented in Kleinburg involves benchmarking, monitoring and evaluating peak water use in single-family homes to determine if cost-effective water savings can be achieved. Preliminary indications show that Fusion Gardening can reduce irrigation demands and can increase on-site infiltration of stormwater thereby reducing runoff. Stormwater runoff is a major source of flooding and contaminant loadings – debris, oil and grit, antifreeze, fertilizers and other contaminants – to surface waters. The Kleinburg pilot project will run for 3 to 4 years and will inform if a market-based approach to sustainable landscaping will reduce peak water demand, increase on-site infiltration and reduce contaminant loadings to surface waters.

  - York Region, in partnership with the Peel Region and Landscape Ontario, developed the Water Smart Irrigation Professional (WSIP) program. The program is comprised of contractor training and certification to optimize in-ground automatic irrigation systems. York Region provides contractors with an incentive to identify, assess and

upgrade inefficient systems to save water. Through market transformation, this program has potential to save significant amounts of water on a long term basis currently wasted by inefficient residential in-ground automatic irrigation systems and to provide cost savings to customers. The long term benefits will outweigh the short term cost in providing incentives. A pilot project completed in Peel Region using this method identified average savings of 10,000 litres per day per acre of irrigated turf. Monitoring and evaluation of the program through local municipal water consumption data is on-going to ensure water savings are realized and sustained.

- The Capacity Buyback (CBB) program involves completing water conservation audits of ICI facilities and identifying opportunities for water savings. A rebate based on water savings achieved when a facility implements recommended measures is provided as an incentive. This will help offset the cost of equipment and process changes needed to reduce water consumption. This program continued to be a significant water conservation program during the past five years as it targets the high water users in the Region. Recent developments to the CBB program included establishing strategic partnerships to provide greater access to potential ICI facilities and the opportunity to leverage shared resources and marketing. For example, York Region is exploring partnership opportunities with the Toronto and Region Conservation Authority to collaborate in identifying water and energy saving opportunities within ICI sectors.

- One of the other recommendations of the Strategy was to develop a full-cost recovery conservation-based water pricing model. An in-depth analysis of conservation-based rate structures was undertaken as was extensive consultation with the local municipalities to discuss implications of a regional rate structure change on their retail rate structure and system of billing. The analysis and consultation informed the decision to achieve full cost recovery and continue with a volumetric rate – supporting the principle that users pay for the water they use.

- The Region developed and implemented a multi-level public campaign to demonstrate the 'value of water' and to establish acceptance and understanding of full-cost pricing.

- Regional-municipal committees play an important role in water conservation programming and in the directional shift to One Water:

  - The York-Area Municipal Liaison Committee is comprised of senior management, meets quarterly and its priority objective is to increase co-operation and collaboration between the Region and local municipalities.

  - The Water and Wastewater Steering Committee is a sub-committee of the Municipal Liaison Committee with a focus on water and wastewater programs.

- Outreach and education continued to be a major focus of water conservation programming in the Region. The Region has been supporting the Children's

Water Festival for over ten years, engaging more than 5,000 students annually from across the Region. Curriculum-based education initiatives, special events, Fusion Garden demonstration projects and community outreach projects were the foundation of the Region's outreach and education programming.

1.5 UPDATED MEASURES AND PROGRAMS

Best-in-class research of leading jurisdictions in water conservation and strategic consultative research informed the selection of potential options for inclusion in the 2016 Strategy Update. Opportunities for new programming and measures were examined through the One Water lens. This meant best-in-class practices and measures that provided, or could be adapted to provide, integrated, system-wide strategies for water conservation were given priority. In addition, the decision was also made to give particular attention to market-based options given the new emphasis on measures and programs which cost-effectively generate long-term, sustained water savings and embed water conservation in the marketplace. Table 4 provides a summary of measures selected for inclusion in the 2016 Strategy Update.

Table 4 – 2016 Strategy Update Water Conservation Measures

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES
PROGRAM MANAGEMENT
1. Water Conservation Advisory Committee (WCAC) • While the WCAC will continue to play similar role in the Region's Water Conservation programming as in the past, initiation of a new term and focus will begin in 2016. • Expanded representation to include local municipalities and business associations on the committee will be evaluated over 2016-2017. • The goal of expanded representation on WCAC is to align the membership with the Region's commitment to One Water and the identification and realization of conservation opportunities system-wide.
2. Tracking and Reporting Framework • Expand on the existing Key Performance Indicator (KPI) mechanism currently in use in the Region to track and report water conservation KPIs on an annual basis. • A water conservation (or One Water) reporting framework could be updated on a regular basis to keep pace with best-in-class practices. • A format for a report to provide a summary of water conservation programming KPIs will be developed in 2016 with initial testing in 2017. • As programming evolves and changes, so too do performance indicators that are tracked, measured and reported without losing year over year comparability.
3. One Water Infrastructure Optimization • The Region works closely with local municipalities via the Regional-Municipal Steering Committee to ensure greater coordination in the operation of the water systems. • With the goal of continuous improvement and recognition that through system optimization, opportunities for greater water conservation, energy savings and capture, water reuse, reduction of Inflow & Infiltration, etc., can be realized; the Region will investigate over the course of 2016 opportunities for optimization including establishing of an Infrastructure Optimization Steering Committee under the auspices of One Water. • Enhanced resiliency in light of climate change and potential increases in extreme and variable weather, changing market demands, significant planned growth and related new construction/re-development, evolving technologies, full-cost recovery, etc. These speak to the importance of a continued emphasis on efficiency and greater co-operation and co-ordination of planning, operation and management of the Regional-municipal water systems.
4. Expanded Analytics • As part of the Region's commitment to continuous improvement, greater integration of data capture and analytics across key divisions to maximize water system efficiency and ensure a continued and growing focus on a One Water approach to planning and decision-making is a key objective over the next five years.

Note: Existing Programs | New Programs | New Pilot Programs

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES
• Continued work with local municipalities to enhance and coordinate water billing data collection for improved integrated decision-making in areas of importance – reducing water loss through leakage, preventing excessive flushing, reducing Inflow and Infiltration, monitoring demand trends, measuring and assessing program performance, planning for growth, optimizing operations protocols, etc. – will remain a priority for the Region in the near and longer terms.
5. One Water Innovation
• With rapid advances in physical and information technology and infrastructure, significant challenges and opportunities exist to bring the two together. • A One Water Innovation Group could work to identify, explore, test and develop new processes, equipment, and technologies related to water management. • The Innovation Group could bring together leading business, academic, and public sector expertise to create innovative solutions and expansion of the Regional Innovation Group to include key external stakeholders via an innovation incubator or innovation hub. This could significantly expand the scope and capacity for One Water innovation in the Region. • Incubators and innovation hubs in leading jurisdictions such as Chicago, Philadelphia, and San Jose stimulate the local economy, support innovation, develop local capabilities and expertise, and generate public sector-private sector-academic joint ventures. • The One Water Innovation Group would be responsible for identifying opportunities for innovation across the Regional and local municipal systems. • Linkages with the province's WaterTAP initiative, the Ontario Water Centre, the York University campus in Markham, the LSRCA and TRCA Living City Campus and the Sustainable Technologies Evaluation Program [STEP], and the Canadian Water Network could be made through a One Water Innovation Incubator.
6. Water Reuse Plan:
• In the final quarter of 2015, the Region formed an internal team to develop a cross-functional water reuse plan. • Water reuse is part of the Region's long-term strategy for achieving its ambitious target of 150 litres per capita per day (LCD) over the next 35 years. • Under the Region's One Water program, research into leading water reuse technologies and practices, and the identification and exploration of potential water reuse opportunities across the Regional and local municipal systems will culminate in the development of a water reuse plan. • Region's Upper York Sewage Solution (UYSS) Individual Environmental Assessment (IEA) has proposed opportunities for water reuse to be undertaken as part of the cross-function water reuse plan development. • This work commenced in 2015 and will continue over the next 3 years of the Strategy Update. • Substantial water reuse will be required to meet the Region's aspirational target of No New Water by 2051. Currently there is no provincial guidance for large scale water reuse. In order to develop large scale water reuse opportunities, the Region will work closely with the Ministry on regulatory and programming guidance.

Note:	Existing Programs	New Programs	New Pilot Programs

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES

7. Integrated Master Planning

- Integration of One Water and the Strategy Update in the master planning process is integral to maintaining continuity and ensuring full consideration of water conservation in all future infrastructure plans and projects.
- Over the past decade the Region has taken significant steps to integrate water conservation into infrastructure planning; this approach will continue with greater focus on system-level water efficiency and water reuse in the master planning process.

POLICY AND REGULATION

1. Building Code Standard for Water Efficiency Upgrades in New Construction

- The Region will investigate the potential to require water efficiency upgrades, specifically 4.0 litre toilets, on-demand hot water recirculation systems, increased top-soil depth and quality, and fusion landscaping in new construction - or to include these measures under the Sustainable Incentive Program (SIP) in 2016.

2. Water Efficiency and Water Reuse Standards for all Regional Buildings

- Region to develop requirements for all new and redevelopment projects of Regional buildings to require 4.0 liter or less toilets, water efficient fixtures, fusion landscaping, and water reuse where viable and feasible.
- The Region will develop water conservation requirements and supporting guidance for all new and redevelopment projects of Region-owned buildings.

3. Requirement for all Facilities with In-ground Irrigation Systems to be Optimized

- Over the 2020-2021 period, the Region will investigate a requirement for ICI facilities with in-ground automatic irrigation systems to install smart (weather-based) controllers to reduce water wastage.

4. Water System Design Criteria Advisory Group

- The Region will investigate opportunities to bring key stakeholders from local municipalities, other GTA or Ontario municipalities and/or associations (American Water Works Association, Federation of Canadian Municipalities, Association of Municipalities of Ontario, Canadian Water Network, etc.) and relevant provincial ministries together. This advisory group will discuss design guidelines for water supply systems, including fire flow requirements, and to explore the efficacy of potential changes to the guidelines for enhanced efficiency, cost-effective operation and quality maintenance, and capital cost reduction.
- The key deliverable from this collaborative work is developing a recommendation for updating design criteria for water supply systems.

REBATES AND OTHER FINANCIAL INCENTIVES

1. Capacity Buyback (CBB) Program

The Region continues to implement Capacity Buyback program to ICI customers. The program offers financial incentives to ICI customers based on average daily water savings achieved.

Note: Existing Programs | New Programs | New Pilot Programs

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES

INFRASTRUCTURE

1. District Metered Areas (DMAs)

- The Region continues to offer support to local municipalities in implementing District Metered Areas to reduce system leakage.
- Localized DMA methodology involves comparing the theoretical demand of an isolated area of the system to the measured actual demand; a high actual demand can indicate leakage.
- The Region will determine the value of bringing the DMA program under the One Water Optimization Working Group.

2. Stand-Alone System Water Conservation Plan and Program

- The Region, in consultation with local municipalities in service areas supported by stand-alone systems such as Kleinburg where serviced population is generally less than 10,000 and peak demand is high, will develop targeted water conservation programming to reduce water demands in these communities.
- The plan will be developed over the next two years.

3. Risk-based Asset Management for Pipe Replacement

- The Region will enhance its risk-based pipe replacement program through adopting advanced condition assessment technology, improving data collection, partnering with other municipalities and educational institutions to research pipe deterioration curves, investing in pressure monitoring and developing a transient model to identify areas of vulnerability.
- A complex assessment risk methodology is used to identify pipes that are statistically more likely to fail, pipe clusters with higher than average or acceptable levels of failure (break) rates are targeted first for replacement, while deferring replacement of pipes in clusters with low failure rates.
- Risk-based pipe replacement reduces the likelihood of pipe failures and resulting water loss, reduces utility liability, and optimizes repair and replacement costs.

4. Pressure Management

- The Region has investigated the use of pressure reduction/management to reduce leakage in system pipes. Pressure management in the water supply system is achieved via the use of pressure-reducing valves and is generally done during low demand periods, usually overnight.
- As part of its One Water system-wide efficiency assessment, the Region will investigate the potential change in system pressure due to system expansion to minimize system pressures that may increase leakage. This investigation will be undertaken in the next three years.

Note: Existing Programs | New Programs | New Pilot Programs

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES

5. Water Energy Nexus

- The Region is currently evaluating energy recovery and operational optimization opportunities within the Regional water system.
- This work will continue throughout the planning horizon of the 2016 Strategy, securing energy capture where viable and cost effective.
- System-wide water conservation work will provide energy savings concurrent with water savings.

PILOT PROJECTS AND RESEARCH STUDIES

1. Development-scale water reuse (greywater) and/or rainwater harvesting

- The Region will work with local municipalities and the local builder/developer industry to identify opportunities for development-scale water reuse or rainwater harvesting projects for non-potable purposes. Opportunites such as toilet flushing and irrigation in new residential developments and building-scale water reuse or rainwater harvesting for non-potable purposes such as toilet flushing, boiler systems, and irrigation for commercial and residential development/redevelopment projects.
- Water reuse involves capturing of greywater (water from showers and sometimes laundry), on-site treatment, storage and subsequent reuse for non-potable purposes.
- Pilot project opportunities will be identified during 2016-2017 with the goal of implementation in 2018 – 2020.
- The goal of the pilot project is to assess the costs, potential savings and constraints of development-scale water reuse or rainwater harvesting for non-potable purposes.

2. Water Banking

- The Region will investigate the potential and value of water banking (aquifer recharge).
- Water harvesting and/or reuse will be considered as potential sources of supply for aquifer recharge.
- Given high water levels in some of the Regional wells, a determination as to the need, feasibility, efficacy and value of water banking is required.
- The study of the potential of water banking to the long term sustainability of Regional aquifers will be carried out over 2019 – 2021 of the Strategy Update.

3. Mains Flushing Public Outreach Campaign

- The Region will investigate the potential of co-ordinating water main flushing activities with a spring-time “fill your pools/water features and irrigate new plantings” public outreach and engagement campaign.
- In areas where significant flushing is required to maintain water quality, the potential and viability of redirecting flush water to fill pools, hot tubs and ornamental water features and for irrigation of new plantings at a peak demand time for these activities (generally the 2nd and 3rd weekends of May), will be evaluated in 2018-2019.

Note: Existing Programs | New Programs | New Pilot Programs

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES

MARKETING OUTREACH AND EDUCATION

1. Market-based Programming

- The Region will continue to pursue market-based programming to drive water conservation transformation in the marketplace.
- Market-based measures identified in the Peak Reduction and Average Annual Day Demand Implementation Plans developed in 2012 will continue through the pilot study phase and, where appropriate (based upon results from pilot studies), will be implemented Region-wide over the 2016-2020 period.

2. Water Smart Irrigation Professional (WSIP) Program

- A market-based program involving a 3-way collaboration of York Region, Peel Region and Landscape Ontario.
- Involves training and certification of irrigation contractors who then qualify for an incentive to optimize the efficiency of existing automatic irrigation systems.
- The potential average water saving for Industrial, Commercial, and Institutional facilities is in the range of 10,000 litres per day per acre of irrigated turf. WSIP is potentially a significant program for reducing peak demand and for tackling high outdoor water use.

3. Fusion Gardening Program

- A market-based program using landscape design/install and maintenance service providers.
- Involves training and certification of landscape designers/installers and landscape maintenance contractors in fusion gardening/landscaping.
- In 2015 the Region began implementing a pilot project in Kleinburg, a community with a significant percentage of high peak season residential water users.
- Fusion landscapes are water efficient and incorporate LID/green infrastructure features such as rain gardens, bioswales, increased vegetative cover (including tree canopy cover), dry river beds, and soak-away pits.
- Fusion landscapes require little or no supplemental irrigation once established, mitigate stormwater runoff and contaminant loadings to source waters, help reduce flooding, and enhance vegetative cover.
- The Fusion Gardening pilot program will continue in 2016 – 2018 and will be evaluated to determine if the program will be implemented Region-wide beginning in 2019.

4. "Water Is" Campaign

- "Water Is" campaign rolled out in the fall of 2013.
- First phase of campaign created an emotional connection between residents and water and included multi-pronged communication tactics including ads (newspaper, bus shelter, and movie theatre), social media, event attendance, photo contest, posters, etc.
- The second phase of campaign is more informational – showcasing hidden infrastructure and how York Region keeps drinking water safe and clean and included videos, posters, social media, Water Hero campaign, advertorials.
- The "Water Is" program raises awareness about the importance of water. Making the connection between the value of water and the need to conserve is a key component of the

Note: Existing Programs | New Programs | New Pilot Programs

2016 STRATEGY WATER CONSERVATION PROGRAMS AND MEASURES

Region's water conservation outreach program.

5. Children's Water Festival

- Grade 4 students across York Region learn about water conservation through interactive, curriculum-linked activities.
- The Children's Water Festival is a five-day signature event that helps approximately 5,000 students understand how important a clean and plentiful water supply is. Children learn respect for a healthy environment and make a commitment to use natural resources wisely. The festival has been held for over ten years for schools in York Region where each teacher registers his/her own class separately.
- The York Children's Water Festival is a major component of York Region's *Water for Tomorrow* program and is a partnership between York Region and the Toronto Region Conservation Authority.

6. Student Education Initiatives

- York Region offers a number of educational water conservation programs for elementary schools.
- Teachers and students are encouraged to participate in events and activities linked to the Ontario curriculum.
- The Region developed a new elementary-level, in-class presentation to demonstrate where water comes from and the systems that move it, and the safety and reliability of the Region's supply. The presentation features hands-on activities and engaging discussion about how water is needed and used.
- The Region offers a calendar showing Grade 7 student drawings reflecting the students' views on water conservation, protection and responsibility.
- Student drawings are first judged at each school and then submitted to York Region for final judging.
- The 12 winning art pieces are printed in the Water for Tomorrow student calendar which is available online. Each winning artist is personally recognized for his/her contribution at his/her school.

INNOVATION

1. Water Reuse Pilot

- Water reuse is part of the Region's long term strategy for achieving its ambitious targets. The Region's Upper York Sewage Solution Project has proposed exploring opportunities for water uses and will be piloting a project to utilize water reuse for irrigation purposes from a Regional Water Resources Recovery Facility.

2. Water Conservation Innovation Investment

- The Region will potentially in conjunction with existing entities, such as Canadian Water Network and WaterTAP, or the One Water Incubator, fund innovative water conservation projects with a specific focus on equipment, technology and processes which save water.

Note: Existing Programs | New Programs | New Pilot Programs

1.6 UPDATED WATER SAVING TARGETS AND TIMELINE

The 2011 Strategy envisions a residential water consumption rate of 150 litres per capita per day (LCD) by 2031. While per capita residential water demands have declined over the last decade or so because of the impact of Regional programs, an improvement in the efficiency of key water using fixtures and appliances (e.g., toilets, clothes washers, showerheads), and a growing awareness of the importance of using our natural resources wisely, further savings are required if the Region is to reach its targets.

Table 5 summarizes the projected water savings and consumption rates that can be achieved over time under three scenarios.

Scenario 1 represents consumption rates that can be achieved through Region's water conservation programs only. Scenario 2 represents consumption rates that can be achieved through the Region's water conservation programs plus additional water savings from provincial legislation such as mandating water efficient fixtures in new homes through the new Plumbing Code (effective January 2014). Scenario 3 represents a 2051 target consumption rate of 150 LCD. It requires implementation of water reuse and provincial guidance on water reuse applications.

Through implementation of the 2016 Strategy Update over the next five years, coupled with additional savings from new building code, the Region is on track to achieve the 2021 target consumption rate of 190 LCD. Piloting water reuse project in the next five years is essential to prepare for implementing water reuse measures from 2021 to 2031, in order to achieve the 2031 water consumption target of 150 LCD.

The 2016 Strategy Update recommends the Region form a team to develop a water reuse plan, including providing support and input to the implementation of water reuse in the Upper York water reclamation centre, and working with the Province on policy and regulatory changes to permit large scale water reuse.

The 2011 Strategy also envisions a "No New Water" goal by 2051. It is expected that achievement of this goal requires large scale water reuse. Currently there is no provincial guidance for large scale water reuse. In order to develop large scale water reuse opportunities, the Region will work closely with the Ministry on regulatory and programming guidance.

Table 5 – Residential Water Consumption Targets and Timelines

WATER SAVINGS SCENARIOS	2014	2021	2031	2041	2051
	Residential Consumption Rate (LCD)				
Scenario 1 Regional Incentive Programs	200	192	185	179	173
Scenario 2 Regional Incentive Programs + Existing Provincial Programs and Legislation		190	183	176	170
Scenario 3 Regional Incentive Programs + Existing Provincial Programs and Legislation + + Water Reuse and Provincial Guidance and Legislative Changes			180	165	150

1.7 CONCLUSION

The 2016 Strategy aligns with the Region's One Water approach to water management and takes a market-based approach to program implementation to leverage resources from other agencies and to maximize the Region's return on investment.

While the Region appears to be on track to reach its "150 LCD" residential water demand target by 2051, the second target of "No New Water" would be more challenging as it will require system-wide, large scale water reuse. The Region will continue to explore options to achieve its aspirational long term goal of "No New Water" as envisioned in the 2011 Strategy, in consultation with the Ministry.

With development and implementation of the 2016 Strategy Update, the York Region maintains its position as one of the leading Canadian jurisdictions regarding water conservation.