CITY COUNCIL AGENDA

DATE February 25, 2009 – 6 p.m.

Please turn off or place on non-audible all cell phones, PDAs, Blackberrys and pagers during the meeting.

INFORMATION SESSION:- WATER CONSERVATION & EFFICIENCY STRATEGY UPDATE

PRESENTATION

- Janet Laird, Director of Environmental Services
- Wayne Galliher, Water Conservation Project Manager
- Michael Brooks of Resource Management Strategies Inc.
  - Kingsley Blease and Aileen Barclay of Resource Management Strategies Inc. will also be present

ADJOURNMENT

CITY OF GUELPH

WATER CONSERVATION AND EFFICIENCY STRATEGY UPDATE

Executive Summary

February 18, 2009

RMSi Resource Management Strategies Inc.

Protecting resources for future generations

1.0 Executive Summary

The City of Guelph has a history of environmental stewardship and leadership. This attitude and action can be observed in the area of water conservation. As one of the largest cities in Canada dependent solely on a groundwater source of water supply, Guelph has been providing water conservation and efficiency education for a number of years and more recently technical programming such as toilet and water efficient clothes washer rebates as well as Industrial, Commercial and Institutional audits and incentive programs.

In June, 1998, the City of Guelph initiated a Water Conservation and Efficiency Study (WC&E) to develop a comprehensive water conservation and efficiency plan for the City's residential, industrial, commercial and institutional sectors. The study established an integrated relationship between the environmental, technical, regulatory and social acceptance of numerous water efficiency alternatives and upon completion in 1999 the Water Conservation and Efficiency study identified the following set of recommendations:

- That City staff accept the Water Conservation & Efficiency Steering Committee's recommended Water Conservation & Efficiency Plan and prepare regular reports on the status of the City's water supply and wastewater treatment capacity.
- That Alternative Day Lawn Watering remain mandatory.
- That a permanent ban on lawn watering not be implemented, however, the ability to temporarily eliminate lawn watering in the event of an emergency be retained.
- That city Staff be directed to require individual metering, where feasible, in all new multi-residential housing.
- That the City continue to track and assess innovations in water conservation and efficiency technology and pursue changes in applicable legislation. Opportunities for inclusion of new or improved technologies should be evaluated on a regular basis.
- That a water rate study, in order to reassess peak period and conservation pricing, be completed by January 1, 2002.
- That the City of Guelph undertake a water audit of City facilities beginning in 1999, and commence installation of required water conservation and efficiency fixtures in order to lead by example.
- That the City continue to pursue opportunities to use the water bill as an educational tool.
- That staff be directed to review processes to regulate automatic lawn water sprinkler installation and maintenance.
- That staff be directed to encourage owners of private distribution system to minimize their unaccounted for water (UFW).
- That staff consider implementing an environmental management system, such as ISO 14000, for the Waterworks and Wastewater Services, and promote similar environmental management systems in the private sector.
- That the City continues its policy of charging full water and wastewater rates for all water used.
- That various funding methods be investigated for the financing of water conservation and efficiency methods.
- That the City establish an implementation committee to oversee the development of the Water Conservation & Efficiency Plan.

To meet future water supply requirements to service and sustain projected community growth, the City initiated the Guelph Water Supply Master Plan in 2004. Through the development of the Water Supply Master Plan, the employment of an enhanced water conservation and efficiency strategy, mitigation of distribution-based water loss, and education/policy/rate based reviews, were identified as the preferred short-term options to reclaim critical supply capacity in concert with optimization and rehabilitation of current supply based infrastructure. With a finite groundwater source, and uncertainty regarding the availability of further groundwater sources or impact of additional water taking from current sources, the finalized 2006 Water Supply Master Plan identified sustainable growth potential in the City contingent upon the success of aggressive water conservation and efficiency programs. As part of the 50 year Master Plan water conservation was recognized as a preferred short term source of water supply and recognized the following time based water reduction targets:

- 10% reduction in 2006 total average day water use by 2010
- 15% reduction in 2006 total average day water use by 2017
- 20% reduction in 2006 total average day water use by 2025

Upon Council's approval of the Water Supply Master Plan, full implementation of the 1999 Water Conservation and Efficiency Study was undertaken with enhanced annual financial support granted to the City's Water Conservation and Efficiency Program in support of pursuing the above targets in the time required to undertake an update to the City's Conservation and Efficiency Strategy.

In 2007, the City Council endorsed the Community Energy Plan which noted the per capita water and energy goal of *Using less energy and water per capita than any Comparable Canadian City.* Later that year, the goal was reiterated and identified through Goal 6 of the City of Guelph 2007 Strategic Plan, noted below:

Natural Environment - A leader in conservation and resource protection/enhancement:

Strategic Objective 6.5 – Use less energy and water per capita than any Comparable Canadian City.

With the emergence of regulatory and technology advancements since the completion of the City's original 1999 Conservation and Efficiency Study, City staff began development of the Water Conservation and Efficiency Strategy Update in February of 2008. For assistance in the development of the strategy, City staff retained project consultant Resource Management Strategies Inc. (RMSi) through a request for proposal process. Included in RMSi's extended consulting team was Leapfrog Energy Technologies, David Pearson Consultancy, Hetek Solutions and B+T Engineering.

The goal of the Water Conservation and Efficiency Strategy Update was to identify preferred program, policy and resource alternatives to best meet the water reduction goals identified in the Guelph Water Supply Master Plan, Community Energy Plan and Council Strategic Plan. In addition, the Water Conservation and Efficiency Strategy Update was to identify preferred program implementation forecasts, and program support staff and maintenance based resources required to meet and sustain the water reduction goals over the planning period.

With the importance of ongoing public consultation throughout the development of the Water Conservation and Efficiency Strategy Update, the formation of a Water Conservation and Efficiency Strategy Public Advisory Committee (PAC) was endorsed by Council. Following Council approval the PAC was formed to work with the staff and project consultant team. A total of 14 members were selected from a variety of stakeholders groups including:

- City Council (1)
- Industry (2)
- Home Builders/Development (1)
- Environmental Interest (3)
- Plumbing (1)
- Academia -University of Guelph (2)
- Grand River Conservation Authority (1)
- Public at Large (3)
- Chamber of Commerce (1)

The PAC met four times throughout the development of the strategy and provided new ideas, direction and initiatives for the consultant team to consider while providing feedback to key findings and progress provided.

To solicit feedback from further members of the public, a series of Public Information Centres (PICs) were held through the Strategy Update process. Through these events, residents and area stakeholders were introduced to the project scope and planned activities, and provided with results to date including: public consultation, market research, residential water use demand analysis, Industrial, Commercial and Institutional water use demand analysis, evaluation of distribution system water loss and water supply demand forecast. As part of each event, a round table discussion was held to obtain input towards the direction of the strategy and to solicit programming ideas.

As a first step to the study, focus groups were held to capture community input to the process through qualitative market research. The data captured does not provide statistically relevant information. However, information gained from the focus groups was used to develop context around water conservation and efficiency, understand issues and local concerns, and explore the appropriate means of communications to achieve success in project development and delivery. In total, three (3) focus groups were conducted on April 22nd, 2008 at a professional focus group facility in Guelph, moderated by a professional market researcher. Each group consisted of 5-7 participants, and lasted approximately 90 minutes. Participants in this research were randomly recruited residents of the City of Guelph.

Finally, a customer survey was completed to capture community input in a quantitative manner, providing statistically significant data that could be extrapolated to the entire community. To accomplish this, 400 randomly selected Guelph residents on municipal water supply were contacted by telephone between June 23rd and June 30th, 2008. Residents were asked a series of questions pertaining to water and water conservation in their community. Through this process, there was a series of scaled (i.e. choose 1- 10), and both open (i.e. how do you feel about…) and closed ended questions (i.e. yes or no).

Information gathered provided data on demographic information, general public knowledge, participation and satisfaction in water efficiency programs offered by the City of Guelph, water use behaviour indoors and outdoors, willingness and desired/required incentives for implementing water saving mechanisms.

The promotion of water conservation and efficiency is not new in the City of Guelph. Since the development of the Water Conservation and Efficiency Study (WC&ES) in 1999 the City has been actively completing a whole range of water efficiency measures including:

- Royal Flush Toilet Program, a rebate program introduced in 2003
- Smart Wash Clothes Washer Rebate Pilot Program, a rebate program launched February 2008
- Industrial, Commercial and Institutional (ICI) Water Capacity Buyback Program, introduced in 2007
- Outside Water Use Program, out water use restrictions introduced in 2001
- Landscape Assessment Pilot Program, launched in May, 2008
- City of Guelph Facility Water Efficiency Retrofits, a program to lead by example
- Public Education and Outreach including
    - Waterloo / Wellington Children's Water Festival
    - Guelph International Resource Centre (GIRC) Water Efficiency Workshop Series (2007/2008)
    - 2008 City of Guelph Water Conservation Breakfast Workshop
    - Green Impact Guelph (GIG) Partner
    - Annual Waterworks Open House
    - Guelph Water Conservation and Efficiency Awards
    - Participation in numerous Community Events and Festivals

These above activities have contributed to significant water savings since 2003 as indicated in the following Table 1.

Table 1: Water Efficiency Results since 2003

Water Conservation Savings by Year 2003 to 2008				
Year	Program	Savings (m3/day)	Savings (m3/yr)	Total Annual Savings (m3/yr)
2003	Royal Flush	80.0	29,200.0	29,200.0
2004	Royal Flush	80.0	29,200.0	29,200.0
2005	Royal Flush	80.0	29,200.0	29,200.0
2006	Royal Flush	80.0	29,200.0	29,200.0
2007	Royal Flush	81.9	29,893.5	
2007	ICI Capacity Buyback - U of G	312.0	113,880.0	143,773.5
2008	Royal Flush	189.1	69,021.5	
2008	ICI Capacity Buyback - Cargill	190.0	69,350.0	
2008	Smart Wash Program	30.0	10,950.0	149,321.5
Total Savings		**1,123.0**		**409,895.0**

In order to develop the strategy, significant investigation and analysis of previous plans and strategies, water system, infrastructure, capital plans, demand forecasts, population projections and housing trends. The key findings are as follows:

- Gross water demand (total billed water supplied divided by population) has declined 17% from 444 litres per capital per day (Lcpd) in 1999 to 370 Lcpd in 2007,
- The City's population increased 14.6% from 101,857 residents in 1999 to 116,766 in 2007;
- The Residential Single Family water demand (total billed residential single family water supply divided by single family population) of 230 Lcpd in 2007 is significantly lower that the Canadian national average of 335 Lcpd and lower than most Ontario communities;
- The Residential Multi Family water demand (total billed residential multi family water supply divided by multi family population) was 153 Lcpd in 2007;
- 5% or 133 Industrial, Commercial and Institutional customers consume 80% of the overall water demand in that sector;
- Based on 2007 data, the City of Guelph has a Infrastructure Leakage Index (ILI) of 2.94 placing it in the Performance Category B with the potential for some improvement;
- The City is currently saving 1,123 m3 per average day (or 409, 895 m3/year) of water as a result of its water conservation and efficiency efforts since 2003. These average day savings would represent the equivalent water resources required for approximately 1000 new homes. A breakdown of daily water savings achieved by conservation program is provided in Table 1 above.

The research, technical analysis and public consultation completed as part of the Water Conservation and Efficiency Strategy Update has resulted in the following program recommendations.

Recommended Water Conservation and Efficiency Strategy Components

Single Family Detached Residential Indoor Measures

- Provide rebates to residents who replace inefficient 13L toilets and install ultra low flow toilets, high efficiency toilets or dual flush toilets.
- Provide rebates to residents who purchase and install water efficient clothes washers, water efficient central humidifiers and floor drain covers.
- Provide rebates to residents who install a grey water reuse system.
- Provide rebates to residents who install a rain water harvesting system.
- Visit homes and install free of charge low flow showerheads, low flow kitchen aerators and repair any water leaks while there.

Single Family Detached Residential Summer Demand Measures

- Provide rebates to residents who purchase and install watering timers.
- Visit homes and educate residents on how to maintain their lawns and water less and how to convert their properties to water efficient landscapes.
- Provide rebates or subsidized pricing for residents who purchase a rain barrel or larger water storage unit.

Multi Family Residential Indoor Measures

- Provide rebates to building owners who purchase and install ultra low flow toilets, high efficiency toilets or dual flush toilets.
- Provide rebates to building owners who purchase and install a water efficient clothes washer in their laundry rooms.
- Visit apartments and install free of charge low flow showerheads, low flow kitchen aerators and repair any water leaks while there.

Residential New Development Indoor Measures

- Provide rebates to builders who proactively purchase and install approved high efficiency toilets or dual flush toilets, low flow showerheads and low flow kitchen faucets at the time of new home construction..
- Provide rebates to builders who purchase and install water efficient clothes washers, water efficient central humidifiers and floor drain covers at the time of new home construction.
- Provide rebates to builders who install a grey water reuse system at the time of home construction.
- Provide rebates to builders who install a rain water harvesting system at the time of home construction.
- Note: New home owners would realize the benefit of ongoing water savings.

Residential New Development Summer Demand Measures

- Provide rebates to builders who install watering timers.
- Provide rebates to builders who install water efficient landscapes as part of new home construction.

Industrial/Commercial/Institutional Measures

- Provide rebates to facilities who replace inefficient 13L toilets with ultra low flow toilets, high efficiency toilets or dual flush toilets.
- Provide rebates to local businesses who purchase and install a water efficient clothes washer in their operations.
- Visit commercial kitchens and install free of charge low flow pre-rinse spray valves.
- Complete ten comprehensive water audits per year and offer a capacity buy-back rebate to any facility that implements all or some of the water saving recommendations.

Municipal Measures

- Design and implement five (5) district meter areas per year for three years in order to locate, quantify and repair the leakage within the water distribution system.
- Complete Property Water Use Audits of existing municipal buildings and implement water efficiency retrofits and public demonstration projects. Identification and priority setting is currently ongoing. A City Building Water Efficiency Plan anticipated for completion in late 2009 and will include appropriate water reduction targets.

Public Education

- Distribution of booklets, leaflets, and fact sheets at home shows and community and environmental events.
- Distribution of a water efficiency bulletin in the water bills.
- Displays at home shows, fairs and community events.

- Newspaper articles and advertisements.
- Develop and maintain a website to educate the public on water efficiency.
- Provide workshops and seminars to the public on water saving techniques both inside and outside the home.
- Provide water efficient demonstration gardens for the public to visit and learn.

Youth Education

- Develop and deliver a water efficiency education program based on the Ontario curriculum requirements.
- Continue annual participation in the Waterloo Wellington Children's Groundwater Festival.

Policy Based Recommendations (requiring Council approval)

- That the time based average day water reduction goals of the City's Water Supply Master Plan be formally endorsed as;

    - 10% reduction (5,300 m3/day) by 2010, based on 2006 average day water use;
    - 15% reduction (7,950 m3/day) by 2017, based on 2006 average day water use, and;
    - 20% reduction (10,600 m3/day) by 2025, based on 2006 average day water use;

- That the City adopt a water reduction philosophy of maintaining average day water production below the 2006 value (53,000 m3/day) for a 5 year period (2014).
- That the City of Guelph continue operation of the City's Outside Water Use Program in efforts to reduce impacts of Peak Seasonal Demands.
- That the City form a long standing Water Conservation and Efficiency Advisory Committee for purpose of ongoing public consultation throughout the implementation of the 2009 Water Conservation and Efficiency Strategy Update with an appropriate mandate and charter to be developed.for the Committee..
- that the City in partnership with the Region of Waterloo continue performance testing research of home water softener technologies and promote through a public educational program technology performance results and related environmental benefits of preferred technologies.
- That the City's Wastewater Effluent Re-use dedicated pipe project, commonly referred to as the "Purple Pipe' project, and Class Environmental Assessment, as approved by Council through the 2008 Guelph Water/Wastewater Master Servicing Plan, evaluate the further potential for a communal wastewater effluent reuse system and design practices for customer serving of the effluent reuse source.
- That the City undertake a feasibility study to evaluate the best practices for multi-unit residential water metering and private servicing condition assessment requirements for current bulk metered multi-unit residential customers.
- That the City's Strategic Urban Forest Management Plan and the Natural Heritage Strategy define the appropriate means for protection and preservation of the City's urban forest in recognition of water conservation and storm water management benefits provided by the urban canopy.
- That staff undertake the immediate development of an enhanced public education water conservation program in 2009 subject to the availability of program funding.
- That staff initiate water loss mitigation activities in 2009 as outlined in the City's Water Loss Mitigation Strategy and investigate the potential for improved water pressure management in distribution system.

- That the City's Waterworks Department undertake a pilot study as part of the City's 2009 Water Loss Mitigation Strategy to evaluate the local implementation of Automated Metering Infrastructure (AMI) for customer water metering.
- That the City's Water/Wastewater Rate Review define customer billing policies for properties possessing Rain Water Harvesting Systems.
- That staff pursue external funding sources, and key partnerships, throughout implementation of the Water Conservation and Efficiency Strategy Update program recommendations.

The capital budget necessary to implement the ten year strategy is shown in the following Table 2.

Table 2: Ten Year Capital Budget

Ten Year Capital Plan	Total Cost	Total Accumlative Savings (Ml/day)	Cost per Litre
Single Family Detached Residential - Indoor Demand Measures	$ 7,579,870	3,448,980	$ 2.20
Single Family Detached Residential - Summer Demand Measures	$ 2,385,000	996,500	$ 2.39
Multi Family Residential	$ 1,413,316	589,770	$ 2.40
New Development Residential - Indoor Demand Measures	$ 2,272,500	583,650	$ 3.89
New Development Residential - Summer Demand Measures	$ 1,026,000	294,000	$ 3.49
Industrial/Commerical/Institutional	$ 1,987,900	1,135,700	$ 1.75
Distribution Leakage Reduction	$ 238,500	1,725,000	$ 0.14
Public Education	$ 1,420,000		
Youth Education	$ 1,030,000		
Other Municipal Initiatives	$ 940,000		
Total	$ 20,293,086	8,773,600	$ 2.31

Funding Allocation	Total
Approved DC Forecast	$ 2,759,958
Current Water Conservation Funding (Rate Base)	$ 5,835,115
Additional Funding (Rate Base)	$ 11,698,013
Total	$ 20,293,086

The $11,698,013 of additional required funding represents a 4.3% water rate increase in 2010.

The cost-effectiveness of a water efficiency strategy is evaluated by determining the cost per litre for the water saved. The cost per litre for water saved is then compared to the cost per litre to construct new water supply and wastewater infrastructure. If the cost per litre of saved water is less than the cost to construct new capacity, then the water efficiency strategy is deemed cost effective. It is important to note that the calculated cost relating to construction of an additional litre of water and wastewater capacity does not include the cost of debt financing of construction projects. It is also important to note, that this figure does not include the cost of additional infrastructure required for the distribution and conveyance of water and wastewater to and from newly serviced areas such as water/wastewater mains, pumping stations or system reservoirs.

In southern Ontario, the combined water and wastewater construction cost per litre of additional supply/treatment capacity ranges from approximately $2.00 to $8.10. For the purpose of this study, a combined water and wastewater construction cost of $4.00 per litre of additional average day capacity was utilized for the financial analysis of the various conservation measures. Overall, the suite of preferred conservation measures identified in the final Conservation and Efficiency Strategy Update recommendation

equalled a total program cost of $2.31 per litre of additional average day capacity (as noted in Table 2 above). Based on this analysis, the total cost per litre for the conservation program is 42% more cost effective than the cost of constructing new water and wastewater capacity.

Water savings generated from the efficiency strategy should be viewed in the same manner as constructing a new water treatment facility. If the City were to design and build a new facility to deliver 8.7 Ml/d, a budget for a maintenance program would be included to ensure that the facility continues to deliver 8.7 Ml d in the future. Water saved from a water efficiency strategy should be viewed similarly.

The strategy has been developed to save a specific amount of water and maintenance will continue to sustain the savings into the foreseeable future. The recommended maintenance budget is included in Table 3.

Table 3: Ten Year Maintenance Budget

Ten Year Maintenance Plan	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Costs	Costs	Costs	Costs	Costs	Costs
Single Family Detached Residential - Indoor	$ 16,213	$ 16,426	$ 17,277	$ 17,916	$ 18,554	$ 19,193
Single Family Detached Residential - Summer Demand	$ -	$ 18,000	$ 18,000	$ 18,000	$ 18,000	$ 18,000
Multi Family Residential	$ 16,112	$ 16,223	$ 16,670	$ 17,005	$ 17,340	$ 17,674
Industrial/Commercial/Institutional	$ 12,061	$ 12,122	$ 22,867	$ 23,051	$ 28,104	$ 31,881
Distribution Leakage Reduction				$ 47,700	$ 47,700	$ 47,700
Total	$ 44,386	$ 62,771	$ 74,814	$ 123,671	$ 129,698	$ 134,448

Ten Year Maintenance Plan	Year 7	Year 8	Year 9	Year 10	Total
	Costs	Costs	Costs	Costs	
Single Family Detached Residential - Indoor	$ 19,831	$ 20,470	$ 21,108	$ 21,747	$ 188,733
Single Family Detached Residential - Summer Demand	$ 18,000	$ 18,000	$ 18,000	$ 18,000	$ 162,000
Multi Family Residential	$ 18,009	$ 18,344	$ 18,679	$ 19,014	$ 175,070
Industrial/Commercial/Institutional	$ 31,907	$ 31,933	$ 31,959	$ 73,985	$ 299,870
Distribution Leakage Reduction	$ 47,700	$ 47,700	$ 47,700	$ 47,700	$ 333,900
Total	$ 135,447	$ 136,447	$ 137,446	$ 180,446	$ 1,159,573

It is important to have a monitoring and evaluation program to ensure that the water savings are achieved initially, and that those savings are sustained over time.

Table 4 below provides the monitoring and evaluation by year for the ten year strategy.

Table 4: Ten Year Monitoring and Evaluation Budget

Ten Year Monitoring and Evaluation Plan	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Costs	Costs	Costs	Costs	Costs	Costs
Single Family Residential - Indoor	$ 345,000				$ 180,000	
Single Family Residential - Summer Demand	$ 45,000	$ 24,000	$ 24,000	$ 24,000	$ 98,460	
Multi Family Residential	$ 315,000				$ 120,000	
Industrial, Commercial and Institutional	$ 297,000				$ 37,700	
Total	$ 1,002,000	$ 24,000	$ 24,000	$ 24,000	$ 436,160	$ -

Ten Year Monitoring and Evaluation Plan	Year 7	Year 8	Year 9	Year 10	Total
	Costs	Costs	Costs	Costs	Costs
Single Family Residential - Indoor				$ 180,000	$ 705,000
Single Family Residential - Summer Demand				$ 98,460	$ 313,920
Multi Family Residential				$ 120,000	$ 555,000
Industrial, Commercial and Institutional				$ 37,700	$ 372,400
Total	$ -	$ -	$ -	$ 436,160	$ 1,946,320

The reduction of water-use through an efficiency program and the associated energy savings provides significant greenhouse gas reductions. With climate-change in mind, most municipalities have set their own greenhouse gas reduction targets.

Water efficiency can be a positive contributor to meeting those targets. The full implementation of the Water Conservation and Efficiency Strategy Update recommendations provides energy savings and greenhouse gas emissions reduction as indicated in Table 5 below.

Table 5: Estimated Energy Savings and Associated Greenhouse Gas Emission Reductions

	Water Savings per Year (m3/year)	Energy Savings per Year	CO2 Reductions per Year (tonnes/yr)
Overall Water Savings	3,202,364	2,348,934 KWh Electricity	728 tonnes
Low Flow Showerheads and Faucets	Included in above	684,216 m3 Natural Gas	1,294 tonnes
Pre-Rinse Spray Valves	Included in above	206,325 m3 Natural Gas	390 tonnes
Overall CO2 Reductions			2,412 tonnes

Electric savings 2,348,934 KWh for the City of Guelph represents a savings of $140,936 on its electric bill per year

The reduction of 2,412 tonnes in CO2 represents the equivalent of 438 cars removed from the road each year

The final 2006 Water Supply Master Plan identified sustainable growth potential in the City contingent upon the success of aggressive water conservation and efficiency programs and identified the following overall targets in support of growth:

- 10% reduction (5,300 m3/day) by 2010, based on 2006 average day water use;
- 15% reduction (7,950 m3/day) by 2017, based on 2006 average day water use, and;
- 20% reduction (10,600 m3/day) by 2025, based on 2006 average day water use;

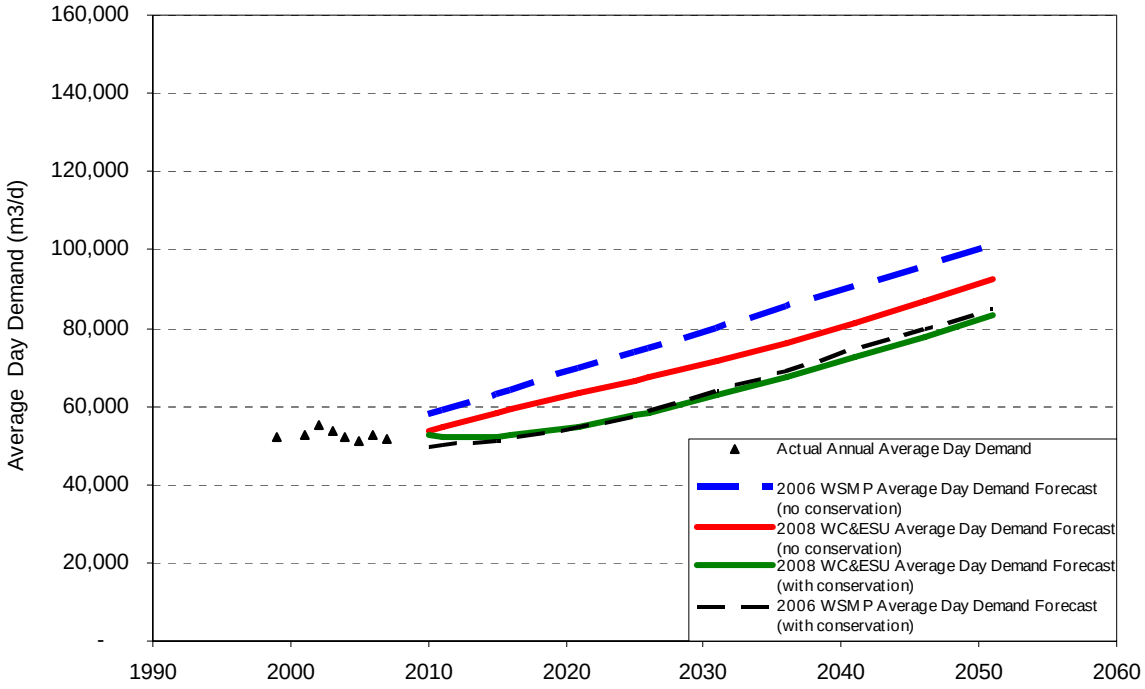
A major objective of this study was to determine if the above targets were achievable.

Total Potential Water Savings:
The analysis determined that the total potential for water efficiency is 13,661 m3/average day of water savings. However, meeting this total water efficiency potential assumes a 100% participation rate in all conservation programs and extensive program funding. This analysis also assumes an overall decrease in residential single family demand from the current 230 Lcpd to 153 Lcpd, which may not be feasible for all vintages of homes in the City.

Total Acheivable Water Savings:
Since the 2006 WSMP, the City has achieved 883 m3 per average day in water savings. The recommended ten year strategy in this report indicates an achievable water savings of an additional 8,774 m3 per average day by 2019. The combined savings represents a total of 9,657 m3 per average day water savings, which means

that 90% of the 2025 water reduction goal (i.e. 10,600m3/day) can be achieved by 2019,. Not included in this estimate is the additional savings attributed to public and youth education. All would agree that education contributes to water conservation and efficiency but as discussed in the report, the exact savings are not possible to estimate or quantify. The above achievable water savings are predicated on adequate program funding throughout the 25-year timeline.

Figure 1: City of Guelph Average Day Demand Projections



The recommended ten year strategy has been developed to take full advantage of the available market potential. Not all, but most of the inefficient toilets, clothes washers, showers and faucets will have been replaced by the end of the ten year period. Additional savings will be more difficult to generate with traditional water saving technologies and more emphasis will be placed on emerging technologies such as grey water reuse and rain water harvesting.

A summary of water efficiency programs being implemented by municipalities in Ontario can be found in Appendix A. City of Guelph's water conservation and efficiency strategy was developed with these neighbouring municipalities programs in mind, aligning the programming to leveraged known successes.

In addition to the recommended programs, it is anticipated that the City will pursue partnering with other municipalities and government agencies in the pursuit of research and development of new and emerging water efficiency technologies and practices.

Advancements to regulations, codes and standards could go a long way in ensuring water efficient housing and businesses in the future. Currently, the Ontario Building Code requires water efficient fixtures in all new

construction; however the retrofit market can still install inefficient toilets. Associations such as the Ontario Water Works Association and the Canadian Water and Wastewater Association, in conjunction with Canadian municipalities are lobbying for the adoption of a regulation that would ban inefficient toilets from all applications. This would assist the municipalities in their pursuit of water efficiency and could reduce or eliminate the need for rebates.

As noted above, water efficiency generates a number of co-benefits including energy savings and reductions in greenhouse gas emissions. Electric and natural gas utilities, with the encouragement of regulators and governments, have been enthusiastic in their promotion of energy efficiency. These agencies are ideal partners for water efficiency programs. By pursuing these types of partnerships the cost of programs can be shared as well as the benefits.

The implementation of this strategy by the City of Guelph will ensure financially and environmentally sustainable water resources for today and future generations.