



Strathcona County
Water conservation,
efficiency and
productivity plan

Serving our community through responsible water management



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Planning our community's water future

Conservation, efficiency and productivity

1.1 Our Water Plan

Water is precious. It is essential for life. But we often take it for granted. We turn on the tap and water appears, even though we cannot see all of the infrastructure and effort that brought it to us. There is a strong belief that Canada holds plentiful water resources. Unfortunately, the available fresh water is almost exclusively located in Canada's north, while the majority of Canadians live in cities along the southern border where only 2.6 per cent of the world's fresh water resides (Bakker, 2007).

FACT: There is a finite amount of potable (drinkable) water in the province of Alberta (97.5 per cent comes from surface water and 2.5 per cent comes from groundwater), (Alberta Water Smart, 2011).

Water plays other roles in our lives outside of our home uses too. We use it for recreation, processing the items we purchase, growing the food we eat and watering the landscapes around us. Wildlife relies on water sources for their habitat, while rivers and groundwater rely on water to recharge their supplies and manage pollutants. In the specialized municipality of Strathcona County, water is used primarily for household purposes in addition to landscape, recreational, industrial, commercial and agricultural use.

Located just east of Edmonton, Alberta, encompassing 1,179m² of land, Strathcona County is home to more than 91,000 residents, 1,847 hectares of natural land, 772 farms and some of the largest oil refining and petrochemical complexes in the world. The County is home to a unique blend of urban and rural lifestyles, a strong community ethic and a multitude of natural features such as the Beaver Hills Moraine, Strathcona Wilderness Centre and rich, agricultural land which make it an ideal place to live, work and play.

The Utilities department at Strathcona County consists of 100 staff members responsible for managing the community's utility services. These dedicated individuals look after everything from watermain breaks to sewer back-ups and stormwater management facility maintenance.

Although Strathcona County serves 91,039 residents, a fraction of these receive water from truckfills and private wells. Sherwood Park, the County's main urban centre, is home to more than 64,000 people.

The aim of this document is to bridge the knowledge gaps regarding water in our community and to educate and empower water users through local water use statistics and adoptable actions for sustainable water management. Strathcona County, along with many other Alberta municipalities have been asked by the Alberta Urban Municipalities Association (AUMA) to create Water Conservation, Efficiency and Productivity plans by December 31, 2011.

In this plan, the following topics will be explored (for Strathcona County):

- Sources and treatment of water
- Water targets to be achieved
- Changes in water demand over time
- Breakdown of water use by sector
- Plans for water management
- Actions for residents and others to adopt

CEP = conservation, efficiency and productivity

Water conservation: Any beneficial reduction in water use, loss, or waste and/or water management practices that improve the use of water resources to benefit people or the environment.

Water efficiency: Accomplishment of a function, task, process, or result with the minimal amount of water feasible. An indicator of the relationship between the amount of water needed for a particular purpose and the quantity of water used or diverted.

Water productivity: The amount of water required to produce a unit of any good, service, or societal value.

Source: Alberta Water Council, 2007.

Education is a key component of Strathcona County's water services, including webpages, workshops, and rebates for water saving practices. New opportunities for education exist through online e-bills, school programs and social networking tools. Also, Utilities staff attend public events such as Canada Day, trade fairs, community meetings and the Women's Wellness Conference to ensure there is one on one interaction with a wide variety of audiences.

Currently Strathcona County's strategic plan calls for the adoption of an Environmental Sustainability Framework that uses strong environmental measures and includes key performance indicators. These principles are to be included into County decision-making processes. The Environmental Sustainability Framework challenges Strathcona County to improve water efficiency by 30 per cent in all County operated facilities by the year 2015 (water use per square foot is used as an indicator for this target). The strategic plan also encourages the County to work with Federal, Provincial, industries and other partners to ensure air and water quality meets or exceeds approved standards.

One of these partnerships is with the Province of Alberta's *Water for Life* strategy. Since 2003, the Province's *Water for Life* strategy has been the main vehicle for managing water resources in Alberta. It is designed to identify collaborative actions that reflect growing pressures on Alberta's water supplies. The strategy outlines the government's commitment to protect water resources now and into the future. It calls for a 30 per cent improvement in water efficiency by 2015 based on 2005 levels and it highlights achievable and timely outcomes for all sectors to work collectively toward achieving this goal (Alberta Environment and Water, 2008).

The *Water for Life* action plan was renewed in 2008 – the main goals remain as:

- Safe, secure drinking water supply
- Healthy aquatic ecosystems
- Reliable quality water supplies for a sustainable economy

The *Water for Life* strategy has influenced new ways of managing water in Alberta. The strategy calls for specifics including: the assessment of future water supply demands, the assessment of options within watershed management, the planning, development and implementation of an education framework to support *Water for Life*, and the development and implementation of a viable governance system that supports sustainable management of water (Alberta Environment and Water, 2008). Under *Water for Life*, the Province created the not-for profit society, the Alberta Water Council, in 2007. This society, made up of 25 multi-stakeholder members, was appointed by the Province to monitor and steward the goals of *Water for Life* and to lead the creation of water plans for agriculture, industry and municipalities. Under guidance from the Alberta Water Council, the Alberta Urban Municipalities Association (AUMA) helps to guide municipal conservation plans through their Water Conservation, Efficiency and Productivity plan, which they adopted in 2009.

The first target is for municipalities to write Water Conservation, Efficiency and Productivity Plans. Strathcona County is working to complete AUMA's three other targets:

- **Reporting water use on the Alberta Environment's electronic Water Use Reporting System (WURS): Complete**
While Strathcona County does not hold water licenses for its potable water supply, smaller licenses are held for park irrigation and livestock watering. Water consumption details for these smaller licenses are recorded on the Province's online Water Use Reporting System.
- **Increase the uptake of water efficient fixtures: Complete**
In 2004, along with a new residential plumbing safety code bylaw for water efficient toilets and showerheads, Strathcona County launched a toilet rebate program. Residents received one \$50 rebate per household for the replacement of a 13-litre or larger volume toilet with a six-litre per flush model. The rebate program expanded to include EcoEnergy® certified front load washer rebates of \$75 in 2010. The program was then administered through Climate Change Central, or C3. And in 2011, the program was updated to provide rebates for WaterSense® approved 4.8 litre toilets instead of the 6-litre models. The WaterSense logo allows the toilets to be easily spotted and the independent third party testing ensures residents are purchasing a quality, affordable toilet for their home. Nearly all 13-litre per flush models have been removed from local retailers' shelves.
- **Complete a water audit and identify ways to reduce municipal leaks and water loss: Started**
Strathcona County is currently working with staff to reach this target. Current water loss is estimated at 7.5 per cent. Clay soils and young infrastructure help to keep water loss in check.

Other influences on our water plan

The University of Alberta's Environmental Research and Studies Centre identifies climate change as a significant factor for future water management. Water flows at Saskatoon, Saskatchewan are now 20 per cent lower than the flows at the beginning of the 20th Century (Schindler and Donahue, 2011). Climate change offers a number of predicted challenges for Strathcona County. A more dynamic water cycle and higher temperatures mean an increased risk of drought and flooding occurrences in the system. Snow accumulation in the Rocky Mountains and across the prairies will be reduced, affecting water availability in the spring and summer months. Increased flows in the spring may lead to flooding and poorer quality water which will require more effort to treat. Lower flows in summer months will mean less water available when water demand is at its peak. Luckily, water quantity is not currently an issue in the North Saskatchewan River (Natural Resources Canada, 2007; Alberta Environment and Water, 2010; Golder Associates Ltd., 2008; Water Management Framework for the Industrial Heartland, 2007).

Strathcona County is a member of the North Saskatchewan Watershed Alliance (NSWA). This provincially appointed Watershed Planning and Advisory Council (WPAC) worked with stakeholders to develop an Integrated Watershed Management Plan. The plan will help to guide water and land management for the North Saskatchewan region.

Under the *Alberta Land Stewardship Act* (ALCSA), regional limits on the effects of development on air, land, water and biodiversity will be directed through Cumulative Effects Management (CEM) under the *Land Use Framework* (LUF). Cumulative Effects Management will help to understand the impact of multiple development pressures in the region in which collaboration for shared responsibility and action will play a significant role (Alberta Environment and Water, 2011).

Regional plans will govern how water is managed for the North Saskatchewan River Basin. The watershed plan may offer a useful template for the regional plans to follow in regards to land and water concerns for the North Saskatchewan Region. Only regional plans created under the *Land Use Framework* will have legislative power. Currently, watershed plan adoption by both government and non-government actors is voluntary (Environmental Law Centre, 2009).

In 2007 Strathcona County was involved in the creation of a Water Management Framework for the industrial heartland that looked at the cumulative effects of future industrial demands on the North Saskatchewan River within the Capital Region. The strategic objectives of the water management framework are to:

- Make Alberta a world leader in water and water reclamation technology.
- Minimize the impact or “footprint” on the North Saskatchewan River by improving the quality of the water and ensuring water conservation practices are in effect.
- Implement the framework using distinct phasing.
- Use the framework as a model for other regional frameworks in the province.

Working with these diverse agencies for the protection of water resources will ensure Strathcona County remains a strong regional and provincial partner in the management of water for generations to come. The County’s CEP plan is designed to compliment many other water strategies that will guide our community over the next decade.





1.2 Our water target

Alberta agriculture and energy sectors* have completed, or are in the process of completing their own CEP plans under the goals of *Water for Life*. For this reason, Strathcona County’s plan will not focus on agricultural or industrial water use. It will instead focus on the residential sector.

Other Alberta municipalities have set targets unique to their community. AUMA has chosen 2006 as a baseline year for water use targets, similar to the community of St. Albert on the chart below, as Federal census data is available for this date. AUMA wanted municipalities to share a similar baseline year as a common benchmark in order to maintain comparable water savings.

These targets offer municipalities a specific goal to reach within a reasonable timeframe. Outcomes and participation for various water conservation practices can be researched to determine effective levels of uptake and could then be compared against the target. For example, if replacing toilets and faucet aerators reduced consumption by 20 per cent and 10 per cent of homes participated, residential water savings would be increased by two per cent.

Table 1. Alberta municipal water targets.

Municipality	Target (litres/capita/day)	Target year	Baseline year
Canmore	Lowered residential consumption to 155 l/c/d	2012	2001
	133 l/c/d	2015	2001
	111 l/c/d	2035	2001
Cochrane	Lowered residential consumption to 182 l/c/d	2009	2004
Red Deer	Lowered residential consumption to 223 l/c/d	2015	2009
	206 l/c/d	2020	2009
	182 l/c/d	2035	2009
St. Albert	Lowered residential consumption to 200 l/c/d	2020	2006

*Alberta’s energy sector includes chemical and petrochemical, forestry, mining/oil sands, oil and gas, power generation.

Strathcona County has set a target of 200 litres per capita per day.

This target would be based on Sherwood Park residential per capita water consumption from 2006 levels. The average water consumption between 2011 and 2010 was 200 l/c/d. If Strathcona County can maintain this level of consumption, the target can be met. A number of water saving initiatives have been considered to reach the County's goal of 20 per cent reduction by 2020.

Using residential per capita as a target is consistent with other AUMA communities. As mentioned above, many industrial sectors are developing their own water reduction plans and Strathcona County has already set a target for internal municipal water use. Even though industrial and municipal use are not part of the target, gross water use per capita will be monitored annually for the sake of additional comparisons with other communities. Gross water use includes commercial, industrial, agricultural and municipal water use records.





1.3 Our water source

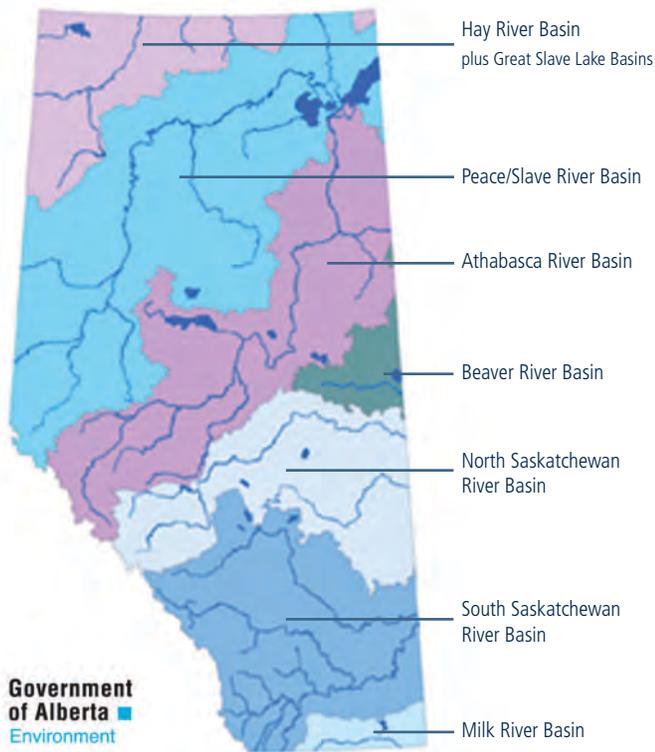
Our water source

Strathcona County is situated within the North Saskatchewan watershed basin and the Beaverhill sub-watershed. A watershed is an entire landscape, or basin, which drains into a river or river system. It typically includes several sub-basins with components from the mountains to the sea including glaciers, tributaries, lakes, ponds, aquifers and wetlands. The North Saskatchewan watershed basin covers approximately 80,000 km². Alberta has been divided into watershed basins in order to facilitate citizen and private sector engagement in a holistic, place-based approach to management of water resources (AUMA, 2010).

The watershed planning and advisory council in Strathcona County is the North Saskatchewan Watershed Alliance (NSWA). As mentioned before, the NSWA is a non-profit, multi-stakeholder organization appointed by the provincial government to protect and improve water quality and function of the North Saskatchewan watershed. Members of NSWA include representatives from industry, government, agriculture, research, education, municipalities, healthcare and environmental organizations. These stakeholders are a diverse group who provide input into watershed protection. It is important for the County to partner with other municipalities, the Province and organizations like the North Saskatchewan Watershed Alliance in order to protect water for future generations.

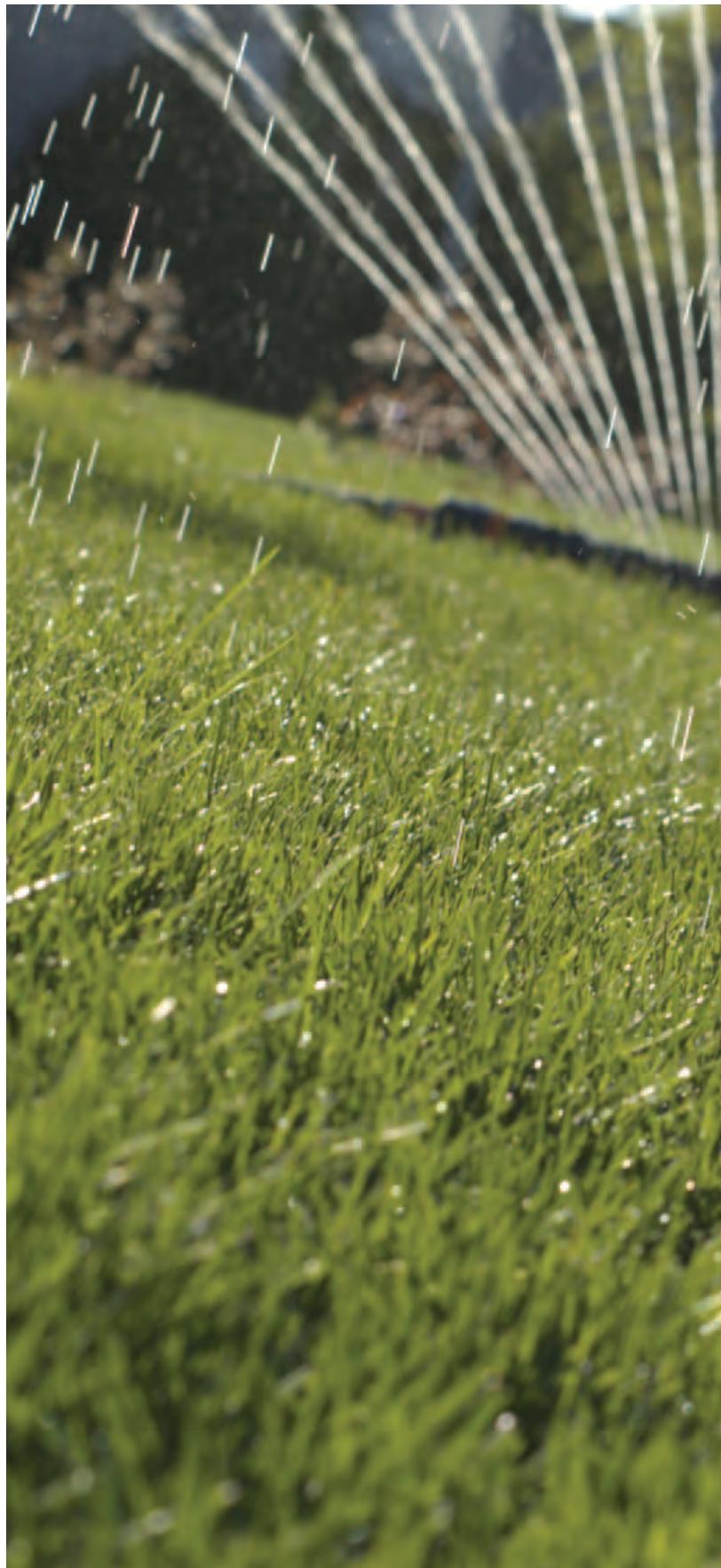
From its headwaters in the Columbia Ice Fields in Banff National Park, 500 km southwest of Edmonton, water travels down the North Saskatchewan River, past Rocky Mountain House and through the City of Edmonton. In Edmonton, EPCOR's treatment plant extracts water from the North Saskatchewan River, and processes the water for consumption before pumping it to Strathcona County and EPCOR's other regional customers. The water leaving Strathcona County homes is sent for wastewater treatment and then sent back into the North Saskatchewan River as it flows east through Saskatchewan and eventually empties into the Hudson Bay.

Figure 1. Watershed basins of Alberta



The County does not hold a license for its potable water; it is purchased from EPCOR and sold to urban and regional customers. EPCOR Water operates two water treatment plants in Edmonton with a total capacity of 680 million litres per day (ML/d). Strathcona County does however hold small water licenses to reuse stormwater for park irrigation and non-potable groundwater licenses for livestock watering. By pulling water from existing stormwater management facilities, Strathcona County can reduce the amount of potable water needed for non-domestic purposes, especially during summer months.

FACT: Did you know Alberta is thought to have more groundwater than surface water? But only 0.01 per cent is thought to be recoverable groundwater from accessible aquifers (Alberta Environment and Water, 2010).





1.4 Our water profile

Serving 22,456 customers, Strathcona County manages over 20,000 connections on nearly 500 km of pipe. Last year 11,368,174 m³ of treated water flowed through the hamlet of Sherwood Park. Surprisingly, Strathcona County's highest five-day water use occurred from May 14 to May 18, rather than in July or August, which are typical peak times. Although, May experienced over 14 millimeters of rainfall. Another unique fact is that the peak hour during this time was 8:00 p.m. to 9:00 p.m., when the temperature was 20 degrees Celsius. This may suggest that residents were preparing their landscapes for spring gardening, doing laundry or showering which are all large water consuming activities.

Table 2. Strathcona County system capacity

Annual water supply capacity	56,764 ML/year
Annual daily supply capacity	156 ML/day
System storage capacity	90 ML, two days of storage
Peak hour system capacity	9.72 ML/hour

FACT: The 34th Street booster station provides 56,764 ML/year to County reservoirs.

Water from EPCOR in Edmonton is supplied to Strathcona County through the 34th Street pumphouse. From there, a portion goes east to the 17th Street reservoir and approximately one-twelfth is sent back to Edmonton customers.

Strathcona County supplies water to Sherwood Park, Ardrossan, the Ardrossan truckfill, Josephburg, the Josephburg Co-op, the Sherwood Drive truckfill, the Highway 14 Regional Water Services Commission and the Capital Region Northeast Water Services Commission.

As a regional supplier of water, Strathcona County cannot supply accurate peak hour demand estimates. Although there is currently no mechanism in place to measure the water supplied to Sherwood Park residents only, we can calculate average day demand and peak day demand for Sherwood Park, Ardrossan and Josephburg customers. These values are compiled using SCADA and customer billing data. More detailed information such as water consumption per customer is easily obtained through billing information.

FACT: Strathcona County recently expanded the 17th Street water reservoir. The facility will add 30 million litres of water storage, enough to fill 1,875 of Emergency Service’s water tankers.

During periods of drought, Strathcona County has conditions in place to lower demand levels, starting with reductions in municipal use such as hydrant flushing and street sweeping. Condition A is a reduction of municipal water uses only. Condition B expands to external customers and voluntary reductions by residents. Condition C is a full ban on all non-essential water uses. Condition C has never been invoked to date but would be in the event of a water crisis such as supply contamination. An internal webpage posts five-day weather forecasts and regional reservoir levels during summer months to help staff reduce their demand on the water supply and provide departments with notice to adjust work schedules to comply with any upcoming water demand management conditions.

Table 3. Strathcona County emergency water demand conditions

Condition A	
Regional reservoir levels	Reservoirs are at 65 per cent capacity
Internal water reduction	
Restricted potable water activity examples	<ul style="list-style-type: none"> • hydrant flushing • sewer flushing • street cleaning • fire fighting training • fleet vehicle washing (including buses) • other non-essential water use (non-essential use is defined by all water not used for human consumption)
Condition B	
Regional reservoir levels	Forecasted reservoir levels are below 50 per cent in the next five days
Internal and external water reduction	
Restricted potable water activity examples	<ul style="list-style-type: none"> • hydrant flushing • sewer flushing • street cleaning • fire fighting training • fleet vehicle washing (including buses) • other non-essential water use (non-essential use is defined by all water not used for human consumption) • voluntary water reduction by residents
Condition C	
Regional reservoir levels	Forecasted reservoir levels are below 35 per cent in the next five days
Internal and external water reduction, public included.	
Restricted potable water activity examples	<ul style="list-style-type: none"> • complete ban on all non-essential water usages • Appeal to commercial/industrial consumers for 50 per cent per day reduction • mandatory water reduction by residents

Alternative water sources

On average, over 3,223,900 m³ a year of recycled wastewater from Gold Bar Wastewater plant is sold to Air Products and Suncor for industrial processes. Strathcona County maintains the recycled water line to these industries. The water line project was built on a strong public-private partnership and demonstrates innovative technology and environmental stewardship.

FACT: In Florida, 52 per cent of their treated wastewater capacity is used for irrigation (CMHC, 2002).

Each year, the Recreation, Parks and Culture department (RPC) looks for new ways to access alternatives to potable water for park and golf course irrigation. These water sources are especially needed during drought conditions. Stormwater is a common alternative to drinking water for irrigation and can be accessed via diversion licenses acquired through Alberta Environment and Water. Reusing stormwater is not a new practice. Some locations, such as the Broadmoor Park Golf Course, have been diverting stormwater from ponds for decades. Recently, RPC began pulling water from stormwater wetlands. The lower water levels during summer months actually help to mimic the wetlands' natural seasonal hydrological changes. Centennial Wetlands on Lakeland Drive is one example of a



unique project where natural wetlands were protected and engineered to handle urban stormwater for treatment, recreation, habitat and flood protection and then used for park irrigation.

Centennial Wetlands

Stormwater in Strathcona County flows into a network of 69 stormwater management facilities. Water from Sherwood Park flows through Oldman Creek and Pointe aux Pins Creek in the east, Aurum Creek in the Northeast, unnamed creek in the west, Fulton Creek in the southwest, Clover Bar Creek in the north and Gold Bar Creek in the south. Water within these smaller basins as shown on Figure 2 then empties into the North Saskatchewan River.

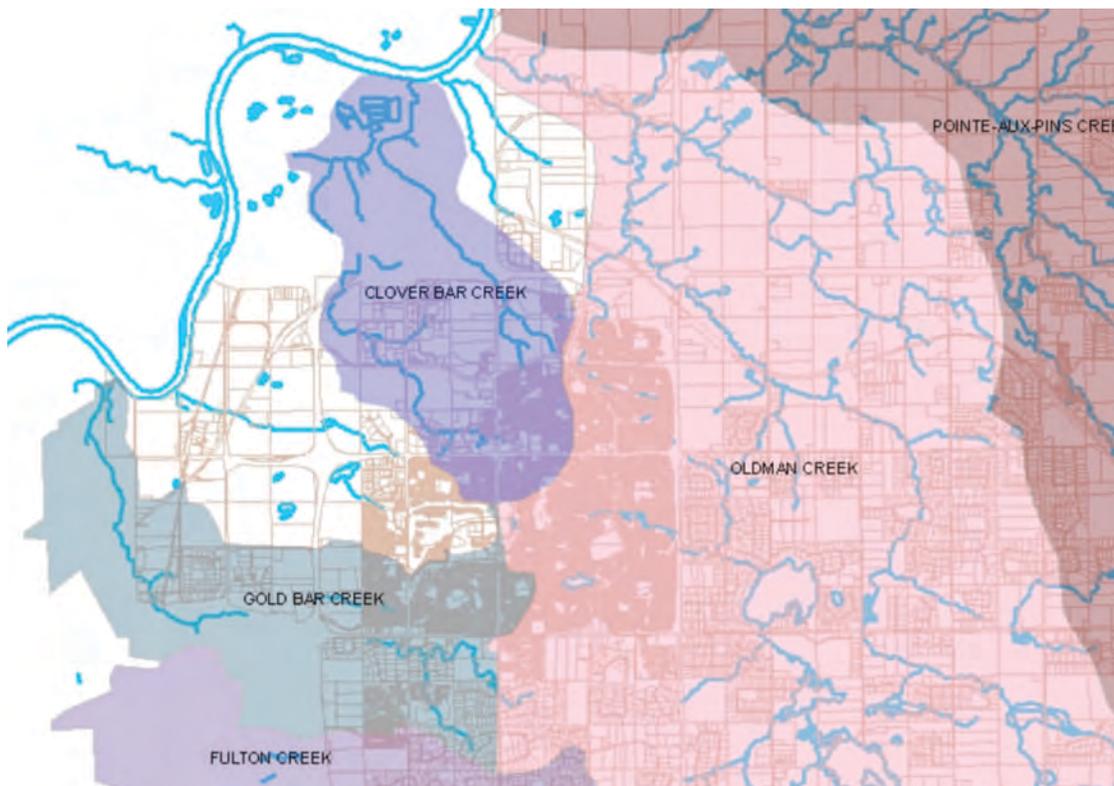
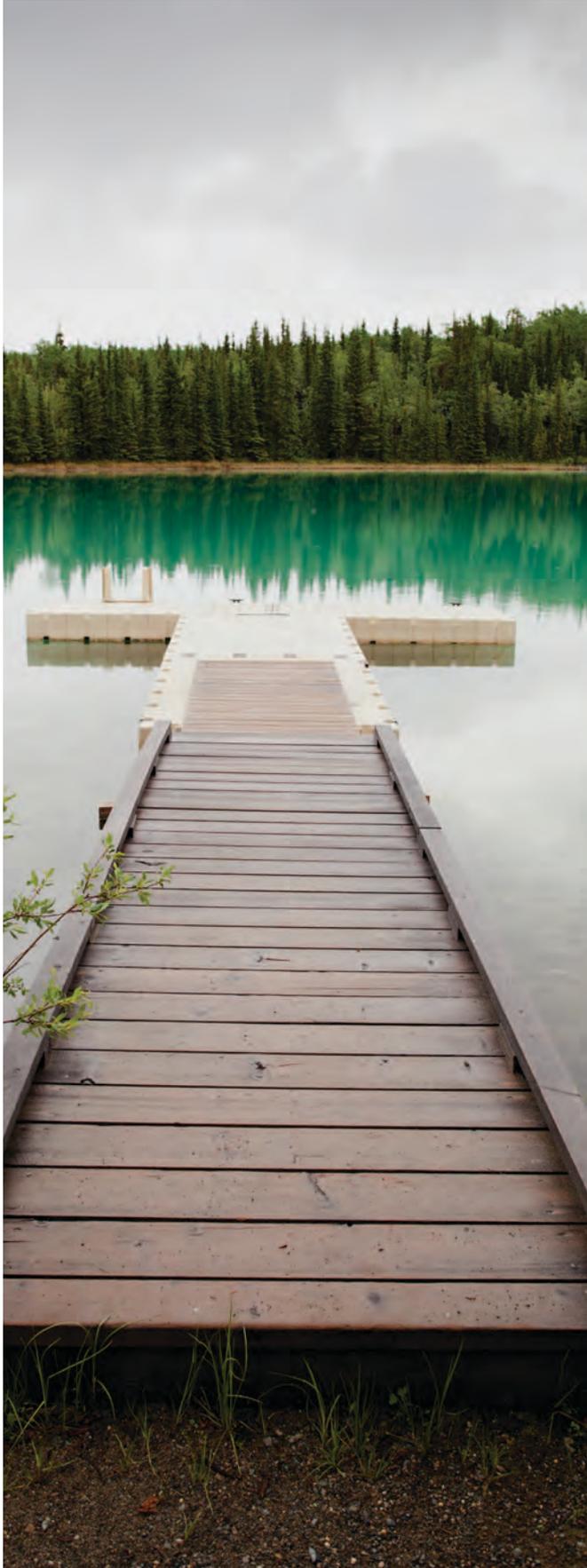


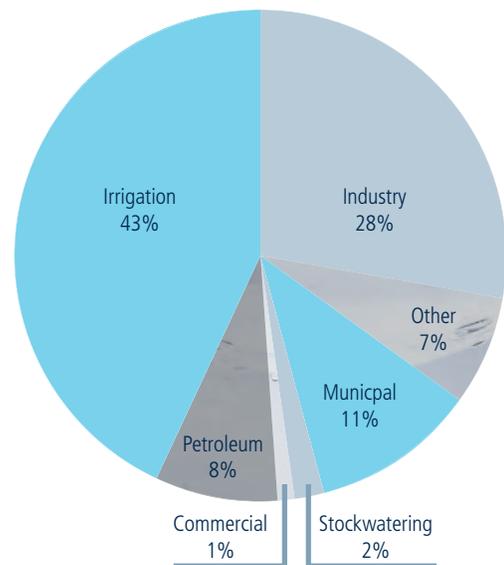
Figure 2. Surface drainage basins surrounding Sherwood Park, Strathcona County.



1.5 Our water use

Municipalities are the third largest water users in Alberta next to agriculture and industry, and are allocated 11 per cent of the Province's water resources as shown on the figure below. These three large water use sectors were chosen by the Province to create conservation, efficiency and productivity plans. In the North Saskatchewan River Basin, industry receives 82 per cent of water allocations from the province (Alberta Environment and Water, 2007). Municipalities differ from industry and agriculture because their consumptive use is only a fraction of their allocated use as stormwater runoff from impervious, urban surfaces and wastewater are included in return flows to the North Saskatchewan River. Although water is returned, it often has degraded water quality, which makes treatment for drinking water more costly.

Figure 3. Alberta water allocation by sector (Alberta Environment and Water, 2007).



Sector water use

Overall, Strathcona County water use is 63 per cent residential and 30 per cent commercial, industrial and agricultural. Rural customers make up around 2 per cent of the County's residential water use. Strathcona County's water plan will focus on the largest water users and most important group to manage, the residential sector. The residential sector makes up 93 per cent of the customers serviced by Strathcona County, commercial and industrial make up five per cent of the customer base and rural customers make up the final two per cent. Strathcona County's sector water use compares closely with the Provincial average where residential use is 62.1 per cent and industrial/commercial is 30.8 per cent.

In Strathcona County, 100 per cent of customers are metered with many condo units receiving individual meters as well. According to Environment Canada (2010), as the percentage of metered homes in a community increases, the water use per capita will go down. Residents are charged a flat fee and a volumetric rate based on water consumption amounts. In Sherwood Park residents are charged a fixed rate of \$5.36 and a volumetric rate of \$1.995 per cubic meter for drinking water. Actual meter reads occur every second month.

FACT: Compared to the annual average, water use increased in Strathcona County by 14 per cent during summer months in 2010 compared to winter months.

Figure 4. Water Use by Sector in Strathcona County

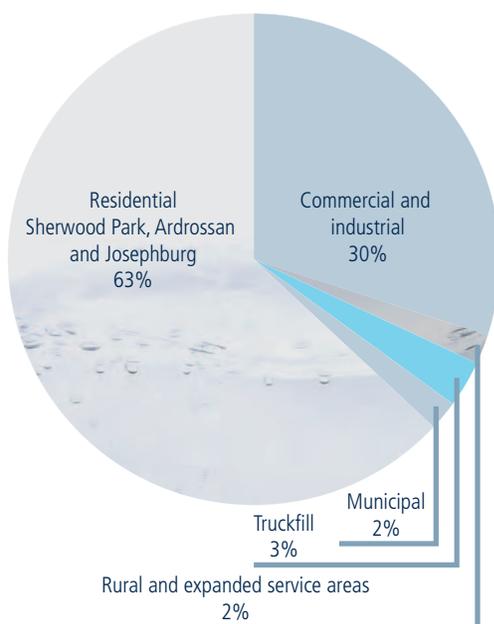
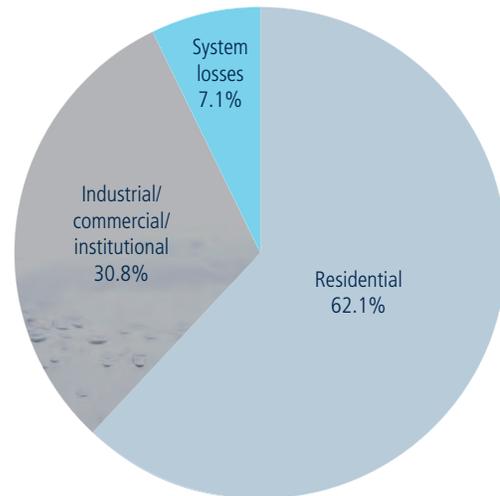


Figure 5: Water Use by Sector in Alberta
(Environment Canada, 2006). Municipal Water and Waste Survey



Historical water use

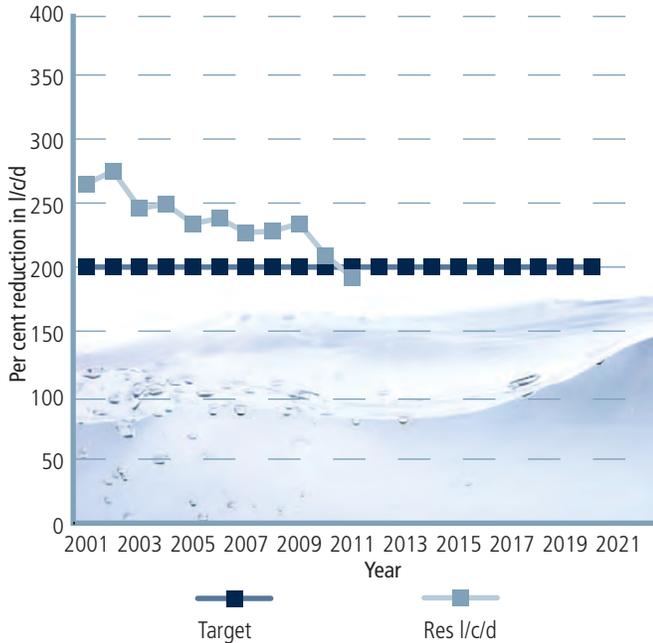
AUMA uses 2006 as a baseline year for water use. Strathcona County will also use this date, although their water conservation programs have been running since 2003. The 2006 year allows Strathcona County's water use to be compared to other communities.

Table 4. Sherwood Park's historic per capita water use.

Year	Residential (multi-family & single-family) l/c/d
2001	265
2002	275
2003	246
2004	249
2005	234
2006	238
2007	227
2008	228
2009	234
2010	209
2011	192

- **Note:** Consumption data is collected from billing records. This information does not include water lost to leaks, theft or unbilled use.

Figure 6. Sherwood Park water consumption trends



Residential water use is also on the decline elsewhere in Canada, however Canadians still rank among the largest consumers of water within the 220 Organization for Economic Co-operation and Development (OECD) countries. The Canadian average residential water use in 2009 was 274 litres per capita per day (l/c/d), a decrease from 328 l/c/d in 2006 (Environment Canada, 2010). This may be the result of new, efficient water fixtures in buildings such as toilets, washers and shower heads. Newer homes are thought to be 30 per cent more water efficient than homes with older fixtures. When looking at Canada’s provinces, Prince Edward Island has the lowest per capita water use at 199 l/c/d, and Newfoundland and Labrador have the highest use at 504 l/c/d (Environment Canada, 2010).

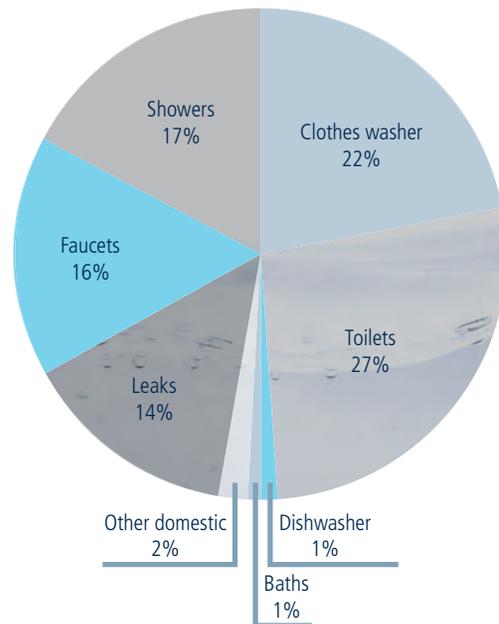
Household water use

Since the majority of Strathcona County’s water is used by the residential sector, household water use is a key area to address. External water use in many other communities can increase 50 per cent during summer months for landscape watering although, in Strathcona County, the increase is slightly less than one-third of this amount (CMHC, 2000).

Toilets consume 27 per cent of water used in the home, which is why Strathcona County has focused on a toilet rebate program for the past eight years. The program was designed to raise awareness of low-flow toilets and to provide incentives for replacing older, high-volume toilets. It was also implemented to compliment the County’s plumbing safety code bylaw for water efficient fixtures. The program has been successful but may now be phased out as awareness of low volume toilets has now reached a large audience and incentives may no longer be required for residents to purchase an efficient toilet.

Behaviour has a significant influence on water use in the home. For example, if residents flushed one less time per day, it would be enough water saved to irrigate their landscaping for the entire summer. Full dishwasher and washing machine loads could save up to 2,000 litres of water in a month as opposed to washing partial loads. This difference saves enough water to fill a bathtub 20 times. Face-to-face encounters and instant changes to the home may result in more substantial buy-in from the County’s residents.

Figure 7. Household water use
(Vickers, 2001. Handbook of Water Use and Conservation).





1.6 Our water loss or unaccounted for water

One of AUMA's four targets is to perform water audits and calculate an infrastructure leak index (ILI), with a plan to reduce leaks by December 31, 2012. The Canadian Water and Wastewater Association references an ILI of 3.5 in an international list of benchmarks (CWWA 2009). ILI is calculated through a water audit that looks at system water from the point of withdrawal to the many areas of water losses. Communities with less than 3,000 connections are unable to calculate ILI. While ILI can be easily compared between larger municipalities, AUMA will accept other water loss calculations as well.

In Strathcona County water loss is monitored and budgeted annually, with an average water loss of 7.5 per cent, nearly three times less than the water loss in a typical Canadian municipality (AUMA, 2009). As Strathcona County is a specialized municipality with a unique water supply and customer base, ILI was not calculated for water loss. Instead, water loss is calculated by taking the volume of treated water purchased and subtracting it by the amount of billed water consumed. Consumption is then broken into three categories; municipal operations (such as street sweeping and dust abatement), system loss, and firefighting (which includes hydrant flushing). Municipal makes up 1.5 per cent of consumption, system loss is 3 per cent and firefighting is estimated at 3 per cent.

A high percentage of clay soils in Strathcona County make system leaks easy to detect and repair in a timely manner. Other communities in Alberta, like Canmore, have a high percentage of gravel soil, which can make leak detection through traditional methods extremely difficult.

The most difficult area of water loss to manage is unmetered, non-revenue water such as unauthorized water theft from hydrants and unmetered dwellings. Water loss from hydrant maintenance is now being calculated more closely by evaluating hydrant flushing rates. Water loss from firefighting however will not be metered because of its emergency service requirements.

Water main breaks are a large problem for many municipalities.

Strathcona County has a very young system; the oldest pipe was laid

in 1955, which means that water main breaks are limited. In 2010 Strathcona County experienced only ten water main breaks in total. Eight of the water main breaks were in Sherwood Park and two of them were in the hamlet of Josephburg. Water lost during these breaks is not currently monitored. In the future, using the VUEWorks system, Strathcona County will be able to estimate water lost during a water main break by reviewing the size of pipe, the length of time of each break, and the water flow rates.

System pressure can also be a concern for managing water leaks. Strathcona County has already made improvements to its water pressure by reducing it from 400 kPa to 360 kPa in 2011 at their 34th Street booster station. Reducing leaks and water demand may help defer future expansions to Strathcona County’s water storage facilities. Other future water loss improvements in Strathcona County may include, finding non-potable sources for street sweeping, dust abatement and/or firefighting training purposes.

Table 5. Strathcona County accounted for and un-accounted for water.

Metered, revenue	Metered, non-revenue	Un-metered, revenue	Un-metered, non-revenue
Hydrant meters	Municipal operations - street sweeping	Construction water - developer	Firefighting
Residential	Sewer cleaning	Construction water - builder	Meter bypasses
Municipal facilities and irrigation			Chlorine analyzer
Irrigation			Pipe leakage
Commercial and industrial	Reservoir cleaning		Contractor flow testing
Truckfill	Fire flow testing		Billing error
Regional bulk water purchases			Water theft
			Uni-directional flushing
			Water main breaks

While Strathcona County is doing more to monitor water loss and reducing pressure in the water mains, system leaks are not a significant concern for the community at this time. Asset management technologies will play a key role in monitoring the system for efficiencies. Residential water loss will be looked at through the creation of leak detection awareness programs.





1.7 Our water conservation programs

In 2003 Strathcona County implemented a water conservation program. Since that time, monthly water consumption per household has decreased from 22 cubic meters to 16.8 cubic meters. The water conservation program uses a variety of tools for residents such as water saving tips in local ads and an online water calculator tool.

Waterspot

Shed pounds and save water

Drinking fresh water is great for your health, but bottled water and running taps are not great for our environment.

The solution — fill a jug with tap water and store it in your fridge for an instant cool drink.

Strathcona County

Questions? 780-467-7785 | www.strathcona.ca/utilities | watersaver@strathcona.ca

Strathcona County looks at internal water demand management through representatives from Recreation, Parks and Culture; Capital Planning and Construction, Transportation and Agriculture Services and Emergency Services departments. Through annual meetings, each department looks at alternative sources of water and explores options for department efficiencies.

Ecoscape workshops are held in the spring to educate residents and staff about using healthy soil and native or low-water plants to create an attractive, biologically diverse landscape. Colourful ecoscape brochures are distributed to residents at a number of public events to promote attractive, healthy and water efficient landscapes. The brochure includes local examples of ecoscaped yards from previous ecoscape contests as well as the ecoscape demonstration garden at Strathcona County’s Public Services building.

Photos of Strathcona Public Services Yard Ecoscape project.



Before



After



In previous years store coupons for 25 per cent discounts on sprinkler timers were distributed to local retailers. Participating retailers included Totem, Rona, Home Depot and the Home Hardware Building Centre. Strathcona County may once again partner with retailers for mulch or soaker hose coupons. (As the program's popularity gradually reduced this was discontinued.)



Canada Day events include water conservation trivia where prizes such as dish scrapers, toothpaste squishers and frisbee rain gauges are distributed. An interactive water pipe play-zone teaches kids about household water use by comparing toilet flushing and shower use with various pipe sizes.



The “Water deep an hour a week” campaign includes colourful ads in the local paper and large welcome mats or “ad pads” at local hardware stores. The goal of these messages is to discourage frequent lawn watering and overwatering.



Strathcona County also offers a rebate to residents who purchase a 4.8 litre WaterSense® toilet or an Energy Star® front-load washer. This program is administered through Climate Change Central, also known as C3. Since the toilet rebate program in 2004, more than 2,300 toilet rebates have been distributed. These Strathcona County households combined are saving 33,826 m³ of water per year.

Program period	Toilet rebates distributed	Annual water savings (litres)
2011	326	5,027,328*
2010	396	5,707,885
2009	389	5,606,988
2008	318	4,583,604
2007	310	4,468,294
2006	321	4,626,846
2005	141	2,032,353
2004	123	1,772,904

*All toilets in 2011 are assumed to be 4.8-litre models. All other years are assumed as 54% dual-flush and 46% 6-litre flush models.

Program period	Washer rebates distributed	Annual water savings (litres)
2011	356	9,224,366
2010	577	14,950,728
2009	247	6,524,258

In an effort to manage stormwater runoff and conserve water, Strathcona County has an annual rain barrel sale where residents can purchase barrels, at cost, for their homes. These annual rain barrel sales are very well attended. In 2011, a total of 667 rain barrels were sold to rural and urban residents through our recreation facilities.

Keeping roof runoff in the yard for landscape watering and allowing water to slowly percolate into the soil helps to protect downstream water bodies from erosion and sediment build up. If 3,000 residents purchase rain barrels, that could mean 600,000 litres of water saved during each rain event.

Since the rain barrel program began in 2003, there have been 5,227 rain barrels sold to County residents. Respondents in Strathcona County’s water conservation survey noted rain barrel sales as the most popular way to encourage outdoor water conservation.

Water conservation survey

Water conservation surveys were conducted by Strathcona County Utilities through Bannister Research and Consulting Inc., in 2003 and 2011, to understand behaviours and attitudes regarding water conservation and household water use.

Some of the 2011 survey results were:

- Over 50 per cent of survey respondents replaced a high-volume toilet with a low-volume model, 79 per cent of these did so without receiving a rebate for their action.
- Only one per cent admitted to watering during the day when evaporation rates are highest. This may suggest that residents are practicing outdoor water efficient behaviours or that residents are simply aware of the messaging around mid-day watering and chose the “correct” answer.
- 30 per cent of respondents claim to use rainwater only (no potable water) for irrigating their yard.
- 65 per cent of respondents claim to scrape dishes rather than rinsing before placing them in the dishwasher.
- The majority of survey respondents prefer to receive their water conservation information through newspapers, utility bills and online.
- Less than 14 per cent of Sherwood Park respondents, and five per cent of rural respondents, consider a green lawn to be very important.

- The majority of rural respondents rely on rain only as their main source of landscape watering.
- A large motivator for installing water saving devices for both urban and rural respondents is that a replacement may save thousands of litres of water, as opposed to other benefits such as saving money on water bills.
- Nearly 83 per cent of Strathcona County residents are under-estimating the amount of water they use in a month.
- Almost 94 per cent of respondents believe that County residents should make an effort to minimize the amount of water they use.





1.8 Our future water tools

Community-based social marketing offers powerful tools for fostering sustainable behaviour. The process focuses on understanding barriers to implementation and drivers for positive change through data gathering, pilot projects, frequent monitoring and program adaptation.

Strathcona County has incorporated feedback from the water conservation survey into an inventory of potential short, medium and long-term future initiatives for 2012 to 2015. The full list of water programs can be found in Appendix A.

Challenge	Residents using hoses to clean their driveway.
Fact	In our spring survey, 48 per cent of residents surveyed admitted to washing their sidewalk or driveway with a hose. The majority of those respondents were urban.
Tool	Use community-based social marketing tools to influence driveway maintenance practices.

Challenge	Checking for household leaks.
Fact	Even a small water leak can waste 10,000 litres of water in a year. That is enough to supply a year's worth of water for cooking in your home (CMHC).
Tool	Increase distribution of leak detection tablets. Ads, online videos and web information would encourage regular leak checks for toilets and taps.

Challenge	Expand water conservation program to work with industrial, commercial and institutional (ICI) customers.
Fact	In Calgary's 2008 spray-valve replacement pilot program, each site saw a water savings of 267 litres per day or 60 per cent. The average customer saved \$1,411 over five years in water and energy costs.
Tool	Could work with local restaurants to install efficient spray rinse valves for dish cleaning and replace high-volume toilets.

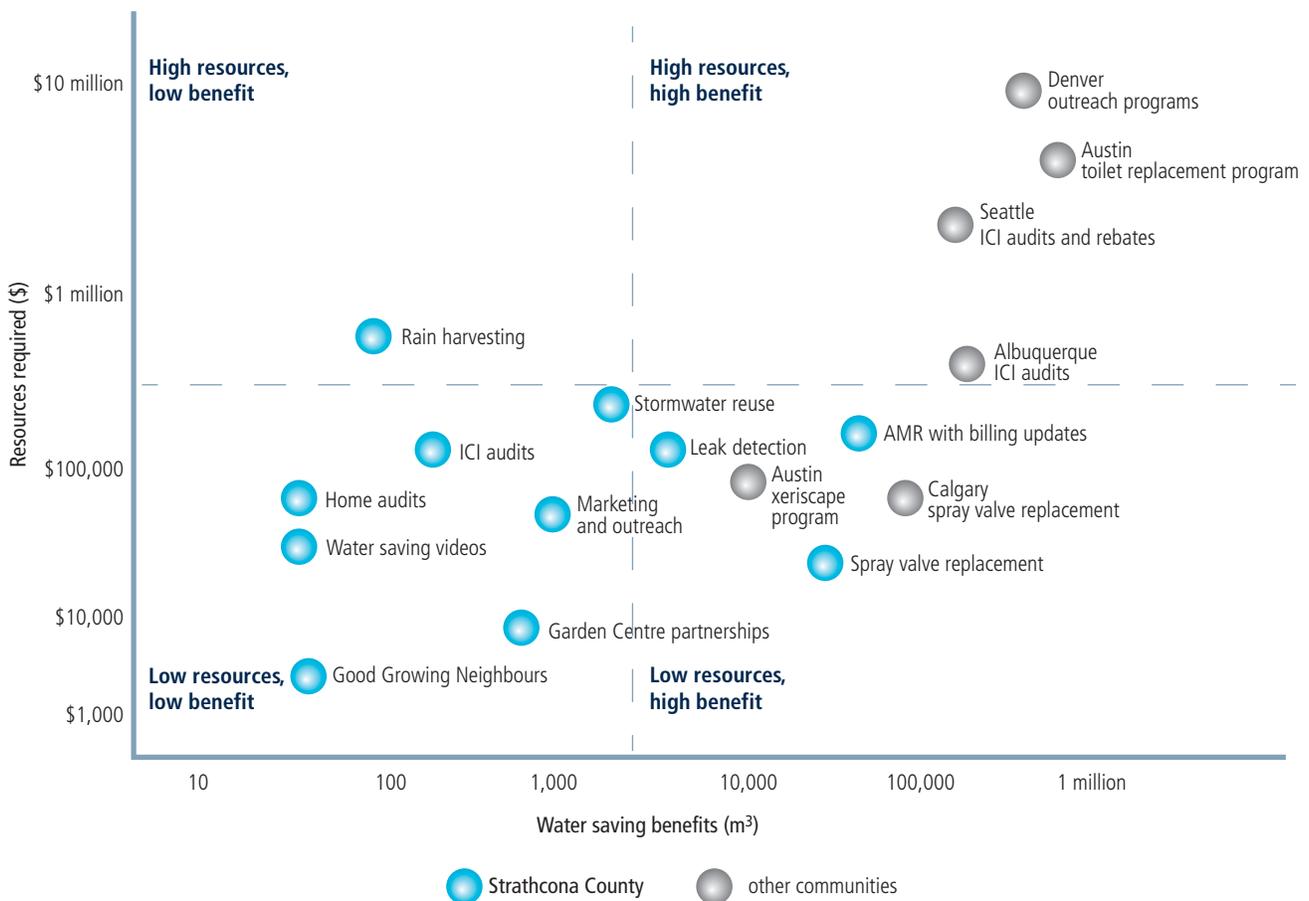
Challenge	Making water conservation a habit in the home.
Fact	Durham Region in Ontario reduced water use by 32% with face-to-face home visits (community-based social marketing).
Tool	Staff could perform home audits and show homeowners how to install aerators, use shower timers and check toilets for leaks. Specific areas in Sherwood Park would be chosen for this initiative using water consumption maps to pinpoint high water use neighbourhoods.

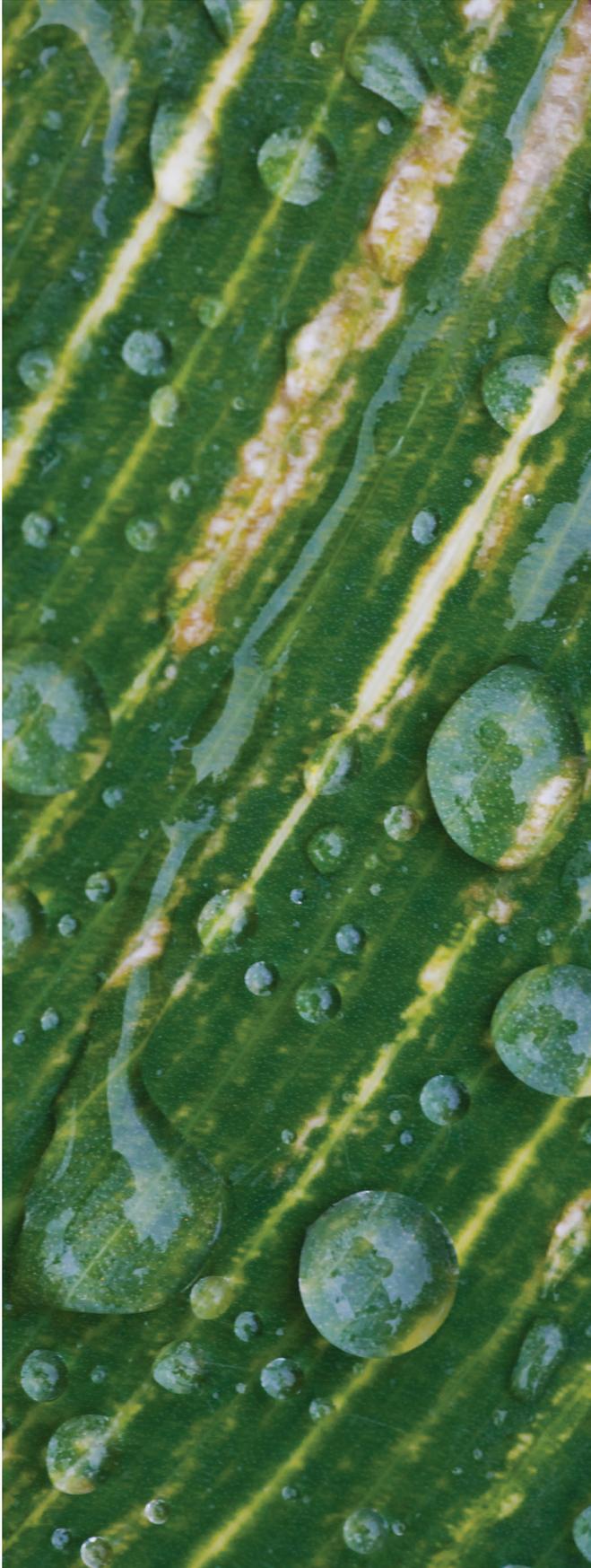
Challenge	Choosing water-wise plant material.
Fact	In our spring survey, residents listed garden centres as the most popular source of tools for outdoor water conservation practices.
Tool	Could work with garden centres to identify water-wise plants using stickers, provide discounts on mulch and manage low-water plant displays. Water-wise gardening workshops could also be hosted through garden centres in the spring.

Challenge	Awareness of individual water use.
Fact	Nearly 60 per cent of survey respondents were unaware of their household water consumption.
Tool	The County could use e-billing notices to compare each customer's water use with other households in the community. Residents could use an online chart to compare current water use with historic water consumption for each customer.

Figure 8 Water demand management program costs and benefits

Source: AWWA, 2006; Denver Water, 2010; Fuller, Gregg, Curry, 1995; Strub, Gross, 2007; Veritac Consulting, 2005





1.9 Conclusion and recommendations

The intent of this document is to showcase the County's water use profile, evaluate CEP opportunities, and to outline which initiatives will be done and when. Strathcona County has set a goal of 200 litres per capita per day residential water use by 2020. In order to reach this goal, the County will explore opportunities to reduce household water consumption over the next decade.

The County's programs will continue with initiatives such as education and outreach, as well as stormwater reuse for irrigation. Strathcona County is a community where the majority of water use occurs in the residential sector. Opportunities exist to expand water conservation awareness to ICI customers, but initiatives will primarily remain targeted at higher residential water users.

Strathcona County will continue to work internally on improving water efficiency of County buildings in an attempt to meet the Province's *Water for Life* goal of 30 per cent efficiency by 2015. Water loss management options will be explored in future years and leak detection awareness programs will be aimed toward older neighbourhoods in the community.

Using initiatives from this plan, and with support from Council and County departments, Strathcona County Utilities aims to increase residents' awareness of water management in the community, share information on potential water saving activities with the industrial and commercial sector, and work within departments to find opportunities for water efficient practices. All with the goal to ensure a strong water supply for the community's future.



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Appendix A: Potential Water Conservation/ Efficiency Initiatives

Short term initiatives (2012)				
Initiative	Target	Benefits	Challenges	Cost
Water conservation plan (High priority, working with AUMA's direction – 4 objectives)	<i>All water customers</i> Develop an integrated water conservation program to address operational solutions and community-wide goals to achieve sustainable water supply objectives.	Showcase Strathcona County as a leader in water conservation. Support AUMA's CEP plan objectives and goals of <i>Water for Life</i> .	Collaborate with County departments to develop short and long-term water goals.	Staff time to compile historic and current water use data, research conservation initiatives and develop short and long-term strategies for water management.
Internal water demand management group	<i>All County departments involved in water use</i> Annual meeting to identify water saving options and challenges within various County service sectors.	Potential water / energy savings for departments.	Projects may be weather dependent and often require significant foresight to prepare budget and staff needs.	Staff time for emails and annual meetings.
Stormwater reuse	<i>Stormwater ponds</i> Lead by example to promote water efficiency.	Provide cost-effective alternative to potable water for irrigation.	Water diversion licensing required. May need memorandum of understanding (MOU) with Province to minimize paperwork required.	Water quality monitoring to avoid turf and habitat damage. Infrastructure costs for pipes, pumps and/or storage.
Good Growing Neighbours, Communities in Bloom Note: GGN program outreach on hold for 2012	<i>All - Outdoor watering</i> Continue work with Recreation, Parks and Culture (RPC) and Transportation and Agriculture (TAS) departments to promote sustainable and healthy yards.	Address myths and benefits of responsible landscape practices.	Co-ordinate with good growing team – resources, staff, and messages.	Attend public events – farmers markets, Earth Day, Canada Day.
Water-wise videos	<i>All water users</i> Entertaining and educational water videos for checking leaks, installing rain barrels, and practicing water-wise activities.	Empower residents through water saving examples they could apply to their homes. Assist billing and utilities staff by providing tools for high water users and other concerned residents.	Meet with plumbing, landscape and operations staff to ensure proper install techniques and terminology.	Cost for video production. Staff time for video design and content creation.
Water-wise garden centres	<i>All water users</i> Work with local greenhouses to promote mulch, soaker hoses and native plant "groupings". Host eco-landscaping workshops at local garden centre.	Reduce confusion for shoppers looking for water-wise options. Raise awareness of water-wise gardening benefits and beauty.	Ensure all greenhouses are approached for participation. Staff and item availability may change frequently.	Stickers to ID water-wise plants. Time to inventory greenhouses and update staff. Web, newspaper ads.

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Medium term initiatives (2012 – 2013) continued...

Initiative	Target	Benefits	Challenges	Cost
<p>Full cost accounting – Smart water bills, Automatic Meter Reading (AMR)</p> <p>FlexNet/ water consumption equipment installation</p>	<p><i>All water customers</i></p> <p>Use meter information to highlight possible leaks, compare water users and show real costs of providing water (sewer charges, etc).</p>	<p>Possible water leaks and high water use inquiries searchable by County staff.</p> <p>Identify water use trends and create social norms.</p>	<p>Requires coordinated departmental efforts.</p>	<p>Upfront costs to install equipment.</p> <p>Train staff on software.</p>
<p>Spray valve replacement</p> <p><i>Partner with Green Routine ICI program</i></p>	<p><i>ICI customers – Restaurants</i></p> <p>Replace water wasting spray valves with low water spray valves for dish rinsing.</p>	<p>Simple, inexpensive. No behaviour change required.</p> <p>Expand program beyond household water use.</p>	<p>Need to determine how many water wasting sprayers are currently in use.</p>	<p>Research interested restaurants and track water / energy savings.</p>
<p>Water wise pledges</p> <p>(Low priority, simple to introduce)</p>	<p><i>All water users</i></p> <p>Encourage community to reduce water use. e.g. Shower for 9 minutes instead of 10 or water 80 per cent of your yard not 100.</p>	<p>Positive way to gain public support for water conservation programs.</p> <p>Instill a sense of pride and generate social norms around sustainable water use.</p>	<p>Find community champions such as school groups or garden clubs.</p> <p>Provide prompts and promo items to reward positive behaviour and keep people motivated.</p>	<p>Communicate water saving options through e-newsletter, web, etc.</p> <p>Place pledge forms online or in paper.</p> <p>Promotional items</p>

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Long term and additional initiative ideas (2014 – 2015) continued...

Initiative	Target	Benefits	Challenges	Cost
<p>Full cost accounting – Smart water bills, AMR</p> <p>FlexNet/ water consumption portal technology</p>	<p><i>All water customers</i></p> <p>Use portal technology to show real time water use to utility customers.</p>	<p>Avoid high water bill complaints.</p> <p>Identify household leaks quickly, shows customer when water is utilized.</p> <p>Identify trends and create social norms.</p>	<p>May receive more complaints – sewer charges for outdoor watering.</p> <p>Requires coordinated departmental efforts.</p>	<p>Communication program will be essential – utility bill report cards.</p> <p>Create graphs, graphics, prompts “you may have a leak”, and monitor water use more often.</p>
Leak detection program	<p><i>All water users</i></p> <p>Work with asset management, operational and billing staff to determine our infrastructure leak index. Create program to identify & manage County, commercial and household leaks.</p>	<p>Minimal behavioural change required.</p> <p>Use existing equipment and staff knowledge to address leaks.</p> <p>Calculate full water loss. Manage through infrastructure programs.</p>	<p>Create priority list, BMPs for finding and fixing leaks.</p> <p>Identify staff to champion this effort.</p> <p>Requirement to maintain pressure results in some level of designed leakage</p>	<p>Staff time to monitor system for leaks, identify priorities and solutions, and repair leaks.</p> <p>Communication program – e.g. “Calgary household leaks are enough to fill the Calgary tower”.</p>
Select sports field location for water reuse based on stormwater access	<i>Needs more discussion with Planning and RPC</i>	Reduce potable water costs and reduce peak demand.	Water quality may be a concern.	Pumping stations, dual pipe install.
Rainwater harvesting	<p><i>County buildings</i></p> <p>Lead by example to promote community rainwater harvesting.</p>	<p>Reduce stormwater runoff from County buildings.</p> <p>Showcase leadership in water reuse.</p> <p>Provide feasible non-potable water options for park irrigation, toilet flushing, dust control, etc.</p>	<p>Existing buildings may be difficult to retrofit. Access required for water trucks & indoor plumbing systems.</p> <p>Need staff to maintain filters, monitor for leaks, etc. (consultants often provide this service).</p> <p>Identify funding sources – FCM, Health & Wellness.</p>	<p>Provide non-potable water signage on trucks, etc.</p> <p>Complete cost-benefit analysis to rationalize installation.</p>

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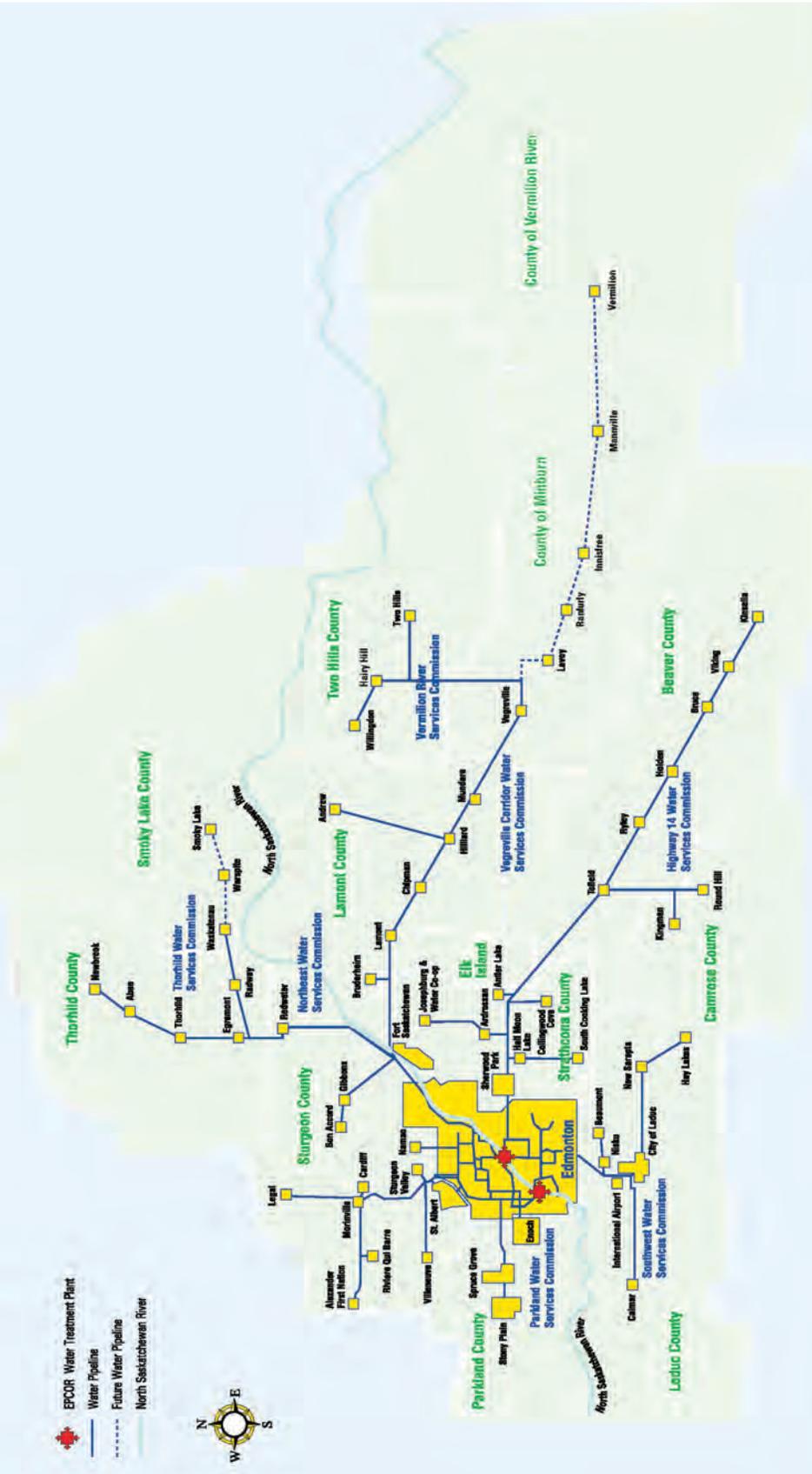
Long term and additional initiative ideas (2014 – 2015) continued...

Initiative	Target	Benefits	Challenges	Cost
<p>Home audits, water workshops</p> <p>Empowering water parties and blue garden parties.</p> <p><i>Partner with community groups, NORWEX party hosts, etc.</i></p>	<p><i>Household water users – females</i></p> <p>Meet with homeowners to determine ways to save water. Friends and family can also learn from the experience to make their own changes.</p>	<p>Help homeowners identify water saving options through kits and advice.</p> <p>Gather feedback for future programs.</p> <p>Build an individual support network to encourage adoption of water-wise practices. Work with neighbourhood Block Parties through Family and Community Services.</p>	<p>Need to reach wide audience without a large budget.</p> <p>Need to schedule around holidays and/or poor weather.</p>	<p>Staff time to arrange meetings and perform audits.</p> <p>Purchase water kits.</p> <p>Possible research required to choose appropriate water kit tools.</p> <p>Enhance website - how to fix leaks, etc.</p>
<p>Water-wise weather forecast</p>	<p><i>All water (and waste) customers</i></p> <p>Use online weather forecast to prompt weather-related water and waste wise practices.</p>	<p>Reach wider audience through weather app or online prompts.</p> <p>Hot, windy or rainy days signal no watering.</p>	<p>Number of prompts might be limited, repetitive.</p>	<p>Cost of messaging through weather network.</p>
<p>Reward positive outdoor conservation practices</p>	<p><i>All water customers</i></p> <p>The "Blue garden prize patrol" will acknowledge and reward residents for sweeping sidewalks, watering in evening, native plants, rain barrels, etc.</p>	<p>Communicate the importance of managing water use – change values, behaviours.</p> <p>Celebrate water wise practices – fun for staff.</p>	<p>Need to partner with enforcement services.</p> <p>Coordinate positive actions/messages with communication campaign.</p>	<p>One staff member to identify positive actions and work with bylaw, operations staff.</p> <p>Awareness via web, newspaper, etc.</p>
<p>Increasing block rate</p>	<p><i>High water users – year round</i></p> <p>Provide a basic rate for all water users based on current average household water use. Higher water use will be charged at a higher rate.</p>	<p>Awareness for high water users. Provides a disincentive for over-watering lawns and using inefficient appliances.</p> <p>Possible to lower peak demands, decreasing strain on water supply.</p> <p>Water savers will be rewarded for their efforts.</p>	<p>May need to also address truck fills, commercial and industrial water users.</p> <p>Need to clarify effect on larger families.</p>	<p>Communication program will be essential – web, e-newsletter, etc.</p> <p>Time to train customer billing staff.</p>

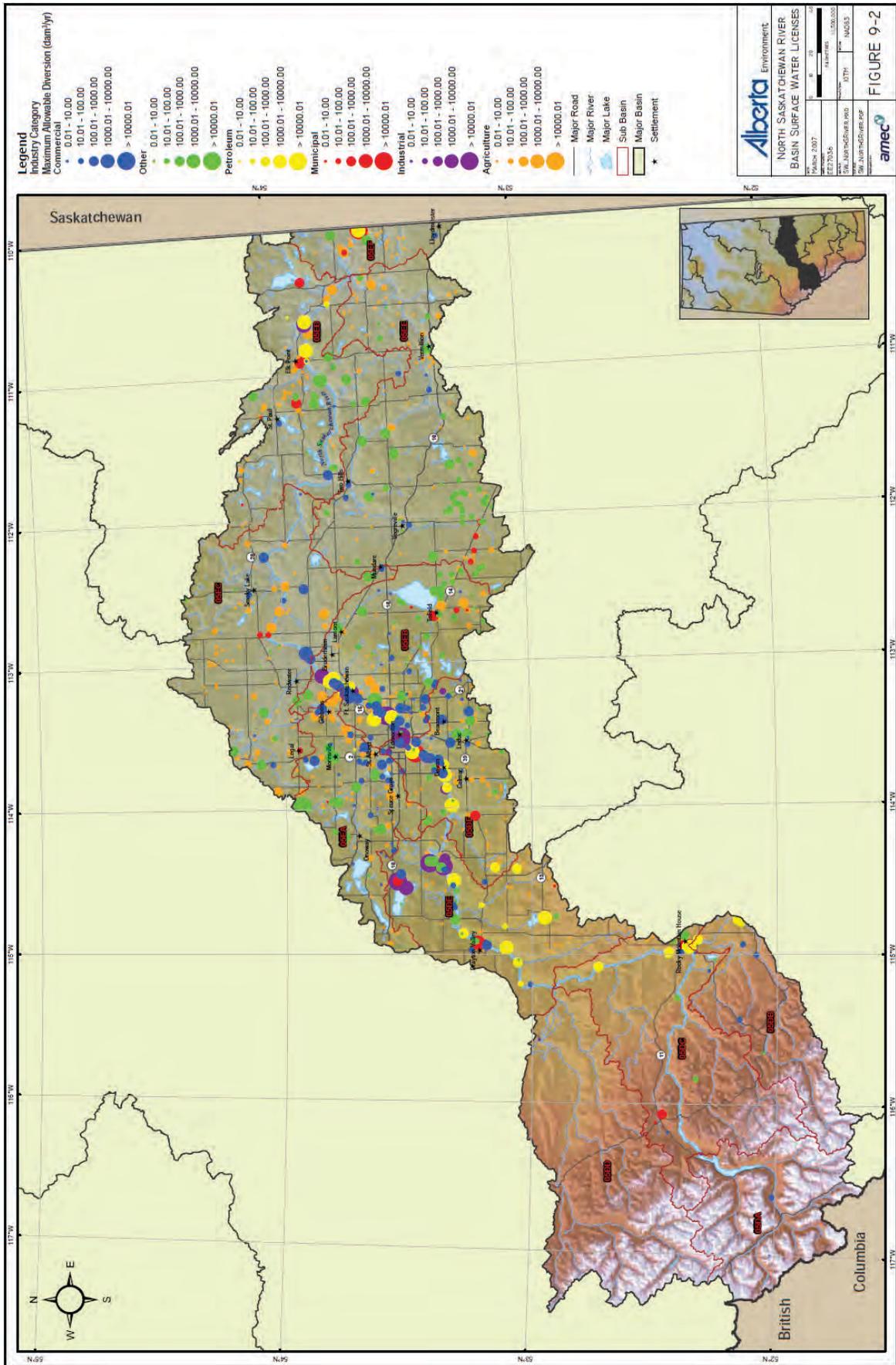
CAPITAL REGION SERVICE MAP



- EPCOR Water Treatment Plant
- Water Pipeline
- Future Water Pipeline
- North Saskatchewan River

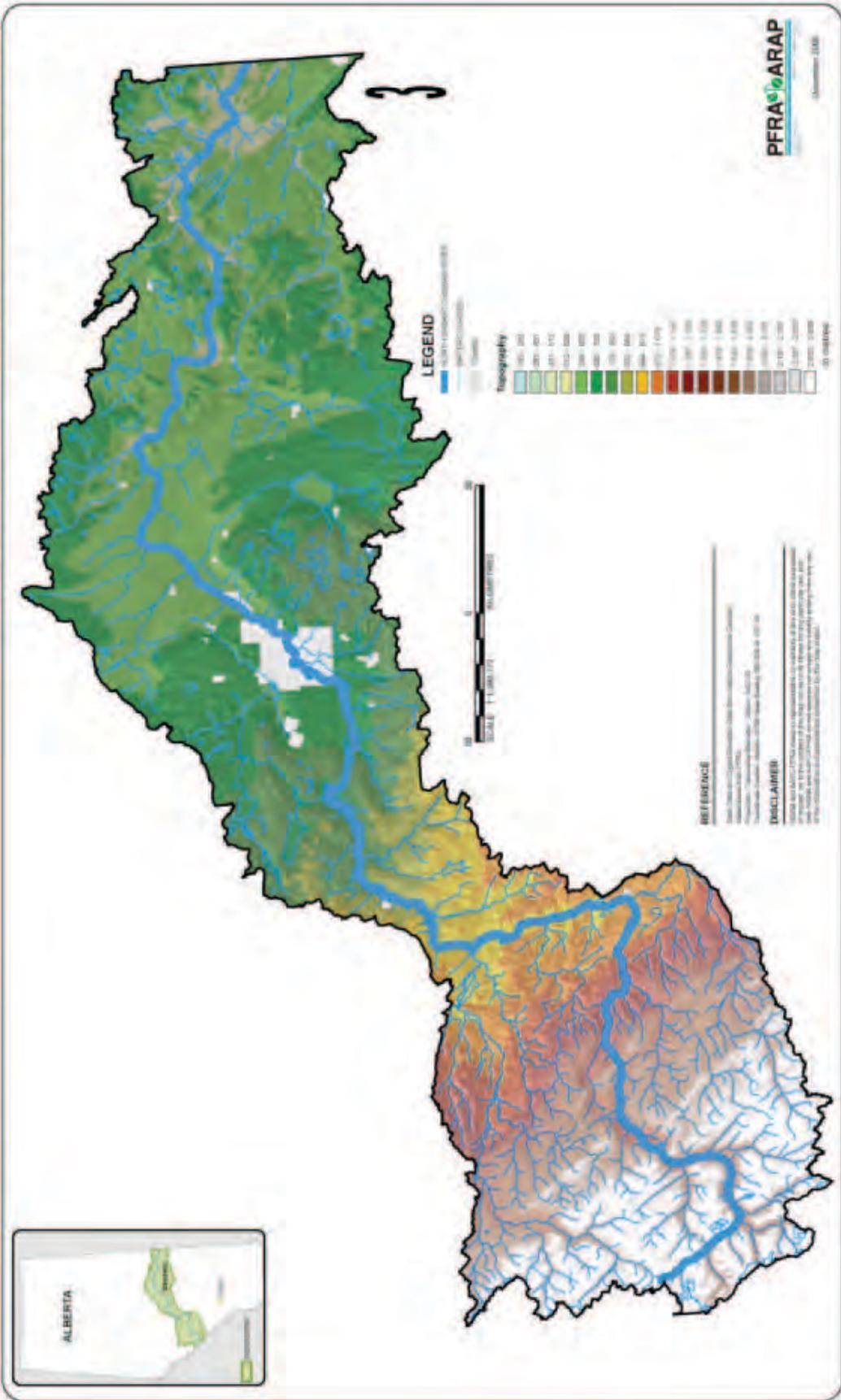


September 2011 (in part to AUCW)



PHYSICAL GEOGRAPHY OF THE NORTH SASKATCHEWAN RIVER WPAC AREA

North Saskatchewan Watershed Alliance



Appendix C Glossary – from CEP planning guidebook, AUMA

Commonly used acronyms

AENV	Alberta Environment
AUMA	Alberta Urban Municipalities Association
AWC	Alberta Water Council
CEP	Conservation, Efficiency and Productivity
IFN	Instream Flow Needs
ILI	Infrastructure Leakage Index
WCO	Water Conservation Objective
WURS	Water Use Reporting System

Glossary of Terms used in CEP Planning

A number of water CEP related terms have been devised by Alberta organizations. Rather than cause confusion by redefining these terms, definitions from other publications have been used in the creation of this document and are noted in quotations below.

Unless otherwise stated the following terms and definitions are taken from <http://environment.gov.ab.ca/info/library/8043.pdf>

Alberta Water Council: A multi-stakeholder partnership tasked to “monitor and steward the implementation of Alberta’s *Water for Life* strategy and to champion the achievement of its three outcomes” (Alberta Water Council, 2009).

Benchmarking: The process of identifying best practices, which indicate superior performance. Benchmarks are adopted as targets for optimal organizational performance, and may include standards or environmental management processes.

Best Management Practices (BMPs): (Beneficial Management Practices) Techniques and procedures that have been proven through research, testing and use, to be the most effective and appropriate in Alberta. Effectiveness and appropriateness are determined by a

combination of: (1) the efficiency of resource use, (2) the availability and evaluation of practical alternatives, (3) the creation of social, economic, and environmental benefits, and (5) the reduction of social, economic, and environmental negative impacts.

CEP = conservation, efficiency and productivity: The individual terms are defined below using their individual terms (water conservation, water efficiency and water productivity)

Consumptive (water) use: The balance of water taken from a source that is not entirely or directly returned to that source. This represents the difference between the amount of water diverted from a source and the amount water returned. In a municipal context, consumptive water use can include water lost to leaks or evaporation (from storage or outdoor uses), or water that is incorporated into other products.

Demand Management: An approach that aims to conserve water by using a variety of policy instruments to reduce water use and increase efficiency. This approach recognizes that water is a finite resource (see also supply management).

Diversion of water: The transfer of water from a stream, lake, aquifer, or other source of water by a canal, pipe, well, or other conduit for any purpose. Also, a turning aside or alteration of the natural course of a flow of water, normally considered physically to leave the natural channel (see also water allocation, water license).

Domestic wastewater: A composite of liquid and water-carried wastes associated with the use of water for drinking, cooking, cleaning, washing, hygiene, sanitation or other domestic purposes, together with any infiltration and inflow wastewater, that is released into a wastewater collection system.

Domestic water use (residential): Water used for drinking, cooking, washing, and yard use. (GWMT)

Governance: The process and structure that brings together capable people and relevant information to achieve goals. Governance defines an organization's accountability systems and ensures effective use of public resources. Governance is the process where elements in society hold power and authority, and influence and enact policies and decisions about public life and economic and social development (See also shared governance).

Grey water: Untreated, used water from a household or small commercial establishment (excluding that from toilets or other fixtures and appliances whose wastewater might have come into contact with human waste).

Groundwater: All water under the surface of the ground whether in liquid or solid state. It originates from rainfall or snowmelt that penetrates the layer of soil just below the surface. For groundwater to be a recoverable resource, it must exist in an aquifer. Groundwater can be found in practically every area of the province, but aquifer depths, yields, and water quality vary.

Hydrologic cycle (water cycle): The process by which water evaporates from oceans and other bodies of water, accumulates as water vapour in clouds, and returns to oceans and other bodies of water as rain and snow or as runoff from this precipitation or groundwater.

Infrastructure leak index: A measure of current losses compared to unavoidable losses in a municipal water system. It is recognized as a performance indicator by the International Water Association (IWA) and is a recommended water audit method by the American Water Works Association (AWWA). AUMA's Water CEP Plan includes short-term actions related to establishing estimates of the infrastructure leakage index for individual municipalities.

Municipal water: Water under a deemed license that is processed through a treatment plant of a local authority of Alberta.

Municipal water use: Purposes usually served by water within a city, town, or village such as household and sanitary purposes, watering of lawns and gardens, and fire protection.

Non-consumptive use: A use of water in which all of the water used is directly returned to the source from which it came.

Per capita consumption: A way to relate water use in a municipality to the population. It is calculated based on the average volume of water used per day divided by the population served. Total (or gross) per capita consumption relates to the total amount of water used by a

municipality whereas residential (or domestic) per capita consumption refers to the portion of water consumed in the residential market. It is usually expressed in L/cap/day or litres per capita per day.

Potable water (drinking water): Water that is provided by a waterworks system (private or municipal) and is used for drinking, cooking, dishwashing, or other domestic purposes requiring water that is suitable for human consumption.

Raw water: Water in its natural state, prior to any treatment for drinking.

Recycled water (reclaimed water): Water that is utilized after it has fulfilled its primary purpose as identified in a *Water Act* license and before it becomes return flow (leaves the wastewater treatment plant back to a watercourse). Water that is used more than one time before it passes back into the natural hydrologic system.

Reservoir: A man-made lake that collects and stores water for future use. During periods of low river flow, reservoirs can release additional flow if water is available.

Riparian: Pertaining to the banks of a river, stream, waterway, or other, typically, flowing body of water as well as to plant and animal communities along such bodies of water.

Sewage: The liquid waste from domestic, commercial, and industrial establishments.

Sewage treatment: The processing of wastewater for the removal or reduction of contained solids or other undesirable constituents.

Sewer system: Any system of pipes, drains, pumping works, equipment, structures, and other things used for the collection, transportation or disposal of wastewater, but does not include any building drain, plumbing, or building sewer.

Shared governance: A governance structure where government and external parties share responsibility for policy development, delivery of planning, programs, or services, but where government retains accountability. The extent of government involvement varies with the level of control that is desired and/or the capacity of the external parties to carry out the functions. Shared governance requires a clear accountability framework with clear roles, responsibilities, and relationships. A collaborative, goal-setting, and problem-solving process built on trust and communication where both government and stakeholders share responsibility for setting and achieving shared outcomes.

Source water: Raw/untreated water received for treatment to provide potable water to municipal, industrial or private users. Sources may include high quality groundwater, groundwater under the influence of surface water and surface water from lake, stream, river or watercourse.

Source water protection:

1. The prevention of pollution of lakes, reservoirs, rivers, streams, and groundwater that serve as sources of drinking water. Wellhead protection would be an example of a source water protection approach that protects groundwater sources, whereas management of land around a lake or reservoir used for drinking water would be an example for surface water supplies. Source water protection programs typically include: delineating source water protection areas; identifying sources of contamination; implementing measures to manage these changes; and planning for the future.
2. Action taken to control or minimize the potential for introduction of chemicals or contaminants in source waters, including water used as a source of drinking water.

Stormwater: Water discharged from a surface as a result of rainfall or snowfall.

Stormwater drainage system: Any structure for collecting, storing, or disposing of stormwater and the connections between them as outlined in the *Environmental Protection and Enhancement Act*. The system includes stormwater sewers, pumping stations, storage areas, management facilities, treatment facilities, and outfall structures.

Supply Management: Managing the supply of water to change the timing of water availability such as water storage, or other measures to increase the supply of water to meet the quantity of water demanded (see also Demand management).

Surface Water: Water bodies such as lakes, ponds, wetlands, rivers, and streams, as well as groundwater with a direct and immediate hydrological connection to surface water (for example, water in a well beside a river).

Wastewater: A combination of liquid and water-carried pollutants from homes, businesses, industries or farms; a mixture of water and dissolved or suspended solids.

Water Act: A piece of provincial legislation in Alberta used to protect the quality of water and manage its distribution. The *Water Act* regulates all developments and activities that might affect rivers, lakes, or groundwater.

Water distribution system: Waterworks System An organized process and associated structures of pipes, valves, fittings and accessories,

including associated pressure reducing stations, that are used to convey potable water in a waterworks system to a service connection.

Water efficiency:

1. Accomplishment of a function, task, process or result with the minimal amount of water feasible.
2. An indicator of the relationship between the amount of water needed for a particular purpose and the quantity of water used or diverted (Alberta Water Council, 2007, p.1).

Water productivity: The amount of water that is required to produce a unit of any good, service or societal value (Alberta Water Council, 2007, p. 2).

Water license (water diversion license): A water license provides the authority for diverting and using surface water or groundwater. The license identifies the water source, the location of the diversion site, an amount of water to be diverted and used from that source, the priority of the "water right" established by the license, and the conditions under which the diversion and use must take place.

Watershed: An area of land that catches precipitation and drains it to a common point such as a wetland, lake, river, stream, or groundwater aquifer.

Watershed Management Plan: A comprehensive document that addresses many issues in a watershed including water quantity, water quality, point and non-point-source pollution, and source water protection. It may or may not include a Water Management Plan. It may also examine ways to better integrate land and resource management within a watershed.

Watershed Planning and Advisory Council (WPAC): Collaborative, independent, volunteer organizations with representation from all key partners within the watershed. Their mandate is to engage governments, stakeholders, other partnerships, and the public in watershed assessment and watershed management planning, while considering the existing land and resource management planning processes and decision-making authorities.

Water re-use: Any beneficial use of the treated wastewater directed to a specific purpose other than the general release to the surface or subsurface environments.

Watershed Stewardship Group (WSG): Community-based groups made up of volunteer citizens, often supported by local businesses and industries, which have taken the initiative to protect their local creek, stream, stretch of river, or lake. These proactive groups develop on-the-ground solutions to ensure the protection of their specific watersheds.



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