



WATER CONSERVATION, EFFICIENCY AND PRODUCTIVITY PLAN

2018 -2033



PREPARED BY WATER SERVICES
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- Water Services

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EXECUTIVE SUMMARY

The City of Airdrie Water Conservation, Efficiency and Productivity (CEP) Plan has been developed to capture water conservation activities completed to date, to recommend proposed actions and to set targets for the future.

Through the CEP Plan, the City of Airdrie (the City) defines tools and resources to assist the community in managing its water consumption in a sustainable manner. The tools and resources are categorized as follows:

- Regulatory
- Financial and Administrative
- Utility Infrastructure and Operation
- Education and Outreach
- Partnerships and Collaboration

The application of these tools and resources is intended to reduce annual average and peak (monthly, daily, hourly) water demand. The benefits of water demand reduction include, but are not limited to:

- extending the useful life of the current water system infrastructure;
- achieving capital and operating cost savings;
- contributing to the improvement and long-term sustainability of the Bow River Basin; and
- ensuring a secure water supply for future generations.

The CEP Plan takes into account that the City continues to be a fast-growing community. Urban growth and industry expansion will increase water demand. Managing demand and financing the construction and maintenance of water distribution infrastructure must be a priority for the community. Proactively undertaking activities that encourage and promote the efficient use of water will have environmental and economic benefits. Benefits will include managing water resources and potential water shortages, delaying costly expansion of water infrastructure, and reducing energy consumption to pump water from Calgary.

The City must be diligent in water resource management to ensure long-term sustainability for all water users. The adoption of water use and conservation practices is an effective means of meeting current and future demand. Alberta is identified as a water rich province. However, water supply is concentrated in the northern part of the province, whereas the highest water demand is from the southern areas where the urban population and irrigated agriculture is concentrated. The City commits to being a leader in sustainable water management by adopting practices to achieve 5, 10, and 15 year water conservation targets outlined in this report.

Proactively undertaking activities that encourage and promote the efficient use of water within the City will have a wide array of environmental and economic benefits within and beyond city limits.

INTRODUCTION

WATER CONSERVATION, EFFICIENCY and PRODUCTIVITY

The sustainability of water resources is an important issue for municipalities in Alberta. Environmental and economic concerns including climate change, watershed protection and the escalating cost of water delivery encourage improved management of municipal water consumption. Water conservation goes beyond reducing consumption; it also includes watershed and aquatic ecosystem protection to ensure a safe, reliable drinking water supply.

The City purchases treated water from the City of Calgary; therefore, it is important to understand the critical role the City’s municipal water consumption plays in the greater Bow River watershed. The City must be diligent in water resource management to ensure long-term sustainability for all water users. The adoption of water use and conservation practices is an effective means of meeting current and future demand.

PURPOSE AND SCOPE

Municipal water conservation, efficiency and productivity planning assists a community in identifying opportunities to provide for a more sustainable future by assessing current water use and the associated impacts on municipal infrastructure and the aquatic environment. The foundational framework for CEP planning was developed by the Alberta Urban Municipalities Association (AUMA).

There are subtle differences in how water conservation, efficiency, and productivity are defined. The City of Airdrie has adopted the AUMA terminology:

Water conservation	Any beneficial reduction in water use, loss, or waste. 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 that is required to produce a unit of any good, service, or societal value.

The City CEP Plan has been developed to capture water conservation activities completed to date, to recommend proposed actions, and to set targets for the future.

COMMITMENT

The City is committed to being a responsible steward of the environment. Environment Canada’s most recent (2009) Municipal Water and Wastewater Survey concluded that larger Canadian municipalities have a lower total per capita water use compared to smaller communities. This coincides with the AUMA’s finding that the majority of larger communities in Alberta have taken and continue to take, deliberate action toward achieving water conservation and efficiency targets, while smaller communities lag behind in water conservation implementation. Municipal capacity is often an implementation barrier to achieving water conservation targets in smaller communities (AUMA, 2014).

The City has undertaken many initiatives that focus on responsible environmental stewardship, most notably the adoption of the AirdrieONE Sustainability Plan. During the public consultation process for AirdrieONE, water was highlighted as an important issue and City residents expressed a desire to protect Nose Creek. Therefore, an opportunity exists to actively promote water conservation and efficiency as Airdrie continues to grow and to become more diverse.

ALIGNMENT

The City’s ongoing commitment is acknowledged in strategic City documents, specifically the Airdrie City Plan and AirdrieONE. The CEP Plan aligns with these existing strategic documents as well as with the AUMA 2014 Urban Municipal Water Conservation, Efficiency and Productivity Plan – Targets and Actions, the Province of Alberta’s Water for Life Strategy, the South Saskatchewan Regional Plan (SSRP), the Bow River Basin Council Bow Basin Watershed Management Plan (BBWMP), and the Nose Creek Watershed Water Management Plan (NCWWMP). Information from these sources as it pertains to water conservation, efficiency, and productivity have been summarized in the following table.

Table 1: Water Conservation, Efficiency and Productivity Guiding Documents

AirdrieONE	Identifies sustainability goals, objectives, actions and measures. Principles of AirdrieONE that specifically align with water conservation include: <ul style="list-style-type: none">• Built Environment – Focus is on development of buildings, facilities and neighbourhoods that contribute to a more sustainable community; where neighbourhoods can be sustained without excessive resource demands on energy and water, while still providing a high quality of life. Provides for fiscal sustainability by facilitating a development pattern that is less infrastructure intensive.• Sustainable Natural Environment – Focus is on protecting natural areas and restoring ecosystems by preserving natural systems, including those extending beyond our municipal boundaries. Maintaining the Nose Creek corridor requires the protection and restoration of a healthy, diverse riparian ecosystem and the implementation of innovative stormwater management practices. On-going support of the Nose Creek Watershed Partnership aligns with this principle.
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	<ul style="list-style-type: none"> • Water – Focus is on ensuring long-term supply of high quality water, protecting natural ecosystems and promoting the efficient use of water. Water use efficiency will help reduce cost and support long-term water supply security. Identifies that climatic factors contribute to the irrigation water demand for lawns, parks, golf courses and other facilities. Encourages sustainable landscaping practices to facilitate water retention. Recommends innovative stormwater management and flow controls to improve water quality and protect receiving waterways, such as Nose Creek. • Achieve fiscal sustainability by supplying water and water system upgrades in the most cost-effective manner possible.
AUMA	Recognizes that sustainability of water supply is an issue for Alberta municipalities. Provides water conservation resources and tools to assist municipalities in managing water demand for long-term sustainability.
BBWMP	Provides guidance and recommendations to decision-making authorities, municipalities, natural resource managers, water users, and residents regarding land and water resources in the watershed. Recognizes that there is a finite carrying capacity for the Bow River Watershed to accommodate anticipated population growth, higher intensity agriculture, and expanded activities in the area of recreation, tourism, oil and gas, and forestry in the future. Encourages efficient water use through improved urban, rural residential, agricultural and industrial conservation practices.
City Plan	Supports sustainability as outlined in AirdrieONE and awareness of environmental issues. Promotes the conservation and efficient use of water resources by: <ul style="list-style-type: none"> • Encouraging the design of public and private landscaping to reduce the need for water and promote water conscious landscaping practices without increasing non-permeable surface area. • Promoting integration of indigenous vegetation, specifically low-maintenance drought tolerant species in city landscaping projects. • Ensuring that water conservation practices, such as efficient use of water for compaction, dust control, and erosion and sediment control are incorporated into site development practices. • Protecting Nose Creek in accordance with the NCWWMP by meeting recommended runoff volume control targets and release rates in new developments. • Supporting inter-municipal collaboration in water supply and watershed management planning.
NCWWMP	Recommends actions to protect riparian areas and improve water quality in the Nose Creek watershed. Recognizes that watershed management is a shared responsibility. Identifies common goals and objectives to maintain and improve the ecological integrity of the watershed and minimize risks associated with land use and development.

SSRP	Recognizes that water supply and demand is a key challenge throughout the South Saskatchewan Region. Continued population growth and economic development depends on efficient and effective use of existing water allocations. Shared watershed stewardship is necessary to support healthy ecosystems and human needs.
Water For Life	Strategy outlines three objectives: safe, secure drinking water; healthy aquatic ecosystems; and reliable, quality water supplies for a sustainable economy. Targets a 30 per cent province-wide improvement in overall water conservation, efficiency and productivity.

STRATEGY

The CEP Plan will utilize the tools and practices for water conservation as identified by the AUMA. These tools and resources are defined as:

1. Regulatory: Municipal bylaws for conservation and efficiency are an effective way to improve water conservation.
2. Financial: Economic and financial tools are an effective way to improve water efficiency and manage costs.
3. Utility Infrastructure and Operation: Changes to water operations and management can often have the greatest impact on improving water conservation.
4. Education and Outreach: Paramount in the dissemination of information for water conservation.
5. Partnerships and Collaboration: Necessary for sharing of ideas, resources and inter-dependent development.

The adoption of these tools and practices is recognized as an effective means of managing demand within existing available supplies and contributing to long-term municipal sustainability.

AIRDRIE'S WATER SYSTEM

WATER SOURCE

The drinking water supplied by the City to residents, businesses and visitors originates in the mountains to the west. Airdrie is located within the Bow River Sub-Basin of the South Saskatchewan River Basin. The two sources of drinking water within this Sub-Basin are the Bow River and the Elbow River. Water from these rivers flows to treatment plants within the City of Calgary; the Bow River supplies the Bearspaw Water Treatment Plant and the Elbow River supplies the Glenmore Water Treatment Plant. The City purchases treated water from the City of Calgary.

Many people rely on these rivers for water. The City of Calgary also supplies water to the City of Chestermere, the Town of Strathmore and the Tsuu T'ina First Nation. Others that rely on these rivers for drinking water are the Village of Lake Louise, the Town of Banff, the Town of Canmore, the Town of Morley, the Town of Cochrane, the Village of Bragg Creek, the Townsite of Redwood Meadows, as well as some areas of Rocky View County and Wheatland County. There is a possibility that additional communities, such as the Town of Okotoks, will be serviced in the future by the City of Calgary.

In addition to providing drinking water, these rivers are vital for supporting agriculture, recreation, tourism and industry as well as providing habitat for plant and aquatic life. With so much dependant on these rivers, it is important to understand the role that the City plays in the larger watershed.

WATER DISTRIBUTION SYSTEM

The City distributes potable water treated by a regional supplier (the City of Calgary). Water is received from Calgary via three supply mainlines that deliver water to treated water reservoirs. The water is continually tested to ensure it meets regulated potable water standards before being pumped to a network of distribution mainline pipes, hydrants and service connections.

At the end of 2017, the water distribution system consisted of:

- 3 treated water reservoirs
- 33 km of supply lines
- 259 km of distribution mainlines
- 3314 water system valves
- 881 hydrants
- 20,000+ service connections

This complex network of infrastructure supplies water for drinking, fire protection, commercial and industrial uses for citizens, visitors, and businesses. The system is operated and maintained to ensure reliable water supply and is expanded as necessary in response to municipal growth.

WATER USE PROFILE

In Airdrie, like many other communities in Alberta, residential water use accounts for the majority of municipal water use; followed by the commercial/institutional sector (including water used by a municipality); and then followed by industrial and agricultural operations that are connected to the municipal water supply.

In the last 15 years, the City's total per capita water use has decreased by 29%; from 400 litres per capita per day (Lcd) in 2003 to 284 Lcd in 2017.¹ This reduction is attributed to intensive programs for leak detection and repair, the installation of low-flow fixtures in new development and the implementation of AirdrieONE.

The following chart demonstrates the total litres per capita per day water use for the last 15 years; it demonstrates an overall downward trend.

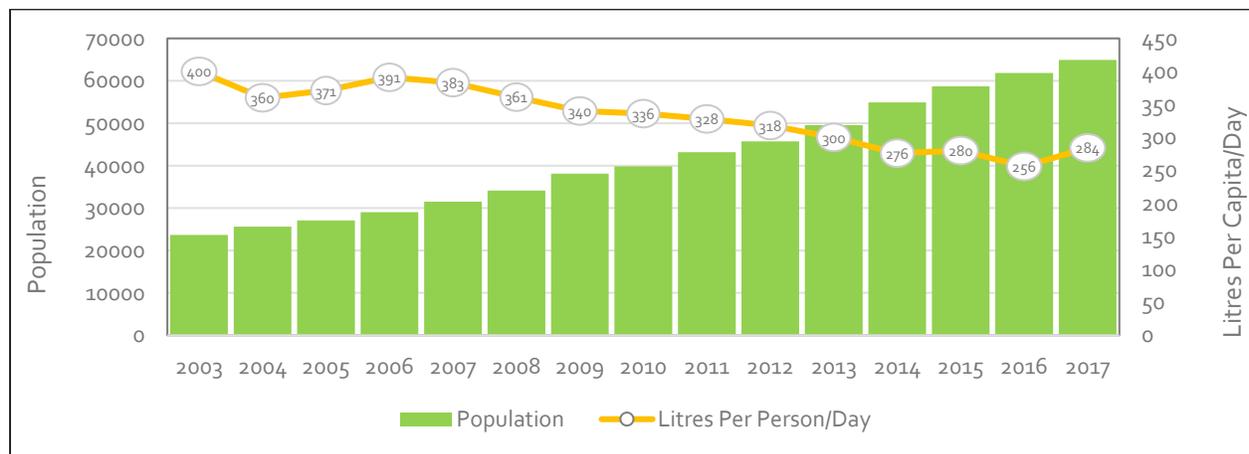


Figure 1: Total Per Capita Water Use 2003-2017.

WATER LEAKAGE AND OTHER WATER LOSS

Every water system leaks and has “unaccounted for” water use, or water loss. This water loss is non-revenue water and can be due to a number of sources.

Water loss can be attributed to municipal operations such as street sweeping, sanitary and storm sewer mainline cleaning, water mainline flushing and annual hydrant flushing. The remaining amount can be attributed to firefighting, water mainline breaks and system leakage. It is important to note that an increase in the number or severity of fires in the City will also increase the water loss volume. System age also plays a role in non-revenue water volume. Currently, a large portion of the City's system is quite new in comparison to the systems in many other cities. As infrastructure ages, proactive leak detection is critical to identify and repair leaks as soon as possible to limit water loss. Water loss will never be zero due to these factors.

¹ Total litres per capita per day is determined by total volume of water supplied by the municipality divided by total population.

Prior to 2016, the City permitted unmetered water use from hydrants by contractors during subdivision construction as well as unmetered irrigation in city parks. Since 2016 the City has taken a proactive approach to ensure this water is metered, by installing portable bulk water stations throughout the City, by modifying the Waterworks Bylaw to prohibit the use of hydrants for construction and by installing meters on all City irrigation.

Amending the Waterworks Bylaw has had a significant impact on tracking the volume of bulk water distributed. Since 2015, bulk water volumes have increased by 28%; this provides an indication of the amount of previously unmetered water use.

Identifying and mitigating water loss represents the single greatest supply-side opportunity to conserve water, recover lost revenue and improve overall operational efficiency.

TARGETS

The City has set ambitious but achievable targets based on federal and provincial guidelines. Environment Canada’s Municipal Water and Wastewater Survey (2009) found that the average system had an “unaccounted for” water loss of 10.1%. Provincially, the AUMA outlines targets for the urban municipal sector to achieve. The AUMA targets are:

1. Alberta’s urban municipal sector will achieve a total per capita water use of 341 Lcd by 2020.
2. Maintain the volume of “unaccounted for” water use at 10% of total water use.

The City has already met the AUMA target by achieving 284 Lcd and is proactively working on identifying all sources of “unaccounted for” water.

To ensure the City continues to support water conservation practices, with growing residential, commercial and industrial demand, targets have been determined as follows:

1. **Total Litres Per Capita Per Day (Lcd).** Continue to reduce the total water use over the next 15 years, even as industrial and commercial activities increase² (Table 2). It is expected that industry and commercial activities will strive to use water more productively.

Table 2: Total Litres Per Capita Per Day targets over 15 years:

Year	Lcd
2023	275
2028	260
2033	250

² Commercial and industrial development may increase total Lcd if the pace of non-residential growth were to significantly exceed the rate of residential growth as non-residential use tends to require more water per service connection than residential use does.

The 15 year timeline aligns with the City of Calgary's Water Efficiency Plan 30 in 30 and provides a coordinated approach with the plan update schedule of the regional water provider.³

2. **Water Loss.** The City will complete a comprehensive water system audit to determine the current volume of water loss. This will assist in establishing achievable targets that incorporate fiscal and environmental sustainability in order to minimize water loss. These targets will appear in subsequent CEP Plan updates.

A performance monitoring program will be developed to track the effectiveness of the City's tools and practices in achieving the City's targets. Performance monitoring measures can be found in Appendix A.

³This timeline differs from the 5, 10, 20 year timeline suggested in AirdrieONE.

FINANCIAL

<p>Master Servicing Agreement Secures long term supply of purchased treated water from the City of Calgary. Updated in 2016 and is effective until 2036. Cost of service reviewed by City of Airdrie and City of Calgary every five years. Regular collaboration occurs to match growth projections with servicing needs</p>	<p>Ongoing, as required</p>
<p>Full Cost Recovery Water utility is structured as a fully funded user pay system. All operational and capital costs are recovered through user fees.</p>	<p>Ongoing</p>
<p>Utility Rate Review Utility rate review completed in 2015. Included a review of water rates by customer type, rate structure, contributions to capital projects and connection fees. Included water conservation rate structures and fixed rate equivalent meter changes. Review considerations; higher revenue from fixed charges provides greater financial certainty, higher revenue from variable charges contributes to improved water conservation. Water utility rate structure includes fixed and variable components.</p>	<p>Completed</p>
<p>Consumption Exception Reporting Utility accounts examined monthly to identify properties with unusually high consumption. Properties are investigated for possible leaks; if leaks are found they are repaired.</p>	<p>Ongoing</p>
<p>Water System Audit Comprehensive review to evaluate the state of the water system. Audit will assess real versus apparent losses, deliver a detailed water management sustainability plan and provide system performance indicators.</p>	<p>2019, pending budget approval</p>
<p>Toilet Replacement Rebate Program Incentive program offers \$50 to residents to replace 20L toilets to a model which uses 6L or less. Homes built prior to 2004 are eligible; after 2004 water efficient toilets were installed at construction.</p>	<p>Ongoing</p>
<p>ERT Meters Encoder Receiver Transmitter (ERT) technology on utility meters transmit data over a short range so usage data can be collected without physical inspection. Older model ERTs are being replaced with higher wattage technology to log hourly data usage for better leak identification.</p>	<p>Ongoing</p>

UTILITY INFRASTRUCTURE AND OPERATION

METERING	
<p>Residential and Commercial Properties All residential and commercial properties are metered. Billing is made up of a fixed portion and a variable portion based on actual water usage. Water conservation is encouraged, as customers can take actions to reduce their bills.</p>	Complete
<p>City Irrigation - Installs Prior to 2015 - approximately 1/3 of City irrigation sites metered 2015 - largest irrigation sites metered 2016 - smaller irrigation sites metered Present – meters installed at all City irrigation sites during construction</p>	Complete
<p>City Irrigation - Retrofits Metered sites not equipped with ERT are retrofit</p>	Ongoing – Completion 2018
<p>Bulk Water Use Three portable bulk water stations are operational in strategic locations from April to November, weather permitting. One permanent bulk water station open year-round.</p>	Complete
STRATEGIC PLANNING	
<p>City Plan See above</p>	Complete
<p>AirdrieONE See above</p>	Complete
<p>Utility Master Plan Focus on water distribution and wastewater collection to meet long-term strategic and sustainable goals of the City Plan, while addressing the system needs under key milestone scenarios. Collaborative effort between all concerned stakeholders. Endorsed by Council on February 1, 2016.</p>	Complete
<p>Parks Landscape and Maintenance Standards Standards supporting water efficiency:</p> <ul style="list-style-type: none"> • Irrigation system design requirements. • Require irrigation system as-built drawings • Minimum soil depth (300 mm) to increase water retention • Minimum mulch depths • Supports Alberta Low Impact Development recommendations • Grass mowing height of 5.0 cm for sports fields and 7.5cm for general parks spaces to limit stress on grass and reduce watering requirements • Operational activities adjusted based on weather 	Complete

LOSS CONTROL PROGRAMS	
<p>Cathodic Protection – Mainlines Cathodic protection upgrades completed in 2015 and 2016 to ensure mainline protect. All metal pipes protected; total length 37.33 km.</p>	Installation complete On-going monitoring
<p>Cathodic Protection – Service Lines Anode installation (began 2012) on City owned side of copper water service lines to extend service life. 654 anodes installed to date, 200 scheduled for 2018 install.</p>	Ongoing, as required
<p>Leak Detection – Supply Lines Supply lines inspected with sophisticated leak detection equipment through contracted services. Undertaken when leak is highly suspected or when pipe has been in long service in accordance with manufacturer and best practice recommendations.</p>	As required
<p>Leak Detection – Distribution System Mainline leak detection equipment purchased in 2015 and is used to accurately locate leaks, even on plastic pipe.</p>	Ongoing
<p>Leak Detection – Service Lines Service line leak detection equipment purchased in 2001; and more sophisticated equipment in use since 2015. Leak detection completed prior to cathodic protection installation and to confirm leak locations.</p>	As required
<p>Leak Detection – Checklist for Homeowners A checklist for homeowners with higher than usual water use to complete a thorough system check to identify issues and undertake appropriate repairs in their homes and water service lines.</p>	Pending
<p>Hydrant Flushing Spring hydrant flushing completed on public hydrants as required under the <i>National Fire Protection Act</i> (NFPA). Hydrants are flowed for an optimal time to meet the NFPA standard while minimizing water use.</p>	Ongoing
<p>In-sink Waste Disposal Use (e.g. Garburator) Organics disposal with a garburator requires potable water. The City Organics Program promotes disposal of organics in the provided green cart so that they can be composted.</p>	Ongoing
<p>Water Use in Greenspaces On-going reduction of irrigated landscaping in new greenspaces. Potable water irrigation systems are installed with centrally controlled systems and wireless rain sensors that shut down operations during a rain event. Smart technology, mower operators, crew leaders and the general public contribute information to optimize the system.</p>	Ongoing
<p>Water Use in Medians Minimizing irrigation in existing greenspaces such as road medians. New road medians are xeriscaped to minimize maintenance and water</p>	Complete

use. Landscaping specification for arterial roads was amended to reflect this change.	
WATER RECOVERY, RECLAMATION, STORMWATER USE and RECYCLING	
<p>Rain Barrels</p> <p>Promote the use of rain barrels instead of potable water for outdoor watering. Rain barrels are available at the Recycling Depot for sale at a discounted price to Airdrie residents.</p> <p>Rain barrels are low maintenance, easy to use and the water collected is chlorine-free with a natural temperature. Lot level rain water capture reduces the flow of stormwater to our waterways, decreasing the transfer of contaminants while supporting flood mitigation efforts.</p>	Ongoing
<p>Stormwater Irrigation</p> <p>Urban stormwater runoff is used to irrigate passive greenspace in two neighbourhoods. Stormwater use is a way to meet runoff volume control targets, recommended by the NCWP, as well as reduce the use of potable water for irrigation.</p> <p>Stormwater use for irrigation is an emerging practice and successful implementation will depend on stormwater quality and treatment. Long term viability will be contingent on provincial legislation and economic efficiency.</p>	Ongoing – as feasible
<p>Data Collection</p> <p>Crews use GIS data collection software on rugged tablets to easily update information and perform better water system asset management for annual hydrant flowing and inspections, valve exercising and inspections for supply line vaults, stormwater management facilities and outfalls. This GIS technology results in more efficient work crews, less waste, less water flowing and less duplication of completed work.</p>	Ongoing
<p>Water De-chlorination</p> <p>Water flowed from hydrants for non-fire related operations is dechlorinated before it reaches the stormwater system. Prevents chlorinated water from entering natural waterbodies including Nose Creek.</p>	Ongoing

EDUCATION AND OUTREACH

City Staff Training Continuing education and staff training on water conservation trends and technologies. Best management practices and techniques from other municipalities are implemented.	Ongoing
Public Awareness Campaign A social marketing campaign for residents, businesses, and developers includes, but is not limited to: best practice information on xeriscaping, rainwater storage, water efficient appliances and fixtures, underground sprinkler systems, and lawn watering will be developed.	Scheduled 2018
Communications Plan A comprehensive plan will be developed including information for businesses and residents on reducing water consumption.	Scheduled 2018

PARTNERSHIPS & COLLABORATION

PARTNERSHIPS	
<p>Nose Creek Watershed Partnership Supported in AirdrieONE for managing stormwater, protecting riparian areas, managing sensitive ecosystems, controlling erosion and installing signage to inform and educate the public on conservation issues. The City is an active member in this partnership.</p>	Ongoing
<p>Alberta Urban Municipalities Association Provides tools and resources for water conservation, efficiency and productivity that are being implemented in Airdrie. The City is an active member in this association.</p>	Ongoing
COLLABORATION	
<p>Calgary Metropolitan Region Board Ten municipalities in the Calgary Region are mandated by the province to collaboratively develop a regional growth plan. Working in partnership provides an opportunity to learn emerging urban development best practices from each other.</p>	Ongoing
<p>Research The City is currently participating in a collaborative research project with the University of Alberta, the City of Calgary and Alberta Innovates - Energy & Environment Solutions for "Evaluating microbial risks and performance criteria for safe management of stormwater and rainwater use in Alberta". This research is a foundation for provincial stormwater use legislation development.</p>	Ongoing

The City supports piloting innovative technology and practices that reduce water consumption while incorporating watershed and aquatic ecosystem protection to ensure safe, reliable drinking water.

NEXT STEPS

The City has already implemented a number of water conservation, efficiency and productivity best practice initiatives in an effort to reduce water usage throughout the community. Additionally, the City supports piloting innovative technology and practices that reduce water consumption while incorporating watershed and aquatic ecosystem protection to ensure safe, reliable drinking water.

Next steps are:

- seek City Council endorsement of the Water Use and Conservation Policy;
- seek City Council in-principle support for amendments to the existing Waterworks Bylaw including additional water use and conservation elements and incorporating a conservation watering schedule;
- complete a Water System Audit;
- develop a Performance Monitoring Program;
- establish water loss targets;
- monitor the development of provincial stormwater use legislation and be prepared to implement legislation and guidelines once available;
- create a checklist for homeowners to find and repair sources of high water consumption;
- create a Public Awareness Campaign;
- create a comprehensive Communications Plan; and
- participate in research that supports water conservation related activities.

TERMS & DEFINITIONS

Anode	Installed for protection of metal in a corrosive environment. An anode is an electrically charged metal that is more reactive than the metal it is installed to protect. It is intended to partially corrode or dissolve to protect the metal of the system it is connected to.
Cathodic protection	The protection afforded by an anode made of an easily corrodible metal to control the corrosion of metal pipe.
Xeriscaping	Landscaping style which requires little or no irrigation.

RESOURCES

Airdrie City Plan

<https://www.airdrie.ca/getDocument.cfm?ID=2575>

AirdrieONE Sustainability Plan

<https://www.airdrie.ca/getDocument.cfm?ID=172>

Standard Landscape Guidelines & Specifications 2014

<https://www.airdrie.ca/getDocument.cfm?ID=2353>

Airdrie Waterworks Bylaw B-30/2016

<https://www.airdrie.ca/getDocument.cfm?ID=4095>

American Water Works Association

<http://www.awwa.org/portals/0/files/resources/water%20knowledge/water%20loss%20contro/l/iwa-awwa-method-awwa-updated.pdf>

AUMA. 2014 Urban Municipal Water Conservation, Efficiency and Productivity Plan – Targets and Actions for the Urban Municipal Sector

https://www.auma.ca/sites/default/files/Advocacy/Document_library/80674_2014_cep_plan.pdf

Bow River Basin Council. Bow Basin Watershed Management Plan.

<http://aep.alberta.ca/water/programs-and-services/water-for-life/partnerships/watershed-planning-and-advisory-councils/documents/BowBasinWatershedManagementPlan-2012.pdf>

City of Calgary Water Efficiency Plan 30in30, by 2033

http://www.calgary.ca/UEP/Water/Documents/Water-Documents/water_efficiency_plan.pdf

South Saskatchewan Regional Plan

<https://landuse.alberta.ca/LandUse%20Documents/South%20Saskatchewan%20Regional%20Plan%202014-2024%20-%20February%202017.pdf>

APPENDIX A: MONITORING & EVALUATION

Tool or Principle	Water Conservation, Efficiency and Productivity Element	Measure (measured per year)
	Water Use	Litres Per Capita Per Day (Lcd)
	Annual Loss	Total water less metered water Cost of water saved due to improvements from previous year
Regulatory	Bylaws	# of violations written by bylaw type
	Provincial Legislation	Legislation and guidelines developed? Yes or No
Financial	Full Cost Recovery	100% of costs recovered
	Consumption exception reporting	# of reports run # of properties identified as leaking # of repairs completed based on identified leaking properties
	Toilet Replacement Rebate Program	# of rebates issued
	ERT Meters	# of meters installed # of ERTs installed # of 100 watt EMRs installed
Utility Infrastructure & Operation	Metering	<u>Residential & Commercial Properties</u> # of new residential meters installed # of new residential developments (should equal # of new meters) # of existing residential meters replaced due to failure # of new commercial meters installed # of new commercial developments (should equal # of new meters) # of existing commercial meters replaced due to failure <u>Irrigation – Installs</u> # of new irrigation system installs # of new irrigation meter installs (should equal # new installs) <u>Irrigation – Retrofits</u> # of retrofits # of meter inspections # of meters replaced due to failure

Utility Infrastructure & Operation Continued	Metering Continued	<u>Bulk Water Use</u> # of bulk water accounts # of new bulk water accounts # of portable bulk water stations # of permanent bulk water stations Volume (cubic metres) of total bulk water sales Volume (cubic meters) of bulk water sales by station
	Loss Control Programs	<u>Cathodic Protection - Mainlines</u> # of times cathodic protection was inspected # of cathodic protection replaced due to failure
		<u>Cathodic Protection – Service Lines</u> # of anodes installed on services # of anodes remaining to be installed on services <u>Leak Detection – Supply Lines</u> # of times inspections occurred Length (metres) of supply line inspected # of supply line vaults inspected # of supply line vaults found to have potable water <u>Leak Detection – Distribution System</u> Length (metres) of distribution system inspected # of distribution mainline leaks detected # of distribution mainline leaks repaired <u>Leak Detection – Service Lines</u> # of services that leak detection was performed # of services found to be leaking # of leaking services repaired
Water Recovery, Reclamation, Stormwater Use and Recycling	<u>Rain Barrels</u> # of Rain Barrels sold <u>Stormwater for Irrigation</u> # of greenspaces irrigated with stormwater % of stormwater irrigated areas undergoing annual assessment of vegetation health and soil chemistry Water quality is monitored at irrigation stormwater ponds monthly during the irrigation season. Post treatment irrigation water monitoring shows an exceedance rate of less than 5% compared to specified stormwater irrigation water quality guidelines. Volume of stormwater (cubic meters) used for irrigation	
Education & Outreach	Staff Training	# of staff with responsibility for water conservation # of training hours for water conservation # of other municipalities contacted regarding water conservation BMPs # of BMPs from other municipalities implemented

	Public Awareness Campaign	# of events attended # (estimated) people spoken to
Partnerships & Collaboration	Partnerships	<u>Nose Creek Watershed Partnership</u> # of general meetings attending # of technical team meetings attending Participate in Plan update? Yes or No Plan endorsed by City? Yes or No
	Collaboration	<u>Research</u> # of research projects participating/participated in