



Parks  
**Water Management  
Strategic Plan**



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# Executive summary



**“Alberta’s water supplies our communities, farms, and industries with water for drinking, recreation, crops, industrial processes and the generation of electricity. Our water also supports countless life forms, both in water and on land. Responsible decision-making ensures Alberta has the water it needs to sustain the population, the economy and the environment.”**

*Water for life: Alberta’s Strategy for Sustainability*

## Water

“Calgary’s water is our most valuable natural resource. The supply is limited, and our growing population and soaring economy are placing increasing demands on the Bow and Elbow rivers. To help us manage our water resources and ensure we continue to have the water we need in the future, City Council has adopted a water efficiency goal known as 30-in-30. Its success is dependent on everyone’s participation.” (Water Conservation Report, City of Calgary 2006)

In 2002 Calgary City Council identified water management and water conservation as key priorities for The City of Calgary and identified the following water goals:

- Lead by example.
- Manage The City’s water usage activities.
- Water conservation through responsible and efficient use.

## Parks and open space

“Calgary is a city of parks and green spaces linked by pathways or interconnected green belts.”

“This natural environment is perhaps our city’s greatest asset ... and we are deeply committed to protecting and preserving this asset.” (Open Space Plan, The City of Calgary 2003)

“Urban parks, open spaces and natural areas offer some of the best preventative medicine around, with proven ability to enhance the health of citizens, neighbourhoods, municipalities, the economy and the environment.” (Proposal for A Re-established Urban Parks Program – ARPA, 2002)

The reality is that many existing parks in Calgary need supplemental water. Building or converting parks to be more water conserving is desirable.

## The Plan

The aim of the Water Management Strategic Plan (WMSP) is to move towards an overall water management system that balances water conservation and financial sustainability while supporting healthy plant material. Overall this plan ensures that the right amount of water get to the grass, trees and flowers in the most cost effective way while ensuring that water delivery is efficient and conserves water.

Using Council's priorities and goals, The City of Calgary Parks has completed this plan for water managed within its jurisdiction primarily related to outdoor water use and landscape irrigation.

*The parks water management program encompasses the application, conservation, drainage and recovery of water for economic and environmental enhancement in turfgrass, trees and landscape plants.*

The parks water management program, over the past decade, has shifted its focus from irrigation infrastructure to water management. The WMSP provides further direction to this shift, addresses other water management challenges and issues and better aligns The City of Calgary Parks with the current environment, best practices and City policies.

New technology, changes to maintenance practices, accessing and developing alternative sources of water, redefining the size and type of parks to be irrigated, selection of more drought tolerant plant varieties, and modifications to the way new parks are built offer the best solution for addressing the challenges facing The City of Calgary Parks.

The WMSP provides a common vision and outcomes. It proposes strategies, policies and actions that will use water more conservatively and efficiently. Success will have been achieved with the following outcomes: we have conserved water, our irrigation systems are more efficient and effective, we are using alternative water sources, we are growing healthy plants, we are financially sustainable and we are working with others.

*Parks will use less water (15 per cent) per irrigated hectare of parkland while protecting and enhancing the health and vitality of the horticultural assets in the parks.*

New thinking, and a movement from irrigation infrastructure to water management, has emerged in the last 10 years as a result of several factors:

- Calgary experienced a prolonged drought that is putting more pressure on water resources.
- There is growing concern about the availability of water in the Calgary region and the cost to supply water into the future as the city grows.
- The City of Calgary Water Services determined that the long-term sustainability of Calgary's water supply is contingent on maximizing water use efficiency and minimizing waste. Water Services is encouraging conservation practices to help achieve its target of a 50 per cent reduction in the average day per capita demand.<sup>1</sup>

In response to these pressures, water management activities have become integrated with other functions such as integrated pest management, urban forestry and integrated site design to support healthy urban parks and open spaces while managing the use of the water resource to ensure conservation.

## Cost implications

Implementing the strategies and policies of the plan will reduce the amount of water used in the parks currently being watered. More sites will be irrigated with the same quantity of water used currently.

Funding for upgrades would come through the Capital Budget process. Sustainable water management is based on being able to reinvest in restoration and management of obsolete infrastructure by reallocating funds that are freed up through the implementation of this plan.

To support implementation, the WMSP is accompanied by the Water Management Operating Manuals; Volume 1: Best Management Practices & Practice Guidelines, Volume 2: Technical and Planning Prescriptions, and Volume 3: Drought Management Plan and Procedures.

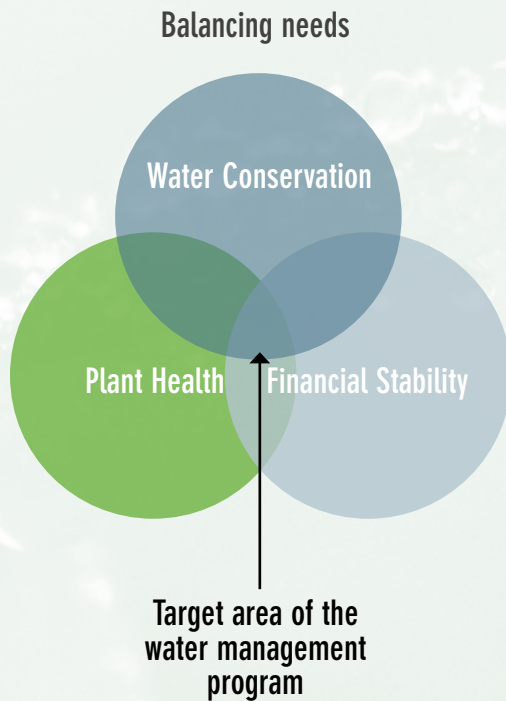
## Endnotes

- <sup>1</sup> City of Calgary, 2003, Waterworks Report to the S.P.C. on Operations and Environment: OE 2003-59 Water Conservation Programs, 6.

Introduction 



The aim of the WMSP is to move Parks towards an overall water management system that balances water conservation, financial sustainability and the promotion of healthy plant material. Overall, this plan ensures that the right amount of water gets to the plant material in the most cost-effective way while ensuring that water delivery is efficient, effective and promotes conservation.



The Water Management Strategic Plan provides vision, outcomes, strategies, policy directions and actions over a 10 year time frame to address sustainability for water management in parks and open spaces.

The WMSP also:

- Clarifies the costs and benefits of various best practices and approaches.
- Identifies performance measures and targets to demonstrate success in achieving desired results.
- Communicates clearly to staff, citizens, communities and partners The City's commitment to water conservation, sustainability and plant health.

The WMSP is a high level directional document and is complemented by additional documents to support implementation of the directions. These documents include *Best Management Practices and Practice Guidelines*, *Technical and Planning Prescriptions*, and *Drought Management Plan and Procedures*. In addition, specific details for the implementation of the policies contained in this plan, related to new development funded by the development industry, will be negotiated with the development industry for inclusion in the *Parks Development Guidelines* and *Standard Specifications for Landscape Construction* document.

This plan was researched, developed and written by The City of Calgary Parks. The City of Calgary Water Services (formerly Waterworks and Wastewater), Land Use Planning, Recreation, Roads, Development & Building Approvals, Corporate Properties and Buildings, and Calgary Transit all contributed to the plan. Developers were consulted through the Urban Development Institute (UDI) and citizens were consulted through four Aldermanic open houses in the fall of 2003.

The Alberta Chapter of the Irrigation Association, the Alberta Association of Landscape Architects and the Landscape Alberta Nursery Trades Association all provided comment on this plan. The cities of Denver CO, San Antonio TX, and San Diego, CA graciously shared information on their experiences and directions in the area of Water Management.

The City of Calgary Parks would like to acknowledge the plan's author, Denis K. Gourdeau, Water Management Co-ordinator. Chris Michaud, Business and Policy Planner for Community Strategies, provided significant assistance in the development of this plan. Doug Marter, Manager Planning & Development Services North and Bashir Jamal, Manager Resource Management, both of Parks, provided invaluable help in the review of the various drafts and acted as department sponsors for the project.

# Parks water management



In 2002, Calgary's City Council recognized water management and conservation as a key priority for The City of Calgary and identified the following water priorities<sup>2</sup>:

- Lead by example.
- Manage the city's water usage activities.
- Water conservation through responsible and efficient use.

## 2.1 Parks mandate

Parks is the steward of Calgary's open space system and natural environment.<sup>3</sup>

Parks provides and maintains a high-quality and diverse park and open space system, protects and enhances the urban forest and natural environment areas and provides environmental stewardship, education, programs and services leading to the following benefits:<sup>4</sup>

- Improved quality of life for all Calgarians: parks promote healthy lifestyles, provides places that are accessible to all and help bring people together and build communities.<sup>5</sup>
- A sustainable, liveable city: parks protect sensitive environments, improve water and air quality and promote bio-diversity and citizen stewardship of the environment.<sup>6</sup>
- Improved image of Calgary: parks make the city look more visually appealing, adds to the value of properties and attracts business and tourists.<sup>7</sup>

## 2.2 Water management for parks and open spaces

Drought conditions and deteriorating irrigation infrastructure is impacting the health of the horticultural asset and reducing the overall image of parks. Parks play an important role in the social, economic and environmental health of communities. Citizens expect parks to be healthy and safe. Water management is a critical component in achieving this. Any plan to address the sustainability of Parks water management system must balance conservation with the reality of Calgary's climate – that supplemental water is needed to sustain plant health. This plan ensures plant health and parks contribution to the image of The City.

The Water Management program encompasses the conservation, application, drainage and recovery of water for environmental and economic benefits, and the enhancement of grass, trees and other landscape plants.

Parks is dedicated to promoting water and soil conservation, and in the maintenance of water quality through the proper management of water.

## 2.3 Vision for water management

**A sustainable water management program growing a vibrant and healthy parks and open space system for current and future generations.**



## 2.4 Outcomes

The outcomes for Water Management in Parks are:

### **Conserve water (increase efficiency, effectiveness and productivity of irrigation systems, use and re-use non-potable alternative water sources).**

1. Parks will use less water than the 16 inches (406 mm) per ha of irrigated land on an annual basis where possible to maintain plant material.
2. Citizens are supporting water conservation in parks and are taking action to conserve water.
3. The City will endeavour to increase the efficiency of its existing irrigation systems and purchase new irrigation systems that are the most water efficient systems available (consistent with budgets, design standards, operating parameters and other criteria established by Parks).
4. Parks supports good water management through: reduced use (use less water where possible), retrofit (purchase the most water efficient systems possible when replacing old systems), repair (stop leaks and fix immediately), reuse (look for opportunities to move towards other non-potable water sources – e.g. irrigating from rainfall-fed dugouts/ reservoirs, grey water reuse).
5. The City of Calgary Parks will minimize water waste with its irrigation systems.

### **Grow healthy plants**

6. Vibrant landscapes are contributing to the environmental, economic and social well-being of Calgary and are contributing to the overall quality of life.
7. The horticultural asset is protected.
8. The image of The City is enhanced.

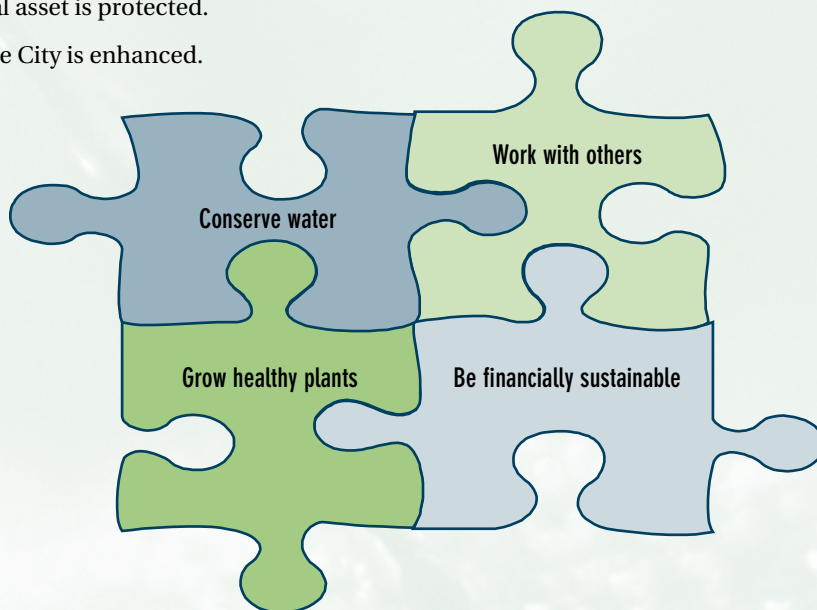
9. An effective drought management plan is in place to address water restrictions.

### **Be financially sustainable**

10. Parks has a long-term financially sustainable irrigation system.
11. Parks and open spaces are designed to promote water conservation.
12. Parks and open spaces are planted with water-conserving and drought tolerant plants.
13. Irrigation equipment is selected based on longevity and low maintenance.
14. Reduce overall operating costs.

### **Work with others**

15. Partnerships are in place to help build knowledge and learning around best management practices.
16. An integrated approach to addressing the various aspects of the ecosystem and their interconnectedness is in place.
17. Community and business partners are implementing landscape water management.
18. The community and region recognize the leadership role of The City of Calgary Parks in the understanding and practices of water management.
19. Co-ordinate with Urban Forestry in the implementation of the Urban Forestry Strategic Plan.



## 2.5 Towards a sustainable water management program

Parks has already taken steps to address the paradigm shift from an irrigation program to a water management program. Though no formal strategy for doing so has been documented, Parks has installed water meters in all but a handful of its sites that are irrigated bringing it to over 99 per cent complete. Parks has also installed a computerized, centrally controlled, water management system in 46 per cent of its irrigated parks. This program has reduced water consumption in those parks by an average of 45 per cent. At the same time plant health has improved subsequently improving park esthetics.

The WMSP addresses this paradigm shift and proposes policies and strategies to support improved water conservation in parks and open spaces.

In addition to water conservation concerns, the irrigation and water management infrastructure is a significant and growing cost for Parks maintenance and operations. The significant growth in infrastructure and the pressure on budgets has led to a situation where The City of Calgary Parks does not have the resources to maintain and operate many of the irrigation systems in its present inventory. Current practices for how and when irrigation systems are built is being revisited. This plan addresses the cost of water management and proposes solutions to help achieve financial sustainability for the irrigation and water management system through the implementation of its policies.

## 2.6 Stakeholder input

A substantial number of stakeholders have an interest in the directions set out in the plan and in the plan's outcome. These stakeholders have been consulted in developing the Plan. (See Appendix 7 in the *Water Management Strategic Plan: Background*).

## 2.7 Ongoing stakeholder input

On issues related to new park construction, the development industry is a special stakeholder, and is involved in the planning, design and installation of irrigation systems that support water management in new community parks. As such, those sections of the plan that impact new park development will require further discussion and negotiation with the development industry as broad concepts from the plan are distilled into specific actions and details related to site specifications and guidelines. Other stakeholders will also have further opportunities for involvement as more detailed plans are developed from this strategic plan.

### Endnotes

- <sup>2</sup> City of Calgary, 2004, Looking Ahead – Moving Forward Council's Priorities 2002 – 2004, 7.
- <sup>3</sup> City of Calgary Parks, Business Plan.
- <sup>4</sup> *ibid*
- <sup>5</sup> *ibid*
- <sup>6</sup> *ibid*
- <sup>7</sup> *ibid*

Strategies, policies and actions



## Strategy 1:

**Re-define the type and size of parks to be irrigated based on park use, horticultural needs and cost to maintain. Introduce the concept of “irrigation only when necessary” approach to park planning and design.**

### Existing policies

The 2002 Parks Open Space Plan discourages the creation of new, subneighbourhood parks.<sup>8</sup>

Traffic islands greater than 500 m<sup>2</sup> are required to have irrigation under the Development Guidelines and Standard Specifications – Landscape Construction 2004.

### New practice

**1.1 Parks will discourage irrigation systems in new parks and open spaces smaller than 0.2 hectares in size.**

#### Discussion

- Small parks make up 57 per cent of all irrigated sites within the existing Park inventory. The cost to operate irrigation on these smaller sites is much higher than larger sites. In order to be cost effective, irrigation should only be encouraged in larger sites, where economies of scale can be achieved.
- Drought-tolerant plant materials and new design techniques should be considered for smaller sites to ensure sustainable, appealing spaces without the need for supplemental irrigation.
- This policy is consistent with the 2002 Parks Open Space Plan which discourages subneighbourhood parks in favour of larger multi-use sites.

**Target:** 10 per cent reduction in the total number of parcels of land (where each individual parcel is 0.2 hectares or less in size) of new open space coming into the Parks inventory by 2010 (from 2000 figures).

### New policy

**1.2 Priority for irrigation in new parks or existing parks undergoing lifecycle upgrading will be given to areas of high wear, high plant stress and high drought sensitivity. In order of priority these areas will be 1) sports fields (play surface), 2) trees, 3) annual planting beds, 4) shrub beds (dependant on type of plants) and 5) high wear areas (e.g. concert sitting areas). Other plant material should not be irrigated unless there is a compelling reason.**

#### Discussion

- A hierarchy of need is required to help guide when and where irrigation should be considered. The significant cost to construct, operate and maintain irrigation systems means irrigation should be built where it can make the most effective impact.
- Sports fields have a high need for irrigation to support turf damaged by heavy use and to ensure a safe recreation space. Trees are a high value asset in parks and considered important by citizens. Annual planting beds cannot survive without supplemental watering but are desirable to enhance the image of the city.
- Irrigation systems should be designed to support the most important amenities and plants in parks such as trees and sports fields. Other parts of parks might not include irrigation, but could be planted with self-sustaining drought-tolerant plant material instead.
- Non-irrigated zones reduce the overall cost to build and maintain irrigation systems as well as avoid future increases in water costs that would otherwise occur if these zones were watered.
- Feature and Regional ornamental, class “A” parks, such as Prince’s Island and Olympic Plaza, may be exceptions and have irrigation over their entire area.

## New policy

1.3 Irrigation systems will be discouraged on boulevards, medians, traffic circles or islands except when approved by the Director of Parks on high traffic sites including major entranceways into the city, major commuter routes important to provide a positive image of the city, projects consistent with approved roadway standards. When trees are involved policy 3.3 and 4.2 will come into effect.

### Discussion

- A large number of the 2,200 irrigated sites in Parks inventory are boulevards, medians and traffic circles or islands. While it is desirable to have vegetation in these areas for aesthetic purposes, the cost to maintain irrigation systems for such small pieces of land is significant.
- Alternatives to turf and the use of drought-tolerant plant material may be more sustainable options for these sites.

## New policy

1.4 Irrigation systems that are constructed for boulevards, medians, traffic circles or islands contrary to 1.3, other small parks or open space sites contrary to 1.1, and enhanced landscapes or optional amenity agreements, require an alternative funding mechanism to be established that will cover all future operating, maintenance and replacement costs associated with the irrigation system.

### Discussion

- In some cases, developers or communities may request irrigation for smaller plots of land such as small parks or medians. Where irrigation is approved for these sites, an endowment fund to cover future maintenance and lifecycle costs should be established. Communities should also assume the regular annual operating costs for the systems.

## New practice

1.5 Parks will identify opportunities to reduce or eliminate irrigation in existing small sites less than 0.2 hectares in size and in other parks where irrigation may not be considered a priority, in consultation with affected communities. Decisions to eliminate irrigation should be based on current use of site, impact on plant material, age and condition of irrigation system and opportunity to redevelop the site using drought-tolerant plant material and xeric principles.

## Discussion

- While it may not be possible or desirable to eliminate irrigation from all small open space sites (0.2 hectares or less) in the existing inventory, these sites should be reviewed. Opportunities to re-develop these sites to be more sustainable should be considered in consultation with the community.
- The identification of sites and the development of designs for the conversion could be part of a community water management plan.

**Target:** Parks will target the elimination of 10 per cent of non-essential irrigation in smaller sites over the next 10 years.

## Actions

- 1a) Parks will work with the land development industry and community organizations to develop criteria for when irrigation will be permitted on smaller sites (less than 0.2 hectares).
- 1b) Parks will conduct an assessment of all existing sites where irrigation systems are in place but are not being used for opportunities to decommission them.
- 1c) Parks will develop criteria and obtain public input for the decommissioning of irrigation systems in existing parks and when alternative design approaches should be considered for the development of new parks.
- 1d) Parks will investigate funding options to support the development of irrigation systems along high profile routes within the city.
- 1e) Sites being watered and with older irrigation systems should have their irrigation systems retrofitted or redeveloped to bring the irrigation system up to modern standards.

## Strategy 2:

**Plan new and existing park redevelopment to reduce the need for water and adopt design practices that promote water conservation.**

### Existing policies

There are no Existing policies related to this strategy.

### New practice

**2.1 Parks will discourage irrigation in proposed new open space sites adjacent to natural areas in favour of keeping these sites naturalized.**

#### Discussion

- The best option for sustainable, water conserving parks is to leave sites in their natural condition. Where possible, when parks are being considered for development next to natural areas, they should be preserved as natural.
- Discussing the need for irrigation on proposed park areas should be undertaken in the planning stage of new communities.

### New practice

**2.2 Parks will reduce or eliminate irrigation on land adjacent to naturalized areas within the existing park inventory on an opportunity basis, based on use, age of irrigation system and impact on plant health following community consultation.**

### New practice

**2.3 Where possible, new drought-tolerant plant material should be planted to make parks more self-sustaining.**

### New practice

**2.4 Parks will encourage the inclusion of xeric landscaping and/or more drought tolerant plant material as an alternative to installing irrigation in new park development or the redevelopment of existing parks.**

#### Discussion

- Calgary's arid conditions are not suitable for many species of plants. However, there is a range of plant material native to Alberta with strong drought resistance tendencies that are able to survive and thrive in these conditions. Increasing their use in the design of new parks could reduce the dependency on new irrigation. Also, incorporating xeric principles into park design optimizes available water use by plants delivered through irrigation systems, enhancing the ability of plants to survive.
- The cost to develop xeric parks is similar to a manicured park. Savings are achieved through reduction in maintenance and water costs and reduced irrigation construction costs<sup>9</sup>.
- Caution must be exercised so that a heat-island effect is not created such as in Phoenix, AZ.

### New practice

**2.5 Parks will encourage the development of water management irrigation master plans, at outline plan stage, for new park development to maximize efficiencies in new irrigation systems.**

#### Discussion

- Irrigation master plans will be used to determine where the irrigation system is laid out within the new park design, taking into consideration irrigated vs. non-irrigated zones.
- Irrigation master plans at the outline plan stage can help reduce the construction and maintenance cost of irrigation systems for developers by outlining where reductions in the number of irrigation services and controllers can occur. The plans will also consider how irrigation systems can be interconnected through the use of road crossings.
- At the time an irrigation master plan is developed, park uses (location of amenities) can be identified and distributed throughout the community so that certain parks with passive use can be developed without irrigation, some with mixed intensities of use can have mixed irrigated and non-irrigated areas and other sites with intensive use all over may be completely irrigated thereby reducing overall parks water demand in the community.
- The cost to develop master plans is expected to be less than the savings achieved from having more efficient irrigation systems<sup>10</sup>.

## New practice

2.6 Wherever possible, Parks will encourage the land development industry to incorporate protection of existing natural areas in new development at the outline plan stage, so supplemental watering is not required.

### Discussion

- Natural landscapes by their nature adapt to the local climate and do not require supplemental watering. Often however, during the development process, land designated as natural area or environmental reserve is disturbed and then replanted, impacting the natural ability of the land to manage itself.
- The most cost-effective way to maintain a natural area is to minimize its disruption when first developing the land. Restoring natural areas often requires temporary irrigation to ensure native vegetation regrowth. Restoration costs far exceed the costs related to protecting this land during development in the first place.

## New policy

2.7 Only irrigation designers certified by the Irrigation Association will be able to submit plans for projects that will be turned over to The City of Calgary.

## New policy

2.8 Only irrigation contractors certified by the Irrigation Association will be able to install irrigation systems that will be handed over to The City of Calgary.

## Actions

- 2a) Parks will pilot the redevelopment of a subneighbourhood park using xeric landscaping principles with community support to demonstrate effectiveness and cost savings.
- 2b) Parks, in conjunction with industry, will develop an inventory of drought-tolerant, non-invasive materials and design principles to be used in new and existing parks to make them more self-sustaining.
- 2c) Parks will develop a demonstration park to test the principles and benefits of hydrozoning.
- 2d) Parks will partner with the land development industry to develop guidelines for irrigation master plans (where and when plans are required and templates for the content of plans).

2e) Parks will partner with industry to pilot the use of native and drought-tolerant plant material in parks.

2f) Parks, in co-operation with land developers, will develop and implement a procedure to include the new design approaches when preparing detailed construction drawings.

## Strategy 3:

**Apply new technology and equipment to improve water efficiency and reduce overall operating costs.**

## Existing policy

The requirement to install central control technology has been in The City of Calgary's *Development Guidelines and Standards Specifications for Landscape Construction* book since 1998.

## New policy

3.1 All new park development and existing park redevelopment that include irrigation systems will incorporate central control technology.

### Discussion

- Central control has been shown to reduce water consumption by an average of 45 per cent. It improves the responsiveness of the irrigation system across the city by allowing watering to be programmed to actual plant need and in response to weather conditions. It also significantly saves on labour cost as staff are not required to go out to the site to turn the system on and off.
- Central control adds to the overall cost of development of a park initially, but significantly reduces the operating and water utility costs over the life of the park.

### Existing practice

3.2 Parks will encourage the use of non-potable water for irrigation systems where it is feasible to do so.

#### Discussion

- Due to the nature of Calgary's water works infrastructure, most water applied in parks is potable water, even though this is not a necessity.
- Opportunities exist in some new developments to take advantage of existing water features and storm ponds to irrigate parks. While at current rates it may be more expensive to build separate pump systems, future expected increases in the cost of potable water make non-potable water a good choice where water is plentiful and located close to new developments<sup>11</sup>.

**Target:** Develop and operate three new non-potable water irrigation systems in new park developments by 2010.

### New practice

3.3 Parks will encourage the use of drip irrigation technology in new development and existing park redevelopment, particularly for trees and shrub beds, to take advantage of the greater water delivery efficiencies. Drip technology should be considered a priority for trees and shrubs on boulevards, medians, traffic islands and circles when exception to policy 1.3 have been approved.

#### Discussion

- Industry literature suggests that drip technology is a much more effective and efficient way to deliver water to plants especially for shrub beds and trees.<sup>12</sup> This should be the standard irrigation technology for all trees and shrubs .
- This will be balanced with the cost of servicing the drip irrigation systems due to plugging, vandalism or damage from animals.

### New practice

3.4 Parks will consider the use of temporary irrigation systems to help plants establish in new developments as an alternative to permanent irrigation. Parks will ensure guidelines are in place for the removal of these systems when plants are established to the satisfaction of Parks.

#### Discussion

- While Parks is seeking to discourage use of irrigation in new development except for priority areas, it is recognized that temporary irrigation may be needed to establish plant material.
- Parks will permit developers to use temporary systems as long as there is an agreement in place for the removal of the systems after the establishment period as defined by Parks.
- Temporary irrigation systems will be removed as directed by the Parks Water Management Coordinator.
- Temporary irrigation system service connections to The City of Calgary water mains will be removed to the satisfaction of Water Services.
- Bonds or letters of credit will be held to ensure removal costs are covered should developers fail to remove systems.

### New practice

3.5 In co-operation with industry, Parks will test innovative types of plant water delivery systems. These will include storage and application systems such as cisterns and improved water harvesting design techniques such as rainfall harvesting. Systems will be evaluated for their cost and effectiveness of operation. Parks will encourage/partner with industry to install systems that prove beneficial.

#### Discussion

- More and more non-technology based approaches to water management are being developed in the irrigation industry. Parks should continue to monitor advancements in park design and where feasible, implement these approaches.



## New practice

3.6 In co-operation with industry, Parks will test the use of new materials and equipment to extend the lifecycle of irrigation systems and negotiate with the UDI in the use of these new materials, in new park construction when benefits have been proven.

### Discussion

- The irrigation industry continues to develop new materials and products to extend the lifecycle of irrigation systems. For example, many parks departments in areas of similar climate use high density polyethylene pipe for main line and laterals.

## New practice

3.7 Parks will invest in central control technology for existing irrigated sites based on cost effectiveness, with priority given to 1) medium and large size parks 2) high-profile parks 3) parks and open spaces that are important to the city image and 4) manually operated parks.

### Discussion

- Building or converting parks to be more water conserving is desirable. However, in reality many existing parks in Calgary need supplemental water. The most effective and efficient way to irrigate parks is through the use of central control technology. Central control offers the advantage of reduced labour costs, more efficient delivery of water, climatically adjusted water application and the ability to monitor and know when leaks or damage has occurred<sup>13</sup>.
- The cost to convert all parks to central control is significant. Other options for some parks, especially smaller parks should be considered. A plan should be developed to convert parks to central control over the long term. As central control technology evolves it may become more economical to convert smaller sites to central control<sup>14</sup>.

**Target:** 10 per cent of manual irrigation system (in hectares) converted to central control over 10 years.

## New policy

3.8 All irrigated park sites will have water meters installed.

### Discussion

- Currently 99 per cent of irrigated sites have meters. All new irrigated parks should have meters installed in order to better enable Parks to manage water use effectively.

## New practice

3.9 All Adopt-A-Park sites, where irrigation systems are manually operated by volunteers, will have water meters fitted with an automatic system for stopping the excess flow of water.

### Discussion

- Adopt-A-Park volunteers have a role in supporting parks by watering manually irrigated parks. This program provides excellent value for The City of Calgary and increases the role of Calgarians in the stewardship of their open spaces.
- However, it is more difficult to control water usage through Adopt-A-Park and ensure the right amount of water is being used at the right time.
- While most Adopt-A-Park groups use less than the overall water required by the park about eight per cent use more than the required amount. The automatic systems for stopping the flow of water is relatively inexpensive and should be used to help better manage water use by Adopt-A-Park groups.
- This automated control would also provide parks with the ability to ensure that watering is not occurring during water restrictions.
- These systems will be installed when new technology, currently being tested, is proven cost effective and becomes widely available.

**Target:** 50 per cent of sites currently watered by Adopt-A-Park volunteers will have automatic controls for stopping the flow of water by 2012.

## Strategy 4:

**Introduce new maintenance practices and techniques that reduce the need for water and improve efficiencies while supporting plant health. Focus on practices that achieve the highest return in terms of water conservation and costs.**

### Existing policies

There are no Existing policies related to this strategy.

### New policy

**4.1 Parks will adopt water management best management practices, guidelines and standards for landscape and irrigation construction, maintenance and management.**

#### Discussion

- As part of this plan Parks developed *The Water Management Best Management Practices and Practice Guidelines* document and the *Technical and Planning Prescriptions* document. These documents will be reviewed and revised as needed.
- The master templates that Parks used for the *Water Management Best Management Practices and Practice Guidelines* document were developed by the Green Industries of Colorado (GreenCO) and the Irrigation Association (IA) and reference expert individuals and organizations. They are supported by agencies such as the Colorado Water Conservation Board (CWCB) and the Environmental Protection Agency (EPA).
- Parks Water Management will also use these documents as the basis for negotiating future changes to *The City of Calgary Parks Development Guidelines and Standard Specifications for Landscape Construction* with the Urban Development Institute.

### New practice

**4.2 All tree planting in parks and open spaces should be co-ordinated with the provision of supplemental watering or moisture management.**

#### Discussion

- Trees are the most valuable horticultural asset in the parks inventory. The resources required to grow and sustain trees over their life is significant, but so are the benefits from trees. Most trees cannot survive and remain healthy in Calgary's climate without some supplemental watering. New plantings should be planned to take advantage of existing irrigation systems and co-ordinated with the planning of new irrigation system installation. Moisture management systems, rain harvesting systems and residents' watering regimens are also factors to consider in planting new trees, particularly along streets.

### New practice

**4.3 Parks will negotiate performance-based irrigation construction standards with developers, based on industry best management practices, for inspecting and approving Construction Completion Certificates and Final Acceptance Certificates.**

#### Discussion

- The current approach to construction inspections includes a number of detailed criteria that do not include irrigation system performance criteria. There is a growing recognition that the results achieved by the system are as important as the detailed elements of design and construction. As such, Parks Water Management will negotiate performance standards for new irrigation systems being designed for future hand-over to Parks with the UDI.

## New policy

**4.4 Parks will require tax levy support, endowment funds or alternative funding for irrigation systems in sites that are not identified as priority for irrigation in order to ensure funds for operation, maintenance and replacement are in place.**

### Discussion

- Despite the directions of this plan, there may be some instances where irrigation is desired by the developer or a community. Where Parks Water Management approves exceptions to policy for installing irrigation systems, an endowment fund will be required to ensure that funds are available for operation of the system, utility costs, lifecycle repairs and regular maintenance of the irrigation system.

## New policy

**4.5 Parks will adopt landscape maintenance practices that reduce the need for water while continuing to support plant health.**

### Discussion

- A range of practices exist that could reduce the need for water use while protecting the horticultural asset. These techniques exist in Best Management Practices and should be tested and adopted where there is a demonstrated cost benefit.
- Water is important to maintaining good plant health. Healthy plants require less intervention with pesticides. Best practice information suggests there are other cultural methods that may be useful to manage pests while conserving moisture. For example:
  - Increasing mowing heights minimizes moisture loss from turf and builds stronger root systems.
  - Using slow release fertilizers throughout the growing season promotes balanced growth.
  - Using natural mulches such as wood chips around plants also helps minimize moisture loss.
  - Increased aeration of turf.
  - Ensuring an adequate depth of good quality, weed-free topsoil.
- Adopting these maintenance practices could allow irrigation to be removed from certain existing parks and not installed in new parks, while ensuring pest management goals are achieved.

- Savings from not having to build or operate an irrigation system in new parks can be used to improve the topsoil composition and depth enabling the plant material to better resist pests.
- These practices should be tested within existing budgets and applied when determined to be cost effective.

## New practice

**4.6 Water Management will conduct regular audits on irrigation systems to ensure Parks is achieving industry best practices for system effectiveness.**

### Discussion

- Industry best management practices conclude that a Distribution Uniformity (DU) of 75 per cent is the minimum that should be attained for an operational irrigation system. A study of a small number of Calgary parks found the DU of the irrigation systems to be less than 75 per cent. This indicates an opportunity for improvement in terms of costs and impact to plant material.
- Performing more system audits will help improve the performance of existing irrigation systems. Audits of sections of the entire irrigation system should take place on a three- to five-year rotation to ensure efficient and effective systems.

**Target:** Parks will audit 100 hectares of irrigated land per year over 10 years.

## New practice

**4.7 All staff and volunteers that maintain Adopt- A-Park sites and sites with manual systems will be provided with watering schedules during the growing season to provide direction on how much water to use, when to apply it and estimates of the volume of water needed for different plant species.**

### Discussion

- Currently Parks staff and volunteers with Adopt-A-Park receive only basic information about how much they should be watering.
- Currently, watering schedules are only calculated for central control sites. All parks should have irrigation schedules written for them.

- Schedules should be up-dated throughout the growing season to help staff and volunteers water parks more appropriately.

**Target:** All current/future Adopt-A-Park sites and sites with manual systems will have watering schedules developed and provided to staff and volunteers by 2009.

### Actions

- 4a) Parks will develop a maintenance management system to track maintenance and repair of irrigation systems. This model will support lifecycle management of the system.
- 4b) Parks will review how the water budget is allocated within Parks to create incentives for conservation and finding efficiencies in operations.

## Strategy 5:

**Engage citizens in stewardship and develop partnerships to support progressive water management activities.**

### Existing policies

There are no Existing policies related to this strategy.

### New practice

**5.1 Parks will work together with Water Services to help the land development industry, and the Calgary Chapter of the Urban Development Institute to explore opportunities for incentives to aid in the implementation of policies related to this plan.**

#### Discussion

- Parks will investigate both internally and externally the availability and the opportunity for the development of incentives that would help offset any possible extra cost to the land development industry related to implementing policies and actions associated with the Parks Water Management Strategic Plan.

### New practice

**5.2 Parks will seek a partnership with the Urban Development Institute to develop informational packages or other related materials that demonstrate how the development industry works co-operatively with Parks to manage outdoor water use in their communities.**

#### Discussion

- Public education is important for managing citizen expectations around what parks look like. This in turn impacts how citizens perceive new communities and thus impacts the land development industry.
- Creating a better understanding of water conserving parks to increase citizens' comfort in buying new homes in communities that have parks built to meet conservation goals.

### New practice

**5.3 In co-operation with Water Services, Parks will inform and educate the public on issues related to outdoor landscape water use and conservation.**

#### Discussion

- The visible role Parks plays in communities and the awareness Calgarians have of Parks provide an important opportunity to engage them and communicate the importance of water conservation. Water Management will share its expertise widely with Calgarians to help them adopt positive water management activities on their own property.
- Important partnerships include those with the land development industry and Adopt-A-Park volunteers. Partnerships should also be sought to help create education resources on water conservation.

## Existing practice

5.4 Where possible, Parks will share knowledge widely with other business units within The City of Calgary and help The City to attain the maximum number of landscape water management points under LEED (Leadership in Energy and Environmental Design).

### Discussion

- The City of Calgary has adopted a Sustainable Buildings Policy based on the principles of the LEED Standard. Outdoor landscape watering is one element in sustainable building design. As such Water Management will share information about water conservation and landscape watering with corporate partners in support of the Sustainable Buildings Policy.

## Actions

- 5a) Parks will develop and implement a communication plan about outdoor landscaping water conservation practices in Parks.
- 5b) Parks will engage and involve the community in the redevelopment process for subneighbourhood parks where it is proposed to remove the irrigation.
- 5c) Parks will seek partners and build a 'water conserving park' to demonstrate improved water management to help educate the public and influence their actions.
- 5d) Develop an education program for children, in conjunction with Water Services, to help them better understand water conservation and take action.
- 5e) Parks will provide the public with access through The City of Calgary website for up-to-date information on plant watering requirements throughout the growing season to help Calgarians make better decisions about how they water their outdoor landscapes on their own property.
- 5f) Parks will expand Adopt-A-Park to encourage greater community responsibility for water management in parks, particularly subneighbourhood parks.
- 5g) Parks will develop a water conservation education package specifically for Adopt-A-Park volunteers that maintain these parks to ensure good water conservation practices.

- 5h) Water Management will work with the Integrated Pest Management program to research and identify plants and materials to meet the aesthetic and safety needs of the community while reducing or eliminating the need for water.

## Strategy 6:

**Design new parks recognizing the recurring drought cycles and implement an effective drought management plan to address water restrictions.**

### Existing policies

Parks has developed a Drought Response Plan in conjunction with Water Services.

### New practice

6.1 Parks will encourage hydrozoning in all new park development and existing park redevelopment. Drought sensitive plant material and other drought sensitive areas are to be zoned separately from areas or plants such as rough turf that are less impacted by lack of water.

### Discussion

- Hydrozoning is the grouping of plants with similar water requirements around irrigated and non-irrigated spaces in parks. This allows for efficiencies in irrigation design and enables prioritization of what gets watered in the event of a drought. For example, in times of drought, only zones of the irrigation system that water trees may be turned on while other zones are not turned on at all.
- Zones should be developed to give priorities to shrubs, trees and other drought sensitive areas.
- Zoning may increase the cost of development.

### New practice

6.2 Parks will encourage use-zoning all new park developments and existing park redevelopments. Sports fields, special event areas and other drought sensitive “use areas” should be zoned separately from other areas less impacted by lack of water.

#### Discussion

- Use-zoning is the grouping of park usage areas around irrigated and non-irrigated spaces in parks. This allows for efficiencies in irrigation design and enables prioritization of what gets watered in the event of a drought. For example, in times of drought, only zones of the irrigation system that water sports fields may be turned on while other zones watering areas where there is casual use are not turned on at all.

### New policy

6.3 Parks will achieve the Water Services ‘Certified Water Managed Property’ site designation for all existing irrigated park sites and new sites as they are added to the inventory.

#### Discussion

- The Certified Water Managed Properties program, administered by Water Services, allows sites that are registered in either Tier One or Tier Two to be less restricted during a watering restriction than non-registered sites. Plant material is therefore better protected from the negative impacts of reduced watering during times of watering restrictions.
- The certified managed site designation allows parks to be more flexible in how it uses its allotment of water during a water restriction. This is critical in helping Parks manage the impact of drought on existing horticulture and will allow parks to prioritize where water is applied. The directions outlined in the Water Management Strategic Plan go a significant way in helping Parks achieve this designation.
- The cost to achieve the certified water managed properties designation can be absorbed within existing budgets based on moving forward with other strategies, policies and actions identified in this plan.

### New policy

6.4 In times of drought, Parks will implement its Drought Response Plan & Management Procedures. This gives priority to irrigated parks that are centrally controlled, and the watering of trees, sports fields and high-use areas.

#### Discussion

- In the past drought was not a significant consideration in park development. New research however has identified that drought will be a more common condition for the Calgary region<sup>15</sup>. New park development should take this into consideration and Parks should prepare a plan for how to respond to water restrictions that are likely to accompany drought in the future. (See Volume 3: *Drought Response Plan & Management Procedures of the Water Management Operating Manuals*.)
- These areas have been identified as the areas where Parks is most at risk of losing a valuable asset or where a safety hazard could be created for Calgarians using parks and open spaces.

### Actions

- 6a) Parks will implement a Drought Response Plan and provide training to Park staff on its implementation.

### Endnotes

- <sup>8</sup> City of Calgary Parks, 2002, Open Space Plan, page 30.
- <sup>9</sup> City of Calgary Parks, 2005, WMSP: Case Studies, 23-28.
- <sup>10</sup> City of Calgary Parks, 2005, WMSP: Case Studies, 31-32.
- <sup>11</sup> City of Calgary Parks, 2005, WMSP: Case Studies, 33-35.
- <sup>12</sup> The Irrigation Association, August 2000, Drip Design in the Landscape, vi-viii.
- <sup>13</sup> The Irrigation Association, 2005, Turf and Landscape Irrigation Best Management Practices.
- <sup>14</sup> City of Calgary Parks, 2005, WMSP: Case Studies, 13-17.
- <sup>15</sup> Dr. Leavitt, professor of biology at the University of Regina.

Triple bottom line 



Financial impact	Environmental impact	Social impact
<p><b>Savings</b></p> <ul style="list-style-type: none"> <li>• More sites could be irrigated with the same quantity of water currently used.</li> <li>• Savings in development from not having to install irrigation systems in subneighbourhood parks (under 0.2 hectares), roadways, medians, etc. (for developers).</li> <li>• Water, operating and maintenance costs savings due to not having to maintain irrigation systems in subneighbourhood parks (under 0.2 hectares), medians, roadways, etc.</li> <li>• New drip technology systems are likely to save money through savings in water; exact savings presently unknown.</li> <li>• Alternative cost-effective means need to be explored for watering trees.</li> <li>• Some savings in construction costs, due to less extensive irrigation systems in new parks.</li> <li>• Savings from development of the irrigation master plan.</li> <li>• Less water use per hectare of park, leading to savings.</li> <li>• Maintenance and operation costs for irrigation per site would be reduced.</li> <li>• Future savings in water, maintenance and operating costs by not putting additional irrigation systems in place.</li> <li>• Irrigation systems in xeric parks will use substantially less water.</li> <li>• Central control offers lower watering cost per ha compared to using manual systems.</li> <li>• Less use of water trucks for watering trees as they are planted with irrigation systems.</li> </ul> <p><b>Costs</b></p> <ul style="list-style-type: none"> <li>• Some additional costs may be required for pesticide on sites where irrigation is eliminated.</li> <li>• Costs associated with removing irrigation systems and redevelopment.</li> <li>• Urban Forestry may be required to provide additional watering by truck, to maintain the health of the trees in sites where irrigation is removed.</li> <li>• Establishment period of new plants may take longer and require, short-term, more expensive maintenance.</li> <li>• Some additional costs to plan and build hydrozones.</li> <li>• Additional costs associated with development of the irrigation master plan.</li> <li>• No significant additional costs to design a park using xeric principles or to use drought tolerant materials.</li> <li>• Central control adds about \$3,000 for a neighbourhood park and \$15,000 for a Joint Use Site to the overall cost of development of a park irrigation system.</li> <li>• Additional resources will be required to support public engagement and public education activities.</li> <li>• Some additional costs may be incurred in the development of new park irrigation systems with hydrozoning.</li> <li>• Budget growth is required for the operation and maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• A sustainable open space and urban forest significantly contributes to our environment.</li> <li>• If drought tolerant plant material is used, there is no impact on the plant material from not having access to supplemental water.</li> <li>• Diversity of plant material may be limited by the increased use of drought tolerant material.</li> <li>• Some additional pesticide use may be required.</li> <li>• Some degradation of assets on existing sites where irrigation is eliminated.</li> <li>• Over long-term, some horticultural material will suffer without supplemental watering unless the site is redeveloped with drought tolerant plant material.</li> <li>• During times of watering restrictions, required reductions in water use could be made by under-watering some areas while others still get their needed amounts and still meet the overall objectives of Water Services.</li> <li>• Improved water conservation.</li> </ul>	<ul style="list-style-type: none"> <li>• Visual aesthetics of parks may be reduced during the dry months of a growing season without the benefit of supplemental water.</li> <li>• Landscape may attain a harder look due to the characteristics of drought tolerant plants.</li> <li>• Turf may be harder or more compacted in non-irrigated parks.</li> <li>• During drought periods there will be a distinct delineation between irrigated and non-irrigated areas.</li> <li>• Park usage patterns may change (i.e. use may become more passive such as walking through or just viewing from windows).</li> <li>• Public engagement will be required to explain new approach to park design.</li> <li>• More natural environment parks.</li> <li>• Can be used as a model for residential and commercial users of landscape watering to demonstrate how technology can be used to conserve water.</li> <li>• Could help promote a move to a type of climatically adjusted and centrally operated and managed irrigation control for residential and institutional users.</li> <li>• Citizen engagement increases the overall benefits to The City and the environment from water conserving practices.</li> <li>• Increased community commitment to water conservation.</li> <li>• Horticulture will be better able to withstand the impacts of drought.</li> </ul>



Financial impact 



Implementing the strategies and policies of the plan will reduce the amount of water used in the parks that are currently being watered. This will provide additional water for irrigating existing parks that are currently not getting water. This can all be done without increasing Parks operating budgets. Funding for upgrades would come through the Capital Budget process. Sustainable water management is based on being able to reinvest and reallocate funds that are freed up through the implementation of this plan.

Case studies to determine the cost and benefit of various strategies, policies and actions were developed as part of the WMSP. The case studies helped identify social and environmental issues

related to the strategies, as well as determine where Parks would receive the best return to achieve financial sustainability while ensuring protection of the horticultural asset and water conservation. Readers interested in the details of the case studies can read *WMSP: Case Studies*. A summary of these studies is presented below as a description of cost/benefit for various policies and actions.

## 5.1 Summary of costs/benefits

The cost/benefit analysis focused on policies and actions that affected changes to the existing Parks inventory.

The analysis identifies costs, benefits and returns from selected recommended directions in the WMSP.

<b>Financial impact (\$000s)</b>				
This table summarizes the costs and benefits related to Performance Measure and Policy Targets. All costs and benefits are based on 2006 figures and value of money.				
<b>Target</b>	<b>Operational costs</b>	<b>Capital costs</b>	<b>Benefits</b>	<b>Comments</b>
Policies			\$169	Target approximately 11 sites equaling 1.45ha. Benefit is calculated over 10 years. Savings is based on the increased cost of maintaining a small site versus a 0.5ha site.
1.1 10% reduction in the total number of new parcels of land (where each individual parcel is 0.2 hectares or less in size) coming into the Parks inventory by 2010				
1.5 Eliminate 10% of non-essential irrigation in sites over the next 10 years		\$170	\$335	Target 34 sites less than 0.2ha in size. Benefit is calculated over 10 years.
		\$545	\$2,448	Target 109 sites greater than 0.2ha in size. Estimated average site size 1.0 ha Benefit is calculated over 10 years.
3.2 Develop and operate three new non-potable water irrigation systems in new park developments by 2010	\$240		\$798	Based on an 8ha site. Developer constructed (see developer cost/benefit in adjoining table). Operating costs and benefits are for 10 years of operation after the developers have turned the sites over to The City.

**Financial impact (\$000s)**

This table summarizes the costs and benefits related to Performance Measure and Policy Targets. All costs and benefits are based on 2006 figures and value of money.

Target	Operational costs	Capital costs	Benefits	Comments
3.7 10% of manual irrigation systems (in hectares) converted to central control over 10 years		\$1,995	\$4,595	Convert 133ha of open space. Cost to covert is approximately \$15,000/ha depending on size and technology used. Benefits are calculated over a 10 year operating period and based upon a \$1,240/ha cost avoidance in labour costs due to automated watering and a \$2,215/ha reduction in water consumption.
3.9 50% of sites currently watered by Adopt-A-Park volunteers will have automatic controls for stopping the flow of water by 2012	\$207	\$563	\$338	This will impact 122ha of open space. The benefit will be a positive perception by the public during watering restrictions. It will also eliminate water wastage on these manually watered sites. Operational costs and benefits are over a 10 year period.
4.6 Audit 100 hectares of irrigated land per year over 10 years		\$1,000	\$4,599	Without significantly increasing operating budgets and hiring more staff this would have to be contracted out. Current sites have Distribution Uniformities (DU) of approximately 55%. The BMP is 75%. Sites should see a 20% reduction in water use. Cost is over the life of the project.
4.7 All current and future Adopt-A-Park sites and sites with manual systems will have watering schedules developed and provided to staff and volunteers by 2009	\$60		\$2,008	Operational cost is based on one additional water management staff member for two years. Benefit is based on a 15% reduction in water consumption per year on 244 hectares of open space for 10 years.
Total (over 10 years)	\$507	\$4,273	\$15,290	
Total (per year)	\$51	\$427	\$1,529	

**Financial impacts related to the land development industry (\$000s)**

This table summarizes the costs and benefits related to Performance Measure and Policy Targets.

Target	Costs	Benefits	Comments
3.2 Develop and operate three new non-potable water irrigation systems in new park developments by 2010	\$585	\$665	Based on an 8ha site. Developer constructed (see Parks cost/benefit in adjoining table). Costs and benefits are over five years (the length of the developers maintenance period).
Over 5 Years	\$585	\$665	
Per Year	\$117	\$133	

**Parks irrigation and water management budgets – 2006 (\$000s)**

<b>Operations and Maintenance</b>	
Central Division	\$ 548
North Division	\$ 836
South Division	\$ 827
Water Management & Central Control	\$ 656
Subtotal	\$2,867
Utility Water	\$4,001
<b>TOTAL</b>	<b>\$6,868</b>

# Performance measurement



In order to monitor progress in achieving this plan, the following performance measures will be used:

Outcomes	Performance Measures	Targets
<p><b>Conserve water</b> (increase efficiency, effectiveness and productivity of irrigation systems, use and re-use non-potable alternative water sources)</p>	<ul style="list-style-type: none"> <li>• Water use per hectare of irrigated land.</li> <li>• Reduced rate of water usage per hectare of irrigated land related to Water Services allotment (one inch per ha x 16 weeks) and the actual plant water demand (ET).</li> <li>• Reduced citizen complaints re: irrigation.</li> <li>• Percentage of parks on central control.</li> <li>• Percentage of parks with effective water schedules.</li> <li>• Increase efficiencies in irrigation systems (from result of irrigation audits).</li> </ul>	<ul style="list-style-type: none"> <li>• 15 per cent reduction in water use per irrigated hectare by 2010 from 2000 figures.</li> </ul>
<p><b>Grow healthy plants</b></p>	<ul style="list-style-type: none"> <li>• Plant material in parks and open spaces indicate good health; reduction in number of trees lost to drought each year.</li> <li>• Data from associated work units regarding plant health, demonstrates plant health improvement.</li> </ul>	<ul style="list-style-type: none"> <li>• 15 per cent improvement in turf condition.</li> <li>• 15 per cent reduction in tree mortality due to drought by 2010 from 2000 figures.</li> </ul>
<p><b>Be financially sustainable</b></p>	<ul style="list-style-type: none"> <li>• The Parks maintenance costs per irrigated hectare of open space is reduced; Parks has the resources to operate and maintain existing irrigation systems.</li> <li>• Percentage of manual irrigation systems used to water landscapes relative to the number of manual irrigation systems initiated every season (system use will be relative to the year's weather).</li> <li>• Percentage of parks on central control.</li> <li>• Life-cycle flags – the percentage of irrigation systems with green flags versus the percentage of irrigation systems with yellow and red flags.</li> </ul>	<ul style="list-style-type: none"> <li>• Parks maintenance cost per irrigated hectare is reduced by five per cent by 2010 from 2000 figures</li> </ul>
<p><b>Work with others</b></p>	<ul style="list-style-type: none"> <li>• Educational package developed</li> <li>• Engage communities with decommissioning proposals</li> <li>• Develop a water conservation brochure with the land development industry</li> </ul>	<ul style="list-style-type: none"> <li>• To be determined</li> </ul>

The performance measures will be reported annually to Parks Management Team to provide information on the success of the strategies, policies and actions.

Next steps



The following activities will be a priority during the first year of the plan:

- Develop a detailed implementation plan for moving forward on the strategies, policies and actions
- Develop an implementation plan for the land development industry, together with the Calgary Chapter of the UDI.
- Prepare a communication plan for staff, other city business units and the community.
- Negotiate changes to development specifications with the UDI.



# Conclusion



The WMSP balances water conservation and protection of the horticultural asset while achieving a more financially sustainable system. New directions include changes to the existing inventory in new park development, and the management of irrigated sites. The plan will require a capital investment of \$4.2 million over 10 years to bring about some of the necessary changes.

Parks will engage the land development industry in negotiating mutually acceptable standards that promote water conservation and the sustainability of the open space system.

Appendix



## Appendix 1: Peer comment and feedback from stakeholders

The plan was circulated to irrigation industry experts, other levels of government, other cities' parks and water management programs, and internally to other City of Calgary business units. Discussions also took place with the development industry through the Urban Development Institute. The following is a summary of this feedback.

### Alberta Environment

Neil Wandler, P. Biol., Pollution Prevention & Conservation Section Alberta Environment

- *"Having reviewed the draft, I believe it is a comprehensive, well documented and forward-thinking plan in so far as irrigation management for commercial turf areas is concerned."*
- *"I believe that this plan could serve as a model for other municipal parks departments and the commercial irrigation industry sector to follow."*

### Irrigation industry

#### • The Irrigation Association

- *"...I would like to congratulate you and your fellow contributors on creating a very complete detailed futurist water management plan. It is very comprehensive and has some very good information, easily read by non irrigation people..."*

#### • Alberta Chapter of the Irrigation Association

- *"You and your staff are to be commended on the effort that has gone into the WMSP document."*

### Landscape industry associations

#### • Landscape Alberta Nursery Trades Association

- *"... the strategic plan does a good job of highlighting the importance of horticultural assets..."*

### Other City of Calgary business Units

#### • Water Services (formerly Waterworks)

- *"Waterworks supports the efforts of Parks to address water conservation in a strategic manner."*
- *"Your focus on using best industry practices and trends, is important and sets the City up as a leader."*
- *"The use and adoption of all BMPs is a wise choice, as all practices are related to water conservation and protection of our water resources."*

#### • Water Services (formerly Wastewater)

- *"I reviewed your document and I think that it is excellent. You covered as much as possible on alternative water sources/stormwater reuse, prior to the completion of our study."*

#### • Planning

- *"The plan is written in a clear and concise style which will be easily understandable to the layman and the strategy & policies seem comprehensive and well thought out."*

## Development Industry feedback

- Urban Development Institute – Concerns raised by the development industry include:
  - UDI asked how the plan is linked to broader City of Calgary Policy.
  - City is achieving savings by off-loading cost to development industry.
  - UDI asked that Parks better define sustainability. For UDI, sustainability in this context refers to financial, plant health, water supply and water/soil conservation – not just irrigation, but everything that is associated with water.
  - UDI identified concerns over the prescriptive nature of the plan. Some policies are broad while others set out very specific approaches / solutions. UDI would prefer to see more of a range of options to achieving the desired goals, so developers have an opportunity to decide how best to achieve the end goal.

## Other cities

- **Denver, CO**
  - Denver Water – “*The Water Management Strategic Plan looks great!*”
- **Eugene, OR**
  - Eugene Power & Water – “*I have reviewed The City of Calgary’s Water Management Strategic Plan and found it to be thorough and well thought out. The guidelines are based on sound science and proven management practices.*”
- **Ottawa, ON**
  - The City of Ottawa – “*I read through the document and was very impressed with the quality and effort.*”

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