

The City of Fremantle

Water conservation strategy



August 2013



Contents

Executive Summary	5
List of Figures	6
List of Tables	6
1. Introduction	7
2. City of Fremantle Water Conservation Strategy Aims	8
3. Analysis of Current Water Issues	9
3.1 Australia	9
3.2 Western Australia	9
3.3 Perth	9
3.4 Fremantle	11
3.5 Other Local Governments	13
4. ICLEI - Local Governments for Sustainability	14
4.1 Background of ICLEI	14
4.2 Milestone 1 Water Consumption and Water Quality Audit Summary	15
5. The Western Australian Department of Water (DOW)	19
6. City of Fremantle Water Conservation Previous initiatives	20
6.1 Water Conservation Action Strategies	21
6.1.1 Irrigation System Performance Strategy	21
6.1.2 Irrigation Maintenance Strategy	21
6.1.3 Hydrozoning and Ecozoning strategy	21
6.1.4 Water Budgeting Strategy (ground and scheme; corporate and community)	21
6.1.5 Communications Strategy (corporate and community)	21
6.1.6 Park Development Guidelines	21
6.1.7 Drought Contingency Plan	21
6.1.8 Alternative Water Supply Development Strategy	21
6.2 Water Conservation Current Actions	21
6.3 Water Conservation Priorities	21
7. Drought Contingency for Fremantle	23
7.1 Introduction	23
7.2 Australian Context	23
7.3 Perth Context	23

7.4	City of Fremantle Context.....	25
7.5	Current Drought Management for the City of Fremantle	25
7.6	Looking Forward - The Next Step for the City of Fremantle	26
8.	City of Fremantle 2013 Water Conservation Strategy Objectives	27
9.	Proposed Strategies for City of Fremantle	29
9.1	Water Management	29
9.2	Corporate Scheme Water Conservation.....	31
9.3	Corporate Groundwater Water Conservation.....	33
9.4	Community Water Conservation	36
9.5	Corporate Water Quality	40
9.6	Community Water Quality.....	42
9.7	Drought Contingency	44
10.	Conclusion.....	45
11.	Glossary	46
12.	References	47
13.	Appendix A - City of Fremantle 2013 Water Conservation Action Plan	50

Executive Summary

A key imperative of the City is to reduce water reliance by actions such as providing incentives for residents to reduce water consumption and to implement staged water management actions for all City of Fremantle properties and recreation areas, with clear targets for reduced water usage and improved water health in accordance with the State Water Strategy.

The purpose of this Water Conservation Strategy report is threefold:

1. Provide background knowledge on the current and projected water resource situations in the City of Fremantle:
2. Identify and publicise strategies, plans and actions that the City of Fremantle has accomplished and is planning to enact: and
3. Outline additional strategies that the City can investigate to progress water conservation and water quality goals.

The City involvement with the ICLEI – Local Governments for Sustainability Water Campaign has also had a strong influence of in the structure of this Report and production of the 2013 Water Conservation Action Plan and the City's involvement in the One Planet Living program.

This report was endorsed by Council on 28 May 2014.

List of Figures

Figure 1: Strategy inputs

Figure 2: Gap Between Water Supply and Demand to 2060 (Gigalitres per year)

Figure 3: Historical Annual Stream flows into Perth Dams (Gigalitres per Year)

Figure 4: City of Fremantle Map

Figure 5: The Estimated Resident Population of City of Fremantle (LGA), 2001-2010

Figure 6: Population Projection for Fremantle and Surrounding LGAs (1981-2031)

Figure 7: City of Fremantle Water Use by Sector, 2010

Figure 8: Total Corporate and Scheme Water Consumption and Cost in COF by Year, 1999-2011

Figure 9: Percentages of Annual Water Consumption in Fremantle by Facility Type, 2010-2011

Figure 10: Scheme Water Usage (kLs) in Fremantle LGA, 2001-2010

Figure 11: Community Water Usage (kLs) in COF Localities, 2001-2010

Figure 12: Percentile Rainfall Deficiencies in Australia March-July, 2006

Figure 13: Percentile Rainfall Deficiencies in Australia January-November, 2010

Figure 14: Percentile Rainfall Deficiencies in Australia April-August, 2012

Figure 15: Fremantle* Rainfall Averages (mm) December-February, 1970-2009

List of Tables

Table 1: Priority Ranking of Fremantle Public Open Spaces in the Event of Drought

Table 2: Corporate Scheme Water Management Action Plan

Table 3: Corporate Groundwater Water Conservation Action Plan

Table 4: Community Water Conservation Action Plan

Table 5: Corporate Water Quality Action Plan

Table 6: Community Water Quality Action Plan

Table 6: Drought Contingency Action Plan

1. Introduction

The City of Fremantle (CoF) through the 2010 to 2015 Strategic Plan outlined that it has a strong focus on providing environmental leadership for the benefit of current and future generations. The City acknowledges that sustainable management practises of our water resources are vital to the future health of our community.

The Water Conservation Strategy provides the key elements to how the City of Fremantle will work alongside the Fremantle community and other stakeholders to provide tangible and long lasting water conservation actions and provisions to ensure the maintenance or improvement of the health of fresh water resources, that is, the water sources from aquifers and rain catchments including our iconic Swan River.

The strategy brings together the initiatives the City has committed to through engagement in the ICLEI – Local Governments for Sustainability Water Campaign™ and the City of Fremantle Water Conservation Plan 2009, which superseded the CoF Water Conservation Plan 2007/2008 and was updated in response to the Department of Water’s State Water Plan 2007.

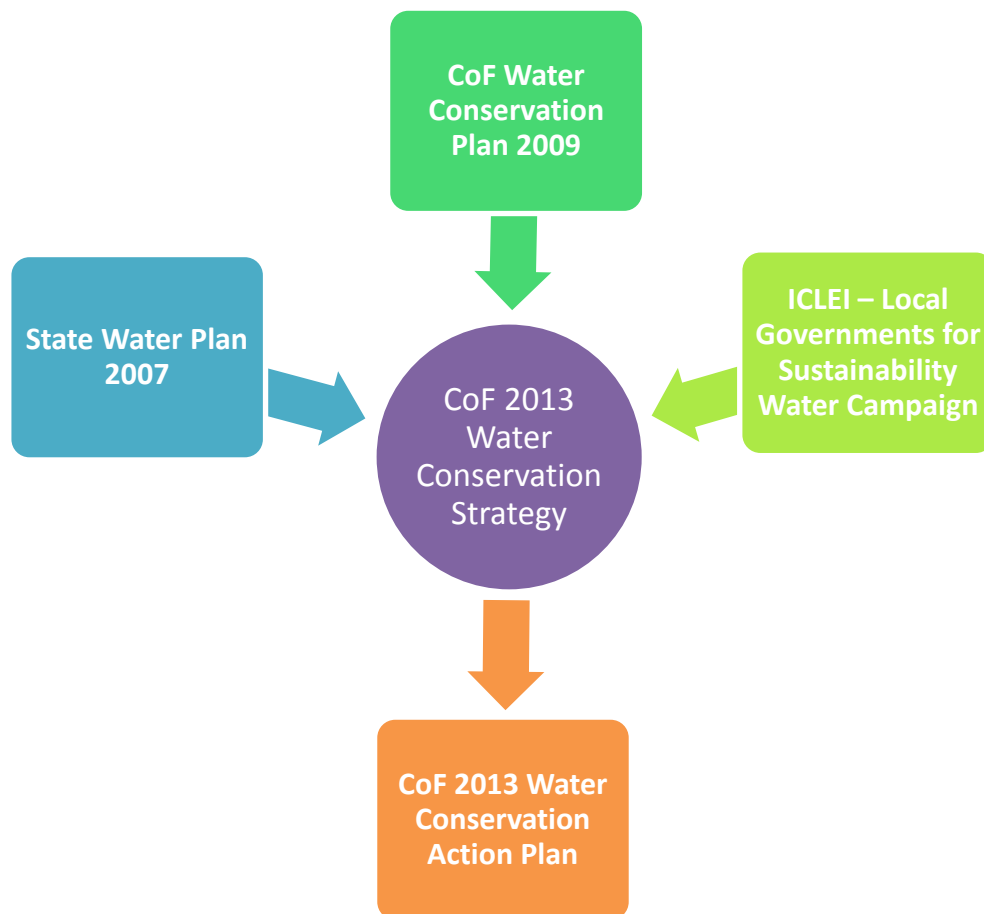


Figure 1 - Strategy inputs

2. City of Fremantle Water Conservation Strategy Aims

GOAL

The City of Fremantle's goal is to sustainably preserve the health of water resources so that the aesthetic and functional amenity of the City can be maintained for future generations to utilise and enjoy.

PURPOSE

The Purpose of the City of Fremantle 2013 Water Conservation Strategy is to enable water to be conserved and water quality to be maintained or improved while preparing for future water challenges through policy development, effective communication and implementation of actions.

AIM

To encourage the pursuit of the Water Conservation Strategies the City will strive to achieve:

- *The ICLEI Water Campaign Milestones;*
- *The Department of Water Ground Water Targets; and*
- *The One Planet Action Goals.*

Through analysis of the current state of water needs, issues and management practises and based on the Water Conservation Aim, the City has developed a set of Action Goals and a new plan of action, detailed as the City of Fremantle 2013 Water Conservation Action Plan, that will address requirements from the Department of Water, while developing the 2nd and 3rd Milestones for the ICLEI Water Campaign™.

This 2013 Water Conservation Strategy additionally outlines areas where future investigations could take place to progress water conservation and improvement of water quality.



3. Analysis of Current Water Issues

3.1 Australia

Australia is the driest inhabited country in the world making water conservation a critical topic for discussion and planning for authorities. The average yearly rainfall is less than 600 millimetres for more than 75% of the country, with places like the south west of Western Australia's rainfall significantly reduced in recent decades.

3.2 Western Australia

Our population in Western Australia increased from 2.35 million to about 2.8 million between 2001 and 2011, making it the most rapidly growing state in Australia. WA's 24% population increase was well above the Australian growth percentage of 15% during this period (ABS 2011). WA's water demand trends during the last century mirrors the population growth patterns. From 2000 to 2008, the rate of water use increased on average by 3.87% annually (Department of Water 2010, p. 3).

Climate change projections in the upcoming years further justify the need for multifaceted, interdisciplinary, and integrated water conservation strategies. The south western regions of Western Australia are projected to experience further reduced rainfall as a result of global climate change. The influence of this decline will be far reaching; affecting residential, industrial, agricultural, and governance sectors of WA (Water Corporation 2009). Perth is one region whose water demands are expected to be most affected by climate change, along with the Greenough, Moore, Peel and Preston regions (Thomas 2008, p. 13).

3.3 Perth

Perth exhibited the most rapid population increase of any Australian capital city between 2001 and 2011, growing by 26%, or 380,100 individuals (ABS 2011). This growth is projected to continue in the near future. Of all the capital cities, Perth is expected to increase by a 1.6% annual rate between 2008 and 2051 – growing from 1.6 million to 3.2 million in 2051 (ABS 2010).

The graph below indicates the gap between water supply and demand to 2060 in Perth and can be found in the Water Corporation's October 2009 report, *Water Forever: Towards Climate Resilience*.

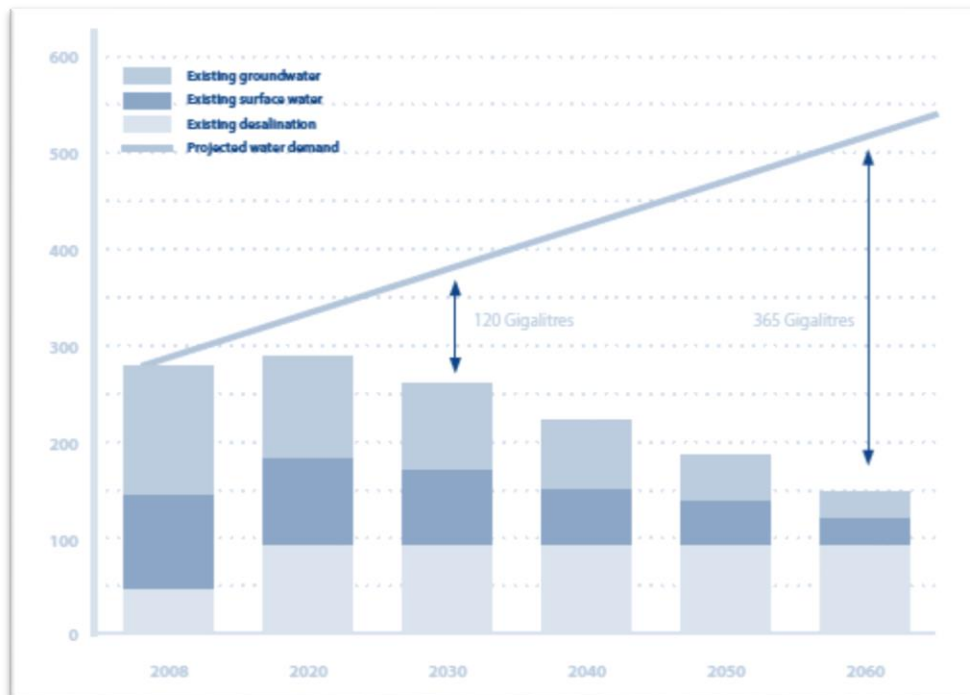


Figure 2 - Gap Between Water Supply and Demand to 2060 (Gigalitres per year) (Water Corporation 2009, p. 7)

Water availability in Perth has been labelled as the most challenging of future water supply and demand scenarios (Thomas 2008, p. 14). Even in “low growth” population projections, the Perth area is expected to be in a water shortage by 2020 with existing groundwater, surface water, and desalination sources (Department of Water 2010, p. 4). The graph below from the Department of Water indicating ever decreasing average yearly inflow into Perth dams since the 1970s reiterates this projection.

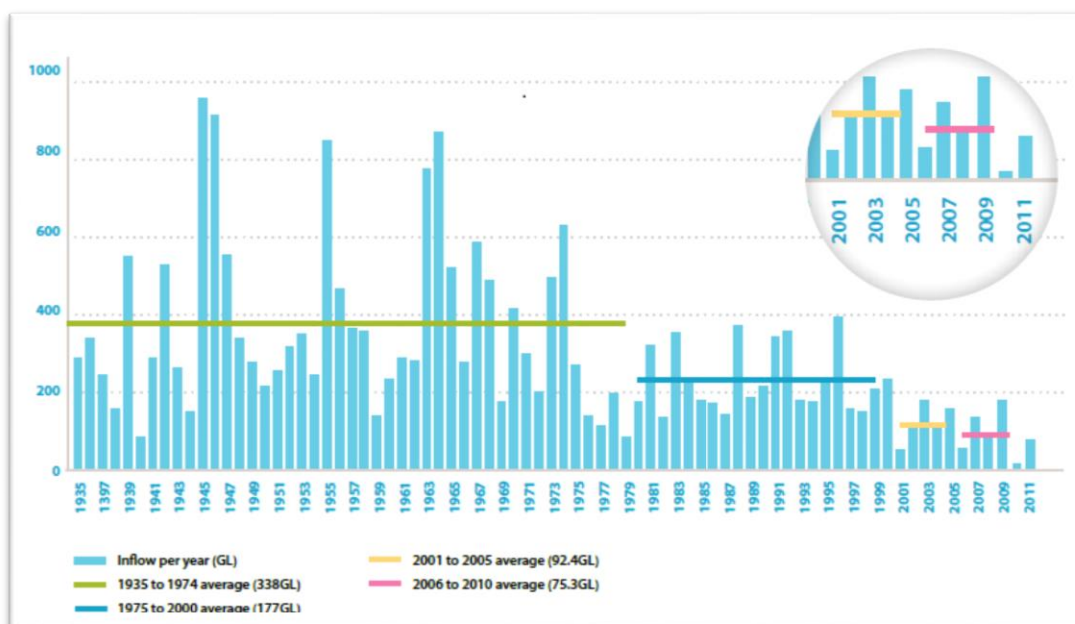


Figure 3 - Historical Annual Stream flows into Perth Dams (Gigalitres per Year) (Water Corporation 2011, p. 4)

3.4 Fremantle

The City of Fremantle (CoF), located only 20 km south west from Perth city centre at the mouth of the Swan River, includes the following suburbs: Beaconsfield, Hilton, North Fremantle, O'Connor, Samson, South Fremantle, and White Gum Valley.

The City is a predominantly residential area, with substantial maritime and industrial areas and some commercial and tourist land use and includes Western Australia's major commercial port, handling the majority of the State's imports and exports. Fremantle encompasses a total land area of about 19 square kilometres, including significant river foreshore and coastline. Fremantle is named after Charles Howe Fremantle, Captain of the HMS Challenger which arrived in the area in 1829.

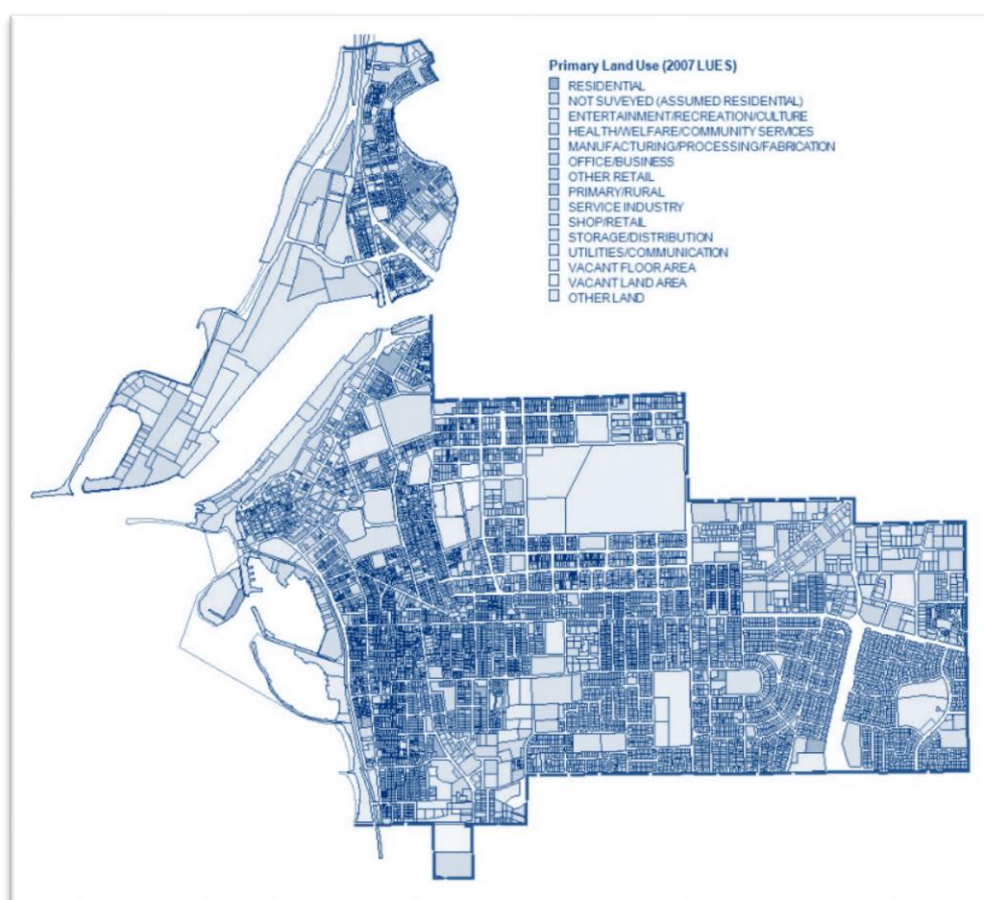


Figure 4 - City of Fremantle Map (COF IntraMap System 2012)

In 2001, estimated resident population was 25,710 individuals. The Australian Bureau of Statistics (ABS) estimated there were 28,626 people in 2010 in Fremantle LGA – so there was an increase of 2,285 in population in 4 years, which equals a 9.2% growth in population. According to the Australian Bureau of Statistics as of 2012, Fremantle has a population of 28,626 individuals.

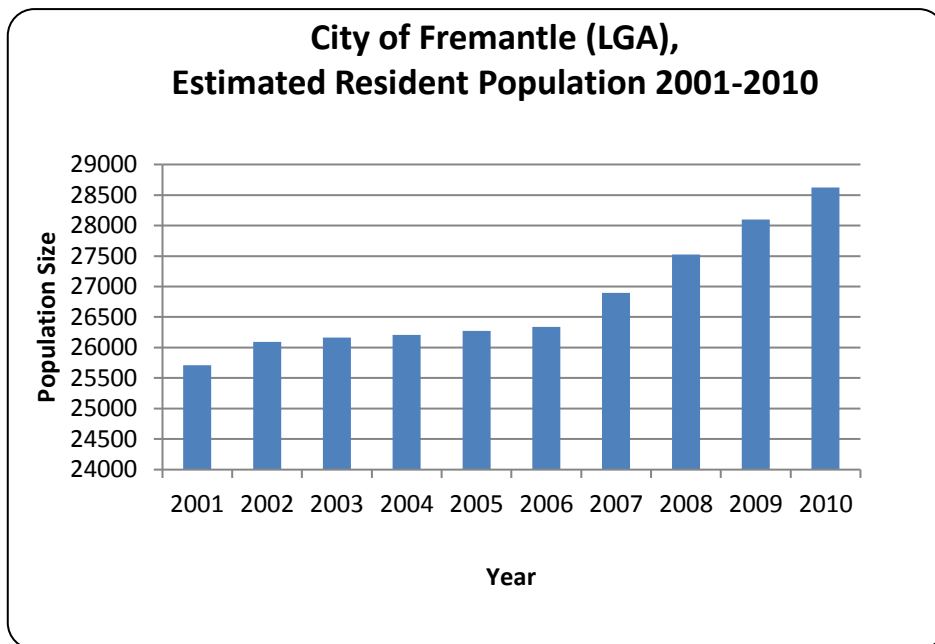
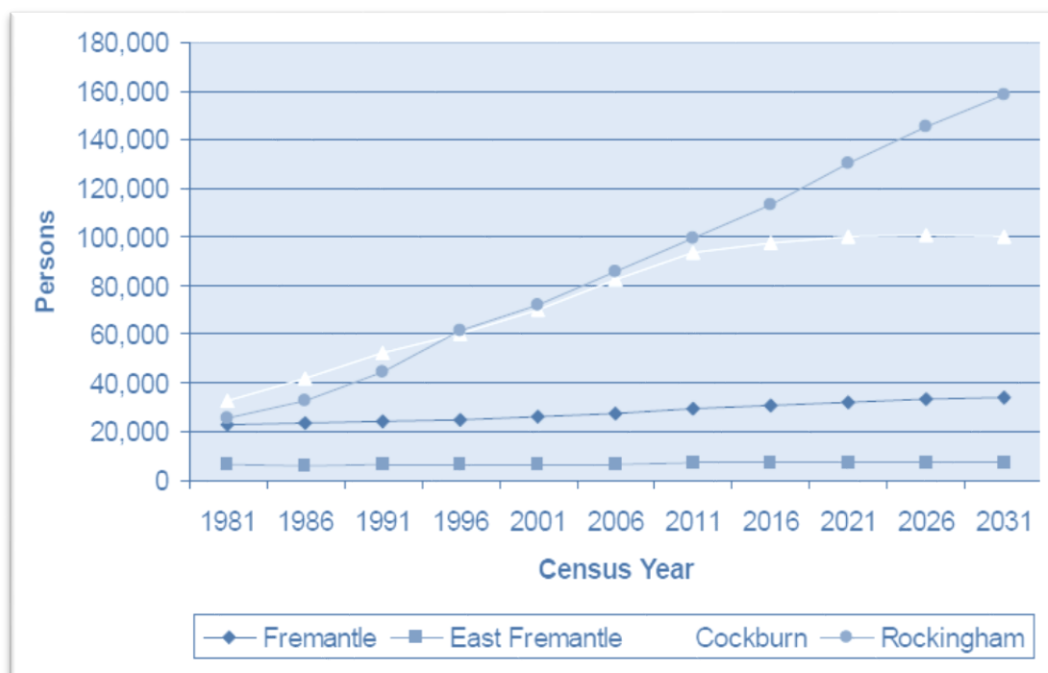


Figure 5 - The Estimated Resident Population of City of Fremantle (LGA), 2001-2010

As can be seen in the graph below, Fremantle's population is not projected to drastically increase over the next few decades relative to other local government areas, staying below 40,000 people. However, even with limited growth, the issues surrounding limited water availability in the future are relevant to the City of Fremantle due to its close vicinity to Perth.

Figure 6 - Population Projection for Fremantle and Surrounding LGAs (1981-2031) (Data Analysis Australia 2004)



What are other local governments doing?

Local Government Authorities (LGAs) throughout WA and Australia are already taking significant steps to combat water scarcity in the coming years. Strategies are numerous and range greatly in scope, cost, and target audiences. Some examples of practices already implemented include behaviour change campaigns, community awareness demonstrations, technology introductions, and informed planning. The City of Fremantle can learn from the successes and challenges of others. Summarised below are a selection of local case studies.

City of Subiaco's "Think Water!" Information Kit

Subiaco developed a complete local action water conservation plan in 2008. One especially novel aspect of their strategy was the "Think Water!" educational campaign. This is an informational toolkit distributed to businesses and community members. It consists of small, doable, water-conserving strategies and necessary tools. Subiaco was commended for this initiative and was given the Water Conservation award at the Australian Sustainable Cities Awards in November of 2011 (Department of Environment and Conservation 2011).

City of Stirling's Water Smart Parks: Irrigating Parks and Gardens Efficiently

The City of Stirling exemplifies effective management of parks, reserves, and other public open spaces. This is accomplished through efficient strategies such as ecozoning and hydrozoning. Additionally, the City of Stirling has installed effective technologies such as irrigation system retrofits, "soil moisture probes," and inclusion within an enclosed watering circuit (ICLEI 2008).

Town of Cottesloe's Groundwater Restoration Project

Started in 2006, the focus of Cottesloe's groundwater restoration project was to restore the town's primary aquifer through a four year strategic plan. This plan exemplifies the use of new technologies (underground treatment tanks, below-ground sumps, and stormwater kerbside soak pits) and community education campaigns. For this project, the Town of Cottesloe received a 2007 WA Water Award for *Management of Water Resources by a Small Organisation* (ICLEI 2008).

4. ICLEI - Local Governments for Sustainability

4.1 Background of ICLEI

Founded in 1990, ICLEI-Local Governments for Sustainability is a non-profit consortium of more than 1,200 local, regional, and national governments dedicated to pursuing and implementing sustainable development. ICLEI provides member support and facilitates valuable networking between governments, thus propelling and strengthening current sustainability related initiatives (ICLEI 2008). There are 127 local government councils throughout Australia currently participating in the ICLEI conglomerate; 42 from Western Australia. The City of Fremantle joined the ICLEI-Local Governments for Sustainability at the end of 2008.

The Water Campaign™

“The water campaign is an international freshwater management program that builds the capacity of local government to reduce water consumption and improve local water quality” (ICLEI 2008).

Due to Australia’s great variation of water sources that are influenced by climatic fluctuations it understandably becomes a necessity to have local responsibility when considering water management. ICLEI created the Water Campaign™ as a template framework for local governments worldwide. This framework provides support and resources from ICLEI and existing members who have experience in the Water Campaign and sets benchmark goals for local government water strategy trajectories.

The two primary and overarching focuses of the Water Campaign™ are water quality and water conservation. These headings are further divided into corporate and community sectors. ICLEI’s Water Campaign™ benchmark program is comprised of the following milestones:

- Milestone 1:** Perform a water consumption and water quality audit.
- Milestone 2:** Determine targets to decrease water consumption and to improve water quality.
- Milestone 3:** Create and implement a local water action plan.
- Milestone 4:** Apply policies and strategies with the goal of integrated water use management. Quantify the benefits that result.
- Milestone 5:** Monitor and make public water consumption and water quality progress.

The City of Fremantle achieved Milestone 1 of the corporate and community module of ICLEI’s Water Campaign™ in January of 2012. To achieve this, the City developed a summary of water use by council actions. The City also completed a water quality checklist to

determine the most effective practices to adopt to improve water quality in Fremantle. On 2 August 2012 Fremantle Mayor, Dr. Brad Pettit, accepted the Milestone 1 award.

The Water Campaign™ Milestone 2 targets will be established in this strategy using the baseline data established through the Milestone 1 water consumption and water quality audit and the Milestone 3 Local Water Action Plan is incorporated into the City of Fremantle 2013 Water Conservation Action Plan.

4.2 Milestone 1 Water Consumption and Water Quality Audit Summary

Records indicate that in 2012 there were 28,626 (ABS 2012) people in City of Fremantle, consuming 4,111,937kL of water, resulting in 143.6kL of water use per capita. The main sources of water for the community and council are groundwater and scheme water. In the City of Fremantle LGA, water use can be divided into 86.8% groundwater and 13.2% scheme water.

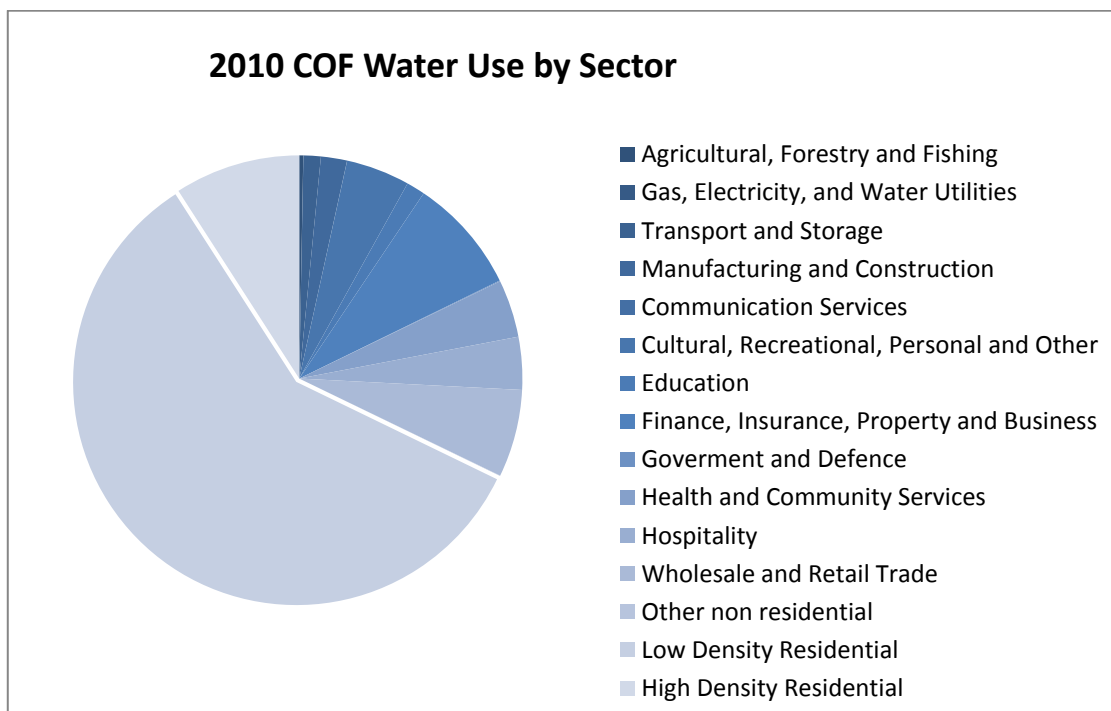


Figure 7 - City of Fremantle Water Use by Sector, 2010

Corporate versus community water usage

To better organise an effective water strategy for the City of Fremantle, and in accordance with the ICLEI Water Campaign™ module format, the water plan is divided into corporate and community objectives.

- **Corporate:** refers to the water usage activities within Council operations. This includes City of Fremantle buildings, parks, recreation fields, reserves and public verges.

Corporate water is primarily **bore water**, or groundwater, pumped from major aquifers in the Fremantle area to irrigate CoF properties. **Scheme water**, managed by the Department of Water, is mainly used in COF buildings.

- **Community**: refers to the water usage activities of residential and private sectors.

Community water use is primarily **scheme water**, managed by the Department of Water and piped from dams.

Corporate Inventory Outcomes - Water Conservation

The Corporate Inventory included collecting and organising data relating to scheme water consumption within the City of Fremantle. The data was categorised by type of facility and aggregated to create a series of reports, examples of which are provided below.

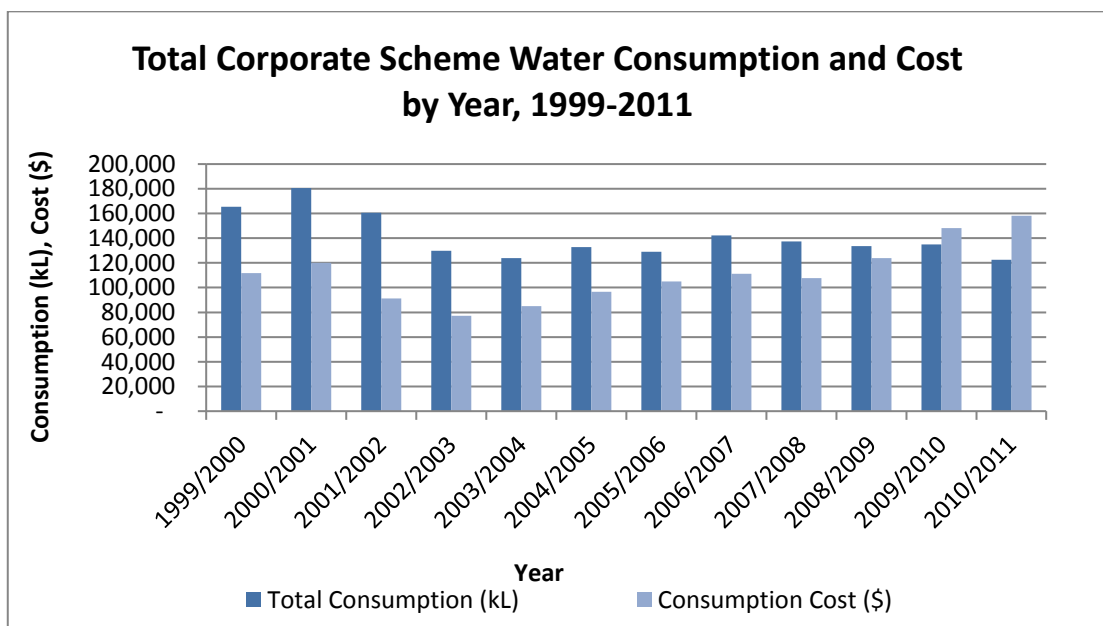


Figure 8 - Total Corporate Scheme Water Consumption and Cost in COF by Year, 1999-2011

The baseline figure for targets in Milestone 2 will be the latest figures:

2010/2011 Total Consumption: **122,578 kL**
 2010/2011 Consumption Cost: **\$ 158,209**

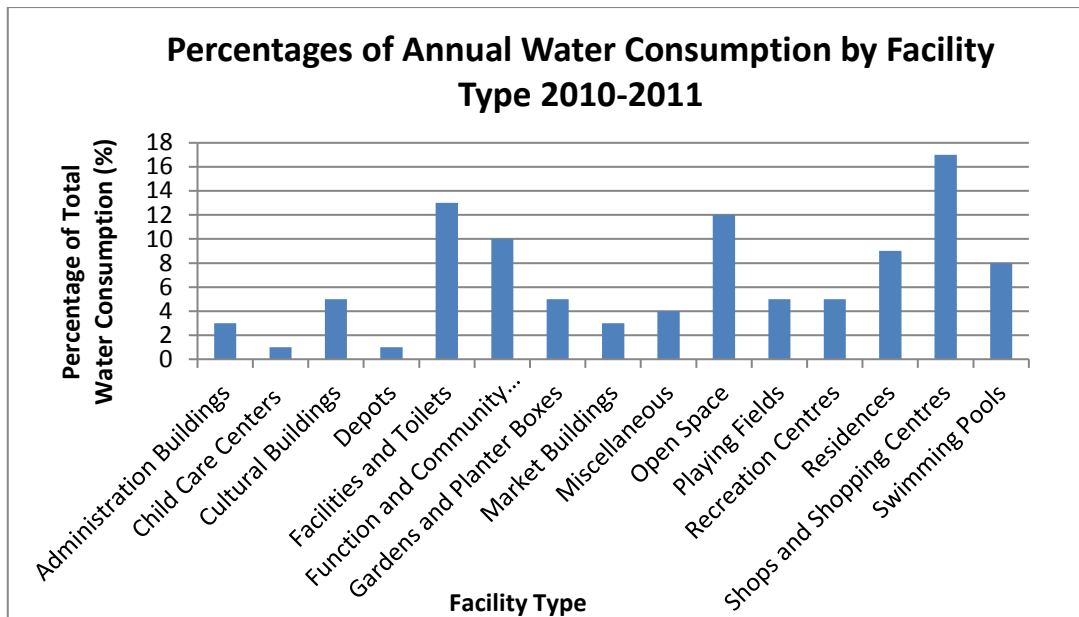


Figure 9 - Percentages of Annual Water Consumption by Facility Type, 2010-2011

Community Water Conservation Analysis

The Water Corporation provided community water consumption data aggregated by suburbs, ANZSIC category, sector and density. This data was analysed through the completion of the ICLEI Water Campaign™ Community Workbook. A summary of the results of this analysis is presented below.

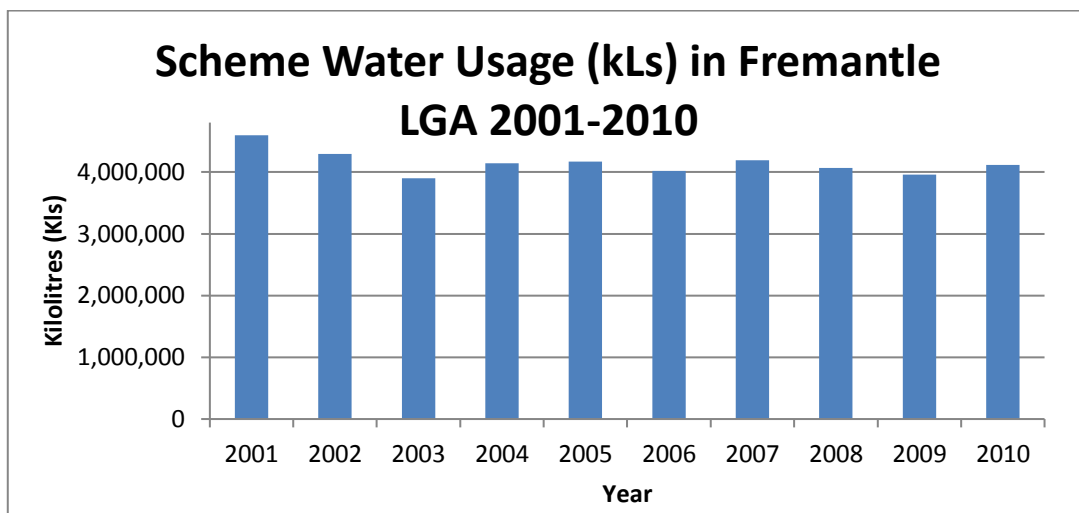


Figure 10 - Scheme Water Usage (kLs) in Fremantle LGA, 2001-2010

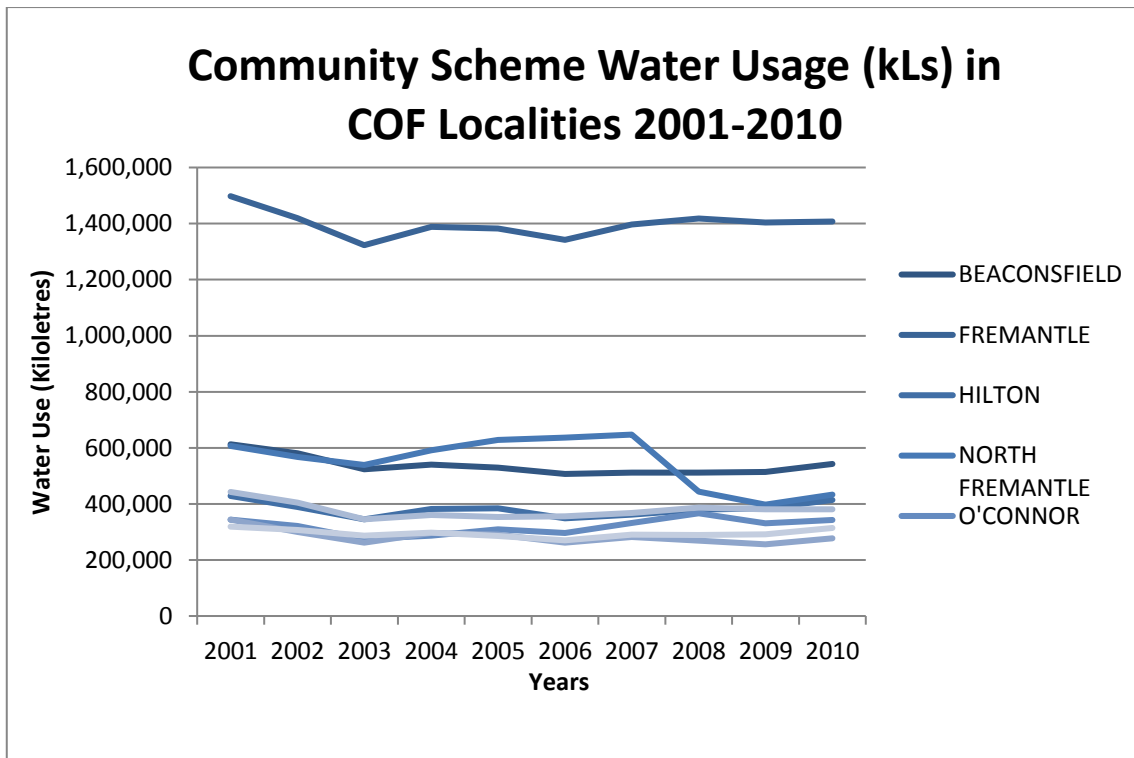


Figure 11 - Community Water Usage (kLs) in COF Localities, 2001-2010

Water Quality

Further in the process to achieve Milestone 1 the City examined 7 key water quality management areas relating to corporate and community actions and identified gaps and proposed 3 priority areas for each.

Corporate Water Quality

City of Fremantle has identified the following priority areas for the management of water quality impacts of the City's operations:

- Sediment control
- Nutrient management
- Gross Litter and Pollution Management

Community Water Quality

City of Fremantle has identified the following priority areas for the management of water quality impacts for the community:

- Waste water management
- Ground water management
- Gross littler and pollution management

5. The Western Australian Department of Water (DOW)

The State Government Department of Water manages the state's water sources. More than 80% of WA's water goes towards "irrigated agriculture, mining, services, industry, and parks" (Department of Water 2012).

The Department of Water continues to take steps towards addressing water resource conservation. Strategy plans are outlined in the 2003 publication entitled 'Securing our Water Future: A State Water Strategy for Western Australia'. This plan was updated in the Government of Western Australia report, 'State Water Plan 2007'. The plan suggests that Western Australia implement key actions including:

1. Use and recycle water wisely
2. Plan and manage water resources sustainably
3. Invest in science, innovation and education
4. Protect ecosystems, water quality and resources
5. Enhance the security of water for the environment and use
6. Develop water resources for a vibrant economy
7. Deliver services for strong and healthy communities

(Government of Western Australia 2007, p. 5)

In 2010, the Department of Water created a strategic five year plan for water conservation in Western Australia through to 2015. The goals highlighted in this roadmap to water conservation are as follows:

Goal 1: Water needs for population and economic growth are met now and for the future.

Goal 2: Western Australia has contemporary and adaptive water management.

Goal 3: Western Australia exceeds national standards in water efficiency and demand management.

Within this framework, the Department of Water has formulated specific action steps to achieve these goals. The plan's proposed actions are multifaceted in discipline; overlapping in areas of policy, science and technology, behaviour change, infrastructural change, and partnerships, among others (Department of Water 2010, p. 3).

*The full Department of Water Strategic Conservation Plan 2010-2015 can be found at <http://www.water.wa.gov.au/PublicationStore/first/97029.pdf>.

6. City of Fremantle Water Conservation Previous initiatives

2009 Water Conservation Plan

Water Conservation Plan

As part of the Department of Water's ground water conservation efforts, each Local government Area within the Perth metropolitan area was asked to prepare and submit a Water Conservation plan to the Department by the 30th of June [2008]. The plan aimed at giving the DoW and the LGA up to date information on each areas groundwater use, something that has not been previously monitored.

The City has 3 licenses covering all of the parks and reserves within the city that do not use scheme water.

The City of Fremantle has a licensed allocation of 671250kl per year; we have estimated our usage for 07/08 to be approximately 723981kl. We have therefore used approximately 53000kl more than we are licensed (and therefore legally allowed to) there are also a number of bores that the city administers that we did not have licenses for. The water conservation planning process has allowed us to identify these bores and license applications have now been submitted to rectify this situation The use of scheme water for irrigation is widespread within the city. We have committed to monitoring all potable water use within areas under the cities management as part of the cities water conservation plan.

Issues and Objectives:

Issues

1. The COF is currently overusing its groundwater allocation, steps need to be put in place to rectify this situation.
2. There are currently sites where water use is not under the administration of the City of Fremantle (CoF), yet are on CoF's groundwater license i.e. Fremantle oval and Fremantle public golf course.
 1. 2a.
 2. Saltwater intrusion into the superficial aquifer within the North Fremantle area limits use.
 3. Current irrigation systems are old and efficiency and effectiveness is questionable
 4. Current manual control of the operation of the irrigation systems is impeding improved management strategies.
 5. There is a need to develop a drought contingency plan.
 6. Increased water demand from the future developments such as Leighton Parklands will require new landscape guidelines and practices.
 7. Managing community expectations for the provision of quality green spaces.
 8. The allocation of sufficient funding to undertake water conservation objectives, particularly reticulation system upgrades.
 9. Accuracy of all data sets needs to be improved.

Objectives

1. Lead the community by example when it comes to water conservation.
2. To reduce groundwater use from current levels to 10% less than the licensed allocation over the next five years.
3. Undertake a review of all Public Open Space and irrigated areas under the CoF's control and identify areas where water savings can occur.
4. Monitoring and manage all potable water use under the City of Fremantle's (CoF) control.
5. Conform to current Best Management Practices when developing / redeveloping irrigated areas.
6. Develop a Drainage Strategy that endeavors to recharge drainage water to ground water aquifers.
7. Communicate the CoF's water conservation aims and objectives to the community.

The City of Fremantle's 2009 Water Conservation Plan was organised in the following sections:

6.1 Water Conservation Action Strategies

- 6.1.1 Irrigation System Performance Strategy
- 6.1.2 Irrigation Maintenance Strategy
- 6.1.3 Hydrozoning and Ecozoning strategy
- 6.1.4 Water Budgeting Strategy (ground and scheme; corporate and community)
- 6.1.5 Communications Strategy (corporate and community)
- 6.1.6 Park Development Guidelines
- 6.1.7 Drought Contingency Plan
- 6.1.8 Alternative Water Supply Development Strategy

Water Conservation Actions Implemented by The City of Fremantle has already accomplished various water conservation initiatives. These initiatives are recorded below:

Strategy area	Completed Action
Irrigation Maintenance	Achieve a distribution uniformity audit across all irrigation systems.
Irrigation Maintenance	Achieve flow and pressure tests across the entire COF's bores.
Hydrozoning and Ecozoning	Assigned water categories to all parks in conjunction with updating irrigated area data.
Water Budgeting	Installed flow metres on all bores.
Staff Training	Developed a training and accreditation program for irrigation staff.

6.2 Water Conservation Current Actions

The City of Fremantle is currently in the process of completing the following actions to meet the water conservation objectives. These actions include the following:

Strategy area	Ongoing Action
Irrigation Maintenance	Monitor water use and turf condition for watering category on a monthly basis and compare with our allocation reducing water use. Yearly production report is submitted to the Department of Water.
Water Budgeting	The COF is working with golf course management on monitoring water used by the Fremantle Leisure Centre for pool use. Currently in the process of amending our licenses.
Alternative Water Supplies	Research alternative water options.

6.3 Water Conservation Priorities

The City of Fremantle has proposed the following actions and is set to undertake them according to the following priority implementation timeline scale:

- Priority 1: Immediately

- Priority 2: Within 6 months
- Priority 3: Within 12 months
- Priority 4: Within 2 years
- Priority 5: Within 3 years

Water Campaign™ Strategy Area and Action	Priority
Irrigation Performance Strategy Action	
Install central control systems within two high profile parks and reserves.	4
Develop a plan to have all irrigation on a central control system.	5
Test a drip irrigation system in a turf area.	4
Irrigation Maintenance Strategy Action	
Develop a maintenance plan to annually undertake the above actions and document progress.	3
Develop guidelines for turf maintenance to reduce water use including the use of wetting agents, soil amelioration, leaf tissue analysis, improved aeration, etc., and document this.	3
Develop and implement a plan to undertake water quality testing across all bores.	5
Hydrozone Ecozone Strategy Action	
Sign agreement with golf course and the Fremantle Dockers on the use of bore water.	1
Undertake a review of all irrigated areas under COF's control to identify in which areas water savings can occur and hydrozones and ecozones can be implemented.	1
Develop a plan for the progressive implementation of hydrozoning and ecozoning across the COF's parks, and reserves.	5
Assign water categories to all parks in conjunction with updating irrigated area data.	3
Water Budgeting Strategy Action	
Improve irrigation data quality index to 1.	3
Communications Strategy Action	
Develop a communication plan to inform the community of water use changes and the COF's planned projects for water conservation.	3
Remove turf in selected high visibility locations throughout the COF and replace with waterwise native planting to increase the communities' awareness of water issues and to lead by example. This will be accomplished in conjunction with the public open spaces study.	5
Park Develop Guidelines Strategy Action	
Develop a set of 'Water Conservation Design Guidelines' to guide the development of new parks, turf areas, and the re-development of existing areas.	3
Drought Contingency Plan	
Develop a drought contingency plan for the city's irrigated areas.	4
Alternative water supplies	
Staff to continue investigating alternative water options including rainwater harvesting, water recycling (e.g. greywater reuse), etc.	1

7. Drought Contingency for Fremantle

7.1 Introduction

A drought is an extended period during which there is not sufficient water for users' usual requirements. The term does not assume merely rainfall deficiencies; if this was true, the majority of the country would be ever considered to be in a state of drought due to precipitation patterns. Consequently, a large part of drought management responsibility lies predominantly with how we use the water we have (BOM no date provided).

7.2 Australian Context

Australia is the driest inhabited continent in the world and also has some of the most precipitation variability of any country due its vast size. In the average decade within this fluctuating climate, Australia experiences approximately three good and three bad years in relation to rainfall adequacy (BOM no date provided).

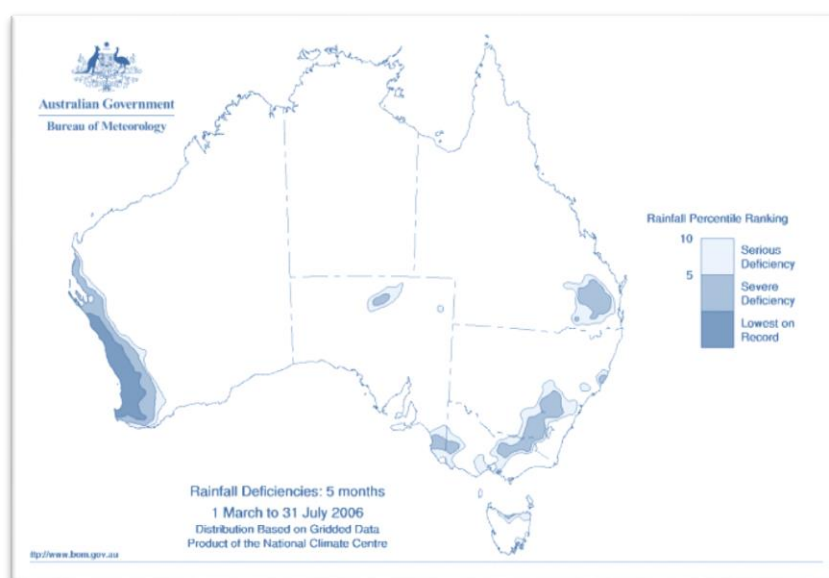


Figure 12: Percentile Rainfall Deficiencies in Australia March-July, 2006 (BOM 2006)

7.3 Perth Context

Continuing trends of decreased rainfall in the Perth metropolitan area are exacerbated when combined with the current patterns of increased urban surfaces, ever-growing urban population, and high water demand. This combination creates added stress on Perth's bore and scheme water sources. Perth's recent rainfall deficiency history that continues today exemplifies this, as can be seen in the following excerpts and climatic image from the Australian Bureau of Meteorology.

"For the 5-month period from March to July, a large part of western WA from Albany to north of Carnarvon is affected by severe rainfall deficiencies...This is the third consecutive month with very much below average rainfall (decile 1) across a significant part of western WA" (BOM 2006).

*“For the **11-month** period from January 2010 to November 2010, below average falls over the southwestern half of WA during November 2010 has maintained areas of rainfall deficiency as described in the previous drought statement and slightly increased areas of lowest on record” (BOM 2010).*

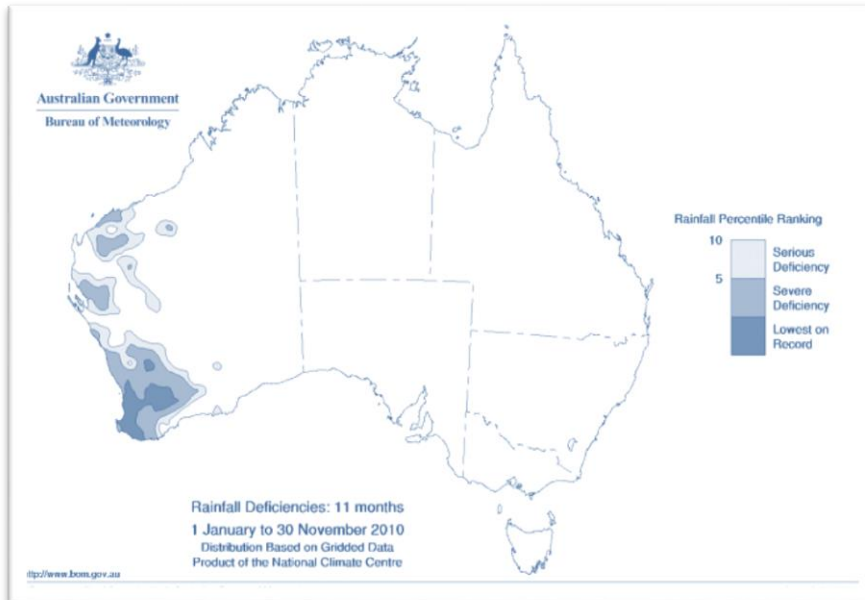


Figure 13: Percentile Rainfall Deficiencies in Australia January–November, 2010 (BOM 2010)

“The southwest region had its driest year on record in 2010, and the two-year period 2010–2011 was the driest on record in some parts of southwest Western Australia. Rainfall for the 3- and 4-year periods ending August 2012 has also been the lowest on record for the southwest” (BOM 2012).

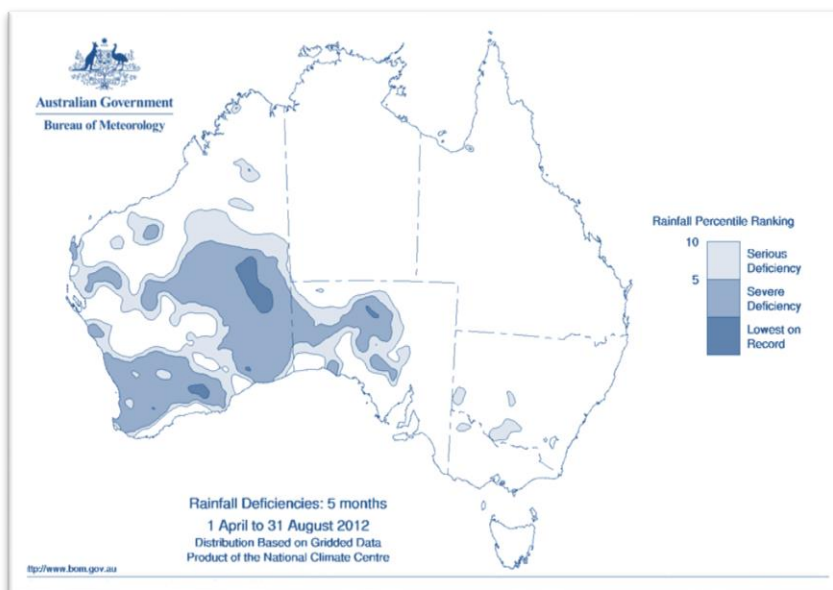


Figure 14: Percentile Rainfall Deficiencies in Australia April–August, 2012 (BOM 2012)

7.4 City of Fremantle Context

In preparation for impending water stress projections for Australia and in response to seasonal climatic dry periods, many cities and towns throughout WA and greater Australia have introduced drought contingency plans. Preparation and knowledge of drought response actions are essential for an effective response to any degree of drought severity. Below is a sampling of towns that have already developed drought contingency plans.

- Town of Weipa, Queensland
- Coffs Harbour City Council, New South Wales
- Mount Isa City Council, Queensland

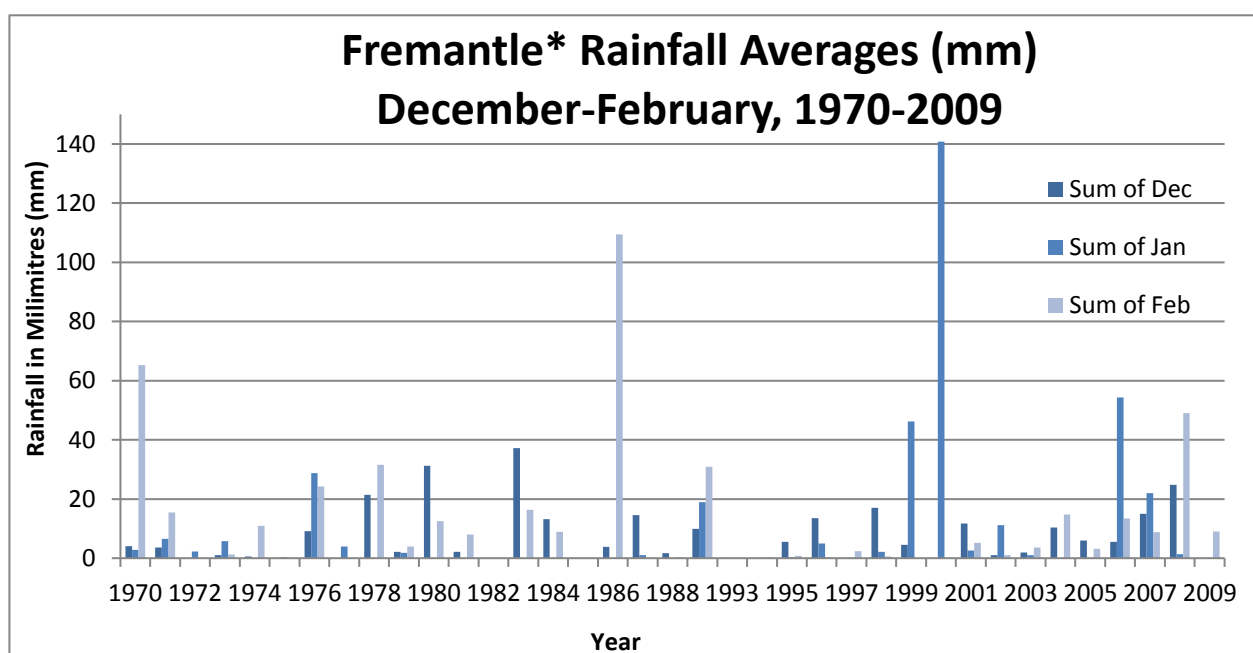


Figure 15: Fremantle* Rainfall Averages (mm) December-February, 1970-2009

*Rainfall data from 1997-2009 was collected from Swanbourne, 9.6km from Fremantle

7.5 Current Drought Management for the City of Fremantle

The City of Fremantle Parks and Landscapes Department has already begun to develop a preliminary priority scale for corporate bore water. This priority scale was developed based on size, functionality, location, and appearance and consists of the following divisions:

- Category 3: Low Priority. In low level low drought events, reductions will be applied here first.
- Category 2: Medium priority. Reductions will be applied here in a medium drought level event.
- Category 1: High priority. Due to the value of these spaces, reductions will be applied here only during high level drought events.

The following chart outlines the existing hierarchy of public open spaces (e.g., corporate bore water) in regards to water allocation in the case of a drought event.

CATEGORY 1	CATEGORY 2	CATEGORY 3
Booyeembara Park	Alfred Road Park	Aurthers Head
Bruce Lee Reserve	Arnott's POS	Bathers Beach
Esplanade Reserve	Beach St Park	Beacy Park
Fremantle Park	Beach Street Reserve	Burford Place Park
Gibson Park	Biscuit Factory Park	Collick St Park
Gil Fraser Reserve	Davis Park	Cyprus Hill Park
Hilton Dick Lawrence	Depot Verge	Douglas Street Park
Hilton Ken Allen	Edwards College POS	Gold Street Park
Hilton Mid Ground	Elder Place Reserve	Jarvis Street Park
Hilton South Ground	Fremantle Markets Car Park	King William Park
Kings Square	Gordon Dedman Reserve	Lilydale Park
Memorial Reserve	Griffiths Park	Sandown / Hollis Park
North Bank Foreshore	Grigg Park	Wilson Park
North Fremantle Memorial	Holland St Park	
Pioneer Reserve	Horrie Long Reserve	
Princess May Reserve	Knutsford St Park	
Queens Square	McCabe Park	
Railway Reserve	Parmelia Park	
South Beach	Philimore St Gardens	
	Plane Tree Grove POS	
	Portside Park	
	Rennie Crescent Park	
	Samson Park	
	SEW Park	
	South Terrace Primary	
	Valley Park	
	Virginia Ryan Park	

Table 1: Priority Ranking of Fremantle Public Open Spaces in the Event of Drought

7.6 Looking Forward - The Next Step for the City of Fremantle

Corporate bore water is only one sector of total water resources consumed by the City of Fremantle. Fremantle should also identify the following:

1. Priority scale for corporate scheme water
2. Priority scale for community bore water
3. Priority scale for community scheme water

8. City of Fremantle 2013 Water Conservation Strategy Objectives

Water Conservation Strategy Objectives (Measures)

The City of Fremantle has drawn upon the framework objectives included in the Department of Water Strategic Conservation Plan 2010-2015 for this water conservation strategy to be endorsed as a 'Waterwise Council'.

The objectives also include factors from Milestone 1 of the ICLEI's Water Campaign™ for the City to move towards achieving all the Water Campaign's Milestones.

Additionally the City of Fremantle is committed to becoming more sustainable in all of its management areas. As such the Council has subscribed to take part in the One Planet initiative.

The One Planet Living framework focuses on ten areas that comprehensively address the environmental, social and economic aspects of sustainability. 'Sustainable Water' - using water more efficiently in buildings and in the products we buy; tackling local flooding and water course pollution – is one of the ten One Planet Actions that will be specifically addressed in this Water Conservation Strategy though the Strategy will also address areas such as 'Zero Waste' and 'Land Use and Wildlife'.

Key factors and best practices that have been included are:

- Address water usage from multiple angles (technology, behaviour, policy, etc.)
- Develop a timeline of long term goals with benchmarked years
- Identify short term action steps to achieve long term goals
- Monitor and publish progress

The City of Fremantle 2013 Water Conservation Strategy has 7 Action Goals and these will be achieved through the implementation of the Action items listed for each Goal.

The Actions to achieve these goals and, have been developed through the steps of:

- Plan;
- Develop policies, guidelines and campaigns;
- Communicate and implement campaigns; and
- Monitor and report results.

The Goals and Action Plan has been summarised in the Appendix attached to this report.

The City of Fremantle 2013 Water Conservation Strategy has 7 Action Goals:

Water Management Goal

Achieve the “Waterwise Council” certification by 2015, supported by the community and in conjunction with the Department of Water, Water Corporation, and ICLEI.

Corporate Scheme Water Conservation Goal

Scheme water consumption in the City of Fremantle decreased by 32% between 2001 and 2011. The new goal is to reduce the City scheme water consumption by a further 10% over the next 10 years between 2013 to 2022 below the 2011 level of 122,578 kilolitres.

Corporate Groundwater Water Conservation Goal

The Department of Water 2013 groundwater licence allocation of 7,500 kilolitres per hectare per year is 708,000kL. The goal is to reduce groundwater extraction by 10% below the 2013 allocation level over the next 10 years to 2022.

Community Water Conservation Goal

Community scheme water usage in the City of Fremantle decreased by about 10% between 2001 and 2010. The goal is to reduce community scheme water usage over the next 10 years to 2022 by a further 10% below the 2010 level.

Corporate Water Quality Goal

The Corporate Water Quality Goal is to achieve 50 Water Campaign™ Corporate Action points by 2018.

Community Water Quality Goal

The Community Water Quality Goal is to achieve 50 Water Campaign™ Community Action points by 2018.

Drought Contingency Goal

The approval by Council of a Drought Contingency Plan that incorporates a plan of action for drought urgency stages by 2016.

Note that ICLEI normally allocate 5 points for each appropriate Water Campaign™ Action Plan Item

9. Proposed Strategies for City of Fremantle

9.1 Water Management

Goal

Achieve the “Waterwise Council” certification by 2015, supported by the community and in conjunction with the Department of Water, Water Corporation, and ICLEI.

To achieve the “Waterwise Council” certification supported in conjunction with the Department of Water, Water Corporation, and ICLEI the following actions are planned.

Action Plan Items

1	Create a Water Smart Team comprising staff and community members to contribute to planning and implementation of the Water Conservation Strategy. Water Smart Team to review Council Policies in relation to corporate and community water use and water quality and provide policy change recommendations and policy guidelines.
2	Water Smart Team to develop appropriate campaigns for all goals, set the priorities and find resources (financial, human, material) to enact campaigns and monitor and report on progress.
3	Ensure that appropriate staff members attend a waterwise training course on waterwise gardening and irrigation and on internal auditing.
4	Effectively communicate the City’s water conservation aims and objectives and action plan to the community.
5	Create public communication venues including multiple forms of media e.g. social media, online newsletters, email blasts, etc., for community water dialogues.
6	Launch educational campaigns to inform public of water concerns in WA and Fremantle.
7	Disseminate waterwise information to the community.
8	Disseminate progress reports of campaigns and actions to Council and the community.
9	Survey a selection of the community each year over 5 years to monitor the attitudes towards water conservation and the impact the City has had on these attitudes and report.
10	Water Smart Team to provide annual review on what has worked or not and create new campaigns if required.
11	Demonstrate substantial progress within 18 months towards implementation of actions; and include reporting on water efficiency targets and performance in the council’s annual report.
12	Apply for Waterwise Council certification and for Water Campaign Milestones.

Table 2: Corporate Water Management Action Plan

Make corporate water usage and conservation progress information easily accessible to the public

The development of additional informational outlets of council activity and progress has great potential for more effective council-community interaction. The promotion water conservation strategy successes that the COF is already undertaking, in addition to future plans, can be achieved via documents such as this, more routine website updates, etc.

Distribute routine updates about groundwater usage

To increase instantaneous updates of Fremantle's water conservation progress, successes of other local governments, and educational blurbs informing the public of the status of WA's water, etc., the City will create and maintain various communication tools to maximise the target audience. These strategies include the following:

- FaceBook page updates
- Twitter
- Online newsletter (subscribe via listserv)

9.2 Corporate Scheme Water Conservation

Goal

Scheme water consumption in the City of Fremantle decreased by 32% between 2001 and 2011. The new goal is to reduce the City scheme water consumption by a further 10% over the next 10 years between 2013 to 2022 below the 2011 level of 122,578 kilolitres.

Action Plan Items

1	Develop policies and guidelines to help reduce scheme water in all City of Fremantle owned and managed properties
2	Develop a water audit routine for corporate buildings and public open spaces with benchmarks to track progress.
3	Develop a routine maintenance audit for the functionality and efficiency of pipes, taps, and other water appliances.
4	Retrofit council buildings with water efficient technology, e.g. toilets, taps.
5	Post visible water conservation reminders within corporate buildings.
6	Investigate the viability of installing rainwater tanks in City managed buildings and properties for irrigation or other uses.
7	Investigate the viability of installing greywater reuse systems in City managed buildings and properties for irrigation or other uses.
8	Publicise corporate water usage and conservation progress information.

Table 3: Corporate Scheme Water Conservation Action Plan

Develop a water audit routine for corporate buildings and public open spaces

Establish a periodic audit schedule with benchmarks to track progress. This could also inspire more definitive water conservation goal-setting and motivation to reach and exceed these goals.

Check taps routinely for maintenance needs

Developing a routine audit for the functionality and efficiency of pipes, taps, and other water appliances is an easy and relatively inexpensive policy to implement, but one that could yield significant water savings.

What are other local governments doing?

*Case study: Waterless Urinal Installation in the City of Melville, WA

Commencing in 2004, the City of Melville replaced all twelve existing urinals in the primary management building to microbial block waterless urinals. Findings show that by retrofitting these urinals, the City saves ten kilolitres of water annually. The yearly cost of maintenance, installation, and materials is about \$612 (ICLEI 2008).

Retrofit council buildings with water efficient technology, e.g. toilets, taps

Replacing current water appliances within corporate buildings with more advanced, up-to-date, and efficient models is a relatively simple step that could result in significant water savings in addition to monetary returns. Examples include waterless urinals and WELS certified low-flow taps.

What are other local governments doing?

*Case study: "Smart Metering" in Logan City, QLD

Logan City aided in the development and installation of installed smart-meter technology in partnership with Ibis information systems through SQL databases. Council installed these "smart meters" throughout a variety of sites including swimming pools, administration buildings, and a wastewater processing facility, among others. This state of the art equipment provides data in a digital configuration with high quality analysis of where and how water is being consumed. Funding was made possible through the Queensland Department of Local Government and due to the fact that Logan City's implementation of the meters was a pilot project (ICLEI 2008).

Post visible water conservation reminders within corporate buildings

A key part of any successful behaviour change campaign is effective communication and messaging. By posting catchy, memorable, and easy-to-read reminders (e.g., stickers, decals, other forms of signage) in close vicinities to high water use sites (e.g., kitchen sinks, bathroom sinks), individual water reduction behaviours will be easier to instil as habit.

9.3 Corporate Groundwater Water Conservation

Goal

The Department of Water 2013 groundwater licence allocation of 7,500 kilolitres per hectare per year is 708,000kL. The goal is to reduce groundwater extraction by 10% below the 2013 allocation level over the next 10 years to 2022.

The current bore water allocation is 7,500 kilolitres per hectare per year.

DOW total allocation = 708,173 kilolitres

GWL157613(4) - Perth - Superficial Swan - 507,900 kilolitres

GWL157615 - Perth - Leederville - Esplanade/Pioneer Parks - 32,325 kilolitres

GWL168282 - Perth - Superficial Swan - North Fremantle - 39,150 kilolitres

GWL104723 - Perth - Superficial Swan - Fremantle Golf Course - 129,000 kilolitres

Action Plan Items

1	Undertake a review of all irrigated areas under COF's control to identify in which areas water savings can occur and hydrozones and ecozones can be implemented.
2	Develop a set of 'Water Conservation Design Guidelines' to guide the development of new parks, turf areas, and the re-development of existing areas.
3	Develop and implement a plan to undertake water quality testing across all bores.
4	Develop an agreement with golf courses and the Fremantle football oval on the reduction of use of bore water.
5	Develop a plan for the progressive implementation of hydrozoning and ecozoning across the City's parks and reserves.
6	Replace current irrigation systems with efficient irrigation technologies.
7	Investigate alternative water supply options.
8	Install central control systems for parks and reserves.
9	Install water-monitoring sensors for irrigation systems of parks and reserves and provide training in their use.
10	Plant waterwise and native vegetation in City managed gardens.
11	Apply wetting agents to reduce watering need to City managed gardens and turf.
12	Use mulch on City managed gardens to reduce evaporative water loss, etc.
13	Remove turf in selected high visibility locations throughout the City and replace with waterwise native planting to increase the communities' awareness of water issues and to lead by example.
14	Develop a communication plan to inform the community of ground water use changes and the COF's planned projects for water conservation.

Table 3: Corporate Groundwater Water Conservation Action Plan

Hydrozone suitable areas

Hydrozoning is a strategy to categorise areas into separate zones requiring different amounts of irrigation water. Irrigation can thus occur at a precise level and unnecessary irrigation will be minimised. Depending on the nature and function of the space, this can take several different forms.

- *Parks, ovals, verges, sports grounds:* Fremantle can classify these areas into separate water requirement zones based on their function, frequency of usage, and appearance.
- *Garden beds and bushland regions:* Fremantle can employ landscaping strategies to ensure that plants are arranged based on how much irrigation water they require. For example, drought resistant plants should be grouped together, while plants that need fifteen minutes of watering should be in a different location.

What are other local governments doing?

*Case study: Soil Moisture Monitoring Sensors in the City of Joondalup, WA

In Joondalup, water moisture sensors, also called lisometers, were installed in ten pilot “active sporting grounds,” at various soil depths, over five months. This environmental technology was introduced to improve irrigation efficiency by decreasing unnecessary groundwater use on areas that were sufficiently irrigated. Post-pilot analysis indicates that this endeavour was successful and aided in the development of a more effective watering timetable. Lisometers are now scheduled to be implemented in all primary public open spaces. Appropriate education was required among staff, however, to understand data gathered by the lisometers. The approximate cost was \$53,000 to buy and install the sensors, in addition to battery substitutions every 2-3 years; this is about equivalent to an annual cost of \$100 per lisometer (Waterwise Council, no date).

Install water-monitoring sensors in public open spaces, parks, etc.

Water monitoring sensors in public open spaces would provide Fremantle with valuable information about the most effective water allocation combination. This aids in water conservation in the cases where soil is found to be too moist, and also increased aesthetic appeal of green spaces and parks without over allocation. It is important to note that trainings may be required for successful installation and data interpretation of the sensors.

Plant waterwise and native vegetation

Waterwise and native vegetation require much less water than grass areas while still maintaining aesthetic appeal and cultural character. This can save the City of Fremantle water that would have been used for irrigation.

Apply wetting agents to reduce watering need

Due to WA’s climate, many native soils frequently become quite dry. This can also result in soils failing to absorb water, which means that the water applied to green spaces and gardens does not effectively penetrate “root zones”. Wetting agents can remedy this

problem; they disintegrate the impenetrable layer of soils, thus helping the water to truly reach the targeted plants (Department of Water 2012).

Use mulch to reduce evaporative water loss, etc.

According to the DOW, applying 50-75mm of “coarse mulch” to gardens has a variety of water conservation and plant quality benefits while also minimizing evaporative loss. These include decreasing the soil temperature in hot weather, reducing the spread of weeds, and adding healthy minerals to the soil (Department of Water 2012).

9.4 Community Water Conservation

Goal

Community scheme water usage in the City of Fremantle decreased by about 10% between 2001 and 2010. The goal is to reduce community scheme water usage over the next 10 years to 2022 by a further 10% below the 2010 level.

Action Plan Items

1	Develop policies and guidelines on greywater use and encourage greywater use for irrigation.
2	Develop incentive programs for retrofitting water saving devices in residences and businesses.
3	Develop a community water saving campaigns like the 'Every drop counts!' campaign.
4	Develop tools and resources for community water saving actions (e.g. Subiaco's "Think Water!" toolkit).
5	Develop a web link on the City of Fremantle website to the 'savewater!® Alliance website - www.savewater.com.au ' or similar.
6	Hold demonstrations and workshops for water conservation strategies (waterwise plants, retrofitting your home, etc.).
7	Develop hands-on water saving events and communications avenues for youths at schools and organised events.
8	Encourage residents to substitute plumbing products, sanitary ware, and white goods with water efficient models.
9	Spotlight residents or business effective home water managers in City publications.
10	Encourage installation of water use monitoring technology, e.g. shower timers.
11	Conduct surveys with the community to monitor reactions to campaigns.

Landscaping and outdoors

12	Encourage compliance with watering rosters and weather event reminders to turn off reticulation.
13	Establish community expectations of bore water use to develop accountability and responsibility.
14	Encourage residents and businesses to install flow meters to their bores and monitor water use.
15	Encourage residents and businesses to reduce or cap bore water use in the home to the suggested amount.
16	Provide training or information to help residents adjust their reticulation controllers.
17	Distribute free giveaways of waterwise seeds or native plants at sponsored events.
18	Encourage residents to plant suitable native species in their gardens.
19	Encourage residents to order street trees for their verge.
20	Provide free mulch to residents and advise on the water saving benefits of mulch.
21	Provide free native plants for verge or waterwise garden planting.
22	Encourage covering of outdoor pools with covers when not in use.

Table 4: Community Water Conservation Action Plan

Adopt small water saving habits at home – every drop counts!

Not all water conservation strategies have to be large-scale and costly. Below are several simple, free ways to immediately reduce your home water usage.

- Wash vegetables in a bowl in the sink rather than under a running tap
- Turn off the tap while brushing your teeth
- Take four minute showers or less
- Run dishwasher and laundry machine only when completely full

Hold community landscaping and gardening workshops

Community landscaping workshops would be an effective way to teach easy and effective ecozoning and hydrozoning strategies that residences and businesses can implement. Additionally, these workshops would help to characterise these strategies as the norm, not the exception, while also encouraging community involvement.

Develop youth communication avenues and hands-on events (e.g. youth newsletter, school partnerships) Instilling waterwise attitudes and awareness in Fremantle's youths is critical for the COF's long term water conservation goals. By developing a variety of different programs, events and publications the COF can engage Fremantle's youth and make them take a stake in their family's water consumption. Targeting a youth audience has proved successful in various Australian towns; adopting successful strategies from these case studies will aid in the development of Fremantle-specific programming. In many cases, youth can be the driving force of behaviour change within a household.

Substitute plumbing products, sanitary ware, and white goods with water efficient models Improving water efficiency is the fastest and most economical way to save water. The *Water Efficiency Labelling and Standards* (WELS) certification guarantees a baseline water efficiency standard in plumbing, sanitary ware, and white goods products. By 2021, utilisation of water efficient products are expected to decrease indoor water usage by greater the 100,000 megalitres annually, and will save residents money in the long-run (WELS 2012).

Existing Program

Showerhead Swap is a water conservation program in the Perth Metropolitan area in which residents can trade in two old showerheads for efficient substitutes for free. Simply return your two old showerheads to the Returns and Exchange section of your local hardware store with your most recent water use account (Water Corporation no date provided).

Existing Program

Toilets to Go is a program jointly sponsored by the Water Corporation, Select Solutions and Caroma. The purposed of this program is to provide residential and private property owners the chance to substitute single flush or "inefficient dual flush" toilets with Caroma 4-star dual flush toilets at a discounted supply and installation fee (up to 30% less) (Water Corporation no date provided).

Spotlight effective home water management strategies

The City can identify willing residences and businesses that practice successful indoor water conservation strategies for public spotlight in a publication (e.g. website, newsletter, etc.). Acknowledged individuals can then be added to COF water conservation resource database to aid and support other homeowners unsure of how to move forward.

Install water use monitoring technology, e.g. shower timers

By shortening your shower from seven to four minutes, approximately 27 litres can be saved per shower. Your savings can pay off the price of a shower timer– a win-win situation! (Bunnings Warehouse no date provided).

What are other local governments doing?

*** Case Study: Shower Timer Campaign in the City of Burnside, SA.**

In winter of 2008, the City of Burnside launched the “A Change in Burnside Can Change the Whole World” shower timer campaign, focused on increasing community knowledge of effective home water management. A “water conservation pack” was distributed to each residence and included a four-minute shower time, refrigerator magnet, and educational card. The city of Burnside spent \$20,350 to develop and issue the kits, to result in projected daily water saving of 1.98 megalitres from Burnside residences. Community monetary savings also have the capacity to be \$1.4 million each year (ICLEI 2008).

Follow and encourage compliance with watering rosters

Fremantle will continue to encourage and enforce watering rosters that are currently in place. Developing an additional list of priority areas for increased water regulation may also be beneficial.

Establish community expectations of bore water use to develop accountability and responsibility

The City encourages and community involvement and participation in water conservation strategies. Providing each neighbourhood with the tools to develop neighbourhood or community goals for water use (information leaflets, discussion and brainstorming topics, goal setting templates, with periodical check-ins, etc.) might help to propel increased involvement and peer-to-peer accountability.

Reduce or cap bore water use in the home to the suggested amount

Fremantle will recommend neighbourhood associations, businesses and industries, or individual residences, or other groups attempt cap bore use to the target amount (determined by the council, neighbourhood association, family, etc).

Distribute free giveaways of waterwise seeds at sponsored events

Giveaways of items advocating water-conscious behaviours will continue to make public and form positive perceptions of these behaviours in the mind of the public. The “free” nature of giveaways also has the potential to expand the audience and participants of Fremantle natives who may not have been willing to take the first step towards adoption by purchasing seeds themselves.

Plant trees in your garden

Tree planting is a good water conservation strategy because it provides valuable shade to other plants in your garden, reducing irrigation needs. Additionally, and depending on the size, trees can also shade residences. This lowers the need for air conditioning, saving money and water (Department of Water 2012).

Cover outdoor pools with covers when not in use

This can conserve approximately 55 litres of water daily from evaporative loss. It also lessens the need to add chemicals to ensure water quality, which saves you money (Water Corporation 2011).

What are other local governments doing?

**Case study: Sustainable Display Home - Promoting Water Management in City of Mandurah, WA*

The City of Mandurah collaborated with various sustainable urban design companies to design and construct the “Sustainable Mandurah Home”. The home showcases water conservation methods including efficient technology, landscaping, and alternate water acquisition and recycling strategies that can be emulated by Mandurah residents. For this reason, the City of Mandurah and its partners focused on three principles throughout design and construction: liveability and ease of replication, affordability, and environmental responsibility (ICLEI 2008).

9.5 Corporate Water Quality

Goal

The Corporate Water Quality Goal is to achieve 50 Water Campaign™ Corporate Action points by 2018.

ICLEI normally allocate 5 points for each appropriate Water Campaign™ Action Plan Item

The City of Fremantle has identified the following priority areas for the management of water quality impacts of the City's operations:

- Sediment control
- Nutrient management
- Gross Litter and Pollution Management

Action Plan Items

1	Develop policies and guidelines on prevention of sediment-laden runoff into drains including from construction sites.
2	Develop policies and guidelines on Gross Litter and Pollution Management.
3	Develop and make public a stormwater management plan.
4	Identify all river and ocean outfalls and develop a 5 year plan for progressively closing these down and infiltrating all storm water within the City.
5	Train staff in Water Sensitive Urban Design principles and practises and encourage use in City planning and designs.
6	Develop and implement a range of methods (e.g. biofiltration swales, etc.) to improve the quality of storm water infiltrated into aquifers within the city.
7	Communicate effectively to the community the environmental impact of nutrient management issues.
8	Communicate effectively to the community the City's management strategies for gross litter pollution.
9	Communicate effectively to the community and businesses/trades people the City's nutrient management plans.
10	Require a plan for site sediment runoff containment as part of building or development applications.
11	Substitute impervious paving with pervious pavement or vegetation
12	Install gross litter pollution traps; record and monitor the amounts of litter that these traps catch.
13	Develop a regular schedule for inspecting, cleaning, and repairing the stormwater system
14	Implement street sweeping after high-debris events

Table 5: Corporate Water Quality Action Plan

Stormwater Management Strategies

According to the Stormwater Management Manual for Western Australia, stormwater is “water flowing over ground surfaces in natural streams and drains as a direct result of rainfall over a catchment” (Department of Water no date provided).

Impervious surfaces in urban or semi-urban areas result in high speed stormwater runoff. This runoff can also pose environmental and public health threats within Fremantle by

collecting contaminants present in the built environment. Algal blooms and fish kills in WA have resulted in greater interest in improving stormwater control. Retrofitting existing areas with water sensitive urban design (WSUD) can aid in improving water quality and water permeation into groundwater storage sources. Non-structural and behavioural strategies also have potential for stormwater management (Department of Water no date provided).

Develop and make public a stormwater management plan

As the city moves forward in developing and implementing stormwater management strategies, a plan will be articulated to the public through effective communication strategies (e.g. website, listserv, etc.).

Introduce biofiltration swales

Fremantle can implement biofiltration swales near manageable stormwater runoff sources including carparks, roads, and other impermeable areas. Biofiltration swales are lightly inclined green canal-shaped areas that biologically filter stormwater runoff. These can also add aesthetic character to impervious surfaces in the city of Fremantle (Government of Western Australia 2004, ch. 9 p. 103).

Substitute impervious paving with pervious pavement or vegetation

Impermeable paving is a primary cause of stormwater runoff during high precipitation occurrences. Retrofitting paved areas (carparks, roads, public squares, plazas, etc.) with porous pavement or natural plants and vegetation can decrease the rate of runoff and avert soil erosion that high runoff can cause, while also improving water quality through filtration into groundwater (Government of Western Australia 2004, ch. 9 p. 81).

What are other local governments doing?

***Case study: Permeable Pavement Installation in the City of Manly, NSW**

The City of Manly substituted conventional pavement with “permeable pavement and permeable sub-base” on parking regions along the North Steyne on Ocean Beach. This strategy was combined with treatment and recycling of stormwater and the removal of kerbside gutters (Government of Western Australia 2004, ch. 6 p. 22).

Monitor stormwater system

Develop a regular schedule for inspecting, cleaning, and repairing the stormwater system. Peak pollution, precipitation, and other extreme events must be taken into account. Monitoring will ensure functionality by eliminating pollutant build-up (debris, leaves, etc.) among the drainage network (Government of Western Australia 2004, ch. 7p. 22).

Implement street sweeping after high-debris events

Street sweeping during high debris events can be an effective measure to improve stormwater quality. High debris events could include construction work on roads, and populated public events, among others (Government of Western Australia 2004, ch. 7 p. 22).

9.6 Community Water Quality

Goal

The Community Water Quality Goal is to achieve 50 Water Campaign™ Community Action points by 2018.

ICLEI normally allocate 5 points for each appropriate Water Campaign™ Action Plan Item

The City of Fremantle has identified the following priority areas for the management of water quality impacts for the community:

- Waste water management
- Ground water management
- Gross litter and pollution management

Action Plan Items

1	Research the installation of third pipe infrastructure in new developments in reference to existing planning regulations and produce a set of guidelines.
2	Develop guidelines on good septic use practises.
3	Update data register regarding onsite septic systems and provide owners with guidelines.
4	Develop creative educational programming and demonstrations
5	Work collaboratively with local schools on litter educational campaigns to engage youth.
6	Launch periodic “litter education programs” in the City of Fremantle.
7	Develop a demonstration site for household waste water reuse and promote it to the community.
8	Support community group/schools programs to monitor pathogens and nutrients in receiving waters; publicise these groups on the COF website.
9	Provide education materials to the community on ground water bore extraction issues.
10	Design and Implement clear signage and/or innovative ways to promote appropriate litter removal.
11	Develop and disseminate literature to locations prone to dangerous litter or waste (e.g., petrol stations and garages).
12	Design and install clean drains signage (e.g. stencils) next to stormwater drains.
13	Develop information on “catchment friendly” gardening with native vegetation.
14	Organise community “cleanup days”.

Table 6: Community Water Quality Action Plan

Develop and distribute stormwater informational literature

Create stormwater management literature to increase community awareness about stormwater management and easy, doable actions that can be taken to minimise groundwater contamination. This can be distributed through intrapersonal interaction, email, newsletters, social media, etc.

Develop creative educational programming and demonstrations

Creative projects and campaigns are often more effective at communicating a strong message than simply information. Murals, art projects, competitions, etc., are some examples of loose programming frameworks that Fremantle can consider.

Preserve native vegetation

Organise gardens with “catchment friendly” strategies and native vegetation. Minimising impervious surfaces by protecting native vegetation reduces runoff and increases groundwater infiltration.

Schedule community “cleanup days”

The City of Fremantle can schedule occasional community volunteer cleanup days to pick up debris and rubbish from roads, public spaces, neighbourhoods, etc. This can lessen risk of groundwater contamination via storm runoff through litter reduction, in addition to increasing accountability among peers and building community (Government of Western Australia 2004, ch. 8 p. 14).

What are other local governments doing?

***Case study: Yellow Fish Road**

To increase awareness of stormwater runoff and contamination within communities, a group of volunteers created Yellow Fish Road. Community groups can buy Yellow Fish Road kits to a group that stencils “anti-pollution slogans” adjacent to storm drains to inform the community to practice appropriate stormwater management behaviours. Additionally, Yellow Fish Road drain stencilling adds to the city’s aesthetic character. Recently, the City of Rockingham has adopted an adjusted version of Yellow Fish Road stencilling specifically for school children of Rockingham and pollution awareness concerning the Cockburn Sound (Government of Western Australia 2004, ch. 8 p. 28).

9.7 Drought Contingency

Goal

The approval by Council of a Drought Contingency Plan that incorporates a plan of action for drought urgency stages by 2016.

Action Plan Items

1	Define parameters for stages of drought urgencies inline with any Water Authority defined stages.
2	Define communication strategy to effectively inform the public of drought response actions to dispel surprise and anxiety.
3	Identify priority areas for corporate and community water reductions during a drought.
4	Identify and prioritise locations to keep water flow for important aesthetic, recreational or infrastructure requirements and those areas of lowest priority that will have the first water reductions when required.
5	Develop action and response strategies for each drought urgency stage.
6	Define actions required to provide smooth transitions regarding water regulations in the case of drought urgency scenarios.
7	Develop further drought amelioration plans such as storm water harvesting or use of treated water (in partnership with Water Corporation) for public open spaces. (<i>e.g.</i> http://archive.iclei.org/index.php?id=10237 , http://archive.iclei.org/index.php?id=2464)
8	Demonstrate the City's current efforts towards water conscious behaviours.
9	Consult with the Community on the draft Drought Contingency Plan
10	Present the Plan to Council for approval

Table 6: Drought Contingency Action Plan

Extensive Drought Management Analysis

Due to the complex integrated nature of developing a thorough and effective drought contingency plan, the City of Fremantle will explore the possibility of engaging third party consulting groups to lead the analysis and plan development. This will ensure an unbiased, expertly managed, and comprehensively analysed plan with well-developed action responses.

An extensive drought contingency plan for the City of Fremantle will also identify:

- **Targets:** Water usage amounts that restrictions will seek to meet
- **Triggers:** Conditions that are predicted to result in a drought event stage
- **Restrictions:** Measures enacted to moderate the form, frequency, and length of water use actions

(Carberry 2007).

10. Conclusion

As can be seen throughout this report, water conservation strategies are needed in Australia now more than ever. The City of Fremantle recognises this and has already taken steps towards creating a waterwise local government authority.

However, this represents only the beginning. To succeed, it is essential that both corporate and community sectors together become aware of the importance of water conservation in the City of Fremantle and take action towards conserving this vital resource.

The water conservation strategy presented in this report outlines a wide range of areas that may be addressed to assist in future proofing the City against the changes in population and climate that can affect our water supplies.

The City will need to continue to work with the Department of Water, ICLEI and One Planet, ensuring the community is engaged and committed to the sustainability of water resources for future generations.



11. Glossary

ABS: Australian Bureau of Statistics

BOM: Bureau of Meteorology

COF: City of Fremantle

Corporate water use: Refers to water usage activities within Council operations. This includes City of Fremantle buildings, parks, recreation fields, reserves, public verges, etc.

Community water use: Refers to water usage activities in all non-corporate sectors. This includes households, businesses, and industry.

DOW: Department of Water

ICLEI: An international local government organisation created to address sustainability issues. It originally stood for International Council for Local Environmental Initiatives, but is now technically called ICLEI - Local Governments for Sustainability.

LGA: Local Government Authority

WELS: Water Efficiency Labelling and Standards. This is a standards system developed by the Australian Government to rate water use efficiency of various water products.

12. References

- Australian Bureau of Statistics 2010, *Australian Social Trends. Population Growth: Past, Present, and Future*,
<<http://www.abs.gov.au/ausstats/abs@.nsf/lookup/4102.0main+features10jun+2010>>.
- Australian Bureau of Statistics 2011, *Regional Population Growth, Australia, 2011*,
<<http://www.abs.gov.au/ausstats/abs@.nsf/Products/3218.0~2011~Main+Features~Western+Australia?OpenDocument>>.
- Australian Bureau of Statistics 2012, *Year Book Australia, 2012*,
<<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0~2012~Main%20Features~Australia's%20climate~143>>.
- Australian Government: Bureau of Meteorology 2012, *Another Dry Month for Western Australia*, <<http://www.bom.gov.au/climate/dr>>.
- Australian Government: Bureau of Meteorology 2010, *Australia's Wettest Spring But No Relief for Southwest WA*, <<http://www.bom.gov.au/climate/drought/archive/20101206.shtml>>.
- Australian Government: Bureau of Meteorology (no date provided), *Living with Drought*, <<http://www.bom.gov.au/climate/drought/livedrought.shtml>>.
- Australian Government: Bureau of Meteorology 2006, *Rainfall Deficiencies Spread in Western WA; ease in central and eastern Australia*,
<<http://www.bom.gov.au/climate/drought/archive/20060802.shtml>>.
- Bunnings Warehouse (no date provided), *Top 5 Water Saving Products For Your Home*,
<http://www.bunnings.com.au/sustainability_save-water_top-5-water-water-saving-products-for-your-home.aspx>.
- Carberry, Paul 2007, 'Planning for Drought', *Primefacts: Profitable & Sustainable Primary Industries*, NSW Department of Primary Industries,
<http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/104112/planning-for-drought.pdf>.
- City of Fremantle 2012, *City Achieves Water Sustainability Milestone*
<http://www.fremantle.wa.gov.au/home/List_of_News_and_Media/August_2012/City_achieves_wwate_sustainability_milestone>.
- Department of Environment and Conservation 2011, *Sustainable Cities National Awards – Congratulations Subiaco*, Government of Western Australia,
<<http://www.kabc.wa.gov.au/programs/sustainable-cities/287-sustainable-cities-national-awards-congratulations-subiac.html?showall=1>>.
- Department of Health: Public Health 2011, *Urban Rainwater Collection*, Government of Western Australia,
<http://www.public.health.wa.gov.au/cproot/1807/2/urban_rainwater_collection.pdf>.
- Department of Water 2012, *Drought Proof Your Garden Ahead of Summer*, Government of Western Australia,
<<http://www.water.wa.gov.au/Business+with+water/Community+information/Drought+proof+your+garden/default.aspx>>.

Department of Water 2010, *Predicting the Future Demand for Water Resources in Western Australia*, Government of Western Australia, pp. 3-4,
<http://www.water.wa.gov.au/PublicationStore/first/90953.pdf>.

Department of Water (no date provided), *Rainwater Overview*. Government of Western Australia,
<http://www.water.wa.gov.au/Managing+water/Recycling/Waterwise+community+toolkit/Nondrinking+water+sources/Rainwater/Rainwater+overview/default.aspx>.

Department of Water (no date provided), *Stormwater*, Government of Western Australia,
<http://www.water.wa.gov.au/Managing+water/Urban+water/Stormwater/default.aspx>.

Department of Water (no date provided), *Stormwater Management Manual*, Government of Western Australia,
<http://www.water.wa.gov.au/Managing+water/Urban+water/Stormwater/Stormwater+management+manual/default.aspx#>.

Department of Water 2010, *Strategic Plan 2010-2015: Looking After our Water Needs*, Government of Western Australia, p. 3,
<http://www.water.wa.gov.au/PublicationStore/first/97029.pdf>.

Department of Water 2012, *What We Do*,
<http://www.water.wa.gov.au/About+us/What+we+do/default.aspx>.

Government of Western Australia 2007, *State Water Plan 2007*, pg.5,
<http://www.water.wa.gov.au/PublicationStore/first/74923.pdf>.

Government of Western Australia 2004, *Stormwater Management Manual for Western Australia*, chs. 3, 6-9. Department of the Environment.

ICLEI-Local Governments for Sustainability 2008, *About ICLEI*,
<http://www.iclei.org/index.php?id=about>.

ICLEI-Local Governments for Sustainability 2008, *Members*
<http://www.iclei.org/index.php?id=global-members>.

ICLEI-Local Governments for Sustainability 2008, *Water Campaign*
<http://www.iclei.org/index.php?id=10435>.

ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: City of Boroondara Victoria, Flow Control Valve Installation*,
<http://www.iclei.org/index.php?id=2469>.

ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: City of Burnside, SA, Shower Timer Campaign*, <http://www.iclei.org/index.php?id=10354>.

ICLEI-Local Governments for Sustainability 2007, *Water Campaign Case Study: City of Holdfast Bay, SA, Rainwater Reuse Project*, <http://www.iclei.org/index.php?id=6824>.

ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: City of Mandurah Western Australia, Sustainable Mandurah Display Home: Promoting Water Management*, <http://www.iclei.org/index.php?id=2399>.

ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: City of Melville Western Australia, Waterless Urinals*, <http://www.iclei.org/index.php?id=2462>.

ICLEI-Local Governments for Sustainability 2005, *Water Campaign Case Study: City of Perth, WA, Improving Water Quality through Stormwater Treatment Wetlands*,
<http://www.iclei.org/index.php?id=2465>.

- ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: City of Stirling, Western Australia, Water Smart Parks: Irrigating Parks and Gardens Efficiently*, <<http://iclei.org/index.php?id=11620>>.
- ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: Frankston City Council, VIC, Rainwater Tanks*, <<http://www.iclei.org/index.php?id=2471>>.
- ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: Logan City Council, QLD, Smart Metering and Data Management Software*, <<http://www.iclei.org/index.php?id=10238>>.
- ICLEI-Local Governments for Sustainability 2008, *Water Campaign Case Study: Town of Cottesloe, Western Australia, Cottesloe Peninsular Groundwater Restoration Project*, <<http://www.iclei.org/index.php?id=7675>>.
- Thomas, J.F. 2008, *Water Futures for Western Australia 2008-30*, Volume 1: State Report, Resource Economics Unit, Prepared for Department of Water, Perth, pp. 13-14, <<http://www.water.wa.gov.au/PublicationStore/first/90954.pdf>>.
- Thompson, Jodie 2004, *Population Demographics 2020: Fremantle 2020*, Data Analysis Australia, <<http://www.daa.com.au/fileadmin/presentations/population-demographics-2020.pdf>>.
- Water Corporation 2011, *It's Easy to Save Water Every Day Inside and Outside Your Home*, Australian Government, <http://www.watercorporation.com.au/_files/PublicationsRegister/11/lts_easy_to_save_water_every_day_inside_and_outside_your_home.pdf>http://www.watercorporation.com.au/W/waterwise_home.cfm>.
- Water Corporation (no date provided), *Showerhead Swap*, Australian Government. <http://www.watercorporation.com.au/S/showerhead_swap.cfm?uid=1961-7353-4372-4599>.
- Water Corporation (no date provided), *Toilets to Go*, Australian Government. <http://www.watercorporation.com.au/T/toilets_to_go.cfm?uid=2229-9249-4440-6350>.
- Water Efficiency Labelling and Standards (WELS) Scheme 2012, *What is WELS*, Australian Government, <<http://www.waterrating.gov.au/about/index.html>>.
- Water Corporation 2009, *Water Forever: Towards Climate Resilience*, pg. 7, <http://www.watercorporation.com.au/_files/Water_Recycling/Water_Forever_50_Year_Plan.pdf>.
- Water Corporation 2011, *Water Forever Whatever the Weather: Drought-Proofing Perth*, pg. 4, <http://www.watercorporation.com.au/_files/waterforever/10_year_Water_Supply_Strategy.pdf>.
- Waterwise Council (no date provided), *Waterwise Council Case Study, City of Joondalup: Soil Moisture Monitoring*, Department of Water and Water Corporation, <http://www.watercorporation.com.au/_files/waterwise/Case_studies/Case_Study_soil_moisture_sensors.pdf>.

13.Appendix A - City of Fremantle 2013 Water Conservation Action Plan

Separate attachment

2013 Water Conservation Strategy Report

Appendix A

City of Fremantle 2013 Water Conservation Action Plan

Goal
The City of Fremantle's goal is to sustainably preserve the health of water resources so that the aesthetic and functional amenity of the City can be maintained for future generations to utilise and enjoy.
Purpose
The Purpose of the City of Fremantle 2013 Water Conservation Strategy is to enable water to be conserved and water quality to be maintained or improved while preparing for future water challenges through policy development, effective communication and implementation of actions.
Aim
<p>To encourage the pursuit of the Water Conservation Strategies the City will strive to achieve:</p> <ul style="list-style-type: none"> - The ICLEI Water Campaign Milestones; - The Department of Water Ground Water Targets; and - The One Planet Action Goals.





City of Fremantle 2013 Water Conservation Action Plan



The City of Fremantle 2013 Water Conservation Strategy has 7 Action Goals:

Overview

The 7 Action Goals will be achieved through the implementation of the Action items listed for each Goal. The Actions have been developed generally through the steps of: plan; develop policies, guidelines and campaigns; communicate and implement campaigns; and monitor and report results.

ACTION GOALS

Water Management Goal

- 1 Achieve the "Waterwise Council" certification by 2015, supported by the community and in conjunction with the Department of Water, Water Corporation, and ICLEI.

Corporate Scheme Water Conservation Goal

- 2 Scheme water consumption in the City of Fremantle decreased by 32% between 2001 and 2011. The new goal is to reduce the City scheme water consumption by a further 10% over the next 10 years between 2013 to 2022 below the 2011 level of 122,578 kilolitres.

Corporate Groundwater Water Conservation Goal

- 3 The Department of Water 2013 groundwater licence allocation of 7,500 kilolitres per hectare per year is 708,000kL. The goal is to reduce groundwater extraction by 10% below the 2013 allocation level over the next 10 years to 2022.

Community Water Conservation Goal

- 4 Community scheme water usage in the City of Fremantle decreased by about 10% between 2001 and 2010. The goal is to reduce community scheme water usage over the next 10 years to 2022 by a further 10% below the 2010 level.

Corporate Water Quality Goal

- 5 The Corporate Water Quality Goal is to achieve 50 Water Campaign™ Corporate Action points by 2018.

Community Water Quality Goal

- 6 The Community Water Quality Goal is to achieve 50 Water Campaign™ Community Action points by 2018.

Drought Contingency Goal

- 7 The approval by Council of a Drought Contingency Plan that incorporates a plan of action for drought urgency stages by 2016.

Meeting the needs of the various Plans/Strategies									
Water Campaign	Conservation Corporate	Conservation Community	Quality Corporate	Quality Community	Points	Scheme Water Conservation Strategies	Ground (Bore) Water Conservation Strategies	Drought Contingency Plan	One Planet

y						y	y	y	y
y	y					y			y
y	y						y		y
y		y				y			y
y			y		50				y
y				y	50				y
								y	

City of Fremantle 2013 Water Conservation Action Plan



ACTION PLAN

1 Corporate Water Management

Water Management Goal

Achieve the "Waterwise Council" certification by 2015, supported by the community and in conjunction with the Department of Water, Water Corporation, and ICLEI.

Actions

1	Create a Water Smart Team comprising staff and community members to contribute to planning and implementation of the Water Conservation Strategy. Water Smart Team to review Council Policies in relation to corporate and community water use and water quality and provide policy change recommendations and policy guidelines.
2	Water Smart Team to develop appropriate campaigns for all goals, set the priorities and find resources (financial, human, material) to enact campaigns and monitor and report on progress.
3	Ensure that appropriate staff members attend a waterwise training course on waterwise gardening and irrigation and/or on internal auditing.
4	Effectively communicate the City's water conservation aims and objectives and action plan to the community.
5	Create public and internal communication venues including multiple forms of media e.g. social media, online newsletters, email blasts, etc., for community water dialogues.
6	Launch educational campaigns to inform public of water concerns in WA and Fremantle.
7	Disseminate waterwise information to the community.
8	Disseminate progress reports of campaigns and actions to Council and the community.
9	Survey a selection of the community each year over 5 years to monitor the attitudes towards water conservation and the impact the City has had on these attitudes and report.
10	Water Smart Team to provide annual review on what has worked or not and create new campaigns if required.
11	Demonstrate substantial progress within 18 months towards implementation of actions; and include reporting on water efficiency targets and performance in the council's annual report.
12	Apply for Waterwise Council certification and for Water Campaign Milestones.

Meeting the needs of the various Plans/Strategies

Water Campaign	Conservation Corporate	Conservation Community	Quality Corporate	Quality Community	Points	Scheme Water Conservation	Ground (Bore) Water Conservation	Drought Contingency Plan	One Planet
----------------	------------------------	------------------------	-------------------	-------------------	--------	---------------------------	----------------------------------	--------------------------	------------

y	y	y	y	y					
y	y	y	y	y					
y	y								
y	y	y	y	y					
y		y							
y		y							
y		y							
y	y	y	y	y					
y	y	y	y	y					
y	y								
y									

y	y								
y	y								
y	y								
y	y								
y									
y									
y									
y	y								
y	y								

Key Staff Roles/Dept in CoF

Water Smart Team Project Manager	Parks & Landscapes	Tech Services	Sustainability	Marketing	CDU	Planning	Building assets	Environmental Health
----------------------------------	--------------------	---------------	----------------	-----------	-----	----------	-----------------	----------------------

y	y	y	y	y	y	y	y	y
y	y	y	y	y	y	y	y	y
y	y						y	
y			y	y	y			
y				y		y		
y			y	y	y	y		
y			y	y		y		
y			y	y		y		
y			y	y	y	y		
y	y	y	y	y	y	y	y	y
y								
y								

City of Fremantle 2013 Water Conservation Action Plan



ACTION PLAN

2 Corporate Scheme Water Conservation

Corporate Scheme Water Conservation Goal

Scheme water consumption in the City of Fremantle decreased by 32% between 2001 and 2011. The new goal is to reduce the City scheme water consumption by a further 10% over the next 10 years between 2013 to 2022 below the 2011 level of 122,578 kilolitres.

Actions

1	Develop policies and guidelines to help reduce scheme water in all City of Fremantle owned and managed properties
2	Develop a water audit routine for corporate buildings and public open spaces with benchmarks to track progress.
3	Develop a routine maintenance audit for the functionality and efficiency of pipes, taps, and other water appliances.
4	Retrofit council buildings with water efficient technology, e.g. toilets, taps.
5	Post visible water conservation reminders within corporate buildings.
6	Investigate the viability of installing rainwater tanks in City managed buildings and properties for irrigation or other uses.
7	Investigate the viability of installing greywater reuse systems in City managed buildings and properties for irrigation or other uses.
8	Publicise corporate water usage and conservation progress information.

Meeting the needs of the various Plans/Strategies								
Water Campaign	Conservation Corporate	Conservation Community	Quality Corporate	Quality Community	Points	Scheme Water Conservation	Ground (Bore) Water Conservation	Drought Contingency Plan

Key Staff Roles/Dept in CoF								
Water Smart Team Project Manager	Parks & Landscapes	Tech Services	Sustainability	Marketing	CDU	Planning	Building assets	Environmental Health



ACTION PLAN

3 Corporate Groundwater Water Conservation

Corporate Groundwater Water Conservation Goal

The Department of Water 2013 groundwater licence allocation of 7,500 kilolitres per hectare per year is 708,000kL. The goal is to reduce groundwater extraction by 10% below the 2013 allocation level over the next 10 years to 2022.

Actions

1	Undertake a review of all irrigated areas under COF's control to identify in which areas water savings can occur and hydrozones and ecozones can be implemented.
2	Develop a set of 'Water Conservation Design Guidelines' to guide the development of new parks, turf areas, and the re-development of existing areas.
3	Develop and implement a plan to undertake water quality testing across all bores.
4	Develop an agreement with golf courses and the Fremantle football oval on the reduction of use of bore water.
5	Develop a plan for the progressive implementation of hydrozoning and ecozoning across the City's parks and reserves.
6	Replace current irrigation systems with efficient irrigation technologies.
7	Investigate alternative water supply options.
8	Install central control systems for parks and reserves.
9	Install water-monitoring sensors for irrigation systems of parks and reserves and provide training in their use.
10	Plant waterwise and native vegetation in City managed gardens.
11	Apply wetting agents to reduce watering need to City managed gardens and turf.
12	Use mulch on City managed gardens to reduce evaporative water loss, etc.
13	Remove turf in selected high visibility locations throughout the City and replace with waterwise native planting to increase the communities' awareness of water issues and to lead by example.
14	Develop a communication plan to inform the community of ground water use changes and the COF's planned projects for water conservation.

Meeting the needs of the various Plans/Strategies	
Water Campaign	
Conservation Corporate	
Conservation Community	
Quality Corporate	
Quality Community	
Points	
Watershed Water Conservation	
Ground (Bore) Water Conservation	
Drought Contingency Plan	
One Planet	

[illegible]

Key Staff Roles/Dept in CoF	
Water Smart Team Project Manager	
Parks & Landscapes	
Tech Services	
Sustainability	
Marketing	
EDU	
Planning	
Building assets	
Environmental Health	

y	y							
y	y		y					
y	y							
y	y			y	y			
y	y							
y	y							
y	y		y					
y	y		y					
y	y		y					
y	y		y					
y	y		y					
y	y							
y	y		y		y			
y	y		y	y	y			

City of Fremantle 2013 Water Conservation Action Plan



ACTION PLAN

5 Corporate Water Quality

Corporate Water Quality Goal

The Corporate Water Quality Goal is to achieve 50 Water Campaign™ Corporate Action points by 2018.

The City of Fremantle has identified the following priority areas for the management of water quality impacts of the City's operations:

- Sediment control
- Nutrient management
- Gross Litter and Pollution Management

Actions

1	Develop policies and guidelines on prevention of sediment-laden runoff into drains including from construction sites.
2	Develop policies and guidelines on Gross Litter and Pollution Management.
3	Develop and make public a stormwater management plan.
4	Identify all river and ocean outfalls and develop a 5 year plan for progressively closing these down and infiltrating all storm water within the City.
5	Train staff in Water Sensitive Urban Design principles and practises and encourage use in City planning and designs.
6	Develop and implement a range of methods (e.g. biofiltration swales, etc.) to improve the quality of storm water infiltrated into aquifers within the city.
7	Communicate effectively to the community the environmental impact of nutrient management issues.
8	Communicate effectively to the community the City's management strategies for gross litter pollution.
9	Communicate effectively to the community and businesses/trades people the City's nutrient management plans.
10	Require a plan for site sediment runoff containment as part of building or development applications.
11	Substitute impervious paving with pervious pavement or vegetation
12	Install gross litter pollution traps; record and monitor the amounts of litter that these traps catch.
13	Develop a regular schedule for inspecting, cleaning, and repairing the stormwater system
14	Implement street sweeping after high-debris events

Meeting the needs of the various Plans/Strategies

Water Campaign	Conservation Corporate	Conservation Community	Quality Corporate	Quality Community	Points	Scheme Water Conservation	Ground (Bore) Water Conservation	Drought Contingency Plan	One Planet
----------------	------------------------	------------------------	-------------------	-------------------	--------	---------------------------	----------------------------------	--------------------------	------------

y			y		5				y
y			y		5				y
y			y		5				y
y					5				y
y			y		5				y
y			y		5				y
y					5				y
y			y		5				y
y			y		5				y
y			y		5				y
y			y		5				y
y			y		5				y
y			y		5				y
y			y		5				y
y			y		5				y
y			y		5				y

70

Key Staff Roles/Dept in CoF

Water Smart Team Project Manager	Parks & Landscapes	Tech Services	Sustainability	Marketing	CDU	Planning	Building assets	Environmental Health
----------------------------------	--------------------	---------------	----------------	-----------	-----	----------	-----------------	----------------------

y	y	y	y			y	y	y
y		y	y			y		y
y		y		y				
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					
y	y	y	y					

City of Fremantle 2013 Water Conservation Action Plan



ACTION PLAN

6 Community Water Quality

Community Water Quality Goal

The Community Water Quality Goal is to achieve 50 Water Campaign™ Community Action points by 2018.

The City of Fremantle has identified the following priority areas for the management of water quality impacts for the community:

- Waste water management
- Ground water management
- Gross litter and pollution management

Actions

1	Research the installation of third pipe infrastructure in new developments in reference to existing planning regulations and produce a set of guidelines.
2	Develop guidelines on good septic use practises.
3	Update data register regarding onsite septic systems and provide owners with guidelines.
4	Develop creative educational programming and demonstrations
5	Work collaboratively with local schools on litter educational campaigns to engage youth.
6	Launch periodic "litter education programs" in the City of Fremantle.
7	Develop a demonstration site for household waste water reuse and promote it to the community.
8	Support community group/schools programs to monitor pathogens and nutrients in receiving waters; publicise these groups on the COF website.
9	Provide education materials to the community on ground water bore extraction issues.
10	Design and Implement clear signage and/or innovative ways to promote appropriate litter removal.
11	Develop and disseminate literature to locations prone to dangerous litter or waste (e.g., petrol stations and garages).
12	Design and install clean drains signage (e.g. stencils) next to stormwater drains.
13	Develop information on "catchment friendly" gardening with native vegetation.
14	Organise community "cleanup days".

Meeting the needs of the various Plans/Strategies

Water Campaign	Conservation Corporate	Conservation Community	Quality Corporate	Quality Community	Points	Scheme Water Conservation	Ground (Bore) Water Conservation	Drought Contingency Plan	One Planet
----------------	------------------------	------------------------	-------------------	-------------------	--------	---------------------------	----------------------------------	--------------------------	------------

y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y
y				y	5				y

70

Key Staff Roles/Dept in CoF

Water Smart Team Project Manager	Parks & Landscapes	Tech Services	Sustainability	Marketing	CDU	Planning	Building assets	Environmental Health
----------------------------------	--------------------	---------------	----------------	-----------	-----	----------	-----------------	----------------------

						y		y
y						y	y	y
y						y		y
y			y	y	y			
y			y	y				
y			y	y				
y			y			y		
y			y					
y			y					
y	y	y	y	y				
y	y		y	y				
y		y	y					y
y		y	y					
y	y				y			
y			y					



City of Fremantle 2013 Water Conservation Action Plan



ACTION PLAN

7 Drought Resilience

Drought Contingency Goal

The approval by Council of a Drought Contingency Plan that incorporates a plan of action for drought urgency stages by 2016.

Develop an extensive drought contingency plan for the City of Fremantle that will identify:

- Targets: Water usage amounts that restrictions will seek to meet
- Triggers: Conditions that are predicted to result in a drought event stage
- Restrictions: Measures enacted to moderate the form, frequency, and length of water use actions

Actions

1	Define parameters for stages of drought urgencies inline with any Water Authority defined stages.
2	Define communication strategy to effectively inform the public of drought response actions to dispel surprise and anxiety.
3	Identify priority areas for corporate and community water reductions during a drought.
4	Identify and prioritise locations to keep water flow for important aesthetic, recreational or infrastructure requirements and those areas of lowest priority that will have the first water reductions when required.
5	Develop action and response strategies for each drought urgency stage.
6	Define actions required to provide smooth transitions regarding water regulations in the case of drought urgency scenarios.
7	Develop further drought amelioration plans such as storm water harvesting or use of treated water (in partnership with Water Corporation) for public open spaces. (e.g. http://archive.iclei.org/index.php?id=10237 , http://archive.iclei.org/index.php?id=2464)
8	Demonstrate the City's current efforts towards water conscious behaviours.
9	Consult with the Community on the draft Drought Contingency Plan
10	Present the Plan to Council for approval

Meeting the needs of the various Plans/Strategies									
Water Campaign	Conservation Corporate	Conservation Community	Quality Corporate	Quality Community	Points	Scheme Water Conservation	Ground (Bore) Water Conservation	Drought Contingency Plan	One Planet
								Y	
								Y	
								Y	
								Y	
								Y	
								Y	
								Y	
								Y	
								Y	

Key Staff Roles/Dept in CoF								
Water Smart Team Project Manager	Parks & Landscapes	Tech Services	Sustainability	Marketing	CDU	Planning	Building assets	Environmental Health
Y	Y							
Y	Y		Y		Y			
Y	Y							
Y	Y							
Y	Y							
Y	Y							
Y	Y							
Y	Y		Y	Y				
Y	Y		Y		Y			
Y								