



City of  
Joondalup

# City Water Plan 2016 – 2021





Oahu Park (Hillarys)

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Water on a Proteaceae in Yellagonga Regional Park (Joondalup)

# Executive Summary

The City of Joondalup recognises the importance of the sustainable use of water within its operations and facilities, and the need to promote water conservation and water efficiency within the community. Sustainable water management is an important issue for the City of Joondalup and the need to balance provision of water services for the community with the protection of water resources is becoming even more vital in a drying climate.

As a Local Government, the City relies heavily on both scheme and groundwater resources. Scheme water is used within the City's buildings and facilities whilst groundwater is utilised for the irrigation of parks and reserves managed by the City.

As water availability decreases due to competing uses, population growth and climate change, it is essential that the City takes steps to use water resources in a sustainable manner while delivering adequate services and facilities for the community.

The City of Joondalup has demonstrated a commitment to sustainable water management by developing and implementing a *City Water Plan 2012 – 2015* and by joining the Waterwise Council Program to further increase the capacity of the City to use and manage water resources in a more efficient way.

Following a review of the *City Water Plan 2012 – 2015*, a new Water Plan has been developed to guide the sustainable management of the City's water practises into the future. The *City Water Plan 2016 – 2021* provides strategic direction for the delivery of water conservation and water quality improvement initiatives within the City of Joondalup over the next five years. The Plan builds on the achievements of the City's previous *City Water Plan 2012 – 2015* and reflects the water management objectives outlined in the City of Joondalup *Environment Plan 2014-2019*.

The *City Water Plan 2016 – 2021* covers eight key focus areas: water monitoring and reporting, management of wetlands and public open spaces, water sensitive urban design, contracts and purchasing, staff education and participation, community education and participation and partnership and policy.

Many of the successful projects which were developed and implemented from the previous *City Water Plan 2012 – 2015*, are carried forward and form the basis of the updated Plan.

The City's key achievements in regard to water conservation and water quality improvement from the past three years include:

- Monthly groundwater bore meter monitoring;
- Installation of soil moisture sensors within public open spaces across the City;
- Park upgrades to include hydrozoning, ecozoning, redesign of irrigation systems and landscaping as per the Parks Redevelopment Program;
- Implementation of Environmental Building Audits;
- The delivery of a wide range of community and staff water education initiatives;
- Continued participation in the Waterwise Councils Program; and
- Implementation of the *Yellagonga Integrated Catchment Management Plan*.

The *City Water Plan 2016 – 2021* includes a number of targets which will enable the City to monitor progress towards achieving the objectives of the Plan. Annual reporting against the targets will ensure both transparency and accountability to the community in the delivery of the outcomes.

The City's ongoing commitment and proactive approach to sustainable water management is demonstrated by the initiatives that are included within this Plan which are beyond regulatory requirements for Local Government in the area of water management.

# Acronyms

BoM	Bureau of Meteorology	ICLEI	International Council for Local Environmental Initiatives
CoJ	City of Joondalup	IWSS	Integrated Water Supply System
CRC	Cooperative Research Centre	mm	Millimetre
CWSC	Cities as Water Supply Catchments	NWI	National Water Initiative
DoH	Department of Health	WA	Western Australia
DoW	Department of Water	WEAP	Water Efficiency Action Plan
DPaW	Department of Parks and Wildlife	WEMP	Water Efficiency Management Plan
EEP	Environmental Education Program	WOC	Works Operation Centre
GPT's	Gross Pollutant Traps	WSUD	Water Sensitive Urban Design
GWL	Groundwater Licence	YICM	Yellagonga Integrated Management Plan 2015-2019
Ha	Hectare	YR	Year
kL	Kilolitre		
KPI	Key Performance Indicator		



Oahu Park (Hillarys)

# Part 1

## 1. Introduction

### 1.1 Purpose

The *City Water Plan 2016 – 2021* (the Plan) builds on the foundations of the *City Water Plan 2012 – 2015* and continues to provide a coordinated approach for the City to sustainably manage water resources within the City's operations and the community. The Plan identifies the main water related issues impacting the City and sets objectives for scheme water and groundwater conservation, water quality and quantity improvements.

The *City Water Plan 2016 – 2021* will guide the City's water management practises over the next five years, which will facilitate the City's ongoing leadership in meeting its water conservation and water quality management targets whilst creating community awareness regarding the need to manage water resources for the future.

#### 1.1.1 Aim

The *City Water Plan 2016 – 2021* aims to build upon the outcomes of the previous *City Water Plan* by providing a holistic and long term strategic plan to improve water conservation and water quality management within the City.

#### 1.1.2 Objective

The overarching objective of the *City Water Plan 2016 – 2021* is to manage the City's water resources in a sustainable manner in order to decrease water consumption, increase efficiency and improve water quality.

#### 1.1.3 Structure of the Plan

The *City Water Plan* utilises a project based implementation framework and includes the development of specific water related projects that will be implemented over the life of the Plan to achieve its stated objectives. The project based framework addresses both water conservation and water quality within City operations and the community sector.

**Part 1** of the *City Water Plan* provides context to the water management issues facing the City, including future threats and impacts.

**Part 2** is an overview of water consumption by the City and the community and details operational barriers to water management and the City's strategic water management targets.

**Part 3** of the Plan includes key projects that will be implemented over the life of the *Water Plan* to achieve the City's water conservation and water quality improvement targets within the following areas:

- Water Monitoring and Reporting;
- Management of Wetlands and Public Open Space;
- Water Sensitive Urban Design;
- Contracts and Purchasing;
- Staff Education and Participation;
- Community Education and Participation; and
- Partnerships and Policy.

The *City Water Plan* will be continually monitored and reviewed on an annual basis, against a set of indicators for water conservation and water quality improvement. This will assist the City to track progress towards the water management targets.

### 1.2 City Water Plan 2012 – 2015

The City of Joondalup adopted the *City Water Plan 2012 – 2015* in June 2012. Substantial progress was made in implementing initiatives within the Plan with all projects that were scheduled for implementation during the life of the Plan having been either completed or commenced. The key achievements from the *City Water Plan 2012 – 2015* are outlined below.

#### 1.2.1 Key Achievements

A number of projects have been implemented since the adoption of the *City Water Plan* in June 2012, which have contributed to the overall reduction in water consumption and improved water quality. Details on the progress of the projects are provided in Appendix 1.

Key achievements include:

- Monthly groundwater bore meter monitoring;
- Installation of soil moisture sensors within public open spaces across the City;
- Park upgrades to include hydrozoning, ecozoning, redesign of irrigation systems and landscaping as per the Parks Redevelopment Program;
- Implementation of Environmental Building Audits;
- The delivery of a wide range of community and staff water education initiatives;
- Continued participation in the Waterwise Councils Program; and
- Implementation of the *YICM Plan*.

## 1.3 Strategic Context

A decline in water availability has prompted action at the national, state and local level. Water management has shifted from purely an operational issue for water service providers and water managers, to one that is now embedded in strategic policy for all spheres of government.

The decline in the availability of water sources has led to the introduction of strong national and state legislation, regulation and restrictions. The key strategic documents and initiatives undertaken to improve water management across government are outlined below.

### 1.3.1 Local

The aims and objectives within the *City Water Plan* align with the City's broad range strategic documents, namely the *Joondalup 2022: Strategic Community Plan 2012-2022* and the *Environment Plan 2014-2019*.

*Joondalup 2022: Strategic Community Plan 2012-2022* is the overarching document for all of the City's strategic planning documents and outlines the City's commitment to achieving the vision and aspirations of its community and regional stakeholders.

*Environment Plan 2014-2019* provides strategic direction for environmental management across the City's natural resources and assets. The aim of this plan is to ensure that the City's operations are delivered in an

environmentally sustainable manner and that the City takes measures to effectively influence positive environmental behaviours within the community. The plan also outlines a framework for the development of environmental plans and strategies to address key environmental issues including water, as outlined in Figure 1. Water is one of the key themes of the Plan with the objective to manage the City's water resources in a sustainable manner in order to decrease water consumption, increase water efficiency and improve water quality.

### 1.3.2 State Legislation and Regulation

#### 1.3.2.1 Groundwater Licensing and Allocations

The Department of Water (DoW) is responsible for managing and allocating the State's water resources. The DoW grants the right to take water from these resources by issuing licences with water entitlements, under the *Rights and Water Irrigation Act 1914*.

Water allocation plans have been developed to help protect Western Australia's key water sources and outline how much water can be taken from groundwater and surface water resources, while safeguarding the sustainability of the resource and protecting the water-dependent environment. The allocation limits are set based on a combination of factors such as on recharge estimates, modelling, environmental objectives and benefits of groundwater use and provide a guide for

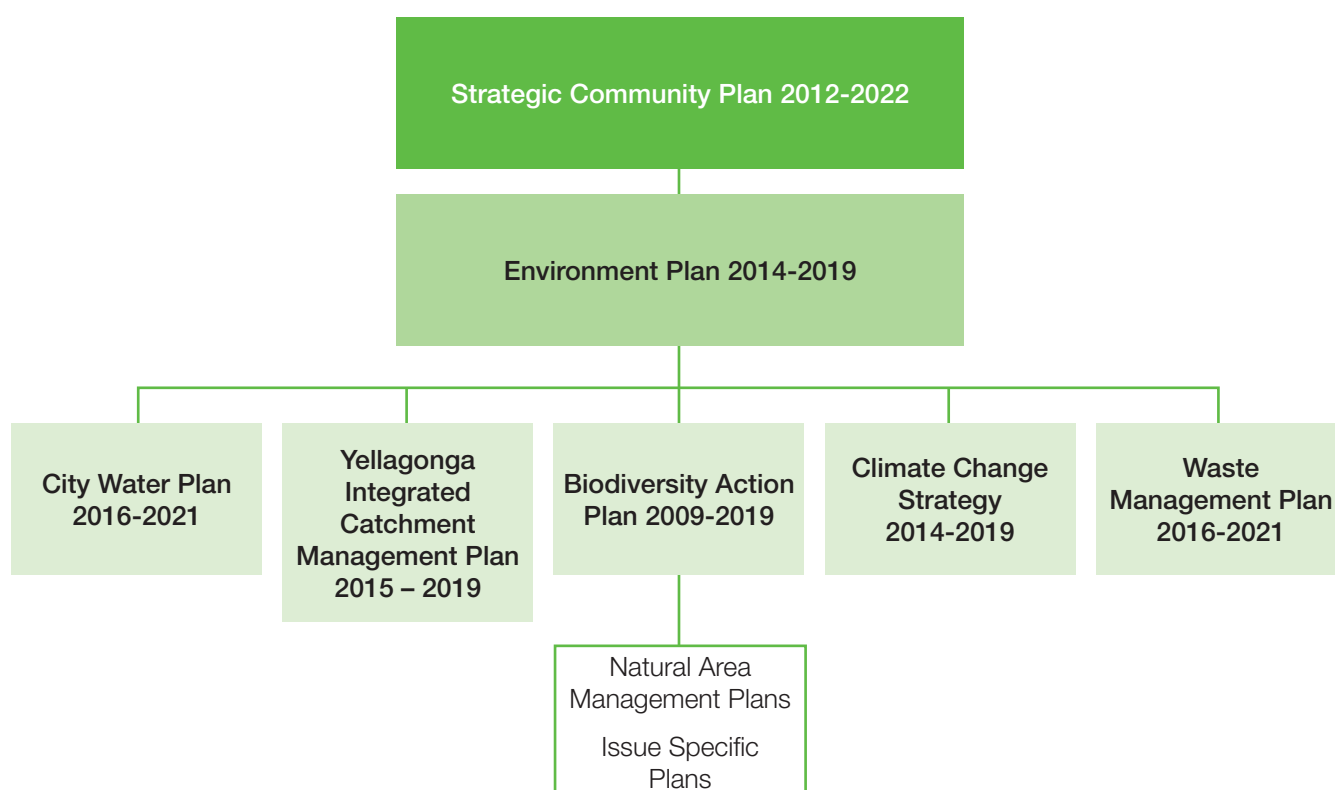


Figure 1: City of Joondalup Strategic Environmental Framework.



### Yellagonga Regional Park (Joondalup)

determining water availability for individual licence assessments. Due to declining rainfall and groundwater recharge over the past forty years, the Gngangara aquifer has become over allocated and the *Gngangara Groundwater Areas Allocation Plan* provides steps for returning the system back into balance.<sup>1</sup> Overall abstraction limits have been reduced by 15% between 2010/11 and 2013/14 in response to the declining rainfall.

The *Gngangara Groundwater Areas Allocation Plan* is currently being reviewed and a draft report for public comment is expected to be released by 2017. This could see further reductions to current allocation limits. The *City Water Plan 2016 – 2021* groundwater targets will be amended incorporating any changes resulting from the revised *Gngangara Groundwater Areas Allocation Plan*.

#### 1.3.2.2 Legislative Reform

Reduced stream inflow has affected water availability for the Perth Metropolitan region and has led to increased pressure on groundwater resources. The region's reliance on groundwater has resulted in more stringent management and monitoring of groundwater use by the State Government. It has meant large users such as the Local Government sector have had to adapt and significantly reduce groundwater use.

The Department of Water is facilitating reform of water resources legislation to ensure a more equitable, transparent and sustainable approach to groundwater

allocations and management. Local Governments will need to prepare for the possibility of changes to the amount of groundwater that is available for irrigation purposes as well as possible changes to management and monitoring processes which will need to be incorporated into future revisions of the Plan.

#### 1.3.3 Waterwise Council Program

The Waterwise Council program was launched by the Water Corporation and Department of Water in 2009 in order to build a cooperative working relationship with Local Governments to improve water use efficiency in their industry and their communities. The program encourages Local Government to lead by example in promoting efficient and effective water management within their communities.

The City joined the program in 2010 to further increase capacity in managing its water resources. The City of Joondalup was named WA's Waterwise Council at the 2011 WA Water Awards for its innovative and sustainable management of water resources. The City has demonstrated ongoing commitment to achieving sustainable water management by retaining Waterwise Council accreditation since 2010.

The Water Corporation and the Department of Water reviewed the Waterwise Council Program criteria in 2015, including the requirement to develop a *Water Efficiency Action Plan (WEAP)*. The *City Water Plan 2016 – 2021* will achieve the requirement for a WEAP.

<sup>1</sup> DoW (2009)

## 1.4 Physical Environment

### 1.4.1 Climate

The City of Joondalup experiences a Mediterranean climate of hot dry summers with an average temperature of 32°C during the day and mild wet winters with an average day time temperature of 20°C.<sup>2</sup>

The average annual rainfall in the City of Joondalup from 2004 to 2015 was 660mm. The average annual rainfall from 1993 to 2003 was 716mm, indicating an annual decrease of approximately 56mm in the past two decades. Approximately 77% of the annual rain falls between the months of May and September, as shown in Figure 2.<sup>3</sup>

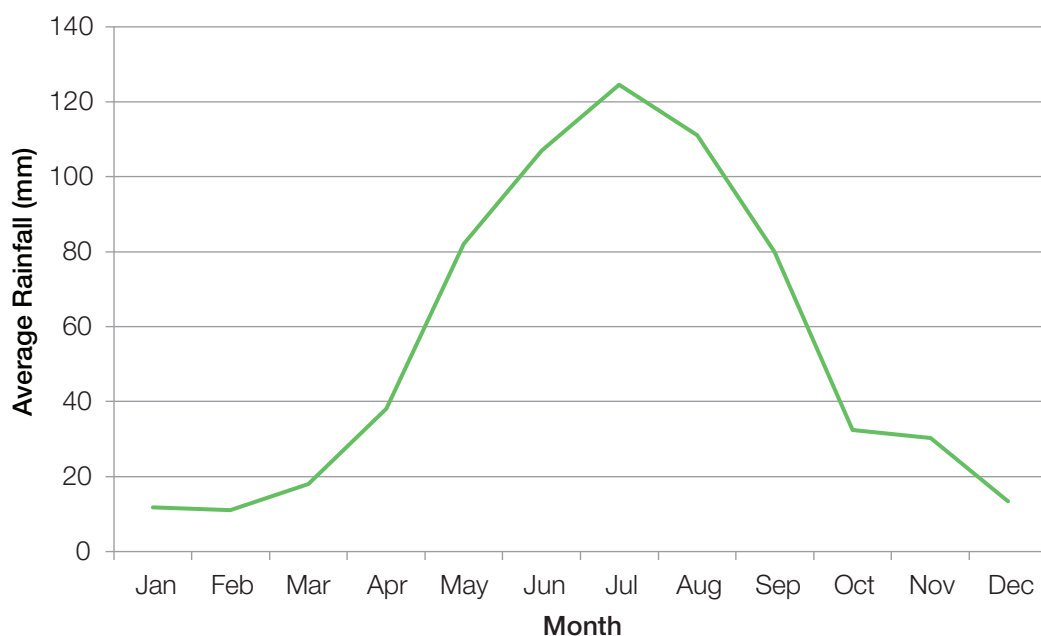


Figure 2: Mean Monthly Rainfall Recorded at Perth Airport Weather Station 2004-2015 (sourced from BoM).

<sup>2</sup> Perth Tourist Centre (2016)

<sup>3</sup> BoM (2016a)

### 1.4.2 Gnangara Groundwater System

The City of Joondalup is located within the Gnangara Groundwater System which is the largest source of good quality, fresh water in the Perth region and supports nationally significant groundwater dependant ecosystems.<sup>4</sup>

The Gnangara Groundwater System stretches approximately 2200 square kilometres along the coastal plain north of the Swan River to Gingin and to the Darling Scarp in the east. The Gnangara Groundwater System comprises of four main aquifers: superficial Gnangara Mound (shallow, unconfined), Mirrabooka (deeper, semi-confined), Leederville (deep, mostly confined) and the Yarragadee (deep, mostly confined). See Figure 3.

40% of the Integrated Water Supply System (IWSS) for public water supply is sourced from the Gnangara system.<sup>5</sup> Water is sourced from all of the aquifers within this system. However, less water is sourced from the superficial aquifer to reduce the impacts on groundwater dependant ecosystems.<sup>6</sup>

## Gnangara Goundwater System

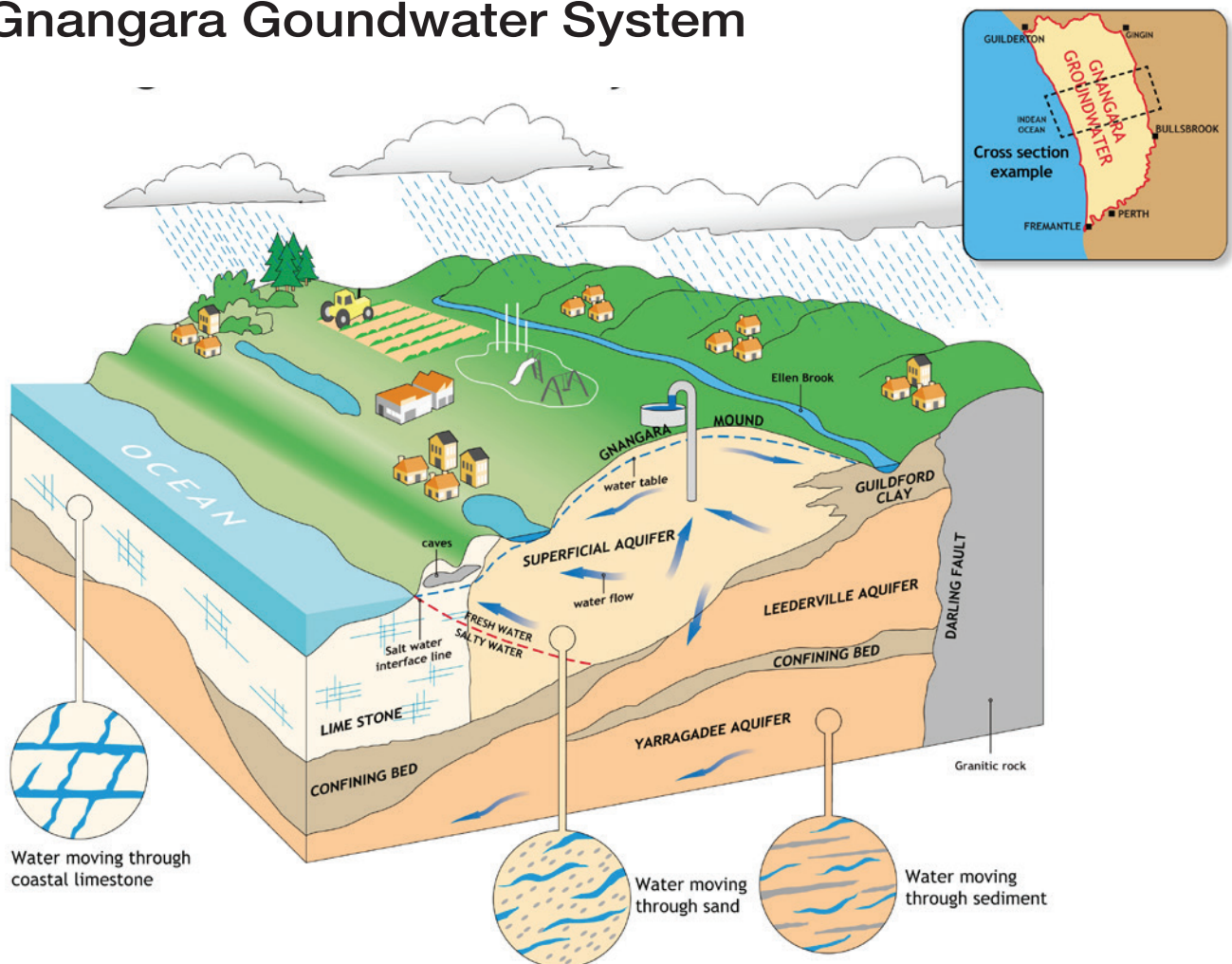


Figure 3: The Gnangara groundwater system (sourced from DoW).

<sup>4</sup> DoW (2011)

<sup>5</sup> DoW (2009)

<sup>6</sup> DoW (2016)



Groundwater levels in the superficial aquifer have been declining over the past 40 years due to a combination of abstraction and declining rainfall. However since the introduction of the Department of Water’s *Gnangara Groundwater Areas Allocation Plans* in 2011 there has been a demonstrated decrease in the rate of decline for groundwater levels as shown in Figure 4.

The Water Corporation conducted a successful three year groundwater replenishment trial at the Beenyup Wastewater Treatment Plant which ended in December 2012. The construction of the treatment plant, which will boost Perth’s drinking water supplies with the ability to recharge 14billion litres of water into groundwater supplies, is expected to be completed by the end of 2016.<sup>7</sup>

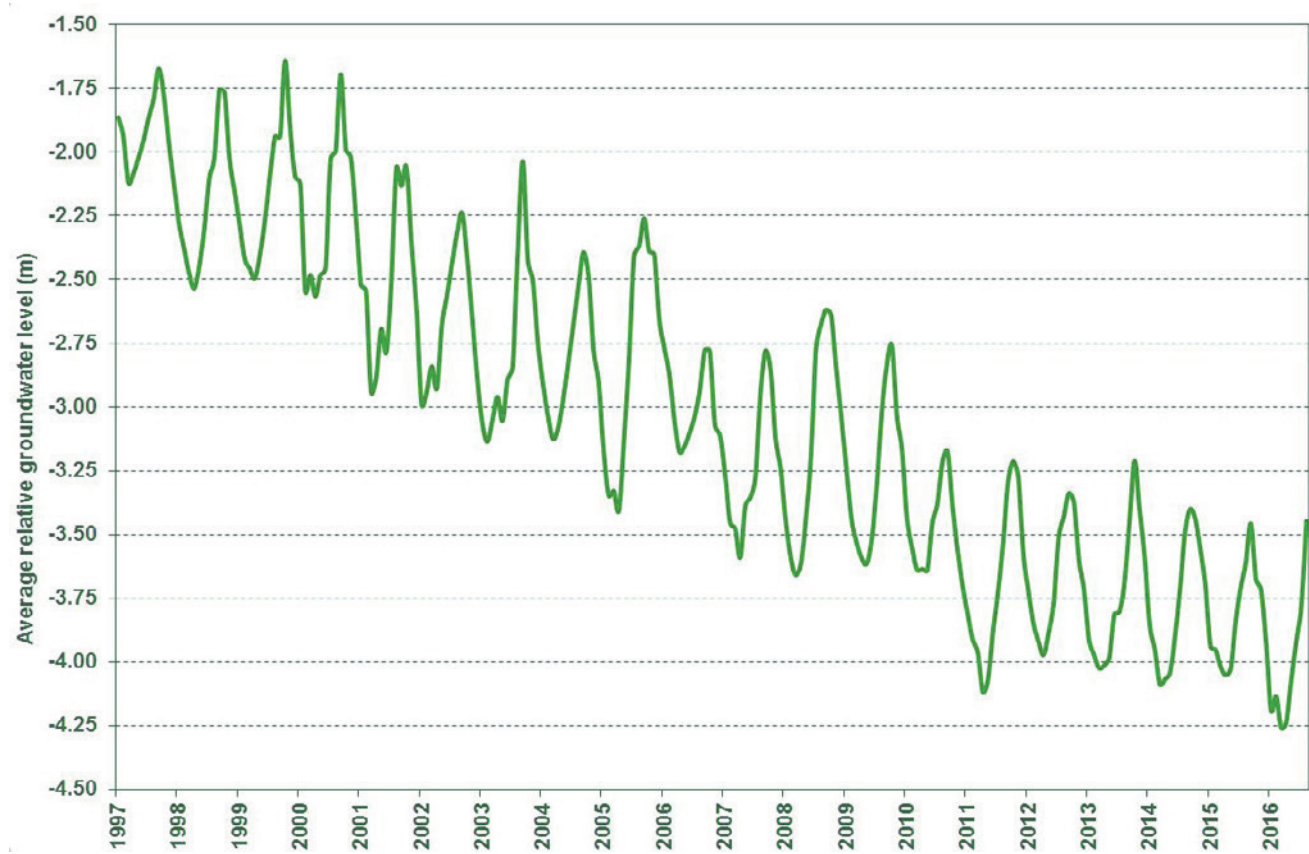


Figure 4: Average groundwater level in the Gnangara Mound (sourced from DoW)

<sup>7</sup> Water Corporation (2016)

### 1.4.3 Yellagonga Regional Park and Wetlands

Yellagonga Regional Park (the Park) is one of eleven regional parks within the Perth Metropolitan area and lies on the Swan Coastal Plain located approximately 20km north of Perth. The City of Joondalup contains part of this distinct linear wetland system which consists of a wetland chain including, from north to south, Lake Joondalup, Beenyup Swamp, Walluburnup Swamp and Lake Goollelal,<sup>8</sup> (see Figure 5).

The surface water catchment area impacting on the Park is estimated to cover an area of approximately 4000 hectares.<sup>10</sup> The catchment area is linked to the Park by surface flows via drainage infrastructure and groundwater flows. The catchment encompasses land on either side of the Park located in the Cities of Joondalup and Wanneroo and includes medium to high-density residential, commercial and light industrial development interspersed with green areas. Lake Joondalup and Goollelal, and the swamps Beenyup and Walluburnup, are the receiving aquatic environments for water from this catchment via surface, groundwater and stormwater flows. Any land use within this catchment will have some impact on the quality and quantity of the water entering the wetlands which can also have an impact on the floristic and faunal communities within the Park.

In order to maintain and enhance amenity, recreational, scientific, educational and conservation values of the Park for present and future generations, an integrated catchment approach has been undertaken by the Cities of Joondalup and Wanneroo and the Department of Parks and Wildlife (DPaW) providing a comprehensive and integrated approach to managing the Park.

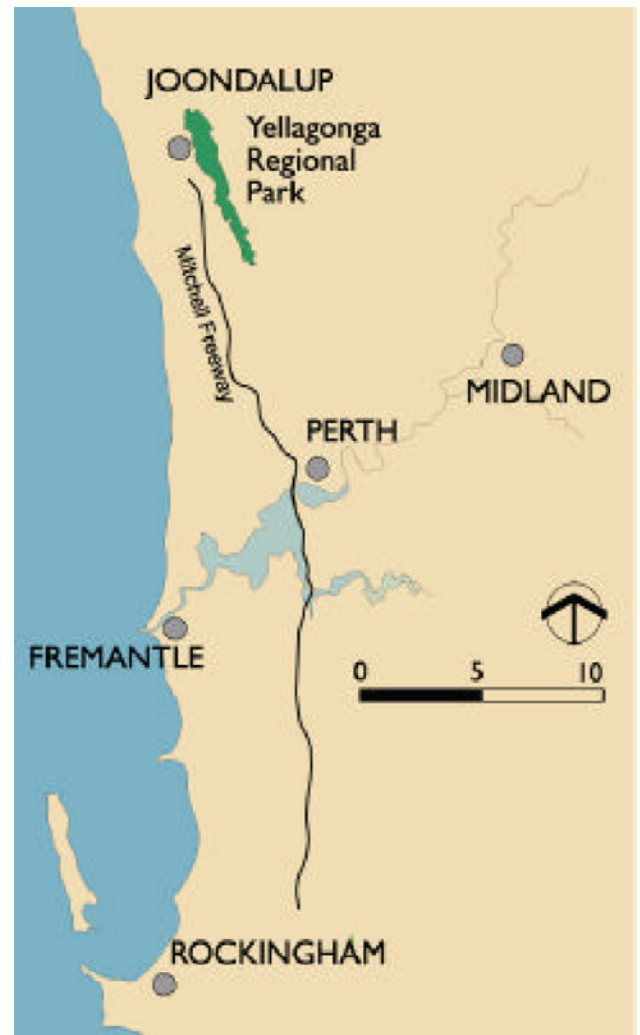


Figure 5: Location of the Yellagonga Regional Park.<sup>9</sup>



Picnic Cove (Edgewater)

<sup>8</sup> CALM et al (2003)

<sup>9</sup> CALM et al (2003)

<sup>10</sup> Ove Arup and Partners (1994)



Baby Pacific Black Ducks Yellagonga Regional Park (Edgewater)

## 1.5 Key Challenges

The City undertakes its water management activities in the context of a number of pressures including requirements to reduce water consumption, a drying climate, increased provision of services and facilities and the impact of pollutants on receiving water bodies from the urban environment.

Four key challenges have been identified for water management within the City and are shown in the diagram below.

### 1.5.1 Meeting current and future groundwater allocations

Groundwater levels in the superficial aquifer have been declining over the last 40 years due to a combination of continued groundwater abstraction, declining rainfall and groundwater recharge. Future projections of further decline in rainfall for the south-west region will result in

less available water for groundwater recharge.<sup>11</sup> With an expected increase in population across the Perth-Peel Region from 1.65million to 3.6million by 2050,<sup>12</sup> demand on water resources is set to increase considerably. This could result in further water allocation reductions within the *Gnangara Groundwater Areas Allocation Plan* which is currently under review by the Department of Water (DoW) and expected to be released for public comment in 2017.

A reduction in water allocations within the *Gnangara Groundwater Areas Allocation Plan* could result in a reduction of the City's current Groundwater Licence's annual allocation limits, which will impact on the available water to irrigate the City's parks and open spaces. The City's future management of its parks and open spaces will need to be considered in the context of changing groundwater allocations.

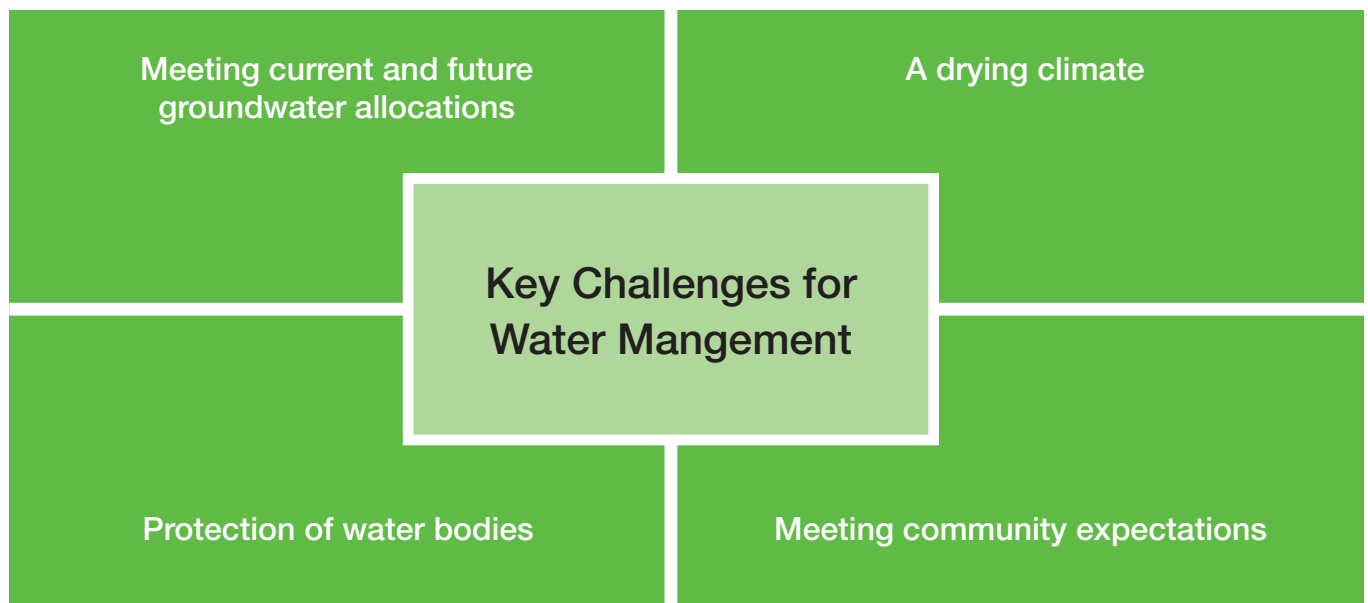


Figure 6: Key Water Management Challenges within the City of Joondalup.

<sup>11</sup> DoW (2013)

<sup>12</sup> Department of Planning and Western Australian Planning Commission (2014)

### 1.5.2 A drying climate

One of the key issues for the South West of WA is the amount of available water due to decreased rainfall which has affected stream flow into Perth dams (see Figure 7). Rainfall in the South West of WA has already decreased by 15% since the 1970s,<sup>13</sup> which has resulted in reduced stream flow to surface water bodies and dams by 70%.<sup>14</sup> The reduction in available water within local dams has placed extra pressures on the groundwater resources at the same time that demand for water is increasing. Reduced stream flow has also dramatically reduced recharge to groundwater aquifers.

Modelling suggests that mean annual rainfall will continue to decrease and the South West of WA could potentially experience 80% more drought-months by 2070.<sup>15</sup>

Adaptation to the drying climate is critical, particularly as the impacts of climate change are already being experienced. Climate change is likely to increase temperatures and the number of days over 30°C in the South West, which will subsequently increase evaporation rates from surface water bodies and soil. By 2030, the annual average number of days over 35°C in Perth could rise from the current 27 to 29-38 days per year.<sup>16</sup> More extreme weather events are also predicted, including increased frequency and severity of droughts. The City's future management of water resources will need to be considered in the context of a changing climate.

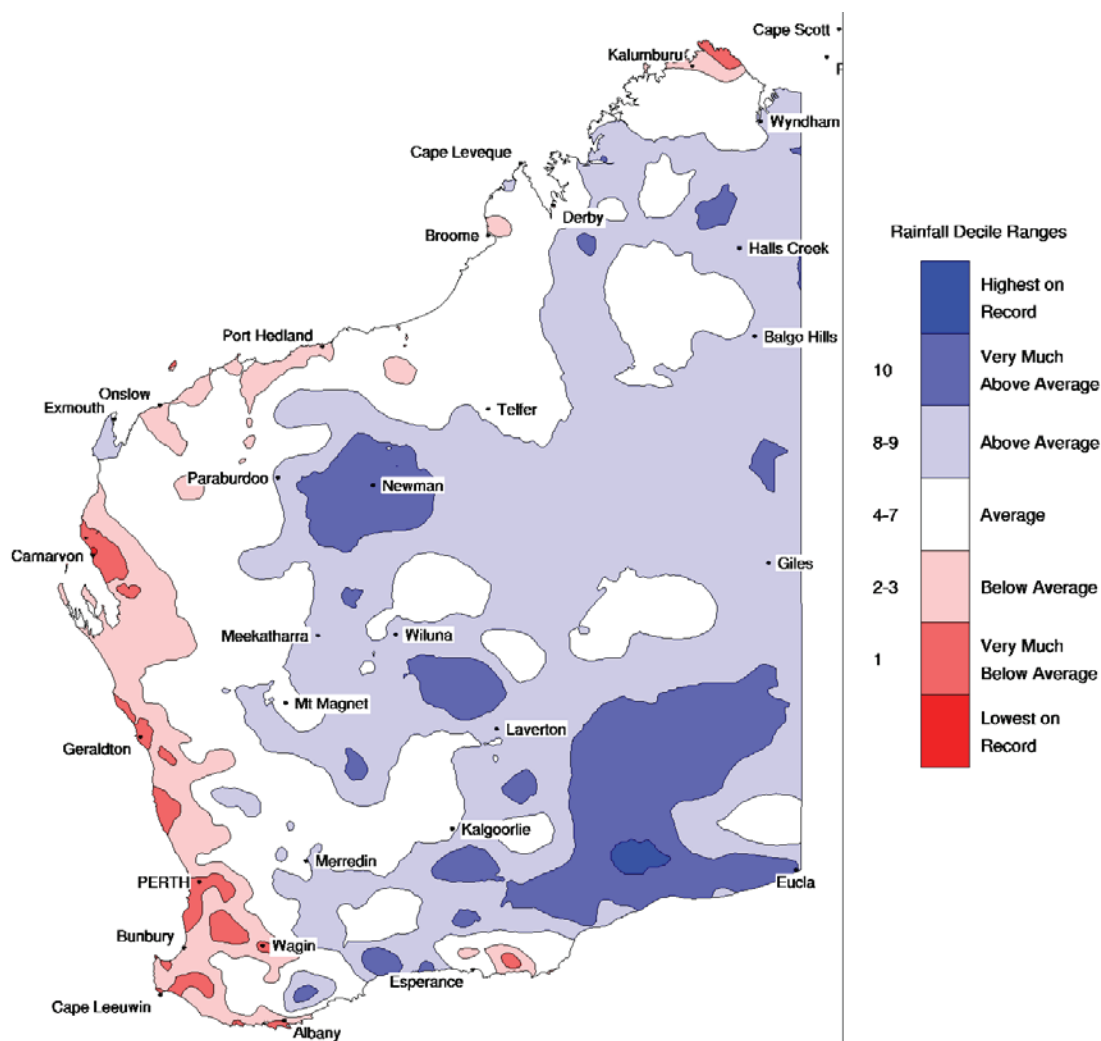


Figure 7: Western Australian Rainfall Deciles 1 July 2013 to 30 June 2016 (sourced from BoM).

<sup>13</sup> DoW (2013)

<sup>14</sup> Water Corporation (2008)

<sup>15</sup> Department of Environment (2016)

<sup>16</sup> South Western Australia (Climate Change) (n.d)



**Mudflats at Yellagonga Regional Park (Edgewater).**

### 1.5.3 Protection of water bodies

The interface between surface water, wetlands, coastal waters and groundwater means that water quality and quantity management is an important issue as an adequate quantity and quality of water is required to support water dependant ecosystems and to provide adequate drinking water sources.

Water quality can be negatively impacted through drainage operations, maintenance works and management of waterways and public open spaces. Within the community, the application of fertilisers, waste management, vehicle use and interaction with waterways can also lead to a reduction in water quality within the receiving environments. Additionally, water quality can be impacted by factors such as land use, groundwater abstraction and climate change.

Pollutants such as heavy metals, hydrocarbons, nutrients, suspended solids and litter can enter the water bodies via the stormwater runoff, groundwater flow and rainfall.

Poor water quality can affect the health of wetlands and aquatic systems with increased levels of metals and nutrients within water bodies which can lead to algal blooms, reduced reproduction rates and death of flora and fauna.

### 1.5.4 Meeting community expectations

The City's population has increased by almost 5% in the past ten years. This has increased demand for services and facilities within the City. With an expected increase in population across the Perth-Peel Region from 1.65million to 2.2million by 2031<sup>17</sup>, demand for water resources is set to increase considerably. As water availability decreases and demand increases, it is essential the City takes steps to use water resources in a responsible manner while maintaining the delivery of high quality services and facilities for the community. To achieve this, the City aims to improve both water conservation and efficiency.

<sup>17</sup> Department of Planning (2010)



Currambine Community Centre (Currambine)



## Part 2

# 2. City Water Profiles

### 2.1 Water Sources

The City utilises both groundwater and scheme water within its operations and buildings. The City utilises scheme water within its community buildings, facilities and administrative buildings whilst groundwater is used in the irrigation of the City's parks and open spaces.

Opportunities for alternative water sources, such as in Currambine Community Centre which utilises a 20kL rainwater tank for toilet flushing, will continue to be investigated. Wherever practicable, the City will also improve the eco-efficiency of City owned buildings and assets by implementing environmentally sustainable design principles into the construction, renovation and retro-fitting of all future building assets as the City adapts to a drying climate.

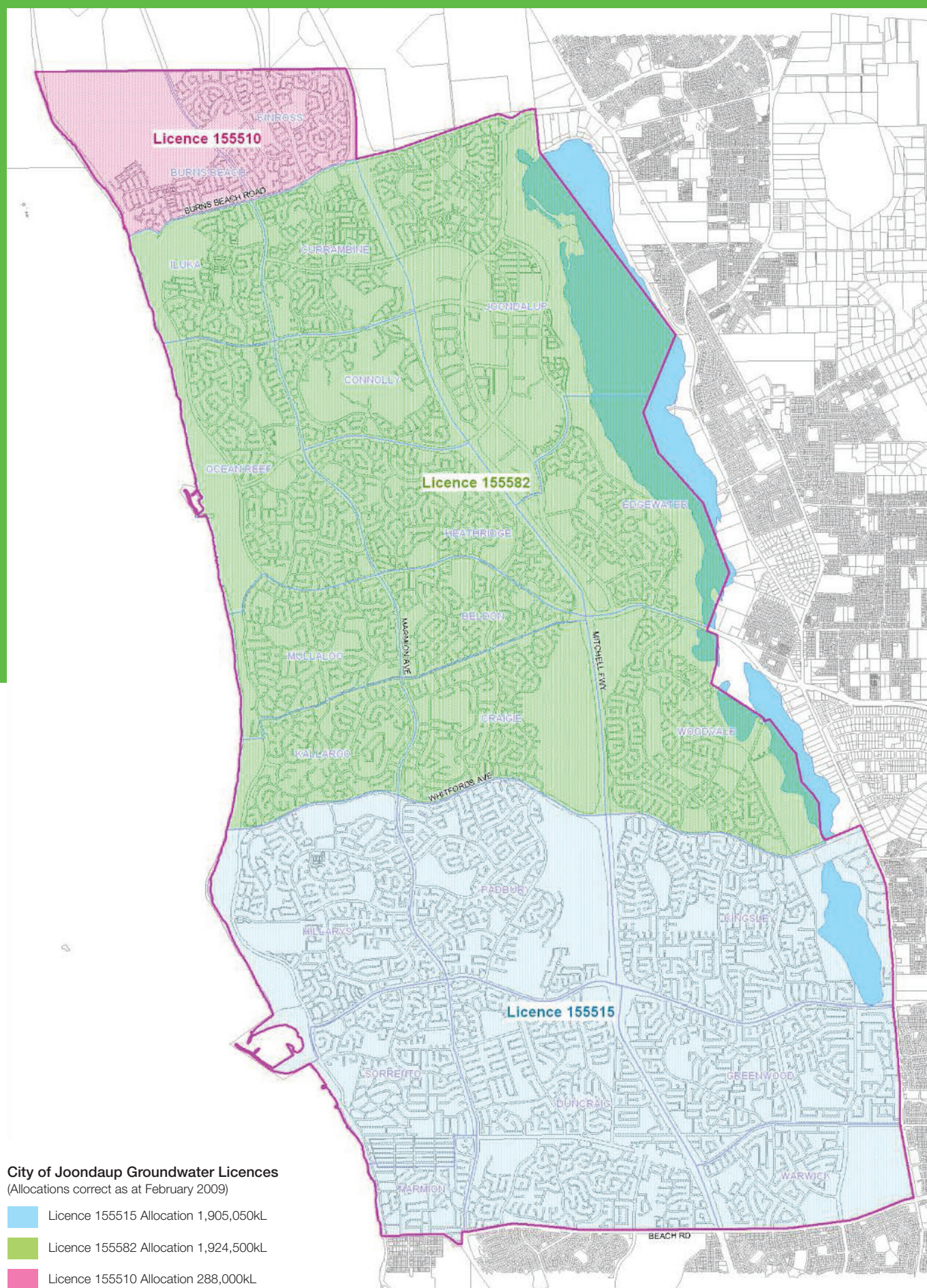


Figure 8: Groundwater Licence Zones - City of Joondalup.

## 2.2 Corporate Water Consumption

### 2.2.1 Groundwater

The City uses groundwater from superficial (shallow) aquifers in the Gnangara Groundwater System to irrigate parks and public open space. Groundwater usage accounts for 98% of the City's corporate water use.

The City has three groundwater licenses (GWL 155515, GWL 155582 and GWL 155510) for irrigating parks and public open space. The GWLs cover two groundwater sub-areas: Whitford and Quinns. GWL 155510 is in the Quinns sub-area, which is located north of Burns Beach Road and consists of newer parks and sporting fields. The remaining two GWLs cover the Whitford sub-area, from Beach Road to Burns Beach Road. This area consists predominantly of established parks and sporting ovals with older infrastructure and design elements.

The GWL have set allocation limits and the usage within the two Whitford licenses has been amalgamated. While the licence areas are still separate, the allocations are effectively combined which gives the City greater flexibility to reduce or increase water use in particular areas when needed, providing for

holistic, sustainable management of the City's groundwater resources. The licence areas for the City's GWLs are displayed in Figure 8.

The City undertakes monthly groundwater consumption monitoring as part of its commitment to increasing water efficiency and proactive resource management. Regular monitoring assists the City to manage and monitor actual usage against the Department of Water GWL allocations. Groundwater consumption data has been collected since 2007/08; however, meters were not installed on all bores until 2008/09. Figure 9 compares the groundwater consumption over the past five years.

Over the past five years, the City's overall groundwater consumption has been below the DoW's annual allocation. The increase in groundwater consumption in 2013/14 can be attributed to Perth experiencing well below average summer rainfall with above average maximum temperatures resulting in Perth experiencing its fifth driest summer since 1876.<sup>18</sup> The 2015 winter was Perth's ninth driest winter on record which was followed by Perth's fifth driest spring.<sup>19</sup> These climatic factors influenced the City's groundwater consumption during 2015/16.



Figure 9: Groundwater consumption 2011/12 – 2015/16.

<sup>18</sup> BoM (2014)

<sup>19</sup> BoM (2016b)

The City has moved towards a reporting regime based on groundwater sub-areas, rather than groundwater licenses as displayed in Figure 10. The Whitford sub-area is an amalgamation of GWL 155515 and GWL 155582. The Quinns sub-area is GWL 155510. The trends in groundwater consumption are relatively consistent across the groundwater sub-areas and reflect similar usage trends based on rainfall and seasonal variations across the years.

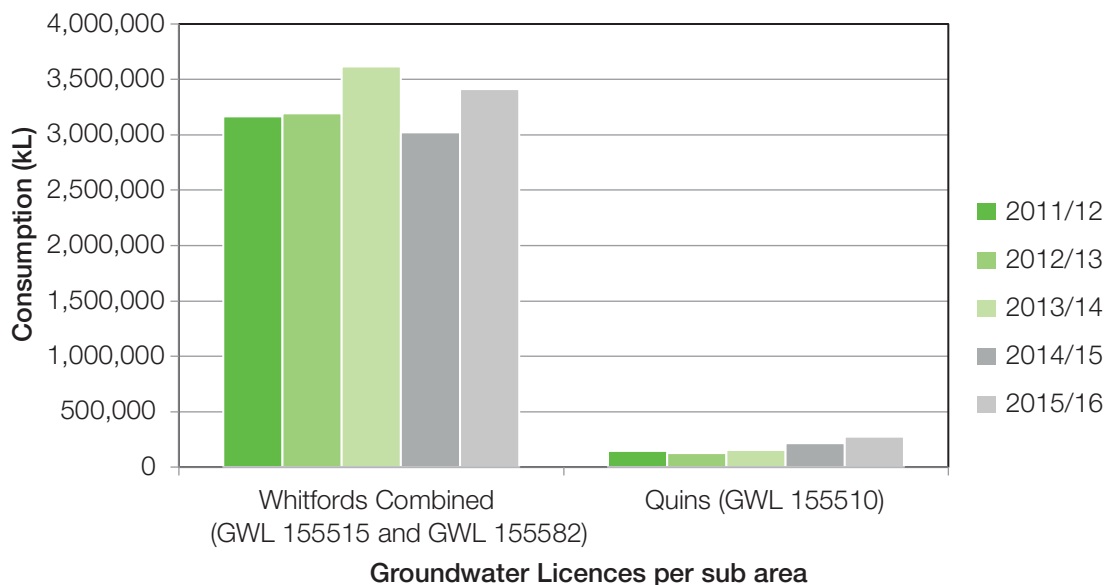


Figure 10: Groundwater use for each groundwater sub-area since 2011/12.

## 2.2.2 Scheme Water

All scheme water is supplied to the City of Joondalup via the Integrated Water Supply System (IWSS) which is sourced from a combination of groundwater, surface water and desalination resources.<sup>20</sup> This is treated at local groundwater treatment plants to drinking water quality. The City uses scheme water in its community facilities, offices, recreation centres, libraries and civic centres.

Figure 11 displays the total scheme water consumption for all City buildings from 2011/12 to 2015/16.

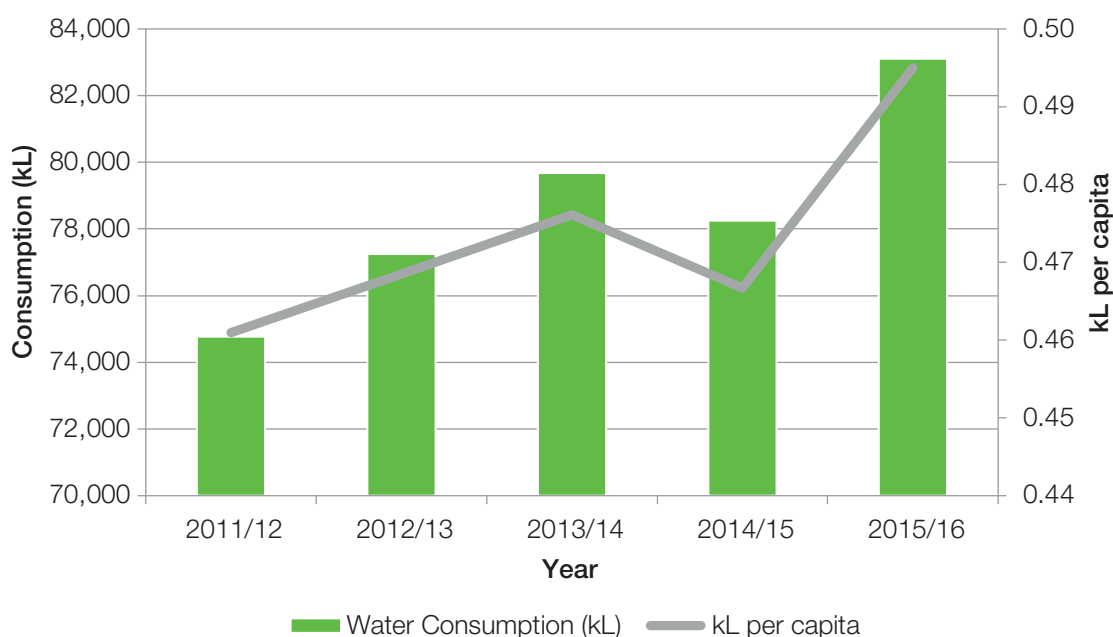


Figure 11: Total Corporate Scheme Water Consumption 2011/12 to 2015/16.

<sup>20</sup> DoW (2012)



Irrigation controller at Santa Ana Park (Currambine)



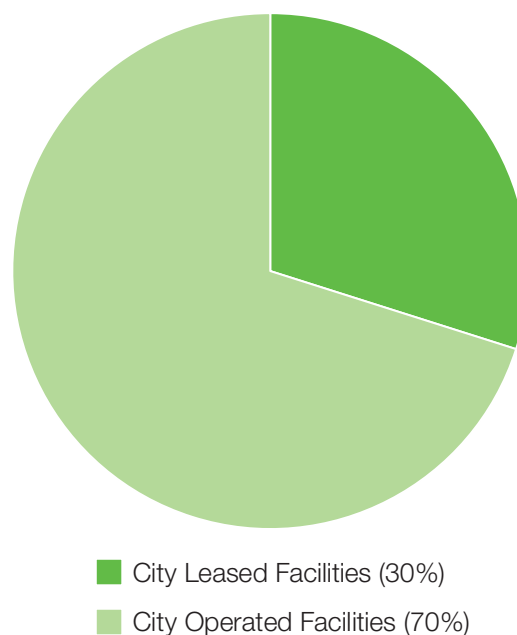
Irrigation testing at Iluka District Open Space (Currambine)

The City has made a concerted effort to reduce scheme water use. However, population growth and new or upgraded facilities such as the City of Joondalup Leisure Centre – Craigie upgrade in 2010/11, has influenced the City's overall scheme water use.

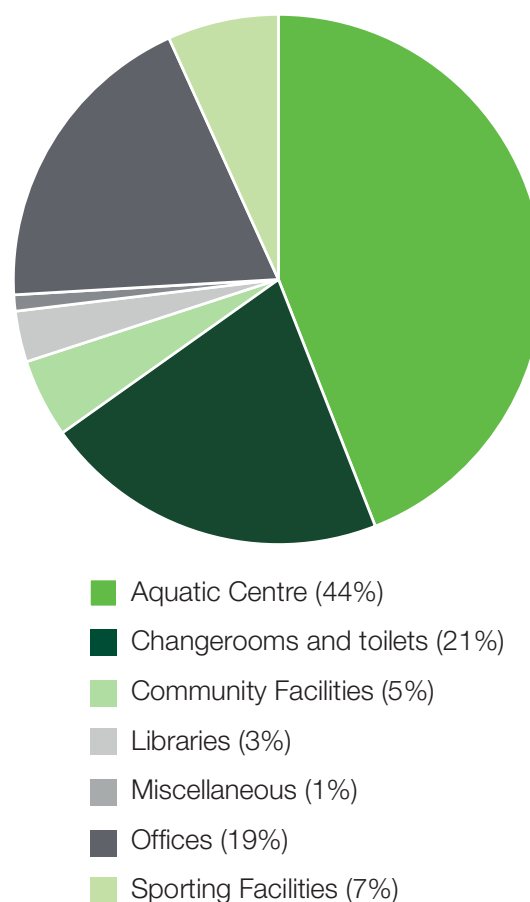
The increase in scheme water consumption during 2013/14 can be attributed to Perth experiencing well below average summer rainfall with above average maximum temperature resulting in Perth experiencing its fifth driest summer since 1876<sup>21</sup>. The 2015 winter was Perth's ninth driest winter on record, followed by Perth's fifth driest spring,<sup>22</sup> which could have influenced the City's scheme water consumption during 2015/16.

The City provides a broad range of services and owns a number of facilities across numerous different building groups. This includes buildings which are owned and operated by the City as well as City owned buildings which are leased to community groups. In some leased buildings the City is responsible for the water usage accounts and in others, the lessee is responsible for water usage accounts. City leased buildings where the lessee is responsible for their own water usage accounts, have not been included as part of the Plan. Over the past five year period, City leased buildings (excluding City leased buildings responsible for their own water accounts), have accounted for 30% of the total Corporate Scheme water usage as displayed in Figure 12. The water consumption figures provided throughout this Plan are based on the most up to date data available at the time. This includes actual data collected through billing information plus minor estimated components. Any water consumption data provided in subsequent reporting will incorporate any minor amendments made to the consumption figures.

Figure 13 indicates that the City's highest scheme water consumers for City owned and operated facilities are the Aquatic centre (City of Joondalup Leisure Centre – Craigie), followed by change rooms and toilets facilities and office buildings.



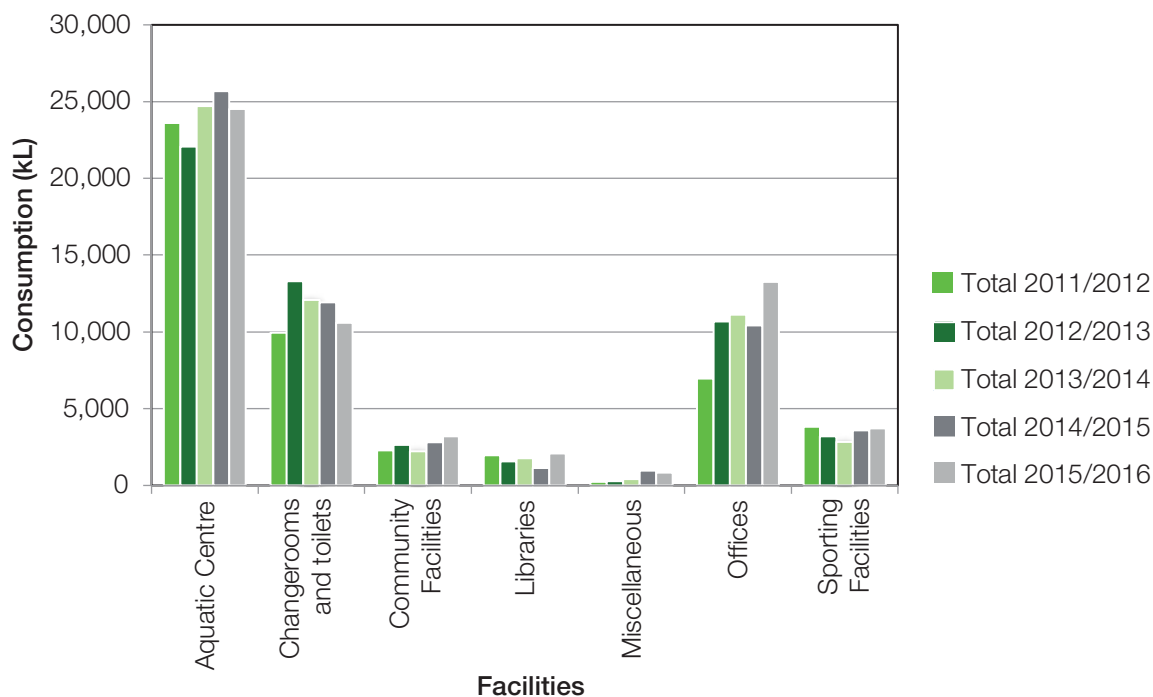
**Figure 12: Total scheme water consumed for City leased and City operated facility groups from 2011/12 to 2015/16.**



**Figure 13: Total scheme water consumption for City of Joondalup operated facility group types from 2011/12 to 2015/16.**

<sup>21</sup> BoM (2014)

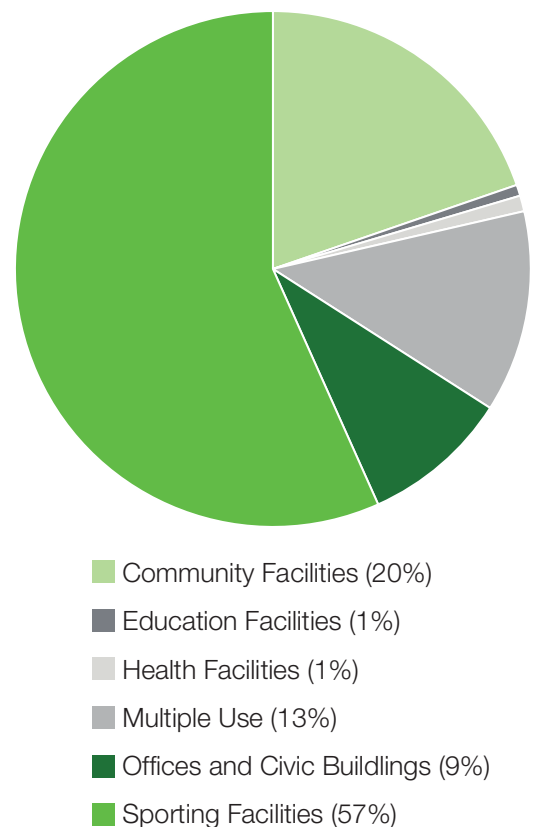
<sup>22</sup> BoM (2016b)



**Figure 14: Total scheme water consumption per facility type for City of Joondalup operated facilities from 2011/12 to 2015/16.**

Scheme water usage over the last five year period has varied amongst the building and facility groups owned and operated by the City as demonstrated in Figure 14. Variation in water usage within these facilities can be attributed to an increase or decrease in facility usage by the local community as well as additional infrastructure being built or retrofitting of existing facilities within the City.

Figure 15 above indicates that the City's highest scheme water consumers for City leased facilities are the sporting facilities, community facilities and multiple use buildings.



**Figure 15: Total scheme water consumption per facility group type for City of Joondalup leased facilities from 2011/12 to 2015/16.**

Scheme water usage over the five year period has varied amongst the City's leased building and facility groups as demonstrated in Figure 16. Variation in water usage within these facilities can be attributed to the number of facilities leased as well as consumption by users. Water usage can be affected by additional infrastructure being built or retrofitting of facilities within the City.

However, population growth and climatic conditions could also increase the City's overall scheme water use within both City owned and operated buildings and City leased buildings.

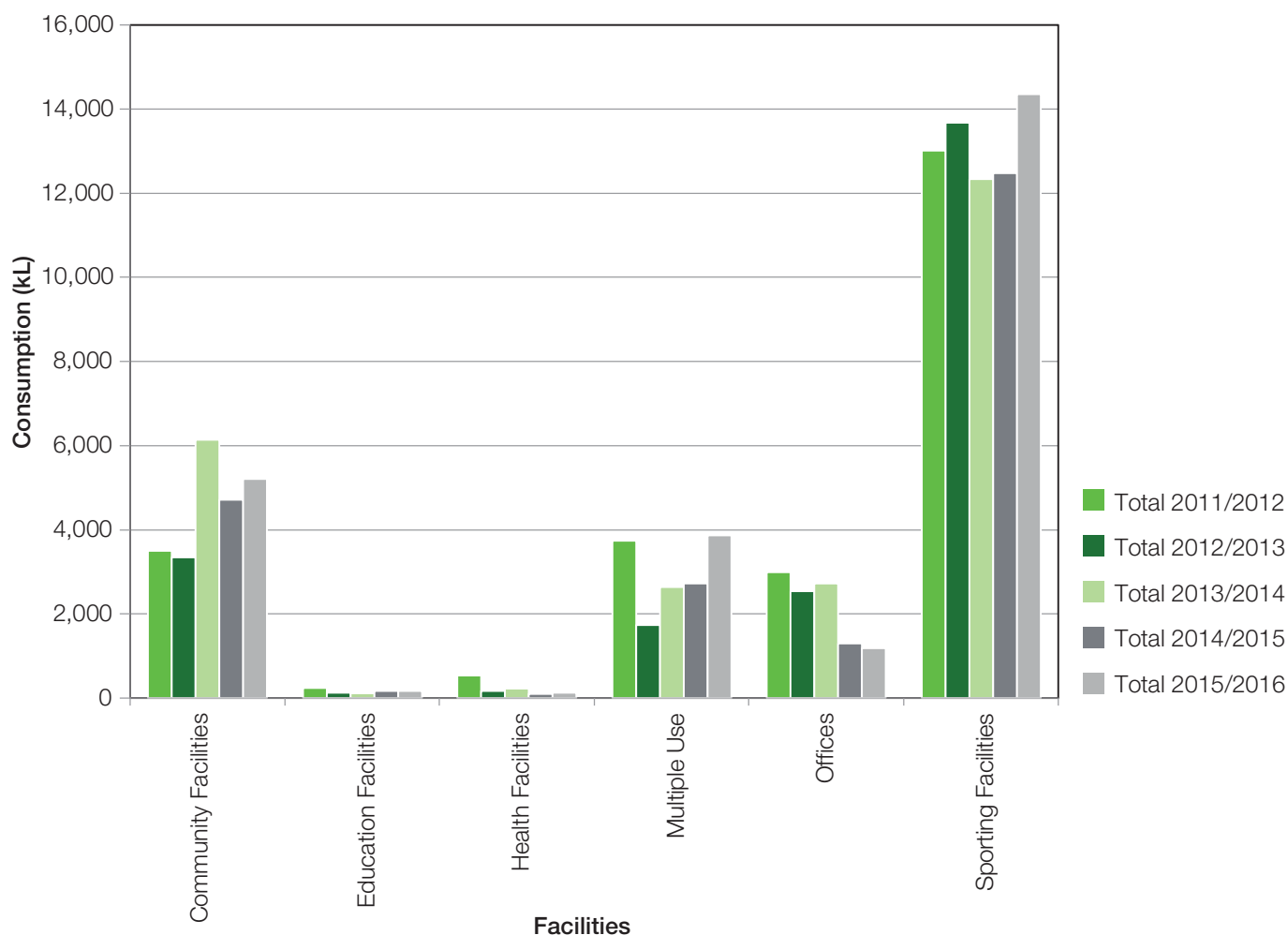


Figure 16: Scheme water consumption per facility group type for City of Joondalup leased facilities from 2011/12 to 2015/16.



Top Twelve Water Using Facilities

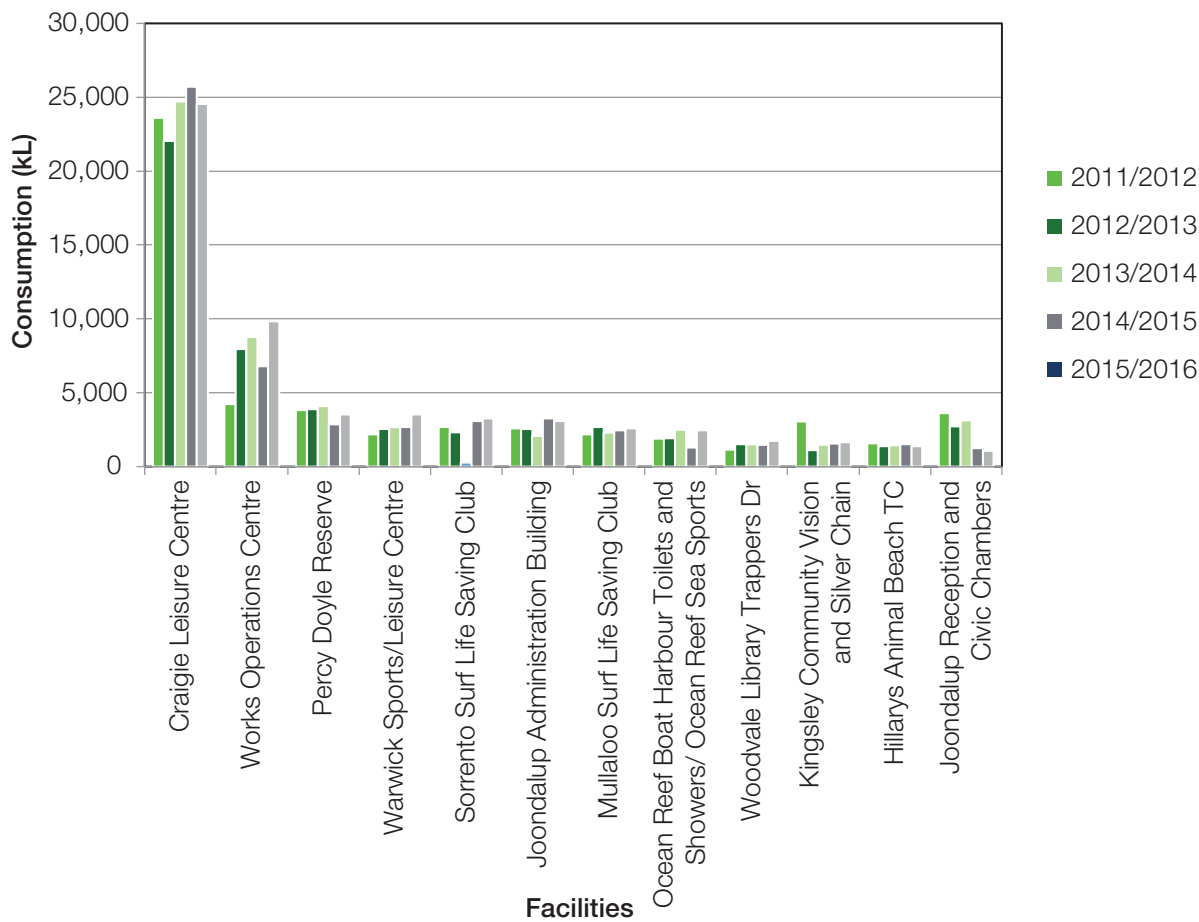


Figure 17 displays the City’s top 12 coporate scheme water using facitlites from 2011/12 to 2015/16.

The top 12 facilities have remained constant over the past five years even though actual usage may have varied. The facilities are a combination of City owned and operated buildings and City leased facilities across various facility types. By far, the highest user was the City of Joondalup Leisure Centre – Craigie which includes multiple swimming pools, spa, sauna, gymnasium, change room facilities and sports courts. In 2015/16, the top 12 facilities formed 71% of the total corporate scheme water usage.







Oahu Park (Hillarys)



## 2.3 Community Water Consumption

### 2.3.1 Groundwater

Groundwater supplying community garden bores is drawn from the superficial aquifer and currently, there is no requirement for home bores within the superficial aquifer to be registered or licensed.<sup>23</sup> There is also no measured data available on community groundwater consumption.

It is estimated that there are 169,200 garden bores within the Perth Metropolitan Area.<sup>24</sup> The DoW has developed the Groundwater Atlas to map areas that are suitable for garden bores. An area can be deemed unsuitable due to water quality concerns or potential impacts to waterways, groundwater dependent ecosystems or acid sulphate soils. Garden bores are encouraged by the State Government because they can reduce demand on scheme water resources by providing a fit for purpose water source.

Availability of the groundwater for residential garden bores is dependent on rainfall to recharge the shallow superficial aquifer and due to the drying climate, sprinkler restrictions have applied to residential garden bores during winter months since 2010.

<sup>23</sup> Department of Environment (2004)

<sup>24</sup> Water Corporation (2013)



City of Joondalup Sustainable Gardens Workshop at Currambine Community Centre

### 2.3.2 Scheme Water

All scheme water is supplied to the City of Joondalup via the Integrated Water Supply System (IWSS) which is sourced from a combination of groundwater, surface water and desalination resources.<sup>25</sup> This is treated at local groundwater treatment plants to drinking water quality. The residential sector accounts for 71% of the water consumption, 39% of which is used for irrigation.<sup>26</sup>

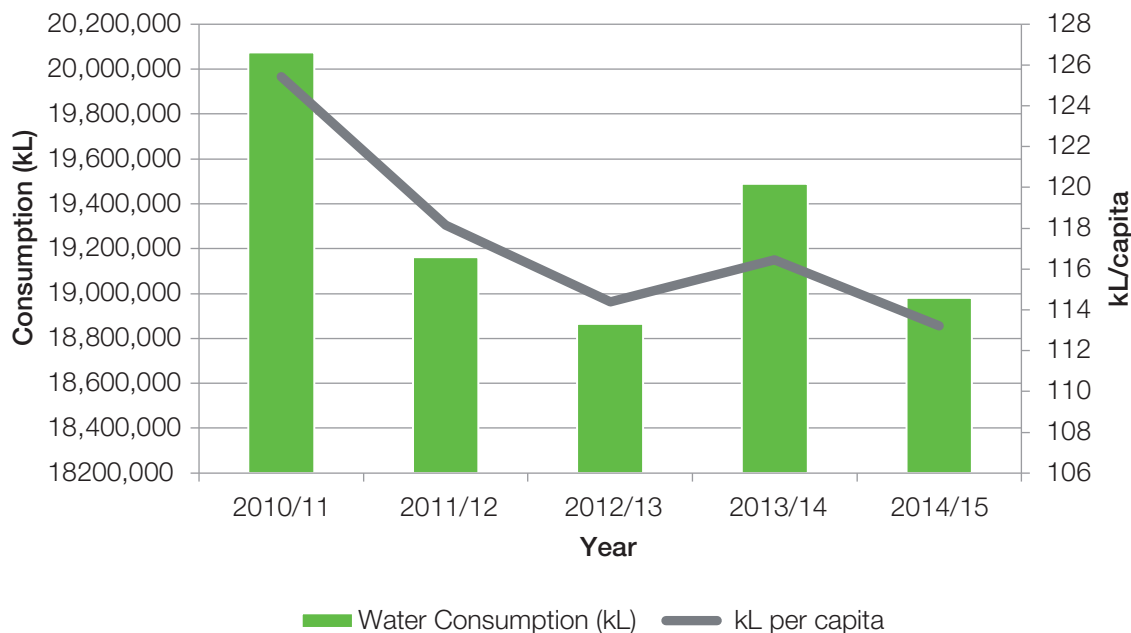
The average annual water usage per person in the Perth region has decreased from 191kL in 2001 to 126kL per person in 2015. This is a reduction of 34% and is well on track to achieving the Water Corporation's Water Forever 2030 target of 125kL per person.<sup>27</sup>

The Water Corporation has implemented a number of strategies to reduce community water consumption across Perth, including enforcing water restrictions and watering days, the H<sub>2</sub>O Assist™ Program, Fresh Water Thinking Campaign and providing information about saving water around the home and garden on the Water Corporation website.

<sup>25</sup> DoW (2012)

<sup>26</sup> Water Corporation (2010)

<sup>27</sup> Water Corporation (2015a)



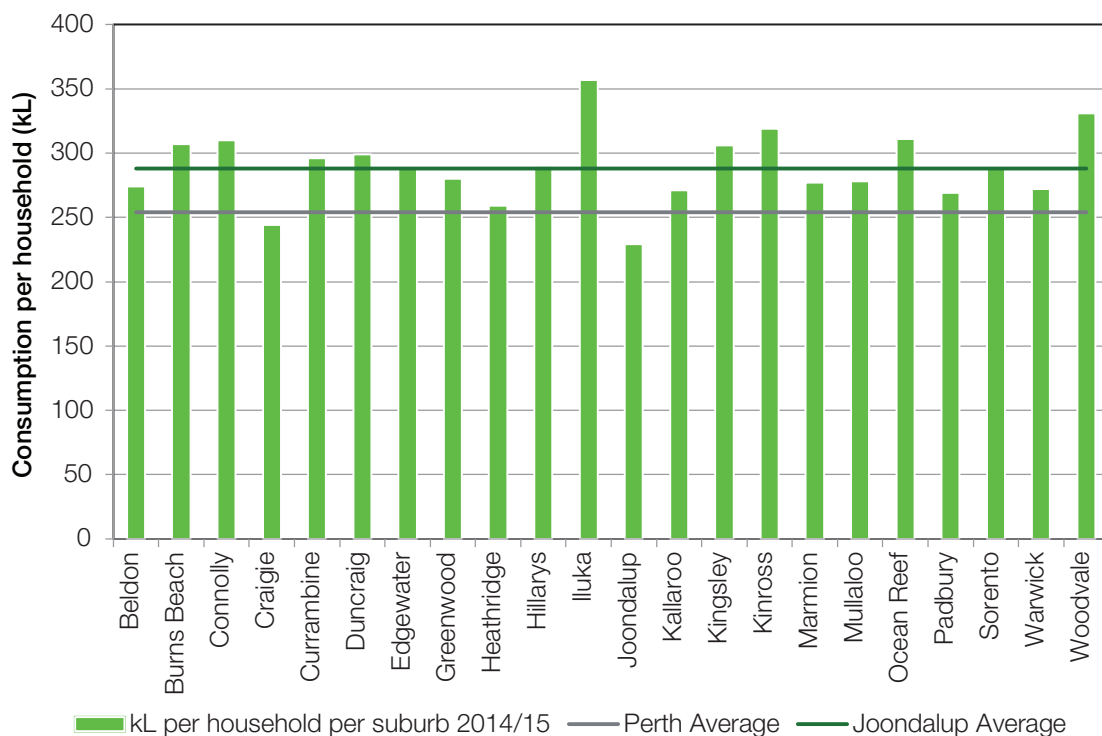
**Figure 18: City of Joondalup Community scheme water consumption from 2010/11 to 2014/15.<sup>28</sup>**

The City's total community scheme water consumption includes residential, commercial and trade scheme water.

Total community scheme water usage for the City of Joondalup has decreased over the past five years, with the exception of 2013/14 (see Figure 18). Climatic conditions may have contributed to this increase as the summer of 2013/14 had well below average rainfall and above average maximum temperatures across the Perth region. The City's community scheme water usage was 20,075,112kL with an estimated resident population of 160,053<sup>29</sup> for 2010/11 (125kL per capita) and 18,981,393kL with an estimated resident population of

167,653<sup>30</sup> for 2014/15 (113kL per capita). The water consumption figures provided throughout this Plan are based on the most up to date data available at the time.

In 2014/15, the City of Joondalup average water consumption per household was 288kL which is an overall decrease of 26.6kL per household since 2010/11. However, the City's average household scheme water consumption remains higher than the Perth average for household scheme water consumption, which has decreased from 276kL<sup>32</sup> in 2010/11 to 254kL in 2014/15<sup>33</sup> (see Figure 19).



**Figure 19: Household scheme water consumption by suburb for 2014/2015.<sup>31</sup>**

<sup>28</sup> Water Corporation (2015b)

<sup>29</sup> Profile ID (2016)

<sup>30</sup> Profile ID (2016)

<sup>31</sup> Water Corporation (2015b)

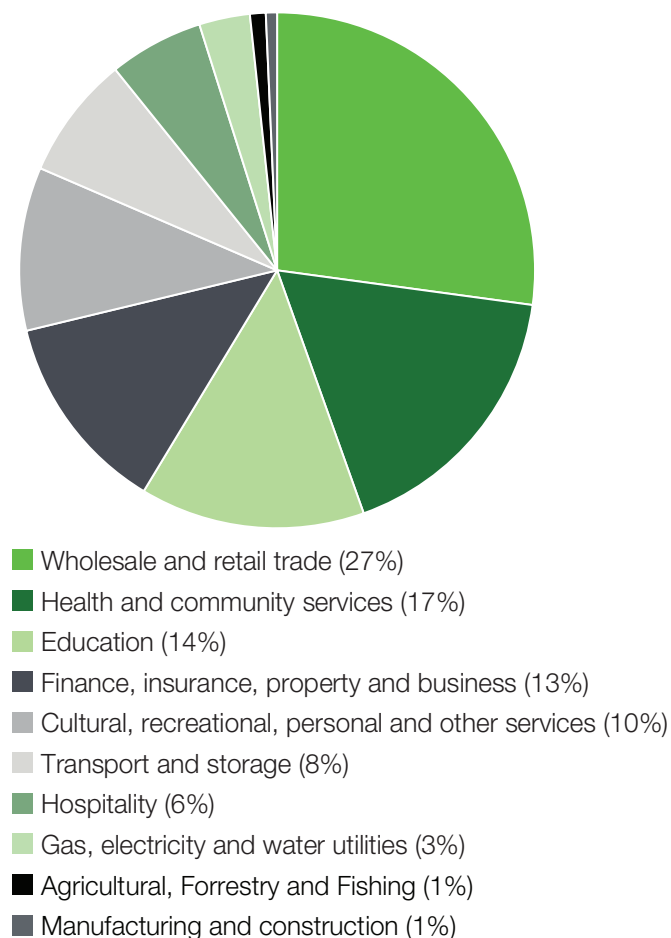
<sup>32</sup> National Water Commission (2013)

<sup>33</sup> BoM (2015)

The top five residential suburbs for household scheme water consumption are Iluka, Woodvale, Ocean Reef, Connolly and Currambine. Iluka continues to have the highest annual consumption per unit of 357kL, which is a decrease of 40kL from 2011. Suburbs with a greater number of high density residential dwellings recorded less water use per unit.

The City will continue to run targeted campaigns for water conservation based on the analysis of suburb by suburb residential water consumption. The City will also encourage water efficiency through its Think Green Environmental Education Program and Eco Home Audits Program. The City will continue to support community water efficiency programs implemented by State Government agencies.

Non-residential community use equates to 10% of the overall community scheme water usage. The top five non residential community water user sectors over the past five years are wholesale and retail trade, health and community services, education, finance, insurance, community services, education, finance, insurance,



**Figure 20: Non-residential community water use breakdown for 2014/2015.**<sup>34</sup>

property and business and cultural, recreational, personal and other services. The wholesale and retail trade category remains the highest non-residential category water user sector (see Figure 20).

The City will continue to use this information to target water conservation programs to specific community users through the City's Environmental Education Program.

## 2.4 Corporate Water Quality

Water quality also forms an integral part of water management as water of an adequate quality is also required to support water dependant ecosystems and adequate drinking water sources. Water quality can also be impacted by factors such as land use, groundwater abstraction and climate change.

A significant area of the City is located within the Perth Coastal Underground Water Pollution Control Area which is classified as a Priority 3 public drinking water source area and groundwater is extracted from this area as part of the IWSS.<sup>35</sup>

The City is also located within the Yellagonga catchment and the health of the Yellagonga Regional Park and its associated wetlands is of high importance to both the local and wider communities, stakeholders and organisations responsible for managing the park. Pollutants such as heavy metals, hydrocarbons, nutrients, suspended solids and litter can enter the Park's wetlands via stormwater runoff, groundwater flow and rainfall.

Water quality monitoring is undertaken at various locations within the Yellagonga Wetlands as part of the Yellagonga Water Quality Monitoring and Improvement Project within the *Yellagonga Integrated Catchment Management Plan (YICM) 2015 – 2019*. This monitoring increases the understanding of contaminants entering the system and provides the required data for improved management of the area.

Water quality monitoring at coastal sites, undertaken with the primary purpose of protecting public health, indicates that contaminants and nutrients are present in marine waters. Contaminants reach the coast through existing stormwater systems that discharge into coastal areas, and through sub-marine discharges from groundwater, and can have a significant impact on coastal water quality.

### 2.4.1 Stormwater Management

The City manages stormwater through its drainage network which consists of pipelines, side entry gullies, outfalls, sumps, leach drains, soak wells, gross pollutant traps (GPTs) and bubble-up pits. Stormwater in the City is discharged via ocean, wetland and sump outfalls, and recharged to groundwater resources via infiltration through soakwells and drainage sumps.

<sup>34</sup> Water Corporation (2015b)

<sup>35</sup> Water Corporation (2007)



Grand Ocean Park (Burns Beach)

Stormwater systems traditionally collected and conveyed stormwater to water bodies, including groundwater, without any treatment. However, the City has developed a *Stormwater Management Policy* which incorporates the principles of water sensitive urban design into stormwater management to protect local waterways from contaminants and other pollutants.

The City of Joondalup has completed an upgrade of all its outfalls in the Yellagonga Catchment as part of the implementation of the *YICM Plan 2009-2014*. The City has developed a Stormwater Drainage Program which provides the City with an opportunity to improve the environmental performance of stormwater management systems, and to reduce potential water quality and water quantity impacts to the local environment. The project aims to increase the amenity of the sumps and improve the quality of water infiltrating into the groundwater systems by improving the biofiltration of the City's sumps. New and renewal projects also provide an opportunity for the City to upgrade stormwater assets to manage increased, and more intense, storm events, as expected under climate change scenarios.

## 2.5 Community Water Quality

Water quality can also be negatively impacted by the community through the application of fertilisers to residential gardens, waste management, vehicle use and the community's interaction with the local waterways.

The City will continue to provide water awareness programs to the local community through the City's Environmental Education Program and Yellagonga Ecotourism and Community Awareness Program.



# Part 3

## 3. Water Plan

### 3.1 Water Plan Key Focus Areas

Eight Key Focus Areas have been identified to address key water issues and opportunities within the City.

Implementation of projects within these key focus areas will ensure that a holistic approach to water management is adopted. Objectives to improve water management within the City have been developed for each key focus area and are provided in Table 1 below.

**Table 1: Key Focus Areas**

Key Focus Area	Key Issues	Objectives
<b>Water Monitoring and Reporting</b>	<ul style="list-style-type: none"> <li>Gaps in data for City Scheme water consumption.</li> <li>Gaps in the City's scheme water and groundwater efficiency tracking.</li> <li>Monitoring and reporting systems for water consumption that are time consuming and prone to human error.</li> <li>Lack of accountability for variances in water use in City facilities.</li> <li>Gaps in some areas of water quality management.</li> </ul>	Collate and maintain accurate water consumption and water quality data that allows for consistent monitoring, efficiency tracking, review and reporting.
<b>Built Environment</b>	<ul style="list-style-type: none"> <li>Lack of accountability for variances in water use in City facilities.</li> <li>Financial constraints for infrastructure upgrades and building retrofits.</li> <li>Gaps in research for new water technologies.</li> </ul>	Create and maintain City assets that minimise the use of water and protect local water resources through appropriate design, construction and operation.
<b>Management of Wetlands and Public Open Space</b>	<ul style="list-style-type: none"> <li>Financial constraints for infrastructure upgrades and retrofits.</li> <li>City operations may negatively impact on local water quality.</li> <li>Continued decline of water quality in wetlands of Yellagonga Regional Park.</li> <li>Gaps in research for new water technologies.</li> </ul>	Manage and protect local water resources through best practice management of the natural environment and public open space.
<b>Water Sensitive Urban Design</b>	<ul style="list-style-type: none"> <li>Financial constraints for infrastructure upgrades and building retrofits.</li> <li>City operations may negatively impact on local water quality.</li> <li>Traditional stormwater conveyance systems which do not provide environmental and social benefits.</li> </ul>	Promote and implement stormwater management practices that improve local water quality and reduce water consumption.
<b>Contracts and Purchasing</b>	<ul style="list-style-type: none"> <li>External contractors and suppliers that operate under different policies and procedures.</li> </ul>	Minimise the consumption of, and impact to, water resources through the consideration of environmental criteria in City purchasing and tender decisions.

Key Focus Area	Key Issues	Objectives
<b>Staff Education and Participation</b>	<ul style="list-style-type: none"> <li>• City operations may negatively impact on local water quality.</li> <li>• Level of staff awareness regarding water quality of Yellagonga Regional Park and local waterways.</li> <li>• Staff water consumption and behaviours.</li> </ul>	Improve the environmental performance of the organisation through the provision of information to staff regarding sustainable water management and water quality improvement.
<b>Community Education and Participation</b>	<ul style="list-style-type: none"> <li>• Level of community awareness regarding water quality of Yellagonga Regional Park and local waterways.</li> <li>• Residential activities may negatively impact on local water quality.</li> <li>• Community water consumption and behaviours.</li> </ul>	Provide opportunities for community education and participation in water efficiency and water quality improvement initiatives.
<b>Partnerships and Policy</b>	<ul style="list-style-type: none"> <li>• Continued decline of water quality in parks of Yellagonga Regional Park and local waterways.</li> <li>• Gaps in research for new water technologies.</li> <li>• Coordination and collaboration with stakeholders.</li> </ul>	Develop partnerships with the State Government and external stakeholders to enhance water conservation and water quality improvement opportunities within the City.

## 4. Overarching Targets and KPI's

By establishing targets, the City can monitor and measure the progress made towards achieving the objectives of the *City Water Plan*. New water usage targets have been established and are outlined in the following section. A summary of the targets are provided in Table 2. Progress made in achieving these targets will be reported on an annual basis.

**Table 2: City Water Plan 2016-2021 Targets**

Indicator	Target 2020/21	Baseline
<b>Corporate Groundwater Consumption</b>	To reduce the amount of groundwater used per hectare by 10% (average kL/irrigated hectare).	Average of 7,500kL/irrigated hectares. (2007/08 DoW allocations per hectare).
<b>Corporate Scheme Water Consumption: Aquatic Leisure Centre</b>	5% reduction kL/patron.	2015/16 kL/patron.
<b>Corporate Scheme Water Consumption: City owned, operated and leased buildings</b>	5% reduction on average kL/m <sup>2</sup> .	5 year average kL/m <sup>2</sup> (2011/12-2015/16).
<b>Corporate Water Quality</b>	Undertake water quality improvement projects within City operations, procedures and policies in at least three Key Water Focus Areas by 2020/2021.	
<b>Community Scheme Water Consumption</b>	5% reduction kL/capita.	2014/15 kL/capita.
<b>Community Water Quality</b>	Undertake water quality improvement projects that encourage community awareness and promote partnerships for water quality improvement in at least two Key Water Focus Areas by 2020/2021.	

### 4.1. Baseline water use and key performance indicators.

The City's water consumption targets and baseline values have been developed through the review of the City's water consumption profile over the past five years. Individual baseline values have been developed for each indicator which allows for more accurate representation of water consumption in that particular area. The KPI units have been selected to provide measurements of water use that are representative for the type of facility or user group. The target year for all indicators is the final implementation year of the Plan of 2020/21.

The *City Water Plan* targets have been developed in consideration of the achievements that the City has already made in reducing water consumption. Through implementation of the *City Water Plan 2012-2015*, the most economic and easily achieved improvements have already been undertaken. Whilst there is still scope for improvement, these initiatives are more challenging and often have larger budgets associated with their implementation.

#### Corporate Groundwater Consumption

In 2007/08, the DoW allocated the City an annual groundwater abstraction allocation based on an average irrigation rate of 7,500kL per hectare per year. The DoW is currently reviewing the volumes for water abstraction which could see a reduction in the City's existing GWL allocation. However, the City has established a groundwater consumption reduction target of 10%kL per irrigated hectare with the DOW annual allocation of 7,500kL per irrigated hectare being the baseline value. A KPI of kL per irrigated hectare has been proposed based on the benchmark indicator by industry for Public Open Spaces.

The City's groundwater consumption baseline value is an average usage of 7,500kL/irrigated hectares. The City will need to reduce its groundwater use to an average usage of 6,750kL/irrigated hectares by 2020/21 in order to meet this target.

### Corporate Scheme Water Consumption

Separate reduction targets have been established for corporate scheme water use within the City of Joondalup Leisure Centre's Aquatic Centre and the remaining City owned, operated and leased buildings.

#### Aquatic Centre (City of Joondalup Leisure Centres – Craigie)

City of Joondalup Leisure Centres – Craigie's Aquatic Centre is recognised as a Waterwise Aquatic Centre due to the best practice approach that is taken to managing water use within the facility.

To build on past achievements of the City of Joondalup Leisure Centre – Craigie, a reduction target of 5%kL per patron has been established. A KPI of kL per patron has been proposed to account for the number of people using the facility. However, other factors have the potential to impact upon the amount of water consumed including planned maintenance work during the life of the Plan as well as a major refurbishment scheduled to occur by 2020/21, which will require major drainage of the pool and will impact on total scheme water used at the facility.

A baseline year of 2015/2016 has been selected. The Leisure Centre's water usage in 2015/2016 was 0.0209kL/ patron. The City will need to reduce its water use to 0.0199 kL/patron by 2020/21 in order to meet this target.

#### City owned, operated and leased buildings and facilities

In order to recognise that the City's water usage can increase with the number of building and facilities that it manages, a reduction target of 5%kL/m<sup>2</sup> has been established. The average scheme water consumption per meter squared over a five year period from 2011/2012-2015/2016 will be used as the baseline value. City operated and managed buildings and facilities including leased premises are included in this category. However, City owned buildings that are leased by operators that are responsible for their own water accounts are excluded from this group.

The baseline consumption for the City's corporate scheme water consumption for City owned, operated and leased buildings and facilities is an average usage of 9.68kL/m<sup>2</sup>. The City will need to reduce its water consumption within these facilities to an average usage of 9.20kL/m<sup>2</sup> by 2020/21 in order to meet this target.

### Corporate Water Quality

The Corporate water quality target has been set based on the City implementing a minimum number of projects per year.

Undertake water quality improvement projects within City operations, procedures and policies in at least three Key Water Focus Areas by 2020-2021.

### Community Scheme Water Consumption

The City does not have any direct influence over how the community utilises scheme water or groundwater. The City can raise awareness of water conservation and water efficiencies within the community. A target for scheme water reduction within the community has been set. However, no target has been established for community groundwater consumption as there is no available data on community bore consumption.

A reduction target of 5% per capita has been established for community scheme water consumption. The average community water consumption per capita in 2014/2015 will be used as the baseline value. A KPI of per capita has been used to capture population growth within the City.

The City's community scheme water consumption baseline value is 113kL/capita. The community will need to reduce its scheme water use to 107kL/capita by 2020/2021 in order to meet this target.

### Community Water Quality

The City does not have any direct influence over behaviours by the community that can impact on water quality. However, the City can raise awareness of water quality issues through undertaking community awareness projects. Community water quality targets have been set based on a minimum number of projects implemented per year.

Undertake water quality improvement projects that encourage community awareness and promote partnerships for water quality improvement in at least two Water Focus Areas by 2020/2021.

## 4.2 Water Plan Projects

In order to achieve the objectives of the *City Water Plan 2016-2021* a number of projects have been identified under the eight key focus areas. Some projects may contribute to achieving objectives across multiple key focus areas. Projects will be implemented over the life of the Plan and will be subject to regular monitoring and review.

### 4.2.1 Project Descriptions

A summary of each project is provided in Appendix 2, which includes project descriptions, project objectives and deliverables.

## 5. Implementation

Effective and coordinated implementation is critical to achieving the objectives of the Plan. Implementation of the Plan will be coordinated by the establishment of processes for monitoring and reviewing projects and key performance indicators (see Table 3).

**Table 3: City Water Plan 2016-2021 Implementation**

Key Focus Area	Project Title	Project Number	Description	Responsible Business Unit	Project Type	Timeframe for Implementation				
						2016/17	2017/18	2018/19	2019/20	2020/21
Water Monitoring and Reporting	Environmental Building Audits	1	In order to reduce water and energy use within City buildings undertake environmental audits of key sites including the development of a new audit schedule.	Asset Management	Existing	■	■	■	■	■
	Soil Moisture Monitoring	2	Continued installation of soil moisture and rain sensors as required to assist in maintaining effective irrigation schedules.	Operation Services	Existing	■	■	■	■	■
	Groundwater Classification Project	3	Investigate opportunities to further breakdown groundwater usage and development of more detailed water usage reports.	Strategic and Organisational Development/ Operation Services	New	■	■			
	Water Database Project	4	Continue collection of water usage data and the development of improved water anomaly and quarterly usage reports.	Strategic and Organisational Development	Existing	■	■	■	■	■
	Yellagonga Water Quality Monitoring and Improvement Project	5	Improve understanding of contaminants entering the Yellagonga Regional Park by undertaking water quality monitoring and mapping within Yellagonga Regional Park.	Strategic and Organisational Development	Existing	■	■	■		

Key Focus Area	Project Title	Project Number	Description	Responsible Business Unit	Project Type	Timeframe for Implementation				
						2016/17	2017/18	2018/19	2019/20	2020/21
Water Monitoring and Reporting	Water Efficiency Database Project	6	In order to track water efficiency projects implemented by the City, develop a centralised data storage location for easier tracking of projects and outcomes.	Infrastructure Management Services/ Strategic and Organisational Development/ Operation Services/Asset Management	New	■	■			
	Weather Station Project	7	Investigate and install web based irrigation central control software incorporating three weather stations located in the northern, central and southern suburbs to gain accurate weather information to influence irrigation run times.	Operation Services	New	■	■	■	■	■
	Leak Detection Project	8	Improve understanding of water usage and leak detection, investigate leak detection options and implement recommended option.	Strategic and Organisational Development/ Asset Management	New	■	■			
	Water Utilities Review Project	9	Investigate and develop a system for tracking water consumption across the City's buildings for reporting purposes.	Asset Management	New	■	■			
	Building Sub-metering Project	10	Development of a priority listing for buildings which are appropriate for submeters with the installation of a least one submeter per annum over the life of the project.	Asset Management	Existing		■	■	■	
Built Environment	Waterless Urinal Upgrade Project	11	In order to increase water efficiency within the City Facilities, undertake waterless urinal retrofits in alignment with the building refurbishment schedule.	Asset Management	New	■	■	■	■	■
	Flow Restrictor Tap Retrofits	12	In order to increase water efficiencies within City facilities, trial water flow restrictor devices on appropriate taps at the WOC.	Asset Management	New	■				

Key Focus Area	Project Title	Project Number	Description	Responsible Business Unit	Project Type	Timeframe for Implementation				
						2016/17	2017/18	2018/19	2019/20	2020/21
Built Environment	City of Joondalup Leisure Centres – Craigie Water Demonstration Project	13	Continued promotion of water efficiency technologies and community education at City of Joondalup Leisure Centres – Craigie.	Leisure and Cultural Services	Existing	■	■	■	■	■
	Green Stamp	14	Maintaining sound environmental management practises through continuous improvement of environmental practises through the reviewing of best practises.	Operation Services	Existing	■	■	■	■	■
	Works Operation Centre (WOC) Iron Filtration Project	15	Implementation of iron filtration system at the WOC which will reduce dependence on scheme water for the nursery.	Operation Services	New	■				
	Review of Contaminant Disposal at the WOC	16	Continue review of contaminant disposal at the WOC and determine opportunities for performance improvements.	Operation Services	Existing	■	■	■	■	■
Management of Wetlands and Public Open Spaces	Low Rainfall Irrigation Management Plan	17	Development and implementation of Irrigation Plan which addresses irrigation priorities within a drying climate.	Operation Services	New	■	■			
	Irrigation Infrastructure Management	18	Continued management of the City's irrigation network by undertaking ongoing irrigation infrastructure audits, groundwater consumption data collection and bore maintenance program.	Operation Services	Existing	■	■	■	■	■
	Review of Nutrient Management Practises	19	Review of operational practises to determine where environmental performance can be improved.	Strategic and Organisational Development	Existing	■	■	■	■	■
	Wetlands Management Plan	20	Continued development of the <i>Wetlands Management Plan</i> and associated Action Plans to ensure best management practises within the City's constructed wetlands.	Operation Services	Existing	■	■	■	■	■

Key Focus Area	Project Title	Project Number	Description	Responsible Business Unit	Project Type	Timeframe for Implementation				
						2016/17	2017/18	2018/19	2019/20	2020/21
Management of Wetlands and Public Open Spaces	Parks Redevelopment Program	21	Continue implementing hydrozoning and ecozoning, and redesigning of irrigation systems to reduce groundwater use within City parks and public open space.	Operation Services/ Infrastructure Management Services	Existing	■	■	■	■	■
	<i>Stormwater Management Policy</i>	22	Continued implementation of the policy to provide direction and guidance on the design and maintenance of drainage systems within the City will be undertaken as per Stormwater Drainage Program.	Infrastructure Management Services	Existing	■	■	■	■	■
	Stormwater Drainage Program	23	Continued retrofitting of sumps annually to increase their amenity and ecological values.	Infrastructure Management Services	Existing	■	■	■	■	■
	Sustainable Procurement Practices	24	Continue to implement the sustainable procurement practises within the City's <i>Purchasing Policy</i> that integrates water criteria, as well as other environmental impacts, into purchasing decisions to ensure that the City purchases services and products that are environmentally sustainable, wherever possible.	Financial Services	Existing	■	■	■	■	■
Staff Education and Participation	Think Green – Green Office Program	25	Continue to deliver the Green Office Program in order to raise staff awareness of water efficiency and conservation practices.	Strategic and Organisational Development	Existing	■	■	■	■	■

Key Focus Area	Project Title	Project Number	Description	Responsible Business Unit	Project Type	Timeframe for Implementation				
						2016/17	2017/18	2018/19	2019/20	2020/21
Community Education and Participation	Environmental Education Program	26	Continued implementation of community education programs within the community as well as provision of water usage data and educational materials to lessees within City buildings.	Strategic and Organisational Development	Existing	■	■	■	■	■
	Yellagonga Ecotourism and Community Awareness	27	Implementation of community awareness and ecotourism initiatives to reduce the community impacts on the Yellagonga wetlands.	Strategic and Organisational Development	New	■	■	■		
	Think Green Buildings	28	Continue to implement environmental technologies within City buildings using the Think Green Building rating framework and continue promotion of the initiative to the community.	Strategic and Organisational Development	Existing	■	■	■	■	■
	Greywater Rebate	29	Develop a program to provide financial incentives such as a rebate, to City residents that install approved greywater reuse systems to encourage greater uptake of the use of greywater within the City's community.	Compliance and Regulatory Services	New	■	■			
Partnership and Policy	Craigie Backwash Water Recycling Feasibility Study	30	Undertake Feasibility Study for backwash water reuse options at City of Joondalup Leisure Centres – Craigie as part of continued water efficiencies.	Leisure and Cultural Services	New	■				
	CRC for Water Sensitive Cities Program	31	Continued participation in and financial support to the research program which will provide the City with access to best available science on stormwater harvesting and peripheral research into institutional barriers, land use planning, capacity building and adaptive governance.	Infrastructure Management Services/ Operation Services	Existing	■	■	■	■	■

Key Focus Area	Project Title	Project Number	Description	Responsible Business Unit	Project Type	Timeframe for Implementation				
						2016/17	2017/18	2018/19	2019/20	2020/21
Partnership and Policy	Waterwise Council Program	32	Ongoing participation in the program and provision of annual reports to Waterwise Council to maintain accreditation.	Strategic and Organisational Development	Existing	■	■	■	■	■
	Midge Management Strategy Partnership	33	Continued participation in the partnership and implementation of projects when required for ongoing control and management of nuisance midge within the Yellagonga Regional Park.	Compliance and Regulatory Services	Existing	■	■	■	■	■
	Beach Microbial Sampling	34	In order to address the risk of stormwater contamination impacting coastal systems, undertake regular monitoring of beach water quality on behalf of the Department of Health.	Compliance and Regulatory Services	New	■	■	■	■	■





## 5.1 Monitoring and Review

Annual review of the *City Water Plan 2016-2021* will identify the progress and effectiveness of projects enabling the City to adapt to emergent issues, readjust priorities and project scopes to ensure effective management of the City's water is achieved within the timeframe of the Plan.

A major five year review will be undertaken at the end of the Plan which will identify further actions which may be required to address any additional issues that have arisen.

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# Appendix 1: Key Achievements of *City Water Plan 2012-2015*

## Corporate

### Groundwater Use

A number of corporate groundwater projects have been implemented since the adoption of the *City Water Plan 2012-2015* that have contributed to a reduction in water use, these include:

- Monitoring of all bore meters on a monthly basis to track groundwater use;
- Assessing weekly evaporation rates and daily rainfall to determine watering regimes;
- Installation of Signal Data Systems at sixteen parks to allow for real time communication with irrigation control systems;
- Installation of twenty-five soil moisture sensors within public open spaces across the City;
- Installation of nine rain sensors within public open spaces across the City;
- Installation of nine new bores to replace older bores and replacement of sixteen pumps as part of the Bore Maintenance Program; and
- Eleven parks upgraded as part of the Parks Redevelopment Program including hydrozoning, ecozoning, redesigning irrigation systems and landscaping.

### Scheme Water Use

The following key projects were implemented for scheme water conservation from 2012-2015:

- Installation of sub-meters at thirteen City buildings to monitor water usage and easily identify issues;
- Continued monitoring of water use in City buildings through the Planet Footprint program and the Water Corporation My Water website. Buildings showing significant water increases were identified and remedial action undertaken;
- Implementation of Environmental Building Audits of the Administration Building, Works Operations Centre, Civic Centre, Joondalup Library and City of Joondalup Leisure Centres – Craigie;
- Continuation of the Think Green Green Office program aimed at raising awareness and encouraging sustainable behaviour among City of Joondalup employees;

- Continued participation in the Waterwise Councils Program; and
- Installation of 16 Think Green Buildings signs at the entrance to City buildings that have received environmental upgrades to promote technologies that can be implemented by community members.

### Corporate Water Quality Management

The following corporate water quality projects are key achievements for 2012-2015:

- Implementation of the Yellagonga Water Quality Monitoring and Mapping Project to monitor the state of surface and groundwater quality within the Yellagonga Catchment Area;
- Implementation of the Yellagonga Acid Sulphate Soils Project to further assess the extent of acid sulphate soils in the Yellagonga region;
- Continued participation in the Midge Steering Group including water quality monitoring and midge treatment strategies;
- Implementation of the City's Sump Retrofit Program with six sumps being upgraded; and
- Adoption of the new *Yellagonga Integrated Catchment Management Plan 2014-2019*.

## Community

### Community Scheme Water Use

The City of Joondalup undertakes a number of environmental education initiatives that promote water conservation to the community, including:

- Gardening Seminars – two gardening seminars are held every year promoting water conservation messages and tips for water wise gardening. Over the past three years 680 residents have attended one of the City's gardening workshops;

- Home Eco-Audit Program – through the Home Eco-Audit Program residents can sign up for a free eco-audit of their home. As part of the program residents can have an auditor visit their home to assess their energy and water consumption and make recommendations for reducing their consumption. Residents can also receive up to \$50.00 worth of energy or water saving hardware for their home including water efficient showerheads, tap flow restrictors and shower timers. Over the past three years, 240 audits have been provided to residents; and
- Information and Awareness Raising – The City in partnership with the Department of Water, produced two brochures Saving Water in the Home and Saving Water in the Garden which it distributes through the City's libraries and customer service centres. Information on how to save water in the home and garden is also provided on the City's website.

The City has limited direct control over community scheme water use. However, it will continue to encourage water efficiency through its Environmental Education Program and Eco Home Audits Program and will continue to support community water efficiency programs implemented by State government agencies.

### Community Water Quality Management

The following community water quality projects were implemented and are highlights for 2012-2015:

- Yellagonga Community Awareness Project including the Green Frog Stencilling Program, Yellagonga school ecology program, environmental events such as flora, fauna and bird watching tours, sustainable gardens workshops, water quality displays and presentations at the Wetland Management Conference; and
- Distribution of the Nuisance Midges brochure to community members and promotions on the City's website.



Yellagonga Regional Park (Edgewater)

# Appendix 2: Project Summaries

## Key Focus Area: Water Monitoring and Reporting

**Objective:** Collate and maintain accurate water consumption and water quality data that allows for consistent monitoring, review and reporting.

Project 1: Environmental Building Audits		
<b>Project Status</b> Existing Project		<b>Project Commencement</b> 2016/2017
<b>Project Description</b>  Environmental auditing involves the identification of assets and processes that contribute to inefficiencies in water use within facilities and operations. Audits also enable the identification of opportunities for improvements which can reduce water consumption.  The City will continue to carry out Environmental Building Audits of key facilities that utilise scheme water in order to identify opportunities for upgrades or improvements in water efficiency. Physical audits of nominated facilities will be conducted.  Property scheme water usage data, provided by database, will be used to inform the Audits. A report will be developed that will include recommendations to improve water use within the facilities. Recommended works will be incorporated into future Capital Works Programs and Maintenance Schedules.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>Identify where water efficiencies can be made through the auditing of scheme water infrastructure in City facilities.</li><li>Prioritise upgrades, retrofits and replacements for the City’s Capital Works Program and Maintenance Schedules.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>Continue to develop an audit schedule for City buildings identifying those that can be audited by City staff and those that require the skills of an external consultant.</li><li>Develop a new building audit schedule to include high water using facilities that aligns with the City’s maintenance schedule and building upgrades projects.</li><li>Environmental Building Audit and Report outlining findings for City facilities including:<ul style="list-style-type: none"><li>City of Joondalup Leisure Centres – Craigie.</li><li>Joondalup Administration Building.</li><li>Works Operations Centre.</li><li>City of Joondalup Libraries – Joondalup, Woodvale, Duncraig and Whitford.</li></ul></li><li>Develop a structured implementation program schedule to including budget allocations for the feasible recommendations from the audits undertaken.</li></ul>		
<b>Approach</b>  The focus of the Project will be to continue to conduct audits at the City’s highest water consumption buildings. Consultants will be engaged to undertake Water Audits for larger City facilities. Audits requiring less investigation may be conducted by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Building Capital Works (Environmental Initiatives)	<b>Responsible Business Unit</b> Asset Management

Project 2: Soil Moisture Monitoring		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Soil moisture monitoring allows the identification of moisture levels in the soil profile and the scheduling of irrigation regimes according to turf requirements. It also allows the City to promote deep root growth without causing stress to turf roots.  Following a trial of ten soil moisture sensors in active sporting ovals in 2011, the City developed a Case Study to investigate the benefits of the technology. Currently, the City has installed 25 soil moisture sensors within public open spaces across the City and will continue to install moisture sensors and monitor each year as required. Soil moisture meters monitor moisture at four depths in the soil profile. This data is then automatically sent to a website where it can be viewed and analysed by City staff to inform irrigation regimes.  The City will continue to use soil moisture data to develop irrigation schedules based on turf needs. The sensors indicate moisture levels after rainfall events, preventing over-watering, and allow the City to manage turf on minimal irrigation without causing stress. Soil moisture sensors are used in combination with weather forecasts, evaporation rates and soil types to ensure the City adopts a science based approach to irrigation scheduling.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure the City adopts a science-based approach to irrigation scheduling to increase water use efficiency.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• The continuation of the program with the installation of soil moisture meters as required.</li><li>• Ongoing development of irrigation schedules with consideration of soil moisture levels and turf requirements.</li></ul>		
<b>Approach</b>  Ongoing research and implementation will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Capital Operational	<b>Responsible Business Unit</b> Operation Services

Project 3: Groundwater Classification Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City undertakes monthly groundwater consumption monitoring as part of a commitment to increasing water efficiency and proactive resource management. Regular monitoring assists the City to manage and monitor actual usage against the Department of Water Ground Water Licence conditions. The City's groundwater consumption is currently reported against the Department of Water groundwater allocation.  The City proposes to investigate opportunities to further track groundwater usage against the park classification to gain a better understanding regarding the specifics of the City's groundwater usage.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Increase understanding of the City's groundwater consumption.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Investigate opportunities within current systems to link bore usage to park classifications.</li><li>• Investigate opportunities for including hectare details within internal monthly reporting.</li><li>• Develop detailed groundwater usage reports.</li></ul>		
<b>Approach</b>  This project will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2017/2018	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Operation Services

Project 4: Water Database Project		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The availability of consistent and accurate water consumption data assists in identifying anomalies and the outcomes of City water efficiency projects. Frequent monitoring and reporting of water consumption data is also important in tracking progress towards water management targets.  The City will continue to measure its environmental performance, providing energy, water, waste, fleet and greenhouse performance including consumption, costs and greenhouse gas emissions data on a quarterly basis.  The City will continue to monitor its energy and water consumption within its buildings, as well as its overall water use, and has water consumption data for each property for the past five years. The City will also report on anomalies and review any significant increases in water consumption. The performance of City buildings is benchmarked against National and International properties in a similar category. The data will be used to inform the priorities for Environmental Building Audits as well as measure the consumption and cost benefits of changes the City makes as a result of the Building audits.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Enable consistent and ongoing monitoring of water consumption data to measure targets and to identify trends and anomalies.</li><li>• Provision of qualitative data to inform City decisions, reports and strategic direction relating to water management.</li><li>• Provision of data to inform the development of community and staff environmental education programs relating to water conservation.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Development of a priority list of high water using buildings.</li><li>• Development of water consumption and anomaly reports.</li><li>• Establishment of a working group to investigate anomalies.</li><li>• Undertake quarterly reviews and reporting of the data.</li></ul>		
<b>Approach</b>  The City will continue to collect and collate water use data for interpretation and reporting of data internally and externally.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 5: Yellagonga Water Quality Monitoring and Improvement Project		
<b>Project Status</b> Existing Project		<b>Project Commencement</b> 2016/2017
<b>Project Description</b>  There are a number of water quality issues arising from groundwater and surface water inputs. These include nutrient enrichment resulting in eutrophication, algal blooms and midge outbreaks; and toxicants such as heavy metals, petroleum products, pesticides, herbicides and industrial/household chemicals.  Monitoring and mapping of water quality entering into Yellagonga wetlands is vital to continued understanding of the movements and concentrations of contaminants.  Edith Cowan University Centre of Ecosystem Management has undertaken surface and groundwater quality monitoring and reporting for the City of Joondalup since 2010. The monitoring provides details on water quality and recommendations to improve water quality are provided.  The Water Quality Monitoring and Improvement Program is undertaken in liaison with the Midge Management Strategy Partnership which shares the same goal of improving water quality.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Increase the understanding of contaminant inputs into Yellagonga wetlands.</li><li>• Provide data upon which sound management decisions can be made.</li><li>• Reduce negative impacts within the Yellagonga Catchment associated with poor water quality.</li></ul>		
<b>Deliverables</b>  The project will: <ul style="list-style-type: none"><li>• Continue scientific monitoring and investigations of groundwater and surface water in the Yellagonga Catchment and Park.</li><li>• Support scientific and education programs aimed at identifying and mitigating sources of contaminants.</li><li>• Collate, analyse and share data between managing authorities.</li><li>• Provide recommendations for on ground actions to improve water quality.</li><li>• Investigate septic tank decommissioning opportunities in Kingsley, in conjunction with the Water Corporation.</li><li>• Investigate the opportunity of physical algal bloom removal.</li><li>• Identify the extent of the non-native species <i>Typha orientalis</i> at South Lake Joondalup for potential revegetation of native species to improve water quality.</li></ul>		
<b>Approach</b>  This project will be coordinated by the City of Joondalup, in partnership with the City of Wanneroo and the Department of Parks and Wildlife.		
<b>Timeframe for Implementation</b> 2016/2017 – 2018/2019	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 6: Water Efficiency Database Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City undertakes numerous projects to improve water efficiencies across its groundwater and scheme water usage areas. A centralised data storage location, which tracks the projects undertaken, cost and water savings achieved through these projects, will enable more efficient tracking of overall water savings and enable greater access to information by decision makers. This information can assist in providing qualitative data to enable the City to make informed decisions in implementing the most effective water efficiency measures.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Consistent monitoring and reporting of water efficiency projects.</li><li>• Improved tracking of water efficiency projects outcomes.</li><li>• Provision of qualitative data to inform City decisions, reports and strategic direction relating to water efficiency management.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Evaluate current record keeping processes.</li><li>• Development of a standardised template for reporting water efficiency measures.</li><li>• Development of improved centralised record keeping process which quantifies costs and savings.</li></ul>		
<b>Approach</b>  This project will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2017/2018	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development  Operation Services  Infrastructure Management Services  Asset Management

Project 7: Weather Station Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Various environmental factors including climate and weather affect water consumption. The City currently utilises the Department of Agriculture and Food weather station to obtain temperature, wind speed, solar radiation and relative humidity data which assists in determine the amount of water required for productive plant growth.  The City proposes to investigate installation of web based irrigation central control software incorporating 3 weather stations located in the northern, central and southern suburbs to gain accurate weather information to influence irrigation run times. The system will automatically download weather data daily and calculate the evapo-transpiration to determine irrigation times for the entire system or specific areas or stations.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Provision of more accurate daily weather data linked to a web based central control irrigation system.</li><li>• Reduced groundwater and power consumption through more accurate data and control of the City’s irrigation practises.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Investigate installation of web based irrigation control software.</li><li>• Installation of 3 weather stations located northern, central and southern suburbs.</li><li>• Adjust irrigation times accordingly to data received including the shutting down of nominated irrigated systems due to wet weather events.</li></ul>		
<b>Approach</b>  The research and implementation will be carried out by the City of Joondalup. The installation of the weather station and software will be co-ordinated by the City of Joondalup and contactors will be used as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Capital Operational	<b>Responsible Business Unit</b> Operation Services

Project 8: Leak Detection Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City utilises an extensive water pipeline infrastructure network for the provision of scheme water. While leaks can be unavoidable, the early detection and maintenance of leaks are within the City’s control. Currently, the City relies on visual inspections and monitoring of water consumption to identify possible leaks. However, visual inspections and reliance on invoicing data have limitations and undetected leaks have the potential to waste large volumes of water.  The City proposes to investigate various leak detection options which can assist in earlier leak detection, including identifying minor leaks which could remain undetected for long periods of time.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>Improved leak detection processes to reduce incidences of water wastage.</li><li>Effective and targeted water education programs.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>Investigate various options for leak detection and determine most effective option.</li><li>Determine top ten water using buildings which are high risk for water leaks.</li><li>Investigate the option of rotating the water loggers amongst high water using buildings and develop a rotation schedule.</li><li>Implement recommended options.</li><li>Review data logging information to monitor for leaks.</li><li>Develop targeted education and behavioural change programs based on logging information.</li></ul>		
<b>Approach</b>  The research and implementation will be carried out by the City of Joondalup. The installation of the data loggers will be co-ordinated by the City of Joondalup and contactors will be used as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2017/2018	<b>Proposed Budget Source</b> Operational Building Capital Works (Environmental Initiatives)	<b>Responsible Business Unit</b> Strategic and Organisational Development Asset Management

Project 9: Water Utilities Review Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City processes over 150 building water usage bills annually with payments managed by the Asset Management Business Unit. This includes the financial allocation of utilities to other business units within the organisation and on-costing to external lessees on a bi-monthly basis.  To calculate costs the City either utilises sub-meters or, on most occasions, applies an arbitrary percentage allocation of water use, which may not reflect the true level of water consumption by the building user. Sub-meters are generally read on a bi-monthly basis to align on-costing to lessees with the current billing period.  The storing of water consumption data against specific buildings is undertaken by an external provider. The data is used for annual reporting purposes, but is often subject to time delays and some inaccuracies.  To encourage reduced water consumption by building users, it is important that accurate consumption data is tracked and frequently reported by the City, as billing alone is not always an effective tool for discouraging high water use due to the affordability of water compared to other utilities.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>Improved water consumption data at a building level to encourage reduce water usage.</li><li>Improved reporting capability to inform future water efficiency projects.</li><li>Review billing allocation methodology to reduce complexity and improve water efficiency outcomes.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>Investigate and implement a Utility Management System to record water and other utility data.</li><li>Develop reports for relevant users to provide accurate information on water consumption for the purposes of encouraging behavior change or informing capital works programming.</li><li>Identifying responsibilities for monitoring consumption data and actioning responses to trends and anomalies.</li></ul>		
<b>Approach</b>  The investigation of a system will be carried out by a project team at the City of Joondalup. A supplier may be engaged to purchase a system if required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2017/2018	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Asset Management  Strategic and Organisational Development  Information Technology

## Key Focus Area: Built Environment

**Objective: Create and maintain City assets that minimise the use of water and protect local water resources through appropriate design, construction and operation.**

Project 10: Building Sub-metering Project		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2017/2018	
<b>Project Description</b>  Sub-meters have been installed within 13 City of Joondalup facilities during the previous <i>City Water Plan</i> which has assisted the City to identify water consumption trends and provide greater accountability to water users. Many of the City's water accounts are for buildings with a number of different occupants or for combined indoor and outdoor uses. Sub-metering allows for separating water consumption and identifying anomalies. Separate account information also assists the City to target its water education and awareness campaigns.  The City will continue to investigate opportunities to identify where sub-metering is required. Meters will be installed according to a priority listing based on water consumption data and trends.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Identification of high water consuming users within City facilities and buildings.</li><li>• Measurable reductions in water consumption at City owned and managed buildings.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Development of a priority listing for buildings which are appropriate for submeters.</li><li>• Installation of at least one sub-meter per annum in City facilities over the life of the project.</li></ul>		
<b>Approach</b>  Initial investigations and installation of sub-meters will be conducted by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2017/2018 – 2019/2020	<b>Proposed Budget Source</b> Capital	<b>Responsible Business Unit</b> Asset Management

Project 11: Waterless Urinal Upgrade Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City has identified through undertaking Building Audits that there are a number of City facilities containing dated water related infrastructure, such as urinals. The current type of urinals use a significant amount of water and the City has identified an opportunity to replace these units with waterless urinals. The new urinal model will use no water, which will result in a cost benefit to the City and provide 100% water saving in relation to use of the urinals. This project will have a positive impact on the City's overall use of scheme water.  This project will also be promoted through the City's Think Green Buildings Program, via the City's website and local media. It is an opportunity for the City to lead by example and highlight to the community examples of environmental upgrades that can be implemented in homes of residents and businesses within the City.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Reduce scheme water usage.</li><li>• Promote environmental upgrades and water efficiency to the community and businesses within the City.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Remove existing urinal stalls and reconfigure pipe work to suite waterless urinals.</li><li>• Install waterless urinals in alignment with the building refurbishment schedule.</li><li>• Promote water efficient urinal upgrades to the community through Think Green Buildings Program.</li></ul>		
<b>Approach</b>  Installation of the waterless urinals will be undertaken by contractors managed by City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Capital (Part Grant funded)	<b>Responsible Business Unit</b> Asset Management

Project 12: Flow Restrictor Tap Retrofits		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City has identified through undertaking Building Audits that there are opportunities for the installation of more water efficient products and fittings within City Buildings. The City has identified an opportunity to pilot water flow restricting units within hand basin taps. The installation of flow restrictors in taps will reduce the scheme water consumption as they reduce the excess flow of water from the taps. This project will have a positive impact on the City's overall use of scheme water.  The City proposes to trial the installation of flow restrictors within toilet facilities at the Works Operation Centre prior to rolling out the initiative to other City's buildings.  This project will also be promoted through the City's Think Green Buildings Program, via the City's website and local media. It is an opportunity for the City to lead by example and highlight to the community examples of environmental upgrades that can be implemented in homes of residents and businesses within the City.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Increase water efficiency by reducing excess water flow from hand basin taps thus reducing scheme water usage.</li><li>• Promote environmental upgrade and water efficiency to the community and businesses within the City.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Determine appropriate hand basin taps for installation of flow restrictors at the Works Operation Centre.</li><li>• Install flow restrictors and monitor effectiveness.</li><li>• Identify suitable facilities to have flow restrictors fitted to basins subject to outcome of the trial.</li><li>• Promote water efficient tap retrofits to the community through Think Green Buildings Program.</li><li>• Develop and implement flow restrictor tap retrofit program.</li></ul>		
<b>Approach</b>  Installation of flow restrictors will be undertaken by contractors managed by City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Asset Management

Project 13: City of Joondalup Leisure Centres – Craigie Water Demonstration Project		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  City of Joondalup Leisure Centres – Craigie is the City’s flagship building for implementing environmental initiatives, it therefore presents an opportunity to demonstrate new technologies and water use efficiency to the community.  This project will continue to promote existing water conservation technologies at City of Joondalup Leisure Centres – Craigie and new initiatives implemented over the life of the <i>City Water Plan</i> . Future projects may include greywater reuse, pool backwash recycling, rainwater harvesting and upgrading existing plumbing and taps to water efficient products. These innovations will be promoted to encourage waterwise behaviour in the community.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Promote water efficiency and water efficient technologies to the wider community.</li><li>• Increase water efficiency at City of Joondalup Leisure Centres – Craigie through community education and installation of new technologies.</li><li>• Demonstrate City leadership in environmental sustainability.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Continued promotion of existing technologies and new projects resulting from City of Joondalup Leisure Centres – Craigie environmental audit.</li><li>• Continuation of communications campaign at City of Joondalup Leisure Centres – Craigie to promote sustainable technologies and encourage sustainable behaviour in patrons.</li></ul>		
<b>Approach</b>  This project will be managed by the City of Joondalup. External service providers will be engaged for the installation of water efficient technologies as required.		
<b>Timeframe for Implementation</b> 2016/2017– 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Leisure and Cultural Services

Project 14: Green Stamp		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The Green Stamp Program is an environmental initiative that assists small to medium scale automotive businesses to improve their environmental performance. The Program was developed by the Motor Trade Association of WA in conjunction with the Waste Authority, with funding assistance from the Waste Avoidance and Resource Recovery Account.  Practices such as inappropriate storage and use of chemicals, wash down procedures, water wastage and waste disposal can affect local water quality. By incorporating environmental performance into processes and practices, the City can achieve Green Stamp accreditation. Following accreditation the City will be required to demonstrate ongoing commitment to operating in a manner that incorporates sound environmental management practises.  The accreditation process involves a baseline audit, audit report and secondary audit to determine the level of Green Stamp accreditation achieved.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure the City’s mechanical processes and practices do not have a detrimental impact on local water quality.</li><li>• Ensure water conservation and water quality improvement opportunities are harnessed at the City’s mechanical workshop.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Continued implementation of recommendations from the Green Stamp Baseline Audit and Secondary Audit Report.</li><li>• Gaining Green Stamp accreditation.</li><li>• Continue to investigate opportunities to improve environmental performance.</li><li>• Continued use of the Robowash Facility.</li></ul>		
<b>Approach</b>  This project will be organised and implemented by the City of Joondalup in conjunction with Green Stamp.		
<b>Timeframe for Implementation</b> 2016/2017– 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Operation Services

Project 15: WOC Iron Filtration Project		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Water for irrigation of the City’s Works Operation Centre (WOC) Nursery was originally sourced from groundwater bores. However, due to the high iron content within the local groundwater source which was found to negatively affect plant growth as well as causing blockages within the nursery irrigation system, the City changed to scheme water to supply the nursery irrigation.  The City will investigate options for implementing an iron filtration system at the WOC Nursery with the intent of using bore water for nursery irrigation which will reduce dependence on scheme water. A preferred option will be identified and action taken to implement the preferred option.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Increase the water efficiency of the City by identifying where improvements in technology can be made.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Research and analysis into iron filtration systems for irrigation infrastructure.</li><li>• Installation of iron filtration system at WOC nursery.</li><li>• Installation of new sprinkler heads.</li><li>• Transfer of water source within the nursery irrigation system from scheme water to ground water.</li></ul>		
<b>Approach</b>  Research and implementation will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017	<b>Proposed Budget Source</b> Capital	<b>Responsible Business Unit</b> Operation Services

Project 16: Review of Contaminant Disposal at Works Operations Centre		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City will continue to review its existing chemical and solvent disposal methods as required which will identify where improvements can be made to protect local water quality. Contaminants including solvents used for cleaning, oils, other chemicals and hydrocarbons from vehicle use are used within the Works Operations Centre. If disposed in an inappropriate manner, these contaminants can leach into groundwater and impact on local water quality.  This project will allow for continuous improvement to existing processes and practices which can reduce the impact of chemical use on water quality.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Improve local water quality through the identification of contaminant disposal practices that lead to its decline.</li><li>• Implement best practice safety and environmental practices for contaminant disposal.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Implementation of an audit of current contaminant use and disposal methods at the Works Operation Centre as required.</li><li>• Research into current best practice for contaminant disposal and opportunities for safe disposal that has a low environmental impact.</li><li>• Implementation of processes and practices that lead to improved water quality outcomes.</li><li>• Education to staff on new processes and practices.</li></ul>		
<b>Approach</b>  The ongoing review of contaminant disposal will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Operation Services

## Key Focus Area: Management of Wetland Areas and Public Open Space

**Objective: Manage and protect local water resources through best practice management of the natural environment and public open space.**

Project 17: Low Rainfall Irrigation Management Plan		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City uses groundwater to irrigate its public open spaces, parks and streetscapes. The City abstracts the groundwater under three groundwater licences which are issued by the Department of Water, namely Groundwater Licence (GWL) 155515 and 155582 located within the Whitford Groundwater Sub area (GSA) and GWL155510 located within the Quinns GSA. Each groundwater licence has an annual groundwater abstraction limit which needs to be taken into consideration when irrigating parks, public open spaces and streetscapes.  While the City has programs in place to develop efficient irrigation schedules, such as soil moisture monitoring, groundwater use is also influenced by unpredictable environmental factors such as climate and weather. During hotter and drier conditions, greater groundwater is required to irrigate the parks, public open spaces and streetscapes. The City proposes to develop a <i>Low Rainfall Irrigation Management Plan</i> to manage its groundwater usage during low rainfall conditions and ensure it remains within groundwater allocation.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure the City effectively manages the parks, public open spaces and street scapes during low rainfall conditions.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Development of low rainfall categories and trigger values based on Park Classifications.</li><li>• Development of priority listing for parks, public open spaces and street scapes based on the rainfall categories and triggers values.</li><li>• Develop an irrigation schedule based on priority listing.</li><li>• Development of consultation strategies and provision of information to the local community regarding the <i>Low Rainfall Irrigation Management Plan</i>.</li><li>• Implementation of <i>Low Rainfall Irrigation Management Plan</i>.</li></ul>		
<b>Approach</b>  Development and implementation of the <i>Low Rainfall Irrigation Management Plan</i> will be carried out by the City of Joondalup, although external experts will be engaged as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2017/2018	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Operation Services

Project 18: Irrigation Infrastructure Management		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  An irrigation infrastructure management program is required to ensure the efficient operation of the City's irrigation bore network. The management program consists of three programs, namely irrigation infrastructure auditing, ongoing groundwater consumption data collection and a maintenance program designed to prevent iron build up within the bores.  The City will continue to carry out audits of irrigation infrastructure to identify where upgrades and maintenance is required. The audits will assess the condition of irrigation assets and will indentify where faulty or end-of-life infrastructure exists, as well as the efficiency of irrigation systems.  The automated monitoring system will allow for more in-depth analysis of the City's groundwater use and significantly reduce time spent on collecting, analysing and reporting groundwater use data and reduces potential human error in recording meter readings.  Ongoing regular maintenance using a bore cleaning agent and air compressor will reduce and prevent iron build up and reduce the need to remove pumps for repair. Bores will continue to be fitted with recirculation valves to allow for filtration of bore water and injection of a bore cleaning product.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Increase the water efficiency of the City's irrigation infrastructure by identifying where improvements in technology can be made.</li><li>• Implement routine maintenance of City bores to reduce the impact of iron build-up in order to improve water efficiency.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Continue maintenance inspections of the City's irrigation infrastructure including: lakes, liners, filters, bores, pumps and irrigation systems.</li><li>• Continue the Landscape Master Plan Capital Works Program detailing priority projects to improve water efficiency and ongoing maintenance schedules.</li><li>• Ongoing research and analysis into the latest water efficient technologies for irrigation infrastructure.</li><li>• Ongoing development and implementation of a Bore Maintenance Program.</li><li>• Ongoing implementation of the Pump and Bore Replacement Program through the Capital Works Budget.</li></ul>		
<b>Approach</b>  The ongoing maintenance inspections of irrigation infrastructure and development of priorities for the City's works and maintenance schedules will be continued by the City of Joondalup.  Fitting of bore filters and implementation of the maintenance program will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Operation Services

Project 19: Review of Nutrient Management Practices		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  A number of operational activities undertaken by the City have the potential to impact on the water quality of wetlands, groundwater and drinking water resources. Water quality can be impacted through direct contamination and discharge to water bodies, and through groundwater leaching. The City will review its nutrient management practices to see where improvements can be made to ensure that City operations have minimal impact on local water quality.  The Review will include an overview of: <ul style="list-style-type: none"><li>• fertiliser use;</li><li>• lawn mowing;</li><li>• street sweeping;</li><li>• litter management;</li><li>• vehicle wash down procedures; and</li><li>• drainage system maintenance.</li></ul> Following the review of City activities it is proposed that amendments be made to procedures, where applicable, in order to improve the City’s nutrient management practices.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure the implementation of best practice by determining where improvements can be made in the City’s nutrient management practices.</li><li>• Protect local water quality by improving City operations and practices.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• A review of all City practices that potentially impact on water quality.</li><li>• A report with recommendations to improve nutrient management practices in City operations.</li></ul>		
<b>Approach</b>  The review and actions arising from this project will be implemented by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 20: Wetlands Management Plan		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City is developing a <i>Wetlands Management Plan</i> to ensure the implementation of best management practices for the City's constructed wetlands. An overarching <i>Wetlands Management Plan</i> will be developed, as well as 17 site specific Action Plans. The <i>Wetlands Management Plan</i> and associated Action Plans will ensure that hydrology, water quality, erosion and habitat protection are considered within the management of the City's artificial lakes and wetlands.  Water monitoring is conducted at wetland sites and this data will be used to inform the development of the <i>Wetlands Management Plan</i> .		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure City management of constructed wetlands considers hydrology, water quality, erosion and habitat protection to improve the ecological values of these wetlands.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Completion of water quality monitoring and fauna/flora surveys at artificial wetlands.</li><li>• <i>Wetlands Management Plan</i> that covers an overview of all constructed and rehabilitated water bodies in the City.</li><li>• Individual Action Plans for each of the 17 constructed wetlands within the City.</li><li>• Implementation of the <i>Wetlands Management Plan</i>.</li></ul>		
<b>Approach</b>  The <i>Wetlands Management Plan</i> will be developed and implemented by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Operation Services

Project 21: Parks Redevelopment Program		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City will continue the implementation of the <i>Landscape Master Plan</i> through the ongoing Parks Redevelopment Program including hydrozoning, ecozoning and redesigning irrigation systems, to reduce groundwater use within its parks and open space areas.  A hydrozone relates to water delivery and is the practice of establishing separate areas or zones to receive different amounts of irrigation water. An ecozone relates to the vegetation that can best accommodate a given watering regime and is usually a grouping of plants with similar water requirements.  As part of the project, amenity is also being improved to ensure community expectations are balanced with sustainable water management. The project has been successful in reducing groundwater use by up to 50% in some parks.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ongoing implementation of hydrozoning and ecozoning principles to reduce groundwater use in City parks.</li><li>• Continue to increase the amenity and diversity of parks in the City.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Ongoing development of detailed landscaping and irrigation design for identified parks to reduce irrigated areas.</li><li>• Ongoing implementation of redevelopment projects including: hydrozoning and ecozoning, at a rate of at least one park per year.</li><li>• Continue development of consultation strategies and provision of information to the local community on projects in their area.</li></ul>		
<b>Approach</b>  The Parks Redevelopment Program will be implemented by the City of Joondalup and external contractors as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Capital	<b>Responsible Business Unit</b> Operation Services

## Key Focus Area: Water Sensitive Urban Design

**Objective: Promote and implement stormwater management practices that improve local water quality and reduce water consumption.**

Project 22: Stormwater Management Policy		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City can improve water management through the implementation of water sensitive urban design in stormwater infrastructure maintenance. Water Sensitive Urban Design (WSUD) is considered best practice because it considers the total water cycle, improves water quality and increases amenity.  The ongoing implementation of the <i>Stormwater Management Policy</i> will provide continued direction and guidance on the design and maintenance of drainage systems and the installation of infrastructure that facilitates infiltration and/or treatment. Flush kerbing, vegetated swales and soakwells will be used to protect property from flooding, with the added benefit of water quality and amenity improvement. Maintenance of the City's stormwater drainage systems will be undertaken as part of the Stormwater Drainage Program.  The adoption of best practice in new and redeveloped sites will also be ensured through the implementation of the <i>Stormwater Management Policy</i> and provision of advice on water sensitive urban design principles.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure that City management of stormwater protects water quality of receiving environments and utilises opportunities for treatment, infiltration and reuse where possible.</li><li>• Improve amenity of stormwater infrastructure while retaining or improving flood management and treatment properties.</li><li>• Ensure best practice stormwater management is provided through planning and development.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Ongoing implementation of the <i>Stormwater Management Policy</i>.</li><li>• WSUD is considered in land use planning process by the City's Planning Officers.</li><li>• WSUD is integrated into the City's management of stormwater and projects promoted to the community.</li></ul>		
<b>Approach</b>  The continued implementation of the <i>Stormwater Management Policy</i> will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Infrastructure Management Services

Project 23: Stormwater Drainage Program		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Drainage sumps are infiltration points for untreated stormwater and contribute to groundwater quality decline. Stormwater that is directed to sumps carries pollution such as fertilisers, pesticides and petrochemicals.  The City will continue to implement its Stormwater Drainage Program to increase the ecological and amenity values of its sumps. This 10-year Program initially focused on sumps near Yellagonga Regional Park. However, a detailed review of all sumps across the City has since been completed with six sumps have being retrofitted.  The Stormwater Drainage Program focuses on the functionality of sumps to manage local flooding events. Biofiltration within sumps will also be maximised to ensure stormwater is treated before it infiltrates groundwater. Projects are limited by the depth, location and surrounding land uses. However, where possible, fencing will be removed to provide additional amenity benefit. Sump redevelopment is also an opportunity for underground storage of stormwater and allows for the improved utilisation of land for public open space.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Increase the amenity and functionality of drainage sumps in the City.</li><li>• Improve the water quality of local waterways, including groundwater, through the implementation of treatment measures in City sumps.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Development of detailed engineering and landscape design for identified priority sumps to improve drainage function, treatment and amenity.</li><li>• Implementation of retrofit projects at a minimum rate of two sumps per year.</li></ul>		
<b>Approach</b> The City’s Stormwater Drainage Program will be implemented by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Capital	<b>Responsible Business Unit</b> Infrastructure Management Services

## Key Focus Area: Contracts and Purchasing

**Objective:** Minimise the consumption of, and impact to, water resources through the consideration of environmental criteria in City purchasing and tender decisions.

Project 24: Sustainable Procurement Practises		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City can contribute to water conservation and water quality management through various purchasing mechanisms, which consider suppliers and products that are environmentally sustainable.  The City has developed sustainable procurement objectives within the City's <i>Purchasing Policy</i> that has integrated water criteria, as well as other environmental impacts, into purchasing decisions. This will ensure that the City purchases services and products that are environmentally sustainable.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure that water use and water quality is considered in City purchasing decisions and formalised through the City's <i>Purchasing Policy</i>.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Continued integration of water criteria into the City's purchasing mechanisms.</li><li>• Continued use and promotion of sustainable purchasing through the City's internal staff education Program, Think Green – Green Office Program.</li></ul>		
<b>Approach</b>  This project will be implemented by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Financial Services

## Key Focus Area: Staff Education and Participation

**Objective:** Provide staff with information regarding water consumption and water quality management that enables them to operate sustainably within the organisation.

Project 25: Green Office Think Green Program		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Staff education and awareness-raising is important in encouraging sustainable behaviour across the organisation. The Green Office Think Green Program currently delivers water conservation education and awareness raising projects to City staff. The Program is focused on increasing participation by City staff in environmental projects and fostering behaviour change. There is opportunity to expand the Program to include more water related resources and activities and to review existing staff practices to improve sustainable water management.  The Program will continue to include: <ul style="list-style-type: none"><li>• Regular reporting of scheme and groundwater use;</li><li>• Water related resources and tips for staff; and</li><li>• Water quality improvement projects.</li></ul>		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Raise the awareness of the importance of water resources amongst City employees.</li><li>• Ensure that staff utilise water resources in a sustainable manner during work activities.</li><li>• Ensure that City facilities and civic buildings have appropriate procedures, processes and infrastructure in place to achieve sustainable water management outcomes.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Ongoing inclusion of water consumption data on the City's intranet.</li><li>• Ongoing development of waterwise and water quality management tips on the Intranet.</li><li>• Delivery of water related activities and events that provide opportunities for staff participation.</li></ul>		
<b>Approach</b>  The Green Office Think Green Program will be implemented by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

## Key Focus Area: Community Education and Participation

**Objective: Provide opportunities for community education and participation in water efficiency and water quality improvement initiatives.**

Project 26: Environmental Education Program		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Community education is vital in influencing behaviour change and this fosters improved environmental management in the community. The City has developed a coordinated program of environmental education activities through its Environmental Education Program (EEP). Water management activities and resources will be incorporated into the existing Program, under the banner of Think Green – Water, to promote water conservation and water quality improvement practices. Some of the activities that will be implemented as part of this project include those targeting households, schools and businesses.  A number of the City’s buildings are leased to external organisations and groups. The City will also continue to raise awareness of water conservation to lessees through the delivery of education initiatives.  The Environmental Education Program includes the development of: <ul style="list-style-type: none"><li>• Water related education resources, including information regarding the water table and climate;</li><li>• Water conservation and efficiency information in community newspapers, other publications and the City’s website;</li><li>• Waterwise workshops and other water education events; and</li><li>• Provision of water usage information to City’s lessees.</li></ul>		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Promote behaviour change in the community through the provision of water conservation information and resources.</li><li>• Awareness-raising in the community about water quality management.</li><li>• Interaction with the City of Joondalup community to achieve sustainable water management across the City.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Development of water related resources for the community and City’s lessees.</li><li>• Development and delivery of water related workshops and events.</li></ul>		
<b>Approach</b>  This Program will be developed by the City of Joondalup, although external experts will be engaged as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 27: Yellagonga Ecotourism and Community Awareness		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Yellagonga community awareness and ecotourism initiatives will target local residents and the broader community with an aim to enhance appreciation of the conservation significance of Yellagonga Regional Park. Most ecotourism initiatives are delivered through the City of Joondalup’s Think Green Environmental Education Program (EEP).  The Project’s objectives and scope, outlined below, are specific to activities delivered in the Yellagonga Catchment.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Develop and implement initiatives and projects that aim to increase the community’s understanding of environmental issues affecting the Yellagonga Catchment.</li><li>• Increase the community’s access to ecotourism experiences by delivering biodiversity and cultural heritage related initiatives within the Yellagonga Catchment Area.</li><li>• Reduce adverse community impacts on the Yellagonga Wetlands through the provision of information and resources addressing the key threats to the area.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Sustainable gardening community workshops to encourage reduced water and fertiliser use and native plantings adjacent the Yellagonga Wetlands.</li><li>• Yellagonga school and community educational resources available on the City’s website.</li><li>• Ongoing distribution and displays of existing and new brochures and posters to raise awareness of key Yellagonga conservation issues including water quality.</li><li>• Tours and presentations to raise community awareness of the Park e.g. catchment model activities, bird watching and flora tours.</li></ul>		
<b>Approach</b>  This Program will be developed by the City of Joondalup, although external experts will be engaged as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2018/2019	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 28: Think Green Buildings		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The City's ECOSTAR program was renamed as the Think Green Buildings Program to align with the branding used as part of the City's Think Green Environmental Education Program.  The Program showcases sustainable technologies in City buildings which reduce energy, water and resource use and highlights examples of environmental upgrades that can be implemented by community members. This communication also helps to build greater trust in the community of sustainable technologies.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Improve the City's environmental performance through systematically upgrading the City's community facilities with water saving technologies.</li><li>• Raise the community's awareness of environmental technologies through the demonstration and promotion of technologies within City facilities.</li><li>• Communicate the progress of the City's environmental improvement initiatives through the placement of Think Green Building plaques and completed upgrades.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Installation of water efficient technologies in City facilities.</li><li>• Evaluation and rating of City facilities using the Think Green Buildings rating framework.</li><li>• Promotion of Think Green Buildings rated facilities to the community through Think Green Buildings plaques and on the City's website and community newspaper.</li></ul>		
<b>Approach</b>  This project will be implemented by the City of Joondalup, although external experts will be engaged as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 29: Greywater Rebate		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Greywater is the wastewater generated from household bathrooms, laundries and kitchens, excluding toilet wastewater. Greywater can be reused for irrigation of domestic gardens and even though most households won't produce enough greywater to supply the entire garden needs, re-using greywater is a valuable contribution to water conservation, particularly in the context of the drying climate.  <i>The Code of Practice for the Reuse of Greywater in Western Australia</i> outlines acceptable greywater re-use practices to ensure the conservation of ground and surface water supplies and the protection of health standards. The installation and operation of all greywater systems must comply with the code. The installation of a single residential greywater system requires Local Government approval.  In order to encourage greater uptake of the use of greywater within the community, the City of Joondalup will develop a program to provide financial incentives such as a rebate, to City residents that install approved greywater reuse systems.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>To increase the number of greywater reuse systems being installed within the City of Joondalup.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>Examination of available options for providing financial incentives to applicants seeking approval for the installation of a greywater system.</li><li>Development of relevant processes and procedures to guide the implementation of a rebate program.</li><li>Implementation of a rebate for greywater systems, including promotion to the community.</li><li>Review of the rebate program after one year of operation.</li></ul>		
<b>Approach</b>  The research and implementation will be carried out by the City of Joondalup.		
<b>Timeframe for Implementation</b> 2016/2017 – 2017/2018	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Compliance and Regulatory Services

## Key Focus Area: Partnerships and Policy

**Objective: Develop partnerships with the State Government and external stakeholders to enhance water conservation and water quality improvement opportunities within the City.**

Project 30: Craigie Backwash Water Recycling Feasibility Study		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b> <p>Wastewater has traditionally been viewed as a waste product. However, due to declining water availability is now recognised as a valuable resource. The City will investigate the feasibility of reusing pool backwash at City of Joondalup Leisure Centres – Craigie.</p> <p>A feasibility study investigating backwash water recycling opportunities will be produced detailing the feasibility in terms of economic, social and environmental considerations.</p>		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>Determine the feasibility, in consideration of economic, social and environmental implications and benefits, of backwash water recycling opportunities at City of Joondalup Leisure Centres – Craigie.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>Development of a Feasibility Study into backwash water recycling opportunities at City of Joondalup Leisure Centres – Craigie.</li></ul>		
<b>Approach</b> <p>Initial investigations will be carried out by the City of Joondalup. Stakeholders may be engaged if the project progresses.</p>		
<b>Timeframe for Implementation</b> 2016/2017	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Leisure and Cultural Services

Project 31: Cooperative research Centre (CRC) for Water Sensitive Cities Program		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The Cities as Water Supply Catchments (CWSC) which ended in 2013/2014 and became the Water Sensitive Cities Cooperative Research Centre. The CRC for Water Sensitive Cities was established in July 2012 under the Commonwealth Government Cooperative Research Centre Program and will continue until 30 June 2021. The program is also supported by higher education institutions, government and non-government organisations, water utilities and the private sector. The vision of the CRC for Water Sensitive Cities is for sustainable, resilient and liveable water sensitive cities.  In collaboration with over 70 research, industry and government partners, the CRC for Water Sensitive Cities will deliver the socio-technical urban water management solutions, education and training programs, and industry engagement required to make towns and cities water sensitive.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Collaborate with leading research organisations and other Local Governments to ensure that research into stormwater harvesting is WA specific.</li><li>• Ensure the City has access to the best available science on stormwater harvesting and peripheral research into institutional barriers, land use planning, capacity building and adaptive governance.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Recognition of the City as a financial partner of the consortium as identified in promotional material.</li><li>• Continued attendance and participation in workshops and training opportunities.</li><li>• Continued participation in research, workshop and resource development opportunities.</li></ul>		
<b>Approach</b>  The City of Joondalup will be involved in the Program as part of the WA Consortium.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Infrastructure Management Services Operations Services

Project 32: Waterwise Council Program		
<b>Project Status</b> Existing Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  The Waterwise Council Program is a joint initiative between the Water Corporation and Department of Water. The aim of the Program is to build a co-operative working relationship with Local Governments to improve water use efficiency. The Water Corporation and the Department of Water have reviewed the Waterwise Council Program criteria in 2015.  The City joined the Waterwise Council Program in 2009 and was officially endorsed as a Waterwise Council in the same year. Criteria for Waterwise endorsement included implementation of water projects identified in the <i>Water Efficiency Action Plan (City Water Plan 2016-2021)</i> and Waterwise training for staff in the areas of: Water auditing for non residential facilities; Cooling Tower water efficiency; and Water efficient landscape and irrigation. The City is required to demonstrate an ongoing commitment to water conservation and is assessed against criteria, set annually by the Water Corporation, to retain Waterwise endorsement.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Demonstrate leadership in water conservation through the gaining of knowledge and new skills regarding best practice water conservation.</li><li>• Foster partnerships with the State’s Water Utility, Water Corporation and the State’s Water Management Agency, Department of Water.</li><li>• Leverage opportunities for staff training, access to resources and promotion.</li><li>• Promote the City’s water performance through the use of Waterwise branding.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Implementation of projects that achieve Waterwise criteria on an annual basis to retain Waterwise status.</li><li>• Development and submission of the City’s annual review detailing water use data and status of water conservation projects to the Water Corporation.</li></ul>		
<b>Approach</b>  The Waterwise Council Program is implemented by the City of Joondalup in liaison with the Water Corporation and Department of Water.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Strategic and Organisational Development

Project 33: Midge Management Strategy Partnership		
<b>Project Status</b> Existing Project		<b>Project Commencement</b> 2016/2017
<b>Project Description</b>  Midge populations in and around the City's wetlands are closely linked to water quality. Improvements to water quality are therefore likely to reduce midge populations and the overall health of receiving water bodies.  The City of Joondalup has had a formal agreement with the City of Wanneroo and Department of Parks and Wildlife (DPaW) for managing midge within the wetlands of the Yellagonga Regional Park since 1999. This partnership was established as it was considered that the midge issue emanates from the surrounding catchment areas and that midge management requires the expertise and resources of the three agencies to be integrated.  The main objective of the Midge Management Strategy Partnership Agreement 2015-2020 is to encourage an effective and sustainable partnership for the purposes of managing nuisance midge within wetlands of the Yellagonga Regional Park. This is achieved through improving cooperation, communication and collaboration between the two spheres of government.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• For control and management of nuisance midge within the wetland system of the Yellagonga Regional Park, through funding midge larval and water monitoring, nuisance reduction using pesticide application when required, other intervention strategies, research projects in an effort to better understand the factors contributing to the seasonal midge plagues and public information and education.</li><li>• To arrange for the allocation, management and administration of funds for the strategy.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Continued implementation of a larval and water quality monitoring program.</li><li>• Application of chemical treatment as required in line with current DPaW requirements.</li><li>• Undertaking of research into midge populations and their environment.</li><li>• Continued implementation of a Midge Education Program to inform local residents about water quality and midge management as required.</li></ul>		
<b>Approach</b>  The Midge Management Strategy Partnership is a partnership project with the City of Wanneroo and DPaW. The City of Joondalup participates in the Partnership and implement projects as required.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Operational	<b>Responsible Business Unit</b> Compliance and Regulatory Services

Project 34: Beach Microbial Sampling		
<b>Project Status</b> New Project	<b>Project Commencement</b> 2016/2017	
<b>Project Description</b>  Stormwater runoff can impact the water quality of coastal systems as they can carry pollutants such as fertilisers, pesticides, sediments and petrochemicals. High levels of some bacteria can indicate a decrease in water quality for swimmers, diving, surfing and skiing. A bacterial monitoring program has been implemented by the Department of Health (DOH) to assess the health of a number of popular recreational waterways.  The City undertakes bacterial monitoring of the City’s beaches on the behalf of the Department of Health.		
<b>Project Objectives</b> <ul style="list-style-type: none"><li>• Ensure adequate beach water quality for swimmers and other recreational activities.</li><li>• Provide water quality sampling information which can be used by the DOH to identify pollution sources and pollution events.</li></ul>		
<b>Deliverables</b> <ul style="list-style-type: none"><li>• Undertake the required beach water quality sampling.</li></ul>		
<b>Approach</b>  The City of Joondalup undertakes the beach water quality sampling on the behalf of the Department of Health.		
<b>Timeframe for Implementation</b> 2016/2017 – 2020/2021	<b>Proposed Budget Source</b> Department of Health (testing of samples)  Sampling costs are Operational	<b>Responsible Business Unit</b> Compliance and Regulatory Services



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Connect with the City



*This document is available in alternate formats upon request.*

# Waterwise Council Action Plan

City of Joondalup  
October 2021





The Waterwise Council Program supports the State Government's vision to create a Waterwise Perth and waterwise communities, recognising that:

*A waterwise Perth is cool, liveable, green and sustainable, a place where people want to live, work and spend their time. It is a city where communities care about and value water, while making best use of its various sources (groundwater, surface water, stormwater, seawater and wastewater).*

*The city serves as a catchment and provides healthy natural environments, supporting a range of social, ecological and economic benefits.*



## Introduction

It has been over 10 years since the Waterwise Council Program was launched by Water Corporation and the Department of Water and Environmental Regulation. The Program was developed to build a cooperative working relationship with local governments to improve water use efficiency in local governments and their communities.

Since the development of the first Water Efficiency Action Plan in 2016, Waterwise Councils have achieved a number of amazing and innovative initiatives to reduce water usage and strive towards developing waterwise communities.

## Criteria to become a Waterwise Council

The Waterwise Council (WWC) Program is free to all local government authorities (LGAs) in Western Australia to join. To be endorsed as a Waterwise Council, a local government must fulfil the following steps:

**Criteria 1:** Sign a Memorandum of Understanding to participate in the Waterwise Council Program.

**Criteria 2:** Review water consumption and create a Waterwise Council Action Plan for potable and non-potable water sources for all local government operations and the community.

**Criteria 3:** Ensure appropriate staff complete online waterwise training at <https://www.watercorporation.com.au/Help-and-advice/Business-customers>

**Criteria 4:** Progress towards full compliance with groundwater licence conditions including metering regulations and no infringements of water usage issued in the past 12 months.

**Criteria 5:** Report annually to retain endorsement (optional recognition scheme)

### Objectives

The objectives of the Waterwise Council Action Plan are to:

- Assess current water management activities across council operations and the community;
- Identify opportunities to save water;
- Set goals to improve water management outcomes;
- Prepare an action plan and implement water actions to progress towards your targets;
- Provide a process for annual reporting on implementation of water actions;
- Work towards creating waterwise communities beyond water efficiency (recognition scheme)

This plan will be valid for a period of **5 years** and forms the basis of annual reporting requirements.

### Methodology

- Waterwise journey
- Water use inventory
- Develop water goals and targets
- Table of endorsement actions
- Recognition Scheme



## Contact Details

LGA details	
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Name	James Pearson
Telephone	+61 8 9400 4000
Email	_____
Primary Program Contact	
Name	_____
Position	Senior Environmental Project Officer
Telephone	_____
Email	_____
Secondary Program Contact	
Name	_____
Position	Acting Environmental Development Coordinator
Telephone	_____
Email	_____

## Water Management Team

Name	Position/Department	Email	Completed online training? Yes/No
	Building Project Officer, Asset Management	_____	Yes
	Acting Irrigation Technical Officer, Operation Services	_____	Yes
	Senior Landscape Architect – Team Leader, Operation Services	_____	No
	Acting Coordinator Park Operations, Operation Services	_____	No
	Senior Development Engineer, Infrastructure Management Services	_____	No



	Team Leader Aquatic and Facility Operations, Leisure and Cultural Services	<hr/>	No
	Principal Environmental Health Officer, Regulatory Services	<hr/>	No
	Acting Manager Planning Services, Planning Services	<hr/>	No
	Senior Environmental Project Officer, Strategic and Organisational Development	<hr/>	No



## City of Joondalup Waterwise Journey

### Waterwise Council Milestones

Milestone	Reporting Year
Endorsement	2010/11
Gold	2015/16
Platinum (Council of the Year)	*
10 Year Waterwise Council	2020/21

\* City of Joondalup won Waterwise Council of the Year in 2010/11, this was prior to this being called Platinum (Council of Year).

### Main Strategic Documents

List any water related strategies or plans below as your main reference documents for background on your waterwise journey so far. This may include, for example, your previous Water Efficiency Action Plan/Waterwise Council Action Plan, an existing Environmental Strategy or drainage asset management plan.

Please also list and link related policies, local laws, management plans and factsheets below that relate to your efforts towards creating waterwise communities.

**Table 1: Summary of related strategic documents**

Main Strategic Document	Link	Notes
Environment Plan 2014-2019	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Environment-Plan-2014-2019.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Environment-Plan-2014-2019.pdf</a>	The City of Joondalup Environment Plan 2014-2019 guides the City's strategic response to local environmental pressures. The Plan identified Water Management as a key theme and set out the City's water management objectives and indicators.
City Water Plan 2016-2021	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/City-Water-Plan-2016-2021.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/City-Water-Plan-2016-2021.pdf</a>	The City Water Plan 2016–2021 provides a holistic and long-term strategic plan to improve water conservation and water quality management within the City.
Related Strategic Document	Link	Notes
Sustainability Policy	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/03/2018-02-Sustainability-Policy.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/03/2018-02-Sustainability-Policy.pdf</a>	The Sustainability Policy has an objective to outline the City's commitment to integrating sustainable practices into all local government functions and services.
Stormwater Management Policy	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/03/2015-12-POLICY-Stormwater-Management-Policy.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/03/2015-12-POLICY-Stormwater-Management-Policy.pdf</a>	The Stormwater Management Policy includes the following objectives: <ul style="list-style-type: none"> <li>To ensure stormwater is managed to protect environmental, social and economic values.</li> <li>To facilitate the integration of water sensitive design principles, appropriate stormwater management and</li> </ul>



		consideration of climate change impacts into planning and development within the City of Joondalup.
Climate Change Strategy 2014 - 2019	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Climate-Change-Strategy-2014-2019.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Climate-Change-Strategy-2014-2019.pdf</a>	The City's Climate Change Strategy 2014-2019 provides guidance to the City's climate change activities including mitigation and adaptation. The Strategy is currently being reviewed and a new Plan will be prepared.
Yellagonga Integrated Catchment Management (YICM) Plan 2021-2026	<a href="https://www.joondalup.wa.gov.au/files/councilmeetings/2021/Attach7brf210810.pdf">https://www.joondalup.wa.gov.au/files/councilmeetings/2021/Attach7brf210810.pdf</a>	The YICM Plan 2021-2026 provides strategic direction for the City of Joondalup and City of Wanneroo to improve catchment health and protect the diverse ecological values of Yellagonga Regional Park.
Landscape Master Plan 2009 - 2019	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Landscape-Master-Plan-2009-2019.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Landscape-Master-Plan-2009-2019.pdf</a>	The Landscape Master Plan 2009-2019 presents a strategic framework for the City of Joondalup to evolve individual landscape plans over the next 20 years and allows the City to be well placed in adapting to the challenges and opportunities created by climate change.
Street Verge Guidelines	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2019/06/Street-Verge-Guidelines.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2019/06/Street-Verge-Guidelines.pdf</a>	The City's Street Verge Guidelines provide information and advice to residents about installing waterwise verge treatments in the verge area adjoining their property.
Local Government and Public Property Local Laws	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2021/09/Local-Government-and-Public-Property-Local-Law-2015-Amended-2019.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2021/09/Local-Government-and-Public-Property-Local-Law-2015-Amended-2019.pdf</a>	Part 8 Division 3 – Verge treatments refers to permissible verge treatments and owner or occupier obligations.
Factsheet Re-using Household Greywater	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Fact-Sheet-Re-using-Household-Greywater-2012-July.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2018/01/Fact-Sheet-Re-using-Household-Greywater-2012-July.pdf</a>	The Re-using Household Greywater Factsheet outlines the steps to obtain approval for a greywater re-use system and details that a rebate is on offer for residents to gain approval to install a greywater system.
Rainwater Tanks Factsheet	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2020/08/Fact71-Rainwater-Tanks-2020.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2020/08/Fact71-Rainwater-Tanks-2020.pdf</a>	The Rainwater Tanks Factsheet outlines the requirements for approvals prior to installation of rainwater tanks.
Irrigation guideline	Not publicly available	Guideline on the design, supply and installation of irrigation assets.
Tree Management Guidelines	<a href="https://www.joondalup.wa.gov.au/wp-content/uploads/2019/06/Tree-Management-Guidelines-2019.pdf">https://www.joondalup.wa.gov.au/wp-content/uploads/2019/06/Tree-Management-Guidelines-2019.pdf</a>	The Tree Management Guidelines outline the process for residents to apply for one or more trees to be planted by the City on the verge adjacent to their property. The Guidelines also outline the process to



		<i>nominate significant trees for the City's Significant Tree Register.</i>
<i>Leafy City Program</i>	<a href="https://www.joondalup.wa.gov.au/kb/resident/the-leafy-city-program">https://www.joondalup.wa.gov.au/kb/resident/the-leafy-city-program</a>	<i>The City's Leafy City Program was developed to mitigate the environmental impact of climate change, rapid urban growth and the increasing heat island effect generated by existing hardstand surfaces through tree planting and increasing canopy cover in residential streets. The program commenced in 2017 and is ongoing.</i>
<i>Growing local native plants - Factsheets</i>	<a href="https://www.joondalup.wa.gov.au/growing-local-native-plants">https://www.joondalup.wa.gov.au/growing-local-native-plants</a>	<i>The City provides Growing Locals brochures to encourage residents to plant native plants specifically for different soil types.</i>
<i>Water management in the City webpage</i>	<a href="https://www.joondalup.wa.gov.au/kb/resident/city-water-management">https://www.joondalup.wa.gov.au/kb/resident/city-water-management</a>	<i>The City is committed to sustainable management of its water use and outlines its strategic approach to water management.</i>
<i>Saving water webpage</i>	<a href="https://www.joondalup.wa.gov.au/kb/resident/save-water">https://www.joondalup.wa.gov.au/kb/resident/save-water</a>	<i>An outline of water saving tips for use in the home and garden.</i>



## Waterwise Achievements

List and link where possible your main waterwise achievements to date, including major projects, ongoing programs, retrofits, water reduction achievements, awards etc:

### **City of Joondalup achievements include:**

- The City of Joondalup reached a ten-year milestone of being a Waterwise Council in 2020/21.
- The City of Joondalup continue to utilise Azility to maintain a database of the City's scheme water consumption using Water Corporation billing data. Azility supports the City with ongoing analysis and monitoring of scheme water consumption, including the identification of anomalies.
- The Craigie Leisure Centre (Aquatic Centre) were recognised in 2020 and continue to operate as a Gold Waterwise Aquatic Centre for maximising water saving through a series of innovative modifications. Further information can be found [here](#).
- Implementation of a new web-based central irrigation control system ([SignalCloud](#)) that links to the City's three weather stations. The City can now monitor, adjust and maintain the City's irrigation from a smartphone, laptop or any web enabled device in real time, allowing a more adaptive irrigation management approach and ensuring efficient use of groundwater.
- Continuation of park upgrades to include hydrozoning, ecozoning, redesign of irrigation systems and landscaping as per the City's Parks Redevelopment Program. Some great examples include MacDonald Park, Padbury; Juniper Park, Duncraig; Moolanda Park, Kingsley; Macaulay Park, Duncraig; and Poseidon Park, Heathridge.
- Between 2016/17 and 2020/21, a total of 13 Sump Beautification Projects were completed. Projects included installation of turf swale and underground storage.
- A total of 21 iron filtration systems were installed, between 2016/17 and 2020/21, to improve water quality and remove iron staining on City assets.
- A total of 54 waterless urinals were installed, between 2016/17 and 2020/21, resulting in a reduction of scheme water usage.
- Between 2016/17 and 2020/21 Think Green Buildings signage was installed on 12 City buildings, showcasing sustainable technologies at City buildings which reduce energy, water and resource use. These 12 buildings include infrastructure such as solar panels, solar hot water systems, WELS (Water Efficiency Labelling Scheme) rated taps and shower heads, waterless urinals, dual flush toilets, timed taps and showers, energy efficient lighting, sensor lighting and the availability of sustainable transport infrastructure.
- Development and implementation of the Stormwater Policy.
- Continued implementation of Environmental Building Audits and subsequent implementation of recommendations to save water use.
- The delivery of a wide range of community and staff water education initiatives.
- Implementation of the Yellagonga Integrated Catchment Management Plan 2015 – 2019, including an annual water quality monitoring program to monitor scheme water and groundwater in the wetlands.
- Water use in public open spaces was 17% below the groundwater licence in 2020/21 with the help of the central control system.
- There was a 12% reduction in corporate potable water consumption in 2020/21 from 2015/16.
- Completed a Water Sensitive Cities Index Benchmarking Workshop in May 2021.



## Water Use Inventory

The purpose of the Corporate and Community water use inventories is to identify priority areas for action and assist LGA's to track water consumption over time. Please outline inventories in the following sections:

1. *Corporate water consumption*
2. *Community water consumption*

### Corporate water consumption

The City of Joondalup's corporate potable and non-potable water consumption data for the previous financial year is detailed in Tables 2 and 3 below.

All scheme water is supplied to the City of Joondalup via the Integrated Water Supply System (IWSS) which is sourced from a combination of groundwater, surface water and desalination resources. This is treated at local groundwater treatment plants to drinking water quality. The City uses scheme water in its community facilities, offices, recreation centres, libraries and civic centres.

**Table 2: Summary of corporate total water consumption overtime from potable and non-potable water sources**

Water source	2016/17 (kL)	2017/18 (kL)	2018/19 (kL)	2019/20 (kL)	2020/21 (kL)
Potable water	77,893	89,321	79,677	73,550	77,106
Non-potable, licensed groundwater	3,591,016	3,828,889	3,783,554	3,652,885	3,566,858
Non-potable alternate water source (Recycled water/stormwater etc.)	0	0	0	0	0
<b>Total water consumption</b>	<b>3,668,909</b>	<b>3,918,210</b>	<b>3,863,231</b>	<b>3,726,435</b>	<b>3,643,964</b>

**Table 3: Top 5 potable and top 5 non-potable water consuming assets**

Account #	Common name	Water use source	2019/20 (kL)	2020/21(k L)	Notes*
<b>Top 5 potable sites</b>					
9003375247	Craigie Leisure Centre	Scheme	17,679	17,828.79	Water use at Craigie Leisure Centre in 2020/21 showed a slight increase as compared to 2019/20. The facility had a full year of normal operations (excluding 2 weeks of COVID shutdown) in 2020/21, as compared to 2019/20 where there was over 3 months of shutdown or limited access to the facility due to COVID.
9003198455	Hillary's Animal Beach Toilets and Changerooms	Scheme	3,507	4,504.32	The City fitted the facility with four dog-wash stations that have



					become increasingly popular with the community. The increased water-use in May 2021 was investigated and it was identified that a tap was likely to have been left on.
9003331834	Mullaloo Surf Life Saving Club	Scheme	3,877	3,864.74	Higher water usage spike over summer period compared to previous years related to higher water usage. There was also a minor leak in the water fountain in the playground area that was fixed in September 2021.
9003073126	Sorrento Beach North Toilets and Changerooms	Scheme	3,713	3,768.43	Small water usage increase likely due to higher use on the dual use path during COVID-19 restrictions. A minor improvement was made to reduce water usage, with an external building water fixture removed.
9016138945	Work Operations Centre	Scheme	3,673	3,638.58	Water usage spike during October and November 2019 due to construction works to extend office building at the Works Operation Centre. There were also some minor leaks that were repaired in 2020/21.
<b>Top 5 non-potable sites</b>					
GWL 155582	Central Park West (Lakefill)	Groundwater	52,902	72,827	Central Park irrigates a large area (70 hectares). Both these bores feed the Central Park Lake and from there are distributed via the network to a series of parks.
GWL 155582	Central Park East (Lakefill)	Groundwater	57,066	61,293	There are minor water losses from evaporation and seepage into the ground at Central Park Lake. The North Metropolitan TAFE campus also utilise



					water from Central Park Lake for their irrigation.
GWL 155515	Percy Doyle Sporting Complex	Groundwater	61,668	60,418	Water usage is high due to the bowling, soccer and football sporting facilities. In addition, the City has installed sub-meters to assist with tracking sporting facilities usage. This is also one of the sites that is waiting for the smart controller upgrade to be completed in 2021/22. There may be water reductions in future years.
GWL 155582	Heathridge Park	Groundwater	60,587	52,390	The high water use in 2019/20 was a result of the Poseidon Park upgrade that used the Heathridge Park bore.
GWL 155582	Chichester South Park	Groundwater	45,397	49,622	The City undertook some works to install below-ground water storage cells to improve water seepage. Following the works, additional water was used to support the establishment of the new turf. The City also installed an Iron Filtration System to improve water quality at this park and additional water is required to flush the system as required.

\* Note that a small percentage of the 2020/21 consumption data is estimated.



Details on the City of Joondalup's corporate groundwater licences is provided in Table 4 below. The City has three groundwater licenses (GWL 155515, GWL 155582 and GWL 155510) for irrigating parks and public open space. The GWLs cover two groundwater sub-areas: Whitford and Quinns. GWL 155510 is in the Quinns sub-area, which is located north of Burns Beach Road and consists of newer parks and sporting fields. The remaining two GWLs cover the Whitford sub-area, from Beach Road to Burns Beach Road. This area consists predominantly of established parks and sporting ovals with older infrastructure and design elements.

The City has moved towards a reporting regime based on groundwater sub-areas, rather than groundwater licenses as displayed in the additional line item titled 'Combined' added to Table 4. The Whitfords sub-area is an amalgamation of GWL 155515 and GWL 155582. The Quinns sub-area is GWL 155510. The trends in groundwater consumption are relatively consistent across the groundwater sub-areas and reflect similar usage trends based on rainfall and seasonal variations across the years.

In addition, the City also has GWL 182271 that is a geothermal bore (~800m BGL) and an injection bore (~430m BGL) utilised for Craigie Leisure Centre (Aquatic Centre). This is a zero-allocation licence, as the system remains a closed circuit and supports the City to maintain water temperatures at Craigie Leisure Centre while being energy efficient, environmentally friendly, cost effective, and saving the City approximately 933 tonnes of greenhouse gas emissions each year. GWL 182271 has not been included in Table 4.

**Table 4: Summary of corporate licences to take groundwater**

Licence #	Current Licensed allocation (kL)	Actual metered abstraction 2018/19 (kL)	Actual metered abstraction 2019/20 (kL)	Actual metered abstraction 2020/21 (kL)	Notes*
GWL 155515	1,905,050	1,632,373	1,604,290	1,603,155	Whitfords groundwater sub-area.
GWL 155582	1,924,500	1,854,242	1,765,319	1,710,326	Whitfords groundwater sub-area.
<i>Combined (GW155515 &amp; GWL155582)</i>	<i>3,829,550</i>	<i>3,486,615</i>	<i>3,369,609</i>	<i>3,313,481</i>	<i>Combined Whitfords groundwater sub-area</i>
GWL 155510	330,000	296,939	284,727	259,379	Quinns groundwater sub-area.

## Community water consumption

The City of Joondalup's annual community water use is summarised in Table 5 and is the amount of water currently consumed by the community. The City's total community scheme water consumption includes residential, commercial and trade scheme water. This information assists the City of Joondalup to recognise the total water cycle to progress towards a waterwise city and has assisted with monitoring performance and information the targets set to reduce water consumption.



**Table 5: Community potable water use sectors and water consumption over time**

Water use source	2016/17 (kL)	2017/18 (kL)	2018/19 (kL)	2019/20 (kL)	2020/21 (kL)
Residential	15,521,844	15,888,100	15,885,653	16,768,554	16,593,826
Commercial	1,569,057	1,552,331	1,536,786	1,436,406	1,405,498
Education	255,677	266,226	247,876	267,384	259,880
<b>Total water use</b>	<b>17,346,578</b>	<b>17,706,657</b>	<b>17,670,315</b>	<b>18,472,344</b>	<b>18,259,204</b>

Table 6 summarises the licensed, self-supply groundwater allocation report for the City of Joondalup, this information is provided by the Department of Water and Environmental Regulation.

**Table 6: Community non-potable water allocation over time**

Water use source	2016/17 (kL)	2017/18 (kL)	2018/19 (kL)	2019/20 (kL)	2020/21 (kL)
Garden bores	5,168,000	5,168,000	5,168,000	5,168,000	5,168,000
Licensed, self-supply groundwater users for example schools, sports clubs, industry, construction and horticulture	-	-	-	-	7,992,679
<b>Total water use (kL)</b>	<b>5,168,000</b>	<b>5,168,000</b>	<b>5,168,000</b>	<b>5,168,000</b>	<b>13,160,679</b>

## Waterwise Goals

Waterwise goals should address all aspects of a waterwise city. In a Waterwise City, urban areas can exploit the synergies between local water management and urban greening while creating resilient and liveable neighbourhoods.

## Waterwise Vision

The City of Joondalup's waterwise vision is:

*The City of Joondalup is recognised as a water sensitive city, where water resources are managed in a sustainable manner in order to increase water efficiency and improve water quality. The community care about and value water and the City serves as a catchment to provide healthy natural environments, supporting a range of social, ecological and economic benefits.*

Adapted from the *Environment Plan 2014–2019*.

## Corporate Water Management

*Separate reduction targets have been established for corporate scheme water use within Craigie Leisure Centre and the remaining City owned, operated and leased buildings.*

*The corporate potable water target has been calculated using a five-year average of the City's performance from 2014/15 to 2018/19, excluding COVID years as they were not reflective of standard operational conditions. The City will need to reduce its water use to below 57,000 kL by 2025/26 in order to meet this target.*

*Craigie Leisure Centre is recognised as a Waterwise Aquatic Centre due to the best practice approach that is taken to managing water use within the facility. The use of kL per patron has been proposed in the target*



*to account for potential increases in the number of people using the facility. However, other factors have the potential to impact upon the amount of water consumed including planned maintenance work during the life of the Plan as well as the completion of the major refurbishment, scheduled to be completed by 2021/22, that will impact on total scheme water used at the facility. Craigie Leisure Centre's average water usage between 2016/17 and 2018/19 was 0.017 kL/patron and is used as a three year average baseline in the target. These years were selected as years where operations were standard and exclude the years impacted by COVID lockdowns and restrictions that took place in 2019/20 and 2020/21. The City will need to reduce its water use at Craigie Leisure Centre to 0.016 kL/patron by 2025/26 in order to meet this target.*

The City of Joondalup's corporate water management goals include:

- *Maintain corporate potable water use 5% below 57,000 kL (five year average from 2014/15 to 2018/19) for the next 5 years.*
- *Maintain Craigie Leisure Centre water use 5% below 0.017 kL/person (average kL/person from 2016/17 to 2018/19) for the next 5 years.*
- *Maintain groundwater abstraction below groundwater allocation levels for the next 5 years.*

## **Community Water Management**

The City of Joondalup's community water management goals include:

- *Maintain community per capita water use below 115kL per annum for the next 5 years.*
- *Undertake a minimum of two water efficiency and/or water quality projects that encourage community awareness and promote partnerships by 2025-2026.*

# Waterwise Recognition Scheme



## Waterwise Endorsement Action Table

The City of Joondalup are currently endorsed as a Waterwise Council, having been part of the program for over ten years. Where mandatory actions have previously been completed, they have been removed from the plan following consultation with Water Corporation. These actions are for the City of Joondalup to progress over the lifetime of the plan and form part of the annual reporting requirements.

Additional action(s) have been included in the plan and have come from other related plans or strategies the City of Joondalup have in place that relate to development/support of waterwise communities and waterwise practices.

**Table 8: Waterwise Endorsement Action Table**

Water Area	Corporate Water Actions	Status (Complete/In Progress/Ongoing/ To be Completed)	Department Responsible	2020/2021 Updates/Notes/Evidence
<b>All water sources</b>				
Facilities	Establish a Water Audit Program or similar, to closely monitor water use, continually improve water efficiency and identify how to reduce water demand of your top water consuming assets. Demonstrate your plans to implement viable recommendations from your water audits over time.	Ongoing	Asset Management	Environmental building audits (inclusive of water) have been undertaken on eight City buildings since 2016/17. Feasible recommendations from the environmental building audits have been implemented on an ongoing basis to improve environmental performance. In addition, the City continues to monitor water usage accounts through Azility and undertakes internal audits on any facilities which display anomalies.
	Implement maintenance processes to detect, report and repair leaks within all Council assets.	Ongoing	Strategic and Organisational Development / Asset Management	The City's Leak Detection Project is ongoing and undertaken as part of building maintenance. Any building with changes to its water use is flagged for meter reading and analysis and appropriate actions taken. The Leak Detection Project has included thirty-two (32) buildings where three (3) buildings had significant leaks and two buildings had minor leaks. All leaks found were repaired. Subsequent water use was analysed identifying significant water and cost savings after the leaks were repaired.  In addition, Craigie Leisure Centre continue to implement the annual Water Efficiency



# Waterwise Recognition Scheme



				Management Plan report project, undertaking annual reviews and identifying ways to better manage and improve water use.
Monitoring	Implement tracking and monitoring of assets' water use over time using industry standards for benchmarking top water consuming sites.	Ongoing	Strategic and Organisational Development/ Operation Services/ Asset Management	<p>The City has continued ongoing monitoring of corporate scheme water consumption through the Azility Program. Azility maintains a database of the City's scheme water consumption using Water Corporation billing data. Data can be downloaded from Azility at any time and analysed. Analysis can be undertaken at a facility level if required. Quarterly meetings are held with relevant Officers and Azility to provide an overview of scheme water use during each quarter. High scheme water usage buildings and anomalies are identified in quarterly meetings and through analysis of Azility data and further investigations and actions are undertaken as required.</p> <p>The City has continued ongoing monitoring of corporate groundwater abstraction which occurs monthly.</p> <p>Annual scheme water and groundwater consumption figures are included in the City's Annual Report and in the annual review of the City Water Plan.</p>
Education	Establish and implement a Water Management Team to foster a culture of Waterwise Champions within the council including providing behaviour change programs, workshops or initiatives that will encourage waterwise practices at the office and at home.	Ongoing	Infrastructure Management Services / Strategic and Organisational Development/ Operation Services/ Asset Management	<p>In 2020/21 the Water Management Team met on a quarterly basis to discuss and review water performance. One of the many initiatives in 2020/21 included sharing waterwise messages through the intranet on watering, fertilisers and growing locals (waterwise plants).</p> <p>In 2021/22 a new Water Management Team has been established to continue to develop the City's waterwise culture. Representatives are included from a variety of business units.</p>
Irrigation	Establish and/or maintain a baseline water budget for every irrigated public open space asset. Demonstrate	Ongoing	Operation Services	The City continues to implement the <i>Sustained Evapotranspiration Irrigation Management Plan</i>



# Waterwise Recognition Scheme



	how you monitor and adjust the baseline water budget in response to weather conditions and or landscape planting changes.			since 2018-19. The City is focused on continual improvement and is in the process of integrating intelligent irrigation control, following the adoption of the SignalCloud Central Control System that integrates the City's three weather stations and the City's irrigation controllers, allowing irrigation programs to be adjusted automatically. During 2020/21, 178 Signal Data Systems Pty Ltd (SDS) smart controllers were installed. The final 32 SDS Smart Controllers are scheduled for installation in 2021/22 to complete the City-wide evapotranspiration programming.
	Provide evidence that demonstrates irrigation systems are performing at best practice and are audited to identify poorly performing fixtures or schedules.	Ongoing	Operation Services	<p>The City continually monitors and tracks its irrigation systems to ensure they are performing optimally. The City's Irrigation Infrastructure Management Program includes:</p> <ul style="list-style-type: none"> <li>▪ Continue maintenance inspections of the City's irrigation infrastructure including: lakes, liners, filters, bores, pumps and irrigation systems.</li> <li>▪ Continue the Landscape Master Plan Capital Works Program detailing priority projects to improve water efficiency and ongoing maintenance schedules.</li> <li>▪ Ongoing research and analysis into the latest water efficient technologies for irrigation infrastructure.</li> <li>▪ Ongoing development and implementation of a Bore Maintenance Program.</li> <li>▪ Ongoing implementation of the Pump and Bore Replacement Program through the Capital Works Budget.</li> </ul>
Landscaping	Landscaping policies and/or plans to include low water use plants, waterwise mulch, hydrozoning and soil amendments.	Ongoing	Operation Services/	The City implements the <a href="#">2021/2022 Five Year Capital Works Program</a> . The program comprises of all City Capital Works projects, including the Parks Development Program and Parks



# Waterwise Recognition Scheme



			Infrastructure Management Services	<p>Equipment Program (which encompasses the <a href="#">Landscape Master Plan</a>); Park Amenity Improvement Program and Revitalise Program. These projects include hydrozoning and ecozoning, upgrading irrigation systems and waterwise landscaping. Community consultation is undertaken for new projects and notification is undertaken for replacement or upgrade projects, as detailed in the <i>City's Consultation Protocol</i>. An example of a project that was undertaken in 2020/21 is the Parks Development Program's Revitalise Program at Poseidon Park in Heathridge that included the implementation of hydrozoning and ecozoning by removing irrigated turfed areas to unirrigated mulched areas below existing mature trees. The resultant landscapes visual and ecological amenity was greatly improved and the hydrozoning and ecozoning has resulted in substantial water savings. In addition, the mulch used in landscaping is pathogen free certified, as guided by the City's <a href="#">Pathogen Management Plan</a>.</p> <p>Other programs with relevance to landscaping, include the City's <a href="#">Street Verge Guidelines</a> (revised in September 2021) and the Streetscape Enhancement Program that includes the City's <a href="#">Leafy City Program</a> and <a href="#">Street Tree Program</a>.</p>
	<p>Continue to implement the City's Leafy City Program working together with local residents to help create cooler inviting green urban spaces to live in.</p> <p>As part of the program, investigate, develop and implement a focused education campaign that emphasises the benefits of trees to the community, so people see them as a community asset.</p>	Ongoing	Operation Services	<p>The Leafy City Program commenced in 2017. Further information on the <a href="#">Leafy City Program – City of Joondalup</a> can be found on the City's website.</p>



# Waterwise Recognition Scheme



Potable water sources				
Facilities	Procurement policies incorporate internal requirements to install better than the minimum Building Code of Australia WELS ratings for water efficiency for water fixtures, fittings and appliances for all new buildings AND external requirements to use Smart Approved WaterMark and Waterwise Approved products and services where possible.	Ongoing	Asset Management, Finance	The City Building Specifications are all equivalent or better than the minimum Building Code of Australia WELS ratings for water efficiency for water fixtures, fittings and appliances. In addition, this is further reflected in the Joondalup 2022 Strategic Community Plan 2012 - 2022 and Building Asset Management Plan 2015/16 – 2035/36.
Monitoring	Scheme water meters (and any sub meters) are read on a regular basis and recorded. Usage anomalies are investigated, and leaks repaired in a timely manner.	Ongoing	Asset Management	The City's Leak Detection Project is ongoing and undertaken as part of building maintenance. Any building with changes to its water use is flagged for meter reading and analysis and appropriate action taken. In 2020/21, the program flagged 32 buildings for meter reading and analysis. Three of these buildings had significant leaks and two had minor leaks that were repaired immediately. Subsequent water use was analysed identifying significant water and costs savings after the leaks were repaired.
Non-potable water sources				
Monitoring	Progress towards metering the take of water from all licenced groundwater bores using correctly installed and approved water meters.	Ongoing	Operation Services	The City undertakes metering of the take of water from all licenced groundwater bores using correctly installed and approved water meters, in accordance with the relevant guidelines and regulatory standards. In 2020/21, flow meters to all major sporting ovals were independently inspected and assessed for accuracy and compliance by a contractor, resulting in flow meters being upgraded at 19 sites. In 2021/22, the focus is on inspecting and assessing the City's passive parks to complete this project.
	Develop a process to record your metered water take for each licensed groundwater bore at the end of each calendar month and submit recordings via <a href="#">Water Online</a> to manage all of your water licensing and metering requirements.	To be completed	Operation Services	The City collects and monitors metered water take for each licensed groundwater bore monthly. The City will commence uploading the meter data monthly into Water Online in September 2021.



## Waterwise Recognition Scheme



	Maintain all meters in good working order and notify the DWER as soon as possible of detecting a malfunction of the water meter.	To be completed	Operation Services	The City implements the Bore Maintenance and Replacement Program. This is inclusive of emergency works where the City follows defined procedures. The City will commence notifying the DWER following detection of a malfunction of a water meter in alignment with the commencement of using Water Online in September 2021.
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# Waterwise Recognition Scheme



Water Area	Community Water Actions	Status (Complete/In Progress/Ongoing/ To be Completed)	Department Responsible	2020/2021 Updates/Notes/Evidence
Education	Engage with household and business ratepayers to promote water efficiency, waterwise gardens and how to be a responsible garden bore owner.	Ongoing	Asset Management, Strategic and Organisational Development	The City will continue to run targeted education campaigns related to water conservation and water quality. The City encourages water efficiency through its Think Green Environmental Education Program and partnership in the Climate Clever Program. Further waterwise information can be found on the City's website.
	Provide information on the installation and local regulation of non-potable water supply (e.g. grey water systems and rainwater tanks)	Ongoing	Regulatory Services, Strategic and Organisational Development	The City of Joondalup provides a range of information on its website and through factsheets, inclusive of: <ul style="list-style-type: none"> <li>• <a href="https://joondalup.wa.gov.au/fact-sheet-re-using-household-greywater-2012-july.pdf">Fact-Sheet-Re-using-Household-Greywater-2012-July.pdf</a> (joondalup.wa.gov.au)</li> <li>• <a href="https://joondalup.wa.gov.au/greywater-reuse-city-of-joondalup">Greywater reuse – City of Joondalup</a></li> <li>• <a href="https://joondalup.wa.gov.au/fact71-rainwater-tanks-2020.pdf">Fact71-Rainwater-Tanks-2020.pdf</a> (joondalup.wa.gov.au)</li> <li>• <a href="https://joondalup.wa.gov.au/saving-water-city-of-joondalup">Saving water – City of Joondalup</a></li> <li>• <a href="https://joondalup.wa.gov.au/think-green-living-guide.pdf">Think-Green-Living-Guide.pdf</a> (joondalup.wa.gov.au)</li> <li>• <a href="https://joondalup.wa.gov.au/environmentally-sustainable-design-checklist.pdf">Environmentally-Sustainable-Design-Checklist.pdf</a> (joondalup.wa.gov.au)</li> </ul>
	Engage with local schools on water efficiency and sustainability programs, including encouraging schools to participate in the <a href="#">Waterwise Schools Program</a> .	Ongoing	Strategic and Organisational Development	The Waterwise Schools Program is promoted in the School Connections e-newsletter annually. The City is a partner of the ClimateClever Program which includes water efficiency measures and schools can subscribe for a 50% discount in the fee.



# Waterwise Recognition Scheme

## Criteria for Gold Waterwise Council Status

As part of the Waterwise Council Program, local governments can be endorsed as a Waterwise Gold Council. To apply for Gold Waterwise Council Status, LGA's must demonstrate significant contribution towards development of waterwise communities and best practice water management.

For all local governments, the following actions must be **completed** before Gold endorsement:

1. Have all **Aquatic Centres** endorsed as a [Waterwise Aquatic Centre](#)
2. Have a Waterwise **Verge Policy or Guideline** in line with Water Corporation's [Waterwise Verge Best Practice Guidelines](#)
3. Have an established cross-functional **Water Management Team**

Please provide an update below

**Table 9: Updates on compulsory Gold waterwise actions**

Gold Compulsory Action (as above)	2020/21 Updates/Notes/Evidence
All Aquatic Centres endorsed as Waterwise	Letter of endorsement (dated 14 January 2021)
Waterwise Verge Policy or Guideline	The City's Street Verge Guidelines were updated in September 2021. Policy link: <a href="#">Street-Verge-Guidelines-2021.pdf</a> ( <a href="#">joondalup.wa.gov.au</a> ).
Established cross-functional Water Management Team	The team participants list, agenda and minutes from the last meeting are provided as Attachments.

If you are currently a Gold Waterwise Council or intending to apply for Gold status for the first time, please provide an update to the actions in Table 10 and provide 5 or more additional actions to report on each financial year for continued Gold re-endorsement.

Additional actions will need to address Water Sensitive City goal areas with at least one action each addressing the following goals:

1. Improve Productivity and Resource Efficiency;
2. Increase Community Capital; and
3. Improve Ecological Health.

Gold actions will need to demonstrate a willingness to strengthen governance arrangements, build community capital, and invest in multifunctional adaptive infrastructure. These actions and others to support high quality and connected open spaces, protecting and enhancing the ecological values of urban landscapes, and recreating a more natural water cycle will assist your council to progress beyond water efficiency and towards creating waterwise cities and communities.

## Water Sensitive Cities Goal Areas

The [Cooperative Research Centre for Water Sensitive Cities](#) developed the [Waterwise Sensitive Cities Index](#) to benchmark cities against a range of goals and indicators to show where cities sit in regards to becoming a Water Sensitive City (WSC).



## Waterwise Recognition Scheme

See Figure 1 for the goals and indicators that you will need to inform your Gold Waterwise Council actions. For more information on how to progress your LGA towards creating a Water Sensitive City, visit <https://watersensitivecities.org.au/> or contact [WEpartnership@watercorporation.com.au](mailto:WEpartnership@watercorporation.com.au).

# Waterwise Recognition Scheme



**Figure 1: Water Sensitive Cities Goal Areas and Indicators**

Ensure good water sensitive governance	Increase community capital	Achieve equity of essential services	Improve productivity & resource efficiency	Improve ecological health	Ensure quality urban space	Promote adaptive infrastructure
Knowledge, skills and organisational capacity	Water literacy	Equitable access to safe and secure water supply	Maximised resource recovery	Healthy and biodiverse habitat	Activating connected green - blue space	Diversify self-sufficient fit-for-purpose water supply
Water is key element in city planning and design	Connection with water	Equitable access to safe and reliable sanitation	Low GHG emission in water sector	Surface water quality and flows	Urban elements functioning to mitigate heat impacts	Multi-functional water infrastructure
Cross-sector institutional arrangements and processes	Shared ownership, management & responsibility	Equitable access to flood protection	Water-related business opportunities	Groundwater quality and replenishment	Vegetation coverage	Integration and intelligent control
Public engagement, participation and transparency	Community preparedness and response to extreme events	Equitable and affordable access to amenity values of water-related assets	Low end-user potable water demand	Protect existing areas of high ecological value		Robust infrastructure
Leadership, long-term vision and commitment	Indigenous involvement in water planning		Benefits across other sectors			Infrastructure and ownership at multiple scales
Water resourcing and funding to deliver broad societal value						Adequate maintenance
Equitable representation of perspectives						



# Waterwise Recognition Scheme

## Gold Waterwise Council Action Table

Actions are allocated against Water Sensitive Cities Goal Areas. For assistance in the below, please contact [WEpartnerships@watercorporation.com.au](mailto:WEpartnerships@watercorporation.com.au)

**Table 10: Gold Waterwise Council Action Table**

WSC goal	2020 – 2025 Gold Actions (minimum of 10 actions including those listed below)	Status (Complete/ Ongoing/To be Completed)	Department Responsible	2020/2021 Updates/Notes/Evidence
Good Water Sensitive Governance	Encourage local developments and infill projects to be accredited under Green Star Developments, EnviroDevelopment, One Planet Living or Living Community Building Challenge.  All of these programs allow a development to become endorsed as a <a href="#">Waterwise Development</a> .	On-going	Strategic and Organisational Development, Planning Services	The City's <i>Environmentally Sustainable Design Checklist</i> assists to raise awareness of environmentally sustainable design principles by requiring the developer to advise on the sustainability measures included in their proposed development. The checklist is required to be completed for non-residential developments and larger residential developments. The checklist will be reviewed and updated to reference the Water Corporation Waterwise Development program.
Good Water Sensitive Governance	Support relevant parks and irrigation staff to complete <a href="#">Irrigation Australia's Irrigation Efficiency Course</a> .	Ongoing	Operation Services	The City continues to ensure relevant parks and irrigation staff undertake the training. Three staff are booked in to complete the training in March 2022.
Increase Community Capital	Provide local planting lists for residents with waterwise species in line with the <a href="#">Waterwise Plant Directory</a>	Ongoing	Strategic and Organisational Development	The City developed Growing Local brochures based on growing specific native plants for the soil types at local residences: - <a href="#">Growing local native plants – City of Joondalup</a>
Ensure quality urban space	Provide active progress towards upgrading retrofitting local drainage sumps infrastructure to improve for community accessibility, amenity and environmental improvement outcomes using Water Sensitive Design techniques.	Ongoing	Infrastructure Management Services	Between 2016/17 and 2020/21, a total of 13 Sump Beautification Projects were completed as part of the City's Stormwater Drainage Program. Projects included removal of old fencing and traditional trapezoidal



# Waterwise Recognition Scheme



	The City's Sump Beautification Project (part of the City's Stormwater Drainage Program) will be reviewed to identify opportunities to improve community understanding of and involvement in the urban water cycle and the benefits of green-blue assets, particularly drainage sumps.		Strategic and Organisational Development	sumps, replaced with underground tanks and surface swale to improve public amenity and visual appearance.
Improve Productivity & Resource Efficiency	Encourage participation of public and private golf courses in the Department of Water and Environmental Regulation's Waterwise Golf Program	To be completed	Strategic and Organisational Development	The Joondalup Resort Golf Course is privately owned and located within the City of Joondalup. The City installed stormwater litter traps to prevent litter impacting the Joondalup Resort Golf Course and will engage with the Joondalup Resort regarding the Waterwise Golf Program.
Good Water Sensitive Governance	Develop a new Environment Strategy that encompasses water targets and initiatives, in consultation with the community within the next five years.	To be completed	Strategic and Organisational Development	The previous <a href="#">Environment Plan 2014 - 2019</a> will be updated with an Environment Strategy within the next five years. The new Strategy will provide strategic direction for the delivery of water conservation and water quality improvement initiatives within the City and continue to integrate the Water Sensitive Cities framework. The new Strategy will also allow for annual reporting of the City's water performance through State of the Environment reporting.
Increase Community Capital	Implement the Yellagonga Integrated Catchment Management (YICM) Plan 2021 – 2026 through the YICM Working Group (consisting of City of Joondalup, City of Wanneroo and Department of Biodiversity, Conservation and Attractions (DBCA)) and collaborate with the Friends of Yellagonga Regional Park and community in relation to the management and improvement of the catchment.	Ongoing	Strategic and Organisational Development / Operational Services	The YICM Plan 2021 – 2026 was endorsed by the City of Joondalup's Council on 17 August 2021 and City of Wanneroo's Council on 12 October 2021. The Plan will be branded and then made available on the City's website.
Improve Productivity & Resource Efficiency	Craigie Leisure Centre Water Demonstration Project:	Ongoing	Leisure and Cultural	The Craigie Leisure Centre Water Demonstration Project promoted water



# Waterwise Recognition Scheme



	<ul style="list-style-type: none"> <li>Continued promotion of existing technologies and new projects resulting from Craigie Leisure Centre environmental audit.</li> <li>Continuation of communications campaign at Craigie Leisure Centre to promote sustainable technologies and encourage sustainable behaviour in patrons.</li> </ul>			<p>efficient technologies and water conservation behaviour through the use of:</p> <ul style="list-style-type: none"> <li>waterless urinals and flow restrictors</li> <li>monitoring the daily use of water in the swimming pools to identify leaks and water wastage</li> <li>seasonal schedule and time limiting on backwashing of the pool filters</li> <li>signage around the facility promoting leisure centre water efficiencies and appropriate water conservation behaviour (for example, encouraging shorter showers).</li> </ul> <p>A water audit was undertaken in May 2018 and in 2019/20, during the COVID shutdown, a significant review of plumbing systems on site was completed and several replacements undertaken.</p> <p>In 2019/20 and 2020/21, Craigie Leisure Centre was recognised as a Gold Waterwise Business after reducing consumption and consistently improving the management of water use over a 10 year period, since the implementation of the annually audited Water Efficiency Management Plan. Craigie Leisure Centre has remained a Waterwise Aquatic Centre for the duration of the plan.</p>
Improve Ecological Health	Yellagonga Water Quality Monitoring and Improvement Project:	Ongoing	Strategic and Organisational Development	The City engages the Edith Cowan University (ECU) Centre for Ecosystem Management to undertake the



# Waterwise Recognition Scheme



	<ul style="list-style-type: none"> <li>• Continue scientific monitoring and investigations of groundwater and surface water in the Yellagonga Catchment and Park.</li> <li>• Support scientific and education programs aimed at identifying and mitigating sources of contaminants.</li> <li>• Collate, analyse and share data between managing authorities.</li> <li>• Provide recommendations for on ground actions to improve water quality.</li> <li>• Investigate septic tank decommissioning opportunities in Kingsley, in conjunction with the Water Corporation.</li> <li>• Investigate the opportunity of physical algal bloom removal.</li> <li>• Identify the extent of the non-native wetland species at South Lake Joondalup for potential revegetation of native species to improve water quality</li> </ul>			Yellagonga groundwater and surface water quality monitoring. The monitoring has been completed annually for the last 11 years. Outcomes of the Reports, including recommendations for management and further research, are presented to the Executive Leadership Team, Elected Members and to partners of the Yellagonga Water Quality Monitoring and Improvement Project.
Promote adaptive infrastructure	<p>Continue to enhance groundwater consumption efficiency through the use of the SignalCloud Central Control Irrigation System.</p> <ul style="list-style-type: none"> <li>• Investigate installation of web-based irrigation control software. <b>Complete.</b></li> <li>• Installation of new irrigation controllers. <b>Ongoing</b></li> <li>• Adjust irrigation times accordingly to data received including the shutting down of nominated irrigated systems due to wet weather events. <b>Ongoing.</b></li> <li>• Investigate and implement automated City wide evapotranspiration programming. <b>Ongoing.</b></li> </ul>	Ongoing	Operation Services	The City is focused on the integration and intelligent control of irrigation, adopting the SignalCloud Central Control System that integrates the weather stations and irrigation controllers and will allow irrigation programs to be adjusted automatically. During 2020/21, 178 SDS smart controllers were installed. The final 32 SDS Smart Controllers are scheduled for installation in 2021/22 to complete the City-wide evapotranspiration programming.

# Waterwise Recognition Scheme



	<ul style="list-style-type: none"> <li>Investigate installation of soil moisture meters, as required, that will link to the central control system.</li> </ul> <b>Ongoing.</b>			
Increase Community Capital	Investigate opportunities to collaborate with the School of Horticulture and Conservation at the North Metropolitan TAFE; focusing on increasing skills and knowledge in the design and implementation of waterwise landscaping practices.	To Be Completed	Strategic and Organisational Development	Project is due to commence in 2021/22.
Improve Ecological Health	<p>Midge Management Strategy Partnership:</p> <ul style="list-style-type: none"> <li>Continued implementation of a larval and water quality monitoring program.</li> <li>Application of chemical treatment as required in line with current DBCA requirements.</li> <li>Undertaking of research into midge populations and their environment.</li> </ul> <p>Continued implementation of a Midge Education Program to inform local residents about water quality and midge management as required.</p>	Ongoing	Regulatory Services	<p>The Midge Management Strategy Partnership extends until 30 June 2025. The Midge Steering Group conducted midge larvae sampling on both Lake Joondalup and Lake Goollelal between 2016/17 and 2020/21. Water levels and temperatures were also monitored and recorded on each sampling occasion. Dependant on the numbers of midge larvae detected in the sampling, chemical intervention has been undertaken at times to address adult midge nuisance. Targeted treatment has been undertaken in November 2016, January 2018, summer 2018/19 and October 2020. Growth inhibitor S-methoprene is used for the treatments after being trialed in 2016/17.</p> <p>The City engaged Edith Cowan University to undertake a study relating to adult midge emergence; providing information on emergence and distribution of nuisance swarms, compliment midge larvae monitoring and identify the effectiveness of the pesticide S-Methoprene.</p>

# Waterwise Recognition Scheme



				Information on midge management has been provided directly to local residents and information and a fact sheet is available on the City's website.
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Endorsement of Waterwise Council Action Plan		
City of Joondalup:		
a)	Will implement the water management measures stated in the Waterwise Council Action Plan and ensure employees and contractors assist in implementing actions.	
c)	Acknowledges that the Water Corporation and / or Department of Water and Environmental Regulation may comment on the Action Plan and/or request additional information relating to the Action Plan.	
d)	Acknowledges that the Water Corporation and Department of Water and Environmental Regulation will monitor the Action Plan and failure to meet requirements of the program may result in the withdrawal of Waterwise endorsement.	
e)	Will submit an annual report, in accordance with the Waterwise Endorsement Action Table, detailing progress made on the Action Plan in order to maintain endorsement as a Waterwise Council.	
Name	Jamie Parry	
Position	Director Governance and Strategy	
Signature		Date
Water Corporation and Department of Water and Environmental Regulation Acceptance of the Waterwise Council Action Plan		
Water Corporation and Department of Water and Environmental Regulation has reviewed and accepted the Action Plan. With acceptance of this Action Plan <LGA>: will be eligible for endorsement/re-endorsement as a Waterwise Council.		
Water Corporation		
Name		
Position		
Signature		Date
Department of Water and Environmental Regulation		
Name		
Position		
Signature		Date

Please submit your Waterwise Council Action Plan to [WEpartnerships@watercorporation.com.au](mailto:WEpartnerships@watercorporation.com.au).

For any questions, contact [WEpartnerships@watercorporation.com.au](mailto:WEpartnerships@watercorporation.com.au) or call (08) 9420 2114