



Water Sensitive Cities Benchmarking and Assessment Report

City of South Perth, WA



Document Title

Water Sensitive Cities Benchmarking and Assessment: City of South Perth

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Preparation of this report has utilised the Water Sensitive Cities (WSC) Index Benchmarking tool developed by the Cooperative Research Centre for Water Sensitive Cities (CRCWSC). More information on WSC Index tool is available here: <https://watersensitivecities.org.au/solutions/wsc-index/>

The City of South Perth would like to acknowledge and thank the Water Corporation for the financial assistance provided which enabled the City to host the benchmarking workshop and generate this report.

Executive Summary

This report provides a summary of the City of South Perth's (the City), Water Sensitive Cities Indexing workshop process and outcomes, and its journey towards becoming a Water Sensitive City. The City was benchmarked using the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) Water Sensitive City (WSC) Index Tool with input from City staff, community and stakeholders in March 2021.

The WSC Index Tool identifies all the key components (indicators) of a WSC. The Tool covers 7 goals and assesses 34 indicators that represent important attributes of a WSC. Although the tool provides a numeric score, the assessment of many indicators is qualitative and thus some variation may be apparent across benchmarked areas.

The WSC Index also facilitates consideration of the developmental states of cities as they move towards a WSC. The results of the benchmarking workshop suggest that the City of South Perth meets all the characteristics of a Water Supply City, Sewered City, Drained City and Waterway City (see Appendix 1). It nearly meets the characteristics of a Water Cycle City (66%); and has commenced the journey (23%) towards the WSC state.

In terms of the WSC goals, the City met the Water Cycle City benchmark for the goals of (1) Ensure good water sensitive governance, (3) Achieve equity of essential services, (4) Improve productivity and resource efficiency, (6) Ensure quality urban space and (7) Promote adaptive infrastructure. A deficit in attaining key attributes of a Water Cycle City is evident for (2) Increase community capital and (5) Improve ecological health.

In response to the discussion and rankings achieved, a ten-point action plan has been developed for the City of South Perth to help

progress the City's journey towards a WSC. The actions predominantly address the lower-performing indicators and are recommended to be collaboratively delivered by all agencies working together with the community. In no particular order, the following actions are recommended:

- Action 1: Develop and communicate a clear vision for a Waterwise City of South Perth
- Action 2: Explore ways to improve water literacy
- Action 3: Develop a Green Infrastructure policy and strategic WSUD retrofit plan
- Action 4: Share approaches for collaboration and engagement with other LGAs to demonstrate leadership and strengthen knowledge sharing opportunities
- Action 5: Recognise and share understanding all WSUD benefits with community
- Action 6: Encourage uptake of alternative fit-for-purpose water supply options and green infrastructure solutions
- Action 7: Address biodiversity/ ecological health through improved monitoring and wildlife habitat creation
- Action 8: Support investment in blue-green infrastructure
- Action 9: Demonstrate an ongoing commitment to improve groundwater use efficiency and quality
- Action 10: Conduct an energy audit and develop greenhouse gas reduction strategy

It is understood that this report and identified actions will assist the City with updating their Water Management Plan, as well as progressing towards a water sensitive future and aligning with the Corporate Business Plan 2020-2024 and Strategic Community Plan 2020-2030. Actions may be further developed, tested and resources allocated for delivery as part of this process.

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1 Introduction

Water sensitive cities are resilient, liveable, productive and sustainable. They interact with the urban hydrological cycle in ways that:

- *provide water security for economic prosperity through efficient use of diverse water resources;*
- *enhance and protect the health of watercourses and wetlands;*
- *mitigate flood risk and damage; and*
- *create public spaces that harvest, clean and recycle water.*

*The strategies and systems for water management contribute to biodiversity, community health and wellbeing, carbon sequestration and reduction of urban heat island effects.*¹

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) is an Australian research centre that brings together many disciplines, world-renowned subject matter experts, and industry thought leaders to revolutionise urban water management in Australia and overseas.

The vision of the CRCWSC is for cities and towns of the future to be liveable, resilient, sustainable and productive. Currently, cities are faced with numerous challenges such as population growth, changing lifestyles and values, climate change and climate variability, and challenging economic conditions. The research and the outcomes of the CRCWSC can help change the way we plan and design our cities by placing greater emphasis on the value and role of water to ensure appropriate responses to the key challenges.

The concept of a Water Sensitive City (WSC) has emerged as an aspirational state where we interact with the urban water cycle in ways that:

- provide the water security essential for economic prosperity through efficient use of diverse available resources;
- enhance and protect the health of waterways and wetlands, the river basins that surround them, and the coast and bays;
- mitigate flood risk and damage; and
- create connected public spaces that collect, clean, and recycle water.

Water sensitive communities are at the core of the concept, with citizens equipped with the knowledge and desire to make informed choices about water, engaged in decision making and demonstrating positive water use behaviours. The conceptual framework is supported and complimented by the provision of high quality and connected open spaces, governance arrangements that encourage diversity of water supply options, re-creation of natural water cycles to restore soil moisture and reduce stormwater runoff, investing in multifunctional adaptive infrastructure, protecting the ecological values of the urban landscape and building community capital to create liveable and resilient neighbourhoods. A WSC is a place where people want to live and work.

As cities develop, the provision of water services is considered to respond to a range of drivers, creating solutions for water supply, public health and flood protection. As awareness increases around the need for social amenity and ecological protection as well as a sustainable water

¹ <http://watersensitivecities.org.au/>

supply, the solutions become more complex and the journey towards a resilient, adaptive and liveable city - the WSC, is challenging.

The CRCWSC has developed a Water Sensitive Cities (WSC) Index to help cities transition to a more water sensitive future. The Index is driven by leading research to understand how far towards a WSC places are, so they can take steps and track progress towards that goal. The Index measures city performance against 34 indicators that characterize a water sensitive city and relate to 7 overall goals. These goals include multifaceted aspects of a water sensitive city such as governance, community capital, essential services, productivity and resource efficiency, infrastructure, ecological systems and urban spaces.

The purpose of the WSC Index is to guide governments and organisations to transition cities into liveable, resilient, sustainable and productive places through water related actions. The WSC Index aims to:

- provide a communication tool for describing key attributes of a WSC.
- articulate a shared set of goals of a WSC.
- provide benchmarking for a city's water-sensitive performance.
- measure the progress and direction towards achieving WSC goals.
- assist decision-makers to prioritise actions, define responsibility and foster accountability for water-related practices.

The WSC Index Tool has undergone multiple development phases including a co-design process with industry partners. Its application relies on cross-organisational knowledge sharing and collaboration that strengthens broader industry relationships to deliver commitment to action.

The Indexing process strengthens knowledge sharing and collaboration opportunities during indicator rating discussions. The results of the Index

benchmarking allow gaps in water related management and actions to be identified and targets to be set to progress towards the key outcome areas of a WSC. Urban water transition areas include enabling structures, on-ground practices and socio-political capital and subsequent benchmarking can track progress and achievements towards this. Communities expect efficient, water-supported, vibrant cities and the Index is a great way to see how we are doing in delivering those outcomes.

This report details the process and outcomes of the benchmarking workshop for the City of South Perth and concludes with suggested actions developed to assist the City in moving towards the aspirations of a WSC.



Figure 1: City of South Perth

2 WSC Index Tool

Many cities and towns face pressures of climate change, population growth and rising urbanisation. A WSC is one that can recognise the fundamental importance of managing water resources and water systems services to enhance a city's liveability, resilience, sustainability and productivity. Less clear is how an individual city or municipality can understand its current performance, and how water can contribute to these outcomes.

To address this gap, the CRCWSC developed the WSC Index, to help urban areas measure their performance and identify where they may improve their water sensitive practices. A summary of the 7 goals and 34 indicators of the WSC Index Tool is presented in Figure 3.

The indicators relate to 7 goals:

- Ensure good water sensitive governance
- Increase community capital
- Achieve equity of essential services
- Improve productivity and resource efficiency
- Promote adaptive infrastructure
- Improve ecological health
- Ensure quality urban space

An accredited provider presents and explains the Index during workshops, bringing together experts, professionals, and other relevant stakeholders. Workshop participants typically include representatives from councils, water authorities, state government agencies, developers, peak bodies and community. The benchmarking process allows participants to share knowledge and develop collaborative relationships necessary to bring about real change. Results allow gaps in water related management and actions to be

identified and targets to be set. Urban water transition areas include enabling structures, on-ground practices and socio-political capital and subsequent benchmarking can track progress and achievements towards this.

2.1 Process for Rating Indicators

A full day benchmarking workshop was held at the City of South Perth on Thursday 4th March 2021. The workshop was opened by Mark Taylor, Director of Infrastructure Services, City of South Perth. Participants included internal stakeholders from a range of the City's business units and external stakeholders operating within the



Figure 2: Workshop close, John McGrath Pavilion, City of South Perth

boundaries of the City, including some community members. A list of participants is included in Appendix 2.

A three-step method for scoring each indicator was used:

1. Live polling via Mentimeter to gauge individual participants' perspectives on the score for the indicator in question;
2. Interactive discussion to uncover evidence and justification to inform the indicator's score; and
3. Reaching consensus amongst the participants on the score to be assigned and level of confidence in that score.

These workshops ensure that participants think about WSC concepts and principles in the same way. Participants start by scoring the indicators individually, results are presented in real-time, scores are then discussed as a group, allowing participants to present their perspectives and ask questions of each other. The discussion also focusses on evidence identified and shared amongst participants (e.g. policy documents, organisational materials, expert views, research projects etc.) to support the scores. All participants then agree on a final score for each indicator, with consensus often reached via a show of hands. The Index translates these final scores into several measures

of city status, to show the city's progress towards greater water sensitivity. In this way, the Index helps participants identify what the city needs to improve. It enables users to explore measures that deliver improvements in liveability, sustainability, resilience and productivity.

The provider prepares a benchmarking and assessment report (this report), which presents comprehensive results. Reporting includes summaries of workshop discussions and the evidence supporting the ratings. The benchmarking results are available on a web interface for the City to re-visit and use. It is anticipated that subsequent benchmarking will be undertaken every three to five years in order to track progress and achievements.

Index Goal areas and Supporting Indicators

Ensure good water sensitive governance	Increase community capital	Achieve equity of essential services	Improve productivity and resource efficiency	Promote adaptive infrastructure	Improve ecological health	Ensure quality urban space
Knowledge, skills and organisational capacity	Water literacy	Equitable access to safe and secure water supply	Maximised resource recovery	Diversify self-sufficient fit-for-purpose water supply	Healthy and biodiverse habitat	Activating connected urban green and blue space
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	Multi-functional water infrastructure	Surface water quality and flows	Urban elements functioning to mitigate heat impacts
Sound institutional arrangements and processes	Shared ownership, management and responsibility of water assets	Equitable access to flood protection	Water-related business opportunities	Integration and intelligent control	Groundwater quality and replenishment	Vegetation coverage
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	Robust infrastructure	Protect existing areas of high ecological value	
Leadership, long-term vision and commitment	Indigenous involvement in water planning		Benefits across other sectors because of water-related services	Infrastructure and ownership at multiple scales		
Water resourcing and funding to deliver broad societal value				Adequate maintenance		
Equitable representation of perspectives						

Figure 3: Summary of goals and indicators

3 Evaluation of Performance

Four analytical frameworks support interpretation of the index scores and provide insight into the management responses that should be prioritised to advance water sensitive practice. There are (1) water sensitive city goals (2) city state benchmarking (3) principles of water sensitive practice and (4) water sensitive outcomes.

3.1 Water Sensitive Goals

There are 7 overarching WSC goals. They are:

1. Ensure good water sensitive governance
2. Increase community capital
3. Achieve equity of essential services
4. Improve productivity and resource efficiency
5. Improve ecological health
6. Ensure quality urban space
7. Promote adaptive infrastructure.

As noted in Section 2, each goal is broken down into a number of indicators (Figure 3). Results of the rating of each indicator are summarised and compared against each goal to provide insight into the City's key areas of strength and where improvements could be made.

Figure 4 summarises the performance of the City of South Perth against the 7 goals of a WSC. The results for the municipality (shown by the shaded light blue area) are compared to an idealised Water Cycle City (shown by the dashed green line).

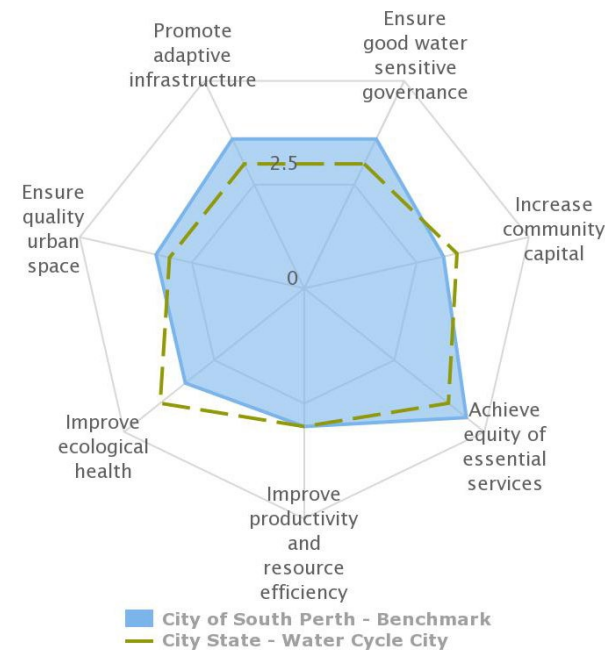


Figure 4: Performance against water sensitive goals

The City met the Water Cycle City benchmark for the goals of (1) Ensure good water sensitive governance, (3) Achieve equity of essential services, (4) Improve productivity and resource efficiency, (6) Ensure quality open space and (7) Promote adaptive infrastructure.

A deficit in attaining key attributes of a Water Cycle City is evident for goal (2) Increase community capital and goal (5) Improve ecological health.

An overview of the indicators that fall short of the attributes for a Water Cycle City is presented below. It is considered that these deficiencies provide the most effective opportunities to progress the City's transition towards a WSC. Note, two of these indicators (4.2 and 6.2) individually fall short of the required score to meet a Water Cycle City despite being within goals that overall meet the Water Cycle City average.

Additional detail regarding the scores for the remaining goals and indicators is contained in Appendices 3 and 4. This should be used to assist in future benchmarking workshops and to track progress.

Goal 2 – Increase community capital

Indicator 2.1: Water literacy (3.0)

Efforts to improve water literacy by Department of Water and Environmental Regulation (DWER) and the Water Corporation were noted such as the *Be Groundwater Wise*, *Water for Life*, *Climate Change* and *"Furry Animals"* campaigns, as well as the provision of water cycle infographics available on websites. Water Corporation Tap-In study results indicate that Perth residents demonstrate an understanding about water efficiency, groundwater replenishment but lack understanding of stormwater management and water sensitive approaches.

The City's dedication to extensive and thorough community engagement processes and the demonstrative impacts of this on improving knowledge and water literacy was highly regarded in some examples, particularly with the youth program and Clontarf Waterford Salter Point Foreshore Masterplan. However, examples of community backlash against a conversion of existing open stormwater drain into a living stream at Bodkin Park indicated that those community members

that were engaged and interested may not necessarily understood the way proposed projects are aiming to improve water management, reflect a more natural water cycle and demonstrate water sensitive practices and outcomes.

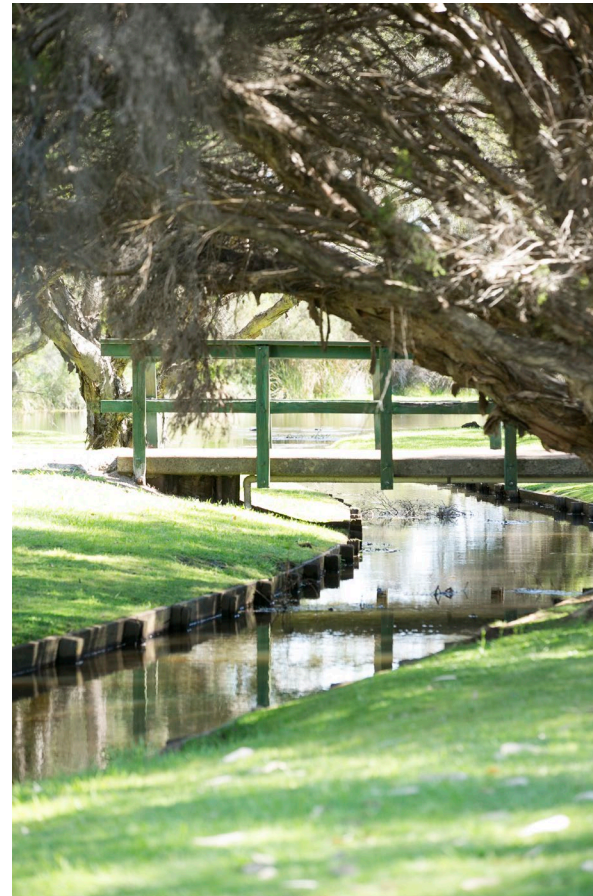


Figure 5: Bodkin Park open stormwater drain



Figure 6: Bodkin Park

The City highlighted the annual sustainability workshops and the importance of these events as avenues to effectively communicate household water efficiency measures, waterwise gardening, waterwise verges, urban greening initiatives and fertiliser wise practices. However, the difficulty in reaching the broader community without a specific interest in water or sustainability issues was discussed.

Water literacy concerns were also raised regarding the use of groundwater allocations in LGA areas across Perth and that some were still reluctant to switch to waterwise verges and reduce and redistribute the water allocation to other POS areas in need.

Goal 4 – Improve productivity and resource efficiency

Indicator 4.2: Low GHG emission in water sector (2.0)

The Water Corporation reported high GHG emissions due to the operation of two desalination plants to provide water for greater Perth, due to a drying climate. Further, the mostly flat terrain of Perth results in large pumping requirements for water supply.

The Water Corporation is actively pursuing a number of renewable energy options to offset their large emissions. These include a renewable energy facility at the Beenyp Wastewater Treatment Plant utilising biogas from the wastewater treatment process; a co-generation plant in operation at the Woodman Point Wastewater Treatment Plant; and wind and solar farms to offset the energy requirements of the Southern Seawater Desalination Plant. Further, Water Corporation aims to incorporate renewable energy generation at all of its new or upgraded assets to reduce emissions.

The City has commenced its carbon emissions reduction journey by developing a Greenhouse Gas Emissions Forecasting and Carbon Reduction Roadmap. The City has identified major carbon emission sources and established reduction targets. The City commenced implementation of key initiatives to achieve carbon emissions reduction. These initiatives include installation of solar PV power systems, HVAC optimisation and consideration of electrical/ hybrid vehicle purchasing for the City's fleet. The Perth Zoo also utilises solar energy. Trees have been recorded in City's asset system and these can contribute to offsetting carbon emissions.



Figure 7: Manning hub solar PV system

Goal 5 – Improve ecological health

Indicator 5.1: Healthy and biodiverse habitat (3.0)

It was recognised that the river foreshore ecology provides healthy diversity in native species and structure. There are very few introduced trees and the City works with DBCA to achieve this. The river also provides natural connection around three sites of the municipality.

However, it was noted that there was a significant difference in habitat diversity between the river foreshore and the drainage network. Water Corporation drains in POS areas do not provide much healthy or significant habitat. Most of the drains are abutted by grass with few pockets of habitat. Instream or bank habitat is negligible e.g. Wooden toe protection drain in Sir James Mitchell Park. Concern was also

raised that many areas were reliant on irrigation to maintain healthy habitats.

It is noted that a rating of three for this indicator, while below average for the Goal, reflects a higher than Perth average score for this indicator and this recognised that the foreshore is a significant part of the municipality and the City is actively working with other agencies to maintain and enhance biodiversity.

Indicator 5.2: Surface water quality and flows (3.0)

Workshop discussions noted the legacy sump issue within the City with approximately 50 sumps (fenced off infrastructure) still within the municipality. These provide recharge to groundwater but no water quality treatment. Given this, the City was looking more towards WSUD solutions to improve stormwater retention, urban greening and water quality, as well as possible drain retrofit projects for ecological and community wellbeing benefits. Particularly more treatment higher up in the catchment rather than just end of line treatment.

It was noted the City has numerous outfalls to the river and approx. 85% have GPTs with oil separators. The City does monitor surface water quality at some outfalls but not flows. It was also noted however that freeway stormwater discharges to the river with GPT treatment only and that consideration should be given to treating the freeway drainage for more than just litter.

It was recognised that there are some areas where retrofitting WSUD has been undertaken or is planned. These included Cygnia Cove wetlands and foreshore restoration, Doneraile Court stormwater sump, Bodkin Park, Millers Pool, Elderfield wetlands, Sir James Mitchell Park lakes, Neil McDougal Lake and Sandon Park and Salter Point Lagoon.



Figure 8: Neil McDougal Lake



Figure 9: Salter Point Lagoon

Indicator 5.3: Groundwater quality and replenishment (3.0)

Broad programs are in place to safeguard our groundwater resource, with Water Corporation and DWER studies providing information on improved allocation. All City bores for irrigation of Public Open Space (POS) are licenced and allocated a particular amount of water. The City has 1.485GL of licenced allocation which they report on annually to DWER. Within the municipality there are 144 active bores totalling 3.3GL, so the City has approx. 42% of the total licenced volume allocation. Irrigation is controlled via a centrally 'Rainman' system, with the central system shutting off irrigation if 6mm of rainfall is detected. POS irrigation system upgrades were being implemented, along with POS management via hydro and eco-zoning. Groundwater use is managed via the Water Resource Operating Strategy that is a DWER requirement and guided by the current Water Management Plan. These sustainable practices are in place to manage climate change.

Some lawn areas and street verges were being replaced with waterwise and local native plants to increase biodiversity as well as reduce demand on groundwater.

It was noted that the superficial aquifer has been stable for approximately 30 years but there has been a decline in Leederville aquifer (possibly due to Water Corporation pumping). It was noted that there have also been some salinity issues since dewatering started to support the building of the new apartments (one bore is going saline).

The Collier Park Golf Course manages their usage to be within their groundwater allocations.

Goal 6 – Ensure quality urban space

Indicator 6.2: Urban elements functioning as part of the urban water system (2.5)

The City noted some efforts to ensure urban space and built form function as an integral part of the water system such as the Living Stream project at Bodkin Park; planting 1000 irrigated trees; and plans to increase tree canopy via the delivery of the Urban Forest Strategy and in areas set to receive underground power. However, the traditional drainage approach compromising of both Water Corporation and City assets/infrastructure still dominated. Scope to improve infiltration opportunities was identified, however retrofitting urban areas was noted as difficult. The natural cooling effects of the rivers were regarded as an important urban heat mitigation measure the City was fortunate to have.

Household scale initiatives to incorporate WSUD and alternative water capture, storage and supply, such as rainwater tanks, were not actively promoted. The City's annual sustainability community education workshops were recognised as the main forum where local site appropriate solutions were introduced, discussed and promoted. The City's residents have access to Switch Your Thinking Program sustainability initiatives such as workshops, discounts for rainwater tanks and pool covers, energy and water audits.

3.2 City State Benchmarking

The Urban Water Transitions Framework (Figure 10, Brown *et al.* 2016, see Appendix 1) considers the drivers and service delivery functions for water infrastructure provision in cities as six developmental states that cities move through in response to society's expanding objectives for

urban water management. Although the transition from one state to the next is not always linear, the progression of water service delivery options can be driven towards the ultimate state that is a WSC. The idealised city-states in the Urban Water Transitions Framework are associated with particular indicator scores. This enables an assessment of how far a city has progressed towards the WSC state.

Figures 10 and 11 summarise the city state benchmarking results for the City of South Perth. Percentage attainment for each city state ranged from 100% as a Water Supply City, Sewered City, Drained City and Waterways City, down to 66% Water Cycle City and 23% as a Water Sensitive City. This section summarises the key elements that contribute to the overall percentage attainment of each city state.

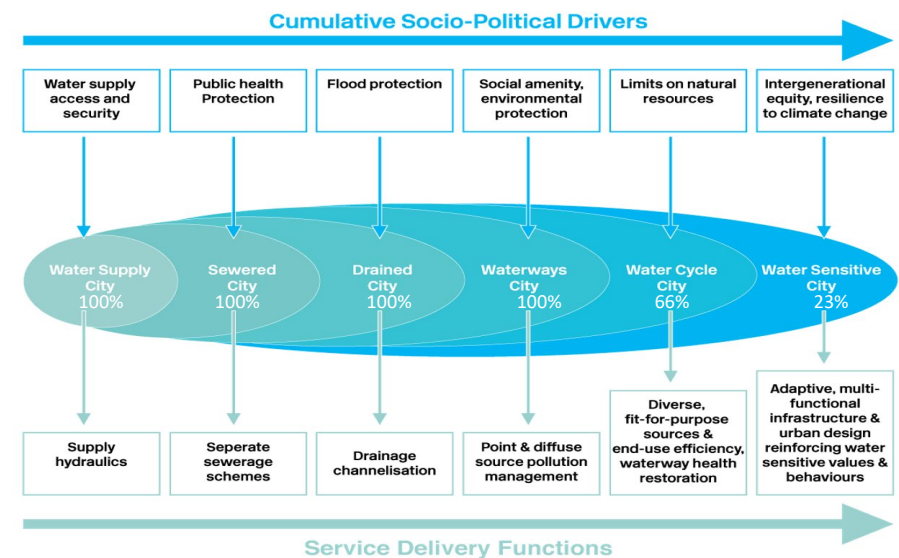


Figure 10: Urban water transitions framework and benchmark results for the City of South Perth

100% attainment of Water Supply City and Sewered City

The City rated 100 % as a Water Supply City and 100 % as a Sewered City. The entire community has equitable access to safe and secure drinking water, through access to the Water Corporation's Integrated Water Supply Scheme. Similarly, the community has access to safe and reliable sanitation, again via the Water Corporation's network. Water and sanitation are affordable, and Water Corporation has a number of programs to assist the community with the payment of bills such as Water Assist, Medical Assist and Time Assist, as well as the state government Hardship Utility Grant Scheme (HUGS).

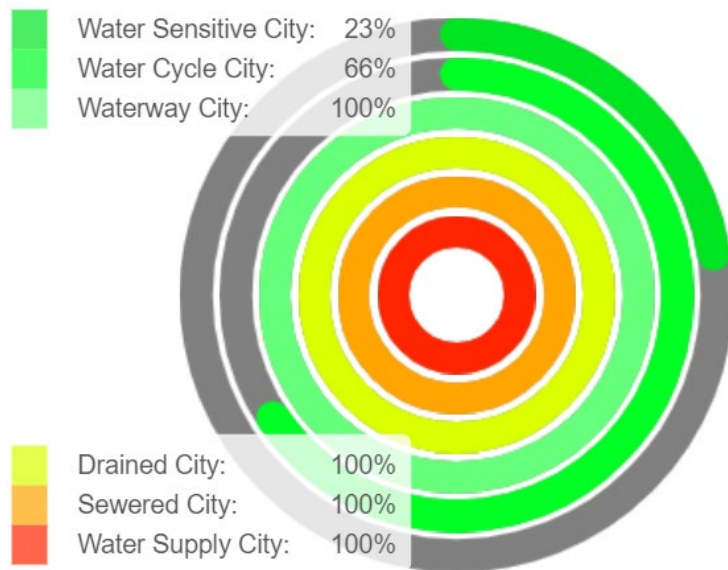


Figure 11: Benchmarking results for City of South Perth

100% attainment of Drained City

The City rated 100% as a Drained City. Rainfall events generally do not disrupt everyday activities, with the stormwater drainage network backed up by pumps in high-risk areas. It was recognised that storm surge events had historically impacted the Kwinana freeway and disrupted access and travel. Recent flood risk modelling lead by EMRC indicated that very few places in the City are subject to flooding in extreme events and only those near the foreshore. Flood Risk Adaptation Plan had been recently completed by the City but had not yet been shared with the community and it was noted that many households would rely on the state Department of Fire and Emergency Services (DFES) for advice on responses to flooding or extreme events.

100% attainment of Waterway City

The City rated 100% as a Waterway City. Water environments and natural areas were highly valued by the City staff, community and external stakeholders. Some natural areas are privately owned but still accessible to the community. Highly valued places include the two Bush Forever sites Canning River Foreshore site 333 and Mount Henry Peninsula Bushland, site 227; Salter Point lagoon; Cygnia Cove foreshore and the numerous green parks, reserves and streets.

The City's Urban Forest Strategy and maintenance/enhancement of green infrastructure was seen as a highlight for the City with a 20% canopy cover and efforts to retain and enhance the urban forest via Trees of Special Significance register, Caring for Our Street Trees document; Street Tree Management Plan, Waterwise Verge Policy and Guidelines. The City aims for every property to have a street tree. The presence of the City's own nursery demonstrates the importance of locally supplied plants and trees for revegetation works, natural areas

planting, street tree planting and riverbank stabilisation, as well as supplying to other LGAs.

Strategic Community Plan 2020-2030 has a focus on a diverse, connected, safe and engaged community as well as a thriving activated city and sustainable urban neighbourhoods. This includes maintaining and improving ecosystem biodiversity, enhancing the urban forest, effectively managing the river foreshores and promoting and implementing the sustainable use of water, waste, land and energy. The River is celebrated as part of this document and the South Perth Peninsula noted as a primary activity centre.

Planning policies are starting to incorporate requirements for water sensitive urban design, consistent with State Government planning policy.

Stormwater outflows are being monitored for water quality in multiple locations and gross pollutant traps and oils separators are being used in 85% of outlets.

66% attainment of Water Cycle City

The City rated 66% as a Water Cycle City. The community has a strong connection with water, particularly with the Swan River bounding the North, the Canning River to the south and the Swan-Canning confluence to the West. River foreshore areas are accessible from most parts, with the exception of the Kwinana Freeway causing a barrier to the West. The City takes pride in its public engagement and transparency processes and ensures residents/community play a key role in project planning and delivery, for example the Waterbird Refuge Project and commitment from friends groups to collect 18 months worth of data as part of monitoring requirements. The Clontarf, Waterford, Salter Point Foreshore Masterplan is another key

example of these processes, with over 18 months of public consultation taking place. Multiple communication platforms are used to connect with the community to ensure decision making is inclusive and representative of all perspectives.

The City's delivery of community sustainability workshops and the waterwise verge policy and guidelines encourages residents to understand and undertake water efficiency measures in their homes and gardens. However, it was noted that more work is required to promote and incentivise alternative water supply/management solutions at the household and commercial scale.

The City's Green Plan, Recreational Space Plan, Playspace Plan, Integrated Transport Plan and Public Open Space Strategy allow for the identification of important blue green connectivity corridors, underperforming areas and ensures POS is maintained to a high standard.

Water Sensitive Urban Design (WSUD) requirements and community aspirations are included in the new and recently endorsed planning strategy, with policy soon to be introduced to support elements in the planning strategy. Cygnia Cove was noted as an example of how the City had incorporated WSUD into planning, design and implementation. Some frustrations were aired over the lack of vision for WSUD retrofits and difficulties in ongoing funding. It was noted that the leadership, passion and cohesive team within the City and strong sustainability focus, is not always matched by council and the vision can get lost when seeking higher approval of projects.

The City and community's use of groundwater as a fit-for-purpose source of water for irrigation are a contribution towards attainment of a water cycle city.

The climate responsive, automated irrigation system is a key and important feature of groundwater usage and great example of intelligent controls. The irrigation system is centrally controlled via the 'Rainman' system, which shuts off irrigation if 6mm of rainfall is detected. POS irrigation system upgrades were being implemented, along with POS management via hydro and eco-zoning. Some lawn areas and street verges were being replaced with waterwise and local native plants to increase biodiversity and strategic shade cover. POS upgrades were also focussing on design for access and inclusions, including paths networks.

Groundwater use is controlled via the Water Resource Operating Strategy that is a DWER requirement and guided by the current Water Management Plan.

Improving stormwater treatment and increasing habitat biodiversity and has been implemented or is being planned through several projects including Cygnia Cove wetlands and foreshore restoration, Doneraile Court stormwater sump retrofit, Bodkin Park existing living stream upgrade, Millers Pool upgrade, restoration of Elderfield wetlands, Sir James Mitchell Park lakes revegetation and installation of floating wetlands, Neil McDougal Lake WSUD retrofit and Sandon Park foreshore and Salter Point lagoon revegetation.



Figure 12: Doneraile Court stormwater sump retrofit



Figure 13: Floating wetlands, image courtesy of Veronica McPhail

23% attainment of Water Sensitive City

The City rated 23% as a WSC, largely attributed to the region's equity of essential services and water sensitive governance.

Leadership demonstrated by the State Government agencies via the Water Wise Perth Action Plan, Waterwise programs, Waterwise Greening Scheme and Drainage for Liveability demonstration projects has provided a strong foundation for ongoing collaboration and delivery of WSC outcomes. The City of South Perth have built excellent relationships with the local community, with residents engaged and empowered during consultation processes on key foreshore and water management projects such as the Clontarf Waterford Salter Point Foreshore Masterplan and Waterbird Refuge project. Local schools are engaged in tree planting programs. Further, strong cross-agency partnerships were evident to deliver important water projects such as with Department of Biodiversity, Conservation and Attractions (DBCA), Department of Planning, Lands and Heritage (DPLH), Main Roads, Department of Transport (DoT), as well as numerous local stakeholders such as friends' groups, river recreational groups, Indigenous reference groups, local businesses and the Perth Zoo. The Perth Water Locality Plan was noted as an example of effective collaborative approaches and Indigenous engagement. The City is part of a LGA Sustainability Group with Town of Vincent, City of Perth, Town of Victoria Park, and City of Subiaco, demonstrating an example of collaboration and knowledge sharing. Staff also have close internal working relationships and a strong sustainability focus, making the delivery of water and sustainability projects easier. Further, the City's Corporate Business Plan and partnerships reported goals and satisfaction with these processes.

Water supply and sanitation services are accessible to everyone within the City of South Perth, with an exception of the small homeless

population. The Water Corporation's Integrated Water Supply Scheme (IWSS) ensures drinking water and sanitation services are safe, secure and affordable. Assistance options are available to help residents that may require help in paying bills and these include earlier mentioned programs from the Water Corporation and the Hardship Utility Grant Scheme (HUGS) from the State Government.

3.3 Water Sensitive Practices

The three pillars of practice that are essential to deliver water sensitive services (Wong and Brown, 2009) are:

- Water-Sensitive Communities where people engage in water-conscious behaviours, feel connected to their water environments and appreciate the many values of water;
- Cities as Water Supply Catchments to provide resources at different scales in fit-for-purpose applications; and
- Cities providing Ecosystem Services to integrate water sensitive practices into the urban landscape, providing multiple benefits such as heat mitigation, ecological health and landscape amenity.

Figure 14 indicates how the City of South Perth compares to Water Cycle City practices (green open circle). The use of fit-for-purpose water sources and highly valued water assets (Swan River) supports the strong practices of Water Sensitive Communities and Cities as Water Supply Catchments.

Improvements in water sensitive practice should be directed at enhancing ecosystem services. This may be achieved through better integration of water sensitive infrastructure into streetscapes and retrofitting that creates ecologically functioning landscapes. This will

strengthen the City's ability to deal with the increasing pressures of climate change and a growing population.

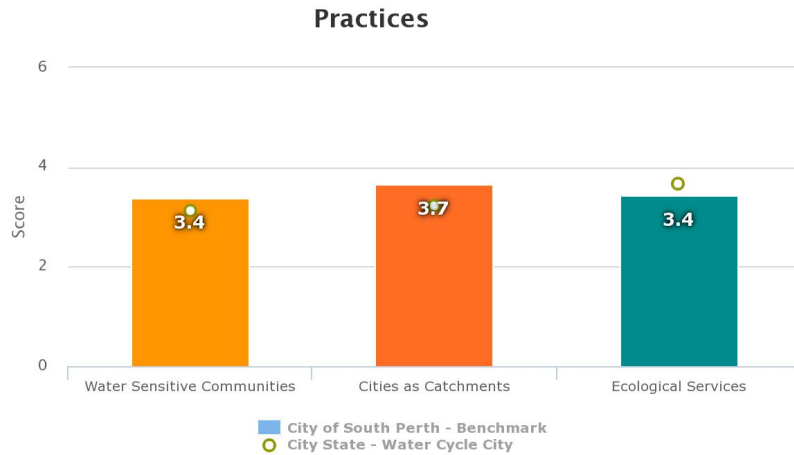


Figure 14: Assessment of water sensitive practices (WSC=5)

3.4 Water Sensitive Outcomes

Water sensitive outcomes assesses the performance of the urban water system against the delivery of resilience, liveability, sustainability and productivity.

Resilience in this context is defined as the capacity to maintain water system services under acute or chronic disturbances, through adaptation or recovery. Sustainability is the capacity of water system services to deliver benefits for current and future generations. Liveability is the capacity of the water system to deliver a high quality of life for communities (such as thermal comfort, aesthetics, amenity,

connection to place, etc.). Productivity is the capacity of the water system services to generate economic value.

The ratings from each indicator can contribute to one or more of these outcomes. For example, improving the rating for the indicator 'diversify self-sufficient fit-for-purpose water supply' related to provision of alternative water supplies would improve both resilience and sustainability outcomes.

Figure 15 indicates how the City of South Perth compares to Water Cycle City outcomes (green open circle). Resilience, liveability and productivity outcomes are meeting or exceeding the desirable outcomes of a Water Cycle City. Improvements should be directed at actions to deliver enhanced sustainability outcomes for the municipality, in particular Goal areas Improve Ecological Health and Ensure Quality Urban Space; as well as indicators Knowledge, skills and organisational capacity; Water literacy; and Share ownership, management and responsibility. Delivering these outcomes is closely linked to improving water sensitive practices.

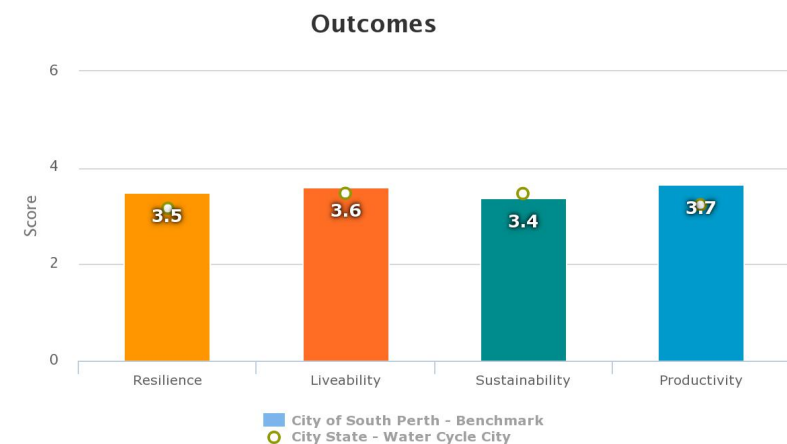


Figure 15: Assessment of water sensitive outcomes (WSC=5)

4 The City's Ten Point Plan

A ten-point action plan has been developed for the City of South Perth in response to the benchmarking results. The actions have been identified to address the lower-performing indicators with the intent of progressing the City's journey towards a WSC. The actions are recommended to be collaboratively delivered by all agencies working together with the community (Appendix 2).

The order of actions listed does not reflect the priority of the actions to be undertaken. Actions are mutually reinforcing and provide an overarching framework to guide initiatives across the City to assist progress towards the aspirations of a WSC. It is hoped that they will stimulate further discussion both within the City and with external stakeholders to further prioritise, develop and implement actions.

Action 1: Develop and communicate a clear vision for a Waterwise City of South Perth

Developing a Waterwise or water sensitive vision can assist the City in identifying opportunities, collaborative planning approaches and ongoing support to deliver projects. The vision should be developed with input from a number of staff to ensure it is interdisciplinary in nature and may require one or two committed staff members to champion or take carriage of it. The vision also needs to have input from the local community to ensure aspirations, values and connections are included and local Indigenous knowledge and stories are at the core. The lenses of a WSC: productive, liveable, sustainable and resilient, could be used to shape the vision. In addition, Waterwise/water sensitive visions created for other LGAs can be referred to and themes adapted to fit the specific requirements and proposed direction for the City of South Perth.

It is important that the vision is shared with all staff and elected members to ensure ongoing commitment, understanding and

prioritisation of water and water related projects for optimal economic, social and environmental benefits. Often the momentum and importance of the journey towards a WSC can be lost due to changes in senior staff and elected members. An induction process could be developed to introduce new staff and elected members to the vision as an important part of ongoing delivery. This will ease the way forward for future projects and ensure that new proposals are part of a broader water sensitive approach that City has decided to embrace.

Action 2: Explore ways to improve water literacy

Improving water literacy is a key step in changing behaviour. The broader Perth community does not have a clear understanding of what a Waterwise City is and often the focus is still on water efficiency. Several themes have been identified where literacy could be improved such as understanding the economic benefits of water and the urban water cycle.

The City could seek to improve water literacy across the community by utilising existing successful engagement and communication processes. For example, the Peninsula Newsletter, 'Have Your Say', social media platforms and the City's *Water Management* webpage (<https://southperth.wa.gov.au/our-future/our-environment/water-management>) could cross-promote the water cycle messaging that is available from Water Corporation and Department of Water and Environmental Regulation (e.g. *Be Groundwater Wise* campaign).

Further, the City could establish physical signage for water-related assets such as swales, tree pits, living streams etc especially in retrofitted areas to ensure the community understands what has been implemented and why an alteration or upgrade has occurred. This will help to reinforce the role of water in ensuring our urban spaces are cool, green, comfortable and liveable and ensure people's connection to water goes beyond water efficiency measures. Clear communication can assist the community in understanding water

sensitive approaches to design and become more actively involved in planning, management and maintenance of blue green infrastructure and other water focussed initiatives. Examples of community participation, such as the Waterbird Refuge Project data collection, should be shared and celebrated to reinforce the importance and increase community understanding and connection.

City events, even those without a strong water focus, should incorporate waterwise vision, themes and messaging to try and reach unengaged sections of the community. The sky show was recognised as large event that celebrates water, however other small scale and community led events could be used to demonstrate the City's ongoing support for all water-related activities and connections.

Action 3: Develop a Green Infrastructure policy and strategic WSUD retrofit plan

As described in the supporting material for the Local Planning Strategy, the City's population is forecast to grow by an additional 21,742 people to a total of around 65,000 people between 2016 and 2041. This population growth will increase demand for employment opportunities and access to infrastructure of all kinds: social, open space, transport. The Local Planning Strategy can be supported by the development of green infrastructure policy that guides future projects and improves on-ground outcomes, for all scales and types of development.

The City could identify key locations for retrofit or upgrade WSUD or WSC projects, in conjunction with the Water Corporation's Drainage for Liveability program. This could include opportunities to improve water quality, prioritise areas with maintenance issues or seek improvements where community use and amenity value is high. As part of developing a WSUD retrofit plan, locations for trials and demonstration projects could be identified that seek to demonstrate improved practices across a range of streetscapes and urban form typologies and that are designed to specifically address local conditions, concerns and context. As part of this approach, learnings

can be documented and communicated with staff, elected members and the community to broaden understanding of WSUD initiatives and ongoing waterwise journey. Planning and implementation could consider sites for stormwater harvesting for irrigation and the incorporate water harvesting tree pits into design as part of delivering the Street Tree Plan.

Action 4 Share approaches for collaboration and engagement with other LGAs to demonstrate leadership and strengthen knowledge sharing opportunities

Workshop discussions indicated that one of the City's strengths was the collaborative planning processes in place and ability to form strong networks before and during project implementation, with different collaborative networks formed depending on the project. The City could demonstrate leadership in this area by evaluating processes and adapting/changing according to new insights or different project governance learnings. Monitoring and evaluation goals and KPIs are already in place to understand the biophysical improvements for various water related projects. Having these structures in place to better understand how collaborative processes are tracking and could be improved would complement existing biophysical monitoring and improve overall project delivery. These learnings could be shared with other LGAs, assisting those where collaborative networks are not easily formed or may not be operating as effectively.

Evaluation, review and feedback on the aforementioned visioning process, if implemented, and supporting governance arrangements to achieving the water sensitive/waterwise vision and goals will also assist in gaining traction and improvement in water sensitive approaches and practice.

Collaborative approaches with local Indigenous groups and individuals was noted as appropriate and effective for many projects. However, evaluation of processes and approaches could also strengthen Indigenous engagement by the City for specific projects. Corporate

systems could be set up to support more meaningful engagement as an outcome from review and evaluation.

Action 5: Recognise and share understanding of all WSUD benefits with community

Proposed projects should clearly articulate and communicate the broader WSC/Waterwise City of South Perth messaging during consultation and engagement phases to ensure the community understands project aims and anticipated outcomes e.g. improved health and wellbeing, greater connection to nature, urban cooling benefits and reduced heat island effect.

Associated business prospects can be identified as part of recognising broader benefits and incorporated into WSUD project planning and opportunity analysis. This could focus on using local products and providers or aligning WSUD projects with tourism, recreational or hospitality businesses for better place-based outcomes.

Action 6: Encourage uptake of alternative fit-for-purpose water supply options and green infrastructure solutions

The City should consider ways to actively promote and increase uptake of fit-for-purpose alternative water supply options, both with residents, businesses and City owned/operated assets. Discussions indicated that there was a need to better promote the uptake, installation and use of systems such as greywater and rainwater systems at a household scale. This could be overcome via the delivery of specific workshops and demonstrations, open days at households that are successfully using alternative fit-for-purpose solutions, sharing success stories and promotion via the City's website and newsletter.

Ongoing support could be made available to residents who are interested in transforming verges to waterwise verges, such as via native plant subsidies or sustainability grants that may allow residents

to apply together to transform neighbouring properties or achieve street-scale waterwise verge improvement projects with greater liveability and sustainability outcomes.

Action 7: Address biodiversity/ ecological health through improved monitoring and wildlife habitat creation

Continue monitoring of water quality at discharge locations to the river to better understand catchment health and evaluate the performance of current treatment infrastructure. Monitoring should particularly focus on the freeway stormwater discharges which are currently largely untreated and unmonitored. Consider including monitoring higher in the catchment where possible and appropriate.

Include flow monitoring in the water quality monitoring program. This can help give reference to the significance of different catchments and address to issue from a pollutant loading perspective, not just a water quality concentration perspective.

Monitoring results should be assessed and shared so the results can help inform identification, design and implementation of future projects. Use this information to continue the conversations with Water Corporation about which drains should be prioritised as part of the Drainage for Liveability program as specified in Action 3.

Consider an assessment of the use and condition of the River foreshore with a focus on biodiversity and compare the health of diverse/ native vegetated sections vs grassed/ non native sections, documenting differences in values. Use the information as the basis to start a dialogue for the community.

Action 8: Support investment in blue-green infrastructure

As identified in Action 3, seek better information about the capacity of the Water Corporation and the City's drainage system to inform future planning and development, particularly where density

increases are proposed. This should then lead on to developing a program of WSC opportunities to guide funding of retrofits. Identify and prioritise opportunities to enhance water quality and water-related amenity values of drainage assets (using the monitoring from Action 7).

Prioritisation should also consider areas with known maintenance problems. 'Quick wins' are likely to be able to be achieved in areas where drains or sumps are co-located with parklands and/or other asset upgrades are proposed. Coordinate capital works and asset upgrades to deliver multiple outcomes. Consideration should be given to opportunities to provide green linkages or improve public access to water assets including the Water Corporation's drainage network.

Establish dedicated budgetary arrangements from across departments for water sensitive practices (including for the maintenance of infrastructure that delivers multiple benefits to the community). Establish sound institutional arrangements and processes to support policy and make these transparent to the general public.

The incorporation of realistic maintenance costs into the City's budgets will help ensure these assets are adequately maintained and thereby help reduce the future risk and the financial burden associated with rectifying assets. The City should commence a life cycle costing data base to enable improved planning for maintenance of drainage assets, fit-for-purpose water supply infrastructure and other WSUD assets to assist the City to better forecast budgets for management into the future.

Action 9: Demonstrate an ongoing commitment to improve groundwater use efficiency and quality

The City should encourage residents to get involved in a voluntary program to identify bore users. The City could partner with DWER to promote the *Be Groundwater Wise* campaign and, at the same time, improve water literacy by communicating water cycle messages and

the many shared uses of groundwater in Perth (in conjunction with Action 2).

For the City's use, this could include an audit of irrigated turf areas, with consideration given to converting some areas to waterwise planting. In addition, local replenishment and treatment of water infiltrating to groundwater should be encouraged through creation of new, vegetated systems and WSUD initiatives to ensure urban greening and cooling benefits, as well as improvements in water quality.

Action 10: Conduct an energy audit and develop greenhouse gas emissions reduction strategy

The strong linkage between energy and water means that the delivery of multi-functional water-related outcomes often provides an opportunity to reduce energy consumption or generate alternative energy supplies. Although much of the energy cost of water services in the municipality is dictated by the Water Corporation, some opportunities exist in parts of the community with self-supply systems in households and corporate buildings (e.g. rainwater/greywater use).

The City should conduct an energy audit, as per the suggestion in the City's Carbon Reduction Roadmap, to audit high consuming facilities with a focus on lighting, HVAC and irrigation pumps to identify measures to reduce energy consumption and associated GHG emissions and plan to further reduce turf where possible and replace with waterwise gardens.

The City should identify and implement strategies to reduce greenhouse gas emissions from local government-owned and managed facilities and identify strategies to assist their community such as provision of incentives and/or removal of barriers to encourage local businesses to take up solar power and battery storage.

Next steps

It is recommended that the City consider the delivery of the above actions and integrate them with the updated Water Management Plan. Actions may be further developed, tested and resources allocated for delivery as part of this process.

References

Brown, R., Rogers, B., Werbeloff, L. (2016). Moving toward Water Sensitive Cities: A guidance manual for strategists and policy makers. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities

Wong and Brown (2009). The water sensitive city: principles for practice. Water Science and Technology. 60 (3), 673-682.

Definitions

CRCWSC: Cooperative Research Centre for Water Sensitive Cities

DBCA: Department of Biodiversity, Conservation and Attractions

DFES: Department of Fire and Emergency Services

DWER: Department of Water and Environmental Regulation

IWSS: Integrated Water Supply Scheme

HVAC: Heating, Ventilation, Air Conditioning

LGA: Local Government Area

POS: Public Open Space

WC: Water Corporation

WPAP: Waterwise Perth Action Plan

WSC: Water Sensitive City

WSUD: Water Sensitive Urban Design

Appendix 1: City-State Descriptions from the Urban Water Transitions Framework



Source: Brown, R., Rogers, B., Werbeloff, L. (2016). [Moving toward Water Sensitive Cities: A guidance manual for strategists and policy makers](#). Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities

Appendix 2: List of Workshop Participants

Workshop Facilitators: Melissa McGrath (JBA) and Rebecca Epworth (Urbaqua)








Internal City of South Perth Participants			
#	Officer Name	Officer Title	Directorate
1	Victoria Lummer	Director Development and Community Services	Development and Community Services
2	Warren Giddens	Manager Strategic Planning	Development and Community Services
3	Emily Salvisberg	Strategic Planning Officer	Development and Community Services
4	Patrick Quigley	Manager Community, Culture and Recreation	Development and Community Services
5	Jennifer Hess	Recreation Development Coordinator	Development and Community Services
6	Mark Taylor	Director Infrastructure Services	Infrastructure Services
7	Chris Jansen	Manager Asset and Design	Infrastructure Services
8	Tom Cunningham	Urban Design Coordinator	Infrastructure Services
9	Simon Pedretti	Civil Design Coordinator	Infrastructure Services
10	Yulia Volobueva	Environment Coordinator	Infrastructure Services
11	Nigel Sutton	Asset Management Coordinator	Infrastructure Services
12	Steve Atwell	Manager Programs Delivery	Infrastructure Services
13	Geoff Colgan	Parks Operations Coordinator	Infrastructure Services
14	Richard Bryant	Reticulation and SJMP Supervisor	Infrastructure Services
15	Paul Reed	Natural Areas Supervisor	Infrastructure Services

16	Jacqueline Scott	Manager Business and Construction	Infrastructure Services
17	Paul Cook	Team leader and irrigation technician	Infrastructure Services
18	Colin Cameron	Director Corporate Services	Corporate Services
19	Leah Horton	Business Improvement Coordinator	Corporate Services

External Stakeholders			
	Officer Name	Officer Title	Organisation
1	Cristyn Fielding	Coordinator Water Efficiency Partnerships Customer & Industry Partnerships	Water Corporation
2	Agni Bhandari	Senior Engineer Urban Water Science and Planning	Department of Water and Environmental Regulation (DWER)
3	Moe Tiong	Senior Water Planning Officer Water Supply Planning	Department of Water and Environmental Regulation (DWER)
4	Stephen Lloyd	Riverbank Manager Rivers and Estuaries Branch	Department of Biodiversity, Conservation and Attractions (DBCA)
5	Greg Comiskey	Senior Town Planner Rivers and Estuaries Branch	Department of Biodiversity, Conservation and Attractions (DBCA)
6	Lisa Brideson	Environmental Projects Officer Environmental Services	City of Cockburn
7	Catherine O'Neill	Secretary	Swan Estuary Reserves Action Group (SERAG)
8	Dr Maria Ignatieva	Senior Lecturer - Landscape Architecture Programme Director - UWA School of Design	University of Western Australia
9	Kat Stewart	Student - research assistant /UWA school of Design	University of Western Australia
10	Marion Fredriksson	Director/ Principal landscape architect	Marion Fredriksson Design
11	Amy Krupa	South East Region Centre for Urban Landcare (SERCUL) CEO	SERCUL

12	Warwick Boardman	City of South Perth Environment Association (COSPEA) Chair	COSPEA
13	Brendan Nock	Environmental Officer	Town of Victoria Park
14	Shelley Shepherd	Workshop notetaker	Urbaqua
15	Melissa McGrath	Workshop facilitator	Josh Byrne and Associates
16	Rebecca Epworth	Workshop facilitator	Urbaqua
17	Rada Tomanovic	Environmental Consultants	Syrinx
18	Ljiljana Pantelic	Environmental Consultants	Syrinx
19	Geraldine Male	Workshop notetaker	Josh Byrne and Associates

Appendix 3 Summary of Ratings for Each Indicator

1. Ensure good water sensitive governance 3.6 	2. Increase community capital 3.1 
1.1. Knowledge, skills and organisational capacity 3.0 1.2. Water is key element in city planning and design 3.0 1.3. Cross-sector institutional arrangements and processes 4.0 1.4. Public engagement, participation and transparency 4.0 1.5. Leadership, long-term vision and commitment 3.5 1.6. Water resourcing and funding to deliver broad societal value 3.5 1.7. Equitable representation of perspectives 4.0	2.1. Water literacy 3.0 2.2. Connection with water 4.0 2.3. Shared ownership, management and responsibility of water assets 3.0 2.4. Community preparedness and response to extreme events 2.5 2.5. Indigenous involvement in water planning 3.0
3. Achieve equity of essential services 4.5 	4. Improve productivity and resource efficiency 3.0 
3.1. Equitable access to safe and secure potable water supply 5.0 3.2. Equitable access to safe and reliable sanitation 5.0 3.3. Equitable access to flood protection 4.0 3.4. Equitable and affordable access to amenity values of water-related assets 4.0	4.1. Benefits across other sectors because of water-related services 3.5 4.2. Low GHG emission in water sector 2.0 4.3. Low end-user potable water demand 3.0 4.4. Water-related economic and commercial opportunities 3.5 4.5. Maximised resource recovery 3.0
5. Improve ecological health 3.3 	6. Ensure quality urban space 3.3 
5.1. Healthy and biodiverse habitat 3.0 5.2. Surface water quality and flows 3.0 5.3. Groundwater quality and replenishment 3.0 5.4. Protect existing areas of high ecological value 4.0	6.1. Activating connected pleasant urban green and blue space 4.0 6.2. Urban elements functioning as part of the urban water system 2.5 6.3. Vegetation coverage 3.5
7. Promote adaptive infrastructure 3.6 	
7.1. Diverse fit-for-purpose water supply system 3.5 7.2. Multi-functional water system infrastructure 3.5 7.3. Integration and intelligent control 4.0 7.4. Robust infrastructures 4.0 7.5. Infrastructure and ownership at multiple scales 3.0 7.6. Adequate maintenance 3.5	

Appendix 4 Workshop Notes for Each Indicator

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
Goal 1. Ensure Good Water Sensitive Governance			
1.1 Knowledge, skills and organisational capacity	3	H	<ul style="list-style-type: none"> • Good that's a smaller team than other LGs; makes it easier as everyone knows each other and communicates; • City has a lot of partnerships and shares resources; e.g. Perth Zoo, Platinum Waterwise Business 2020; Business; RAC; DBCA; Water Corporation; other LGs; Perth NRM; DWER for licences. • WALGA; Waterwise Councils program; Irrigation Australia. • Community events with Water Corporation. • Member of a sustainability group: City of Vincent; City of Perth; Town of Victoria Park; City of Subiaco - recently formed and chaired by City of Vincent CEO; • Proactive at managing water use • Water Corporation: Waterwise business program; Waterwise greening scheme; demonstration gardens; partnerships with science based organisations s; Water Efficiency Action Plan; Water Management Plan – fully integrated Water • Compliance regulation • Own nursery so can provide landscape and ecological knowledge to CoSP and to other LGAs.
1.2 Water is key element in city planning and design	3	H	<ul style="list-style-type: none"> • Monitoring and evaluation of planning and performance not quite happening. Ecological/Water use monitoring and evaluation yes, but not. to improve planning decisions, processes and practices for more water sensitive outcomes. • Some integration, coordination and collaboration but not across the city; WSUD not all in place. • New planning strategy has been endorsed, includes WSUD requirements and reflects community aspirations; introducing policy to support elements in the planning strategy. • Allowed more focus; work with operations departments turning into urban stream. • Not a huge city for infill; historical problems not new developments; fixing old and retrofitting is a bit harder. • Opportunities to work on waterways and drainage not popular in the past. • Cygnia Cove experimentation with WSUD fully integrated into UD. Cygnia Cove Natural Areas Restoration (foreshore reserve, retained wetland, constructed wetland, stormwater retention basin). • Water Corporation perspective: Waterwise Perth Action Plan, Water policies, State Planning Policy include WSUD, Perth Peel 3.5 – all have actions to improve and guidelines for design; water supply and active in responding to climate change. • Member of public – concerned about acid sulphate; water issue – big building – mistakes still being made. • Water perspective; DWER planning for the Perth Southern Allocation plan, opportunity for collaboration. • Partnership with DBCA to finalise Perth Water Locality Plan. • DBCA regard the sustainability focus a strength. • 1 Green star building.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
1.3 Cross-sector institutional arrangements and processes	4	L	<ul style="list-style-type: none"> • 4) externally look at the Southern Foreshore Clontarf Waterford Salter Point Masterplan every action in the plan refers to other organisations such as WC/DBCA and stakeholder consultations – good example of requiring arrangements and collaborative approaches. • 4) governance systems – in terms of established programs the City has number of programs in maintaining water related environments – governance ok. Got evaluation of foreshores; urban environment; proactive in addressing problems. • Riverbank project – DBCA with SoP, DPLH, Wadjuk reference group, Main Roads WA. A lot of consultation to deliver projects. • DBCA grants program valuation of foreshore prioritisation. • Dept of transport; cyclist groups, scout groups – a lot of round table discussions with a large amount of stakeholder before soil turned and projects implemented; • Community services area; mandate is activation of open space. • Corporate plan and partnerships reported goals and satisfaction with these processes. • Monthly foreshore assessment use group; group of cross section representation of all areas e.g. parks, health; recreation. • Photo monitoring; • Guidelines assessed on annual bases • Areas concerned Collier Golf Course – enviro management plan 2004 design of new recreation facility – hard footprint. Monitoring of ecological impact of this? Significant wetlands. Response - focussed on economic outcomes first; then environmental after; • How to report – foreshore infrastructure management – have goals and monitoring KPIs against • Water Corporation has MOUs for how improvements can be made: Waterwise Council Program, DWER, JBA. • Waterwise Perth Action Plan, 9 agencies involved. • DBCA/LGA Water Quality Partnerships Program CoSP catchments • City of South Perth very strong compared to other LGs
1.4 Public engagement, participation and transparency	4	H	<ul style="list-style-type: none"> • Strong stakeholder engagement policies; toolkits. Stakeholder Engagement Policy under review. • Internal policy high – Stakeholder engagement Guide & Toolkit • CoSP Newsletter (Peninsula); Have Your Say, Facebook; social media • (5) Local school program for planting days; Youth officer work with schools; 18 months of public consultation for Clontarf, Waterford, Salter Point Masterplan – shows lots of perseverance and transparency by the City; Friends of groups active and committed. E.g. a Grant condition for the Waterbird refuge project was that the group had to collect 18months of data; e.g. Wetlands get feedback to the point friends group commitment to data collection and monitoring and report back – great 2 way communication • Clontarf, Waterford, Salter Point Masterplan is an example that CoSP aren't afraid to engage with potential problem groups. • Can be tendencies to over engage E.g. Bodkin Park initiative to retrofit drain – local residents were presented with the design; lost funding even though approved at Masterplan stage as residents objected even though DBCA provided advice; Residents thought increased vegetation may increase crime; snakes. Too much consultation leading to water sensitive outcomes not achieved. • McDougall Lake – residents very happy with proposed WSUD solution • Mends St – at what point do you stop consultation as you might undo all good work – missing bit in process to elected members. Only good on big scale projects. 80% support. • Definition of community all of City of South Perth and not just local people. • Public engagement and transparency strong; education not particularly strong • WWPAP, Southern Water Allocation Plan, DWER have stakeholder engagement portal

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
1.5 Leadership, long-term vision and commitment	3.5	L	<ul style="list-style-type: none"> • 4) Senior management very supportive of WSUD design and implementation; Only drawback is when it goes to council as there are other priorities and the budget is often not approved; CoSP management good – council not so much. • 3) CoSP leadership is keen; good collaboration with leaders in the field. • At higher level passion/vision not there so not presented to council properly; Many councillors haven't been on the journey. • Council changes every 2 years; Educating council is the missing link. Needs to be an induction to align with vision. • How to keep momentum? Council and CEO not part of ongoing vision. • Ongoing funding is an issue. • Council have a lack of ownership over policy. • Retrofitting – how well informed is the vision for infrastructure for retrofitting WSUD. • 3) Waterbird refuge project - council issues, had co-funding approved by DBCA but still council issues. • Missing component is educating council – some community members but also developers/business. • Proposals reference council commitment. • DWER – big ticket items done e.g. Waterwise council, endorsed in 2012. • McDougal Lake officer level design and operation team implementation. • WC and DWER; WWPAP leadership.
1.6 Water resourcing and funding to deliver broad societal value	3.5	L	<ul style="list-style-type: none"> • DWER from perspective of regulation of shallow bores, importance placed on social aspect of green spaces; CoSP adherence to monitoring commitment. POS groundwater use for societal benefit. • WC resourcing via Drainage for liveability – SP Bodkin Park; WW greening scheme – SP claimed \$10k for demonstration projects; approved WW document/incentive for green initiatives, funding for Indexing workshop. • 4) CoSP received a grant from Perth NRM \$120k for 3 years to remove grass and plant sedges at the Elderfield wetland. • CoSP has ongoing commitment to install 2 x GPTs per year. • Main Roads WA to co-fund drainage asset upgrades along foreshore, clean GPTs and prevent backflow loss. • SERCUL nutrient management program. • 60% ; chose low cost option Gross Pollutant Traps – need policies that address nutrient exacerbation. • Community workshops on sustainability, in particular on fertiliser use and the impact on river. • 10 yr financial plan funding for projects. • Maintenance budget looking at hydrozone/ecozone. • Parks leaders – fertiliser training; soil/leaf analysis of reserves. • Steam weeders and manual weed removal. • Funding on annual basis but not adequately enough. • SP facilitates community funding projects e.g. sporting club facilities that have implemented water saving. • Neil McDougal Park WSUD received federal government funding and GPTs specifically designed for this location.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
1.7 Equitable representation of perspectives	4	H	<ul style="list-style-type: none"> • CoSP uses multiple communication platforms to ensure inclusiveness/representation. Printed, social media, community events etc. • CoSP converses with many community groups for decision making/reference groups. E.g. masterplanning, retrofitting, upgrades – community part of decision making. • Inclusive Community Advisory Group. • Disability Access and Inclusion Plan 2017-2021. • Employ disability organisations - Engage with Interlife for watering of natural areas. • Aboriginal landcare group to care for natural areas. • Aboriginal reference group made of elders. • SPIN youth group are frequently engaged. • Equity policy – HR policy & practices. • Water Corporation has targets around women in senior management, cultural background, 3rd RAP, an Aboriginal board member, and a gender diverse in upper management. • Water Corporation annual report – Aboriginal employees and have active plan to use more aboriginal owned contractors.
Goal 2. Increase Community Capital			
2.1 Water literacy	3	M	<ul style="list-style-type: none"> • 3) Water Corporation have lots of marketing and education aimed at the education of the water cycle and improving water literacy; Water for Life campaign, Fury Animals, Climate Change is Real campaign; Infographics; lots of support; Perth residents demonstrate an understanding about water efficiency, groundwater replenishment but not necessarily water sensitive. • DWER engage at grass roots level, aquifer model how water is distributed; Gngara microsite; Be Groundwater Wise website; infographics where water comes from on Water Corporation website. • DWER supply a large volume of groundwater to some LGAs that use it for watering verges – there is a lack of understanding and reluctance to redistribute current water use. • Right outcome from sustainability; measure of literacy; developers have potential influence. • Hard to sell WSUD – how to make it to attract more public interest. • Shared ownership of water. • Participants from workshops – people have some understanding of water management; issue with how to bring them in, how to target those that are not interested – always have audience that have personal agenda or want to put their own interests first such as the Bodkin Park small group of local residents who shut down the living stream project over concerns of safety but this was a misunderstanding/selfishness. • Clontarf Waterford Salter Point (SWSP) Foreshore Masterplan, good community engagement - large community vision – more shade, better amenities – but no acknowledgement of change to foreshore. • Outcomes from sustainability workshops capture before and after – how to communicate with others? Avenue to use. • Youth program non for profit organisations engage promote WSUD planting days. • Younger generations are more responsive and willing to participate than mature audience. • Free community water management workshops.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
2.2 Connection with water	4	M	<ul style="list-style-type: none"> • 5) Feels community values water – they don't want to share! Scouts, boat owners, rowing, fishing, dog owners, nature lovers all share assets within the city. • People live in CoSP as love river and access, 3 significant waterfronts: Swan, Canning and Swan Canning confluence. • Tendency to use the water more than we should – eg river fireworks, theme parks, sail – not necessarily water sensitive outcome; permits not necessarily best for water resource protection. • Water related artworks – public art. • Property prices reflected in water value. • Connection to water perception. • Issue of density and apartments – view corridors to water; need to have facility to utilise to take advantage of it – balance. • Events centred around water – skyshow brings everyone to the river foreshore in South Perth.
2.3 Shared ownership, management and responsibility of water assets	3	M	<ul style="list-style-type: none"> • 2) policy & strategy limited incentivisation of water management solutions; not convinced residents are actively encouraged beyond government supply. • 3) Lake Douglass friends group actively engaged in improving water quality – treat it as their own, shared ownership. • Free mulch for residents – not sure about native plants. • Community facilities – leased buildings shared ownership – users would pay for water consumption; community gardens. • Waterwise Perth Action Plan – goal for alternative water supplies, Action 7 initiate long term education and engagement program and 10 initiate behaviour change program to reduce domestic groundwater use by 10%. • Interest in local water management solutions from people attending workshops – with intent to install rainwater tanks. • Monitoring of water consumption – officers gathering quarterly to monitor high water users, retirement village. • Offer education to those who attend workshops.
2.4 Community preparedness and response to extreme events	2.5	M	<ul style="list-style-type: none"> • 4) Work to do in telling community what plans we have in place. • Risk management plan due to come out next month – community involved in the process; response to risk of floods etc – not online yet. • 1) Not prepared for extreme event – e.g. pipe burst on freeway and no one could move for hours. Floods still possibility; algal blooms impact on water quality; impact of sudden rainfall events on quality of river water. • 2) Public not well prepared; fire plan yes, led from DFES but no flood plan and not at household level response. • Flood plan risk analysis completed with EMRC; produced this year – SP doesn't have many areas in high risk zone; areas close to foreshore may be impacted; information exists but not communicated - waiting for Stage 5 package to provide residents. • Most household would rely on DFES advice. • Local Govt role is recovery; State Govt role is response. • Hail stone event in the past – e.g. heritage losses; not prepared enough. • Only can go as far as you can with the resources you have. • Operations team help with minor flood events, quick response and incorporated into plans. • Lack of communication about plans. • Interactive flood mapping information (web based interactive flood intelligence site to understand flood risks).

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
2.5 Indigenous involvement in water planning	3	M	<ul style="list-style-type: none"> • Fantastic aboriginal engagement but corporate systems not set up for adequate meaningful engagement; use advisory group but fell by wayside; re-establish only for purpose of specific projects. • Implies value but not on a day to day basis – e.g. no aboriginal employment. • 1) have policies/procedures but hard to make it happen; only give it lip service; Hasn't changed behaviour in any significant way. • Aboriginal affairs team at Water Corporation to support indigenous engagement; indigenous member elected onto board; education campaign huge aspect story heavily involve aboriginal heritage connection to water. • Water Corporation have a school education campaign, elders speaking through headphones. • CoSP Economic policy – aboriginal business exemptions, can bypass purchase policy. • New signage – aboriginal references; e.g Mindeerup traditional Noongar name meaning 'place of the shore', the name Mindeerup acknowledges the significance of this area in Noongar culture and heritage. • Specifically commissioned engagement for art works to highlight/include culture. • CWSP Masterplan liaison with indigenous groups; improve communications as much as possible. • From experience working with lots of LGs SP is quite a good LG (not just box ticking). • City's Aboriginal Engagement Strategy. • Draft Innovate Reconciliation Action Plan (RAP). • Section 18 approval for foreshore. • Perth Water Locality Plan process had fantastic indigenous engagement. • Aboriginal Heritage Act/Swan Canning Act.
Goal 3. Equity of Essential Services			
3.1 Equitable access to safe and secure potable water supply	5	H	<ul style="list-style-type: none"> • Water Corporation has a tiered payment structure, all pay the same for first 150kL - \$1.782/1000L; Expensive water supply because of sourcing, but hardship assistance in place: Water Assist, Medical Assist and Time Assist. • Water Corporation Financial Inclusion Action Plan 2018 • Hardship Utility Grant Scheme (HUGS) WA State Government support. • Access to water for all – even dogs and birds. • Homeless people perhaps not equitable access in parks and reserves.
3.2 Equitable access to safe and reliable sanitation	5	H	<ul style="list-style-type: none"> • Everyone has safe sanitation and waste is treated. • Wastewater at Water Treatment Plants must comply with standards in operational licences set by DWER and DoH. • Homeless people perhaps not, Sir James Mitchell Park has 3 toilet facilities however not always open.
3.3 Equitable access to flood protection	4	H	<ul style="list-style-type: none"> • Kwinana freeway flooding – storm surge. • Stormwater catchment network in place for flood protection/drainage. • EMRC flood study modelling, very few people in South Perth subject to flooding in extreme events. • Disruption to everyday activities – traffic and access are the main issues. • Diesel powered pumps in high risk areas available to pump excess water. • Prioritising areas – riverwall replacement happening in October. 3 agencies coordinating with \$40m budget. • DBCA/Main Roads WA /DWER/CoSP differing views for river wall flood mitigation. • Flood risk doesn't take into consideration local stormwater drainage network that may not cope with large volume of water in short period.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
3.4 Equitable and affordable access to amenity values of water-related assets	4	H	<ul style="list-style-type: none"> Highly accessible foreshore except for Aquinas which is privately held as not as accessible. SRT research found that the community are ok with places of high conservation value set aside with no access for protection. All foreshore areas are/have been assessed and environmental impact studies conducted first before any work or public access is agreed. Having certain access points may change dynamics of ecology. Vulnerable areas aren't easily accessible. Reserves for the broader community. All POS is within 500m of households. Paid parking on foreshore areas. Buses are available around the foreshore for low cost. Planning scheme set up for foreshore.
Goal 4. Improve Productivity & Resource Efficiency			
4.1 Benefits across other sectors because of water-related services	3.5	M due to concerns re quantification	<ul style="list-style-type: none"> 3 Vote- Emily, development considers multiple benefit including tourism and transport/connectivity. Developing a plan to generate business and economic activity that 5 covers the city and foreshores. Riverfront perimeter is large so many recreational benefits. But city still doing traditional drainage. All areas that are irrigated provide important benefits for people – physical activity. So should be 4/5. Has lots of irrigated areas. 4-4.5 Vote – obvious benefits of all water services to residents. Projects do consider biodiversity to residents. Projects do consider biodiversity recreation and heat in terms of investment. Don't think benefits are difficult to justify – just don't do it. Business case is more about the scope document for a project. This does identify all benefits. Water will be a part of it. Informs executive. Projects are guided by a series of masterplans which do acknowledge all benefits. All projects align with a strategic direction. City does surveys but data does not get quantified.
4.2 Low GHG emission in water sector	2	H	<ul style="list-style-type: none"> Water Corporation – process of installing solar panels on lots of facilities. Desalination Water Treatment plant electricity usage and carbon emissions are offset by windfarms. But constrained by size of network and significant pumping costs across flat landscape. Harvesting bio gas. Think we are 200-300 tonnes. CoSP installed a few solar PV power systems on high electricity consuming buildings. CoSP is planning to develop Carbon emissions reduction strategy with an aim to reduce current emissions to zero. Has identified where emissions come from. Measured and monitored. Also costed. Trees are also recorded in asset system and these offset emissions. Perth Zoo also uses solar. 2 Votes – not going far enough at the City -scale but acknowledge action at whole of Perth scale.
4.3 Low end-user potable water demand	3	H	<ul style="list-style-type: none"> Waterwise council report 295L/ person/day. Water Corporation run extensive water conservation program. CoSP will aim for Gold Waterwise Council status. No incentives for potable water demand. Waterwise Schools Program. 3 – lots of programs so could go 3.5. 3 in terms of volume. Recognize garden use. Perth average is 347L/person/day so doing better than others.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
4.4 Water-related economic and commercial opportunities	3.5	H	<ul style="list-style-type: none"> • Sir James Mitchell Park – small business operate on river – kayaks. Also some on Canning River. • Lots of personal trainers. • Surf cats – restaurants and cafes. Water bikes/water craft. Food trucks/coffee vans. Parking raises revenue • Council nursery – trees and native plants. • Council policy to encourage business along the foreshore – 4 vote. • City is encouraging business to supply waterwise landscaping. • No interpretive signage along foreshore. South Perth Foreshore Strategy and Management Plan.
4.5 Maximised resource recovery	3	H	<ul style="list-style-type: none"> • Water Corporation recycle 28 GL for groundwater replenishment, harvest biosolids, agriculture, recover struvite (magnesium salt), recover carbon/graphite, harvest/recover biogas, innovation hub at Subiaco WWTP (resource recovery plant) – Vote 3.5 or 3. • What is the Zoo doing? Something with the lake. • Recycled water from golf course wash down areas. • Vote 2 – recognise what Water Corp is doing but would like to see more done within South Perth. • What about car washes?
Goal 5. Improve Ecological Health			
5.1 Healthy and biodiverse habitat	3	M	<ul style="list-style-type: none"> • Golf courses have pines – habitat for Carnabys. • River provides natural connection around three sites of municipality. • Vote 2-Watercorp (WC) drains through POS don't provide much habitat. Small pockets only of habitat, most just grass. Doesn't provide instream or bank habitat. Wooden toe protection drain in Sir James Mitchell Park. • Vote 2 - very patchy in terms of distribution and quality. Lots of places would disappear without irrigation. • Milyu Nature Reserve – good connections along the foreshore, all way round. Diversity there in native species and structure. Some edge effects but work like stepping stones so limited edge effects. • River based foreshore ecology is significant and healthy. Very few introduced trees. DBCA works with the City to do this. • Big difference between the foreshore and the drainage network. • Could push to a 3.5 as foreshore is so significant and actively working with other agencies to establish biodiversity. • Note lots still held in private ownership.
5.2 Surface water quality and flows	3	H	<ul style="list-style-type: none"> • Vote 4- City foes monitor drainage at falls for water quality not flows. All outflows have GPTS (85%) with oil separators. • But freeway drainage is not treated? Have project to try to address in future – GPT's. • Bodkin Park – will convert drain into living stream. Cygnia Cove already built. • Still have 50 sumps. These provide recharge but no water quality treatment. • Lots of guidelines – SMM, WQIP< SPP2.9, all require this for new developments. City has WSUD policy. • Pipes at River wall in Sir James Mitchell Park connected to landward lakes which provide treatment of low flows. Only high flows go over. • End of line treatment in foreshores not much up the catchment. • Algal blooms and Salter Point lagoon but have done work there and better now. • Still come water quality issues in some wetlands – have program to address.
5.3 Groundwater quality and replenishment	3	H	<ul style="list-style-type: none"> • Bores monitored monthly and report 6 monthly to DWER. • One bore is going saline since dewatering started to support new apartments. • Golf course bores are good. • DWER – 144 active bores – 3.3GL licenced with 1.4GL to City. Superficial aquifer stable for 30 years but decline in Leederville (likely Water Corporation pumping) 3-4 as sustainable practices are addressing climate change. • No industrial areas.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
5.4 Protect existing areas of high ecological value	4	H	<ul style="list-style-type: none"> • Swan River Trust (also requires replacement vegetation and stops development) management area requires permits for removal of vegetation (native). • EP Act Par 5 – clearing permits. • DBCA protected species mapping. • Some Bush Forever sites. • Wetlands with some have vegetation buffers. • Greening Plan. • Some individual local natural areas with individual plans – Cygnia Cove and Bodkin Park. • Vegetation around Aquinas Private School. • Goss Avenue Reserve – being protected by the City. • Working with Como Secondary College and by residents. • Community recognised the importance of natural areas. • Local scheme has conservation zone. • Recognise subdivision is exempt.
6. Ensure Quality Urban Space			
6.1 Activating connected pleasant urban green and blue space		H	<ul style="list-style-type: none"> • 3)While it seems to be beautiful because its green space, reflected in housing prices; everyone wants to visit; find it's fragile as a lot of green in private hands; most of the natural is in Clontarf etc; and they can choose what they do; have to rely on private interests and their environmental education for the best interests of the spaces. • Shared arrangements with school; POS kept to a good standard. • Balance with private ownership and facilitate private access. • Green Plan (2002) allows mapping and connectivity corridors; Private sector where city has limited space can't control; maybe work on legislation to retain trees on private land. • Integrated Transport Plan has identified where certain suburbs are underperforming. • Recreation Space Plan; Playspace Plan for a hierarchy of reserves. • Urban forest retaining over infill. • Lost foreshore access due to Kwinana freeway on Western boundary. • Foreshore eroded due to freeway; trying to maintain green buffer; sandbags in Palms management zone of the Kwinana Freeway Foreshore are not stable due to progressive foreshore erosion. • Active work in street trees; objective is to have street tree on every property. • Greater good vs residents. • Can public access green spaces – yes. • Trees of Special Significance register. • Public Open Space Strategy 2012.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
6.2 Urban elements functioning as part of the urban water system	2.5	M	<ul style="list-style-type: none"> • 3) 1000 trees/year; section on N side • 2) little drain infiltration; few green roofs; no recycled water • Current process does not allow for private water sensitive initiatives to be taken up as much; how can we better promote; e.g. rainwater tanks based on evidence provided; perhaps CoSP needs to promote evidence for better uptake. Sustainable design advice contains reference to the installation of rainwater tanks and greywater systems. Webpage promoting appropriate use of rainwater. • City does provide community sustainability workshops; look at options residents can have on their block; they can get info on rainwater tanks, greywater systems. • Exemptions now in place depending on size of rainwater tanks. • CoSP fortunate to be surrounded by river; natural cooling effects throughout the LGA area. • Starting to see more integration with larger infrastructure; missing link tying to street scale. • Apartments – green elements. • Traditional infrastructure still dominates.
6.3 Vegetation coverage	3.5	M	<ul style="list-style-type: none"> • 3) trees on private land; successful; infill • Challenge of swale on foreshore; limited opportunities to shift over time. • Canopy cover 20%; Policy long standing and well resourced 4; deliverables 3. • Urban Forest Strategy formally adopted July 2018. • Better trees on streetscape; better canopy cover. • Caring for Our Street Trees doc; Street Tree Management Plan 2015. • South Perth nursery secured Nursery Industry Accreditation (2020). Produces more than 450 different species of plants and 55 species of trees for CoSP as well as other local councils (Perth, Vic Park, Subiaco, Belmont, Canning, New Norcia, Kalamunda and Fremantle). 19/20 the nursery produced 42,500 plants for reveg works, natural areas planting, street tree planting and riverbank stabilisation. • Verge policy updated in 2011 to have a waterwise and sustainability focus. • Greening Our Streets: Street Verge and Landscape Guidelines booklet. • Many areas targeted to receive underground power, with the intent of increasing tree canopy.
7.1 Diverse fit-for-purpose water supply system	3.5	M	<ul style="list-style-type: none"> • Vote 4 - our water comes for a large range of sources. • POS uses groundwater which is fit for purpose. • Use under the allocation including golf course. • Tree water from a watering truck. • Vote 4 – Water Corporation highly diverse supply from dams, desalination plant, groundwater replenishment scheme and groundwater. Climate resilient. • Vote 2 - made choice prior to explanation would change now. • Vote 3 - Water is centralised for drinking water but diversified for some others. • Reason for Vote 3 is that not enough done to find alternative or decentralised solutions.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
7.2 Multi-functional water infrastructure system	3.5	H	<ul style="list-style-type: none"> • Vote 4 – most POS where we have water is accessible. Encourage people to use. • Also fauna is encouraged. Bats have policies (POS Policy). Basins are fenced though as don't want people in it and maintenance is cheaper. But majority of sumps/basins are fenced. Policy excludes people due to safety. Some fronts of sumps are open – vegetated lot sized. • WC drains are mostly open – golf course drains have recreational value. Include natural systems as they provide a flood protection function. • Most of WA system is unfenced. Not really like Bassendean. • Have drainage for liveability projects going. • Does a lack of fence indicate multifunction. • Foreshores are very distinct. Southern foreshore provides significant flood plain irrigation. Not the others. Sir James Mitchell Park has River Wall. • Working on removing the fence wall in some areas. • Could use fences as a feature. • Policy to open fences where we can.
7.3 Integration and intelligent control	4	H	<ul style="list-style-type: none"> • Automated monitoring in all parks. • Vote 3 - but move to 4. • Good for irrigation. Not sure of others? • Water Corporation systems highly automated. • City of South Perth administration building is monitored. • Irrigation linked to weather station and operated from phones. • Flow monitors on all sites but not all yet on evapotranspiration monitoring. • Includes golf course and zoo. • Zoo recognised by Waterwise program. Run same system as City.
7.4 Robust infrastructures	4	H	<ul style="list-style-type: none"> • Don't have bypasses for drainage systems but do have pumps in low lying areas and not reliant on power so will always work. • Pipes or jetted once/year and monitored throughout winter. • Put cameras in a number of pipes near main roads to check integrity-looking good. • Sometimes vegetation does block the drains but the structures are good. No pipe failures. • Does the lack of failures still mean no need redundancy measures? • Very few water supply interruptions with bypass systems for maintenance. • No interruptions for wastewater systems. Also now have more backup tanks. Cygnia Cove wetland has a tank and Mends St upgraded. • Infrastructure is checked on a regular basis.
7.5 Infrastructure and ownership at multiple scales	3	H	<ul style="list-style-type: none"> • Quite a few private garden bores. • LG has groundwater bores as does the zoo and schools. • Don't really want decentralised drinking water. • Whole city is sewered. • Some septic tanks in public toilets in foreshore and golf course. • Vote 2.5 – water and wastewater is centralised. City is encouraging but not much uptake. • Vote 3 – Water Corporation main provider. Many bores. Some encouragement of private systems management be a planning policy. • Operational policy and WSUD GL. • Number of policies that encourage but no mandate. Lots of exceptions where not required.

Indicator	Rating 0 to 5	Confidence High/Med/Low	Evidence
7.6 Adequate maintenance	3.5	H	<ul style="list-style-type: none"> • System is really good. We know exactly what the issues are, don't always have the correct amount of funding. • Sometimes get funding from Water Corporation. • Don't think we spend enough on the blue-green assets. Money side not there. Still seen as nice to have. Residents want to keep the rates down. • Get funding for roads and the things people can see. People don't want to pay for things they don't see. Try to show water quality issues by uploading information to website. • City has information for now to maintain the blue-green assets. May not be the City's info but people know how to access it. • City manages the shoreline really well. Walk them every year. Know the condition and have capitalised the budgets for maintenance in long term. Also manage green spaces really well on foreshores. Also investing in dealing with legacy issues. • Cooperation between CoSP, MRWA, DBCA and Water Corporation is really good. Include finding streams. Across multiple asset areas eg. DBCA and Water Corporation. • Water Corporation do traditional pipe maintenance well but not as good for blue/green as flows is conveyance less budget available. • If don't get \$ from others project doesn't happen ie. Renewal/upgrade. • Funding is there for maintenance including for irrigation upgrades.



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