GOVERNMENT OF
WESTERN AUSTRALIA

CASE STUDIES

Waterwise Action Plan 3

KEP KATITJIN GABI KAADADJAN

GROWING WATERWISE COMMUNITIES IN BOORLOO (PERTH) AND BINDJAREB (PEEL) TO ADDRESS CLIMATE CHANGE

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Cover image by artist Darryl Bellotti

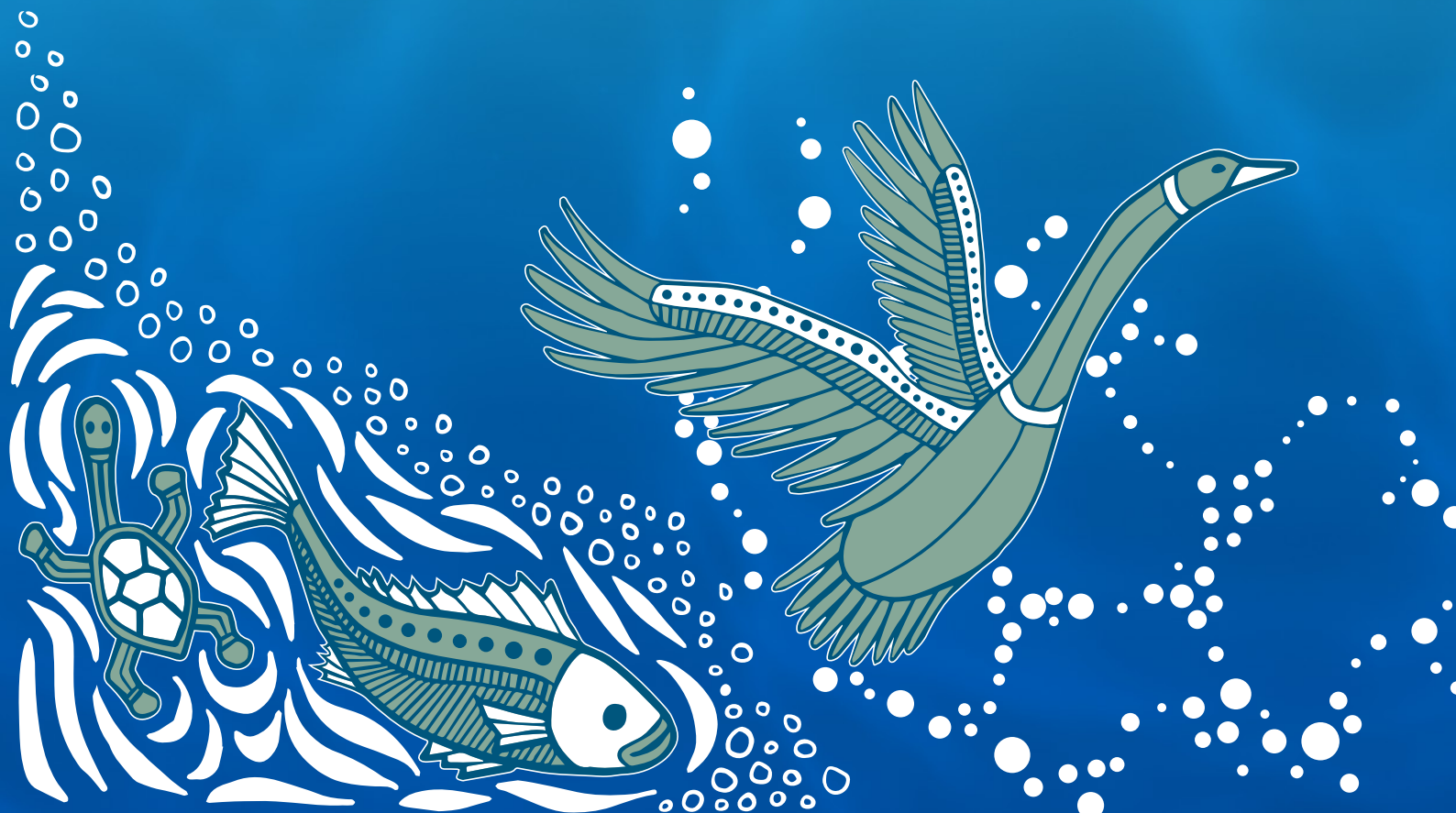
Acknowledgements

We acknowledge the Traditional Owners, the Whadjuk and Bindjareb peoples of the Noongar Nation, whose land and water this plan affects. We pay our respects to their Elders past and present, and we recognise the practice of intergenerational care for Country and its relevance to our work.

Thanks to the Waterwise Steering Committee and Waterwise Working Group of Waterwise program partner agencies for their time, commitment and collective direction and knowledge. It is through that collaboration that the Waterwise program is more than the sum of its parts. Particularly important is the coordinated, shared, across-water-portfolio approach to delivering waterwise outcomes between DWER and Water Corporation.

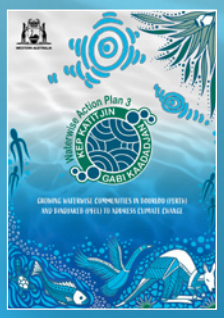
Waterwise program partner agencies:

- Department of Biodiversity, Conservation and Attractions (DBCA)
- Department of Communities (DoC)
- Department of Education (DoE)
- Department of Finance (DoF)
- Department of Local Government, Sport and Cultural Industries (DLGSC)
- Department of Planning, Lands and Heritage (DPLH)
- Department of Primary Industries and Regional Development (DPIRD)
- Department of Water and Environmental Regulation (DWER)
- DevelopmentWA (DevWA)
- METRONET
- Water Corporation (WC)



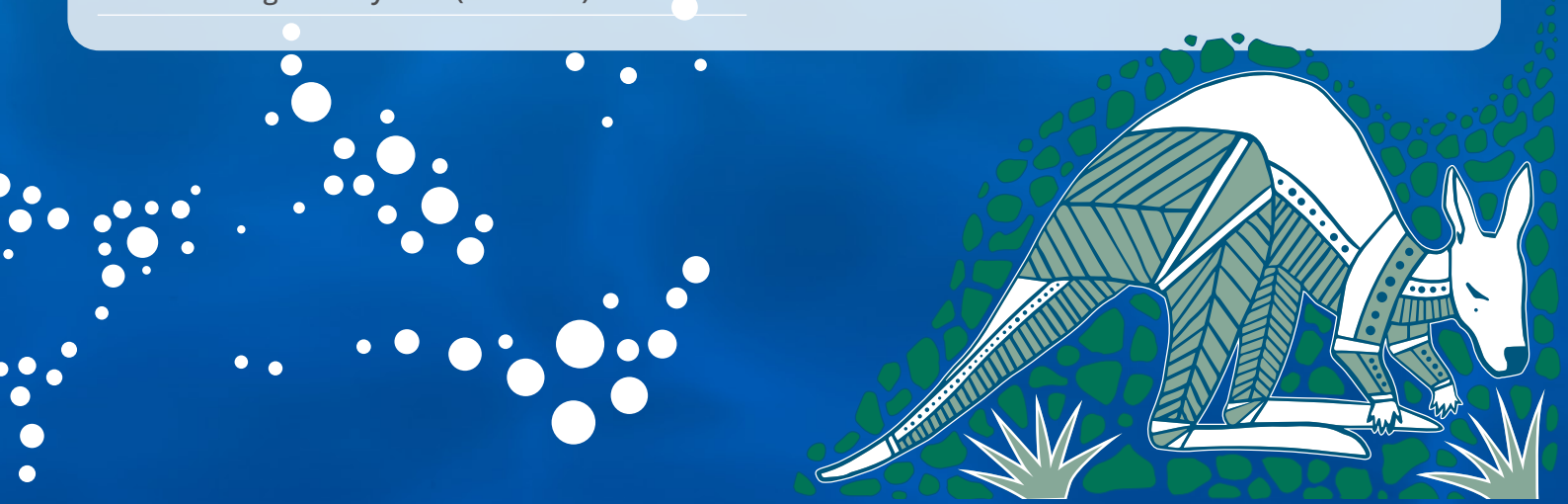
‘Waterwise’ is about so much more than saving water.

To show what that means in practice, this document compiles 20 case studies that demonstrate what is being achieved and what is possible. They explain how waterwise agencies and broader stakeholders are collectively delivering waterwise outcomes at all scales and in increasingly integrated and innovative ways. These on-ground examples demonstrate the momentum that is being gained and the way we are transforming our urban spaces on our journey to leading waterwise communities by 2030.



For more information see
Kep Katitjin – Gabi Kaadadjan
Waterwise action plan 3

Contents



Case study
Stronger together on Bindjareb country

Action 1

Bindjareb Djilba Kaadadjan Bidi yarning circle with Winyama Pty Ltd on 30 November 2023 at Harvey Aboriginal Corporation's Boola Bidi Dreaming Centre | Front row: George Walley, Sharon Cooke | Middle row: Carol Vitale, Lesley Ugle, Brad Vitale, Franklyn Nannup, Rick Ugle, Kallan Nannup | Back row: Andrew Dowding (Managing Director, Winyama Pty Ltd); Robert Jetta, Theo Kearing, Phyllis Ugle, Karrie-Anne Kearing | Absent: Gloria Kearing, Jane Nannup, Adrianna Jetta

Bindjareb Djilba Kaadadjan Bidi yarning circle is gathering to heal waterways in Bindjareb country

Bindjareb Noongar Elders and young leaders come together from the Mandurah, Serpentine, Pinjarra, Waroona, and Harvey areas to participate in a Bindjareb-led yarning and governance circle – the Bindjareb Djilba Kaadadjan Bidi (Peel-Harvey estuary knowledge pathway). The yarning circle oversees our own overarching water plan the Bindjareb Gabi Wonga (Bindjareb Water Story) and the implementation of several Bindjareb-led actions in the Bindjareb Djilba (Peel-Harvey estuary) Protection Plan. The Bindjareb Djilba Kaadadjan Bidi yarning circles enable us to get together just like our old people who walked our country did. We are more resilient and stronger together for our Wirrin (spirit), boodja (country) and baalap (people).

Healthy Estuaries WA and the Bindjareb Djilba Protection Plan are walking with us in our Bring Together, Walk Together journey, putting culture first and listening to Bindjareb-led ways to address the challenges we face in looking after our important waterways. Together, with our partner Aboriginal organisations – Winjan Aboriginal Corporation, Murray Districts Aboriginal Association, Harvey Aboriginal Corporation and Waroona Aboriginal & Torres Strait Islander Corporation – we are achieving moorditj (great) outcomes for our people and waterways.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Mapping country to preserve cultural knowledge for future generations and empower our people in decision-making to heal the waterways

The Bindjareb Djilba Kaadadjan Bidi yarning circle is leading several initiatives on the journey to heal waterways, including mapping country to preserve cultural knowledge for future generations and empower our people in decision-making. In 2023 we engaged Winyama Pty Ltd to build our geospatial tool, the Bindjareb Kaadadjan Mia (the Bindjareb knowledge hub). The Bindjareb Kaadadjan Mia is owned and managed by our partner Aboriginal corporations to protect our cultural intellectual property. The direct-to-digital cultural mapping process can now be undertaken by our people, for our people. The Bindjareb Kaadadjan Mia is bringing about many benefits and has wide application to empower our people. Our geospatial tool enables us to:

- engage our Elders to share their lived experiences and cultural knowledge
- encourage truth telling and healing
- share cultural knowledge with our young people
- train our young people to become geospatial professionals
- get our stories back and keep them safe for future generations
- map country to identify priority places to protect and manage
- plan and record activities of our Aboriginal Ranger Program
- keep records for our strategic projects
- share high-level cultural information to partners to embed cultural knowledge and values into decision-making
- better understand the cumulative impacts of land uses on cultural values.

HEALTHY ESTUARIES WA

Delivering on the

Bindjareb Djilba | Peel-Harvey estuary Protection Plan

The importance of cultural knowledge in the journey to heal waterways

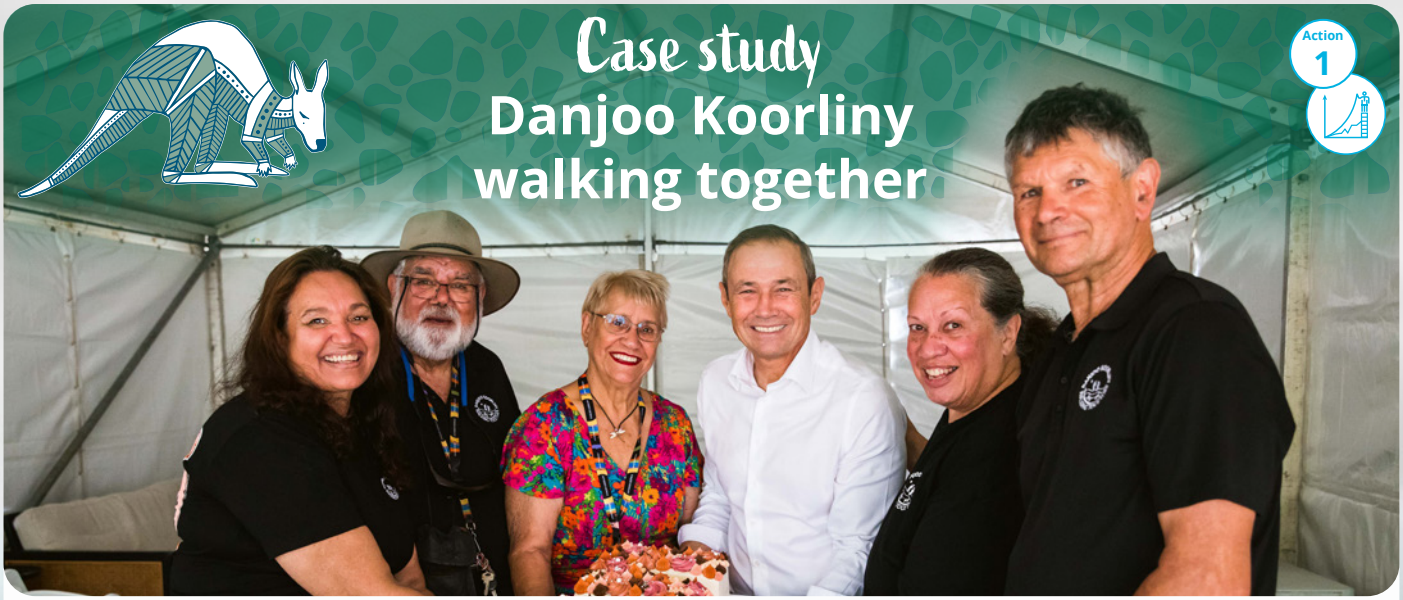
Bindjareb people have looked after the Djilba (estuary) for more than 60,000 years based on governance and lore. We have a continuing life commitment and cultural responsibility to the preservation of this area, and it holds great significance to us. The history of occupation has been unbroken where Bindjareb people have gathered for ceremonies along the estuary and the Harvey, Murray, and Serpentine rivers to hunt, fish, camp and look after country in rhythm with the Noongar Six Seasons. As we face the challenges of climate change and a drying climate, our cultural knowledge is important in the walking together journey to heal waterways.

The Bindjareb Djilba Kaadadjan Bidi yarning circle is funded by the Bindjareb Djilba Protection Plan and Healthy Estuaries WA program – State Government initiatives to improve the health of our estuaries.

Bindjareb Djilba (Peel-Harvey estuary)

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Danjoo Koorliny walking together



Danjoo Koorliny Co-Directors Carol Innes AM and Dr Noel Nannup OAM, Noongar Elder Carol Pettersen, Premier Roger Cook, Danjoo Koorliny Co-Directors Emeritus Professor Colleen Hayward AM and Dr Richard Walley OAM

Danjoo Koorliny is a bold, long-term, large-scale, Aboriginal-led systems change project to help all of us – in Western Australia, the rest of Australia and around the world – walk together as Aboriginal and non-Aboriginal people to co-create a better future for all. The first milestone is in 2029 (200 years of colonisation in Boorloo), and the project will go far beyond Western Australia's bicentenary. Begun in 2019 by Noongar leaders Dr Noel Nannup OAM, Dr Richard Walley OAM, Carol Innes AM and Professor Emeritus Colleen Hayward AM, it is based at The University of Western Australia's Centre for Social Impact, in the Business School.

In 2020, Bindjareb Elder George Walley and DWER officer Bronte Grant presented the co-authored Bring Together Walk, Together Framework at Danjoo Koorliny's Social Impact Festival Kep Water Symposium. This was the beginning of deeper working between DWER and Danjoo Koorliny, centring on including Danjoo Koorliny's invaluable advice and guidance in *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2*, including suggesting its name and launching the plan.

Shortly after the plan's launch in October 2022, DWER's Waterwise Program Manager commenced a placement with Danjoo Koorliny, to more deeply deliver Aboriginal outcomes through the Waterwise program. Over the 18-month placement, together we reached thousands of people across the world, Australia and locally to share the importance of Aboriginal involvement in planning and delivery for water and the environment and how it can create systems change. Dedication of a government resource into an Aboriginal-led project has provided additional capacity and resources, and has allowed the department to directly access Aboriginal advice and guidance and learn Aboriginal ways of working. This has been translated back into projects and approaches, beginning to create change in the organisation and beyond.

Working together on kep and Boodja issues is a strong place to start healing – by healing Country together we can begin to heal the deep wounds and wrongs of the past. We know that Aboriginal people hold profound knowledge of Country that existed long before our newer scientific approaches and this knowledge is constantly found to be technically robust and indeed more connected and holistic than our current siloed and specific ways of empirical research. Increasingly we are recognising and appreciating that this knowledge is the right way for this Country, rather than our imposed European ways. The recognition of Noongar seasons for the south-west of Western Australia is an ideal example of this. For two centuries we have tried to work with four ill-fitting seasons on this Country and we are now recognising that seasonal changes are more subtle and more frequent.

The Waterwise program vision is for 2030 and aligns to the timeframe and path to the 2029 bicentenary. While 'walking together' means we move forward side by side, we recognise that who leads and who follows can and should change throughout the journey. A foundation of shared values, mutual respect and genuine collaboration that is rooted in deep listening and understanding is essential. Knowing when to lead, when to follow, and when to be alongside relies on trust and we acknowledge that we will not always get it right. However, through the exchange of knowledge, the sharing of power, and building of trust, we are navigating the complexities of partnership together.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
The Djarlgarro Bilya Waterways Project

Action 3

Part of the Elders group, research team and Noongar artists involved in the Djarlgarro Bilya Waterways Project at one of their cultural mapping workshops in December 2023. | Front row, from left to right: Jill Abdullah, Irene Stainton AO, Peter Wilkes, Mort Hansen, Tanya Bodney | Back row: Emma Ligtermoet, Rohan Collard, Glenda Kickett, Cristina Ramalho, Rohin Kickett, Julianne Wade, Herbert Bropho, Brett Hill

The Djarlgarro Bilya Waterways Project is a highly collaborative, cross-cultural project that brought together researchers from UWA and members of Boorloo's Noongar community to record the Noongar cultural values of Boorloo's waterways. The project was initiated within the Clean Air and Urban Landscapes Research Hub of the National Environmental Science Program. The project extended beyond the life of the Hub through the support of several organisations within the Water Sensitive Transition Network, including Water Corporation, DBCA, DWER, DoC, DPLH, DoE, METRONET, City of Canning, Perth NRM and Urbaqua.

Under the guidance of a Cultural Advisory Group consisting of Vivienne Hansen, Irene Stainton AO, Glenda Kickett, Mort Hansen and Peter Wilkes, the project recorded the stories of connection with the Djarlgarro Bilya waterways of 13 Traditional Custodians and Knowledge Holders. In the stories, the Elders talked of their lived experience and connection with the waterways, their cultural knowledge of water and how the waterways are important to them, and their perspectives about caring for Boodja, working together and education. While the project focused on the Djarlgarro Bilya, the Canning River, the Elders shared many stories about places along the Swan and Avon rivers, depicting a connectivity of water and culture extending across the metropolitan area.

The project produced a book co-authored by the Elders, a large standalone cultural map artwork produced by two Noongar artists, and a set of short films of the Elders on Country. The Elders and researchers involved in this project believe that the book is a gift to all those that call Boorloo home.

The Elders shared their culture and grounded their stories and perspectives in places where most of us live, work, gather and relax, often without knowing the Noongar significance of those places. They hope this project will open a window for Boorloo's residents to view and understand a city and an environment in ways that they have not seen or understood before. They also hope this project will bring the Elders' values, place connections, perspectives and worldviews to the forefront of local and regional environmental management and planning. The materials recorded provide a foundation for other outputs the Elders would like to see produced soon, that would help to further elevate their voices and reach different audiences.

An important outcome of this project is learning how to work together. Key ingredients on this journey were deep listening and attention, trust, constantly learning from those involved and consequently adjusting the project's course, an active approach to 'decolonise' research, and a supportive network of stakeholders and funding agencies.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Fresh take on waterwise gardens for social housing

Action 5

This waterwise garden with native plants replaced a high-maintenance garden at a DoC-owned social housing property, reducing water consumption and providing space for the senior residents to enjoy

A Mosman Park social housing complex for seniors is the location for a new waterwise garden approach that goes beyond saving water to creating better connections among residents and nature.

The approach will inform the Department of Communities' waterwise landscaping design policy for future social housing projects to boost water efficiency, while also bringing social and community benefits.

The garden makeover at the corner of Stirling Highway and Wellington Street was completed late May 2023 and was the result of a joint project by Water Corporation, Department of Communities and environmental consultants The Forever Project, as part of the Waterwise Social Housing Program.

The garden aims to save water while bringing many other environmental, social and mental health benefits, including giving residents the chance to interact with nature as well as each other.

There are nine garden sections, which were planted with more than 3,000 native shrubs, 10 native shade trees and 20 fruit trees, along with rock and log features, herbal and medicinal plants, gabion seating, and patches where residents can grow vegetables. The Town of Mosman Park is also a keen supporter of the project with a donation of 10 tuart trees to provide shade.

The project started with a pop-up garden in late 2022 where two workshops were held, giving the complex's residents the opportunity to share their preferences and wishes. Based on this engagement, The Forever Project designed the garden.

"We got an overwhelmingly positive response with active involvement from residents who are so excited at having a nice garden around the complex. Meaningful connections were made, with lots of sharing of ideas and wishes that went into designing this shared space," said Chris Ferreira, Managing Director of The Forever Project.

This approach to creating gardens not only benefits residents, it also contributes to urban greening and cooling, reduces water use through planting waterwise plants, reduces waste by using products made of recycled brick diverted from landfill, and encourages biodiversity by providing a beneficial habitat for insects, birds and reptiles.

Reducing statewide water use in social housing

Water Corporation and the Department of Communities have partnered since 2019 to deliver the Waterwise Social Housing Program, which aims to help tenants reduce water consumption and lower their bills.

To date, the program has seen water-efficient fittings, like dual flush toilets and waterwise showerheads, installed at more than 1,200 statewide social housing properties, saving more than 490 million litres of drinking water, or a reduction of around 20 per cent. The program's goal is that no social housing tenant in Western Australia should receive higher water bills due to inefficient plumbing.

Waterwise landscaping in progress

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
H_2OME project helping households adapt to climate change

Action 7

The H_2OME project, Water Corporation's largest ever residential water-use study, employed the world's most advanced technology available to understand how water is used around the home and garden. The study provided powerful insights to help plan for Boorloo (Perth) and Bindjareb's (Peel) water future and to find new ways of working with the community to use water efficiently.

More than 2,000 Water Corporation customers representing a cross-section of Boorloo and Bindjareb's population took part in the H_2OME study, which commenced in 2018 and was completed in 2024, spanning both the *Waterwise Perth Action Plan 2019* – Action 1, and *Kep Katitjin – Gabi Kaadadjan Waterwise Perth Action Plan 2* – Action 6 in the Household and building scale. Digital meters were installed to collect high resolution water use data, which was combined with household information on fixtures and appliance efficiency, demographics, weather and spatial land data. Advanced analytics provided an in-depth understanding of water use behaviour, which informed the design of new waterwise offers to help households save water.

Key insights:

- Leaks on the customer side of the meter were identified in 30 per cent of properties participating in the study.
- Outdoor water use accounts for 36 per cent of total residential drinking water use.
- Most water used inside the home is in the shower, with household showers accounting for 24 per cent of total residential drinking water use.

Residential Drinking Water Use - End use classification data

Shows where water is used in the home and garden.

Average annual household consumption by end use category 2020–21

Indoor

- 24.0% Shower 52.82 kL/year
- 8.6% Washing machine 18.93 kL/year
- 11.9% Toilet flush 26.19 kL/year
- 0.7% Dishwasher 1.54 kL/year
- 12.6% Inside tap 27.73 kL/year
- 1.7% Evaporative air conditioning 3.74 kL/year

Outdoor

- 28.0% Sprinklers/ irrigation system 61.62 kL/year
- 3.2% Hand watering plants/grass 7.04 kL/year
- 4.7% Other outdoor 10.34 kL/year

Leaks

- 4.6% Leaks 10.12 kL/year

Average household consumption 220.1 KL/year

Note: *'Average' lot size was 744m2 and average occupancy was 2.62 across all households in the study*

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

In response to the study's findings, Water Corporation has offered customers incentives to save water in the garden, fix leaks and install water efficient showerheads, which have saved 1024 million litres of water over the past three years.

Examples of Water Corporation's waterwise offers and rebates:

Spring Irrigation Program – During September to May, customers in Boorloo and Bindjareb could access an irrigation check conducted by a Waterwise Garden Irrigator. More than 5,500 customers took up the offer over the past three years. The program was developed to help customers optimise the performance of their existing irrigation system in Spring (the Noongar seasons of Djilba and Kambarang), providing the maximum opportunity for gardens to remain healthy during the hot summer months, while also minimising overwatering.

Rebates for Weather-Smart Irrigation Controllers – Over the past three years, more than 3,400 customers took up the offer of rebates for weather-smart irrigation controllers, making the latest technology in water-saving irrigation practices more accessible to customers. The controller uses local weather data to adjust sprinkler watering times and reduce overwatering. The controllers were installed by a Waterwise irrigation specialist to ensure watering rosters and other waterwise gardening practices were considered. A trial showed households using the controller reduced water use by 15 per cent.

Waterwise Garden Advice for Bore Owners – During August 2022 to May 2023, free garden visits were offered to domestic bore owners in the Boorloo (Perth) and Bindjareb (Peel) regions. The new program was developed to help garden bore owners adapt to the new two-day per week watering roster. More than 550 customers took up the offer for a waterwise landscaper or garden designer to visit their property and advise on optimising soil condition, watering requirements of plants, alternative waterwise options, and garden design and layout to reduce irrigation requirements while maintaining a thriving garden.

The H_2OME study examined water use in a range of property sizes and occupancies. This data allows customers to compare their use to households with similar block sizes and number of people. Customers can also compare their water use to similar households in their neighbourhood by checking their Waterwise status at watercorporation.com.au/bill-and-account.

Drinking water use by property size and occupancy (kiloliters per household per year)

Drinking water use (kL/hh/yr)	Average	x1	x2	x3	x4	x5+
Average	**221**	**126**	**195**	**246**	**294**	**348**
<250m²	**114**	82	131	145	194	148**
250-490 m²	**167**	115	172	201	215	258
490-730 m²	**253**	178	220	255	300	339
730-1025 m²	*260	*156	*214	*280	*321	*362
1025m²+	*256	*170	*204	*245	*321	*389

Notes:

**Bore water use was not measured in the H2OME study. It is probable that larger blocks use private bores for irrigation, thereby resulting in comparatively less drinking water use.*

*** The sample size of households with 5 or more people on less than 250m² properties was small.*

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
A splash of colour

Artist Jarni McGuire – Splash of Colour project, Crawley

Splash of colour is a public art program that celebrates our community's connection to water, highlighting Western Australia's water cycle and the important role water conservation plays in the future of the state. More than 75 Water Corporation assets have been painted since the program was established in 2017 to connect people to their local water infrastructure and unique water stories throughout Western Australia.

Artist Jarni McGuire – Splash of Colour project, Crawley

Splash of colour is one of many community partnerships delivered by Water Corporation, Department of Biodiversity, Conservation and Attractions and Department of Water and Environmental Regulation under Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3 - Action 9 *Raise awareness of water's importance and strengthen community connection to local water stories and environment through community partnerships and programs.*

Two Water Corporation electrical cabinets on Matilda Bay foreshore were given a colourful and meaningful makeover by local artist, Jarni McGuire. The proud Whadjuk, Ballardong and Yuat woman was born and raised on Noongar Boodja. She drew inspiration from her mob's language and stories to create the artwork.

One of the cabinets captures the Whadjuk people prior to settlement through the artistic use of shapes and colours.

"The area was home to many Noongar mob. The country was shared and cared for by tribal groups for ceremonies and meetings. Whadjuk people lived along coastlines, waterways and wetlands to access fresh water and food," said Jarni.

The second cabinet, which displays headpieces and dances, pays respect and acknowledges Traditional Owners and families. Boorloo (Perth) was home to a thriving lake system and Noongar people knew how to care for the country.

"My family still wear the traditional headpieces that are shown in my artwork, and these dances, traditions and knowledge are still being passed down to this day," Jarni said.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Waterwise Schools

Action 12

Waterwise Experience school incursion

Water Corporation's Waterwise Schools Education Program has been recognised for its leadership nationally, with the 'Waterwise Experience' school incursion winning the Customer Experience Award at the Australian Water Awards in 2024.

The Waterwise Experience is an interactive, multi-sensory incursion for high school students that is designed to engage and inspire them on the topic of water sustainability. Using silent disco technology, the students are led through three engaging narratives to learn that water is a finite resource we need to protect and use sustainably.

For more than 25 years, the Waterwise Schools Education Program has been teaching our next generation of waterwise champions. The program educates students about Perth's water supply, water conservation and water in Aboriginal culture. We are well on our way to achieving our Kep Katitjin – Gabi Kaadadjan target of reaching 50,000 students per year by 2030, with a record 42,350 Perth school children participating in the program in 2022–23.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Waterwise Grounds – Bush Classrooms (delivered through the second Waterwise Plan)

Bush Classrooms is at the start of its waterwise journey. It is a Department of Education initiative that supports schools to regenerate areas of their grounds using native plants that naturally occur in the local area. This is a leading example of the waterwise principle of designing with a sense of place.

By 2030, increased areas in school grounds will be providing additional educational and social value, having transformed to have greater biodiversity and cultural value and lower water use.

The initiative is encouraging schools to create culturally responsive, outdoor learning areas that privilege the first cultures of this country and celebrate Aboriginal ways of knowing, being and doing. Bush Classrooms provides opportunities to deliver components of the Western Australian Curriculum while supporting student and community engagement and wellbeing. The teaching and learning process that underpins this initiative is aligned to the Department of Education's Teaching for Impact strategic direction, which outlines what effective teachers believe, know and do to have high impact on student outcomes.

There is a broad range of benefits in engaging in this transformative teaching and learning process. These benefits include climate change mitigation through bio-sequestration (the process where carbon dioxide, the main driver of climate change, is removed from the atmosphere by plants and micro-organisms) and reduced water use on school sites. Regenerated areas are usually ones that were previously under grass or non-native plants and required significant watering. Although native plant tube-stock are well watered in the first year or so, reticulation and hand watering are gradually removed as plants establish themselves, and the area transitions to a water-efficient natural ecosystem.

Bush Classrooms vary in plant species, soil profile, size and positioning based on the needs and context of the school. For some schools, there is limited space available to create a bush classroom, so they are making use of smaller areas, for example Aveley North Primary School uses six raised beds incorporating local plants that reflect the Noongar seasons. Other schools have more available space, and an increasing number, including Makybe Rise Primary School and Baldivis Secondary College, have engaged with Murdoch University's Miyawaki Forest Outreach Program (Miyawaki Program) to create larger bush classroom areas.

The Bush Classrooms initiative is informed by the Miyawaki Forest methodology. Working with the Miyawaki Program ensures alignment with the Western Australian Curriculum and the Department of Education's Sustainability framework – Caring for Country together. There is a Bush Classroom Miyawaki Forest demonstration site at the Department of Education's Statewide Services Centre, which supports Bush Classrooms professional learning for school staff.

Bush Classroom Miyawaki Forest at Statewide Services (July 2022)

Bush Classroom Miyawaki Forest at Statewide Services (April 2024)

Yarning circle

Track leading to a yarning circle at the centre of the Bush Classroom

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Lake Street Urban Stream

Action 16

Lake Street Urban Steam, a new linear park designed for local residents, visitors and wildlife © LD Total

The Lake Street Urban Stream plays a vital role in achieving the City of Canning's vision of a connected, accessible, vital and resilient city centre. This project converted a fenced-off, trapezoidal drain into a vibrant living stream that mimics a natural waterway. The living stream provides increased access to greenspace, improved ecological health and liveability benefits for the local community, while still performing its original function of safely conveying floodwaters.

The project involved reshaping and revegetating the site. New infrastructure was installed for the community, including a boardwalk, lookout, seating and path connecting to the local train station and shopping centre. About 60 new native trees were planted as part of the Lake Street Urban Stream project, including *Eucalyptus rudis, Melaleuca preissiana, Banksia littoralis* and *Casuarina obesa*, to increase tree canopy and urban cooling. More than 6,000 native plants, comprising nearly 50 different species, were planted to increase biodiversity and habitat. Local native sedges were selected to filter pollutants and improve water quality.

Lake Street drain prior to transformation into an urban stream © City of Canning

The Lake Street Urban Stream is part of the City of Canning's broader program to regenerate the Canning city centre. This regeneration has included projects such as the award-winning Wharf Street Basin Next Generation Park and Cecil Avenue West and East smart streets, which incorporate water sensitive urban design. Providing high quality greenspace, such as the living stream and wetland, helps support increased urban density by improving the amenity and climate resilience of the urban landscape. The green network also creates 'naturelinks' or biodiversity corridors for wildlife in the urban area and opportunities for people to connect with nature.

The project was led by City of Canning working in partnership with Water Corporation and the Department of Water and Environmental Regulation's Drainage for Liveability Program. LD Total completed the design and construction.

The Lake Stream Urban Stream is one of 38 'Drainage for Liveability' projects delivered towards the Kep Katitjin-Gabi Kaadadjan target of *50 land and water assets retrofitted to improve local community benefits of green spaces and improve ecosystem health.*

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Waterwise Greening Scheme creating more sustainable neighbourhoods

Action 17

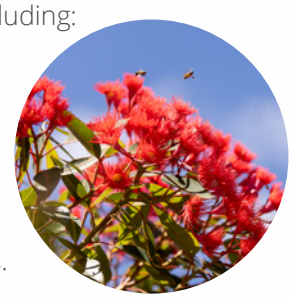
Native plant giveaway

A record number of expressions of interest have come from councils across the state for the 2023–24 Waterwise Greening Scheme. The scheme is provided by the Department of Water and Environmental Regulation and Water Corporation.

To be eligible, local governments must be an endorsed Waterwise Council with a waterwise best-practice verge policy. Waterwise Councils are eligible for up to $10,000 of co-funding. City of Joondalup was awarded Platinum Council of the Year award in 2022, making it eligible for $20,000 of co-funding under the scheme in 2022–23.

Councils use the co-funding for one or more waterwise greening initiatives including:

- verge subsidies
- plant sales
- garden competitions
- demonstration gardens
- street trees
- garden and verge workshops.



Since being expanded in 2019, the scheme has provided more than $675,000 to co-fund 296,000 waterwise plants, 6,000 waterwise trees and 1,000 verge transformations.

City of Joondalup creating more sustainable neighbourhoods

City of Joondalup residents are greening and cooling their neighbourhood one native plant at a time. The Waterwise Greening Scheme provided co-funding for the council's native plant giveaway in April 2024. The initiative proved popular, with the 750 allocations snapped up in under a day, including a total of 7,850 native waterwise plants.

Residents received 10 native seedlings from a choice of five bespoke plant packs. A tree seedling, free advice and resources on waterwise gardening were also included. The native seedlings could be planted anywhere on the property to help with cooling their suburb and increasing biodiversity. Some of the most popular native plants included Prostrate Banksia (*Banksia petiolaris*), Emu Bush (*Eremophila glabra 'Ocean Reef'*) and our state emblem the Red and Green Kangaroo Paw (*Anigozanthos manglesii*). The most popular waterwise trees included the gorgeous Chenille Honey-Myrtle (*Melaleuca huegelii*), Red Flowering Gum (*Corymbia ficifolia*), Pincushion Hakea (*Hakea laurina*) and Dwarf Acorn Banksia (*Banksia prionotes*).

City of Joondalup also used the co-funding to hold its inaugural Waterwise Verge Garden Competition in 2023–24, as part of the Waterwise Verge Rebate Program. From 39 entries, the Waterwise Verge Garden of the Year was awarded to Melanie Davies in Sorrento who transformed her large verge into a waterwise, biodiverse garden over five years. Concrete and exotic weeds were removed to make way for a garden full of thriving native plants. Melanie received a free Red Flowering Gum street tree which is already having a cooling effect by providing shade to the verge and street. The front garden features a stunning 300-year-old Balga (Grass tree) that was translocated from local bushland being cleared for housing. The verge features Fringed Lily, Yellow Leschenaultia, Grey Cottonheads, Bottlebrushes and Coastal Boobialla groundcover plants. The garden now requires very little water or maintenance, aside from applying soil wetting agent in summer and mulch every two to three years to retain moisture in the ground. Friends ask for Melanie's advice in choosing waterwise plants for their new native gardens. Her children enjoy the nature play opportunities in their garden, collecting seeds, spotting new flowers and insects and make cubbies. The local wildlife is just as happy with the new habitat. The native plants are attracting pollinators, praying mantises, frogs, geckos, skinks and the occasional Carnaby's Black-Cockatoo and Boobook Owl.

City of Joondalup

WATERWISE COUNCIL WATER CORPORATION GOLD COUNCIL

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
River Protection Strategy for the Swan Canning River System

Action 18

River Protection Strategy workshop with local governments. Credit: Department of Biodiversity, Conservation and Attractions

Every day, thousands of people in Western Australia interact with the Derbal Yiragan (Swan) and Djarlgarro (Canning) rivers, which form part of the broader Swan Canning river system. This interaction is a privilege we enjoy due to the condition of these rivers, which are among the cleanest in the world's capital cities. The rivers hold a deep significance for the community, and there is a shared hope that they will be protected and cherished over time. The responsibility for maintaining the river system is a collective effort that goes beyond geographical limits and unites us all. Everything is connected.

The *Swan and Canning Rivers Management Act 2006* requires the preparation of a River Protection Strategy. The primary goal of the River Protection Strategy is to synchronise management efforts to safeguard and enhance the ecological, community, and amenity values of the Swan Canning river system. The management of our river system is a complex task, and the strategy provides a framework for actions that will secure the river system's future, offering a shared vision, objectives and coordinated management strategies.

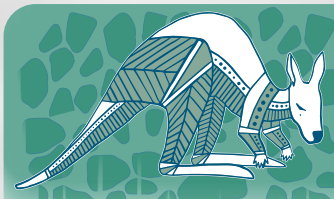
The inaugural River Protection Strategy was launched in 2015 and underwent an internal review of what had been achieved by the strategy, which was published in 2022. An independent review was conducted in 2023. The independent review comprised a comprehensive examination of the River Protection Strategy document suite and interviews with 17 partner agencies and organisations. These processes are informing the development of a new River Protection Strategy and led to a commitment to increase collaboration in the development and implementation of the next strategy. This includes fostering closer ties with Traditional Owners, local government, natural resource management organisations and the community.

From December 2023 to January 2024, a community survey was conducted to identify the key values of the river system. The results have been used to create a values framework for the new River Protection Strategy. The Swan River Trust and Department of Biodiversity, Conservation and Attractions are collaborating with Traditional Owners; local governments; State Government agencies, including waterwise partner agencies; and natural resource management groups to develop new objectives and strategies to protect these values.

Working together, we will develop and implement a 10-year River Protection Strategy aimed at achieving a healthy, thriving river system for nature and people, to be cared for and enjoyed as the heart of our community.

South Perth foreshore swans © Veronica McPhail

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.



Case study
Water planning in a changing climate

Action 26

The climate of Boorloo (Perth) and Bindjareb (Peel) is changing, becoming drier and hotter. Annual rainfall has fallen significantly since the 1970s and Boorloo's water supply is regarded as one of the most affected by climate change compared to other major cities around the world.

The impacts of a drying climate and projected climate change have been considered in Boorloo's water management for well over 20 years.

In 2007, Climate Change in Australia used Coupled Model Intercomparison Project phase 3 (CMIP3) global climate models to project climate change across Western Australia. Climate Change in Australia regularly updates the CMIP as knowledge about changing climate develops. CMIP6, the most recent version, was released in 2021.

Water Corporation's *Water Forever: Towards Climate Resilience* 50-year plan, released in 2009, used the CMIP3 projections to investigate future long-term declines in Boorloo's dam inflows and groundwater availability. This enabled the development of a diversified strategy to respond to climate change that included helping the community to reduce water use, increasing recycling of wastewater and developing climate-resilient water sources such as desalination to support Boorloo's growing community.

The *2009 Gnangara groundwater areas allocation plan* responded to declines in winter rainfall and projections that reducing rainfall would drive a significant decrease in streamflow and groundwater recharge. The 2009 Gnangara plan drove reductions in the use of groundwater for Boorloo's public water supplies and reduced the average amount of groundwater available to Water Corporation in 2013, after the Southern Seawater Desalination Plant was expanded.

In 2015 the Department of Water – now the Department of Water and Environmental Regulation released the *Selection of future climate projections for Western Australia* guide. Based on a pattern scaling approach, the guide provided a consistent and transparent approach to apply CMIP3 projections for the management of water resources.

The 2015 guide informed the department and Water Corporation's water supply and demand planning for Boorloo and the *2022 Gnangara groundwater allocation plan*. The 2022 Gnangara plan includes the next steps in adapting to the long-term decline in rainfall from climate change. The plan includes further reductions in groundwater use for Boorloo's public water supplies and, together with projections of further declines in dam inflows, triggered the building of Boorloo's next seawater desalination plant at Alkimos. The plant is expected to be operational by 2028 and will provide a long-term climate independent drinking water source for Boorloo.

In 2024, the department released a new *Guide to climate projections for water management in Western Australia*. It provides a practical framework for water planners and decision-makers to use climate change projections in climate impact assessments. The framework links a change in climate features, such as temperature or rainfall, to changes in long-term water availability. The guide recommends using the Bureau of Meteorology's National Hydrological Projections (2022). The same framework can be applied to new downscaled CMIP6 projections as they become available through the Western Australian Climate Science Initiative in 2025.

Under both the CMIP5 and CMIP6 global climate models, there is high confidence that the future climate for south-west Western Australia will be warmer and drier, meaning Boorloo's water management will need to continue to actively respond to our changing climate.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
Support for local government water reductions

Action 28

Beatty Park Leisure Centre - Wastewater Reuse Feasibility Study – investigating irrigating public parks with wastewater from the Beatty Park aquatic centre.

Councils adapting to climate change to keep our suburbs cool and liveable

Gnangara local governments with large groundwater entitlements and comparatively low tree canopy cover are most at risk of the urban heat island effect and are using the Gnangara Waterwise Councils Grants Program to assist in adapting to a drying climate.

The Gnangara Waterwise Councils Grants Program is a joint initiative of the Department of Water and Environmental Regulation and Water Corporation. The program provides funding of up to $4 million over four years (2022–23 to 2025–26) to support local government projects that improve water efficiency and urban cooling.

The grants program aims to help local governments in the cities of Bayswater, Joondalup, Perth, Wanneroo, Vincent, Swan and Stirling, and the towns of Bassendean and Cambridge, to meet the target set in the 2022 Gnangara groundwater allocation plan for a 10 per cent reduction in groundwater use by 2028.

The program assists local governments to:

- take action to reduce the urban heat island effect and keep suburbs cool and liveable
- become more waterwise
- lead by example in creating innovative, water-efficient and cool outdoor recreational spaces for community benefit
- incorporate Aboriginal cultural knowledge and engage the community.

Innovative water-saving projects

Funding will support the redevelopment of parks to include waterwise principles and create resilient open spaces to maximise water use efficiency, improve biodiversity and cool outdoor spaces. The grants are contributing to a range of projects such as:

- City of Joondalup will redevelop Barridale Park (aim to reduce water usage by 21 per cent) using waterwise design principles and hydrozoning.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Simone McGurk MLA Minster for Water (front row and centre) with Ms Emily Hamilton MLA Member for Joondalup (far left) with representatives from Water Corporation, the Department of Water and Environmental Regulation and the City of Joondalup

- City of Perth will increase Stormwater Harvesting from the Claisebrook Main Drain to offset the City's 500,000 kL groundwater allocation irrigating the CBD.
- Town of Bassendean will apply ecozoning to reduce areas of irrigated turf at Success Hill Reserve and Mary Crescent Reserve, with installation of mulch and tree planting.
- City of Wanneroo hopes to achieve a 15 per cent reduction in groundwater use through enhanced control and monitoring associated with central systems.
- City of Vincent's education officer will increase awareness of the importance of waterwise activities and change public perception of green spaces in a drying climate.
- City of Swan intends to hydrozone and renew all the irrigation at Lilac Hill Northern Oval, Ron Jose Oval and Ballajura Oval and aims to reduce groundwater use at these sites by 15 to 20 per cent (7,000 – 10,000 kL per oval).
- City of Stirling will investigate potential alternative water sources for irrigation of public open space (stormwater harvesting, managed aquifer recharge, sewer mining).
- City of Bayswater is converting 4 ha of underutilised irrigated turfed area to a waterwise urban forest, resulting in a reduction of about 31,000 – 42,000 kL of groundwater used per year.
- Town of Cambridge will conduct an audit to identify where to apply waterwise principles and reduce groundwater use. It will also establish two waterwise demonstration sites.

Find more information on these and other projects.

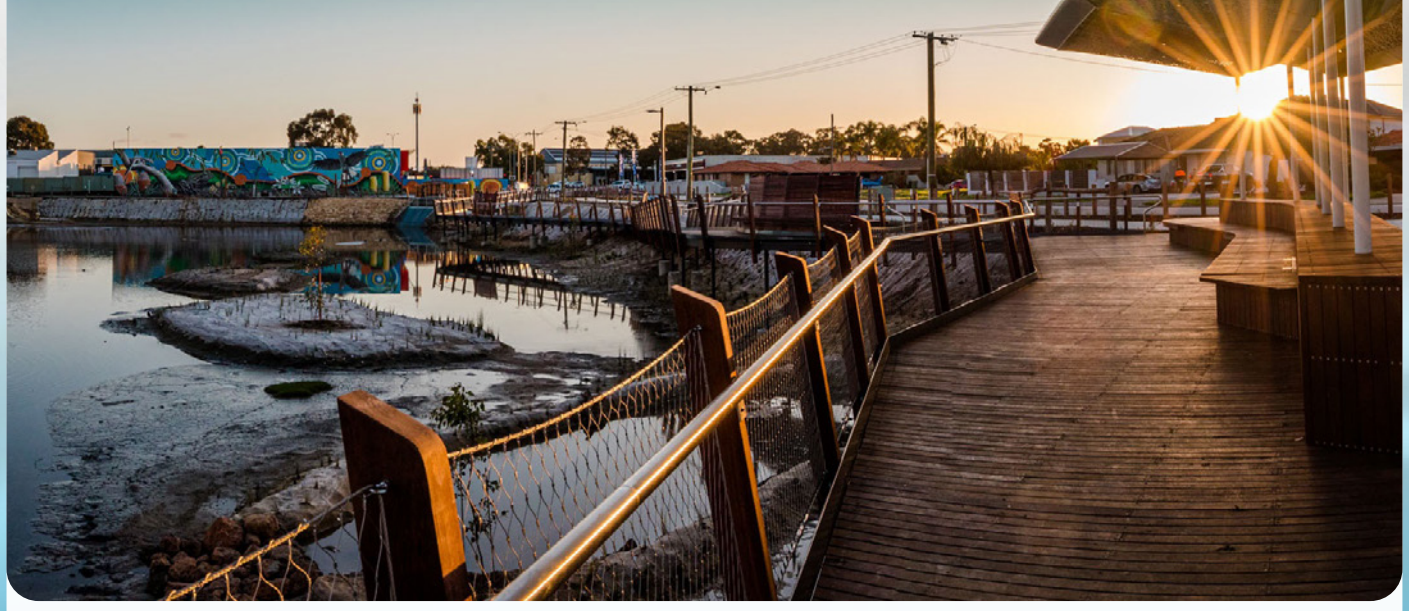
Find information on the Gnangara groundwater allocation plan.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Action 31
All targets

Case study

Water Sensitive Cities Benchmarking Index – how the indexing tool is driving change towards more waterwise communities in Boorloo and Bindjareb



Our journey towards a water sensitive city has been accelerated by the tools, knowledge and partnerships created through our participation in the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) (2012–21). The purpose of the CRCWSC was to help change the way we design, build and manage our cities and towns by valuing the contribution water makes to economic development and growth, our quality of life, and the ecosystems of which cities are a part.

The CRCWSC released the Water Sensitive Cities Benchmarking Index tool in 2016 and it has since been used by more than 70 cities and municipalities across Australia and overseas. The tool allows a city or local government area to measure performance against 34 indicators organised under seven goal areas that characterise a water sensitive city (Figure 1).

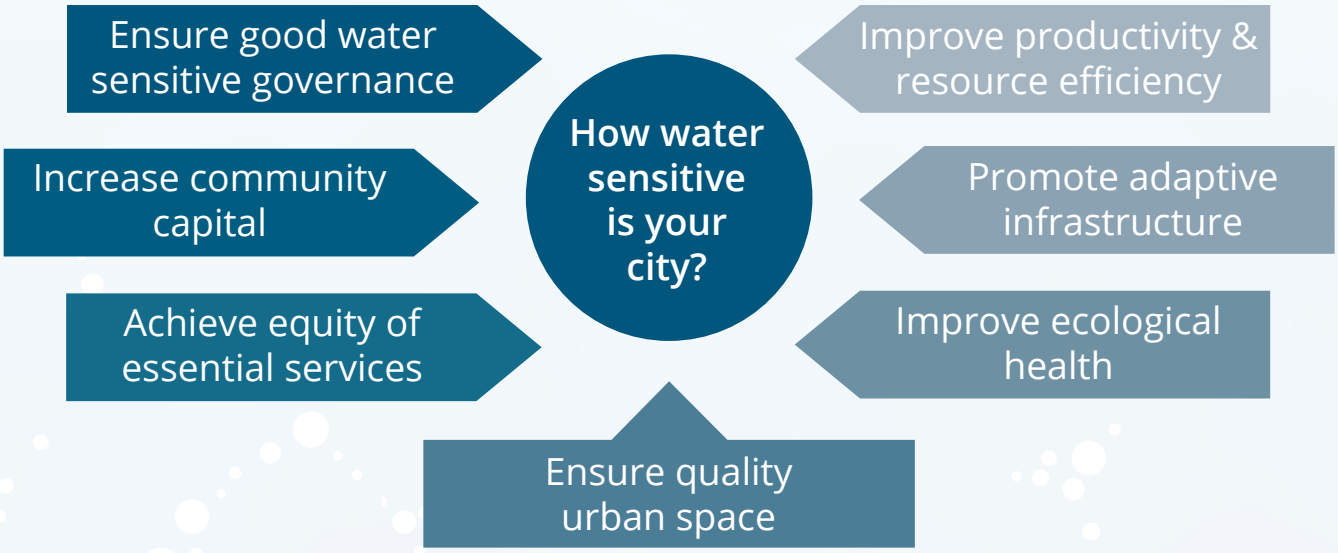


Figure 1: The seven goal areas of the Water Sensitive Cities Benchmarking Index

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Benchmarking has been an essential step in creating a shared understanding of water management performance among Boorloo (Perth) and Bindjareb (Peel) stakeholders.

Greater Perth (the Boorloo and Bindjareb region) was the first to trial the benchmarking tool in 2016 and the first to re-benchmark in 2021.

The results showed that Greater Perth shifted from being slightly behind other capital cities' water sensitive performance to become a leading water sensitive city. Our overall urban water management performance (total score across all seven goal areas) improved by 26 per cent over five years to 2021, compared with 2016 (Figure 2). This achievement reflects a significant effort by all stakeholders to adopt water sensitive/waterwise practices in a growing city being impacted by climate change.

The results reflect the commitment demonstrated across government through the Waterwise Steering Committee and Working Group to deliver the waterwise program and its long-term vision.

Improvements were also driven by the strong cross-sector collaboration achieved through the Water Sensitive Transition Network (WSTN), which was established in 2016 as a result of work under the CRCWSC. The WSTN is made up of a group of champions from state and local governments, industry, community and research organisations that have been working together with a clear ambition to transition Boorloo and Bindjareb to water sensitive communities through information sharing, greater alignment, cooperation, and coordination of activities and knowledge.

The WSTN received the Bronze Project Innovation Award at the 2022 IWA World Water Congress and Exhibition in Copenhagen. This award recognises innovations in governance and institutional transitions and the role this plays in supporting the circular and digital water economies.

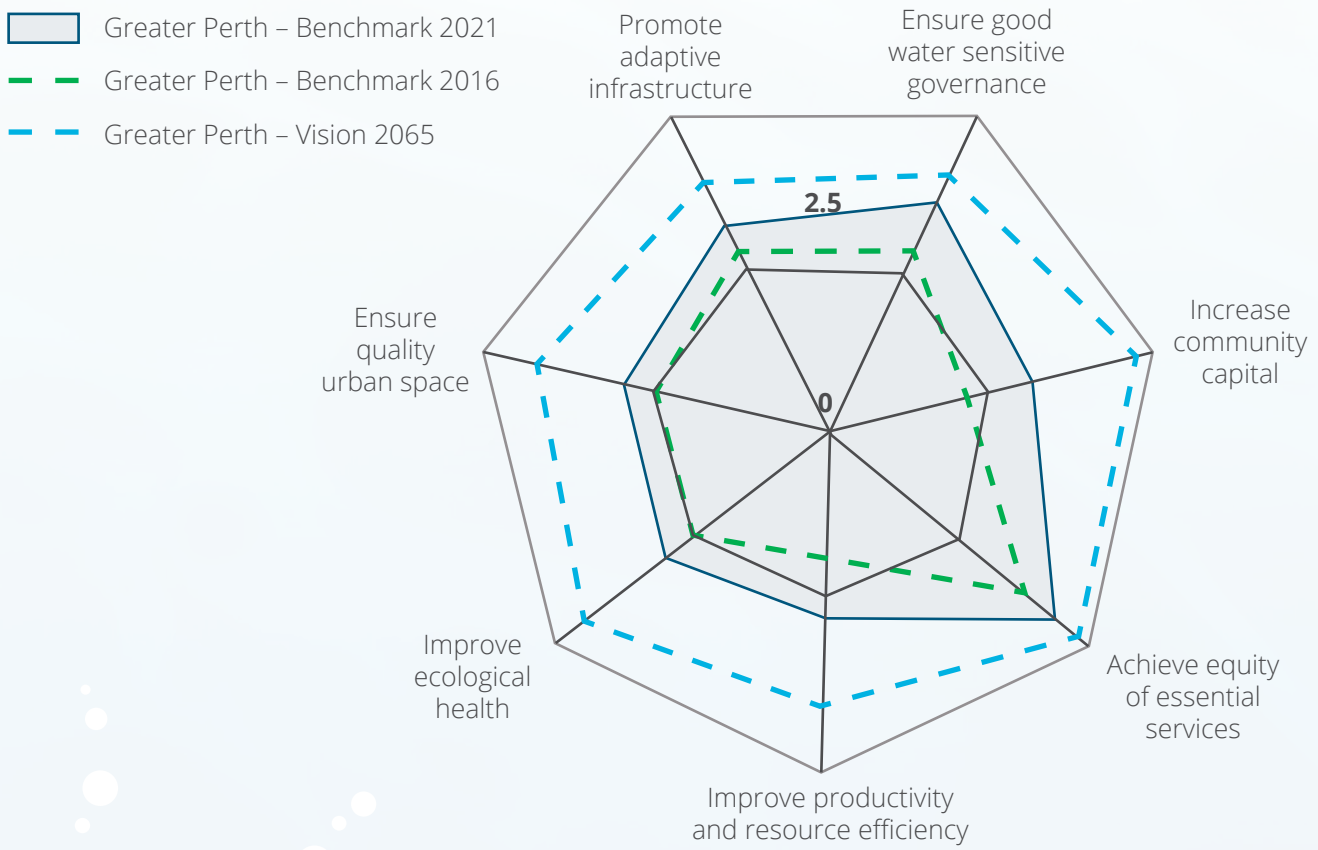


Figure 2: Results of Boorloo and Bindjareb's reassessment using the WSC Index in 2021, compared with the 2016 benchmark and 2065 vision mapped to the seven goals of the Water Sensitive Cities Index. A score of 5.0 represents the aspirational water sensitive performance for each goal.

Waterwise will continue to benchmark the Boorloo and Bindjareb region at appropriate intervals to track progress towards the 2030 targets.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
The University of Western Australia: Living Lab 3 'Urban Biodiversity in Design'

An experimental, low maintenance garden that is a hands-on landscape design project is putting research into practice. The main goal of the Living Lab Garden 3 'Urban Biodiversity in Design' is to understand nature and natural processes that occur in an urban environment and to demonstrate how ecological design can strengthen urban biodiversity. The project also recognises that alternative and more sustainable and waterwise solutions may be appropriate ways of maintaining urban green spaces in a drying climate.

Living Lab Garden 3 was established in October 2022 in the Crawley Campus of The University of Western Australia (UWA). It is included in the interdisciplinary research project Lawn as a Social and Cultural Phenomenon in Perth, which was a deliverable for Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2 action 27 *Collaborate with universities, local government, industry and the Water Corporation on sustainable design and management solutions for lawns in public green spaces in a changing climate.*

One of the project tasks is to test alternative sustainable planting design solutions for urban green spaces (including lawns) in a drying climate. Investigating different mixtures of native grasses and groundcovers to find waterwise and low maintenance solutions for verges, road reserves and other public and private green spaces. This can be important to maintain amenity during extended dry seasons.

The living lab showcases the uniqueness of Western Australian landscapes, demonstrating the waterwise principle of 'sense of place' and explores and tests the difficulties in restoring existing urban habitats back to native, diverse and self-sustaining ecosystems. This research can inform how we can design our urban landscapes to be more waterwise and resilient to climate change.

The Living Lab 3 design concept is based on the demonstration of the dynamic character of existing urban landscapes. The low maintenance garden shows the dramatic transformation of Perth's landscapes from the original native vegetation to a designed colonial garden, an orchard, and a spontaneous weedy space (Garden of the Outcasts). This journey is taken through a series of looped paths that start and finish with the Noongar six seasons – an attempt to return native vegetation and bushland to the urban landscape. Three areas of Living Lab 3 are dedicated to testing native grass species and native groundcovers as new resilient and biodiverse options for covering open spaces.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Living Lab 3 provides a tranquillity space for the local community and allows students, staff and visitors to experience the ongoing research at the UWA School of Design and other UWA Schools. The garden demonstrates new biodiversity potentials for public and private gardens. People are invited to visit Living Lab 3, located at 29 Cook Street, Crawley, Perth.

Living Labs are the joint effort of UWA students and staff with the support of Water Corporation, Department of Water and Environmental Regulation, City of South Perth, City of Rockingham, Turf Growers Association of Western Australia, Murdoch University, Stratagreen, ArborCarbon and Syrinx Environmental.

More information

Urban Biodiversity in Design Living Lab 3

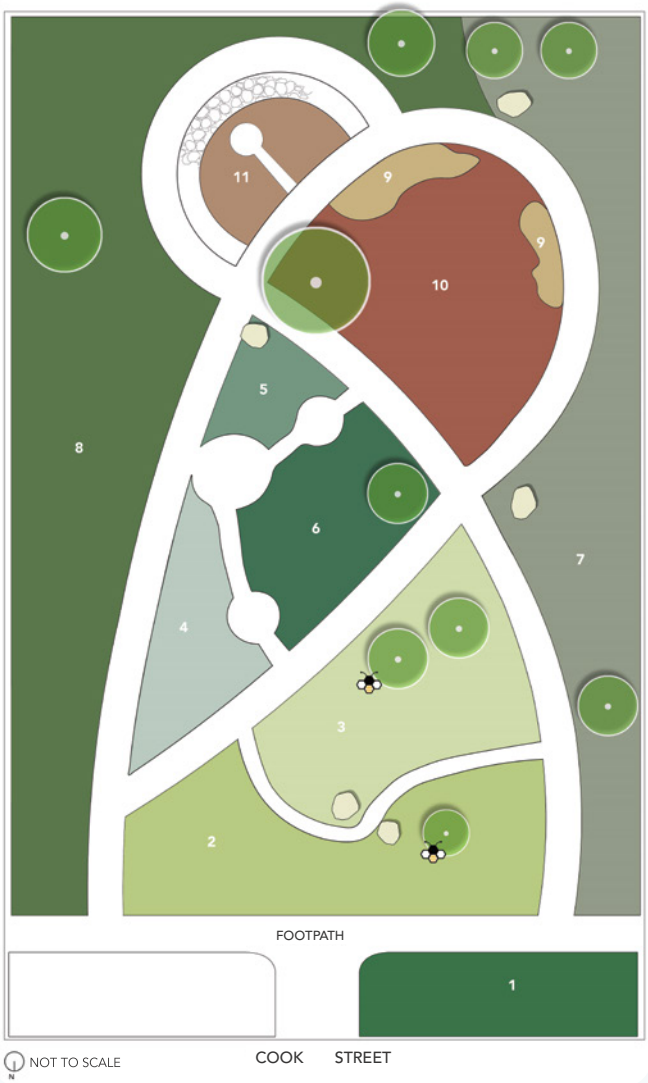
Lawn as a Living Lab

Shifting Sands

Peer-reviewed articles based on the LAWN project

Ignatieva, M., Hughes, M., Chaudhary, A.K., and Mofrad, F. (2024), The Lawn as a Social and Cultural Phenomenon in Perth, Western Australia. Land 2024, 13, 191, https://doi.org/10.3390/land13020191.

Ignatieva, M., Dushkova, D., Martin, D.J., Mofrad, K., Stewart, K. and Hughes, M. (2023) From One to Many Natures: Integrating Divergent Urban Nature Visions to Support Nature-Based Solutions in Australia and Europe. Sustainability 2023, 15(5), 4640; https://doi.org/10.3390/su15054640



GARDEN ELEMENTS

- LIMESTONE SEATINGS
- NATIVE BEE HOTELS
- EXISTING TREES

PLANTING EXHIBITS

- 1 VERGE GARDEN
- 2 SIX SEASONS GARDEN 1 (YELLOW, RED AND ORANGE)
- 3 SIX SEASONS GARDEN 2 (PURPLE, PINK AND WHITE)
- 4 EXPERIMENTAL LAWN ALTERNATIVE WITH NATIVE MIXTURE 1
- 5 EXPERIMENTAL LAWN ALTERNATIVE WITH NATIVE MIXTURE 2
- 5 EXPERIMENTAL LAWN ALTERNATIVE WITH NATIVE MIXTURE 2
- 6 EXPERIMENTAL LAWN ALTERNATIVE WITH NATIVE MIXTURE 3
- 7 INDIGENOUS NATURE OF THE KARRAKATTA COMPLEX
- 8 ORCHARD
- 9 MEETING AREA PLANTING ZONE
- 10 MEETING AREA
- 11 GARDEN OF THE OUTCASTS (WEEDY SPONTANEOUS PLANTS)

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
METRONET Sustainability

Action 35

Artist impression of METRONET Ellenbrook Station

As one of the single largest investments in public transport that Boorloo (Perth) and Bindjareb (Peel) has seen, METRONET is positively changing how people live and travel. With approximately 72 km of new passenger rail and 23 new stations, METRONET is a catalyst to turn more than 8,000 hectares of land into desirable places to live, work and play.

Under its Sustainability Strategy, METRONET is focused on delivering sustainable outcomes for the long-term benefit of the community, with alignment to the principles of the Waterwise Program. This includes strategic planning and development against Kep-Katitjin 2030 targets, with climate and water embedded in each step of METRONET projects.

To help identify and address the impacts of climate change, the Climate Change Resilience Framework was used to assess each METRONET project. Areas of key vulnerability were evaluated to understand risks from extreme rainfall and flooding, bushfire, drought and storms, and recommend suitable mitigations.

These assessments were shared with precinct planners to support project decision-making and feedback into future design development. Additionally, the Resilience Assessment Framework identifies the key short-term shocks (e.g. extreme rainfall and flooding) and long-term stressors (e.g. inadequate urban planning and drought) considered significant for METRONET projects. The framework ensures climate change impacts and broader resilience risk are integrated into transport infrastructure and station design, with impacts mitigated where possible to achieve a well-connected and integrated Perth.

METRONET also collaborated with the Department of Water and Environmental Regulation and the Public Transport Authority, in consultation with Water Corporation and Main Roads WA, to develop A guide to water sensitive urban design for public transport infrastructure in Western Australia 2021. The guide will be used in each project to embed waterwise outcomes into the planning, design construction and operation of METRONET transport infrastructure, stations and station precincts.

To support consistent outcomes across METRONET projects and precincts, a Landscape Design Guide was developed to balance sustainability with maintainability, safety and access to maximise environmental and social benefits such as place making, amenity, urban ecology and biodiversity.

In addition to the waterwise initiatives above, METRONET program wide sustainability objectives also include the use of drought tolerant and/or native plants to minimise the urban heat island effect, 20 per cent reduction of whole-of-life direct water use and greenhouse gas emissions, and the creation of safe and accessible stations and public spaces.

By prioritising best practice, transparency and accountability in collaboration with key stakeholders and partners the METRONET program promotes the walking together approach championed by Waterwise and showcases sustainable transport solutions to guide Perth's future development.

Artist impression of METRONET Malaga Station

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Action 35

Case study
METRONET Victoria Park – Canning level crossing removal

Artist impression of METRONET Whiteman Park Station

The Victoria Park-Canning Level Crossing Removal Project is Perth's first major elevated rail project, designed to improve public transport safety, create new and versatile public space for the community, reduce traffic congestion, improve biodiversity and mitigate urban heat island impacts.

Six level crossings are being removed along the Armadale Line by raising the rail over the road at Mint/Archer Street, Oats Street, Welshpool Road, Hamilton Street, Wharf Street and William Street to allow vehicles to cross the rail line without stopping for passing trains. New, modern elevated stations will be built at Carlisle, Oats Street, Queens Park and Cannington stations.

Elevating the rail structure will allow for 6 hectares of land previously occupied by rail lines to be transformed into flexible community spaces. Community consultation was important in designing these public spaces, allowing stakeholders to shape the look, feel and function of their neighbourhood open spaces. Five key themes emerged from the consultation, specifying that the community has a strong desire for public spaces that support connectivity through safety, activation, movement and the natural environment.

As such, the parkland area along the rail corridor is being designed to:

- provide welcoming and culturally sensitive spaces where people can come together
- create safe spaces with good lighting and well-designed activity zones
- enable a diverse range of easily accessible activities and events
- accommodate both commuter and recreational cyclists while also providing convenient pedestrian links
- promote health and wellbeing with opportunities to connect with nature and green spaces by adding more trees and shade.

These priorities have informed the addition of specific design elements including:

- a signalised pedestrian crossing opposite Sevenoaks Senior College to allow more direct access to Cannington Station and bus interchange
- opportunity for events to be held adjacent to the Harold Hawthorn Community Centre with construction of a stage, seating walls and furniture
- youth plazas near the South Metropolitan TAFE and Cannington Leisureplex
- a nature playground close to Oats Street Station and play area south of the Queens Park Station Plaza for preschool children
- pedestrian links to Queens Park Soccer Stadium
- an interpretive area that acknowledges the historic and cultural significance of local Aboriginal people
- parkland trails between Carlisle and Oats Street stations.

The project's Tree Retention Strategy set targets aiming to double the number of trees while retaining as many existing trees as possible during works to improve urban heat island impacts. The strategy promotes local, native flora species to support biodiversity, provide habitat for native fauna and minimise water use.

The project will be completed mid-2025, delivering not only upgraded transport infrastructure but a greener, more connected urban environment for all to enjoy.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
East Village at Knutsford recognised as Western Australia's top waterwise development

East Village

East Village at Knutsford by DevelopmentWA has been recognised as one of WA's most sustainable infill developments. The 1.5 hectare industrial site in Fremantle is now a prime residential precinct within walking and cycling distance of local parks, cafes, golf courses and the nearby Fremantle city centre. The development includes an apartment building, 36 townhomes and a terrace site with initiatives that support sustainable living.

The all-electric, water-efficient three and four-bedroom townhomes are targeting 80 per cent reduced mains water consumption. Each property has a 7,000 L underground rainwater tank which is internally plumbed to the hot water heat pump system, toilets and washing machines. If the rainwater tank is empty, there is an automatic switch over to mains water.

Water use

Groundwater is used to irrigate private courtyards and shared public spaces via a shared strata bore. This comes at a lower cost and lower greenhouse gas emissions profile when compared with mains water supply. Groundwater is replenished by the site's stormwater management system that is designed to retain and infiltrate rainfall on site. Water sensitive urban design initiatives incorporated in the landscape design include permeable paving, roadside swales and rain gardens. Heavy rainfall is directed to underground galleries to recharge the aquifer. These initiatives, as well as the overall landscape and streetscape design, provide urban cooling benefits, wildlife habitat and local amenity.

Greening

Prior to redevelopment, the former industrial site had no tree canopy. Now the shared spaces include hydrozoned exotic and native gardens, with the aim of achieving a minimum 20 per cent canopy coverage. Many of the verge trees are edible fruit and nut species, providing residents with an opportunity to access locally grown food to enjoy and connect over. A considered approach to tree selection and placement has been applied, with deciduous varieties planted to optimise winter solar gain for buildings and waterwise trees planted along walkways to provide shade for a cool, walkable environment. Small turf areas are included in public access ways and streetscapes.

Design

The townhomes feature climate-responsive design and are thermally comfortable and well-lit with natural light. Living spaces on the second floor capture winter sunlight for natural warming. A 6.6 kilowatt solar PV system is installed on the rooftop of each townhome to provide the household's energy. Any surplus power charges a shared battery and, if the battery is fully charged, the energy is exported to the grid. Solar energy generation, power and water use is monitored by a submetering system so that households can keep track of their use, costs and credit gained from recharging the shared battery. Any backup grid energy is purchased from renewable sources.

Award winner

East Village at Knutsford was awarded Water Corporation's Waterwise Development of the Year 2024 for outstanding achievement in water sensitive urban design. The development, as part of the wider Knutsford Regeneration Precinct is also a case study site in the RACE for 2030 CRC Pathways to Net Zero Precincts research project led by Curtin University.

Prior to taking out the Waterwise Development of the Year award, East Village at Knutsford was recognised as a One Planet Living Global Leader by Bioregional in 2020. The project was also previously a recipient of a Smart Cities and Suburbs grant to investigate governance systems for shared energy and water resources.

For more information, visit East Village at Knutsford DevelopmentWA and Waterwise Development Program.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
OneOneFive Hamilton Hill – DevelopmentWA Innovation through Demonstration

OneOneFive

OneOneFive Hamilton Hill is a DevelopmentWA 'Innovation Through Demonstration' project targeting the highest levels of sustainability in urban infill development. The 244-lot residential estate is located on the former Hamilton Senior High School site, south of Perth. It aims to be a vibrant residential community featuring climate responsive planning, a diverse range of modern energy and water efficient housing options including quality public open space that prioritises canopy cover, biodiversity and connection to remnant bushland in response to a drying climate.

The development aligns with actions in the first two waterwise plans, and in this plan, action 39: *Showcase Waterwise Developments to evaluate, share and inspire adoption in the private sector.* OneOneFive contributes to targets relating to integrating best practice waterwise policies into State Government urban water documents and achieving waterwise government-led urban developments.

The development demonstrates sustainability leadership, including achievement of all six leaves in the Urban Development Institute of Australia (UDIA) EnviroDevelopment program, recognition as a Water Corporation Platinum Waterwise Development (2022) and winner of the 2021 Waste Sorted Awards 'Waste Initiative of the Year' for commitment to resource recovery.

OneOneFive Hamilton Hill has a balanced approach to water management that includes a community groundwater bore scheme; water efficiency measures in the landscape and household; tree retention and landscape enhancement; stormwater retention such as permeable paving; and water use metering, including household scale initiatives.

These sustainability initiatives form the basis for several applied research projects, including the OneOneFive Waterwise Exemplar and the Smart Neighbourhood Waterwise Performance Monitoring. They seek to understand how successful waterwise and sustainability initiatives can become mainstream in Perth's urban development industry. These learnings are intended to assist in the transition towards a more liveable, sustainable and resilient Perth.

In particular, the Waterwise Exemplar program focuses on improving urban water management by understanding processes such as planning, design and implementation; overcoming barriers; sharing learnings; and building capacity among local government, developers and their consultants in response to Perth's drying climate. This program is a collaborative partnership between Water Corporation, Department of Water and Environmental Regulation, DevelopmentWA and City of Cockburn.

Knowledge sharing and communication outputs from the Waterwise Exemplar project include presentations at industry events, site tours and the Waterwise Development Pathway for planning design and approvals. The Pathway encourages greater uptake of waterwise initiatives through statutory planning processes for improved urban greening, liveability and ecological outcomes.

Projects such as OneOneFive Hamilton Hill provide an opportunity to demonstrate the changes to planning, design and implementation needed to deliver sustainable urban developments that incorporate waterwise principles. They are important to trial new approaches; monitor, evaluate and refine approaches and share knowledge and learnings to assist with embedding new practices. These practices demonstrate to industry and stakeholders how to embed learnings to achieve waterwise outcomes, which are critical for addressing climate change in Boorloo (Perth), Bindjareb (Peel) and the wider region.

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

Case study
DLGSC Infrastructure
Case Study – State Football Centre Project

Successful release of an adult turtle

The State Football Centre (now known as the Sam Kerr Football Centre) is a world-class facility designed to meet international standards and was used as a training ground for the FIFA Women's World Cup 2023.

Development of the Football Centre aimed to increase the overall environmental value of the Queens Park Open Space site in the City of Canning through better protection, restoration and management of retained bushland areas. The project aimed to minimise impacts to natural vegetation and fauna and took into consideration wetland preservation and best practice urban water management and drainage principles. Environmental and water management plans were developed and implemented to ensure all necessary measures were taken to manage and monitor environmental assets and hydrological features that were directly impacted by the building works.[1]

Working with the Yunga Foundation, the project established an Aboriginal Reference Group comprising Whadjuk representatives. The reference group provided valuable input relating to Aboriginal culture for the Sam Kerr Football Centre project. Ongoing maintenance and management post-construction were also well considered.

Measures to ensure integrated water cycle management included:

- Water supply and conservation
- Stormwater management
- Groundwater management
- Water quality management
- Environmental asset protection.

Within the development site there was a semi-constructed basin that collected water runoff from the centre and surrounding areas – creating a 'wetland' which was home to several snake-necked turtles. Prior to clearing the site, these turtles were collected and cared for offsite while construction works took place. During and after construction, revegetation of the area occurred, and it now provides fringing vegetation and some cover to the 'wetland'. In April 2023, 22 turtles (one believed to be about 80 years old) and three hatchlings were successfully returned to the drainage basin on site, where they now reside permanently.

[1] Department of Local Government, Sport and Cultural Industries (2024), Sam Kerr Football Centre, DLGSC website, accessed 25 July 2024

For more information see Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3.

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