



CRC for
Water Sensitive Cities

Strategic Plan

2016/17—2020/21



Australian Government
Department of Industry,
Innovation and Science

Business
Cooperative Research
Centres Programme

1. A vision for water sensitive cities

Liveable, resilient, sustainable, and productive.

For the world's cities and towns, water is profoundly important to shaping healthy, productive places that meet our social and environmental needs, now and into the future.

However, mounting threats like urban growth, a changing climate, and stressed economic budgets mean that a “business-as-usual” approach to managing water, and to planning the form and function of urban communities, can no longer protect the lifestyles we value, the environment that sustains us, and the economy that fuels our prosperity.

Instead, recent experience of drought, floods, bushfires, and heat waves has crystallised global recognition that the cities of the future can – and must – embrace “water sensitive” thinking: a revolutionary approach that harnesses extraordinary advances in science and technology, and places water at the core of how we plan cities and manage their growth.

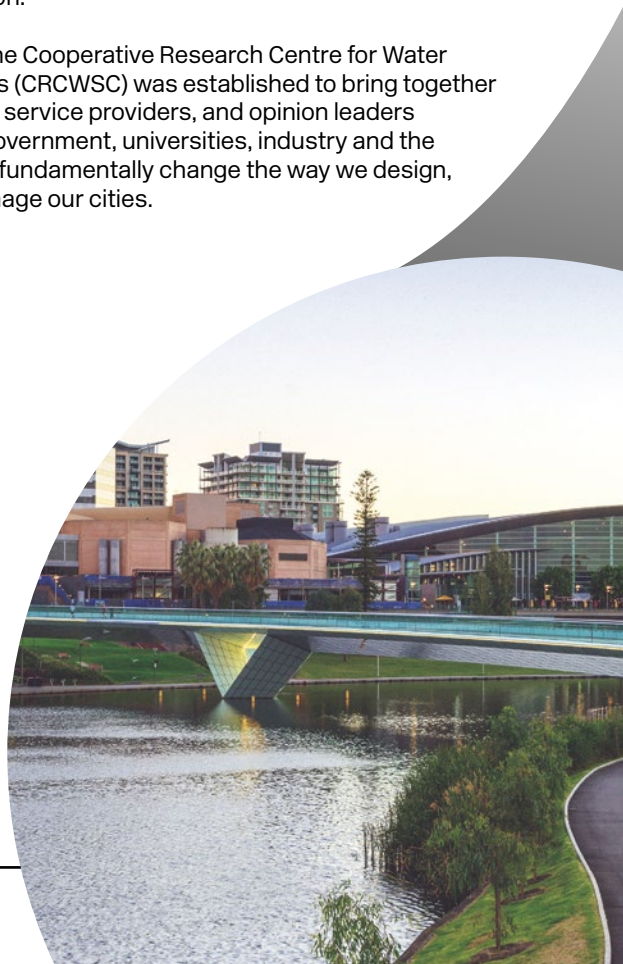
As traditional water management has done for us in the past, water sensitive thinking can now crucially secure safe and reliable water supplies for urban communities. But among other benefits, it also unlocks more effective ways


to manage floodwaters, protect ecosystems, and boost recreational opportunities. In other words, water sensitive cities and towns are designed to be sustainable over the long term, economically productive, and resilient to extreme events – despite new challenges.

But the tools and knowledge for achieving a water sensitive transition vary from one location to the next, and many towns, cities, and regions are missing the solutions they need. Truly overcoming the deficits will require the insight of diverse players, and new scales of collaboration and collective action.


In response, the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) was established to bring together world experts, service providers, and opinion leaders from across government, universities, industry and the community to fundamentally change the way we design, build, and manage our cities.

The result is a
**global perspective
focused on enabling
local solutions.**




An aerial view of a modern city with a mix of high-rise buildings and green spaces. A winding path or water feature runs through the center, surrounded by trees and low-rise buildings. The overall scene is a blend of urban development and nature.


What makes a water sensitive city?

A circular inset showing a stylized diagram of a city layout. It features a grid of streets, a central water body, and various green spaces. A toilet icon is visible in the upper right corner, and a blue line representing a water feature runs along the right side.


*Smarter technologies
and planning enable
access for all to
water and sanitation
services.*

A circular inset showing a street-level view of a city. A person is walking on a sidewalk next to a road. There are trees and greenery along the street, and a building is visible in the background.

*Streets are planted
with cooling greenery
that cleanses
stormwater and
diverts floodwater.*

A circular inset showing a street-level view of a city. A person is walking on a sidewalk next to a road. There are trees and greenery along the street, and a building is visible in the background.

*Communities are
connected and
water literate.
Citizens contribute to
decision-making.*

A circular inset showing a street-level view of a city. A person is walking on a sidewalk next to a road. There are trees and greenery along the street, and a building is visible in the background.

*All sources of water –
including wastewater,
stormwater, and
rainwater – are
recognised as valuable
resources, collected
locally, and used
appropriately.*

2. Challenges and opportunities for cities and their regions

Cities and towns in Australia and around the world face critical challenges: climate change and variability, population growth and urbanisation, and economic pressures for homes, businesses and governments.

Threats to the liveability and resilience of cities

Population growth

AUSTRALIAN CITIES ARE ALREADY HOME TO MOST OF THE POPULATION
88.9% IN 2011
 — AUSTRALIAN BUREAU OF STATISTICS

BUT OUR CITIES ARE ALSO **GROWING**
 ON AVERAGE, POPULATIONS WILL GROW BY **95%** BY **2061**
 — INFRASTRUCTURE AUSTRALIA

WITH FEWER BACKYARDS, **PARKS AND GARDENS** ARE EVEN MORE IMPORTANT FOR HEALTH AND WELLBEING

WITH GROWING WATER NEEDS, WE NEED SMARTER WAYS TO ACHIEVE **LIVEABILITY AND WATER SECURITY** FOR OUR CITIES

Climate change and variability

DROUGHT ALREADY STRAINS OUR WATER SERVICES



MILLENNIUM DROUGHT COST MELBOURNE BETWEEN 400M&1.5B
 — WATER SERVICES ASSOCIATION OF AUSTRALIA

RAINFALL IS DECLINING
 ACROSS SOUTHERN AUSTRALIA, MAKING IT HARDER TO FILL OUR DAMS

FOR CITIES LIKE PERTH, ADELAIDE, AND MELBOURNE, DROUGHT WILL **BECOME MORE FREQUENT, AND MORE SEVERE**
 — CSIRO/BUREAU OF METEOROLOGY

“EXTREME RAINFALL
 EVENTS CAUSING FLOODING WILL BECOME MORE INTENSE”

— CSIRO/BUREAU OF METEOROLOGY

RECORD-BREAKING 2011 FLOODS IN QUEENSLAND COST AN ESTIMATED **\$14.1B**

— AUSTRALIAN BUSINESS ROUNDTABLE

MORE **PEOPLE** AND **HIGHER DENSITY LIVING** AMPLIFIES THE DAMAGE AND DISRUPTION OF FLOODS



TO PROTECT CITIES AND COMMUNITIES WE NEED BETTER WAYS TO SAFELY CAPTURE AND REDIRECT FLOODWATERS.

Economic challenges

RESIDENTS, BUSINESSES, AND GOVERNMENTS ARE **FACING RISING BILLS AND DEBT**



\$3.5–\$4.5B SPENT ON WATER INFRASTRUCTURE **EVERY YEAR**
 — WATER SERVICES ASSOCIATION OF AUSTRALIA

URGENT INVESTMENT SECURED WATER SUPPLIES DESPITE THE **MILLENNIUM DROUGHT - AND ALSO RAISED WATER BILLS**

FUTURE INVESTMENT WILL BE NEEDED AS INFRASTRUCTURE AGES, **CITIES GROW, AND THE COST OF FLOODS AND DROUGHTS RISES**

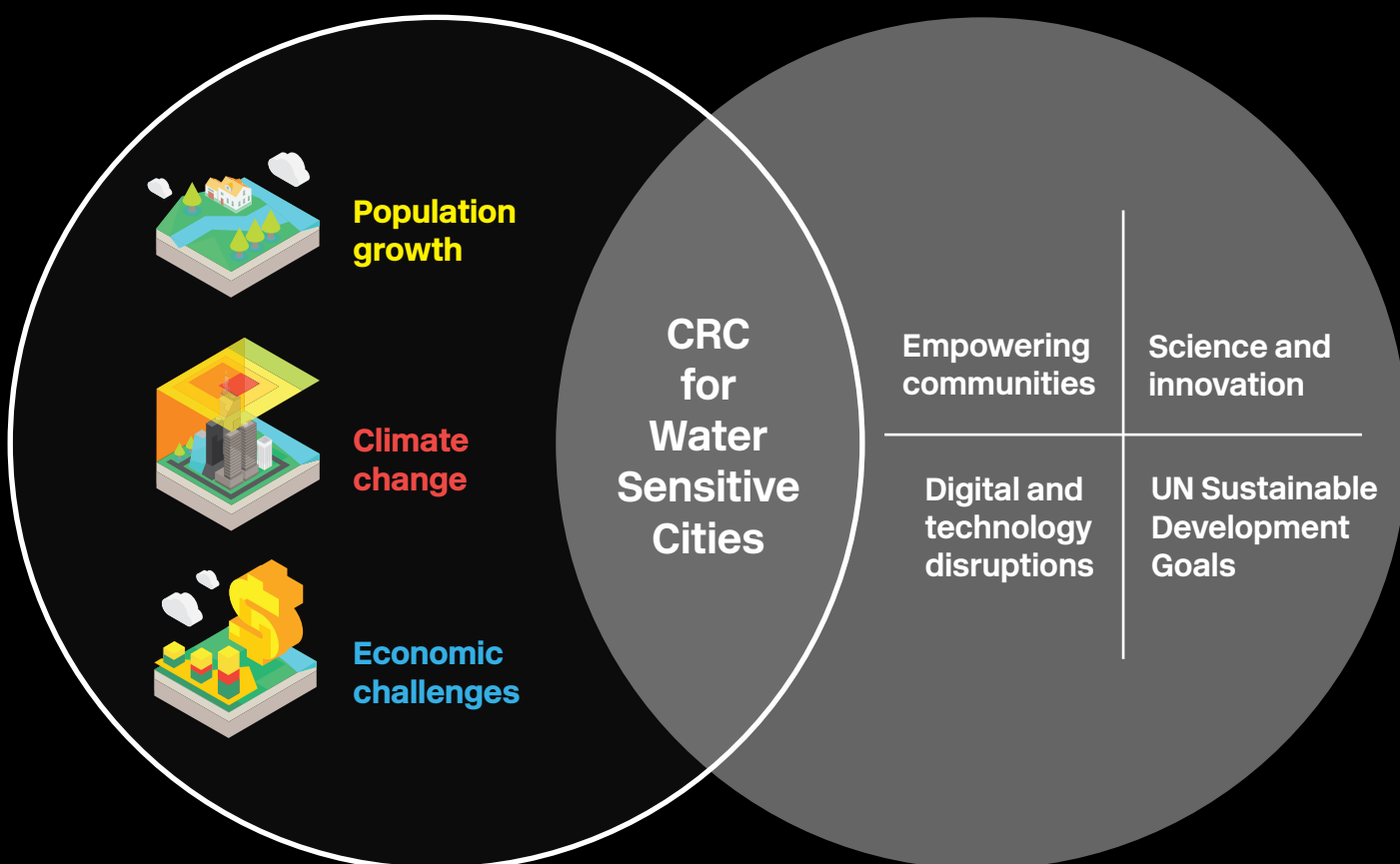
Rainfall is declining, water need is increasing, and funds are tighter: we cannot simply build more dams and scale up a “business-as-usual” approach. We need ways to ensure we can supply services sustainably and affordably.

How well we respond to these challenges will determine our future, yet all of them have a common link: they affect our water security, and their impact can be mitigated by a water sensitive approach. As a foundation of water sensitive thinking, an integrated approach to managing diverse urban water sources and needs can help to address the issues – and the CRCWSC’s work is to place that potential firmly within reach.

Just as the future poses big questions that must be answered, it also holds exciting opportunities: chances for new ways of doing, creating, and achieving change.

In Australia and globally, water sensitive thinking finds different expressions, but it is clear that developing countries have the most acute need for positive change and the greatest opportunities to “leap frog” into smarter, future-ready infrastructure. In growing our international presence from a strong Australian base, we proudly leverage the health and environmental benefits of water sensitive thinking to help drive achievement of the United Nations’ Sustainable Development Goals (SDGs), an unprecedented global agenda for a more sustainable world by 2030. The SDGs include aspirations of clean water, sanitation, sustainable cities and communities, and more.

The CRCWSC creates a nexus between the challenges facing our cities and the opportunities for action



Locally, nationally, and globally, working towards water sensitive cities is incredibly timely: organisations big and small are rapidly aligning in their calls to action on water sensitive principles.

The CRCWSC’s plans for research adoption and tangible impact align with the Commonwealth Government’s vision for smart Australian cities and echo the priorities of agencies and governments across the country. On the international stage, the United Nations’ SDGs underscore the growing collaboration and momentum towards a water sensitive future.

3. The CRCWSC's role: visionary collaborators in urban water management

Transforming cities and regions into water sensitive, future-focused communities is a complex and exciting undertaking that requires genuine cross-collaboration.

Since 2012, the CRCWSC has been working with our 80+ partner organisations across the globe to revolutionise how the world's cities and towns conceptualise and use water.

In working with others, our actions reflect the following core values:

- We are **bold** in our aspirations for a more water sensitive future and we apply a creative, flexible approach
- We act with **integrity** by being open and transparent in everything we do, treating people with respect, and taking full responsibility for our words and actions
- We are **generous** in the way we listen to and work with others, and in sharing our experience, expertise and time.

Our thoughts and actions reflect our commitment to be *BIG* (behaving with Boldness, Integrity, and Generosity). By living our values every day, we aim to support *BIG*-inspired change in working with others to conceptualise, design, and deliver our future cities.

Our Mission

We **research** interdisciplinary responses to water problems, **synthesise** diverse research outputs into practical solutions, and **influence** policy, regulation, and practice to promote adoption.



Our founding partners include:

- Department of Communities (Housing)
- Department of Environment, Land, Water & Planning
- Department of Water and Environmental Regulation
- Melbourne Water Corporation
- Monash University
- South East Water
- The University of Queensland
- The University of Western Australia

Other partners include:

- Natural Resources Adelaide and Mt Lofty Ranges
- Blacktown City Council
- Brisbane City Council
- ChemCentre
- City of Boroondara
- City of Canning
- Fairfield City Council
- City of Gosnells
- City of Greater Bendigo
- City of Greater Dandenong
- City of Joondalup
- City of Kingston
- City of Mandurah
- Inner West Council
- City of Melbourne
- City of Melville
- City of Newcastle
- City of Port Phillip
- City of Subiaco
- City of Sydney
- City West Water
- Department of Planning and Environment
- DHI
- Technical University of Denmark (DTU)
- Eastern Metropolitan Regional Council
- eWater Limited
- GHD
- Greater Sydney Local Land Services
- Griffith University
- Hornsby Shire Council
- International WaterCentre
- Kellogg, Brown and Root (KBR)
- Knox City Council
- Ku-ring-gai Council
- LandCorp
- Maddocks
- Manningham City Council
- Moonee Valley City Council
- National University of Singapore
- Public Utilities Board (PUB)
- SA Water Corporation
- Department of Biodiversity Conservation and Attractions
- The University of Adelaide
- UNESCO-IHE Institute for Water Education
- University of Innsbruck
- Northern Beaches Council (formerly Warringah Council)
- Water Corporation WA

80+

Partner Organisations

Our organisational sectors:



Our small to medium-sized enterprise partners:

- e2DesignLab
- Bligh Tanner Consulting Engineers
- DesignFlow
- SPEL Environmental
- Urbaqua
- REALMstudios
- Water Technology
- ZiPu Environmental Planning and Design (Shanghai) Ltd
- Integrated Planning and Design (Shanghai)
- Citygreen Systems
- Alluvium Consulting
- Foundry Consulting
- Envirostream Solutions Pty Ltd
- Prentice Eco Systems Pty Ltd
- Biofilta Pty Ltd
- Josh Byrne & Associates
- Yarra Valley Water
- City of Unley
- Coliban Water
- Gilgandra Shire Council
- Flow Systems
- Strathfield Municipal Council
- Kunshan City Bureau of Planning
- Kunshan City Construction, Investment and Development Company
- City of Nedlands
- Southeast University
- Townsville City Council
- City of Gold Coast
- Southwest Jiaotong University
- Western Suburbs Regional Organisation of Councils

Research

In our first 5 years of operation, 314 researchers generated more than 1000 knowledge outputs across 4 programs: delivering social change; influencing urban planning through water; future technologies; and pathways for WSC adoption.

From technical guidelines and practical case studies to reports and articles, these outputs mean that we now better understand the challenges facing our cities – but also potential solutions to those problems. And the calibre of our research has been recognised by prestigious national and international journals and awards.

Our research over the next 4 years will build on the knowledge already generated. For example, work uncovering the health effects of urban heat, the ways in which water sensitive design can mitigate such impacts, and the community's willingness to pay for those benefits, are now informing the development of a new economic evaluation framework for WSCs. We will also ensure that existing knowledge is readily accessible, within Australia and globally, through useful guidelines, reports, training courses, and real-world case studies.



Synthesis

New knowledge often needs dedicated synthesis before it becomes useable on the ground.

For that reason, the CRCWSC has developed a signature Research Synthesis process: a unique method for drawing on WSC knowledge to generate practical ideas and designs for specific contexts. Collaborative, facilitated workshops provide the platform. With 15 examples to date and growing, our process has delivered innovative "Ideas for" projects in varied geographical, demographic, and climatic contexts, as well as different governance and institutional settings.

Already available for its partners to take up, the CRCWSC will now offer the Research Synthesis service to organisations across Australia and internationally as part of its commercial activities. The CRCWSC has also translated its research into tools that support action. For example, the Water Sensitive Cities Index is a tool that helps users to develop and implement WSC strategies. Another example is the Water Sensitive Cities Toolkit, an interactive software platform that captures CRCWSC research on planning and managing stormwater infrastructure for multiple benefits.

In the next 4 years, the CRCWSC will consolidate our suite of software, tools, and products to provide a common platform for easy access to those outputs.



Ideas for Aquarevo

The CRCWSC's Research Synthesis process facilitated new insights for Melbourne's Aquarevo, a 42 ha development site capturing industry-leading water sensitive innovations for residential settings. Jointly developed by South East Water and Villawood Properties, Aquarevo showcases research-based water and energy design in which each home needs about 70% less mains water than a regular suburban house.



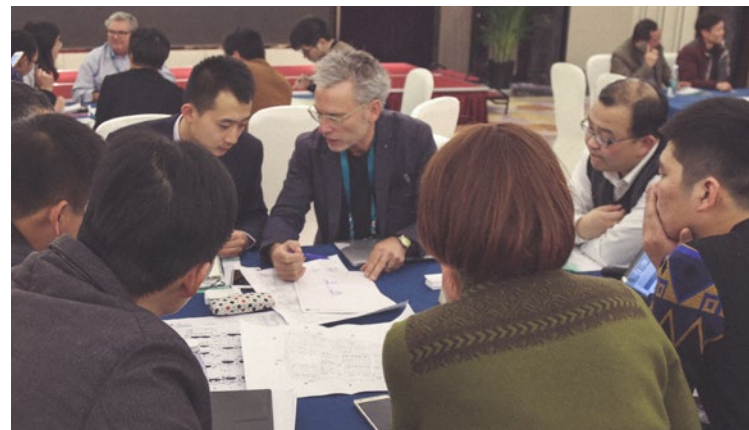
Influence

We advise the major players who shape our cities to adopt water sensitive solutions on local, national, and international levels.

In Australia, we help to shape and inform policies at municipal, city, and state levels – such as the Victorian Government's Water for Victoria plan. We also channel our knowledge, via advice, consultation, and products, into progressive new developments such as Aquarevo in Melbourne, the Bentley Regeneration Project, Perth, and Southbank, Brisbane.

Overseas, we are building capacity and research adoption in our "incubator city" of Kunshan, China, where 300 water sensitive city projects have been implemented in just 3 years.

We are fast cultivating our presence on a global scale. The Asian Development Bank has engaged the CRCWSC as a knowledge partner to "fast track" urban communities across the Asia-Pacific into better futures – and we are now embarking on an exciting project in Indonesia and Fiji to show that water sensitive approaches can revolutionise human health in the world's urban slums. We are also a member of the Australian Department of Foreign Affairs and Trade's Australian Water Partnership: a unique, long-term platform for further shaping global water perceptions and practices.



Water sensitive innovation in Kunshan, China

We have supported the City of Kunshan to become China's foremost example of urban water innovation. By building local confidence in water sensitive practices, our influence has created new business opportunities and jobs for Australian companies. And by fostering initiatives like an ambitious new A\$1B capital works program, we are enabling projects – from waterway restoration to flood infrastructure – that will field test new research and technology.

4. Outcomes for 2017/18-2020/21

Grounded in the achievements of the last 5 years, the CRCWSC will continue to collaborate extensively – but with a greater focus on translating research into tangible action and impact.

Over the next four years, the CRCWSC will further expand its reach by:

- Translating existing research gains into practical use by our partners, and delivering a further A\$15 million (cash and in-kind) in WSC research
- Providing strategic and technical advice for our partners' big projects in Australia and overseas
- Coordinating a national effort for research adoption and industry capacity building in WSC initiatives
- Establishing a “think tank” that will challenge conventional approaches to urban water cycle management
- Influencing government policies and regulations.

Backed by a science-based, integrated approach, the CRCWSC can add unique value to a global water sensitive movement by filling a niche function: we catalyse change by connecting organisations, people, and research to unify otherwise disparate efforts and foster synergistic impacts.

The CRCWSC's success over the coming four years will be measured by achieving the following 6 Outcomes:

- Industry is leading the on-ground implementation of WSC interventions because all parties recognise a water

sensitive approach as the best way to manage water in an era of urban growth and climate change

- Government and the industry workforce has adopted WSC principles and is developing implementation capability
- Water utilities, local governments, and private operators are equipped and motivated to operate WSC infrastructure and technologies
- Australia is recognised as a world-class provider of WSC research and development, education, technology, capacity building, and advice
- Enduring WSC partnerships and active national forums between government, industry, and research institutions are established and flourishing
- All major Australian cities are aspiring to be water sensitive, and at least one is recognised as a world leader in water sensitive urban design

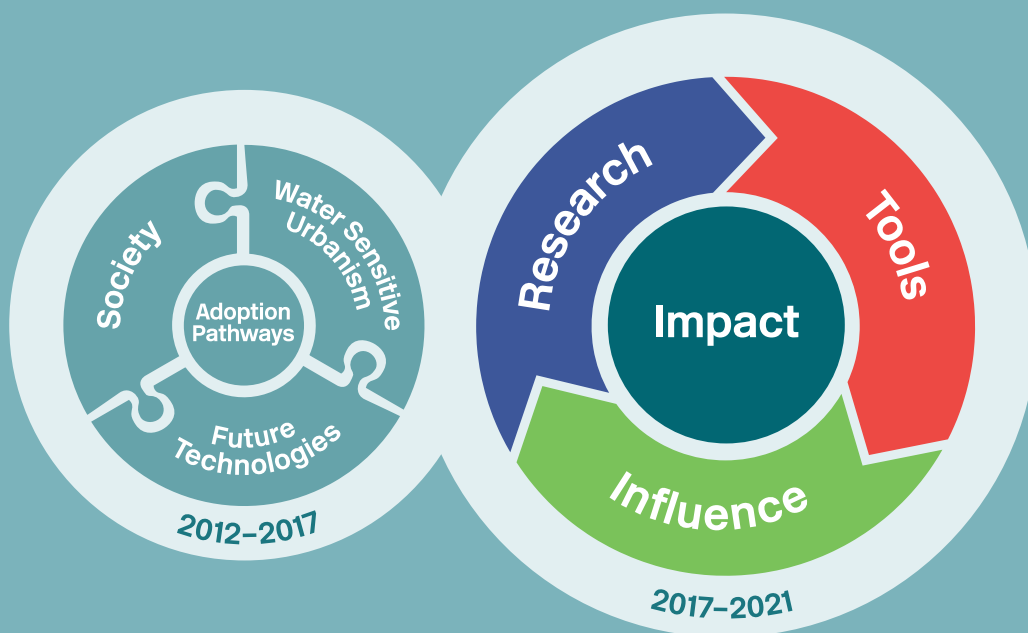
We have already generated substantial momentum, but achieving our mission into the future requires a clear set of actions. Accordingly, the CRCWSC has set itself a number of ambitious 2020/21 Objectives that address a core question for on-ground change: How can we mainstream knowledge and adoption to impact real-world problems?



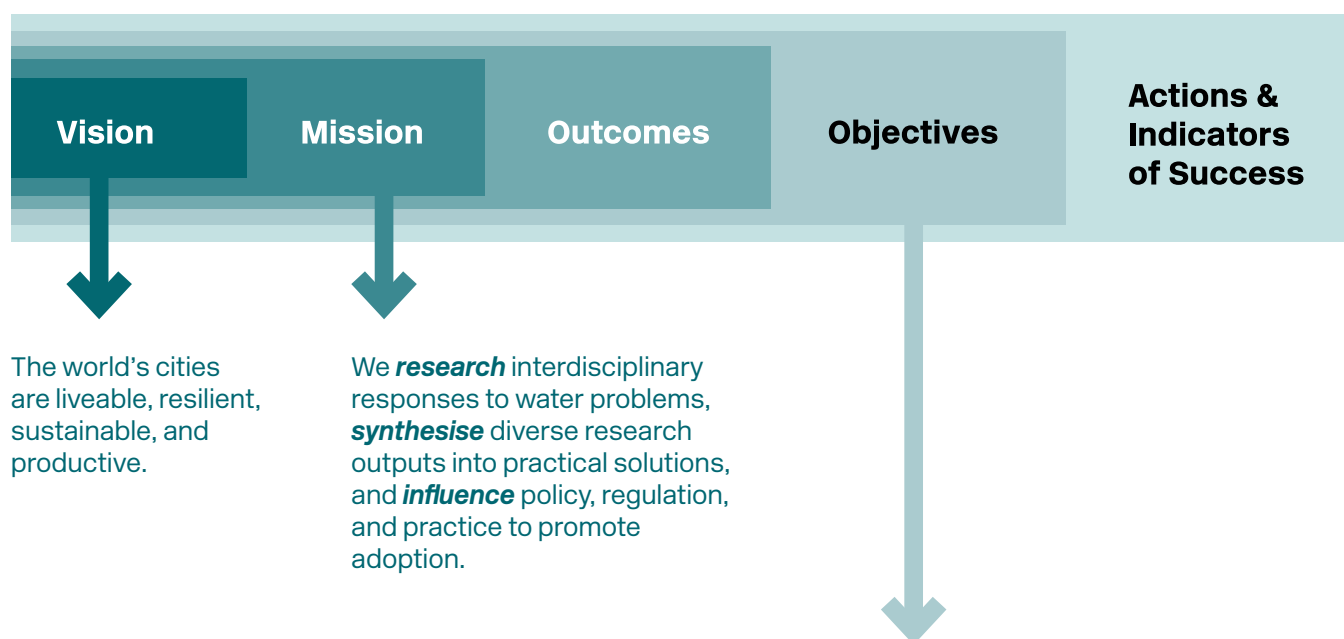
Growing from our previous Strategic Plan (2014/15–2016/17), the structure for our next 4 years will therefore centre on:

- Integrated Research Programs that combine diverse technical disciplines and existing research outputs to develop useful tools and products
- Enabling our existing partners to adopt the research
- Commercial development to expand WSC principles to new partners and locations, and to provide more options for individuals and groups seeking the knowledge and tools they need.

“We are moving into an exciting period of applying and testing our existing research outcomes via three themes that promote impact: Research, Tools, and Influence.”



5. Delivering our stated Outcomes 2017/18 to 2020/21



Objectives
National, state, and local government policy and plans recognise water sensitive city (WSC) principles and approaches
Communities have the capacity and are empowered to collaborate with: <ul style="list-style-type: none"> • City policy makers to develop a shared WSC vision and the policies and priorities to support its delivery • Water and urban planners to develop strategies and plans to achieve that WSC vision
To advise government policy makers so that national, state, and local policy and plans recognise WSC principles and approaches
The rules and regulations by which our cities are planned and developed actively support application of WSC principles
Investment and decision-making (business case) processes for urban development and water management adopt WSC principles and research
WSC best practice is implemented in the practices (tools and techniques) used by urban planning, architecture, water management practitioners, and the development sector to deliver WSC strategies and create the physical, social, and biological form of cities
Water cycle technologies are in use, and guidelines for their design, operation, and asset management ensure that WSC benefits are realised
Urban water services are provided in a more integrated, efficient, and effective way through practical demonstration of WSC principles and research
Public health and other benefits of WSC principles are demonstrated and communicated, together with lessons learned and future research needs

Actions & Indicators of Success

Research

- Cities/towns across Australia have WSC transition strategies and implementation plans that are informed by a broad range of scientific disciplines, and which are generating evidence of impact
- Research is incorporated into city-shaping decision support tools and products that aid city planners at all levels of government, as well as publicly owned water business and the private sector, to optimise local, regional, and city-wide investment and ensure sustainable growth (including urban infill)
- Integration of decision support tools has led to investment decisions that better reflect direct, indirect, and longer term community and environmental costs and benefits
- Local and state governments, utilities, private sector partners and the broader community have the new knowledge, tools, and guidance needed to plan, design, and deliver integrated WSC-based solutions in a practical, cost-effective way
- The benefits of innovative, whole-of-water-cycle technologies are demonstrated to support wider application or adoption
- There is conclusive scientific evidence on the public health benefits of applying WSC approaches

Adoption

- The CRCWSC provides thought leadership to national and international water policy and community debate through policy blueprint papers, advocacy, communications, and stakeholder engagement (including ministers, policy advisors, and key executives)
- WSC submissions are made to urban growth plans to influence and inform urban growth planning at state, city, and municipal levels
- State-based Regional Advisory Panels influence policy, build capacity, deliver transition strategies, inform future research, and support collaboration on local adoption of WSC principles
- A national mechanism (such as an internet portal and community of practice) is in place for the ongoing dissemination and application of WSC knowledge and research outputs
- A nationally coordinated and funded WSC Capacity Building Forum is in place for developing guidelines and training packages
- A WSC capacity and research adoption mechanism has been established to support urban communities across the Asia-Pacific region
- An enduring legacy exists to lead ongoing research, knowledge translation, and adoption of WSC principles

Commercial Development

- The CRCWSC has developed a portfolio of services that benefit its partners and stakeholders-at-large, and its commercial activities (national and international) have added unique value to the understanding and application of WSC principles
- CRCWSC participants, national peak industry bodies, the private sector, and government agencies understand the CRCWSC fee-for-service offerings available to support WSC projects
- Pathways are established for CRCWSC activities to impact developing countries and the aid sector; new incubator cities are established and host proof-of-concept WSC implementations that deliver applied insights for Australian practice
- By partnering with Australian government and multilateral organisations, the CRCWSC extends its influence and market reach in the international arena
- Research organisations see even greater value in partnering with the CRCWSC by enjoying increased visibility in its work and achievements, and through the CRCWSC's activities to secure new research funding and expand pathways for international impact
- The CRCWSC continues to create business opportunities for partners and industry, and supports emerging technologies and innovation

6. Creating a legacy for a water sensitive future

Securing a productive, sustainable future requires revolutionary shifts in how we plan and manage our water resources and cities.

Towards a shared vision of liveable, resilient, sustainable, and prosperous cities, the CRCWSC is committed to creating an enduring legacy and genuine, ambitious change beyond 2021.

We aim to ensure that:

- Australia continues to lead WSC research, collaboration, and application
- Institutions, tools, industry capacity, and culture are maintained to support the multidisciplinary collective adoption necessary for lasting change
- WSC principles are applied internationally to support local communities and return new lessons to Australia to enhance our capabilities.

The CRCWSC recognises and embraces that needs will change over time, and is committed to flexibly supporting our collaborators. We will continue to review the CRCWSC to ensure that our structure and function facilitates the best delivery on our commitments over the next 4 years, and positions our partners and communities for long-term success in water sensitive practices. With the CRCWSC's funding ending in 2020/21, we will also seek opportunities and partnerships to ensure the vital work we have started takes on its own life beyond 2020/21.

The promise of sustainable, resilient, productive, liveable communities is closer than ever before, and is a goal greater than any one institution. As we embrace our fast-emerging role of active catalyst and agent of change, the CRCWSC unites governments, universities, businesses, and their communities, by ensuring they have the knowledge and tools needed to design and deliver their own water sensitive city vision.



We envision future cities and towns that are sustainable, resilient, productive and liveable – a vision of water sensitive cities that everyone can make their own.



Our partnerships, experience, and research all enable our plan for catalysing knowledge translation and uptake, empowering others to realise their own water sensitive future.



*Kunshan Studio 2
MADA students credit:
M. Hurst, J. Pitts, T. Shallue, Y. Wang*



CRC for
Water Sensitive Cities

Cooperative Research Centre for Water Sensitive Cities



Level 1, 8 Scenic Boulevard
Monash University
Clayton VIC 3800



info@crcwsc.org.au



[@crcwsc](https://twitter.com/crcwsc)



www.watersensitivecities.org.au