CRC for
Water Sensitive Cities

ANNUAL REPORT 2014/15

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

CRC for Water Sensitive Cities
Annual Report 2014/15

Publisher

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Date of publication: April 2016

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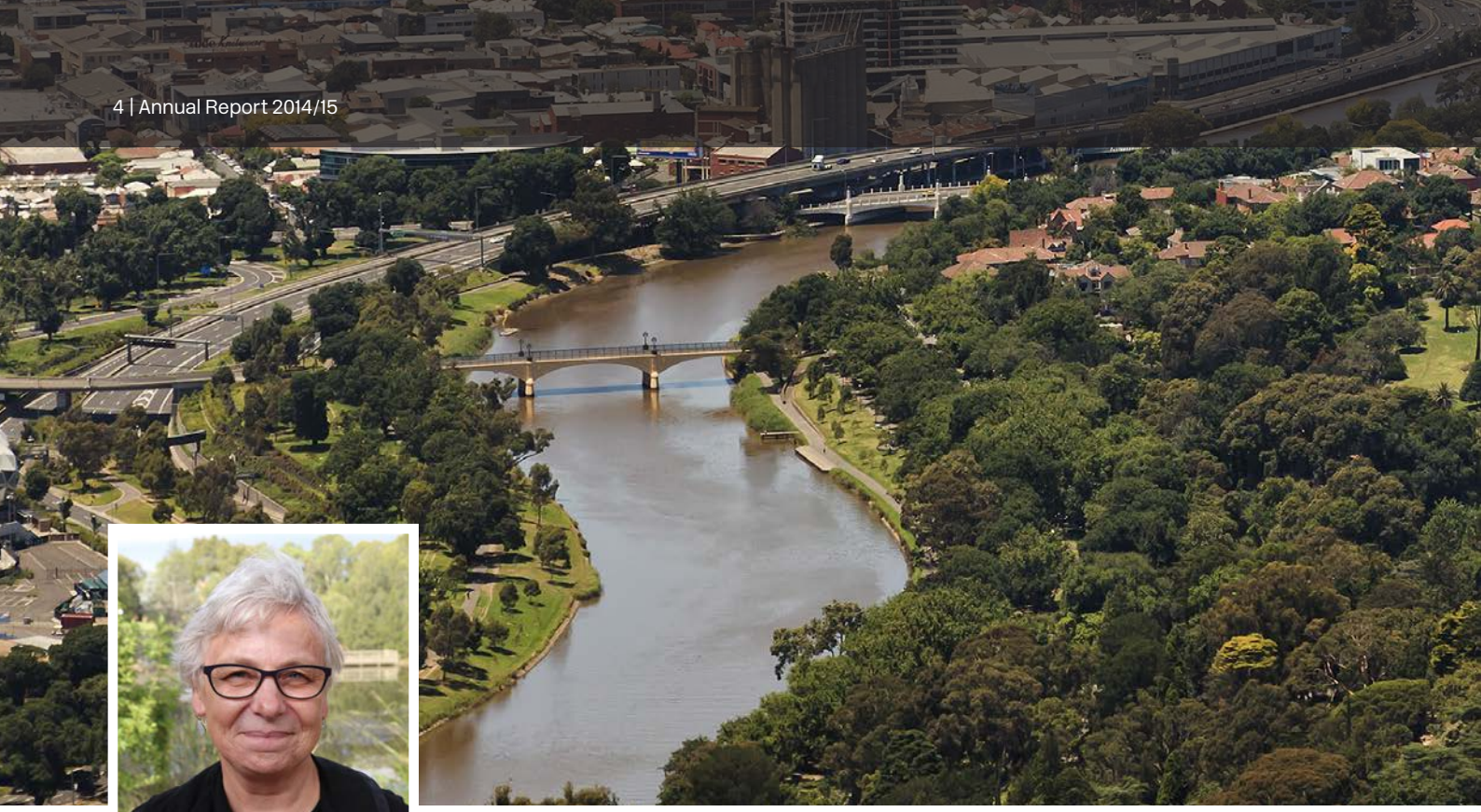


Message from the Chairman

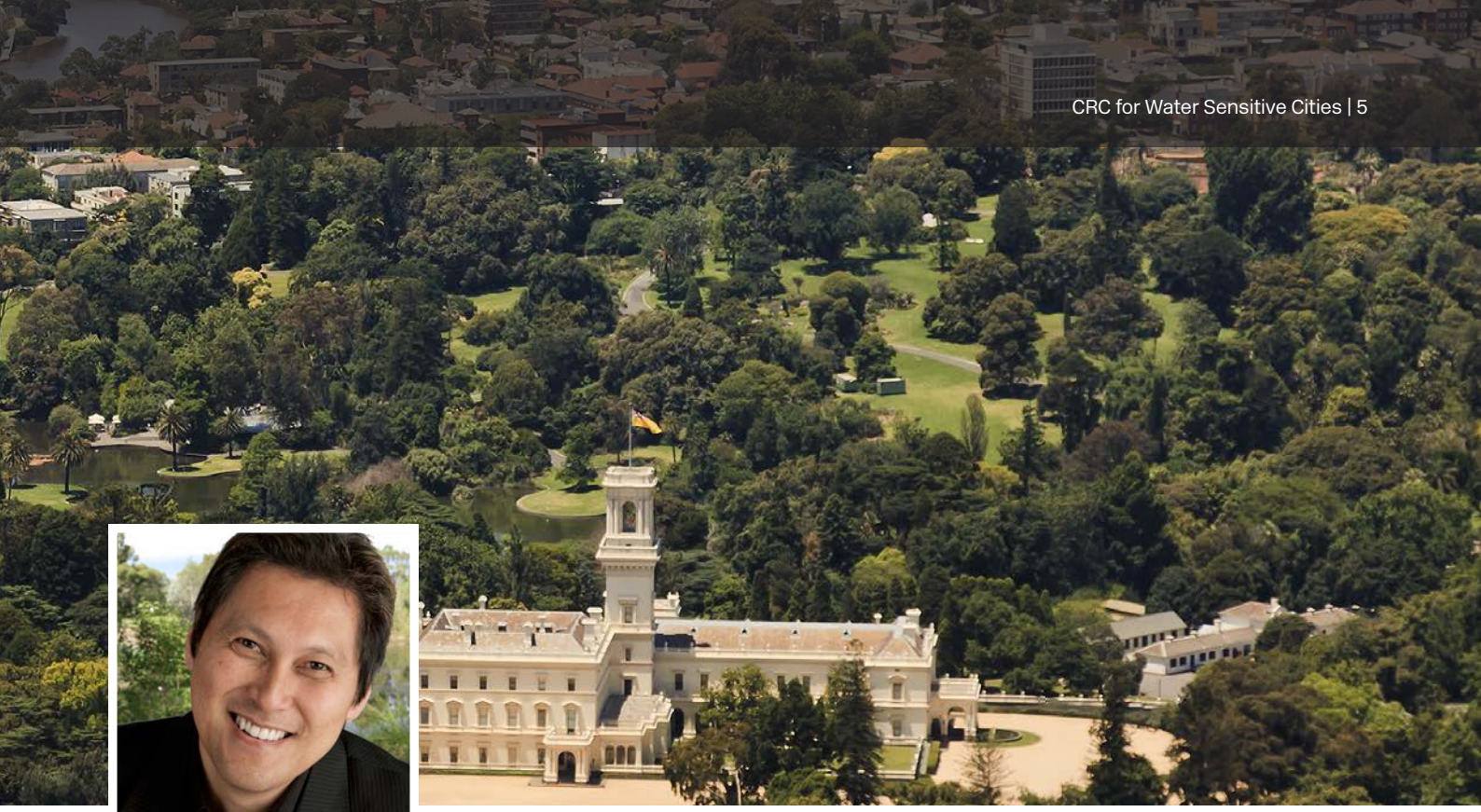
Building on firm institutional foundations and the sound governance structure we established in its first year, the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) has developed from strength to strength. All of our initial tranche of projects are well underway, and interim learnings and recommendations already influence the practice of our participants. It is especially pleasing to note how well our partnerships with stakeholders are translating hard science into real practice. Our involvement has already informed development of local government policies – notably at Marrickville Council and Warringah Council in New South Wales, the City of Boroondara in Victoria, and the City of Greater Geraldton in Western Australia.

In 2014/15 the CRCWSC operated with its full contingent of ten Board members. Elected by our participants, the members bring to the task a wide diversity of skills and experience – across the many sectors and geographies of our participants. The Board is highly motivated, committed to the vision and mission of the CRCWSC; and it enjoys an excellent working relationship with the executive group.

The Board has reviewed and refined research projects as they progressed to the final year of their activities to ensure continued alignment with industry needs, while maintaining a stable research environment in the face of shifting government priorities. Our Strategic Plan for the next three years of operation has a clear focus on ensuring impact: through industry collaboration in research, and adoption of research outputs and the Board are already discussing the scope of the 2nd tranche of projects to commence in FY1617. For their part, our industry partners are proactive in synthesising research outputs to suit their respective organisational needs. The Board continues to schedule its meetings across all its regions, meeting with local participants to understand practical issues that they face in the work of delivering water sensitive cities.

The Board is delighted to see net CRCWSC participant numbers continuing to grow even though the current difficult fiscal environment has meant that some of our founding participants had have to retire from the CRCWSC. We continue to attract interest of small to medium enterprises to our research translation activities, building industry-wide capacity for water sensitive practices. As our third year drew to a close the CRCWSC could boast a participant list of 85 organisations, along with a total of 221 researchers and 64 PhD candidates undertaking 34 research projects – all toward making water sensitive cities a lived reality.

Cheryl Batagol
Chairman



Message from the Chief Executive

The third year of the CRCWSC was about consolidation of research activities, developing productive connections among researchers and government and industry partners, synthesising interim research outputs, and influencing the projects and policies of our participants. During FY1415, we completed three Research Synthesis charrettes with our participants, for the Batavia Coastal Marina Stage 2, Fishermans Bend, and Bentley Revitalisation projects. We continue to influence state and local government policies on water management and water sensitive design, notably for Marrickville Council and the Victorian Government.

The CRCWSC came through with flying colours in the major review by the Commonwealth Government, demonstrating clear and significant return on investment to our participants. The review panel consisting of eminent researchers and practitioners selected by the Commonwealth Government concluded that "Overall it was clear that the CRC for Water Sensitive Cities' research delivers significant positive impact and benefits to the Australian urban water management industry". This is recognition of the 130+ tangible outputs from our 1st tranche of projects that have and will continue to deliver value to our partners and stakeholders-at-large.

A major highlight was hosting the inaugural Water Sensitive Cities Conference in October 2014, which was attended by more than 320 people from 55 participant organisations and 26 non-participant organisations, focused on aligning research insights with our industry and government partners; and with over one hundred representatives from participant organisations, these were considered resounding successes. We also convened successful researchers' and industry partner workshops in Perth in February 2015, which helped to connect local government and private business practitioners with some of the top researchers in urban water management.

The CRCWSC's international profile was further increased when the City of Kunshan became our first Incubator City in China, committing to "extensively using its future projects as incubators of new planning, design concepts, and technologies generated out of the CRCWSC", giving "the opportunity to test research concepts and findings at a city-scale". Two demonstrations are already being constructed in Kunshan. This early exposure in China prefigures many new pathways for marketing our approach to urban water management, particularly for commercial partners. We have also commenced engagement with the Asian Development Bank with the intention to form a strategic partnership that would significantly expand the adoption pathways for CRCWSC research.

In our fourth year we look forward to even more enhancement of CRCWSC's research activities, research synthesis with industry and government partners, and influencing their policies and practices. Our projects continue their timely delivery of insights and recommendations, and we are scheduled to undertake more research synthesis charrettes on our participants' projects across Australia.

Professor Tony Wong
Chief Executive

Executive summary

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) has successfully completed a major review by the Commonwealth Government in May 2015 with the review panel concluding that "Overall it was clear that the CRC for Water Sensitive Cities' research delivers significant positive impact and benefits to the Australian urban water management industry".

The review panel went on to commend the CRCWSC on its governance, stating that "Whilst the interdisciplinary nature of this CRC, and the large number of participants, could present a challenge for the leadership team, the CRCWSC's leadership, particularly from its Chairman (Cheryl Batagol) and CEO (Professor Tony Wong), has provided effective governance across this CRCWSC's broad remit. The CRCWSC's many collaborations are strong and deliver outcomes valued by end-users, which is a positive reflection of the leadership capability and efforts of the CRCWSC's CEO, Chairman, Board members and CRCWSC leadership team."

We see research excellence as a key ingredient and in January 2015 and appointed Professor Jurg Keller as Chief Research Officer to dedicate our efforts in maintaining and further improving our world class research. All projects underwent an internal mid-term review with a number of selected projects also subject to external peer review.

Collaboration is at the very heart of the CRCWSC. Projects have been specifically designed to facilitate collaboration with CRCWSC participants to foster collaborative research across the 13 research provider organisations and cooperation in the synthesis, communication and adoption of research outputs amongst all participants. The number of private enterprises and end-user organisations with an active involvement in delivering research outputs has increased in FY1415 to nine. While maintaining our high quality and level of achievements from our research activities, we have facilitated contributions from many of our end-user participants in (i) the synthesis of research outputs into context specific strategies and solutions; (ii) development and delivery of education and training courses; (iii) pilot testing of the water sensitive cities modelling toolkit; and (iv) development of a city-based institutional/agency vision of place-based water sensitivity through a series of five envisioning workshops that will ultimately support user-driven development of the next tranche of CRCWSC projects in FY1516, for commencement in July 2016.

Our research communication and stakeholder engagement is best showcased through the very successful inaugural Water Sensitive Cities Conference in Melbourne in October 2014. The Conference was attended by over 320 delegates, including non-participant delegates who paid to attend the forum devoted to showcasing CRCWSC research outputs, and discussions on their potential application by our participants. CRCWSC researchers collaborated with SME Associate Partners to run an industry training day immediately following the conference and 119 industry practitioners attended the six master classes and interactive training sessions. In total, we presented 151 capacity building and industry engagement activities in FY1415 that were attended by approximately 3095 participants and end-users.

Our PhD community continues to grow and we now have a cohort of 65 scholars involved in CRCWSC projects. Nearly 80% of all PhD scholars have some non-CRCWSC funding, which clearly demonstrates the high calibre of candidates our research program has been able to attract. Additionally, our postdoctoral and research fellow cohort has expanded further with 57 currently actively involved in our projects. These fellows are mostly early career researchers, which gives them an excellent base for their future development given the highly interactive, interdisciplinary and progressive nature of our research program.

The environment in Australia is currently one of fiscal restraint and this is beginning to impact on the CRCWSC, with the withdrawal of one Essential and one Other Participant during the period due to tightening budgets. In addition, five participants plus one SME Associate retired this year and a further five Other Participants have notified us of their intention to retire. On the flip side, nine new participants joined the CRCWSC and three others renewed their agreements.


KEEP CLEAR
LOADING ZONE

About the CRC for Water Sensitive Cities

The CRCWSC was established in July 2012 under the Commonwealth Government Cooperative Research Centre (CRC) Programme 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.

Our end-users include organisations that are participants in the CRCWSC, new Small and Medium Enterprise (SME) Associate Partners, governments, community groups and industry. As of 30 June 2015, the CRCWSC had 85 participants, of which eight are Essential Participants and ten are international organisations. Australian participants come from all States and Territories with the exception of Tasmania and the Northern Territory. Five SMEs joined the CRCWSC during the reporting period – three from Victoria, one from Queensland and one from Western Australia.

The CRCWSC exists to meet the challenges of three critical drivers affecting Australian cities and towns: population growth and the subsequent changes in lifestyle and values; climate change and variability; and changing economic conditions. Climate change gives rise to more extreme weather events such as droughts, floods, and heat waves. The collective urban water challenges and opportunities faced by Australian cities and towns is a good example of the inter-connectedness of the public and private sectors in affecting the economic productivity and growth of the country. For example:

80% **our cities generate 80% of net national income and they are also where most Australians work and live**

cities that are resilient to climate change and able to accommodate population growth will attract economic development

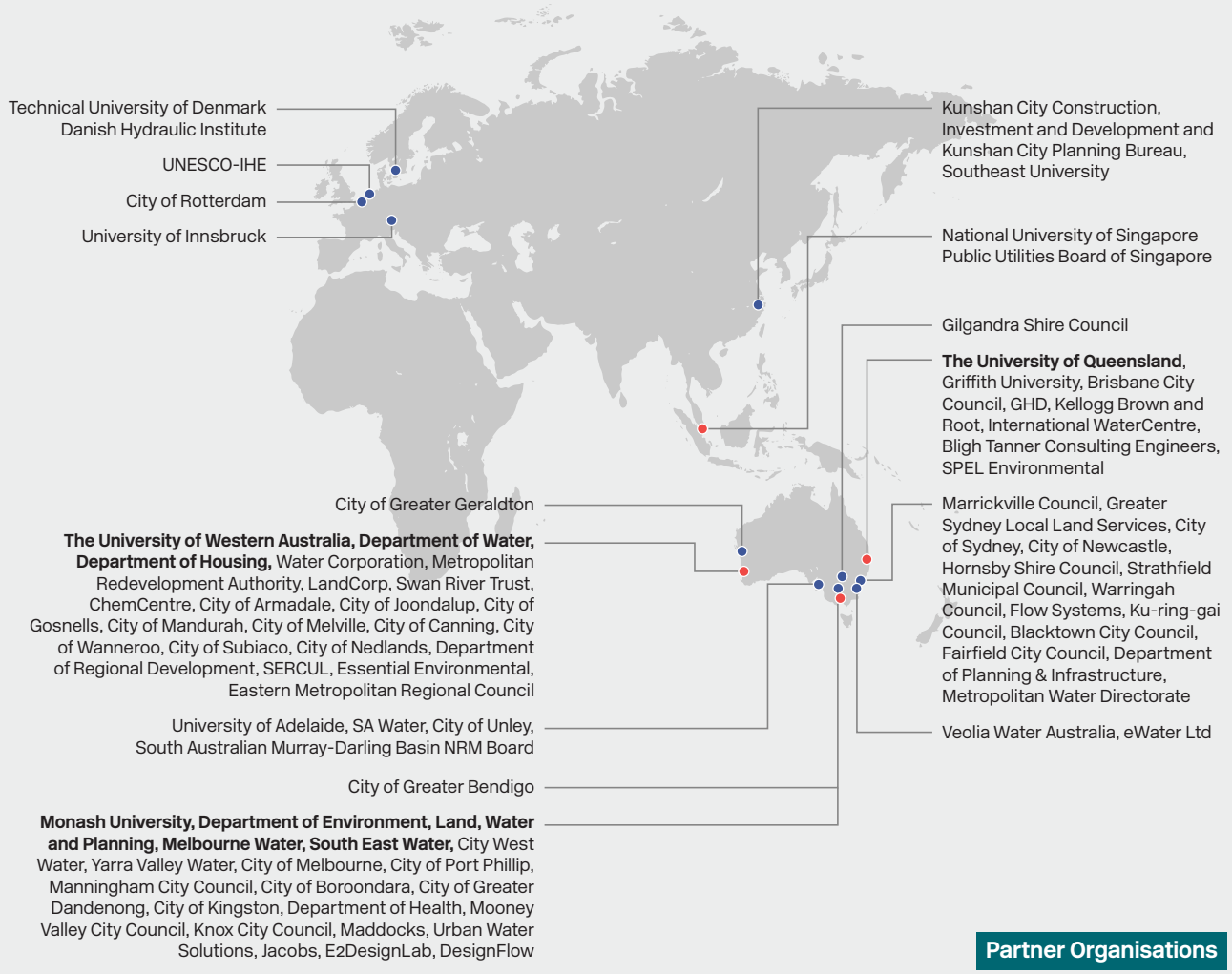
Australian cities are facing major population growth & geographical expansion that will exacerbate these vulnerabilities

continued expansion of centralised infrastructure provision is problematic (competing spending priorities, perceived/actual fiscal constraints, large lumpy capital expenditures with high risks of stranded costs)

a city's amenity and liveability are important in attracting the best people globally

effective urban planning, design, implementation and management are critical to economic performance – managing urban water exemplifies many of these challenges as reflected in recent episodes of:

- **reduced water supply security caused by droughts and increasing demands attributed to increasing population;**
- **increased flood vulnerability; and**
- **degrading environmental quality of urban waterways attributed to urban pollution;**



Partner Organisations

Our external stakeholders and end-users are public and private organisations in the following sectors:

- water infrastructure and services
- urban and land use planning
- housing and land development sector
- Local government
- State planning and regional development
- environmental protection
- education and training.

The urban water services sector is an important economic actor in its own right and its efficiency and cost effectiveness is important in maintaining secure and efficiently priced water services to businesses and communities.

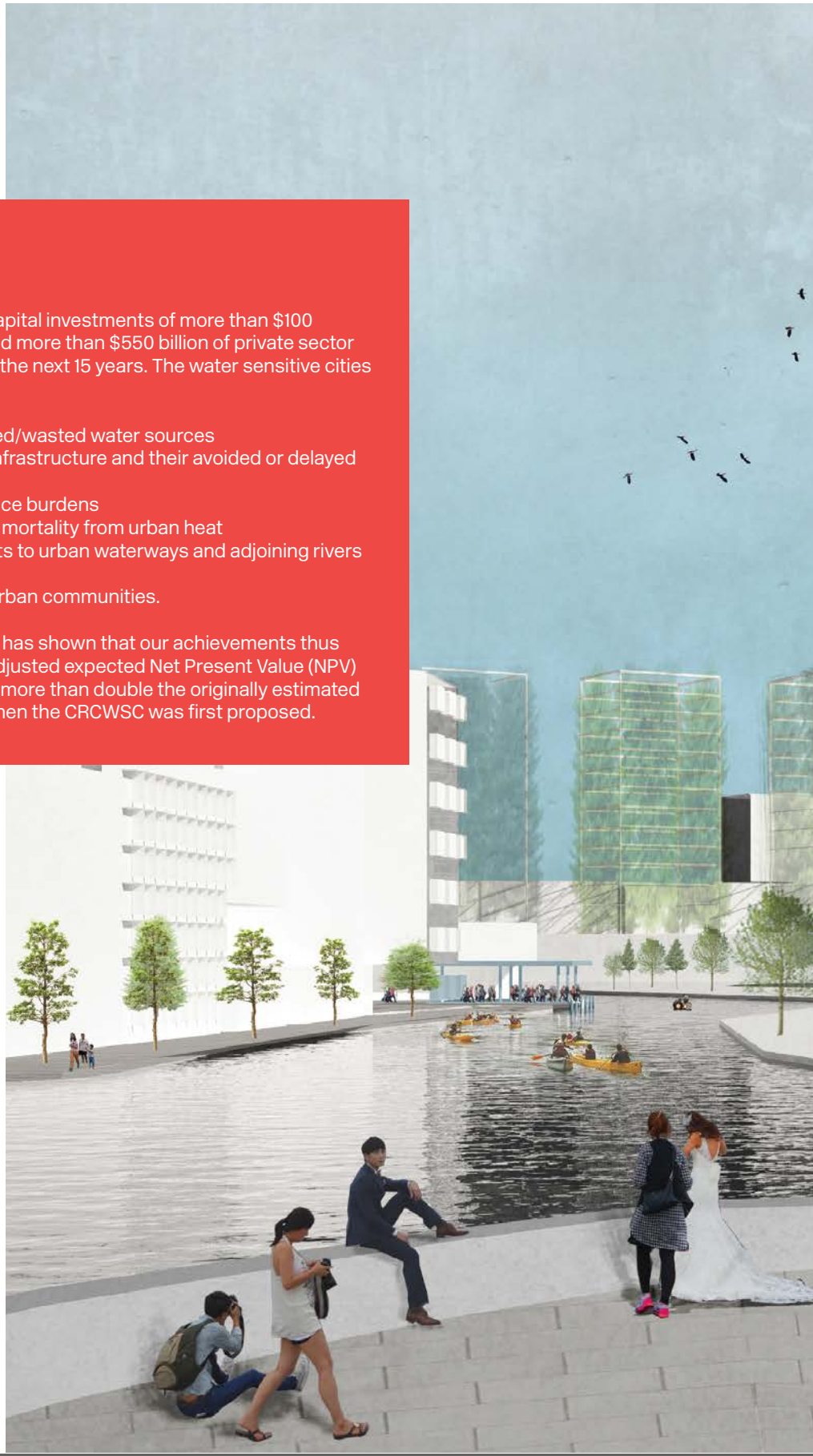
Organisation sector	Number
Community group	1
Local government	35
NGO or NFP organisation	2
Private company	14
Research organisation or university	10
State government department or agency	16
Water utility or corporation	7
Total	**85**

Impacts

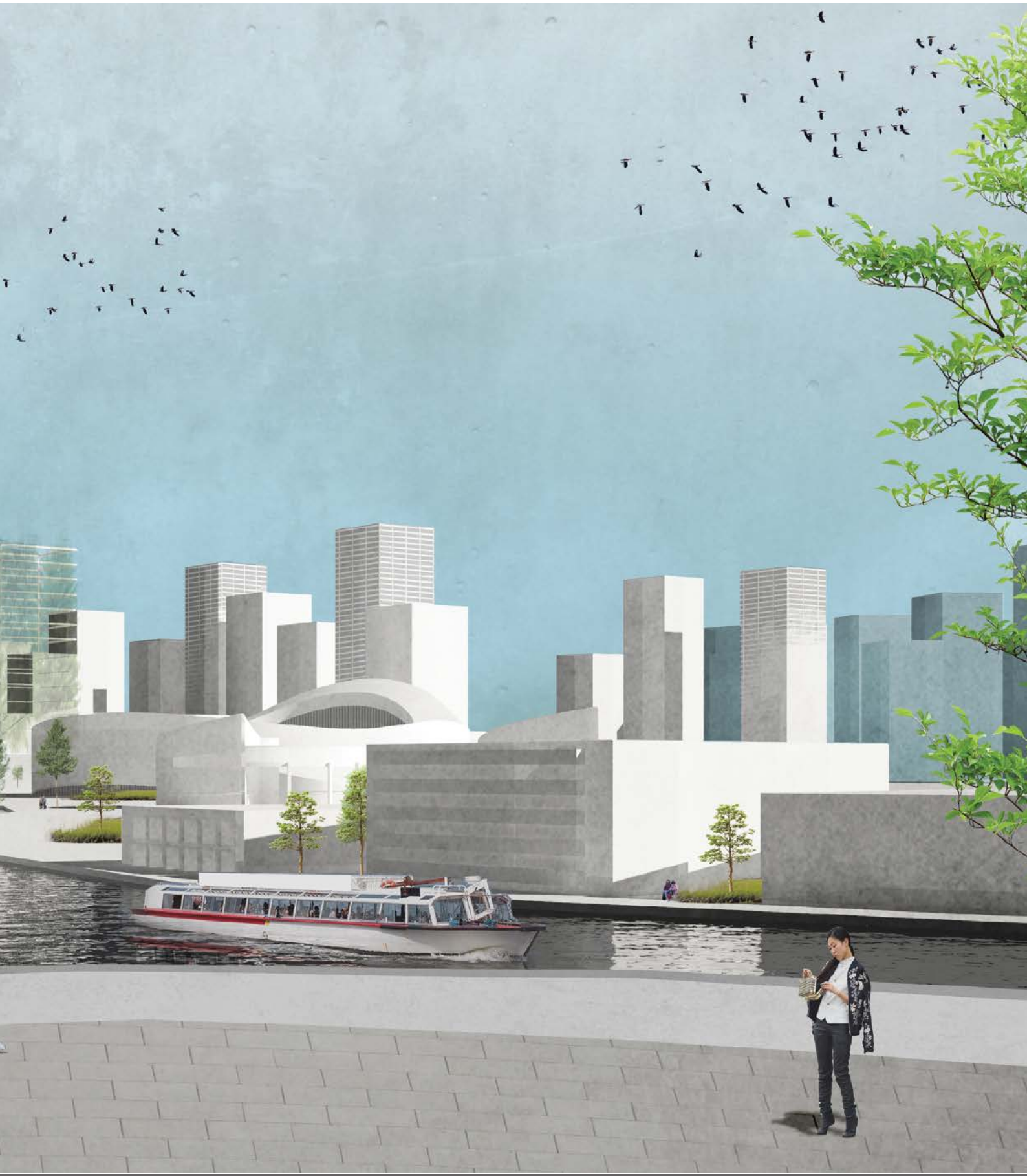
The output of the CRCWSC will guide capital investments of more than $100 billion by the Australian water sector and more than $550 billion of private sector investment in urban development over the next 15 years. The water sensitive cities approach will result in:

- More cost effective use of underused/wasted water sources
- Greater productivity from existing infrastructure and their avoided or delayed upgrade
- Reduced flood damage and insurance burdens
- Reduced community morbidity and mortality from urban heat
- Avoided or reduced restoration costs to urban waterways and adjoining rivers and bays
- Improved health and liveability for urban communities.

Our revision of the Impact Tool analysis has shown that our achievements thus far have led to an increase in the risk-adjusted expected Net Present Value (NPV) benefits to approximately $343 million, more than double the originally estimated expected NPV benefit of $165 million when the CRCWSC was first proposed.



Kunshan Studio: Wetland precincts



Research summary

The research program of the CRCWSC has progressed substantially in this third year with many projects now in their key delivery phase. During the 2014/15 financial year (FY1415), a total of 35 projects have been operating, with seven of them being successfully completed during this year.

The cohort of PhD scholars has further grown to 65 students, which far exceeds the initially projected numbers and is expected to continue at this level in the coming year.

With the emphasis of the research program shifting more towards deliverables and outcomes, it is pleasing to note that most Commonwealth milestones and expected project-level deliverables have been successfully achieved during the year.

The CRCWSC successfully completed a major review by the Commonwealth Government in May 2015, which highlighted the strong progress made since its beginning in 2012. The review particularly recognised that the *"interdisciplinary focus of the CRC is one of its key strengths, and was commented on by partners and Research Higher Degree (RHD) students as a significant point of difference offered by the CRC compared to consultancies and other research organisations"*. It also assessed the research outputs of the CRCWSC as *"strong"* and that *"all four research programs and associated projects are largely on track to achieve their milestones and outcomes as stated in the CRC's Commonwealth Agreement"*.

The review also identified a need to undertake an *"evaluation of existing projects ... to identify projects with commercial potential, and to map the path to market, utilisation and commercialisation for each of these projects"*. This evaluation has already been started in the current financial year with the project work plans and deliverables for FY1516 being assessed, and amended where required, in this context.

Participation in the research projects by CRCWSC Participants is based on matching complementary research and research adoption expertise amongst these organisations, striking a balance in ensuring meaningful research collaboration but also a critical mass of researchers based in any one institution. The level of collaboration across research participants remains consistently high. All but six of the 35 projects currently underway involve researchers from at least two participant organisations, with three projects involving participation from four or more organisations. The number of end-user organisations with an active involvement in research participation has also increased to nine. With most projects now in operation for their second or third year and some projects completed, many valuable deliverables are being generated.

Key highlights of the achievements from the research projects include:

- Our economics researchers have published research findings which found, based on empirical evidence from Perth, that houses with rainwater tanks attract a sale price premium of up to $18,000. This has implications for policy development to encourage rainwater tank installation, as it indicates that subsidies may not be required given the direct, and now demonstrated, economic incentives.

- The analysis of a large, national survey of more than 5000 participants undertaken in our Society Program found that the water literacy profiles across Australia vary considerably, but were overall quite limited, particularly in terms of people's knowledge of the urban water system. This clearly highlights the need for better information sharing and engagement to promote the emergence of 'water sensitive citizens' in the future.

- Our experts on urban heat effects have now evaluated the benefits of water sensitive urban design (WSUD) or green infrastructure features in reducing the induced heat effects in urban areas. It clearly shows that trees and green spaces have measurable benefits, and additional water will enhance these effects further.

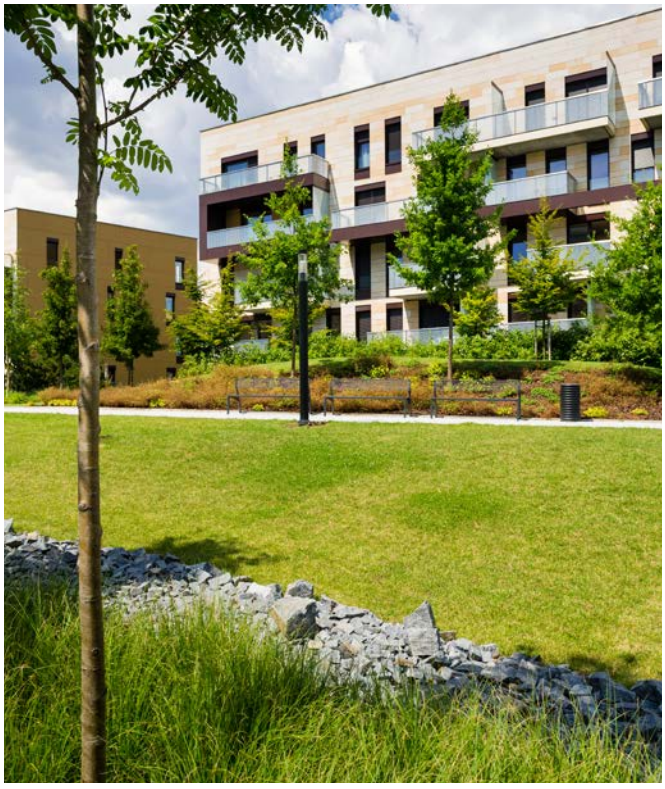
- One of the remaining Cities as Water Supply Catchments projects on stormwater characterisation has now completed a very comprehensive and detailed database of the physical, chemical and biological contaminants found in stormwater from different catchments. This will be a valuable resource for ongoing work on treatment and utilisation of stormwater for fit-for-purpose use.

- Our engineering researchers have successfully developed novel 'data mining' approaches to identify, based on distributed smart metering, that a large fraction of users (over 90%) can have leaks in their water supply system. Additionally, peak demand periods are often directly created by only few, large users, such as irrigators, and shifting their usage patterns can save 30% or more in peak water flows. This is creating significant benefits for water utilities and has generated major interest from local and state governments as well.

- Our Future Technology Program team has already proven, at the laboratory scale, a highly innovative and conceptually novel process to efficiently recover key resources from wastewater, while also generating a reusable effluent stream. The technology is gaining major interest from industry participants in the CRCWSC and will be demonstrated at pilot scale in the coming year.

- Our Water Sensitive Cities Toolkit has been completed as a first *Beta* version and is being tested in practice. It will be further expanded with additional modules as the research activities progress and will be an important tool for practitioners to access some of the key outcomes from the ongoing research program.

Different elements of the research program are increasingly being integrated in location-based case studies. The suburb of Elwood in Melbourne is such an example where challenges and opportunities around urban densification, liveability, flooding, stormwater management and alternative technology solutions are being considered in a cohesive way by researchers from five different projects across the CRCWSC.



"Our technical staff want to know the latest with biofiltration, which is particularly important if we want to reuse the water. That's the beauty for me; it's actually living the research in our day-to-day work. It sounds clichéd but it's really exciting, very motivating."

*— **Jan Orton**, Marrickville Council (NSW), on applying research to Council's capital works program.*

We have also considerably increased our PhD student cohort and during FY1415 we have had a total of 65 scholars involved in CRCWSC projects. This number is far greater than initially planned (the target was 28 at the end of FY1314), and this has been made possible due to the large number of candidates that have some or all of their scholarship provided by non-CRCWSC sources. In fact, nearly 80% of all PhD scholars have some non-CRCWSC co-funding, which clearly demonstrates the high calibre of candidates our research program has been able to attract. This is further supported by the remarkable statistics that 70% of our PhD students had at least one year non-academic professional experience prior to starting their PhD projects. The first four PhD candidates have already successfully completed their studies, with some continuing in some related projects as postdoctoral research fellows.

In FY1415, 18 students (11 full time and seven7 part-time) completed the module "Urban Futures: Delivering Water Sensitive Cities", as part of the Masters in Integrated Water Management (MIWM) managed by the International WaterCentre (IWC), a CRCWSC participant. Many students then undertook project-work, as part of fulfilling their Masters-degree program requirements, with CRCWSC participant organisations.

The Water Science and Engineering Program Committee of UNESCO-IHE have now approved two master's modules which will form the water sensitive cities specialisation of the Urban Water and Sanitation Masters – 'Water Sensitive Cities' and 'Water Sensitive Urban Planning and Design'. Both modules will be offered to international master's students in 2016 and will also be made available as professional not-for-degree training courses.

"It's very easy to 'blue sky' things, but then there is the reality that these ideas have to be delivered in an affordable and responsible manner. I think the CRCWSC and its research can help shape those parameters. We can work together to look at how we might be able to deliver environmentally sensitive communities, and do it in a way that might end up being cheaper than building them in traditional ways."

— ***Vernon Langdon**, CRCWSC Participant, Western Australia's Department of Housing*

Additionally, our postdoctoral and research fellow cohort has expanded further with 57 currently actively involved in our projects. These fellows are mostly early career researchers, which gives them an excellent base for their future development given the highly interactive, interdisciplinary and progressive nature of our research program. On the other hand, from the CRCWSC's perspective, it greatly enhances our ability to expand the skills and capabilities of these young, enthusiastic researchers that will generate valuable future capacity across the urban water sector. They will also be ideally placed to take on key roles among our large number of end-user and industry participants, again enhancing the overall capacity and uptake of the water sensitive city concepts and solutions.

We have also commenced the development of a rating tool to assess the water sensitivity of places at a range of scales, from a precinct to municipality to whole-of-city scale, based on the criteria of sustainability, resilience and liveability. The Water Sensitive Cities Index is developed with a web-based platform and user manuals to assist self- assessment by end-users.

Professor Jurg Keller
Chief Research Officer

Society Program

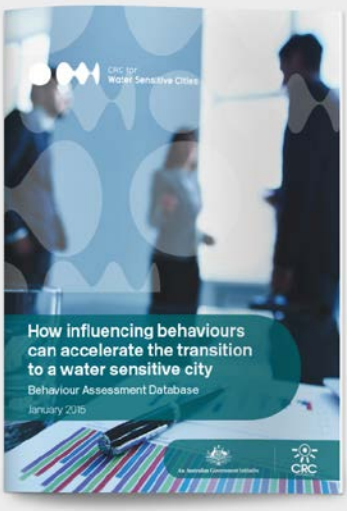
Program A

Understanding and delivering the social transformations needed to support water sensitive cities is the target of the Society Program (Program A). Focal points include community attitude and behavioural change, planning and development practices, economic valuation, institutional and urban water governance reform. There are 12 projects being undertaken in this program with all projects reaching a level of maturity with significant project outputs.

The economics projects undertook investigation into quantifying the non-market value of water sensitive practices including undertaking an investigation into community willingness-to-pay for a number of water sensitive initiatives such as water supply security, flood mitigation, improved waterway health and urban heat mitigation. There was clear evidence of community willingness-to-pay for better water management outcomes that are linked to higher resilience to climatic extremes and urban liveability. The team also examined the hedonic values of such initiatives in Perth, as highlighted in the previous section of this report.

Off the back of an extensive community survey of over 5000 respondents, the Program established the Behaviour Assessment Database to serve as a point of reference and tracking tool for researchers for understanding the impact of behavioural options as well as the likelihood of uptake by residents. Interestingly, the database also shows that water managers who interact with community members are good judges of impact and likelihood (comparison between their judgement and a survey of residents). The water behaviour typologies have significant implications for social marketing in promoting behaviour change resulting in various benefits to the broader society. Water managers can use the database and the typology to make informed decisions on the target audience (behaviour cluster) for behaviour change, and devise marketing strategies accordingly. It was also found that there are differences between water professionals' perceptions of water savings (by behaviour) and consumers' perceptions. These findings could be useful in informing practitioners about opportunities to communicate to their constituents about how to save water.

The projects investigating issues on reforms needed in governance, policy and regulation, highlighted the need for a better understanding of policy processes and how knowledge translation can assist in the uptake of research based evidence in order to achieve robust policy decisions, such as through more effective communication between the research community and the policy community. Across Melbourne, Brisbane and Perth, the current regulatory frameworks, supply options and institutional arrangements have been shaped in response to a conventional model of urban water management and service delivery. Yet these very frameworks and institutional arrangements may now be impeding innovation. The legal definitions of water, and the mechanisms employed to allocate and protect water resources, do not fully capture the variety of potential water sources available for exploitation. However, it was determined that restrictive regulation is not as significant a barrier to innovation as gaps within existing regulatory frameworks. In fact it was the absence, or insufficient clarity, of specific regulations that have created uncertainties and risk-adverse responses in industry. Enabling regulation can play an important role in providing certainty and lowering transaction costs and may also allow the risks of the new practice to be specifically allocated, and potentially shared, in more desirable ways.



"The CRCWSC program is about more than just research and development outcomes. The development of capacity in research partners provides ongoing support to the industry, and the active involvement of Melbourne Water staff in project design, implementation and even as researchers means better uptake of research outcomes."

— ***Ben Furmage***, *General Manager Corporate Strategy, Melbourne Water*

Water Sensitive Urbanism Program

Program B

With a focus on improving the sustainability and liveability of urban environments, projects in the Water Sensitive Urbanism Program (Program B) are aimed at a capturing the many aspects of urban water management including water security, flood protection, climate-responsive design, terrestrial and aquatic ecological landscapes, and productive landscapes. There were originally eleven projects in this Program, however two of the projects *Protection and restoration of urban freshwater ecosystems: informing management and planning* (B2.2 and B2.3) have subsequently merged to establish a stronger critical mass of researchers working on a common theme. The nature and maturity of outputs has varied across the Program because of the staggered start between and within projects.

Two of the projects which were legacy projects from the Cities as Water Supply Catchments (CaWSC) Program that preceded the establishment of the CRCWSC were completed this year, they are *CAWSC - Stream Ecology* (Project B2.1) and *CaWSC – Green Cities and Microclimate* (Project B3.1). A third project, *CaWSC - Urban Rainfall in a Changing Climate* (Project B1.1) is near completion.

Program B also commenced two additional projects. *Impact of climate change on extreme rainfall and drainage design* in Singapore (Project B1.3) which provides an extension of new methods developed in Project B1.1 for downscaling future scenario rainfall time series into tropical climatic regions; and *The design of the public realm to enhance urban microclimates* (Project B3.2) which builds on the success of Project B3.1. This project is aimed at linking urban micro-climate to WSUD in developing more micro-climate enhancing public open spaces.

Catchment scale landscape planning for water sensitive city-regions in an age of climate change (Project B1.2) is progressing well with the establishment of a conceptual framework for evaluating a city-region scale urban metabolism including a methodology for calculating and representing the water budgets across multiple landscape types in the three case study city regions of Greater Melbourne, South East Queensland and Greater Perth.

Concurrently, *Statutory planning for water sensitive urban design* (Project B5.1) has completed a comprehensive literature review of planning policy and legislation relevant to WSUD, focusing on Australian States and Territories and selected international exemplar jurisdictions as well as a comparative survey of statutory planning legislation, regulation and processes across five cities (Brisbane, Sydney, Melbourne, Adelaide and Perth).

Hydrology and nutrient transport processes in groundwater/surface water systems (Project B2.4) has generated strong and effective interactions with the end-users in the Perth region, namely with the Department of Water. This project has also secured additional external funding to the project.

The two flood-related projects, *Social-technical flood resilience in water sensitive cities – quantitative spatio-temporal flood risk modelling in an urban context* (Project B4.1) and *Socio-technical flood resilience in water sensitive cities – Adaptation across spatial and temporal scales* (Project B4.2), led by researchers in UNESCO-IHE and the Danish Technical University respectively are progressing well and their work is now progressively being integrated into other projects within the CRCWSC, notably the integrated Elwood flood resilience case study.

"A major strength of the CRCWSC is the broad economic and sociologic research that is being integrated into water sensitive urban design and integrated water cycle management. It is our view that this aspect of the CRCWSC is crucial to our continued improvement in water management in our cities and peri-urban areas. An additional benefit for us and other SME partners is the CRCWSC's activities internationally. These activities allow SMEs access to international markets. While the intellectual requirements to work in these international environments can be demanding, the satisfaction in showcasing Australian knowledge, innovation, and flexibility is also great exposure for us."

*— **Dr. Sara Lloyd and Dr. Peter Breen**, E2DesignLab*

Future Technologies Program

Program C

The Future Technologies Program (Program C) focuses on the use and integration of multiple water sources at a range of scales to support context-specific fit-for-purpose uses. Taking the perspective that a city is an interelated system this research will develop tools and techniques to manage urban resource flows, minimise waste streams and recover energy, nutrients and other valuable materials. The Program has seven projects all of which have commenced.

One of the CaWSC legacy projects, *CaWSC – Sustainable Technologies* (Project C1.1) was successfully completed with its final output being the publication titled 'Adoption Guidelines for Stormwater Biofiltration Systems'. The second legacy project entitled *CaWSC – Risk and Health: Understanding Stormwater Quality Hazards* (Project C1.2) is near conclusion having just completed a comprehensive and detailed database of the physical, chemical and biological contaminants found in stormwater from different catchments as highlighted in the previous section of this report. *Fit-for-purpose water production* (Project C1.3) commenced this year building on the foundation of Projects C1.1 and C1.2 to trial development of pilot-scale novel technologies for stormwater and greywater harvesting for a range of fit-for-purpose applications.

Another project to achieve continued success was *Resource Recovery from Wastewater* (Project C2.1). Early discussion on potential patent of the processes developed was undertaken and potential development partners sought. This project has also attracted significant external funding to supplement CRCWSC funding.

Managing interactions between decentralised and centralised water systems (Project C3.1) is also making significant headway having completed the development of the conceptual sewer sedimentation model, and the selection of modelling packages for the implementation of the conceptual sewer sedimentation model. Concurrently, experimental rigs have been constructed at the Luggage Point Sewage Treatment Plant in Brisbane to undertake experiments on the impact of water demand reduction on in-sediments reactions in sewers.

Integrated multi-functional urban water systems (Project C4.1) has commenced a pilot-scale trial of a biofiltration living wall in a building recently constructed in Melbourne where greywater, sourced from showers and hand basins, will be used to maintain the living wall while excess water will be cleansed through the biofiltration process of the wall for non-potable reuse.

Also highlighted in the previous section is the significant ongoing success in the work undertaken on 'data mining' approaches based on distributed smart metering. The initial trial of a new algorithm to rapidly assess water consumption pattern in Kalgoorlie has resulted in approximately 900 million litres of water savings, and had led to the Western Australian Water Corporation expansion of the application of smart water meters into the Pilbara region.

Adoption Pathways Program

Program D

The Adoption Pathways Program (Program D) aims to develop a long term partnership between government, industry, the water sector, and the community that is informed by the evidence drawn from our research and that is freely available, scientifically-rigorous, and open to public examination and comment. Demonstration projects and the development of decision-support and design tools are also key activities in the Program.

The Program aims to:

- build sufficient human capital with the appropriate skills, knowledge and capacity;
- establish the evidence and create effective decision support tools and frameworks to support the design and development and implementation of integrated and flexible or adaptive water sensitive city outcomes; and
- support the development of a long-term vision and strategic framework for water sensitive cities.

This Program currently has five projects with the *CaWSC legacy project CaWSC – Integration and demonstration through urban design* (Project D1.4) completed this year. The flagship demonstration project at Officer, on the reconstruction of Gum Scrub Creek which incorporated ecological sponges to manage hydrology, won a design excellence award from the Victorian Chapter of the Australian Institute of Landscape Architects in 2014, and more recently the Victorian Stormwater Industry Association award for Design Excellence.

In relation to building human capacity and capability, the project *Strengthening educational programs to foster future water sensitive cities* (Project D4.1) continues to deliver valuable outcomes in relation to providing contemporary postgraduate education with an additional 18 Masters students completing the CRCWSC coordinated Urban Water Futures stream offered through the International WaterCentre's Masters in Integrated Water Management (MIWM). Work also commenced with UNESCO-IHE to scope potential postgraduate offerings for a wider international market. To support the development of structured short courses aimed at government and private industry practitioners, an assessment of industry skills and knowledge needs was undertaken in Australia, The Netherlands, Vietnam and Bhutan. The needs assessments highlighted the need for a range of skills in collaboration, leadership and developing and capacity building and using persuasive business cases for water sensitive city approaches.

Researchers from *Urban Intensification and Green Infrastructure* (Project D5.1) have actively participated in a number of research synthesis charrettes where all of the relevant CRCWSC research knowledge is synthesised into context-specific solutions for specific development scenarios.

Development of an evaluation and learning framework to inform CRCWSC impact assessment (Project D6.1) has mapped the adoption and impact pathways of completed research activities from CaWSC and found there is an enduring legacy of research activities, under the auspices of the CRCs for Catchment Hydrology and Freshwater Ecology on Victorian Government policies - a legacy spaning over 15 years since the completion of those activities. The work has highlighted the many adoption and impact pathways that may not always be apparent, and the importance in nurturing these pathways well after the conclusion of the originating research enterprises.

Established in 2014/15, the new *Water Sensitive Cities Index Project* (Project D6.2) has delivered the initial conceptual framework for the index comprising a number of goals and objectives that represent overarching qualities related to water sensitivity. The objectives are measurable and are associated with a number of indicators that will be measured on a five-point rating scale. The prototype index and indicators are currently being tested with two local governments in Victoria. A Water Sensitive Cities Index website was also established to provide resources to councils engaged in the prototype development.

"Our investment in the CRC for Water Sensitive Cities is leading to tangible outcomes. Our Integrated Water Management teams in Sydney and Melbourne are currently participating in beta-phase trials of the CRCWSC Toolkit. This modelling package incorporates and synthesises many of the CRC's research outputs, and will be directly applicable to our clients and projects across Australia. We also have several staff that actively participate in the CRCWSC stakeholder reference groups, whether at a regional, program or project level. This direct contact with researchers and their work builds the industry connections needed for successful research and builds the capabilities our people need to be at the leading edge of our markets."

— ***Dr. Jeff Foley***, *GHD*

Education and training

In FY1415 the CRCWSC completed the revision of the Communication and Adoption Plan (Version 1) and released the draft Research Adoption Portfolio Plan (incorporating communication, education and training, and stakeholder engagement portfolios) for stakeholder consultation.

The Urban Futures Module as part of the Masters in Integrated Water Management that was co-developed last year with the International WaterCentre, was awarded a 2015 Stormwater Queensland Award for Excellence in Policy and Education. The module has been progressively refined to capture new insights and case studies derived from CRCWSC research. A new Masters module based on material derived from CRCWSC research has been developed and its incorporation into a UNESCO-IHE Masters program has been approved for commencement in 2016.

A review of industry training needs was undertaken and proposals for new short course programs completed. We consulted more than 120 industry practitioners to gain a better understanding of their capacity building needs for innovation towards water sensitive cities and revealed a stronger preference for professional short courses over new master's degree modules. A new structured short course program has been designed and is currently in development phase. The first course in the Water Sensitive Cities Innovation Skills series will focus on how to build a business case for water sensitive city related projects and programs.

In FY1415, 151 capacity building and industry engagement activities were hosted or co-hosted by the CRCWSC and were attended by approximately 3095 participants and end-users, including:

- 142 seminars aimed at end-users
- 9 structured training activities of half-day or greater.

As part of the inaugural Water Sensitive Cities Conference held in Melbourne on 21-22 October 2014, CRCWSC researchers collaborated with SME Associate Partners to run an industry training day. 119 industry practitioners attended six master classes and interactive training sessions.

SMEs have also been engaged to deliver training and capacity building activities to industry, both at the postgraduate (university accredited) level where SMEs delivered specialist seminars and hosted student special projects, and at the professional development (non-university accredited level) where SMEs have hosted various training programs such as designing and delivering a one-day masterclass on 'Optimising outcomes for integrated water cycle management projects' by E2DesignLab and the delivery of courses on 'Collaborative planning' and 'Leading high performing teams' by the International WaterCentre.

PhD and postgraduate education

The cohort of 65 PhD candidates consist of a strong multi-disciplinary mix, with a very large number of candidates coming from non-traditional science fields. A PhD and post-graduate coordinating committee support this large cohort. This self-organised, and CRCWSC supported, initiative engaged widely with the students in FY1415 to better understand the skills and capacity development needs of the cohort. A number of priority areas were identified and they have informed the design of skills development activities.

In October 2014, the second water leadership workshop on "Influencing and fostering creativity" was attended by 55 students and focused on:

- Power: the necessity to build power in order to exert influence, types of power, and strategies to build power with a focus on personal power.
- Influence: principles and tactics for exerting influence, strategies for planning significant influence attempts.
- Fostering innovation and creativity as an individual as well as within teams.
- Exploring these concepts within a real case study involving a leader in the water sector.

In FY1415, 18 students (11 full-time and 7 part-time) successfully completed their studies of the module "Urban Futures: Delivering Water Sensitive Cities", as part of the Masters in Integrated Water Management (MIWM) managed by the International WaterCentre (IWC), a CRCWSC participant. All students are junior to mid-career water professionals drawn from a range of disciplines and a range of organisations involved in the policy, planning and management of stormwater and other urban water services and systems. Domestic students are drawn from across Australia and include participants from local governments, state governments, federal government, utilities and consulting firms. International students are drawn from around the world from a mixture of utilities, local and State governments, and to a lesser extent, from consulting firms and non-government organisations. So far, students have come from Australia and countries including Bangladesh, Canada, Chile, China, India, Indonesia, Japan, Laos, Mexico, Namibia, New Zealand, Peru, Sierra Leone and the United States. All students also complete a one semester 'special project'. Many students undertook their project with CRCWSC participant organisations.

In FY1415, UNESCO-IHE received approval from their Water Science and Engineering Program Committee for two Masters modules which will form the water sensitive cities specialisation of the Urban Water and Sanitation Masters – 'Water Sensitive Cities' and 'Water Sensitive Urban Planning and Design'. Both modules will offered to international students in 2016 and will also be made available as professional not-for-degree training courses.

CRCWSC Participants Kunshan City Construction, Investment and Development and Kunshan City Planning Bureau in China sponsored a two-week long Masters-level architectural studio in Kunshan involving some 14 students from Monash University exploring opportunities for urban agricultural and ecological landscapes in a rapidly developing Chinese city context. This studio built on an earlier research synthesis charrette held in Kunshan to develop ideas for Kunshan to become China's first water sensitive incubator city for CRCWSC research outputs. To date, there have been a number of on-ground demonstrations of CRCWSC innovation, working in conjunction with CRCWSC SME Associate E2designlab.

Pathways for delivering impact

Synthesising research

During the year CRCWSC expanded its popular research synthesis activities. These activities are based on a charrette-style process where researchers and end-users come together to develop context-specific solutions to real world projects of our industry participants. They have proven effective at rapidly translating CRCWSC's research knowledge into innovative urban designs and infrastructure solutions for major urban developments in our major cities, and are in demand by our industry participants.

Research synthesis can be broadly described as a process of applying the CRCWSC's knowledge to specific on-ground contexts through case studies. Our industry participants nominate their projects as case studies on which research insights and outputs are applied to formulate practical world best practice solutions. The process offers a demonstration of the integration of research disciplines and the collaborative development of innovative solutions with end-user organisations. To date, most of the research synthesis charrettes have focused on the planning phase of water cycle planning and urban design at precinct-scale with case study areas ranging from 6ha to 10,000ha.

The design process is highly collaborative and involves multiple researchers from across our research projects as well as industry end users. The main outputs of these charrettes is the documentation of opportunities for innovation for the respective projects. The process itself fosters increased understanding and inter-connections between the many research disciplines, grounded through the practical adaptation of research outputs to current socio-technical considerations. These activities provide a tangible outcome for end users who have invested in CRCWSCs research as well as invaluable feedback to researchers on impact pathways.

During the year we completed a further five research syntheses charrettes across Australia, and covered a range of urban development contexts:

- Ideas for Batavia Coastal Marina Stage 2 (WA)
- Ideas for Bentley (WA)
- Ideas for Beverly and Kojonup (WA)
- Ideas for Fishermans Bend (VIC)
- Ideas for Ripley Valley (QLD)

Research synthesis activities are not confined to urban planning and development but are also relevant in the policy realm, where demand exists to capture and apply the lessons of research to new policy, regulation and governance initiatives by our end users. During the year we also convened a workshop directed at synthesising research outputs, scientific evidence and proof-of-concepts to aid the formulation of the business case for water sensitive practices, recognising that there are multiple beneficial outcomes that have a variety of market and non-market values. The outputs from the workshop were published in the document *Strategies for Preparing Robust Business Cases*, which now serves as a guide for end-users in the preparation of business cases for projects ranging from policy reform to water sensitive urban design works.

The Fishermans Bend project, in particular, highlights the extent of research-to-research, research-to-industry and industry-to-industry collaboration that can be initiated through the research synthesis process. This proposed inner-city redevelopment of a 252 ha site will require some $500 million of water infrastructure and attract some $30 billion of private sector investment, to accommodate around 120,000 residents. The research synthesis charrette involved the participation of the following Victorian CRCWSC

"Being part of a great research group such as the CRCWSC, with the capacity and expertise to examine uncertainties, is a hugely important part of building a water sensitive city. The strength is in the collaboration; there's an awful lot of power in that"

*— **Chris Tanner**, from SME Associate Partner Bligh Tanner*

Engaging with stakeholders

Participant organisations: Department of Environment, Land, Water and Planning; City of Melbourne; City of Port Phillip; Melbourne Water; South East Water and Department of Health. Thirteen CRCWSC projects had a direct input into the development of water sensitive innovation for the project. CRCWSC participant GHD provided consulting services to support South East Water's development of a water supply and sewerage servicing strategy. Furthermore, the synthesis of research outputs for this project even extended to low carbon precinct-scale and building design through our collaboration with the CRC for Low Carbon Living.

A comprehensive evaluation of the CRCWSC research synthesis portfolio of work was also undertaken in 2014/15 with the explicit purpose to enhance the quality and value of the activity to end-users and the contributing researchers. This independent review (in the sense that it was methodical and not conducted by the synthesis team) provided valuable insights that will shape the synthesis portfolio in 2015/16 and beyond. Interviews were undertaken with 19 individuals who had participated in one or more of the synthesis case studies completed to date. This evaluation identified a wide and varied range of benefits. In particular, interviewees indicated that value and benefits were derived from:

- multi-stakeholder conversations within a safe and neutral environment;
- involving high or senior level organisational representatives and stakeholders;
- generating novel ideas, and applying and testing research in real-world situations;
- the notion that organisations were not obliged to commit to any of the ideas discussed;
- the learning experiences offered by participation in the workshops; and
- raising greater awareness of the CRCWSCs research activities.

The collaborative workshop processes were well-regarded and perceived to have:

- furthered dialogue on alternative, innovative solutions;
- strengthened relationships between organisations; and
- developed capacity among a wide range of sector stakeholders.

The evaluation also showed that the synthesis projects can have a high impact in effecting actual changes in master plans, reports and designs. For example:

- The Aquarevo development now addresses urban heat island effects by incorporating street trees, open space, wetlands and green spines in its latest plan;

- The conceptual designs for Batavia Coastal Marina Stage 2 (BCM2) now address microclimate and water sensitive urban design principles.

We presented 151 capacity building and industry engagement activities in FY1415 that were attended by approximately 3095 participants and end-users.

Twice a year the CRCWSC brings together its 85 research and industry participants along with the various Research Advisory Sub-Committee and Stakeholder Advisory Sub-Committee members to share its research achievements and to focus on integration and application. In October, 2014 the CRCWSC held its inaugural Water Sensitive Cities conference. It was attended by approximately 320 leading researchers and industry champions and comprised 30 research presentations, four keynote presentations and ten industry-based panel discussions.

In February 2015, more than 170 participants from 38 CRCWSC participant organisations attended a combined Researchers Workshop and annual Industry Participants Workshop (IPW) in Perth. The IPW had a focus on sharing and discussing the research outputs associated with the first three years of effort. Special interactive sessions were also held to commence the discussion on how individual city areas and regions could transition to water sensitive cities using the new Water Sensitive Cities Index tool being developed in one of the research projects.

"...the collaboration that has happened between say the academic community, ... departments within the Victorian government, but also the water industry and the developers; how we've been able to sit around a table and share ideas and come up with some good aspirations that are probably a little bit innovative and challenging. And I think the heartening point has been the recognition of the large number of common outcomes that we share"

*— **Participant in a Fishermans Bend workshop**, on workshops enabling conversations to take place (Bos et al. 2015)[1]*

[1] *Bos, J.J., Farrelly, M.A. and Tawfik, S.S. (2015) Synthesis Project Review. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities*

Demonstration projects and research application

In addition to undertaking research synthesis activities in real development scenarios, the CRCWSC has a focus on working with our industry participants to demonstrate the delivery of outcomes over the long term.

In FY1415 the CRCWSC continued to worked alongside Places Victoria (formerly VicUrban) to help transform a 320 ha outer-urban site at Officer in South East Melbourne into a new residential neighbourhood and greenspace. The project involved the design and construction of ecological sponges to help protect and enhance the ecological values of the waterways. It showcased how the latest knowledge and integrated thinking can transform a narrow agricultural drain into an innovative multifunctional landscape that responds to the physical, environmental and social context of the site. This project won an Australian Institute of Landscape Architecture Award – Victoria award in 2014.

We have also worked hard to ensure individual research projects produce outputs that can have immediate impact for industry. Results are not only published in academic journals, key findings and the implications for end-users, are also incorporated into technical reports and industry practice or policy notes. These outputs involve industry stakeholders at all stages of the research, including development of case study and pilot project application and communication of outputs in a format that best suits industry need.

A few examples include:

- "A National Survey of Australia's' Water Literacy and Water-related Attitudes" (*Engaging communities with water sensitive cities* – Project A2.3) which establishes a baseline understanding of Australians' water literacy and provides insights for organisations developing water-related communication campaigns. More than 5000 Australians were engaged in the survey.
- "How influencing behaviours can accelerate the transition to a water sensitive city: Behaviour Assessment Database" (*Accelerating transitions to water sensitive futures* – Project A2.2) which creates a typology of water sensitive behaviours and strategies for designing behaviour change programs.
- "Adoption Guidelines for Stormwater Biofiltration Systems" (*Cities as Water Supply Catchments: Sustainable technologies* – Project C1.1) provides guidance for industry on how to apply the research findings in practice.

Influencing policy

Influencing policy outcomes forms another key aspect of the CRCWSC mission statement and recognises that long-term change will require water sensitive city principles to be embedded within all national and state government policy, regulations and supporting instruments. In FY1415, the CRCWSC continued to work with its key stakeholders to support their water policy reform activities, notably:

- the development and implementation of the former Queensland Government's WaterQ: a 30 year strategy for the Queensland water sector. The majority of its elements are supported by the new Queensland government; and

- the Victorian Government's various water and planning policies associated with the former and current government, including the current review and development of the government's Water Plan.

The CRCWSC was also invited to share its insights on sustainable urban water management at the G20 Leaders Summit and Global Café, organised to coincide with the G20 meeting in Brisbane. CRCWSC Chief Executive Tony Wong was one of 50 global and high profile thought leaders, and the only person on the topic of water, invited to speak at this event. A focus of his presentation was highlighting the need for a whole-of-government approach to integrating urban water system planning and management to fully realise the economic, environmental and social benefits of a water sensitive city.

Communicating our research

Research Project Fact Sheets were also prepared for each of the 35 research projects. Aimed at industry end-users, the fact sheets provided a basic overview of the research purpose and context, the key outcomes to be delivered, the project design and a summary of future work. Each fact sheet also includes a short case study of research application. Face sheets have been published in hard format in "Research 2012 to 2016" and available as individual fact sheets on our website.

In FY1415, the CRCWSC and its research participants published 164 publications including:

- 6 books and book chapters
- 46 articles in scholarly referred journals
- 34 refereed publications in conference proceedings
- 78 end-user reports
- 3 corporate publications:
- FY1314 Stakeholder Annual Report
- Research Report 2012-2016
- Strategic Plan 2014-2017.

CRCWSC publications available on the CRCWSC website were downloaded 7200 times[2]. The top CRCWSC publications downloaded were:

- 1136 downloads – Biofilters and wetlands for stormwater treatment and harvesting Report
- 655 downloads – Research 2012 - 2016 Report
- 480 downloads – Green Cities and Microclimate Report
- 464 downloads – Strategic Plan 2014-2017.

The CRCWSC has also invested core resources to communicate with our participants and stakeholders-at-large through regular newsletter, newsflashes, website and social media elements. Please refer to the News Section of our website.

[2] Statistics from Google Analytics (GA), does not include all publications downloaded, only reports tracked by GA. Reports downloaded from within the intranet were not included

International engagement

In FY1415, the extent of our external linkages have also expanded substantially from previous years. Our ongoing collaborative work in Singapore has led to engagement with the National Environment Agency of Singapore. Throughout the year the CRCWSC has been a destination on many inbound international delegation's itineraries and we are now hosting, on average, 2 international delegations a month, with delegations mainly from South America, China, South East Asia and more recently California, USA. In April 2015, we participated in a Victorian Government Education (& Research) trade mission to South America, visiting Santiago, Sao Paulo, Brasilia and Bogota. Many parts of South America are currently in the grip of significant prolonged drought conditions. Many cities, Sao Paolo in particular, are interested in the Australian story of drought – of how we overcame the pressures of drought and, more importantly, what we are doing to build our resilience to future droughts. The story and vision of a water sensitive city was a prominent one and while in Sao Paolo, our CEO was invited to speak at an international seminar on this topic. In Bogota, there appears to be a well-established appetite for a water sensitive approach to city planning for Colombia. The establishment for the CRCWSC was in fact featured in the Colombian magazine Social Innovation Review in August 2014. The article was entitled "Ciudades Sensibles al Agua".

The International Water Association's Cities of the Future program has its key vision of water security for cities through integrated urban design and service. This program is developing a series of "Principles of Practice" for the achievement of water security in cities and convened the Cities of the Future Symposium to develop these principles. The program of the Cities of the Future (CoF) Symposium was jointly developed by the CRC for Water Sensitive Cities and the CRC for Low Carbon Living, bring together the water-energy nexus in developing the principles of practice for water security. The CRCWSC contributed 13 papers to the Cities of the Future symposium and helped draft a communique for further development at the 7th World Water Forum (WWF) held in Daegu, Korea, in April 2015.

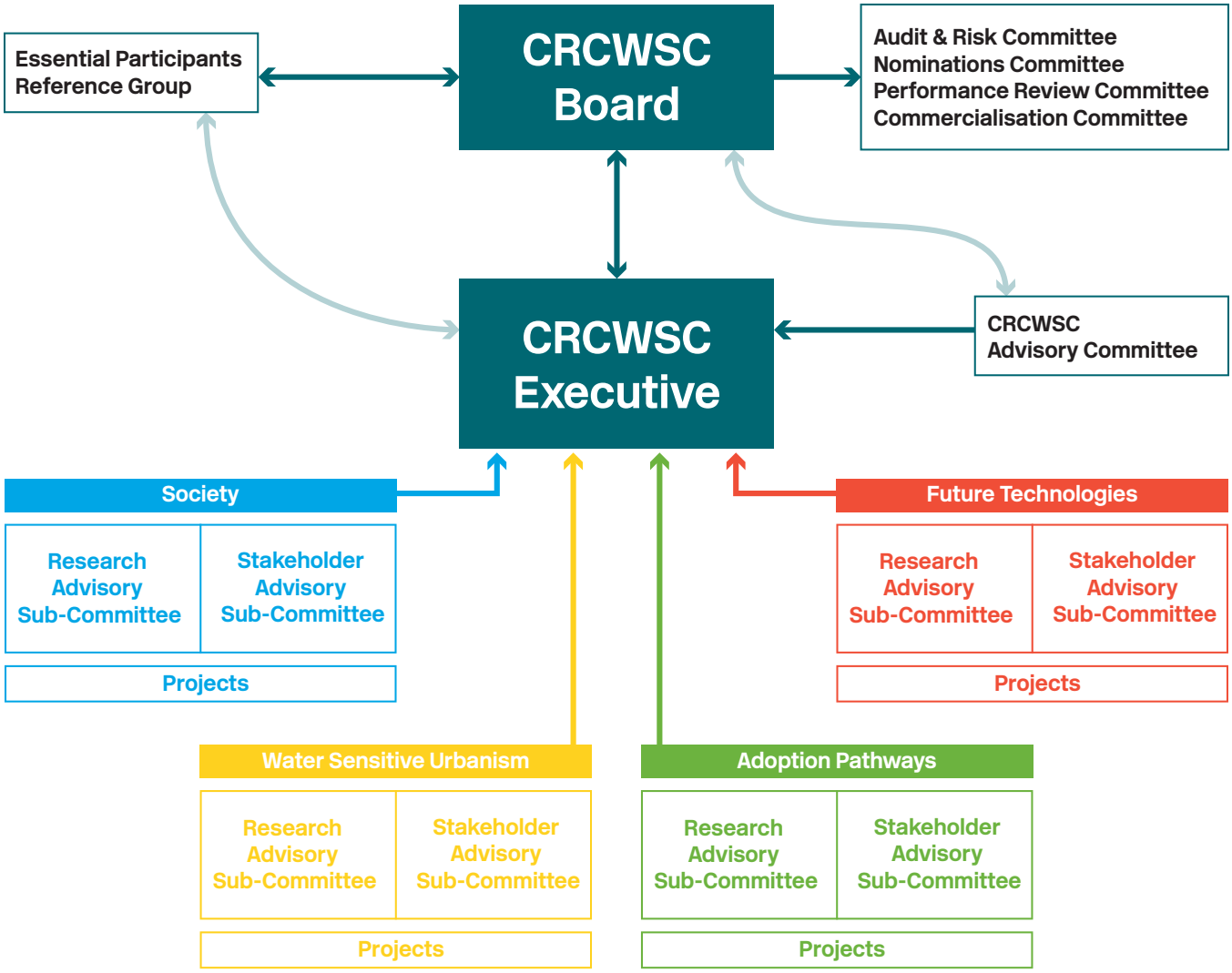
We also contributed to the 'International Workshop on Urban Adaptation to Climate Change' held in Beijing, China in September 2014. Wholly funded by the Asian Development Bank (ADB), the event was jointly organised by China's National Development and Reform Commission (NDRC) and the Ministry of Housing and Urban-Rural Development (MOHURD). The CRCWSC was the only international organisation invited to speak at the forum on resilient urban infrastructure.

We have commenced establishing formal partnerships with the ADB, the World Wide Fund for Nature in China (WWF-China) and the World Bank.

Governance

The CRCWSC is an unlisted public company limited by guarantee, incorporated and domiciled in Australia. The company was incorporated in Australia on 17 May 2012. It has been endorsed by the Australian Taxation Office for charity tax concessions effective from the 17 May 2012. The tax concessions are income tax exemption under Subdivision 50-B of the Income Assessment Act 1997, GST concessions under Division 176 of A New Tax System (Goods and Services Tax) Act 1999 and Fringe Benefits Tax (FBT) rebate under section 123E of the Fringe Benefits Tax Assessment Act 1986.

There were no governance or management issues experienced during the period.



Governance structure of the CRCWSC

Board

At the commencement of FY1415, the Board comprised a Chairman and eight Directors. The eight Directors were elected as follows:

- two by Research-based Essential Participants
- two by Non-research-based Essential Participants
- one independent by all Essential Participants
- three by the Other Participants.

The terms of appointment of all Directors were adjusted during FY1314, by shortening or extending them so that they all finish the day before the first meeting in the subsequent financial year. This was implemented to ensure continuity and to enable all vacancies to be filled simultaneously. Terms of individual directors are shown after their names, below.

The terms of office for the independent director and for Director A with financial qualifications nominated by the Other Participants, were completed in August 2014. Nominations were sought for these 2 positions: the Essential Participants renominated Kerry Stubbs for a further 3 year term, and the Other Participants renominated Dominic Dolan for a further 3 year term.

Barry Ball, nominated by Non-research Essential Participants resigned from the Board, effective September 2014 and took up a role on the CRCWSC Executive.

Michael Waller, nominated by Non-research Essential Participants resigned from the Board, effective December 2014.

Our constitution permitted the Board to vary the number of directors, and it decided to increase the allowed maximum number from 9 to 11 to allow for 2 additional appointments at the Board's discretion. This decision was supported by all but one of the Essential Participants. The Constitution was amended accordingly in August 2014 and the anomaly remains within the Essential Participants Agreement, allowed for in its drafting. One Director, Greg Claydon has been appointed directly by the Board.

With the resignation of Barry Ball and Michael Waller, there were two vacancies to fill, both through nominations by the Non-research Essential Participants. In addition, the term of one of the directors nominated by the Research Essential Participants, Rob Skinner, is due to expire in August 2015 and is up for nomination. The Board also has the discretion to appoint one further director if it feels the need to do so.

Another Director, Dominic Dolan, will, in August 2015, resign his employment with eWater, one of our Other Participants, hence become an Independent Director. During the year, the Board undertook the AICD's Not-for-Profit directors' one and a half day training course.

Board members

Cheryl Batagol
Chairman and Chair, Nominations Committee

Environmental Protection Authority (VIC)

Commencement: May 12 for 5 years
Status: Term expires Aug 17

Prof. Robert Skinner
Deputy Chairman

Monash University

Commencement: Aug 15 for 3 years
Status: Term expires Aug 18

Nicholas Apostolidis
Director, (incoming) Chair, Performance Review Committee

Independent

Commencement: Feb 13 for 3 years
Status: Term expires Aug 16

Barry Ball
Director

The University of Queensland

Commencement: Jul 13 for 2 years
Status: **Resigned Sep 14**

Greg Claydon
Director

Department of Water (WA)

Commencement: Aug 13 for 3 years
Status: Term expires Aug 16

Prof. John Dell
Director

The University of Western Australia

Commencement: Aug 13 for 3 years
Status: Term expires Aug 16

Dominic Dolan
Director

Formerly eWater Pty Ltd, independent as at Aug 15

Commencement: Feb 13 for 2 years
Status: Re-elected Aug 14 for 3 years

Stephen Frost
Director

Independent

Commencement: Feb 13 for 3 years
Status: Term expires Aug 16

Kerry Stubbs
Director, Chair, Audit and Risk Committee

Independent

Commencement: Nov 12 for 2 years
Status: Re-elected Aug 14 for 3 years

Mike Waller
Director, (now former) Chair, Performance Review Committee

Formerly OLV, now independent

Commencement: Aug 13 for 3 years
Status: **Resigned Dec 14**

CRCWSC Board Committees

Audit and Risk Committee

The Audit and Risk Committee assists in the discharge of the Board's responsibility to exercise due care and diligence in relation to the CRCWSC's corporate governance, financial reporting, and risk management. The committee holds at least four meetings per year, including one meeting in May to review the Annual Budget and one meeting in September/ October to review the Annual Financial Statements.

Committee meetings are attended by the CEO, the COO, the Finance Manager and annually by CRCWSC's auditor.

The Audit and Risk Committee met five times during the FY1415 year.

Kerry Stubbs
Chairman

Independent

Commencement: 01/11/2012

Science (social/humanities), business management, governance/board, communication, urban water management, policy, skill and capacity building

Cheryl Batagol
Member

Environmental Protection Authority (VIC

Commencement: 17/05/2012

Business management, governance/board, urban water management, catchment management, industry engagement

Dominic Dolan
Member

eWater Pty Ltd

Commencement: 28/02/2013

Accounting/finance, business management, governance/board, communication, industry engagement, skill and capacity building

Nominations Committee

The Nominations Committee oversees the nomination and selection of acceptable candidates for director positions and makes recommendations about the Board's succession plans.

It meets as required to discharge its obligations. The Chairman of the Board chairs the Nominations Committee, and its three members are nominated by the Essential Participants. The committee membership is four, the quorum is two and Board directors are eligible to be members as long as they are not due for election within the next year. During FY1415, two positions became vacant on the Nominations committee and the Essential Participants were asked to nominate committee members for election at the 2 February 2015 meeting. The Essential Participants nominated two new committee members for three-year terms, listed in the table below.

The Nominations Committee held two meetings in FY1415 to oversee the selection of the new directors and to nominate new members to their committee.

Committee meetings are attended by the Company Secretary.

Cheryl Batagol
Chairman

Environmental Protection Authority (VIC)

Commencement: 17/05/2012
Status: Term expires Aug 17

John Savell
Member

Department of Housing (WA)

Commencement: 17/05/2012
Status: Term expires May 16

Simon Want
Member

Office of Living Victoria (VIC)

Commencement: 17/05/2012
Status: **Resigned Nov 14**

Sara Harbidge
Member

Department of Environment, Land, Water & Planning

Commencement: 2/02/2015
Status: Term expires Feb 18

Ian Harris
Member

The University of Queensland

Commencement: 2/02/2015
Status: Term expires Feb 18

Performance Review Committee

The Board established this Committee in November 2013 and it met for the first time in February 2014 to establish its Terms of Reference and oversee the performance appraisal of the Chairman, a requirement in the CRCWSC Essential Participants Agreement. The Performance Review Committee's role is to provide advice to the Board about governance responsibilities on matters relating to board and Chair performance and to recommend performance targets for the CRCWSC and the CEO. The Committee retains oversight of the performance evaluation of both the Board and the CEO and the performance-based remuneration of the CEO. The Committee meets twice a year and additionally as it considers necessary, reflecting the performance target setting, assessment and remuneration cycle applicable to the Chair, Board, CEO and the CRCWSC's Operational Plan. The Committee met three times during FY1415 to oversee the performance appraisal and succession plan for the Chairman, to establish an external annual performance review of the whole Board, to oversee the performance appraisal and succession plan for the CEO and to establish the process to appraise the skill set of the board and develop a list of potential nominees to fill vacant Board positions

CRCWSC Executive staff do not attend the Committee meetings.

Nicholas Apostolidis
Chairman

Independent

Commencement: 28/2/2013
Status: Appointed Nov 13,
Chair 4 Dec 14

Cheryl Batagol
Member

Environmental Protection Authority (VIC)

Commencement: 17/05/2012
Status: Appointed Nov 13

Stephen Frost
Member

Independent

Commencement: 28/02/2013
Status: Appointed Nov 13

Prof. Robert Skinner
Member

Monash Water for Liveability

Commencement: 17/05/2012
Status: Appointed Nov 13

Barry Ball
Member

The University of Queensland

Commencement: 17/05/2012
Status: **Resigned Sep 14**

Mike Waller
Chairman

Formerly OLV, now independent

Commencement: 22/08/2013
Status: **Resigned Dec 14**

CRCWSC Executive

The CRCWSC Executive is responsible for the day-to-day management of the CRCWSC and for the successful delivery of the CRCWSC Strategic Plan, including the research programs and associated engagement with Essential Participants, Other Participants and other stakeholders. The CRCWSC Executive met monthly by teleconference and face-to-face during FY1415.

Prof. Tony Wong
Chief Executive

CRCWSC

Prof. Jurg Keller
Chief Research Officer (from Jan 15):

- Regional Executive Director: Eastern Region (to Dec 14)
- Acting Program Leader of the Society Program (from Nov 14)

The University of Queensland

Robyn McLachlan
Chief Operating Officer and Company Secretary

CRCWSC

Christopher Chesterfield
Executive Director – Strategic Stakeholder Engagement

CRCWSC

Barry Ball
Executive Director – Strategic Stakeholder Engagement (QLD), commenced Oct 14

CRCWSC

Prof. Rebekah Brown
Program Leader of the Society Program (to 30 Nov 14)

Monash University

Dr. Briony Rogers
Interim Deputy Program Leader of the Society Program (Program A) (from Dec 14)

Monash University

Prof. Nigel Tapper
Joint Program Leader of the Water Sensitive Urbanism Program (Program B)

Monash University

(continued)

(CRCWSC Executive, continued)

Prof. Darryl Low Choy
Joint Program Leader of the Water Sensitive Urbanism Program (Program B)

Griffith University

Prof. Zhiguo Yuan
Program Leader of the Future Technologies Program (Program C)

The University of Queensland

Fiona Chandler
Program Leader of the Adoption Pathways Program (Program D)
Executive Director – Communications and Adoption

International WaterCentre seconded to the CRCWSC

Jamie Ewert
Regional Executive Director: Southern Region (VIC/SA/TAS)

Melbourne Water seconded to the CRCWSC

Prof. Anas Ghadouani
Regional Executive Director: Western Region (WA/NT)

The University of Western Australia

Dr. Sandra Hall
Regional Executive Director: Eastern Region (QLD/NSW/ACT) (from Jan 14)

The University of Queensland

During FY1415, Professor Rebekah Brown was appointed the new Director of Monash Sustainability Institute and stepped down as Program Leader of the Society Program (Program A). Professor Brown will continue to lead two research projects but will cease to serve the CRCWSC at the Executive level. We thank Professor Brown for her considerable and valuable contribution to the CRCWSC.

In carrying out its duties, the CRCWSC Executive strives to foster research excellence, promote strategic stakeholder engagement, facilitate adoption of research outputs, ensure the growth and development of the CRCWSC and plan for its transition to a new entity when it finishes. This includes:

- Developing the CRCWSC's vision, mission and Strategic Plan with the Board and its three-year Operational Plan for approval by the Board
- Reviewing and approving all CRCWSC publications and presentations for quality, accuracy and potential Intellectual Property disclosure
- Undertaking major site-specific workshops for development/redevelopment idea generation and thought leadership resulting in hard copy reports that incorporate the CRCWSC's research outputs, promoting their adoption
- Maintaining strong participant and stakeholder links through monthly regional activities and biannual national activities, quarterly participant updates, quarterly newsletters and weekly newsflashes
- Conducting a strong PhD program to educate and train our graduates in all aspects of research practices as well as cross-disciplinary research training in the CRCWSC's research activities.

To facilitate the conduct of the CRCWSC Executive's activities, towards the end of FY1314, the CRCWSC established a portfolio management system – the operational portfolios were assigned with Board approval. The purpose is to improve the efficiency of the CRCWSC Executive as a whole and to create specialist working groups to provide a higher level of oversight into each of the key activities the CRCWSC undertakes. The annual budget has been allocated across the portfolios and each portfolio has a set of activities to be completed in the three year operational plan. The portfolios and their leaders are as follows:

- Research and Development – Jurg Keller with Program Leaders
- Synthesis – Jamie Ewert with Regional Executive Directors (REDs)
- Communication and Adoption – Fiona Chandler with REDs and Program Leaders
- Stakeholder Engagement – Chris Chesterfield and Barry Ball with REDs
- Education and Training – Fiona Chandler with REDs and Program Leaders
- Organisational Management – Robyn McLachlan and operational staff.

The CEO has ultimate responsibility and accountability across all portfolios. The portfolio team meets monthly a week prior to the monthly CRCWSC Executive meetings. The individual portfolio teams meet as required.

CRCWSC Committees

CRCWSC Advisory Committee

The CRCWSC Advisory Committee provides advice on research proposals and project performance, as well as on the effectiveness of program and project linkages, and on stakeholder needs. It comprises the Chairs of the Research Advisory Sub-Committees (RASC) and the Stakeholder Advisory Sub-Committees (SASC) of the four programs. The Committee reports to the CRCWSC Executive and informally to the Board. During FY1415 it met on two occasions and appointed a Chairman and commenced drafting its Terms of Reference. It will next meet in September 2015.

Committee meetings are attended by the CEO, the COO and optional attendance by other CRCWSC Executive members.

We thank all committee members, especially those detailed below who resigned during the year, for their valuable contributions to the CRCWSC.

Prof. Chris Cocklin
Member
Program A, RASC Chair
James Cook University

Prof. Peter Newton
Member
Program B, RASC Chair
Swinburne University

Prof. Paul Greenfield
Chair
Program C, RASC Chair
Australian Nuclear Science and Technology Organisation, Australia

Dr. Andre Taylor
Member
Program D, RASC Chair
Andre Taylor Consulting

Dr. Malcolm Robb
Member
Program B, SASC Chair
Department of Water (WA)

Krishna Seewraj
Member
Program C, SASC Chair
Department of Water (WA)

Ian Johnson
Member
Programs A, and D, SASC Chair
South East Water (VIC)

Research Advisory Sub-Committees (RASC)

These four sub-committees (one for each Research Program) provide independent appraisal of the quality and relevance of the research projects, and advice as to whether they are meeting milestones and delivering the expected outputs. The Chair of the RASC of each research program reports to and is a member of the CRCWSC Advisory Committee, which reports to the CRCWSC Executive. Each sub-committee met twice during the reporting period.

Society – Program A Research Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Prof. Chris Cocklin	Chair	Resources and environmental policy, agriculture and rural communities, global environmental change, sustainable development, and corporate environmental management, governance, research	James Cook University
Dr. Geoff Syme	Member	Social psychology, interdisciplinary approaches to policy evaluation, integrated assessment of catchment management policy, evaluation of small scale groundwater supply systems, monitoring community behavioural modification in response to climate change, planning for inter-generational equity	Edith Cowan University
Prof. Tom Kompas	Member	Public policy, applied economic dynamics, cost-benefit analysis, natural resource and environmental economics	Australian Centre for Biosecurity and Environmental Economics, Australian National University

Water Sensitive Urbanism – Program B Research Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Prof. Peter Newton	Chair	Sustainable urban development, design innovation, new urban technologies, sustainability, governance	Swinburne University
Prof. Nancy Grimm	Member	Streams, nitrogen dynamics, ecosystem services, technological services, urban socio-techno-ecological systems	Global Institute of Sustainability, Arizona University, United States
Prof. Glenn McGregor	Member	Synoptic climatology, climate and health, large scale hydroclimatology and climate and society	University of Auckland, New Zealand

Future Technologies – Program C Research Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Prof. Paul Greenfield	Chair	Chemical engineering, governance, higher education, biotechnology, wastewater treatment, economic evaluation of projects	Australian Nuclear Science and Technology Organisation, Australia
Prof. Gustaf Olsson	Member	Industrial automation, wastewater systems, power systems	Lund University, Sweden
Prof. David Sedlak	Member	Fate of wastewater-derived chemical contaminants in conventional and advanced wastewater treatment plants, fate of steroid hormones in the aquatic environment, chemical fate during groundwater recharge and in engineered treatment wetlands, metal speciation in soil and water	University of California, Berkeley, United States of America

Adoption Pathways – Program D Research Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Dr. Andre Taylor	Chair	Leadership, team development, facilitation, capacity building, urban water	Andre Taylor Consulting
Dr. Kevin Collins	Member	Social learning, natural resource management especially water resources, adaptation, and systems thinking and practice	The Open University, United Kingdom
Carol Howe	Member	Strategic analysis, water resource planning, wastewater residuals and water demand management, climate change impact analysis, sustainability performance measurement, transition management, stakeholder negotiation and capacity building	ForEva Solutions, United States of America
David Perry	Member	Communications, stakeholder engagement, business development	Bureau of Meteorology, Australia

Stakeholder Advisory Sub-Committees (SASC)

These four sub-committees liaise with stakeholders interested in each of the four research programs and provide context and support to the program leaders. They enable participants to influence the adoption, focus and progress of research projects within each research program.

The Chair of each Stakeholder Advisory Sub-Committee is a member of the CRC Advisory Committee, which reports to the CRCWSC Executive. Seven individual SASC meetings were held during FY1415.

Society – Program A **Stakeholder Advisory Sub-Committee**

Name	Role	Key Skills	Independent/ Organisation
Ian Johnson	Chair	Policy, resource management, integrated water management, economic regulation, strategic planning	South East Water (VIC)
Martin Allen	Member	Urban water policy, water sensitive urban design, stormwater	Department of Environment and Natural Resources (SA)
David Bell	Member	Organisation change, community engagement, corporate policy	Warringah Council (NSW)
Chris Evans	Member	Public policy, government, strategy, litigation	Department of Environment, Land, Water and Planning (VIC)
Ursula Kretzer	Member	Water policy, resource management, integrated water management	Department of Water (WA)
Reid McNamara	Member	Water management, policy, governance, sustainable development, stakeholder engagement	Metropolitan Water Directorate (NSW)
Peter Morison	Member	Research Fellow Monash, policy, governance	Melbourne Water (VIC)
Mike Mouritz	Member	Strategic policy, planning, urban regeneration, water sensitive urban design	City of Canning (WA)

Water Sensitive Urbanism – Program B Stakeholder Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Dr. Malcolm Robb	Chair	Water management, policy, catchment and waterways management, research	Department of Water (WA)
Rhys Coleman	Member	Melbourne Water, Senior Ecologist	Melbourne Water (VIC)
Ben Fallowfield	Member	Policy, stakeholder engagement, Local Government, sustainable development	Warringah Council (NSW)
Paul McAllister	Member	Leadership, project management, design, urban renewal, sustainability	City of Gosnells (WA)
Tim Meaker	Member	Catchment planning	Fairfield City Council (NSW)
John Savell	Member	Stakeholder management, governance, policy, stakeholder engagement	Department of Housing (WA)
Amelia Tendler	Member	Environmental social science, green roofs, and the water industry	Department of Environment, Land, Water & Planning
Jennifer Stritzke	Member	Swan River Trust, Environmental Scientist	Swan River Trust (WA)

Future Technologies – Program C Stakeholder Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Krishna Seewraj	Chair	Practical and technical understanding of water sensitive urban design, working knowledge of policy and planning frameworks in Western Australia, involvement in south west region long term water planning	Department of Water (WA)
Peter Adkins	Member	Swan River Trust, Environmental Scientist	Swan River Trust (WA)
Andrew Chapman	Member	South East Water, Water System and Technology Strategist	South East Water (VIC)
Dr. Jeff Foley	Member	Wastewater recycling and treatment, odour control, life cycle assessment, greenhouse gas emissions	GHD
David Hardy	Member	Civil engineering, wastewater and stormwater management, project engineering, drainage, water quality, environmental management systems	Melbourne Water (VIC)
Garry Henderson	Member	Process engineering, biological bioreactor design, research portfolio management, engineering management, risk management	KBR
Olof Jay Jonasson	Member	Environmental engineering, water sensitive urban design, stormwater harvesting systems, sewer mining, leachate reuse, raingarden and bioretention design, research	Ku Ring Kai Council (NSW)
Peter McCafferty	Member	Analytical chemistry, water, quality control, environmental analysis, innovation, high tech start ups	ChemCentre (WA)
Simon Wilson	Member	Water treatment, strategic planning, risk assessment	Veolia Water Australia

Adoption Pathways – Program D Stakeholder Advisory Sub-Committee

Name	Role	Key Skills	Independent/ Organisation
Ian Johnson	Chair	Policy, resource management, integrated water management, economic regulation, strategic planning	South East Water (VIC)
Ashis Dey	Member	Engineering, urban drainage modelling and system hydraulics, river engineering, published technical reports, lecturer	eWater Pty Ltd
Greg Ingleton	Member	Stormwater, recycled water, water sensitive urban design, environmental policy research and development, coastal water quality improvement	South Australian Water Corporation (SA)
Natalie Payne/ Keysha Milenkovic	Member	Stormwater management, sustainability, environmental education, urban design, water quality, community engagement	Blacktown City Council (NSW)
Tim Sparks	Member	Planning, urban water management, experience in Local, State and Commonwealth Government, drainage, water sensitive urban design, land use change, salinity and catchment management	Department of Water (WA)

Essential Participants Reference Group

The Essential Participants Reference Group (EPRG) was established to provide advice to the CRCWSC Executive and Board on the needs of the Essential Participants. It is made up of one representative from each of the CRCWSC's eight Essential Participants (as at 30 June 2015). Queensland Urban Utilities withdrew as an Essential Participant during FY1415 opting to invest in research directly to meet its specific needs. The representative from Queensland Urban Utilities has resigned and not been replaced, given that organisation's withdrawal from the CRCWSC became effective 31 March 2015.

The EPRG meets at least twice per year, in addition to an annual meeting with the Board and CRCWSC Executive, which was held in February 2015. The EPRG can also raise matters for discussion by the Board at its quarterly meetings.

EPRG meetings are attended variously by invitation by the CEO, the COO and members of the CRCWSC Executive.

Essential Participants Reference Group

Name	Role	Key Skills	Independent/ Organisation
John Savell	Chair	Strategy, leadership, urban design, strategic land planning, governance and management, project delivery and contract negotiation	Department of Housing (WA)
Sara Harbidge	Member	Water policy, governance and management	Department of Sustainability and Environment (VIC)
Ian Harris	Member	Strategic planning, research management and collaboration, business development, higher education, governance	The University of Queensland
Ian Johnson	Member	Policy, resource management, integrated water management, economic regulation, strategic planning	South East Water (VIC)
Dr. Peter Morison	Member	Stormwater policy and regulation	Melbourne Water (VIC)
Prof. Pauline Nestor	Member	Research partnerships, industry engagement, qualitative research and strategy	Monash University
Dr. Campbell Thomson	Member	Research, strategic planning	The University of Western Australia
Antonietta Torre	Member	Water engineering	Department of Water (WA)

Participants

The CRCWSC at 30 June 2015 had 85 participants:

- 8 Essential Participants
- 70 Other Participants
- 7 SME Associates.

The changes to participants since the end of the financial year are detailed below. The overall impact of the changes is positive as the contributions from new participants exceed the losses from withdrawals. Please refer to Appendix 1 for a complete list of CRCWSC participants as at June 2015.

Changes to Participants

New Participants and Partners in the FY1415 reporting period

- City of Nedlands (WA)
- City of Unley (SA)
- DesignFlow (VIC, SME Associate)
- Essential Environmental (WA, SME Associate)
- Urban Water Solutions (SME Associate)
- Gilgandra Shire Council (replaced Central West CMA, NSW)
- Hydrasyst (QLD, SME Associate)
- Jacobs Group (VIC)
- Southeast University (China)
- Strathfield Municipal Council (NSW)
- Flow Systems (NSW)

Renewed agreements

- City West Water (VIC), effective 1 Jul 15 to 30 Jun 18
- Swan River Trust (WA), effective 1 Jul 15 to 30 Jun 18
- Urban Water Solutions (VIC, SME Associate)

New participants and Partners since year end

- City of Townsville (QLD)
- Water Technology (VIC, SME Associate)
- XiPu Environmental Planning and Design (Shanghai), Ltd (China, SME Associate)

Withdrawals

- Queensland Urban Utilities, effective 31 Mar 15
- Department of Environment, Water and Natural Resources (SA), effective 31 Dec 14

Retiring Other Participants

- Urban Renewal Authority (Renewal SA), effective 30 Jun 14
- Adelaide & Mount Lofty Ranges NRM (SA), effective 31 Dec 14
- National Water Commission (ACT), effective 31 Dec 14
- Places Victoria (VIC), effective 31 Dec 14
- City of Vincent (WA), effective 30 Jun 15

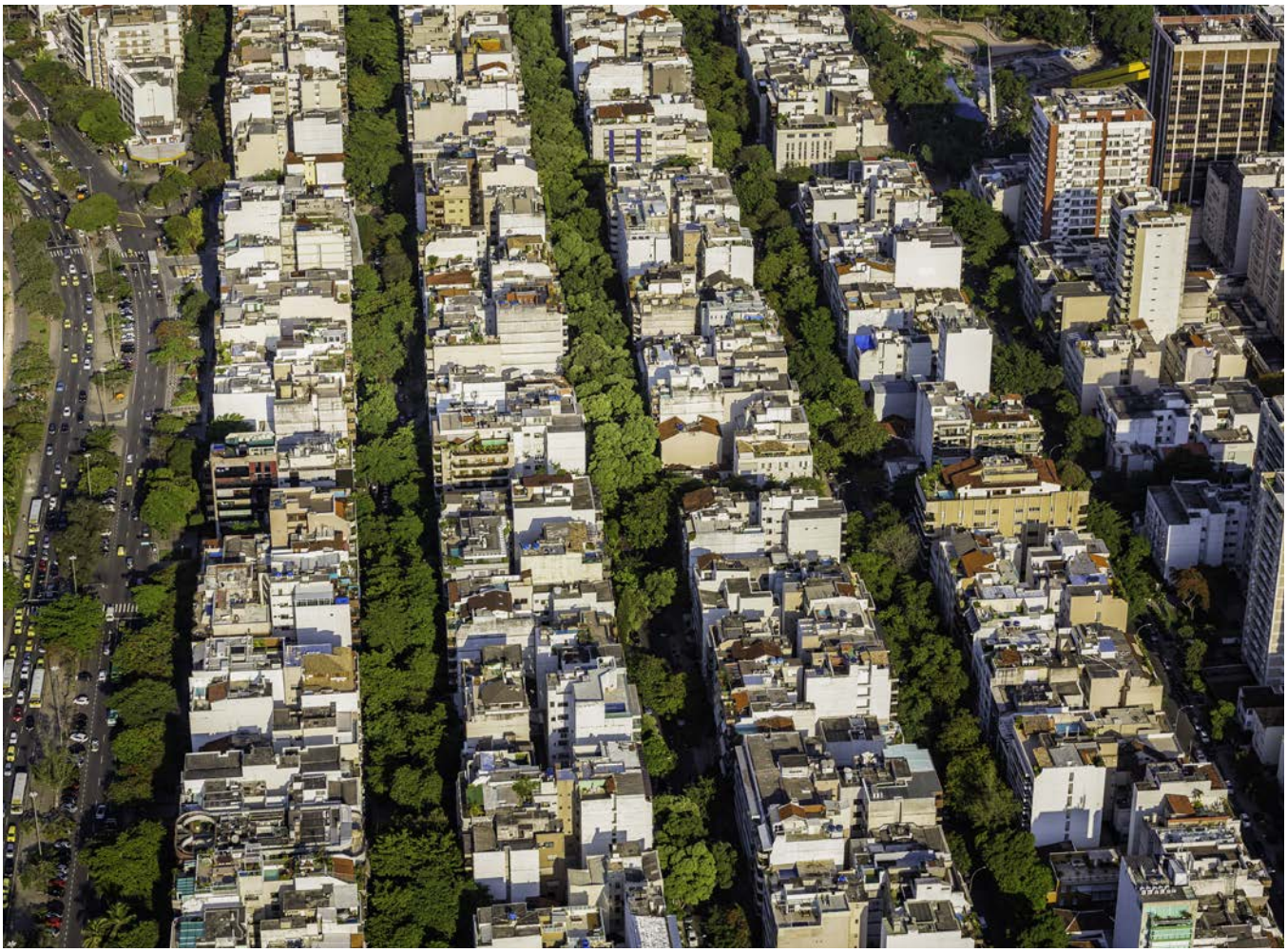
Retiring SME Associate

- Hydrasyst, effective 30 Jun 15

Notification of intent to resign

- City of Armadale (WA), effective 30 Jun 15
- City of Geraldton (WA), effective 30 Jun 15
- City of Wanneroo (WA), effective 30 Jun 15
- SERCUL (South East Regional Centre for Urban Landcare) (WA), effective 30 Jun 15
- South Australian Murray Darling Basin NRM, effective 30 Jun 15.


LOCALE



Financial Management

The CRCWSC has now completed its third full year of operational activity and no significant financial issues arose during the year. Income for the year ended 30 June 2015 was $11.11 million, with total expenditure of $11.11 million. The audited balance of funds at year end was $1.20 million.

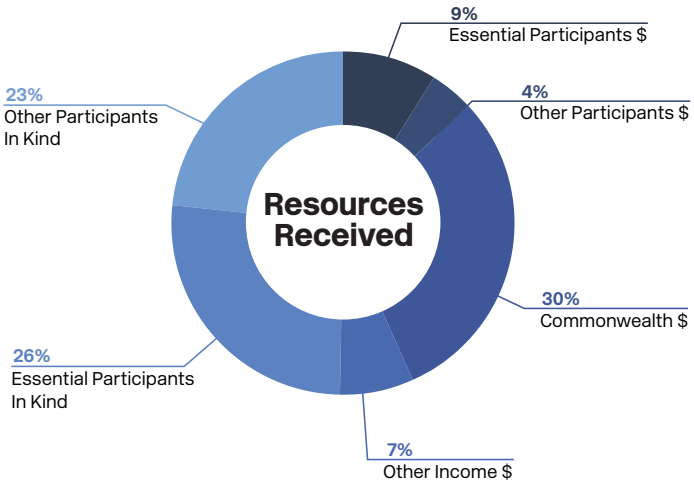
Essential Participant contributions of $1.99 million and Other Participant contributions of $3.04 million were received. All pledged cash contributions were received. At year end debtors totalled $1.19 million and creditors totalled $0.59 million, the former being for contributions for FY1516 and the latter primarily project funding payments unpaid at 30 June 2015. All employee accruals and other compliance obligations have been accounted for and the CRCWSC does not have any loans, other than minimal outstanding credit card balances. As a public good CRC, the entity is exempt from income tax. No assets with a value of more than $5,000 were purchased during the year.

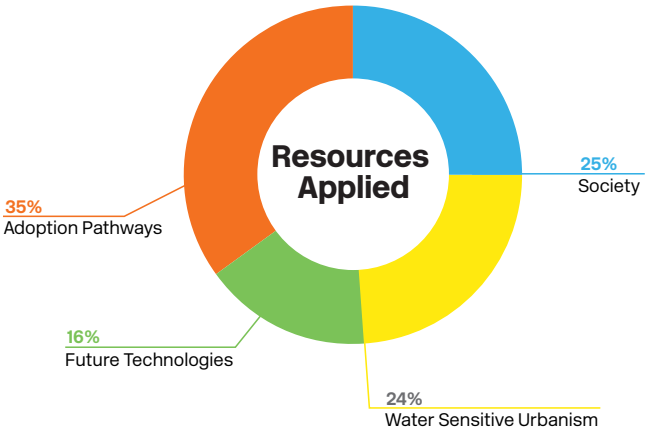
Research expenditure is actively monitored by the Project Leaders through their quarterly financial acquittal reports for their research projects. As part of the quarterly reporting process, Project Leaders raise any concerns about their projects and budgets with their Program Leader so that a plan can be put in place to bring the research activity back on track. Should the Program Leader have any concerns, these matters are dealt with via the CRCWSC Executive and thence to the Board if required.

The auditors met with the Audit and Risk Committee after conducting the FY1415 audit, both with management and in camera. No concerns were raised and the CRCWSC was complimented on its financial management. No management recommendations were made.

The Audit and Risk Committee met five times during FY1415. Activities included risk management, evaluating the Annual Budget, reviewing all financial reports including quarterly and annual reports to the Board and annual reports to the Commonwealth, to Higher Education Research Data Collection (HERDC), the Australian Bureau of Statistics Economic Activity report and the Australian Charities and Not-for-profits Commission (ACNC) annual report. Policies reviewed for the Board's consideration and adoption included Procurement, Delegations, Insurance, Conflicts of Interest (Management) and Fraud. In addition, the credit card procedure was audited externally and the policy revised in accordance with the findings.

An important aspect in the next financial year will be to ensure continued financial stability of the CRCWSC as the financial climate in Australia tightens.





Appendices

Appendix 1 – CRCWSC Participants (as at June 2015)

Participant Name	Participant type	Organisation type
Department of Housing, WA	Essential Participant	State Government
Department of Environment, Land, Water and Planning (VIC) (was DSE)	Essential Participant	State Government
Department of Water, WA	Essential Participant	State Government
Melbourne Water Corporation	Essential Participant	State Government
Monash University	Essential Participant	University
Queensland Urban Utilities	Essential Participant	Other – Statutory Body
South East Water Limited	Essential Participant	State Government
The University of Queensland	Essential Participant	University
The University of Western Australia	Essential Participant	University
Adelaide & Mt Lofty Ranges NRM	Other Participant	State Government
Blacktown City Council	Other Participant	Other – Local Government
Brisbane City Council	Other Participant	Other – Local Government
Chem Centre (WA)	Other Participant	State Government
City of Armadale	Other Participant	Other – Local Government
City of Boroondara	Other Participant	Other – Local Government
City of Canning	Other Participant	Other – Local Government
City of Fairfield (NSW)	Other Participant	Other – Local Government
City of Gosnells	Other Participant	Other – Local Government
City of Greater Bendigo	Other Participant	Other – Local Government
City of Greater Dandenong	Other Participant	Other – Local Government
City of Greater Geraldton	Other Participant	Other – Local Government
City of Joondalup	Other Participant	Other – Local Government
City of Kingston	Other Participant	Other – Local Government
City of Mandurah	Other Participant	Other – Local Government
City of Melbourne	Other Participant	Other – Local Government
City of Melville	Other Participant	Other – Local Government
City of Nedlands (WA)	Other Participant	Other – Local Government
City of Newcastle	Other Participant	Other – Local Government
City of Port Philip	Other Participant	Other – Local Government
City of Rotterdam	Other Participant	Other – Local Government
City of Subiaco	Other Participant	Other – Local Government
City of Sydney	Other Participant	Other – Local Government
City of Unley (SA)	Other Participant	Other – Local Government
City of Vincent	Other Participant	Other – Local Government
City of Wanneroo	Other Participant	Other – Local Government

Participants listed in grey text withdrew during the 2014/15 financial year.

Participant Name	Participant type	Organisation type
City West Water (VIC)	Other Participant	Other – Statutory Authority
Department of Environment, Water and Natural Resources (SA)	Other Participant	State Government
Department of Health & Human Services (VIC)	Other Participant	Australian Government
Department of Planning & Infrastructure (NSW)	Other Participant	State Government
Department of Regional Development and Land (WA)	Other Participant	State Government
DHI	Other Participant	Industry/Private Sector
DTU (Technical University of Denmark)	Other Participant	University
Eastern Metropolitan Regional Council (Perth)	Other Participant	Other – Local Government
Edith Cowan University	Other Participant	University
eWater Pty Ltd	Other Participant	Industry/Private Sector
Flow Systems	Other Participant	Industry/Private Sector
GHD Pty Ltd	Other Participant	Industry/Private Sector
Griffith University	Other Participant	University
Gilgandra Shire Council	Other Participant	Other – Local Government
Hornsby Shire Council	Other Participant	Other – Local Government
University of Innsbruck	Other Participant	University
International WaterCentre	Other Participant	Other – Research Organisation
Jacobs Group	Other Participant	Industry/Private Sector
Kellogg Brown & Root Pty Ltd	Other Participant	Industry/Private Sector
Knox City Council	Other Participant	Other – Local Government
Kunshan City Bureau of Planning	Other Participant	Other – international government
Kunshan City Construction, Investment and Development Company	Other Participant	Other – international government
Ku Ring Gai Municipal Council	Other Participant	Other – Local Government
Landcorp	Other Participant	Industry/Private Sector
Maddocks	Other Participant	Industry/Private Sector
Manningham City Council	Other Participant	Other – Local Government
Marrickville Council	Other Participant	Other – Local Government
Metropolitan Redevelopment Authority	Other Participant	State Government
Metropolitan Water Directorate	Other Participant	State Government
Moonee Valley City Council	Other Participant	Other – Local Government

Participant Name	Participant type	Organisation type
National University of Singapore	Other Participant	University
National Water Commission	Other Participant	Australian Government
Department of Planning and Infrastructure (NSW)	Other Participant	State Government
Places Victoria	Other Participant	State Government
Public Utilities Board (Singapore)	Other Participant	Other – International Public Sector
South Australian Murray-Darling Basin NRM	Other Participant	State Government
South Australian Urban Renewal Authority	Other Participant	State Government
South Australian Water Corporation	Other Participant	Other – Statutory Corporation
South East Regional Centre for Urban Landcare	Other Participant	Other - NGO
Southeast University (China)	Other Participant	University
Strathfield Municipal Council (NSW)	Other Participant	Other – Local Government
Swan River Trust	Other Participant	State Government
UNESCO IHE	Other Participant	Other – International NGO
University of Adelaide	Other Participant	University
Veolia Water	Other Participant	Industry/Private Sector
Warringah Council	Other Participant	Other – Local Government
Water Corporation WA	Other Participant	Other – Statutory Authority
Yarra Valley Water	Other Participant	Other – Statutory Authority
SME Associates		ABN
Bligh Tanner Consulting Engineers	SME Associate	32 061 537 666
e2DesignLab	SME Associate	47 761 189 355
DesignFlow	SME Associate	50 978 863 990
Essential Environmental	SME Associate	11 861 497 121
Hydrasyst	SME Associate	66 123 586 238
SPEL Environmental	SME Associate	83 151 832 629
Urban Water Solutions	SME Associate	80 124 213 592

Appendix 2 – CRCWSC Publications (2014/15)

Book Chapters

Head, B.W. (2014). 'The Collaboration Solution? Factors for Collaborative Success', in O'Flynn, J., Blackman, D. and Halligan, J. (eds) Crossing Boundaries in Public Management and Policy. London: Routledge, pp. 142-157.

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Walter, J. (2014). 'Political Leadership'. In A. Fenna, J. Robbins and J. Summers, (eds), Government and Politics in Australia. Sydney: Pearson, pp. 242-258.

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Batstone D.J., Hülsen T., Mehta C.M., Keller J. (2014). Platforms for energy and nutrient recovery from domestic wastewater: A review. Chemosphere, doi:10.1016/j.chemosphere.2014.10.021

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Cason, T. and Gangadharan L. (2015). Promoting Cooperation in Nonlinear Social Dilemmas through Peer-punishment. Experimental Economics, Vol 18 No 1, pp. 66-88.

Chandrasena K.K.G.I., Pham, T., Payne, E.G., Deletic A., McCarthy D.T. (2014). E. coli removal in laboratory scale stormwater biofilters: Influence of vegetation and submerged zone. Journal of Hydrology, Volume 519, Part A, pp 814-822, doi:10.1016/j.jhydrol.2014.08.015

Coutts, A., White, E., Tapper, N., Beringer, J. and Livesley S. (2015). Temperature and human thermal comfort effects of street trees across three contrasting street canyon environments. Theoretical and Applied Climatology, DOI: 10.1007/s00704-015-1409-y

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Appendix 3 – Summary of key training, capacity building and communication activities in 2014/15

Date	Region	Activity
2014		
3 Jul	Western	Presented on the Toolkit and UrbanBEATS to WA participants at a CRC Western Region / EMRC event focussed on green infrastructure
16 Jul	International	Presented on water sensitive cities to an IWC delegation from the Peru National Water Authority (ANA)
5 Aug	Western	2014 Seddon Lecture – Water For Society
15 Aug	Southern	Breakfast Function – celebrating the impending completion of the Cities as Water Supply Catchment Program; presentation of CRCWSC Highlights for FY13/14; Melbourne City Council Urban Forest Strategy
27 Aug	Eastern	Sydney Roadshow - Professor Tony Wong presented highlights of CRCWSC activities and achievements during the 2nd year of operation (FY13/14) and the progressive realisation of the value proposition for CRCWSC participants
3 Sep	Eastern	Brisbane Roadshow - The Year in Review. Professor Tony Wong presented highlights of CRCWSC activities and achievements
3 Sep	Southern	Rainwater Gardens workshop. This half day workshop considered the different perspectives of rain garden design to understand the potential for new and novel designs, particularly where aesthetics are a key success factor for local communities.
4 Sep	International	CRCWSC was invited by China National Institute of Architecture Design to present the water sensitive cities and its international applications in its headquarter in Beijing. The presentation made by Jianbin Wang was well received with much interactive discussion on technical details. The Institute expressed strong interests in collaborating further on delivering built projects
5 Sep	International	The CRCWSC contributed to the 'International Workshop on Urban Adaptation to Climate Change' held in Beijing, China. Wholly funded by Asia Development Bank (ADB) the event was jointly organised by China's National Development and Reform Commission (NDRC) and the Ministry of Housing and Urban-Rural Development (MOHURD). The CRCWSC was the only international organisation invited to speak at the forum on resilient urban infrastructure
16 Sep	Eastern	CRCWSC seminar in Sydney "Governing Water Sensitive Cities: Expanding the tool box?" with guest speaker Dr Yvette Bettini (Research Fellow at the Institute for Social Science Research, UQ) presented some preliminary case study results on the probable governance mechanisms and policy capacity to support moves towards water sensitive cities
18 Sep	Western	Western Region Roadshow. Professor Tony Wong presented highlights of CRCWSC activities and achievements during the 2nd year of operation.
23 Oct	National	The first industry training day was conducted following the Water Sensitive Cities conference with six individual training and master classes held and presented by the CRCWSC, International WaterCentre and E2DesignLab. Topics included: • Designing Biofilters for water sensitive cities (full day) • Water Sensitive Cities Modelling toolkit (full day) • Integrated water cycle management projects presented by E2DesignLab (full day) • Urban climate primer master class (half day) • Collaborative planning presented by IWC (half day) • Leading high performing teams presented by IWC (half day)
18 Sep	Western	CRCWSC demonstration sites meeting with WA industry participants. Meeting also discussed research synthesis project in Perth with CEO during Roadshow visit
24–25 Nov	International	Series of workshops with Southeast University to scope three joint projects funded through a government grant from the Jiangsu Provincial Government in China

Date	Region	Activity
16 Oct	Eastern	Fiona Chandler and Richard McManus (Stormwater NSW) facilitated a workshop on 'Local Government Needs and Capacity Building- A National Stocktake' at the National Stormwater Conference in Adelaide
21–22 Oct	National	Water Sensitive Cities Conference – Melbourne The conference showcased the CRCWSC's internationally recognised research and collaborative efforts to create sustainable, resilient and liveable water sensitive cities and towns
24 Oct	National	PhD/Early Career Researchers Workshop. This was the second workshop in a series on water leadership, and focused on power, influence, and fostering innovation and creativity
24 Oct	Southern	CRCWSC hosted synthesis workshop Fisherman's Bend Workshop (1/3) First of three workshops as part of a synthesis project for Fisherman's Bend, a major urban redevelopment in Melbourne
11 Nov	International	Fiona Chandler presented a keynote "Creating water sensitive cities in Australia" at a Danish University of Technology hosted conference on "Climate resilient cities" in Copenhagen. The conference provided an opportunity to share experiences on industry led research programs and status of CRCWSC research
19–20 Nov	Eastern	'Ideas for Ripley' synthesis workshop with QUU, Ipswich City Council, DEWS and representatives of the development sector
26 Nov	International	Outputs of the Kunshan Architectural Studio were presented to the key officials of the Kunshan City construction Investment and Development Company (KCID) and the Planning Bureau of the City of Kunshan (China)
1 Dec	Southern	CRC for Water Sensitive Cities Fisherman's Bend Workshop #2 workshop, part of a synthesis project for Fishermans Bend, a major urban redevelopment in Melbourne. Includes collaboration with the CRC for Low Carbon Living
8 Dec	Eastern	Workshop with Brisbane City Council to strengthen professional relationship and update participant on relevant research
9 Dec	Western	Batavia Coast Marina Research Synthesis Workshop with Landcorp, City of Greater Geraldton and Midwest Development Commission
16 Dec	Eastern	Meeting to discuss the future of the WSUD in Sydney Program with regards to needs, opportunities, resourcing, coordination and opportunities to collaborate with the CRCWSC
2015		
21 Jan	Southern	Local level "water management in a changing climate workshop" delivered in partnership with the Clearwater and the City of Boroondara. This half-day session provided a unique opportunity to hear from leading experts in this field and actively discuss how to address these issues practically
5 Feb	Southern	CRCWSC Fishermans Bend Workshop #3. Last workshops as part of synthesis project for Fisherman's Bend, a major urban redevelopment in Melbourne
9-11 Feb	National	IWA Cities of the Future Symposium. 12 presentations were made by the CRCWSC to support the development of a Cities of the Future communiqué to deliver at the World Water Forum in Korea in April
16-17 Feb	National	2015 CRCWSC Researchers Workshop. Focus of workshop is to build awareness and implementation of communication and adoption activities along with updating on key issues such as CRCWSC performance review and process to develop 2nd tranche of research projects
18-19 Feb	National	2015 Industry Partners Workshop. Focus of workshop to commence discussions on how CRCWSC research can support the transition of Australian cities to be more water sensitive

Date	Region	Activity
20 Feb	Western	WA Dept of Planning, Dept of Water, CRCWSC workshop on the Liveable Neighbourhoods Policy review. The CRCWSC is assisting to strengthen key policy areas in relation to water and liveability
26 Feb	Western	Anas Ghadouani presented an overview of the activities of the CRCWSC, and the impact of climate change and stormwater management on local wetlands and urban design, at the Glyde-In Community Learning Centre in Perth
27 Feb	Southern	Monash University's Graduate Research Interdisciplinary Program (GRIP) launch and orientation for the 13 new PhD candidates working in the area of "Water Sensitive Cities in Delivering Asian Cities". An interdisciplinary partnership between Monash Sustainability Institute, Faculty of Arts, Faculty of Engineering, CRC for Water Sensitive Cities, and Australia-Indonesia Centre
4 Mar	Southern	Launch of the Monash University and CRCWSC Massive Open Online Course (MOOC). Number of registrations: 4,331
11 Mar	Southern	Seminar on interdisciplinary research on participatory processes and modelling approaches coalescing around three different projects/case studies - DAnCE4Water, Elwood and Kiruna
12 Mar	Western	20 European Union Counsellors visited UWA. The CRCWSC hosted the delegation for a one-hour meeting during their visit. On behalf of the CRCWSC, Anas Ghadouani delivered a presentation on an overview of the centre
17 Mar	International	CRCWSC seminar with Zhuhai Government to engage with City of Zhuhai, which is the top liveable city in China, to assist with their water strategy
17 Mar	Western	CRCWSC - City of Canning workshop to scope a future collaboration around the revitalisation of Canning City Centre
23–27 Mar	International	Tony Wong attended an Asian Development Bank commission trip to Manila, which included a forum at the Australian Embassy with invited speakers from other multilateral banks, aid agencies and Australian companies in the Philippines
14 -17 Apr	International	7th World Water Forum - Tony Wong presented on water security for cities through integrated urban planning and services
14 Apr	International	Meeting with OECD to discuss potential collaboration
18 Apr	International	Victorian Government Education Mission to South America. Tony Wong attended on behalf of Monash University
5-7 May	Southern	2015 Stormwater Victoria Conference, Cintia Dotto & Ross Allen presented on behalf of the CRCWSC. The conference was attended by 16 CRCWSC participant organisations and associates in addition to 7 CRCWSC researchers. Over one-third of the 142 delegates were associated with the CRCWSC. Notably, every concurrent session had one or more presentations by a CRCWSC participant or associate organisation, demonstrating that the lessons and outcomes from CRCWSC research have an effective pathway into the broader industry
2-3 Jun	Western	Bentley Regeneration Synthesis Workshop
9 Jun	Southern	CRCWSC mid-year review breakfast briefing in Melbourne
9 Jun	Southern	Chris Chesterfield hosted a meeting to discuss the Tranche 2 (T2) process with CRCWSC Melbourne based Industry Participants. T2 is the second round of CRCWSC projects that will commencing July 2016. Input is required from participant organisations
11 Jun	International	Deputy Major Mr Zhang from City of Nanning visited CRCWSC's incubator City Kunshan. Deputy Major Mr Zhang leading a delegation of 21 from various government departments visited a number of CRCWSC's demonstration projects in Kunshan

Date	Region	Activity
15 Jun	International	Australia-Changsha Day. Jianbin Wang attended Changsha-Australia Day event and give a presentation on Australian Water Sensitive Cities initiatives in the Building and Planning Stream invited by Austrade China
16 Jun	International	CRCWSC participated in a high level meeting between Australia Embassy and Hunan Department of Science & Technology. CRCWSC was invited to represent Australian urban water management expertise
17 Jun	Southern	WSC - Research needs for Adelaide workshop (Jamie Ewert with watersensitiveSA)
18 Jun	Eastern	CRCWSC Modelling Workshop. An inaugural workshop was held to bring together the key knowledge holders and modelling experts across the whole CRCWSC to discuss the diverse models in development towards the water sensitive cities vision
29 Jun	Eastern	Urban Water Management Program Workshop to discuss progressing Sydney towards becoming a WSC. Workshop includes a number of stakeholders (Barry Ball)

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