



WESTERN Regional Advisory Panel

Meeting No. 23

18/01/17

Meeting Minutes

WA Trustees
Building, L2, 133
St Georges Tce
Board Room @
8:00am

Attendees

Greg Claydon – DoW/CRCWSC
Board – Inaugural Chair
Ben Harvey - DoP
John Savell – Housing
Authority/CRCWSC EPRG
Sharon Dignard - Water
Corporation
Naomi Rakela– EMRC

Giles Pickard – City of Subiaco
Shelley Shepherd – New Water
Ways Inc
Sonja Davidson – CRCWSC
Glen McLeod Thorpe –
Department of Parks and Wildlife

Antonieta Torre –
DoW/CRCWSC EPRG
Greg Ryan – LandCorp
Mike Mouritz – CRCWSC Board
Nicholas Deeks – GHD
Max Hipkins – City of Nedlands

Apologies

Anas Ghadouani – UWA/
CRCWSC Western RED
Emma Yuen – CRCWSC
Regional Manager

Peter Davies – UWA
Bruce Young – UDIA
Sergey Volotovskiy - Water
Corporation

Neil Burbridge – City of Armadale
Ajay Shah – KBR

Item
No.

Agenda Topic

1.

Welcome & Apologies

The Chair opened the meeting at 8:00am and welcomed and wished everyone a happy new year. The Panel went around table and introduced themselves. The Chair acknowledged that Anas Ghadouani, Emma Yuen, Sergey Volotovskiy and Neil Burbridge had sent their apologies. The Chair thanked Sonja for the meeting preparation.

2.

Record of Discussion

The Record of Discussion from the last Regional Advisory Panel meeting held 17 November 2016 was noted and approved by Panel members.

Actions Arising From Previous Minutes (17 November 2016)

November Action 1: John Savell to identify lead officer/s at DPC for the Smart Cities Fund. John's DPC contact is not involved with the Smart Cities Fund.

The draft Smart Cities Program guidelines are open for comment (Post-meeting update: Consultation on the draft guidelines closed on 20 January 2017).. There will be a call for Expressions of interest in early 2017 for projects to begin in 2017/18 FY. CRC WSC Board and Tony Wong are interested in the Program and consider it a good opportunity.

Action 1 Mike Mouritz and Greg Claydon to contact the Department of Premier and Cabinet to gauge willingness to prepare WA submissions for the Smart Cities Fund.

November Action 9 Greg Claydon on behalf of the WRAP to speak to the CRCWSC



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	<p>Executive regarding the need to develop the IRP5 proposal on the same timeline as IRPs 3 & 4 (to commence in July 2017). The IRP5 Workshop will be held in Perth during the 1st week of March 2017. Shelley is contacting other region RED's to discuss local projects. Shelley is summarising B2.4 & B2.23 outcomes to prepare for the IRP5 workshop. Action 2 Sonja to determine budget, investigate venue and confirm date for the IRP5 workshop.</p> <p>November Actions 14 & 15 John and Antonietta to clarify process for research synthesis project selection and funding with Jamie Ewert. Regional Manager to action and monitor Research Synthesis as a priority.</p> <p>Action 3 Sonja to organise teleconference with Jamie Ewart, Anas, Emma, John & Antonietta to discuss Research Synthesis.</p> <p>November Action 17 John and Antonietta to draft a paper and/or presentation on behalf of the WRAP for the annual Board/Executive/Advisory Committee/EPRG meeting being held on 2 Feb 2017. Convene a WRAP sub-team meeting to prepare the paper/presentation and distribute draft to the broader WRAP for feedback prior to our 18th January 2017 meeting.</p> <p>Action 4 Antonietta to organise meeting ASAP of WA representatives attending the annual CRCWSC Board/Executive/Advisory Committee/EPRG meeting to discuss presentations, focusing on the strategic issues and opportunities in WA.</p> <p>WRAP members noted that all other actions from the previous meeting were either completed or covered by the agenda for this meeting.</p> <p>The committee noted there were no other matters arising from previous minutes.</p>
3.	<p>CRC Executive</p> <p>Regional Executive Director Report</p> <ul style="list-style-type: none"> • Apologies from Anas
4.	<p>Regional Manager Report</p> <ul style="list-style-type: none"> • Emma Yuen commenced in the Regional Manager role on the 2nd January 2017. Emma is currently on leave until 31 Jan. • Emma will be attending 2 Feb annual CRCWSC Board/Executive/Advisory Committee/EPRG meeting in Melbourne as member of the Leadership team. • Emma has visited many WA stakeholders and will visit the remaining when back from Melbourne. Emma will report to the WRAP on the outcomes and recommendations arising from these stakeholder meetings. • Emma is getting up to speed with the IRP1 WSC Transition Project and research. • Emma and Shelley are liaising with key researchers and stakeholders in preparation for IRP5. • Urbaqua's proposal to the CRCWSC to cover specific tasks while the Regional Manager is on leave has been approved.
5.	<p>CRCWSC Board Update</p> <ul style="list-style-type: none"> • Transition Committee – <ul style="list-style-type: none"> ○ T o R approved. ○ CRC WSC is required to submit a Transition Plan to the Commonwealth Government by 30 Jun each year. The Board and Executive conducted a Strategic Planning workshop to develop a new plan to take the CRCWSC to June 2021 and five years beyond - incorporating key goals to enable transition to a new



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	<p>entity.</p> <ul style="list-style-type: none"> ○ Options on how to fund a post-2021 entity are being explored. Mike Mouritz is investigating potential alternative funding, for example whether local governments can invest superannuation “green bonds”. ○ Strategic Planning discussions between the CRCWSC Board and EPRG have been scheduled for 2 Feb 2017. • Commercialisation Committee - <ul style="list-style-type: none"> ○ A Consultant has prepared a report on the CRCWSC’s IP assets emanating from Tranche 1: <ul style="list-style-type: none"> ▪ 20 IP assets have commercial potential ▪ 18 IP assets have potential value if appropriately packaged for end user need ▪ 15 IP assets are publicly available. ○ Mike Mouritz discussing with Nick Apostolidis the Curtin Climate kit as a model to innovate and develop climate benefit products • IRP2 – Economic Framework <p>A.C Taylor and T.D Fletcher 2005 “Triple-bottom-line” assessment of urban stormwater projects . Are life cycle costs of WSUD versus traditional urban development to be assessed in IRP2? Maintenance and life cycle costs are raised as a major impediment to WSUD implementation.</p> <p>Action 5: Greg Claydon and Mike Mouritz to confirm whether the CRCWSC’s IP consultant report will be distributed to the RAPs.</p>
6.	<p>CRCWSC T2 Advisory Committee Update</p> <p>The annual EPRG/Advisory Committee/Board/Executive meeting will be held 2 February 2017 in Melbourne. The WRAP has the opportunity to provide input to this annual meeting via Greg Claydon, who (as Chair of the WRAP) is a member of the Advisory Committee.</p> <p>The WRAP shared ideas for presenting to the 2 Feb meeting:</p> <ul style="list-style-type: none"> ○ Positive CRCWSC events that have generated momentum in WA <ul style="list-style-type: none"> ▪ Water Sensitive Cities Index Workshops – Feedback from local councils has been very positive, however councils are not prepared to pay the fees quoted by the CRCWSC . The Index is a great tool to engage stakeholders and grow awareness. A local supplier is required to reduce costs to run the Index workshops and roll out the Index more broadly in WA. ○ Suggestions on how to gain further momentum <ul style="list-style-type: none"> ▪ City Deals – get some traction between local and state government and push the Water Sensitive City agenda ▪ Water Corporation – newly appointed Chair of the Board of Directors, Michael Hollett to meet with Mike Mouritz and discuss the CRCWSC goals and outcomes. ▪ Can Perth be the first Water Sensitive City in Australia? ○ WA challenges include economic climate and slow down in urban development ○ The WA State election on 11 March 2017 may lead to changes in the public service and government direction. <p>Essential Participants Reference Group Update</p> <p>Focus of the EPRG meeting with the Board will be to provide strategic advice as set out in the EPRG T o R</p> <p>https://watersensitivecities.org.au/mttsecured/86f7b544ac1377d5fd4e294161080229/5881b80d/2016/06/EPRG-ToR-28-Apr-16.pdf</p> <ul style="list-style-type: none"> •



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7.	<p>WA capacity building</p> <ul style="list-style-type: none"> Outcomes of capacity building survey <ul style="list-style-type: none"> MN3 WA Needs Analysis Dec 16 Commencement of 2016/2017 activities were delayed until October 2016 when the proposal was approved. 3 – 4 months of event catch-up planned and ready to be executed. WRAP agreed it was a great holistic list. Capacity Building sub-team formed Naomi Rakela, Antonietta Torre and Sharon Dignard. WRAP to consider the priority of events and activities for the remainder of 2016/17. <p>Action 6: Please advise Shelley additional capacity building priorities out of session by 27th January.</p> <table border="1"> <thead> <tr> <th>Deliverable</th><th>Topic</th></tr> </thead> <tbody> <tr> <td>Local work plan for 2017 to 2020</td><td>Local Work Plan to 2020 prepared</td></tr> <tr> <td>Short list of priority policy initiatives</td><td> <ul style="list-style-type: none"> Review of SPP 2.9, 2.10 and 2.1 Review of SPP 2.2, 2.3 & 2.7 Preparation of SPP 7.3: Precinct design City of Armadale WSUD LPP City of Melville green infrastructure policy </td></tr> <tr> <td>Two (2) focused events</td><td> <ul style="list-style-type: none"> City of Armadale WSUD policy City of Gosnells rebuilding the vision </td></tr> <tr> <td>Two (2) WSC workshops with key stakeholders</td><td> <ul style="list-style-type: none"> Delivering better maintenance – practical activities and planning Delivering street trees in existing neighbourhoods – design exercise in Melville with other local governments </td></tr> <tr> <td>One (1) Industry practice note/ guidance</td><td>Car park retrofits for WSUD – improving stormwater and microclimate outcomes</td></tr> <tr> <td>Three (3) Researcher presentations</td><td> <ul style="list-style-type: none"> Valuation of economic, social and ecological costs and benefits (Project A1.2) and Economic incentives and instruments (Project A1.3), Prof. David Pannell Hydrology and nutrient transport processes in groundwater/surface water systems (Project B2.4), Carolyn Oldham and Carlo Ocampo Angela Dean, Engaging communities with water sensitive cities (Project A2.3) </td></tr> <tr> <td>Two (2) Cross-agency forums and networking events</td><td> <ul style="list-style-type: none"> LIAWA Symposium – 17 March 2017 AWA/SWA/NWW/CRC community day – 21 April Possible UDIA joint event </td></tr> <tr> <td>One (1) demonstration tour</td><td>WGV in February or March 2017</td></tr> </tbody> </table>	Deliverable	Topic	Local work plan for 2017 to 2020	Local Work Plan to 2020 prepared	Short list of priority policy initiatives	<ul style="list-style-type: none"> Review of SPP 2.9, 2.10 and 2.1 Review of SPP 2.2, 2.3 & 2.7 Preparation of SPP 7.3: Precinct design City of Armadale WSUD LPP City of Melville green infrastructure policy 	Two (2) focused events	<ul style="list-style-type: none"> City of Armadale WSUD policy City of Gosnells rebuilding the vision 	Two (2) WSC workshops with key stakeholders	<ul style="list-style-type: none"> Delivering better maintenance – practical activities and planning Delivering street trees in existing neighbourhoods – design exercise in Melville with other local governments 	One (1) Industry practice note/ guidance	Car park retrofits for WSUD – improving stormwater and microclimate outcomes	Three (3) Researcher presentations	<ul style="list-style-type: none"> Valuation of economic, social and ecological costs and benefits (Project A1.2) and Economic incentives and instruments (Project A1.3), Prof. David Pannell Hydrology and nutrient transport processes in groundwater/surface water systems (Project B2.4), Carolyn Oldham and Carlo Ocampo Angela Dean, Engaging communities with water sensitive cities (Project A2.3) 	Two (2) Cross-agency forums and networking events	<ul style="list-style-type: none"> LIAWA Symposium – 17 March 2017 AWA/SWA/NWW/CRC community day – 21 April Possible UDIA joint event 	One (1) demonstration tour	WGV in February or March 2017
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8.	<p>Process for input into IRP 3 and IRP4 has been emailed to WRAP and other workshop attendees.</p> <ul style="list-style-type: none"> MN4 Attached. 																		
9.	<p>B1.2 Catchment Scale Landscape Planning for Water Sensitive Cities in an Age of Climate Change (Project Leader Darryl Low Chow, WRAP contact Ben Harvey)</p> <ul style="list-style-type: none"> MN1 Attached 																		
10.	<p>B2.23 Protection and restoration of urban freshwater ecosystems: informing management and planning (Project Leader Peter Davies, WRAP contact Antonietta Torre)</p>																		



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	<ul style="list-style-type: none"> MN1 Attached
11.	B2.4 Hydrology and Nutrient Transport Processes in Groundwater/Surface Water Systems (Project Leader Carolyn Oldham, WRAP contact Antonietta Torre) <ul style="list-style-type: none"> MN1 Attached
12.	B4.2 Social-Technical Flood Resilience in WSC – Adaption across spatial & temporal scales. (Prct Leader Richard Ashley, Phd Student Amar Nanda, WRAP contact Nominations tbc Neil Burbridge) <ul style="list-style-type: none"> MN5 attached
13.	B5.1 Statutory Planning for Water Sensitive Cities (Project Leader Barnaby McIlrath, PhD Don Williams, WRAP contact Ben Harvey) <ul style="list-style-type: none"> MN1 Late attached
14.	C5.1 Intelligent urban water systems (Project Leader Rachel Cardell-Oliver WRAP Contact Sergey Volotovskiy) <ul style="list-style-type: none"> MN1 Attached
15.	D1.4 ‘Learning through Integration and Demonstration’ (Project Leader Celeste Morgan, WRAP contact Antonietta Torre) <ul style="list-style-type: none"> MN1 Attached
16.	D5.1 Urban intensification and green infrastructure: towards a water sensitive city (Project Leader Diego Romirez-Lovering, WA led by - Geoffrey London (UWA) WRAP contact Greg Ryan) <ul style="list-style-type: none"> Geoffrey London has been invited to present at IRP 4 Workshop.
17.	IRP1 WSC Transition Strategy and Implementation Plans (Project Leader Briony Rogers, WA Regional Representatives Don Crawford and Cara Bourne) <ul style="list-style-type: none"> MN1 Attached
18.	IRP2 Comprehensive Economic Evaluation Framework (Project Leader Sayed Iftekhar, WRAP contact Naomi Rakela) <ul style="list-style-type: none"> MN1 Attached.
19.	WSC Tools & Products (TAP) (Project Leaders Jurg Keller & Christian Ulrich, WRAP Contacts Nick Deeks, Giles Pickard) <ul style="list-style-type: none"> TAP1 - WSC Index TAP2 - WSC Integrated Modelling tool kit TAP3 - DanCE4Water modelling tool kit A Steering Committee for the TAPs program has been established. A draft program proposal will be sent to the EPRG and RAPs for comment before being presented to the CRCWSC Board for endorsement at the February 2017 Board meeting.
20.	Knowledge Transition Tools and Services (KATS) (Project Leader Barry Ball, WRAP contact Shelley Shepherd) Capacity Building Collaboration - New Water Ways & CRCWSC <ul style="list-style-type: none"> MN1 Late attached MN3 Attached
21.	Research Synthesis <ul style="list-style-type: none">



Item No.	Agenda Topic
22.	<p>General Business</p> <ul style="list-style-type: none">• Greg Claydon and WRAP happy to continue with Project updates. Watching brief to check on value.• CRCWSC Water Sensitive Cities Conference will be held 18-20 July 2017 in Perth<ul style="list-style-type: none">◦ Venue feedback – CBD location preferred◦ WRAP members enjoyed Master classes at the 2015 Conference and suggested these be held again in Perth◦ Side shows, i.e., presentations to specific WA organisations held outside of the conference program would be useful.◦ The WRAP suggested a bus trip to White Gum Valley during the week of the conference. <p>Action 7: Shelley to circulate the draft Water Sensitive Cities conference program to the WRAP for comment.</p> <p>Action 8: WRAP to advise Shelley what Masterclasses we would like as part of the Conference program and training day.</p>
	<p>Standing Items</p> <ul style="list-style-type: none">• Western RAP Opportunities for Influence• Engaging Stakeholders <p>The City of Perth Water Sensitive Cities Index workshop held on 14 December 2016 was successful and highlighted good practices. Inspiring to see many departments getting together and talking. The Water Sensitive Cities Index workshops are an opportunity to get positive involvement from stakeholders.</p>
23.	<p>Correspondence In and Out</p> <p>None to record</p>
24.	<p>Close: the meeting closed at 9:00am and the Chair thanked everyone for their attendance.</p> <p>Date of next meeting: 16 March 2017</p>



Actions	Description	Who	When
1.	Mike Mouritz and Greg Claydon to contact the Department of Premier and Cabinet to gauge willingness to prepare WA submissions for the Smart Cities Fund	Greg Claydon, Mike Mouritz	
2.	Sonja to determine budget, investigate venue and confirm date for the IRP5 workshop.	Sonja Davidson	
3.	Sonja to organise teleconference with Jamie Ewart, Anas, Emma, John & Antonietta to discuss Research Synthesis.	Sonja Davidson	
4.	Antonietta to organise meeting ASAP of WA representatives attending the annual CRCWSC Board/Executive/Advisory Committee/EPRG meeting to discuss presentations, focusing on the strategic issues and opportunities in WA.	Antonietta Torre	19 Jan 2017
5.	Greg Claydon and Mike Mouritz to confirm whether the CRCWSC's IP consultant report will be distributed to the RAPs.	Greg Claydon, Mike Mouritz	
6.	Please advise Shelley additional capacity building priorities out of session by 27th January.	All	27 Jan 2017
7.	Shelley to circulate the draft Water Sensitive Cities conference program to the WRAP for comment.	Shelley	
8.	WRAP to advise Shelley what Masterclasses we would like as part of the Conference program and training day.	All	
Standing Item	All WRAP members to forward to Sonja details of events that would be of interest to Western Region WSC and Sonja will keep the calendar up to date	All	ongoing
Standing Item	The Panel to share experiences from meetings and engagements with others in the industry.	All	ongoing



CONSENT FORM

Project: 'DE170100042 – Virtual Reality for Planning of Green Urban Water Infrastructure'

Chief Investigator: Dr. Peter Marcus Bach

I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following:	Yes	No
Audio and/or video recording during an interview/workshop	<input type="checkbox"/>	<input type="checkbox"/>
Taking part in an interview and a follow-up focus group workshop of up to 10 persons	<input type="checkbox"/>	<input type="checkbox"/>
Any follow-up conversations by telephone and/or email for clarification purposes	<input type="checkbox"/>	<input type="checkbox"/>
The data that I provide during this research will be used for the research project	<input type="checkbox"/>	<input type="checkbox"/>
The data that I provide during this research will be used for future research projects that build upon this current project	<input type="checkbox"/>	<input type="checkbox"/>

Name of Participant _____

Participant Signature _____

Date _____

Monash University Human Research Ethics Committee**Approval Certificate**

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number: 7887

Project Title: DE17010042 - Virtual Reality for Planning of Green Urban Water Infrastructure

Chief Investigator: Dr Peter Bach

Expiry Date: 30/01/2022

Terms of approval - failure to comply with the terms below is in breach of your approval and the *Australian Code for the Responsible Conduct of Research*.

1. The Chief Investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash letterhead and the Monash University complaints clause must include your project number.
6. Amendments to approved projects including changes to personnel must not commence without written approval from MUHREC.
7. Annual Report - continued approval of this project is dependent on the submission of an Annual Report.
8. Final Report - should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected completion date.
9. Monitoring - project may be subject to an audit or any other form of monitoring by MUHREC at any time.
10. Retention and storage of data - The Chief Investigator is responsible for the storage and retention of the original data pertaining to the project for a minimum period of five years.

Thank you for your assistance.

Professor Nip Thomson

Chair, MUHREC

CC: Dr Megan Farrelly

List of approved documents:

Document Type	File Name	Date	Version
Consent Form	consent-form-DECRA	09/01/2017	1.0
Explanatory Statement	explanatory-statement-DECRA	12/01/2017	1.0
Supporting Documentation	Interview Protocol - v1	12/01/2017	1.0
Focus Group questions	Focus Group Questions	12/01/2017	1.0

Project Background

Rapid urbanisation has been challenging the way we manage cities, in particular our urban water systems. In urban water management, Water Sensitive Urban Design stormwater systems (WSUD) are low-energy, space-efficient, scalable green technologies that have been widely adopted to deliver environmental protection and other multiple benefits, such as alternative water supply, greening of urban space and improved urban amenity^[1, 2].

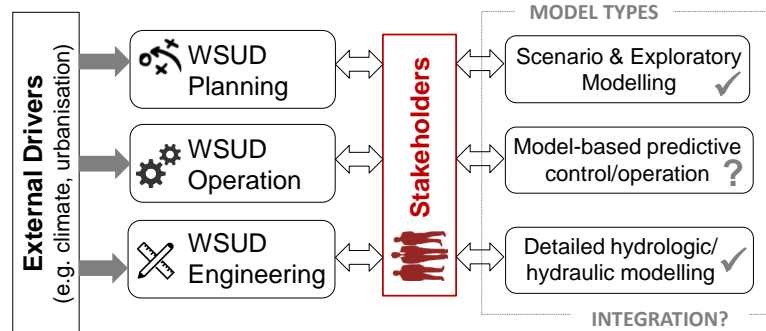


Fig 1. Conceptual Framework, role of models and stakeholders in the WSUD planning process

Effective planning for WSUD is, however, not a straightforward engineering design problem, but requires understanding of the relationships with urban development. It is also a balancing act between many stakeholders with conflicting needs and priorities. With expanding urban development over the next 50 years, we are at the brink of major urban change. There is an urgent need for efficient and sustainable stormwater management now as the costs of retrofitting cities later would be monumental^[3]

Despite advancements in WSUD over the last 20 years and rapid uptake of in practice (with over 10,000 systems implemented across Melbourne alone), significant knowledge gaps are still prevalent about the dynamics of WSUD management (from initial planning stages all the way through to operation of implemented systems – Fig. 1). There are serious concerns about the long-term efficiency of many existing WSUD assets due to poor design, construction and maintenance decisions^[4-6]. Furthermore, existing WSUD models (see Fig. 1) that are typically used to support planning and management processes^[7-9] are unable to fully consider its complex interactions with urban development and socio-economics. Knowledge transfer to WSUD practice is stagnating. If nothing is done to harness our current WSUD approaches to better consider these complex dynamics, the economic and logistic cost of managing existing WSUD assets will soon outweigh their perceived benefits.

New techniques in integrated modelling for sustainable urban water management are constantly being experimented with and the incorporation of social dynamics into models is becoming more common^[8]. Additionally, the use of computer games and virtual reality as platforms for understanding human decision-making has gained increasing attention in the planning sphere^[10-12]. With a plethora of visual styles and simulation games emerging from the gaming industry (see Fig. 2 for examples), there is a huge opportunity to explore the use of these in advancing the modelling and interdisciplinary science of WSUD management.



Fig 2. Examples of Gamifying the City (left - SimCity4, source: EA Games ; centre - Anno2070, source: Ubisoft, right: LowPoly City Model for Unity3d Game Engine, source: VenCreations)

Aims & Objectives

This project, known as VR Water for short, aims to **develop a new understanding of the complex planning-technical-social dynamics of Water Sensitive Urban Design**. It will achieve this through advancing existing WSUD modelling science and utilising state-of-the-art immersive virtual reality and gaming technology for eliciting and analysing complex planning and decision-making processes of key actors in WSUD planning and management.

The two key aspects of this project include:

- Developing and testing a novel dynamics model of long-term WSUD planning, which also incorporates tacit knowledge from practitioners across Australia
- Transforming this complex integrated model into a computer game, which can yield insights into collaborative decision-making when played by groups of stakeholders

Approach

This highly interdisciplinary project involves a wide range of researchers with different expertise including engineers, architects, social scientists and game designers. Qualitative research methods including interviews and workshops will be combined with integrated and exploratory modelling science. An interactive gaming environment will be developed using cutting edge virtual reality technologies that are rapidly growing in popularity including some shown in Fig. 3.

We will build upon an existing planning-support tool, the UrbanBEATS model (www.urbanbeatsmodel.com), which is rapidly gaining attention in the urban water industry as a powerful and flexible tool for exploring the planning of WSUD in urban precincts. Using the industry standard Unity3D game engine (www.unity3d.com), we will create a highly visual and interactive gaming experience that is based heavily on tacit knowledge and experience informed by our industry stakeholders and our exploratory model.



Fig 3. Emerging immersive technologies including CAVE2 at Monash University (top), Samsung GearVR headset (bottom left) and Mixed Reality with Microsoft HoloLens (bottom right)

Research Outcomes

This research will empower stakeholders to more effectively plan WSUD strategies in existing and new cities at the most appropriate and cost-effective points in time. Key outcomes include:

- new insights into the long-term dynamics of WSUD and advances in current WSUD modelling science
- an understanding of the complex planning-technical-social interactions of WSUD will lead to more resilient integrated stormwater management solutions and policies and;
- serious computer gaming will yield insights on stakeholder decision-making, provides a platform for collaborative planning and WSUD knowledge transfer and training

Contact Details



Peter Marcus Bach

Project Lead – ARC DECRA Fellow
Monash Infrastructure Research Institute
Monash University, Clayton 3800 VIC
e. peter.bach@monash.edu
m. 04 3217 5283



References

- [1] Brown, R., et al., 2007, *Transition to Water Sensitive Urban Design - The Story of Melbourne, Australia*.
[2] Wong, T.H.F., et al., 2013, *blueprint 2013 - Stormwater Management in a Water Sensitive City*, Cooperative Research Centre for Water Sensitive Cities. [3] Melbourne Water, 2013, *Stormwater Strategy: A Melbourne Water strategy for managing rural and urban runoff*. [4] Leinster, S., 2006, *Australian Journal of Water Resources*. 10(3): p. 321-329. [5] Stormwater Victoria, et al., 2013, *Developing WSUD Condition Audit Guidelines - Request for Proposal*. [6] Browne, D., et al. 2014, *Proceedings 13th International Conference on Urban Drainage*. Sarawak, Malaysia. [7] Elliott, A.H., et al., 2007, *Environmental Modelling & Software*. 22: p. 394-405. [8] Bach, P.M., et al., 2014, *Environmental Modelling & Software*. 54: p. 88-107. [9] Lerer, S.M., et al., 2015, *Water Asset Management Journal*. 7: p. 993-1012. [10] Bishop, I.D., 2011, *Landscape and urban planning*. 100: p. 390-392. [11] Valkering, P., et al., 2012, *Simulation & Gaming*. 44(2-3): p. 366-390. [12] Van der Wal, M.M., et al., 2016, *Environmental Modelling & Software*. 75: p. 119-132.

Funded by:



Australian Government

Australian Research Council

Discovery Early Career
Researcher Award (DECRA)
Project: DE17010042

EXPLANATORY STATEMENT

Project: 'DE170100042 – Virtual Reality for Planning of Green Urban Water Infrastructure'

Peter Marcus Bach

Department of Civil Engineering
phone: 04 3217 5283 | 03 9905 3837
email: peter.bach@monash.edu

Megan Farrelly

School of Social Sciences
phone: 04 0576 8455 | 03 9905 4618
email: megan.farrelly@monash.edu

You are invited to take part in this study. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact the researchers via the phone numbers or email addresses listed above.

Participant groups

This explanatory statement applies to either of the following participant groups: interview, focus group, workshop participants.

What does the research involve?

The aim of this study is to explore the organisational dynamics and workflows used in the design, implementation and management of green urban water infrastructure. You have been invited to participate in ONE or BOTH of the following activities: interview, workshop. This document will specify what is expected from you during these activities. Note that only the specification of the activity you will be partaking in today will apply to you.

During an interview, you will be asked a number of questions about your experience with green urban water infrastructure (we will first begin by clarifying the terminology). The interview process has three main phases: (1) a discussion about the current workflows and processes within your organisation and your role, (2) a discussion about the challenges that you believe the practice of green urban water infrastructure faces and, finally, (3) a creative process, where we would like you to creatively think about what the practice would look like in an ideal world. The whole interview process should last for one hour.

If you are participating in the workshop, you will be working together with other participants as a team to solve fictitious challenges and scenarios that are set by a computer game. You will be given virtual resources and decisions to make. This process can take up to half a day and there will be a de-briefing session, during which we would like to hear your feedback about the experience and understand any new knowledge gained from the process.

Why were you chosen for this research?

You have been chosen to participate in this research project because you have worked in projects relating to green urban water infrastructure. You would have either been contacted directly by myself through our previous collaborations or through your colleague, who would have recommended you based on your expertise and experience.

Source of funding

This project is funded by the Australian Government's Australian Research Council (ARC) Discovery Early Career Researcher Award (DECRA), project code DE170100042, titled "Virtual Reality for Planning of Green Urban Water Infrastructure".

Consenting to participate in the project and withdrawing from the research

Prior to the activities, you will be asked to sign a consent form. You have the right to withdraw from further participation at any stage along with any implications of withdrawal. It will not be possible to withdraw the answers given after the interview has concluded.

Possible benefits and risks to participants

The findings of this research will help improve the green urban water infrastructure planning process and identify potential pathways to improve the lifespan of existing and new assets. The research will also provide practitioners a new means of experimenting with new methods of collaboration and communication through the computer gaming exercise proposed in the workshop activity. This research does not put you at any personal risk and will only take some of your time.

Confidentiality

Any data collected during this research will be treated confidentially. Anonymity will be protected both for the interviewee and his/her organisation. Any personal information connected to the data will only be used in the case of clarification sought with the participant. If requested by the participant, data in its original raw form can be stored in an unidentifiable form. Interviews will be recorded and transcribed. During the workshops, audio and possibly video recording may take place. Pictures might be taken of the participants. In all three cases, a clearly stated consent of all the participant(s) will be sought. No personal details will be shared with any third party at any time. It should be noted that researchers cannot guarantee confidentiality of actions or anything spoken during the workshops by participants as the activity will be performed in groups of participants.

The publication of results will only contain general findings and aggregated information. Results will be published in scientific conference proceedings and peer-reviewed journals.

Storage of data

Interviews will be transcribed and the opinions and experiences of our participants will constitute the data of this research. Transcriptions and recordings will be stored in a secured server, which is only accessible by the research team registered in the Monash University Ethics Application (i.e. the above names). Upon completion of the project, all collected data will be destroyed.

Use of data for other purposes

Only aggregated de-identified data may be used for other projects where ethics approval has been granted. All original data will be destroyed upon project completion.

Results

Results from the research will be disclosed through publications in journals and at conferences. Upon request, we can provide you a copy of these publications and your own personal recording and transcription. Participants will be able to receive a copy of these documents and their own personal transcripts upon request.

Complaints

Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
Room 111, Chancellery Building E,
24 Sports Walk, Clayton Campus
Research Office
Monash University VIC 3800

Tel: +61 3 9905 2052 Email: muhrec@monash.edu Fax: +61 3 9905 3831

Thank you,



Peter Marcus Bach



3rd Water Sensitive Cities Conference

Making the transition: Case studies and practical lessons for water sensitive cities

Perth Convention and Exhibition Centre, Australia | July 18 - 20, 2017

Conference Program

As of 1 February 2017 - subject to change

Time	WSC Conference DAY 1 - Tuesday 18 July 2017	
9:00	Session 1: Opening Plenary	
	Welcome Address CRCWSC at the midway point <i>Tony Wong, CEO</i> Keynote #1: Progress in the Transition of Perth into a Water Sensitive Cities <i>Mike Rowe, Department of Water</i>	
10:30	Morning Break	
11:00	Session 2a: Engaging communicates in water sensitive cities transition - the Elster Creek project Development of a community vision for the Elster Creek Precinct in Elwood The translation of the vision into tangible initiatives in terms of urban water infrastructure, building social and structural flood resilience, and urban design. The operationalisation of the community vision through integrated projects across three municipalities and two water utilities.	Session 2b: Recent advancement in water technologies New insights in the development of new water management technologies; <ul style="list-style-type: none"> • Efficiencies in sewage management • Nutrient recovery • Biofilters and green walls • Catchment characterisation for effective stormwater harvesting • Relevant research synthesis project / case study's
12:30	Lunch	
13:30	Session 3a: From research synthesis to practice and implementation Case studies of recent research synthesis projects <ul style="list-style-type: none"> • Aquarevo - South East Water • Project TBC 	Session 3b: Urban development and managing surface and groundwater interactions: insights from Perth-based research and practices Presentation from Perth-based participants from project B2.4; <i>Hydrology and nutrient transport processes in groundwater/surface water systems</i>
15:00	Afternoon Break	
15:00	Session 4a: Formulating transition plans An overview on outputs from Trance 1 projects (2012 – 2016) and progress on Tranche 2 Project (2016 – 2021) <i>Water sensitive city transition strategies and implementation plans (IRP1)</i>	Session 4b: Economic Valuation of Water Sensitive Cities An overview on outputs from Trance 1 Projects (2012 – 2016) and progress on Tranche 2 Project (2016 – 2021) <i>Comprehensive economic evaluation framework (IRP2)</i>
17:30	Close	
18:30	Water Sensitive Cities Annual Participants Dinner	



Time	WSC Conference DAY 2 - Wednesday 19 July 2017	
9:00	Session 5: Keynotes – Emerging applications of water sensitive cities principles and practices	
	Keynote #2: Water sensitive cities and human health outcomes in developing countries <i>Prof. Rebekah Brown, Director, Monash Sustainable Development Institute</i>	
	Keynote #3: Water utilities of the future	
10:30	Morning Break	
11:00	Session 6a: CRCWSC International	Session 6b: Tools for achieving integrated planning and decision making
	<ul style="list-style-type: none"> Influencing global practice CRCWSC Projects in China Knowledge Partnership with the Asian Development Banks 	Overview of the CRCWSC suite of software tools and products <ul style="list-style-type: none"> Dance4Water WSC Toolkit and the urban micro-climate module
12:30	Lunch	
13:30	Session 7a: The Water Sensitive Cities Index	Session 7b: Designing liveable cities through heat mitigation
	An overview of the theoretical basis of the WSC Index, the 7 goals and 34 indicators; assessment through the lenses of sustainability, resilience, and liveability; cities performances against the three principles of practice – cities as water supply catchments; cities providing ecosystems services; building social and institutional capital for water sensitive cities.	<ul style="list-style-type: none"> Research outputs Industry case studies
15:00	Afternoon Break	
15:30	Session 8: Summary and Closing	
	An overview of IRP3 and IRP4 <i>Prof. Jurg Keller, CRO</i>	
	Panel Q&A <i>CRC Board Members and Prof. Tony Wong, CEO</i>	
16:30	Closing Remarks <i>Dr. Cheryl Batagol, Chairman of the CRC Board</i>	
	Close	



Time	WSC Conference DAY 3 - Thursday 20 July 2017	
9:00	Training Session 1: Designing green infrastructure for heat mitigation and multiple-benefits using WSC Toolkit	Training Session 2: Engaging stakeholders in a water sensitive city
10:30	Morning Break	
11:00	Continuation of training session 1	Continuation of training session 2
12:30	Lunch	
13:30	Training Session 3: Designing groundwater-sensitive urban developments	Training Session 4: Stormwater characterisation and harvesting
15:00	Afternoon Break	
15:30	Continuation of training session 3	Continuation of training session 4
17:00	Close	



WESTERN Regional Advisory Panel

Meeting No. 24

MN2: Project Meeting Notes

WA Trustees
Building, L2, 133
St Georges Tce
Board Room @
8:00am

18/01/2017

1.	<p>B1.2 Catchment Scale Landscape Planning for Water Sensitive Cities in an Age of Climate Change (Project Leader Darryl Low Chow, WRAP contact Ben Harvey)</p>
2.	<p>B2.23 Protection and restoration of urban freshwater ecosystems: informing management and planning (Project Leader Peter Davies, WRAP contact Antonietta Torre)</p> <p>The Victorian component of the project is complete. The WA component is due to be completed by 30 June 2017. Project Researcher, Dr Leah Beesley, is working on the riparian guidelines, the fact sheets and the RESTORE tool. The draft fact sheets to instruct managers on repairing the nine ecosystem components shown in the RESTORE tool are being finalised and will be made available for review by industry stakeholders. PhD Student, Jen Middleton, will undertake her second round of nutrient sampling on urban streams and drains around Perth in March 2017.</p>
3.	<p>B2.4 Hydrology and Nutrient Transport Processes in Groundwater/Surface Water Systems (Project Leader Carolyn Oldham, WRAP contact Antonietta Torre)</p> <p>Prof. Carolyn Oldham and Dr Carlos Ocampo presented their research findings at a highly successful workshop held on 25 November 2016. The workshop presentations are available on the New Water Ways website at http://www.newwaterways.org.au/Research/CRCWSC-Project-B2.4-Hydrology-and-nutrient-transport-processes-in-groundwatersurface-water-systems. A report on the workshop outcomes will be made available to the WRAP.</p> <p>The report <i>Guide for monitoring performances of WSUD elements in areas of shallow groundwater</i> has been completed and is going through the CRCWSC publication process.</p> <p>The report <i>Performance of two urban stormwater biofilters in an area with seasonally high groundwater</i> has been published and is available at https://watersensitivecities.org.au/content/performance-two-urban-stormwater-biofilters-area-seasonally-high-groundwater/</p> <p>Carolyn Oldham, Emma Yuen and Shelley Shepherd have been liaising with industry stakeholders in other states to scope interest, issues and potential project sites for the Tranche 2 Integrated Research Project 5 (IRP5) <i>Knowledge-based water sensitive city solutions for groundwater impacted developments</i>. The IRP5 workshop has been tentatively booked on Thursday 6th April 2017.</p>
4.	<p>B4.2 Social-Technical Flood Resilience in WSC – Adaption across spatial & temporal scales. (Prct Leader Richard Ashley, Phd Student Amar Nanda, WRAP contact Nominations tbc Neil Burbridge)</p> <p>. The challenge of managing wetland ecosystems impacted by climate change and urbanisation was examined at an interdisciplinary workshop held on 29 November 2016 at the University of Western Australia. The event saw the Department of Parks and Wildlife, the City of Armadale, the Department of Water and the Friends of Forrestdale Community group work together with scientists to visualise objectives, thresholds, and measures to adapt wetland management to a drying climate. Lake Forrestdale, a large regional wetland listed internationally as a Ramsar wetland, was used as a case study.</p>



	<p>An article on the project and the workshop outcomes titled <i>A framework for urban wetland management in the Water Sensitive City</i> was published by the CRCWSC in February 2017, available at https://watersensitivecities.org.au/content/a-framework-for-urban-wetland-management-in-the-water-sensitive-city/</p> <p>Research on this project is being undertaken by Amar Nanda, PhD student. Amar is currently working with another post-doc on the surface water-groundwater modelling for Forrestdale Lake. The model has been applied to estimate stormwater retention and groundwater recharge in the catchment. The students are liaising with environmental water planning and modelling experts at the Department of Water to use the Department's calibrated and peer reviewed PRAMS 3.5.2 model and future climate projections.</p>
5.	<p>B5.1 Statutory Planning for Water Sensitive Cities (Project Leader Barnaby McIlrath, PhD Don Williams, WRAP contact Ben Harvey)</p> <p>PhD student Don Williams is examining the performance of the Better Urban Water Management framework in achieve water sensitive urban design outcomes in Western Australia. Don is using Wungong Precinct E as a case study and will be conducting interviews with relevant stakeholders over March-May 2017 in relation to the BUWM framework applied to this case study. Don will likely visit Perth in the first week in May to meet with stakeholders and undertake field visits.</p> <p>The B5.1 report will be available for review when?</p> <p><u>Key recommendations from the B5.1 project are attached (confidential). Please note these recommendations are not to be distributed to anyone outside of the RAP as they are subject to refinement.</u></p>
6.	<p>C5.1 Intelligent urban water systems (Project Leader Rachel Cardell-Oliver WRAP Contact Sergey Volotovskiy)</p> <ul style="list-style-type: none">
7.	<p>D1.4 'Learning through Integration and Demonstration' (Project Leader Celeste Morgan, WRAP contact Antonietta Torre)</p> <p>A Project Advisory Group meeting was held on 14 February 2017. The preliminary results of the national industry survey (seeking information on projects used as WSUD demonstrations/case studies) were discussed. Proving technical viability was cited as the most common reason for use of case studies, as well as inspiration. The survey close on 9 December 2016. 170 people participated in the survey, identifying 254 suggested WSUD reference projects across Australia and internationally. 38 of these suggested sites/projects are in WA. Criteria is being developed to shortlist the nominated case studies for potential inclusion in a compendium / flipbook of WSUD snapshot case studies. Survey respondents indicated that information on business cases associated with case studies is required. Format of the case studies was discussed, e.g. online portal and/or a report.</p> <p>Celeste Morgan, D1.4 Project Leader, visited Perth to attend the New Water Ways & CRCWSC bus tour of the White Gum Valley Waterwise Exemplar Development on 28 February 2017. While in Perth, Celeste interview key stakeholders about the project. The project will be written up as a CRCWSC case study. The CRCWSC has contributed funding towards the White Gum Valley research and communication program.</p> <p>Other case studies currently being explored under the project include the green/living wall trial at Bentley (WA), the vertical gardens at Central Park in Sydney and the heat mitigation trial at Adelaide airport.</p>
8.	<p>D5.1 Urban intensification and green infrastructure: towards a water sensitive city (Project Leader Diego Romirez-Lovering, WA led by - Geoffrey London (UWA) WRAP contact Greg Ryan)</p> <ul style="list-style-type: none">
9.	<p>IRP1 WSC Transition Strategy and Implementation Plans (Project Leader Briony Rogers, WA Regional Representatives Don Crawford and Cara Bourne)</p>



	<ul style="list-style-type: none"> The Regional Manager, Water Sensitive Transition Network and IRP1 project team will all 														
10.	<p>IRP2 Comprehensive Economic Evaluation Framework (Project Leader Sayed Iftekhar, WRAP contact Naomi Rakela)</p> <ul style="list-style-type: none"> Second steering committee meeting held on 24/01/2017 Some changes to the steering committee due to people moving on to other organisations, committee currently seeking replacements (not applicable to WA). Contacts for case studies allocated as per table below: <table border="1"> <thead> <tr> <th>Case study / Work package</th><th>Individual members</th></tr> </thead> <tbody> <tr> <td>WP5.1 (Greening pipeline)</td><td>Grace</td></tr> <tr> <td>WP5.2 (Subiaco case study)</td><td>Ursula</td></tr> <tr> <td>WP5.3 (Living stream)</td><td>Naomi</td></tr> <tr> <td>WP5.4 (Arden- Macaulay)</td><td>Greg</td></tr> <tr> <td>WP5.5 (Breakout Creek)</td><td>Mellissa</td></tr> <tr> <td>WP6 (Urban Heat Island)</td><td>Grace</td></tr> </tbody> </table> <ul style="list-style-type: none"> Three new appointments to the IRP2 team. <ul style="list-style-type: none"> Dr. Kerry Nice completed his PhD at Monash University on the topic modelling water sensitive urban design (WSUD) features with the Vegetated Temperatures of Urban Facets in 3-D (VTUF-3D) urban micro-climate model. Kerry will be based at Monash working mainly on WP6 on urban heat island mitigation with Prof. Nigel Tapper. Dr. Asha Gunawardena is a post-doctoral researcher at the Centre for Environmental Economics and Policy, School of Agriculture and Environment, UWA. She will be working on updating the non-market valuation database and development of benefit transfer tool. Mrs. Tamara Harold is a Research Officer in the Centre for Environmental Economics & Policy. Tammie will be working on the communication and stakeholder engagement. The next immediate task is to start working on the stakeholder engagement strategy. Project initiation scoping meetings currently being organised for WP5.2 and WP5.3 case studies, updates to be provided in due course. Sayed Iftekhar presented on IPR2 at recent CRCWSC Business Case workshop on 21/02/2017. 	Case study / Work package	Individual members	WP5.1 (Greening pipeline)	Grace	WP5.2 (Subiaco case study)	Ursula	WP5.3 (Living stream)	Naomi	WP5.4 (Arden- Macaulay)	Greg	WP5.5 (Breakout Creek)	Mellissa	WP6 (Urban Heat Island)	Grace
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11.	<p>WSC Tools & Products (TAP) (Project Leaders Jurg Keller & Christian Ulrich, WRAP Contacts Nick Deeks, Giles Pickard)</p> <ul style="list-style-type: none"> TAP1 - WSC Index TAP2 - WSC Integrated Modelling tool kit TAP3 - DanCE4Water modelling tool kit 														
12.	<p>Knowledge Transition Tools and Services (KATS) (Project Leader Barry Ball, WRAP contact Shelley Shepherd) Capacity Building Collaboration - New Water Ways & CRCWSC Key activities</p> <ul style="list-style-type: none"> Bus trip to WGV – 46 attendees. Thanks to Landcorp and JBA for providing speakers 														



	<ul style="list-style-type: none">• Local work plan for 2017 to 2020 – see draft for comment• Planning for LIAWA/DoP/NWW Symposium on Trees – Tuesday 4th April at DoP (see attached draft program)• Planning for joint AWA/NWW/CRCWSC/SWA community day – Friday 21 April (see attached outline)• Planning for targeted workshops, focussed events and industry note<ul style="list-style-type: none">o LandCorp development managers – 24 and 27 Marcho City of Armadale WSUD policy reviewo WSC workshop - Delivering street trees in existing neighbourhoods – design exercise in Melville with other local governmentso Industry practice note/ guidance - Car park retrofits for WSUD – improving stormwater and microclimate outcomes. Draft in April
13.	Research Synthesis <ul style="list-style-type: none">•

CRCWSC Western Region EVENT SCHEDULE 2016-2017

	Event	Topic	Organisation(s) in Charge
2017	2017	2017	2017
Tue 21 & 22 February	IRP1 Workshop 2	IRP1 Perth Workshop 2	CRCWSC Water Corp
Tues 21st Feb 2017	NWW introductory training session	Better Urban Water Management	NWW
Mon 27th February	Board Meeting	TAP program introduced	CRCWSC
28th Feb 2017	WS Demonstration Tours	One Planet Living	NWW
9th March 2017	NWW Event	How organic bio-filtration media works	NWW Richgro
Wednesday 15th March	Regional Advisory Panel		CRCWSC WR
17th March 2017	IPWEA-WA	City Super day Sustainability	IPWEA
23rd March 2017	AWA Seminar – Murdoch Uni	Academia and Industry: science – practice partnerships	AWA
29th March 2017	WS Demonstration Tours	Kalamunda Hatfield Park	NWW
??? March tbd	IRP5 Workshop	Proposal Development – Perth	CRCWSC
Tues 4 – Thurs 6 April	UDIA National Congress	(Crown Perth)	UDIA
8 - 23 April 2017	WA School Holidays	Term 1 WA School Holidays	
14 April	Good Friday		
2-3 May 17	IRP1 Workshop 3	TBA Proposed Event – Water Corp –	CRCWSC Water Corp
21st Apr 17 Tentative	Community Involvement Day	AWA/SWA/NWW/CRCWSC	NWW
3rd-5th May 2017	2017 Stormwater Victoria Conference	Time for a Watershed	
16-18 May 17	AWA's Ozwater		AWA
Wednesday 17th May	Regional Advisory Panel		CRCWSC WR
Tuesday 23rd May	NWW introductory training session	Groundwater management for urban development	NWW
Monday 22th May	Board Meeting		CRCWSC
Tuesday 20th June 2017	NWW introductory training session	Local Water Management Strategies - how to get it right	NWW
1 – 16 July 2017	WA School Holidays	T2 WA School Holidays	
12-14 July 2017	ECOCITY World Summit	Melbourne, Victoria	
18 -20th July	3 rd Water Sensitive Conference	Perth, Western Australia	CRCWSC Nat
Wednesday 19th July	Regional Advisory Panel		CRCWSC WR

	Event	Topic	Organisation(s) in Charge
Tuesday 25th July	NWW introductory training session	Biofilters	NWW
Tuesday 15th August	NWW introductory training session	Retrofitting for WSUD	NWW
23-25 August 17	2017 Stormwater NSW	Conference	
27 Aug – 1 Sept	World Water Week Stockholm	Water and waste – reduce and reuse.	Stockholm Intl Water Instit (SIWI)
Tuesday 19th Sept	NWW introductory training session	Maintenance	NWW
23 Sep – 8 Oct 2017	WA School Holidays	T3 WA School Holidays	
10 – 13 October 2017	2017 Stormwater QLD	Conference	
15 Dec – 28 Jan 2018	WA School Holidays	T4 WA School Holidays	
February 2018	10th International Water Sensitive Urban Design	(WSUD) Conference, Perth	Engineers Au, AWA Stormwater WA
CRC Board, Executive Or Committee Meeting	CRC Project Event	CRC Special Event	
CRC Project Team Meeting	CRC Synthesis Event	National External Event	
Regional Advisory Panel Meeting	Capacity Building -Public	WA External Event	
	Capacity Building - Invite	WA School Holidays	