



**7<sup>th</sup> International Conference  
on Water Sensitive Urban Design**  
21 – 23 February 2012  
Melbourne Cricket Ground, Melbourne, Australia



## Final Program and Abstract Book

[www.wsud2012.com](http://www.wsud2012.com)

Hosted by



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## Welcome

On behalf of Engineers Australia and the Centre for Water Sensitive Cities, we are delighted to host the 7<sup>th</sup> International Conference on Water Sensitive Urban Design (WSUD2012), in Melbourne, Australia, in the week of 20<sup>th</sup> to 24<sup>th</sup> February 2012. Since the first WSUD conference in Melbourne some 12 years ago, we have seen the practice of water sensitive urban design grow; now practitioners from a range of disciplines regularly engage with one another and WSUD is familiar territory for local, state and government agencies and is commonly included in their policies. Furthermore, these concepts are not just recognised in Australia, but we see this implemented even overseas. This is the decade of “Water Sensitive Cities”, where we will work together to address significant issues of sustainability in cities of the future. From our personal perspective, the forthcoming commencement of the CRC for Water Sensitive Cities will capture the very essence of this very exciting period for WSUD, the process that is the foundation of future Water Sensitive Cities.

Understanding the nexus between sustainable urban water management and the vitality, liveability and prosperity of urban communities is one of the most significant challenges of the 21<sup>st</sup> Century. Many urban communities are now faced with rising temperatures, longer and more severe droughts, more frequent and devastating floods and increased levels of water borne pollutants. All of these diminish the liveability of our urban areas and degrade our natural environments.

Building a water sensitive community cannot be achieved with traditional urban water management approaches alone. To meet this challenge, an integrated approach is necessary; we should strive to effectively link the myriad design and implementation cultures of the different disciplines involved in urban water management. We hope that WSUD2012 will provide you with an opportunity to realise how this linking is possible, and that this conference be the first stepping stone toward building the water sensitive community.

WSUD2012 will introduce three categories of presentations (traditional, practice and soap-box), devised to encourage a greater level of participation across all sectors. In addition, five international and national specialists have kindly accepted our invitations to present keynote addresses covering five diverse but interrelated disciplines contributing to the creation of water sensitive communities. Our proceedings through the week also reflect this diversity in practice disciplines. The conference program also includes a number of pre- and post-conference workshops, technical tours and social functions.

We are grateful for the support of our sponsors, without whom a conference such as this cannot be successfully staged. We are also delighted at the presence of many overseas participants, making WSUD2012 one of the major international conferences in the field of water sensitive cities. Finally, we are especially appreciative to all reviewers, whose efforts have ensured the quality of the submissions.

If you are a visitor to Melbourne, we trust you will enjoy your time in one of Australia's most exciting destinations. Melbourne is a large modern city with a rich heritage, bustling with a unique fusion of culture, cuisine and beauty. It is also Australia's sporting capital and the heartland of the nation's fashion industry. Prepare to be impressed with what Melbourne has to offer!

Thank you for coming. We wish you a rewarding conference!

**Tony Wong**  
*Chairman, Organising Committee*

**Dave McCarthy**  
*Deputy Chairman, Organising Committee  
Chairman, Scientific & Technical Committee*



## Organising Committee

**Professor Tony H F Wong**, *Director & Chief Executive, Centre for Water Sensitive Cities, Monash University Conference Chair*

**Dr Dave McCarthy**, *Lecturer, 2009 Churchill Fellow, Centre for Water Sensitive Cities, Civil Engineering Department, Monash University - Chairman of the Scientific and Technical Committee and Conference Deputy Chair*

**Phil Edwards**, *Melbourne Water*

**Jamie Ewert**, *Melbourne Water*

**A/Prof Phillip Johnstone**, *Science-Policy Partnership, Centre for Water Sensitive Cities (Monash) & Department of Sustainability and Environment (Victoria)*

**Deborah Kuh**, *Associate Director - Design, AECOM*

## Technical Committee

**Dr Dave McCarthy**, *Lecturer, 2009 Churchill Fellow, Centre for Water Sensitive Cities, Civil Engineering Department, Monash University - Chairman of the Scientific and Technical Committee and Conference Deputy Chair*

**Prof Richard Ashley**, *Department of Civil and Structural Engineering, University of Sheffield, UK*

**A/Prof Peter Breen**, *AECOM, Australia*

**Prof Rebekah Brown**, *Centre for Water Sensitive Cities, Monash University*

**Prof Ana Deletic**, *Centre for Water Sensitive Cities, Monash University*

**Prof Tim Fletcher**, *The University of Melbourne, Australia*

**Prof William Hunt**, *North Carolina State University, USA*

**Prof Wolfgang Rauch**, *Innsbruck University, Austria*

**Dr Allison Roy**, *Department of Biology, Kutztown University, PA, USA*

**Prof Nigel Tapper**, *Professor of Environmental Science, School of Geography & Environmental Science, Monash University*

**Prof Leon van Schaik AO**, *Professor of Architecture - Innovation Chair, School of Architecture & Design, RMIT University*

**Prof Chris Zevenbergen**, *Professor of Flood Resilience of Urban Systems, UNESCO-IHE, The Netherlands*

## Host Organisations

**Centre for Water Sensitive Cities,  
Monash University**



The twin challenges confronting Australian cities and towns of accommodating increasing population and the effects of climate change have implications for almost every aspect of water in our urban environments. Through the practice of Water Sensitive Urban Design, the planning and design of a "Water Sensitive City" responds to issues of water conservation and water security, risk of flooding, degradation of urban waterways and rising temperatures, in a way that enhances the liveability of our cities and towns. The notion of water sensitive Australian cities has featured in government policies, including the Victorian Government's Green Paper on Climate Change Adaptation (June 2009), but how to get there remains largely undefined.

The vision endorsed by the Centre for Water Sensitive Cities is to transform cities and their communities in ways that will help them to live in harmony with natural water environments.

The Centre will play a pivotal role in transforming Australian cities to become resilient to current and future challenges.

The Centre is building Australia's capacity to advance sustainable urban water practices through

- research excellence
- engagement with planning, development and water management professions, and
- supporting the development of government policies

## Engineers Australia



Since 1919, Engineers Australia has provided the national focus for the development of all aspects of engineering as well as representing the interests of engineers and the communities they serve.

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## Sponsors

The Conference Organising Committee gratefully acknowledges the support of the following organisations that have contributed to the WSUD 2012 Conference:

**Platinum Sponsor**  
Melbourne Water



**Competition & USB Sponsor**  
Centre for Water Sensitive Cities,  
Monash University



## Keynote Speakers

### Professor Richard Ashley



Richard Ashley is a Professional Civil and Environmental Engineer, Director of EcoFutures Ltd (<http://www.ecofutures.eu/>), Professor of Urban Water & former Managing Director of the Engineering and Physical Sciences Research Council funded multi-disciplinary Platform Centre, the Pennine Water Group (PWG) at the University of Sheffield. He has more than 300 publications in journals, articles, reports and books. He led the urban area flooding aspects of the UK Government's 2004 Foresight Future Flooding study, the AUDACIOUS project on adapting local drainage to climate change; acted as specialist scientific advisor to the UK Government House of Lords Scientific Committee inquiry into water management, was involved in three UK Government flagship local drainage pilot studies and advised the Government Cabinet Office inquiry into the UK 2007 floods, undertaken by Sir Michael Pitt. He is involved in 4 current EU projects related to flood resilience, water, sanitation and climate change. He has been a visiting Professor at a number of international Universities and has recently taken up a part-time position at UNESCO IHE, Delft, in Flood Resilience ([www.floodresiliencgroup.org/frg/](http://www.floodresiliencgroup.org/frg/)) and at the University of Bradford in an EU environment framework project adapting water supply and wastewater systems to climate change and at Lulea technical University as an adjunct professor. He won the International Water Association's biennial Prize for Research Excellence in Support of Sustainable Urban Water Management in 2008. His most recent activities are in advising the Australian Academy of Technological Sciences and Engineering on adapting to climate change in the urban environment; the OECD on flood risk management in the Loire catchment; reviewing the Dutch Room for the River programme; Thames Water on the scope for retrofitting SUDS in London and is engaged in a CIRIA project on retrofitting surface water management. He is in process of being appointed a part-time position as adjunct Professor at Luleå University in Sweden. Richard will bring a wealth of knowledge to the 7th International Conference on Water Sensitive Urban Design, especially with regard to sustainable urban water systems, flooding and climate change research."



## Keynote Speakers

### Professor Nigel Tapper

Professor Nigel Tapper holds a Personal Chair in Environmental Science at Monash University where he has recently served as Head of the School of Geography and Environmental Science, Foundation Director of the Monash Sustainability Institute, and Joint Coordinator of the Monash Atmospheric Science Program. He is currently on the Executive of the Monash Centre for Water Sensitive Cities, Project Leader in the Cities as Water Supply Catchments Program and is a designated Key Researcher in the new CRC for Water Sensitive Cities. In the climate change space Nigel serves on the Implementation Committee of the Victorian Centre for Climate Change Adaptation Research and is actively involved in the work of the IPCC, including the IPCC Expert Panel on Infrastructure and Settlements. Nigel has an active research program in surface atmosphere interaction, climate change adaptation and mitigation, and climate impacts, especially as they relate to urban environments, human health, dust and fire.



### Professor David Pannell

David Pannell is Winthrop Professor in the School of Agricultural and Resource Economics at the University of Western Australia, Director of the Centre for Environmental Economics and Policy, and an ARC Federation Fellow. He has been a prominent commentator on environmental policy within Australia, arguing for policies that better reflect scientific, economic and social realities. He was President of the Australian Agricultural and Resource Economics Society in 2000, a member of the WA Government's Salinity Taskforce in 2001, and a director on the Board of Land and Water Australia 2002-05. His research includes the economics of land and water conservation; environmental policy; farmer adoption of land conservation practices; risk management; and economics of farming systems. His research has been published in five books and 160 journal articles and book chapters, and has been recognised with awards from the USA, Australia, Canada and the UK, including the 2009 ARC Eureka Prize for Interdisciplinary Research.



### Professor Stuart Bunn

Professor Stuart Bunn is the Director of the Australian Rivers Institute at Griffith University in Brisbane. His major research interests are in the ecology of river and wetland systems, with a particular focus on the science to underpin river management, including environmental flow assessment and the development of tools to assess aquatic ecosystem health. This research has resulted in over 200 technical publications, most of which are refereed journal papers and conference proceedings. Stuart has extensive experience working with international and Australian government agencies on water-resource management issues. He is Chair of the Scientific Advisory Panel for the Lake Eyre Basin Ministerial Council, Deputy Chair of the Scientific Expert Panel for the Healthy Waterways partnership in South East Queensland and leads the Australian Climate Change Adaptation Research Network for Water Resources and Freshwater Biodiversity. In 2008 he was appointed as an Australian National Water Commissioner. Stuart will bring internationally recognised expertise to the 7<sup>th</sup> International Conference on Water Sensitive Urban Design in the area of aquatic ecosystem protection and management.



### Jon Shinkfield

Jon Shinkfield is a Principal of the design firm AECOM with extensive design and masterplanning experience of public spaces. Jon's high calibre portfolio has been recognised through various awards, competition wins and publications. His projects and team leadership are characterized by a pursuit of higher order ideals embedded in long term sustainable goals combining complex urban design issues and leading conceptual applications in landscape architecture. Projects such as E-Gate in Melbourne (carbon neutral and car free city piece), Masdar City in Abu Dhabi (carbon neutral and car free city) and Melbourne's Southbank Structure Plan are indicative of the teams and projects that he is leading. In addition he has recently directed the team responsible for winning the international competition for Seoul Grand Park in Korea. The winning entry, Gaia: The Living World, envisions an integrated entertainment and educational experience that revitalises the urban realm and showcases Korean heritage. Jon's project focus stems from his passion for systems based thinking and his ongoing exploration of 'how does a designer inform practice with theory, and how do theorists gain the insight of practice?'



- Prof Chris Zevenbergen, Professor of Flood Resilience of Urban Systems, UNESCO-IHE, The Netherlands

# Rainwater tanks and water supply

## analysis # 2

**Wednesday, 22 February 2012 13:30 - 15:10, Jim Stynes Room A**

*Chair* Mr Tony R Weber BMT WBM Australia

**The Impact of Spatial and Temporal Averages on Prediction of Water Security Using Network Analysis - Understanding the True Potential of WSUD**

- [Dr Peter Coombes](#), Bonacci Water, Australia

**A Framework for Reducing Water Demand in Multi-Storey and Detached Dwellings in the United Arab Emirates**

- Prof Abdullah Shanableh, University of Sharjah, United Arab Emirates

**Study of characteristics of polycyclic aromatic hydrocarbons (PAHs) pollution in urban roof runoff**

- Dr He Li, School of Civil Engineering, Southeast University, Nanjing, China, 210096, China

**A Comparison of TAMSAT Satellite Rain Derived Products with Meteorologically Measured Rainfall in the Volta Basin (West Africa)**

- Amos Kabo-bah, State Key Laboratories, Department of Hydrology and Water Resources,, China

**Emulating Pre-Urban Initial Rainfall Losses with Adaptive Rainwater Diversion**

- Mr Benjamin A Taylor, University of Southern Queensland, Australia