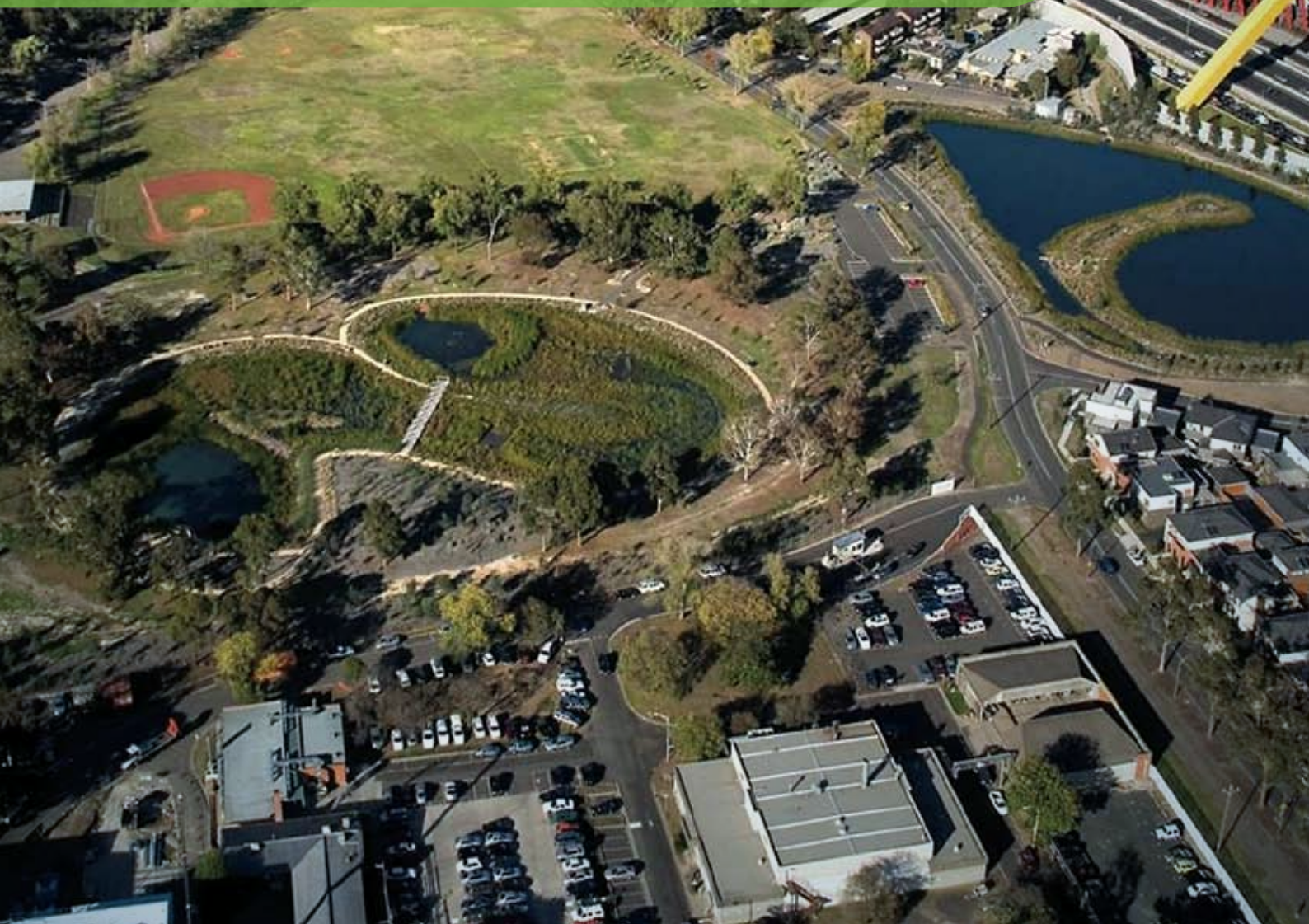
centre for water sensitive cities

# Water Sensitive Cities
## Winter School

Monash University
Clayton Campus,

11th to 15th July 2011



## Background

Many of today's societal challenges may be classified as wicked problems where it is often inappropriate to reduce these problems to a perceived single dimension for which a solution is developed. The perceptions of the causes of these challenges differ from one discipline to another and yet they are all relevant. We now recognise the complex dynamics of the socio-technical dimensions of challenges we face today and our cities are expressions of our efforts in solving many of these wicked problems. Water management in our cities plays a key role in defining and shaping our cities' future prosperity and well-being, as almost every aspect of our urban environment and quality of life is affected by the way we manage urban water.

## Overview

The Water Sensitive Cities Winter School is a unique opportunity to hear from Australia's leading researchers and thought-leaders on key actions in delivering water sensitive and liveable cities. Lectures and workshops will present latest solutions and concepts on required technologies for stormwater treatment, urban design and modelling, climate change adaptation, behavioural change, and social and government engagement. These cross disciplinary topics will all be linked to broader urban sustainability issues and lessons from the international community.

# Cost and Registration

## Industry Partners
$750

## Local Government / Non profit
$950 (early bird rate)
$1,100 (standard rate)

## Commercial & other
$1,300 (early bird rate)
$1,500 (standard rate)

Early bird finishes May 31st 2011

All prices are inclusive of GST

**Registration is available on the Events and Training section of the Clearwater website**
www.clearwater.asn.au/events_and_training

The Winter School is highly recommended for anyone across government and private industry requiring a comprehensive understanding on the practical elements of transitioning to a water sensitive city.

# Program

An intensive 5 day program consisting of half-day thematic sessions on a range of topics

### Sustainable Cities – Vision, Challenges and Opportunities

This session is convened by Prof Tony Wong and will present the overall context of the design of the Winter School: It will outline the many challenges of our cities associated with the aspirations of liveability, public well-being and prosperity in times of increasing population and climate change. Many organisations over the last few years have commenced envisioning future cities; some related to the overall theme of liveability, with others more focussed on climate mitigation and adaptation, urban water management, future transport and energy scenarios, etc. Because these aspects are all inter-related and equally important to deliver water sensitive cities, this session will present the background context for subsequent sessions throughout the week.

### Urban Climatology and Climate Responsive Designs

This session is jointly convened by Prof Nigel Tapper and Assoc Prof Jason Beringer. Cities are unique human constructions that transform the natural environment to produce a unique climate that is warmer, drier and less windy than the surrounding rural environs. Consequently, cities can be climatically hostile environments for people during heat waves, a situation likely to worsen under predicted climate change. This session will open with a presentation on urban climatology and the role of city form, structure and surface materials in the urban heat island, and the potential for stormwater and green infrastructure to improve climate and provide "head room" against unavoidable climate change. We will then visit some of our on-campus household-scale experimental plots to give participants "hands on" experience of some of the microclimatic techniques used to monitor the impacts of Water Sensitive Urban Design on microclimate.

### The New Hydro-Social Contract and Governance of Water Sensitive Cities

This session is convened by Prof Rebekah Brown and will focus on the social, institutional and governance dynamics of cities as they relate to the bio-physical dimensions of creating more sustainable urban water systems. Delivering water sensitive cities requires significant change and capacity development of professionals, organisations and institutions involved across the resource and land management spectrum. This session will present latest research on how to enable the shift from the traditional technocratic management approach, towards approaches that reflect the dynamics of resilience, adaptation and transformation of socio-technical systems. Examples of alternative approach from government agencies, water utilities and community groups will also be highlighted through an interactive panel discussion session.

### Behaviour Change and Water Sensitive Cities

This session is convened by Dr Liam Smith and will cover how changes in human behaviour can complement and assist transitions to water sensitive cities. There are many water sensitive behaviours that, if undertaken en masse, would make tangible differences to issues and dilemmas facing the water industry as well as pro-actively move toward greater water sensitivity. These behaviours vary from the acceptance and application of technology to undertaking, or not undertaking, simple tasks in the home. Through active participation and encouraging outside-the-box thinking, this session will encourage participants to first identify and then prioritise, based on a number of selection criteria presented, a range of water sensitive behaviours. Using multiple examples, the session will also guide participants through several theories of human behaviour and how they can be applied to design communication to influence prioritised behaviours.

### Understanding and Modelling Uncertainties

This session is jointly convened by Prof Ana Deletic and Dr David McCarthy and will focus on identifying and quantifying the key uncertainties in the design and operation of integrated urban water systems. It will start by introducing the broad concept of uncertainties in water resources management and explain the role of uncertainty analyses in decision making processes. It will then discuss each of the levels of uncertainties that link to the key sources of uncertainties (as per the latest thinking in the field), including: (1) total ignorance, (2) recognised ignorance, (3) qualitative uncertainty (4) scenario uncertainty and (5) statistical uncertainty. Each of the levels will be discussed in depth and will include a review of the latest methods and approaches used for their quantification. The session will include examples on how to assess uncertainties in urban drainage modelling that could be expanded to integrated urban water models.

### Aquatic Ecosystem Health and Ecosystem Services

This session is convened jointly by Prof Jennifer Davis and Assoc Prof Tim Fletcher and will cover the various ecosystem services that urban aquatic systems provide, and strategies for preserving and enhancing these ecosystems. Under a drying climatic regime, urban wetlands and waterways potentially play a vital role as aquatic refugia for wetland biota, in addition to providing new habitats to replace those lost due to urban expansion. Although most urban wetlands have been specifically constructed to fulfill only one or two major ecosystem services (nutrient retention and flood control) they potentially support multiple ecosystem services and values. These include: biodiversity support, microclimate modification, carbon sequestration, provision of recreational open space and landscape amenity. Whilst the need to manage urban aquatic landscapes to provide a wide range of ecosystem services and values is increasing, managing simultaneous ecosystem services can be extremely challenging. This theme will also consider the factors that impact on urban waterways and wetlands, and provide a framework for the design of stormwater harvesting and management systems to protect and restore urban aquatic ecosystems.

## Sustainability Advocacy and Effective Government Engagement

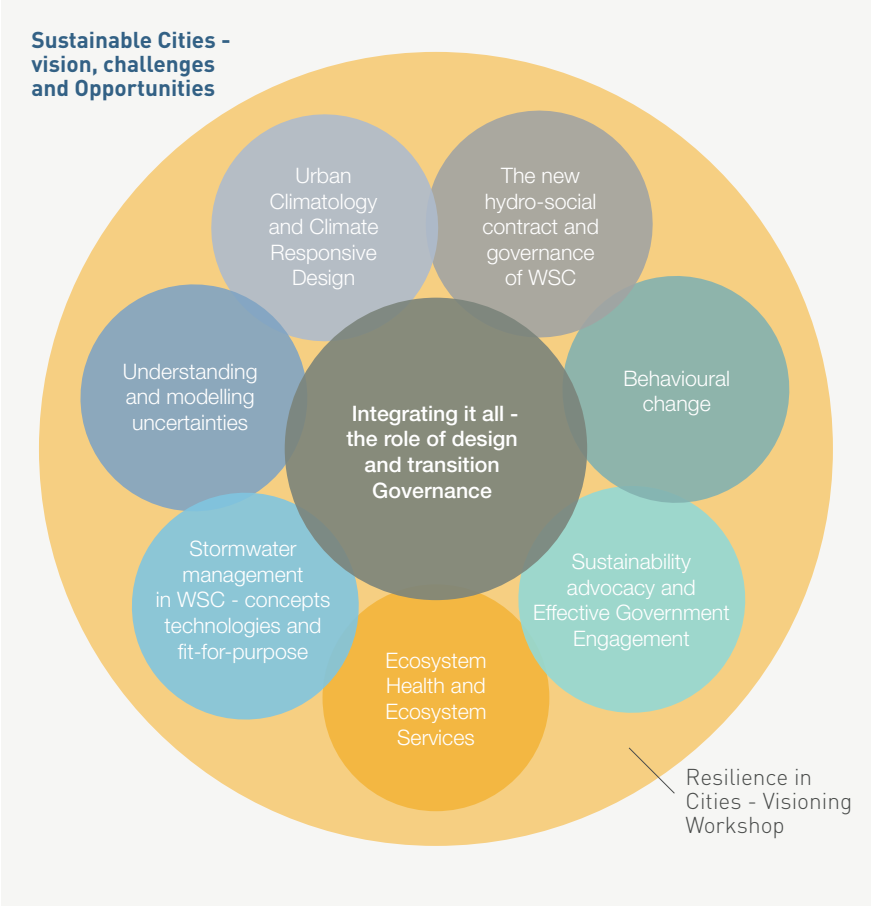
This session is convened by the Hon John Thwaites and will provide attendees with an understanding of the workings of governments and how best to influence the political process to achieve sustainability outcomes. Prof Thwaites will draw on personal experience as a senior Government Minister and use case studies from both Federal and State Government. The session will explore why it is difficult for the political process to deal with complex long term issues like water and climate change and will discuss potential solutions.

The session will examine

- The nature of modern government and how it influences political decision-making;
- How government deals with complex, long term problems;
- Ten commandments for influencing government policies and decisions;
- Community attitudes to water, environment and climate change;
- Communication and the media; and
- Working with government to achieve behaviour change for sustainability.

## Stormwater Management in Water Sensitive Cities - Concepts, Technologies and Fit-for-Purpose

This session is convened jointly by Dr David McCarthy and Prof Ana Deletic and will present emerging stormwater treatment technologies for environmental protection and human consumption. It will start by an overview of stormwater pollutants and environmental/ human risk posed by runoff from urban areas. Australian national guidelines for stormwater harvesting will be discussed, as well as stormwater management targets introduced. The session will then discuss the key treatment technologies and their consequential design concepts for future urban water management systems, encompassing water supply, waterway protection and flood management services. The topic will link to the sessions about Climatology, Ecosystems and Design & Transition Governance by outlining how these technologies could deliver multiple benefits to our cities. The session will finish by an example on how to retrofit a stormwater harvesting system in an existing built-up area.




## Integrating it all – The Role of Design and Transition Governance

This session is convened by Prof Tony Wong and will canvass the methods with which we can integrate the insights and strategies for water sensitive cities from the various disciplines into the physical and social cityscape. Urban design provides the means of physical integration of design initiatives across the disciplines while transition governance may serve as the pathway for transforming the social and institutional paradigm of cities.

## Resilience in Cities – Visioning Workshop

This session chaired by Professor Rebekah Brown will invite participants to reflect on the week's learnings and on the questions of defining and enabling resilience in cities - Linking social, ecological, flood, drought and micro-climate resilience.

# Presenters

The Winter School program will be delivered by the following thought leaders associated with the Centre for Water Sensitive Cities

### Associate Professor Jason Beringer

Jason is an Associate Professor at the School of Geography and Environmental Science and his primary areas of interest include micrometeorology, boundary layer climatology, land/atmosphere interactions, land surface modelling, remote sensing and global change (earth systems science). In particular, he is interested in the detection of changes in the environment and vegetation and its influence on surface energy and trace gas exchanges and ecosystem processes. These include vegetation and ecosystem change, urban change, and land/water interfaces.

### Professor Rebekah Brown

Rebekah is a Professor of Environment & Society within Monash University's School of Geography and Environmental Science, and a Director of the Centre for Water Sensitive Cities. With 18 years local and international experience in urban water practice and research, her primary research areas include socio-technical transitions, environmental governance and adaptive policy making. Rebekah has developed a unique framework for policy-makers and strategists to design and implement institutional capacity building programs to expedite the transition towards more sustainable water futures. She established Monash University's National Urban Water Governance Program in 2005, the first Australian research program focusing on the interrelationships between the social and technical realms for advancing more sustainable urban water futures. Rebekah also provides strategic advice on urban water governance to Local, State and Federal government agencies.

### Professor Jennifer Davis

Jenny is a Professor in Freshwater Ecology within Monash University's School of Biological Sciences. Her research in wetland and stream ecology, includes community ecology, bioassessment and biomonitoring, ecosystem resilience, non-linear dynamics, and the impacts of multiple stressors on urban and agricultural wetlands. She has worked on aquatic ecosystems in Victoria, Western Australia, Tasmania, central Australia, and Sarawak. Together with various co-authors, Jenny has published over 170 works and supervised 75 Hons and postgraduate students. She received the Vice-Chancellors Award for Excellence in Postgraduate Supervision at Murdoch University in 2004 and was awarded the Limnology Medal by the Australian Society for Limnology in 2006. Jenny is a member of the Editorial Board of Freshwater Biology, a member of INTECOL's International Wetlands Conference Organising Committee, the Chair of the ABRS Research Sub-Committee, and an independent scientist on the National Water Commission Framework for Assessing River and Wetland Health (FARWH) Steering Committee.

### Professor Ana Deletic

Ana is a Professor in Water Engineering within Monash University's Civil Engineering Department, and a Director of the Centre for Water Sensitive Cities. She has been involved in urban water research since the early '90s, studying stormwater management in Yugoslavia and Sweden. She completed her PhD at Aberdeen University in Scotland, and joined Monash University in 2003. Since joining Monash, she has formed a world renowned research group that focuses on development of technologies that employ sustainable, innovative ways for treating urban runoff for stream protection and human consumption. Biofiltration developed under her leadership was implemented across Australia and exported to Singapore and Israel. She is Associate Editor of 'Water Research', as well as Chair of the International Working Group on Data and Models, which operates under the Joint Committee on Urban Drainage (IWA/IAHR). Ana is a Fellow of Engineers Australia and in 2008 was presented with the Dean's Award for Excellence in Engineering Research.

### Associate Professor Tim Fletcher

Tim is internationally regarded for his expertise in stormwater quality, treatment and impacts. His research focus has included modelling stormwater flows, quality and the performance of stormwater treatment systems, along with ecosystem response to stormwater management. He co-leads, with Assoc Prof Walsh from the University of Melbourne, the Little Stringybark Creek project, which is monitoring the hydrological, water quality and ecological consequences of retrofitting a small urban catchment with rainwater tanks and biofiltration systems. Tim also has significant collaborations with INSA Lyon in France and was an invited professor there in 2008-9, focussing on stormwater quality monitoring, modelling and the performance of infiltration systems. Tim is an elected member of the IWA/IAHR Joint Committee on Urban Drainage and is particularly interested in the role of vegetation in stormwater management.

### Dr David McCarthy

David is recipient of Monash University's Research Accelerator Awards program as one of Monash University's emerging research leaders. David's research interests include: (1) improving monitoring regimes for urban stormwater systems, (2) novel modular porous pavement systems designed for reuse applications, (3) modelling of urban stormwater quantity and quality (mostly microorganisms), (4) quantifying model uncertainty, (5) development and design of stormwater harvesting systems and (6) characterising the microbial quality of both wet and dry weather stormwater flows.

### Dr Liam Smith

Liam is an Australian Research Council research fellow, a recipient of Monash's Research Accelerator award and the Director of the newly-formed Behaviour Change Initiative, an interdisciplinary group of leading researchers interested in behaviour change based at the Monash Sustainability Institute. Prior to taking up the role in the Behaviour Change Initiative, he was director of Monash University's Tourism Research Unit. Working extensively in applied scenarios such as zoological and national parks, his primary research interest is examining different persuasion attempts for their effectiveness in influencing behaviour. He has also worked with industry to identify target behaviours likely to succeed, the role of emotion in human behaviour and using behaviour theory to identify key messages to influence behaviour.

### Professor Nigel Tapper

Professor Nigel Tapper holds a Personal Chair in Environmental Science at Monash University. He is a past Head of the School of Geography and Environmental Science and was also Foundation Director of the Monash Sustainability Institute. Nigel has current research interests in surface-atmosphere interaction, climate change and variability and climate impacts, especially urban environments, human health and fire. Outside of Monash University he is a member of the Physics, Chemistry and Earth Sciences Research Evaluation Committee of ERA (Excellence in Research for Australia), is Chair of the National Committee for Geography, and is a member if the Implementation Committee of the Victorian Centre for Climate Change Adaptation Research and the IPCC Expert Panel on Infrastructure, Human Settlements and Spatial Planning.

### Professor John Thwaites

The honourable John Thwaites is a Professorial Fellow, Monash University, and Chair of ClimateWorks Australia and the Monash Sustainability Institute. He is a consultant at Maddocks Solicitors and also chairs the Climate Group Ltd in Australia, the Peter Cullen Water and Environment Trust, and the Australian Centre for the Moving Image. He is also a director of the Australian Green Building Council. John Thwaites was Deputy Premier of Victoria from 1999 until his retirement in 2007. During this period he was Minister for Health, Minister for Planning, Minister for Environment, Minister for Water, Minister for Victorian Communities and Victoria's first Minister for Climate Change. While Minister for Water, John Thwaites developed Victoria's Our Water Our Future water plan and led a successful water conservation program reducing water use throughout Melbourne by 22 per cent. He also led the Victorian Government's climate change program including five-star energy and water efficiency for all new homes, renewable energy and energy efficiency targets and state-based work on a national emissions trading scheme. As Planning Minster he introduced a new residential planning framework for Victoria and instigated Melbourne's planning strategy, Melbourne 2030.

### Professor Tony Wong

Tony is Chief Executive and Director of the Centre for Water Sensitive Cities. He has over 30 years experience in the fields of water resources management in both the rural and urban environment, with a recent focus on the water aspects of Ecologically Sustainable Development, particularly integrated urban water cycle management and Water Sensitive Urban Design. His expertise has been gained through consulting, research, and academia, and he has received a number of industry awards for the projects he has led. He was presented with the Sir John Holland Award as the Institution of Engineers Australia's 2010 Civil Engineer of the Year.

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Supported by Clearwater - **www.clearwater.asn.au**

**The Clearwater – Centre for Water Sensitive Cities Partnership**

Clearwater and the Centre for Water Sensitive Cities have established a 3 year partnership bringing together industry and academic leaders in water management and capacity building. Working closely with the Centre's Cities as Water Supply Catchments research program, the Clearwater Partnership key focus areas are:

- Fast-tracking the dissemination of research outcomes through tailored capacity building initiatives
- Influencing policy and decision makers across industry, state and local government
- Providing feedback to researchers and the Centre on industry needs and receptivity to the research.

For more information please visit
**www.watersensitivecities.org.au**

For more information concerning the registration process, please contact:

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