Water Sensitive Cities: Examples of cities making the transition

watersensitivocities.org.au
City transitions

It's possible to leapfrog the traditional evolution process by:
• Closer integration water resource management and urban planning
• A stronger focus on fit for purpose use of all sources of water
• Better use of natural assets (ecosystem services)
• Early engagement to align vision, pool expertise and resources and sustain effort
Large and small scale solutions for an integrated response

Spatial scale of implementation

- Large
- Small

Temporal scale of implementation

- Short
- Long

- Urban Planning & Design
- Architecture & Landscape
- Industrial Design
Example 1: A flood prone city

Kunshan (昆山) is a satellite city in the greater Suzhou region. Administratively, it is a county-level city within the prefecture of Suzhou. It is located in south eastern part of Jiangsu Province, China, adjacent to the Shanghai Municipality. It has been regarded as the back-garden, and lately the back-office of Shanghai.

Kunshan sits on Taihu Lake Plain in the Yangtze River Delta Area.

Present 2015
Population 人口
• 2 million

Future 2030
Population 人口
• 3.3 million
City of Kunshan to be China’s first CRC Incubator City for Water Sensitive Design and Technology

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On Friday 17 January in Kunshan, China, a three-party Memorandum of Understanding (MoU) between the CRC for Water Sensitive Cities (CRCWSC), the Kunshan City-construction Investment and Development Company (KCID) and the Planning Bureau of the City of Kunshan was signed. The MoU represents a combined commitment by the two Kunshan City agencies for city planning and city construction to “extensively use their future projects as incubators of new planning, design concepts and new technologies that are generated out of the CRCWSC and thus providing the opportunity to test research concepts and findings at a city-scale”.
• “Dialysis wetland” as kidney for water cleansing
• Internal river for toilet flushing to reduce potable water demand and support future population growth
• More storage in internal waterway for flood protection
• Parks for water cleansing and extreme flood events

City (polder) as a water supply catchment

Fit-for-purpose supply

More storage for flood protection

“dialysis wetland”

Internal waterway

“pumped to external waterway”
Architecture and Landscape Design Scale @ over 30 projects built or being built
Urban Planning and Design Scale @ Kunshan Ring Road Strategy
Industry Design @ water sensitive city furniture
Industry Design @ retrofitting existing road with water sensitive furniture
Integration platform to implementation water sensitive practice

Spatial scale of implementation

Temporal scale of implementation

Large

Small

Short

Long

Urban Planning & Design

Architecture & Landscape

Industry Design
Polder Real Time monitoring and control

Dashboard implemented

- Water level (m)
- Water quality

[Image of a dashboard showing water level and quality data for polder areas, with interactive elements for real-time monitoring and control.]
To establish an 10 ha innovation park focusing around Research-Training-Industry partnership and validation facility

- To bring Australian advanced research, leading-edge technology and WSC products into Kunshan for demonstration, incubation, local application and commercialization

- To facilitate a whole-of-government approach and ensure Kunshan’s leading position in Chinese sponge city

- To be used as future training base for Jiangsu sponge city industry
Hetian
From the rapid assessment undertaken by the CRCWSC team of the water security vulnerability of the City and the critical inadequacies of the existing water services has identified opportunities to position and transition Hetian City into a water sensitive city with key attributes of water sustainability and resilience to climate change, and to promote greater liveability and ecological civilization outcomes from incorporating water ecological landscapes into the urban design of the city.

This vision presents great opportunity to develop Hetian City into a model Chinese Sponge City for desert environment and demonstrate to the Chinese government that the current concept of Sponge City goes beyond just stormwater management that is often narrowly understood and practiced by the Chinese industry.
Thank you.

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Find out more about us and
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Questions
Emerging Technology @ IOT enabled green infrastructure

- **Monitoring device**
  - Data collection
  - 海绵设备

- **Sponge City Brain**
  - 海绵大脑

- **Public Interface**
  - 公众界面

- **Guide operation**
  - 指导运行

- **Sponge infrastructure**
  - 海绵基础设施

CRC for Water Sensitive Cities
Urban Water Transitions: Development continuum

Traditional servicing takes a linear approach

Opportunity for developing cities to ‘leap-frog’ toward becoming water sensitive cities

Co-benefits:
✓ Wastewater recycling & economic opportunities
✓ Environmental protection (including fisheries etc)
✓ Resilience through diversification of water supplies
Raingarden tree pits
- typical profile

- inundation tolerant tree
- addressing trip hazard
- ground cover vegetation
- extended detention
- break in curb
- protection from traffic
- road
- loamy sand filter media
- sandy transition layer
- gravel drainage layer containing perforated drainage pipes
- connection to conventional drainage system
A Water Sensitive Approach in Informal Settlements

- **Low-cost** and easy to maintain and operate
- **Well understood**, and not experimental
- **Decentralised**, not requiring connection to large centralised infrastructure
- **Flexible in scale** and be able to fit into relatively dense urban environments
- Appropriate for the **specific conditions**
- Increase **climate resilience**

- Most importantly the approach should aim to deliver solutions that have multiple benefits, ensuring multiple challenges are addressed together wherever possible
Water-Sensitive Revitalisation Tool Box

Smart Septic Tank

Wastewater Treatment Wetland

Nature-based Treatment System

To Urban Agriculture

Aerobic Surface Wetland

Water-Sensitive Revitalisation Tool Box

Smart Septic Tank

Wastewater Treatment Wetland

Nature-based Treatment System

To Urban Agriculture

Aerobic Surface Wetland
• WSC approach to infrastructure delivery
• Suva, FIJI and Makassar, INDONESIA
• 5 year action research programme
• RCT – environment and human health assessments
The connection between human health and environmental health
Demonstration Project
March – June 2017

Batua, Makassar

Tamavua-i-wai, Suva
Co-design at the neighborhood scale
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