

Water Sensitive Urban Design

Background

The National Water Initiative contains a number of commitments under the objective to “Innovate and Build Capacity to Create Water Sensitive Australian Cities.”

The aim is to identify and develop innovative ways of managing and achieving more efficient water use in our cities. This happens at different levels of planning.

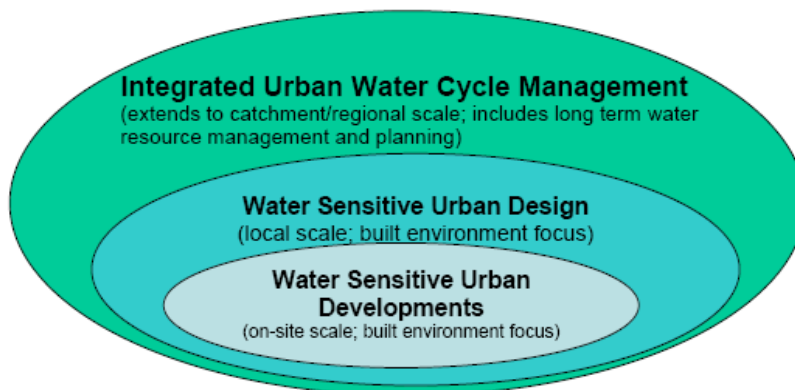


Figure 1: Conceptual Model of Urban Integrated Water Cycle Management and related concepts

Source: National Water Commission

The Water Corporation has adopted the National Water Initiative definitions for these concepts, and these are detailed below.

Integrated urban water management (IUWM) is the integrated management of all water sources to ensure that water is used optimally within a catchment in accordance with national and state land use and water policies. It promotes the coordinated planning, sustainable development and management of water, land and related resources (including energy use) linked to urban areas.

Water sensitive urban design (WSUD) helps to guide subdivisional scale planning to help to manage, protect and conserve the urban water cycle.

Water sensitive urban developments apply WSUD principles at the site scale by building waterwise homes, planning for stormwater recharge and efficient outdoor water use. This can occur in large scale residential developments (typically greenfield developments), small - medium scale residential developments (likely to include infill developments and conversions in existing urban areas), large and small-medium scale industrial developments and regional developments.

Current Situation

In April 2004 the Environmental Protection Authority (EPA) released strategic advice on the management of drainage in the Swan Canning Catchment. This advice recognises that WSUD is a key component to improve drainage management.

The EPA recommended that the WA Planning Commission incorporate WSUD principles, criteria and outcomes in its strategic land use planning, policies, structure plans and subdivision approval conditions.

The WAPC has developed a Statement of Planning Policy 2.9 'Water Resources' which requires that developers take into account total water cycle management and water-sensitive urban design principles and ensure that development is consistent with current best management and planning practices for the sustainable use of water resources, particularly stormwater.

The Department of Water has released the 'Stormwater Management Manual for Western Australia' to build on the traditional objective of local flood protection by having multiple outcomes, including improved water quality management, protected ecosystems, and liveable and attractive communities.

The manual encourages a combination of approaches including 'at-source' infiltration, use of more natural water body systems and structural methods such as swales and infiltration basins. It also addresses the reuse and recycling of stormwater. These approaches support water sensitive urban design.

Integrated Urban Water Management

In Western Australia, land development in the Southern Rivers (Armadale) area has set design objectives to guide drainage design and promote fit for purpose water use. The goal is to not use drinking water outside the home.

'How to' guide for alternative water supplies

The Water Corporation has worked with land developers and key regulatory agencies to produce a 'how to' guide (H₂Options) that provides an overview of what kinds of alternative water sources are available to meet residential non drinking water demand and key steps to access this water (including regulatory approvals).

Water Sensitive Urban Design

Water Sensitive Urban Design is being encouraged throughout Australia. The goals of WSUD are to:

- minimise impact on existing natural features and ecological processes;
- minimise impact on natural hydrologic behaviour of catchments;
- protect water quality of surface and ground waters;
- minimise demand on the reticulated water supply system;
- improve the quality of, and minimise polluted water discharges to, the natural environment;
- collect, treat, store and/or reuse runoff, including roof water and other stormwater (while ensuring natural processes are maintained);
- reuse treated effluent and minimise wastewater generation;
- increase social amenity in urban areas through multi-purpose green space, landscaping and integrating water into the landscape to enhance visual, social, cultural and ecological values;
- add value while minimising development costs – minimise the drainage infrastructure cost of the development; and
- take into account the nexus between water use and wider social and resource issues.

Features of WSUD include the collection and reuse of stormwater which begins at the lot level through the use of soak wells. These effectively recharge the superficial aquifer which is then used by local councils for watering public open spaces and by householders for use in garden bores.

At a streetscape level, roads are now being designed without kerbing so that as much stormwater as possible is available to be reused locally – by being directly delivered to garden beds and parks as well as being infiltrated to the groundwater. Some councils are now removing the bottoms of existing drainage system storage tanks so that the stormwater recharges the shallow aquifer.

Rain gardens act as a filtration system for stormwater quality



Bioretention systems to manage water quality through biological reactions

Ascot Water in Western Australia is one of the most recognised local examples of this kind of planning. Other examples include Beachridge Estate (200km north of Perth) and Brookdale/Wungong (south-eastern suburbs of Perth). The WSUD features of Beachridge Estate include:

- a network of central vegetated road swales providing immediate at-source infiltration (no need for both piped drainage and infiltration systems);
- native planting in these areas reduces water demand and assists in nutrient stripping from stormwater;
- 3m front setbacks, all planting in front garden to be from approved plant list (native and indigenous plants) and turf areas per block restricted to 150m²; and
- incentive rebates of \$3,000 for front garden landscaping and \$750 for a rainwater tank are offered to buyers who build within two years of purchase.

The Future

The Corporation has developed a Waterwise Land Development Program to provide a benchmark in Western Australia for Water Sensitive Urban Developments.

The objective of the program is to create land developments that adopt a range of water efficient measures throughout while minimising the impacts on existing natural features and ecological processes.

Changes are being made to the land and water planning processes to support the consideration of these principles early in the land and water planning processes. This will help reduce the demand on drinking water, reduce the need for drains and ensure that water is not wasted.

Sustainability considerations - addressed in planning

Economic	Social and cultural	Environmental
Additional infrastructure to be managed at the local level resulting in additional operational costs	Water Sensitive Urban Design typically provides improved community amenity over traditional drainage infrastructure	Recognition of the environment as part of the water cycle
Seeks to find the most cost effective solution to water servicing	Promotes collaboration between land and water planning, and planning at regional, subdivisional and local scales	Better management of the quality and quantity of water discharged from developments

More Information

- National Water Initiative Urban Reform Action (February 2007) *Institutional and Regulatory Models for Integrated Urban Water Cycle Management*, National Water Commission, available at <http://www.nwc.gov.au/publications/index.cfm>
- *National Guidelines for Evaluating Water Sensitive Urban Design* (November 2007), available at <http://www.newwaterways.org.au/userfiles/file/pdf/Draft-SUD%20Guideliens%20BMT-WBM-Nov07.pdf>
- Engineers Australia- Australian Rainfall and Runoff. 4th Edition http://www.melbournwater.com.au/content/library/publications/fact_sheets/drainage/water_ensitive_urban_design.pdf
- Ecological Engineering (2006), Wastewater Reuse in the Urban Environment: Selection of Technologies. Report for Landcom. http://www.landcom.com.au/downloads/file/Wastewater_reuse_technology_report_links3.pdf
- Department of Water – Stormwater Management Manual at http://portal.water.wa.gov.au/portal/page/portal/WaterManagement/Stormwater/Stormwater_MgtManual
- Western Australian Planning Commission – SPP 2.9 ‘Water Resources’ at <http://www.wapc.wa.gov.au/Publications/1281.aspx>