Findings from a Case Study tour in Australia and the WSUD 2013 Conference

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In July 2013, the ACT Government launched the WSUD review that involved the inquiry looking into the Water Sensitive Urban Design regulation against a government objective of a 40% reduction in water usage in new developments and refurbishments/extensions (compared with pre-2003 levels).

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(Source: WSUD Issues Paper 2013)

In July 2013, the ACT Government launched the WSUD review that involved the inquiry looking into the Water Sensitive Urban Design regulation against a government objective of a 40% reduction in water usage in new developments and refurbishment when comparing it to pre-2003 levels.

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The review findings and recommendations are to be finalised in the next couple of months.
ACT Government WSUD Review

- Public consultation
- ACT across agency working group
- Technical panel of experts
  - Ian Lawrence, Julien Lepetit, Ross Thompson, Luke McPhail, Ashis Dey & Rob Catchlove
- Technical tours to see what other jurisdictions are doing
The review considers 16 issues that can be grouped into four themes:

- Current application of WSUD in the ACT compared to a changing environment
  - The current context
  - what has changed outside of the regulation and
  - what could be changed.
- Housing affordability
  - Housing affordability was perceived by some as the most important issue.
  - Perception that WSUD was impacting negatively on housing affordability. An extensive literature review could not make this conclusion.
- Coordination and compliance of WSUD in the building and development phase
  - This includes management processes and handover processes between agencies and developers.
- Sustainable maintenance of WSUD assets
  - How the ACT Government can look at other sustainable maintenance regimes occurring in other jurisdictions.
Presentation on: Site visits and attend the International Water Sensitive Urban Design 2013 conference.

Showcases what other jurisdictions are doing with WSUD in the way it is managed, implemented and maintained.
What are other jurisdictions doing?

- **Comprehensive Water Sensitive Urban Design guidelines** used in Blacktown City Council and Penrith City Council (Source: Refer to website)
  - These guidelines are guidelines. They are not regulation.
  - They look at best practice examples that apply to the local area.
- They can be looked at like a manual which:
  - Provides information on issues
  - Advises on selection of typical treatment measures
  - Provide examples of how treatment measures can be integrated into the streetscape
  - And gives guidance on the modelling of treatment measures using MUSIC – which is the most common modelling tool used for urban stormwater modelling.
- **Regional strategic stormwater management plan**
  - The Northern Tasmanian NRM region includes six local governments who have banded together to formulate a regional strategic stormwater management plan.
  - This overarching plan informs the Council’s individual stormwater management plans.
  - Ensures individual plans complement the regional strategy and what is carried out within in one jurisdiction does not adversely impact on neighbouring or downstream jurisdictions.
- Between the six councils they also have a stormwater enforcement officer who has powers to enforce regulations across the six council areas to ensure consistency.
- This has helped with the education of and been highlighted as a useful education and awareness tool.

Other jurisdictions also have:

- Stormwater treatment initiative programs which includes rebates on installation of rainwater tanks. (Little Stringybark Creek)
- Strategic flood planning management. Strategic flood planning management goes beyond flood emergency management. For example, after the Brisbane flood, Brisbane City Council developed their floodsmart future strategy which utilises a flood risk management matrix which looks at four areas.
  - Flood awareness and information
  - Land use planning and development control
  - Flood emergency management
  - Flood mitigation infrastructure
- Brisbane City Council identified the challenges of climate change and increasing development will require adaptive approaches to flood risk management.
- One example: Measures such as backflow prevention devices were installed after 11 stormwater systems were found to be vulnerable to flooding due to heavier rainfalls. A backflow device is designed so that water flows in one direction through piped stormwater systems and minimises water flowing back up stormwater pipes.
- It is important to identify that WSUD infrastructure can manage stormwater flows but does guarantee full flood protection. So moving towards a matrix like Brisbane City Council’s is a higher-level strategic framework. Water sensitive urban design is one component of this.

Another example of strategic framework is implemented in Wagga. The main recognised mechanism for flooding in Wagga is the Murrumbidgee River. Flooding can also be caused by local rainfall.

In 2010, the Wagga CBD received some intense rainfall. It highlighted that numerous areas, including commercial and residential areas are liable to flooding following intense rainfall like the Wagga Marketplace.

For many years the focus has always been on the flooding from the river and the flooding levees.

Wagga City Council commissioned the Wagga Wagga Major Overland Flow Flood Study after this event, it identifies the major overland flow branches throughout the study area. The study looked at climatic vulnerability of sites and even modelled what would happen if there were an increase of 7% in rainfall.

The study looked at the base flow to high tail water and tested scenarios of where the pipes and drainage systems may become blocked and a number of other factors to run their model.

The study concluded there were reasonable planning controls that limit the number of household/commercial operations that are likely to experience over floor flooding. However the study identified a number of vulnerable areas and further recommended areas for improved design diversion mechanisms or enhance the flow capacity into other assets.

Green infrastructure strategies

- The urban heat island effect is a phenomenon which can increase temperatures within urban areas and have detrimental effects on human comfort in public spaces, increase costs of energy use in buildings and increase in health stress.
- It can also cause supercell storms like the one that hit Canberra in 2007. Green infrastructure strategies and plans have been introduced and implemented in many jurisdictions because it can ameliorate the impact of heat in urban spaces.
- In order to do this, water sensitive urban design plays an important element for the success of these strategies. The review identified a need for a green infrastructure strategy for the Territory.
Sustainable funding for maintenance and management

- What other jurisdictions are doing?
  - Stormwater offsets (e.g. Logan City Council, QLD)
  - Maintenance agreements (e.g. Local councils & Melbourne Water)
  - Development Service Schemes (e.g. Melbourne Water)
  - Stormwater management levies (e.g. NSW local councils)

Funding models and agreements for maintenance being utilised by other jurisdictions. This includes:

- Stormwater offsets
  - Stormwater offsets are built from contributions paid by developers to mitigate the impacts of stormwater pollution from urban development. Offsets can occur when the developer cannot place stormwater quality assets in their developments and therefore regional assets are built which achieve similar stormwater quality and quantity target than onsite and smaller devices.
  - There's a lot of industry debate about the success of stormwater offsets.

- Maintenance agreements
  - Maintenance agreements like those that are applied where Melbourne Water services. Melbourne Water in conjunction with the local councils requires developers to take into consideration maintenance agreements when designing, and constructing wetlands or retarding basins, for catchments greater than 60 hectares.
  - The agreement delegates the responsibilities of maintaining an asset between Melbourne Water and the relevant council. So for example open space features such as bench seats, playgrounds and barbeques are maintained by the local Council. And the waterbodies, hydraulic structures, aquatic and edge planting falls into Melbourne Water’s responsibilities. Source: Melbourne Water website.

- Development service schemes
  - Development services are also used by Melbourne Water. It is a catchment-based drainage strategy that outlines the functional designs of the relevant infrastructure required to service urban growth, and a pricing arrangement that details how Melbourne Water will recoup the infrastructure costs through financial contributions paid by developers.
  - Source: Melbourne Water website

- Stormwater management levies or service charges
  - Stormwater management levies are used to manage stormwater quantity and quality, of stormwater that flows off land. It also includes a service to manage the reuse of stormwater for any purpose.
  - In NSW, the Department of Local Government (2006, http://www.dig.nsw.gov.au/dig/dlghome/documents/Information/06-47%20-%20Stormwater%20Guidelines.pdf) produce a guideline for local councils to adhere to when developing their own stormwater management service charge. It sets out the maximum a local council can charge per urban block and it also provides a list of stormwater management activities that the levy pays for.
  - So the fund is used for activities, for example cleaning up stormwater pollution incidents, management or rehabilitation of riparian areas, replacement of stormwater assets and the planning and the construction and maintenance of drainage systems receiving urban stormwater.

That’s just a quick summary of what other jurisdictions are doing that is different to how the Territory deals with WSUD and also flooding. It must be remembered that the ACT has some wonderful developments of stormwater treatment trains and WSUD infrastructure that showcases best practice examples. What I’ve tried to showcase here is how we can consider other ways to manage WSUD this alternative sustainable funding maintenance and management models.
WSUD Case Study Tour

Go Vap, Vietnam
The WSUD review involved:
• an ACT technical tour: East O’Malley Pond, Kingston Foreshore, Childers Street Raingardens, Dickson Pond, Lyneham Wetland, Harrison (corner of Pinnacles and Combo Sts and corner Windjana and Pinnacle Sts), Franklin Gungaderra Creek Wetlands, Casey Springback Rise and Crace (raingardens, CRIP and Pond).

• Visit to Melbourne visiting ten sites of residential, commercial and industrial developments:
  1. Royal Park Wetland
  2. Carinlea Estate (Gladstone St Residential wetland)
  3. Roxburgh Park (Pond, Roxburgh Park Drive)
  4. Aurora Estate (integrated approach)
  5. Mernda Village (Stockland residential village aquifer storage and recovery scheme)
  6. Melbourne Market (Melbourne market relocation)
  7. Epping Industrial (Taryn Drive, Industrial wetland)
  8. Kalparrin Lake
  9. Little Stringybark Creek and
The Royal Park Wetland in Melbourne’s CBD is a large open space site of 170 hectares containing the baseball grounds, a netball centre and State Hockey Centre and the Melbourne Zoo.

The large site is managed in a joint maintenance agreement between the City of Melbourne and Melbourne Water. The site has a wetland and stormwater reuse with a large irrigation area supported by tanks and includes a number of stormwater treatment trains.
"Wetland with a purpose". Monash University monitored the inflow and outflow. They found that the water quality treatment was high when they compared it with the initial MUSIC modelling. The water used for irrigation when compared with those standards was also of high quality.

The next site is the Aurora Estate in Epping North, which is a satellite town of over 8,500 residential lots. It is a low impact urban design development with 50% of the site designated as open space. The aim of the estate development is to improve water quality after its completion and to improve the condition of Edgars Creek.

This is really important to note. Previously rural site. Therefore its aim – is to go one better. Rather than just aiming to ensure no further impact on Edgars Creek as a target it’s ultimate target is to improve its condition post development.
So how will they do it?

The Aurora Estate uses a lot of community education to better inform residents as they move into the area. This includes an education room at the sales centre. Water saving toilets and shower heads on the wall to demonstrate what should be used in the developments.

It also detailed how recycled water was being used across the site and even on their block. Education packs to new residents also outline what the purpose of their nature strip swales and raingardens. It deters most people from trying to fill them up and level them out or manicuring their raingardens. I said most...... but not all...
The Aurora Estate utilises an integrated WSUD approach. VicUrban which is similar to the LDA here and the NSW Landcom decided to opt for a stormwater treatment train throughout the catchment rather than an end-of-catchment style treatment. The requirement for two wetlands was removed from the original masterplan through incorporating water quality infrastructure and assets through the site.

The estate also aims to reduce potable water consumption by 70% (or 55% without tanks). To put this into context, the ACT Government’s aim is to reduce mains water consumption by 40% when compared to existing development and developers generally include water tanks into this calculation.
A report conducted for the Merri Creek Catchment Committee assessed and analysed the practical implementation of WSUD at Aurora. They sampled four sites with great difficulty given it was hard to obtain concept plans and original contact officers.

The report findings were generally inconclusive and that the water testing results shows that there was no overall change in the water quality at Edgar’s Creek. This indicated to the consultant that the development has so far not negatively impacted on the condition of Edgar’s Creek.

The aquifer storage recovery scheme at Mernda Village at the City of Whittlesea captures large volumes of excess surface water and stores it underground in natural aquifers. The stored water will be used for periods of low rainfall for irrigation.
The diagram shows how the aquifer storage recovery scheme works. Stormwater flows into the wetland and through the injection well on the surface. It then injects the water into the aquifer storage underground. During the dry period it will be pumped up and used for irrigation.
The advantages of having an aquifer storage and recovery scheme include minimal loss of water through evaporation and minimal amount of land is required for infrastructure. Well designed and managed schemes do not reduce the volume of groundwater contained in an aquifer.
Kalparrin Gardens, Greensborough, Melbourne

Banyule Council identified a need to rejuvenate the lake at Kalparrin Gardens

- Project planning started during drought
- Stormwater harvesting project with a focus on innovative water conservation and water quality improvement

Kalparrin Gardens at Greensborough, is north east of Melbourne CBD is part of Banyule City Council’s project of rejuvenating the lake at Kalparrin Gardens. It is also part of a bigger council project of ensuring local parks and sport fields have their own water supply long into the future.

It was one of the local councillors who pushed for this project during the drought after a number of sporting ovals suffered and were closed. Kalparrin Gardens is part of a larger stormwater harvesting project which focuses on innovative water conservation and water quality improvement.
The Banyule Stormwater Harvesting Project is a unique partnership.

I visited the Kalparrin Gardens site which is one of the three stormwater harvesting sites.

The Kalparrin Lake project features a ‘double-decker’ design with a wetland built on top of an underground storage which is partly filled with light volcanic rock called ‘scoria’. The stormwater is cleaned by the wetland and algae building up on the scoria and then further treated through a sand filter and ultra-violet light.
The site will harvest up to 17 Olympic swimming pools worth of stormwater per year. With the three stormwater harvesting projects, more than 30 Olympic swimming pools worth of stormwater will be harvested saving the council $200,000 per annum.

Key water quality improvements modelled include removing 50 tonnes of litter, 120 tonnes of sediment, 700kg nitrogen and 200kg phosphorus from Kalparrin Lake alone.
Little Stringybark Creek.
Sources:


D, Bos, personal communications, 28 August 2013.
Thank you

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