OCCASIONAL PAPER 26

Cities of the Future

2011 Report and Recommendations

FEBRUARY 2012

OVERVIEW OF WSAA

WSAA IS THE INDUSTRY BODY THAT SUPPORTS THE AUSTRALIAN URBAN WATER INDUSTRY

Its members and associate members provide water and wastewater services to approximately 16 million Australians and many of Australia's largest industrial and commercial enterprises.

The Association facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. It is proud of the collegiate attitude of its members which has led to industry-wide approaches to national water issues.

WSAA can demonstrate success in the standardisation of industry performance monitoring and benchmarking, as well as many research outcomes of national significance. The Executive of the Association retain strong links with policy makers and legislative bodies and their influencers, to monitor emerging issues of importance to the urban water industry. WSAA is regularly consulted and its advice sought by decision makers when developing strategic directions for the water industry.

DISCLAIMER

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ACKNOWLEDGEMENTS

This report is the synthesis of the Cities of the Future workshop conducted at the OzWater 2011 Conference.

The workshop was hosted by the Water Services Association of Australia (WSAA) and SA Water. It was facilitated Adam Lovell (WSAA) with the support of an expert panel consisting of

Adam Beck (Manager for Sustainable Communities, Green Building Council of Australia)

Tim Horton (South Australian Commissioner for Integrated Design)

Professor Richard Weller (Winthrop Professor of Landscape Architecture)

A significant contribution to the workshop was made by the workshop speakers:

John Ringham (SA Water)

Shaun Cox (Melbourne Water)

Anne Barker (City West Water)

Bhakti Devi (Project Manager, City of Sydney)

Sue Murphy (Water Corporation)

Dr Bruce Hamilton (Deputy Chari of Perth Region NRM)

Chris Marles (SA Water)

Phil Donaldson (SA Water)

Terry Leckie (Water Factory Company)

The contribution of all organisers and participants in the workshop is gratefully acknowledged. A list of registered workshop participants is provided in the Appendix.

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Foreword

As one of the critical custodians of the community's public health we have long recognised the need to actively plan to ensure our citizens have safe, reliable and affordable water services. Increasingly we are recognising the importance of these services to the broader quality of life in our cities – water is emerging as a fundamental driver of 'liveability', that intangible quality that is so highly regarded by international surveys such as that published by the Economist Intelligence Unit.

It is of little surprise to us that Australian cities feature strongly in these rankings. What is surprising is the impact of water management on this liveability – recent droughts have highlighted the importance of green cities in promoting healthy, active lifestyles.

The urban water sector is also talking about resilience. In 2010 and 2011 we saw Perth and the South West experience a record drought while on the east coast the cities of Melbourne and Brisbane experienced record floods following a prolonged period of drought.

This experience reinforces the need for water services and indeed cities themselves to be resilient to a range of shocks.

Developing this resilience and liveability is not the sole responsibility of the water sector, although our sector will play an important leadership role. The Cities of the Future workshops at the Ozwater and Enviro conferences in 2010 began a conversation on this topic with our colleagues in the urban planning and other sectors. It is important to continue these discussions. As you will see from this report OzWater 2011 provided valuable insight into the benefits of collaboration with our colleagues in other sectors responsible for planning our cities into the future.

Adam Lovell, Executive Director, WSAA

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Executive summary

The 2011 Ozwater Cities of the Future Workshop focused on a series of case studies (that applied the water sensitive cities principles identified at Ozwater and Enviro 2010 and subsequently adopted by the IWA) to demonstrate the leadership role that the Australian urban water industry has taken in this space. The case studies also highlighted how public and private water service organisations were facilitating new approaches to designing urban environments. In his keynote address, Tim Horton, Integrated Design Commissioner of South Australia, praised the case studies as clear demonstrations of how urban environments could be designed more sustainably with good governance and collaboration. He also provided national and international examples of projects where water was the key consideration for designers.

The five case studies presented to workshop participants included:

- Greening the West Strategy – City West Water
- Decentralised Water Master Plan – City of Sydney
- Ellen Brook Sustainability Project – WA Water Corporation
- Lochiel Park, Adelaide – SA Land Management Corporation
- Central Park, Sydney – Water Factory Company

An expert panel was on hand to present its own views and interrogate the case studies. Panel members included:

- Adam Beck - Manager for Sustainable Communities, Green Building Council of Australia
- Tim Horton - South Australian Commissioner for Integrated Design
- Professor Richard Weller - Winthrop Professor of Landscape Architecture

CASE STUDIES – KEY THEMES

PARTICIPATION, COLLABORATION AND ENGAGEMENT

It is essential for the water industry to be part of the design and planning process for Cities of the Future. Each case study clearly demonstrated this.

Collaborating and engaging stakeholders', including the community, is crucial to achieving Cities of the Future outcomes. The case studies all drew on benefits from bringing the community on board early in project development and encouraging residents and businesses to have a say in the shape of the places in which they would like to live.

APPLICABILITY AND RESILIENCE OF PROJECTS AT A LARGER SCALE

Whilst it is important to pilot projects, and test the possibilities, it is also important to ensure sustainable water initiatives can be applied on a larger scale and still provide social, environmental and economic benefits.

Resilience is, possibly, the most important aspect of Cities of the Future ie designs and plans need to cater for uncertainties - particularly in the area of water supply.

Maximising community value in healthy, liveable cities is a primary goal. However, it also creates some uncertainty in who should pay for these 'universal' benefits.

COSTS AND FUNDING

Who bears the risks in these projects - who pay and where do the benefits accrue?

What is the role of the urban water services sector in developing healthy, liveable cities?

These are important discussion points. These are questions that the National Water Commission and the Productivity Commission are interested in, as well as State Economic, Environmental and Health regulators.

WHAT'S HAPPENING NEXT?

A set of best practices guidelines for cities wanting to implement the IWA Cities of the Future Principles are being developed by Melbourne Water and GHD. These guidelines will provide the next layer of detail to help the industry realise the vision of Cities of the Future.

- A workshop focusing on the development of these guidelines will be held at OzWater 2012 in Sydney from 8-10 May.
- The Cities of the Future steering committee will be hosting a 'Cities of the Future' session at Singapore Water Week and at the IWA World Congress in South Korea in September 2012.
- Rob Skinner, formerly of Melbourne Water, is leading the collation of a book which is to be published through IWA based on papers and workshops held in the Cities of the Future program over the past 2 years. This report will be a major contribution to this book.

WHAT WILL WSAA DO?

RESEARCH AND INNOVATION STRATEGY (IN DEVELOPMENT)

This strategy includes 6 key priority areas; one of these being healthy, liveable communities. WSAA will work with its members to develop a roadmap which identifies and delivers on key research in this area. The focus will be on ensuring:

- social, economic and environmental factors are quantified and included in decision-making processes;
- water utilities evaluate and implement adaptive management approaches for urban water planning to support the development of healthy, liveable cities; and
- sustainable water solutions can be applied on a large scale.

WSAA will then ensure:

- appropriate communication of the roadmap to research funders and providers, government departments and other relevant organisations;
- it develops best practice guidelines and industry codes that reflect research outcomes; and
- research outcomes are shared with members and operationalised 'into the business.'

In particular in the case of Cities of the Future, WSAA will build strategic relationships with the following:

- Green Building Council of Australia;
- Urban Development Institute of Australia;
- Infrastructure Australia;
- Australian Green Infrastructure Council; and
- CRC for Water Sensitive Cities.

- National Urban Water Research Coalition

As a member of this Coalition, WSAA is currently contributing to a National Urban Water Science roadmap (to be presented at OzWater 2012) focusing on the key areas of:

- water security;
- safe and healthy water;
- managing floods; and
- valued water solutions (community and customer value).

All of these key areas impact on Cities of the Future. This roadmap is a precursor to the development of a National Urban Water Science Strategy

POLICY POSITIONS

WSAA will develop a suite of policy positions in 2012/13 addressing issues affecting Cities of the Future including water efficiency, energy efficiency and carbon abatement in water services, water recycling, desalination etc. This will ensure greater understanding amongst our stakeholders of the costs and benefits associated with these issues.

SUSTAINABILITY

WSAA recognizes that most of our member utilities have now adopted a sustainability framework. However, implementing the framework can be problematic so some of our members have developed quantitative or qualitative tools to assist in this regard.

Given the importance of sustainability to Cities of the Future, and the need for smaller-scale, pilot projects to now be scaled up; WSAA proposes to prepare a compendium of sustainability tools. For each tool this will identify its:

- strengths and weaknesses; and
- suitability and relevance, depending on what is being assessed (ie project, plan or program).

CUSTOMERS

WSAA's members are always focused on ensuring their customers get value for money. One of the key learnings out of these case studies is that the 'environment' and 'communities' can be considered as customers in their own right. Therefore, through the development in 2012 of a position paper on customer value, WSAA will explore this issue with its members.

LOCAL GOVERNMENT

Cities of the Future will be successful if they have 'on the ground' support. Often this is provided, or facilitated by local government. In the case of water, this is particularly relevant to the ongoing management of areas of public open space. WSAA is keen to open a dialogue with local government on this issue.

TRANSPORT AND ENERGY SECTORS

The urban water sector is increasingly becoming a top tier issue in planning and delivering services to Australia's communities. Cross-sectoral planning processes must be improved to allow for efficiency in delivery of services which will promote innovation and help keep capital and operating expenses down, and customer bills down.

Introduction

WATER SECTOR DEMONSTRATING LEADERSHIP IN PLANNING CITIES OF THE FUTURE

By collaborating, consulting and using its unique position as providers of urban water services, the water industry is taking a lead role in planning resilient and liveable Cities of the Future.

Opening the OzWater 2011 workshop, SA Water Chief Executive John Ringham explained that water utilities had long recognised the need for strategic planning to ensure citizens had safe, reliable and affordable water services.

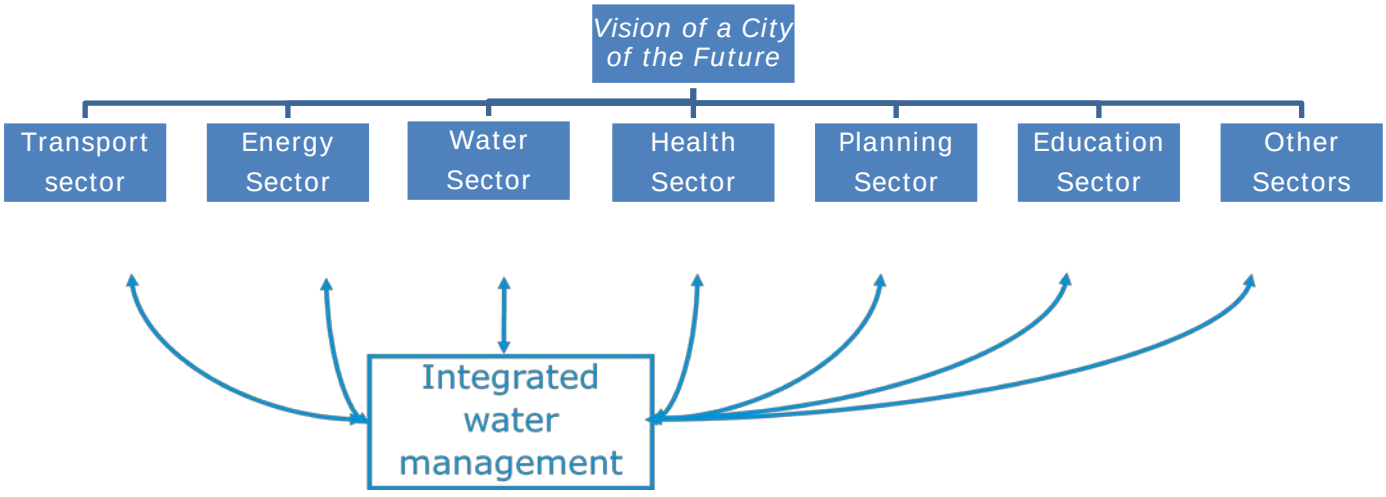
"Increasingly we are recognising the importance of these services to the broader quality of life in our cities. Water is emerging as a fundamental driver of liveability, that intangible quality that is so highly regarded by international surveys such as that published by the Economist Intelligence Unit," Mr Ringham said.

"The water sector is also talking about resilience. Already in 2011 we have seen cities across the country affected by drought and flood. These experiences reinforce the need for water services - and, indeed, cities themselves - to be resilient to a range of shocks. Climate change is likely to result in more extreme climatic variability in many parts of Australia."

"The Cities of the Future workshops at the Ozwater and Enviro conferences in 2010 began a conversation on this topic with our colleagues in the urban planning and other sectors," he said. "It is important to continue these discussions."

PURPOSE OF THIS REPORT

This report is presented as an update to the Ozwater and Enviro 2010 report. It applies the 12 Principles to a series of case studies to demonstrate how they are already being implemented by the Australian Water Industry. And it makes a series of recommendations on how the industry can continue to actively participate in creating and achieving more sustainable cities in the future.



Ozwater 2011 Cities of the Future workshop Keynote address

DESIGNING THE FUTURE: TOWARDS AN INTEGRATED DESIGN DECISION MAKING MODEL FOR CITIES

Tim Horton - Integrated Design Commissioner of South Australia

The future of "the city" is one where design - not just planning - plays a key role, according to South Australia's first Commissioner for Integrated Design Tim Horton.

"Better design builds better cities," he told the workshop in his keynote address. "Cities of the Future are best if we start from the position of design."

The Commissioner told participants water now featured high in the minds of designers and congratulated the workshop for putting a focus on case studies. "Part of the success of policy discussion is when you do see it applied in a case study. There is value in having exemplars on the ground that people can learn from," he said.

"Lochiel Park is a good one in relation to building a community understanding of how we might operate as urban environments in the future."

However, while we share visions of a "magical urban future", he noted increasing disaggregation in the water industry formed "a series of artificial barriers which seem to be preventing perhaps the more strategic thinking".

Having an interconnected approach, which recognised the importance of the natural landscape in the urban environment, would deliver more sustainable outcomes.

Mr Horton pointed to the recently released Our Cities, Our Future National Urban Policy as having strengths but also weaknesses in this context. "Chief among them is a weakness in identifying the interconnectedness of some of the natural systems that power our cities (the water and energy infrastructure as well) and the importance of an integrated and working landscape in defining just what a more liveable and sustainable model of Australian urbanism might be," he said.

"We know the importance of landscape within the urban environment; we know there is that link between a thriving urban landscape and sustainability in cities; the link between a successful urban landscape system and the measures of liveability - which I think we're yet to fully articulate; and increasingly, the link between urban landscape system and creativity and productivity in our cities. That's backed up by a whole series of really interesting research around public health."

In line with benefits identified with City West Water's Greening the West case study, Mr Horton outlined a number of economic, health and wellbeing benefits to be derived from green space, including in the areas of mental health and managing obesity. He cited research which showed that children playing in green space found more creative forms of play, were more alert and better able to concentrate, and were more able to use their bodies, than in manufactured play space.

"Greening the city we know can have benefits in relation to public health," he said. "It can reduce pavement temperatures by eight degrees where street trees are used. Unfortunately, what we see is traffic engineers who see street trees as being a risk - limbs can fall off, pedestrians can pop out behind them into traffic. Street trees in Adelaide, for example, are extremely hard to build into tomorrow's communities and yet critical in a city that has regular temperature spikes of 46 degrees."

Mr Horton reflected on water as a "touchstone" for what he called integrated decision making through design. "It's essential because (like with wildlife and biodiversity) water is something that in its natural form at least fails to recognise title boundaries or jurisdictions," he said.

The Integrated Design Commission of South Australia includes eight people who are charged to work across the areas of design, planning and development.

"Importantly, the Commission believes we've got to work away from the two dimensional reality that we've relied on in the past, which is about land use planning alone and we've got to work in three dimensions," he said. When we talk about the work of the Commission, effectively it can be considered to be about being design led, it's about being spatial and importantly it's about being collaborative which is word I've heard most - if not all - of the case study presenters using as well."

"Key to that is the issue of governance. You can't have a discussion about the design aspirations for a community without looking at how you are delivering it. The big challenge in promoting a more integrated approach to the design of cities is how we align the planning, the costing, the funding of infrastructure we need, for example. There's not enough focus on spatial planning and not enough investment in strategic planning. "

To close Mr Horton stated that "the city of the future is likely to be one that finds a workable model for collaborative governance - and I reckon that's pretty exciting. This is about designing a new 21st Century model of governance that's yet to be defined of designed."

KEY POINTS

- Green space in urban communities has been proven to improve public health outcomes.
- Urban water can contribute to the development of green space through delivery of 'fit for purpose' water products and services, including recycled water.
- Design and planning are critical to the success of developing healthy, liveable communities.
- Developing cross-sectoral governance is a top priority, as is getting the funding models right.

Cities of the Future principles

PROJECTS BRINGING LIFE TO IWA CITIES OF THE FUTURE VISION

Melbourne Water's Managing Director, Shaun Cox, reminded participants of the themes and principles underpinning the Cities of the Future vision and acknowledged the work of the Australian water sector in driving strategies to support liveable, sustainable and productive cities.

"The genesis of the principles was Ozwater last year and the principles were then taken to the International Water Association meeting in Montreal where they were adopted by IWA as the principles for the Cities of the Future agenda," he told the participants.

"It's fair to say Australians have led the way in developing the principles for the IWA."

Mr Cox reiterated the water sector had a major role to play in building more resilient and liveable cities and in the overall planning of urban communities going forward.

The IWA Cities of the Future 12 Principles that describe the characteristics of a city that is liveable, sustainable and prosperous.

THEME 1 – LIVEABLE AND SUSTAINABLE CITIES

Principle 1: Cities will continue to grow in population but will be increasingly liveable. A feature of cities will be more interconnected communities.

Principle 2: Cities of the Future will provide access to safe drinking water and sanitation for all.

Principle 3: Sustainable cities will combine a compact footprint with sustainability and liveability.

Principle 4: Cities will be resource neutral or generative, combining infrastructure and building design which will harmonise with the broader environment.

Principle 5: Sustainable cities will be part of prosperous, diverse and sustainable regions.

THEME 2 – THE MANY VALUES OF WATER

Principle 6: Sustainable cities will be served by a well-managed water cycle that – in addition to public health and water security – provides for healthy waterways, open spaces and a green city.

Principle 7: Sustainable cities will recognise that all water is good water – based on the concept of 'fit-for-purpose' use.

THEME 3 – COMMUNITY CHOICE AND KNOWLEDGE SHARING

Principle 8: Cities will be served by informed, engaged citizenry and multi scale governance that enables local community choice.

Principle 9: Customer sovereignty with full environmental and social cost.

Principle 10: Accurate and useful information, including smart metering.

THEME 4 – ADAPTIVE AND COLLABORATIVE WATER SECTOR

Principle 11: Sustainable cities will be served by adaptive and integrated approaches to urban development.

Principle 12 Sustainable cities will be served by a multi-faceted water management system.

Implementing the IWA Cities of the Future principles
Case studies

1. GREENING THE WEST STRATEGY

Anne Barker (Managing Director, City West Water, Victoria)

One of three Victorian Government owned retail water businesses in Melbourne, City West Water provides drinking water, sewerage, trade waste and recycled water services to customers in the central business district, inner and western suburbs.

The western suburbs of Melbourne are drier and hotter than the rest of Melbourne, and are home to a large proportion of Melbourne's socially disadvantaged communities. The general health of this population is also the poorest in Melbourne.

City West Water provides fit-for-purpose water for the project but also plays a role as facilitator, forging a link between the community, business, local and state government to encourage and enable actions by others.

City West Water has initiated the Greening the West project to reduce the heat island effect and to provide a green environment to deliver better health outcomes for western suburbs communities.

COMMUNITY CENTRAL TO DRIVING GREEN CHANGE

Businesses such as City West Water could change more in the next 10 years than they have in the past 50 - and customer and community expectations will be a key driver of that change, according to Managing Director Anne Barker.

The utility's Greening the West Strategy has the community at its core. Strongly reflecting the Cities of the Future theme of 'liveability and sustainability' (encapsulating principles 1 – 5), the strategy has strong community input to ensure it delivers positive outcomes for residents and businesses in the region.

City West Water believes it can deliver benefits to its community by extending its core skills and services beyond water supply and management. "As the impact of climate change increases and we get more and more heatwaves, my customers are going to be that much worse off," Ms Barker told the workshop.

"Water businesses have a quite unique position in the community. We're an enabler of these kinds of initiatives because we're the ones who control the water source. So, if you want to achieve the things we're setting out to do we have to enable them to go ahead because we're the ones providing the water."

However, the water sector also has a positive role as a facilitator, with strong links to all tiers of government, and with residential and non-residential customers.

The project has benefited from the following:

- Greening the West Think Tank - more than 100 attendees;
- Steering committee - all councils, the Victorian Department of Health, Parks Vic, academics and community representatives; and
- Reference group (managed electronically via open access website) for everyone who wants to be involved.

Through fulfilling the 'facilitator and enabler' roles and playing an active part in greening the urban environment through the provision of water, City West Water will help deliver benefits for the community including reducing:

- health costs by establishing a green environment;
- the heat island effect; and
- pollution and improving air quality.

The Greening the West project also shows a change in approach towards the environment. "We are starting to think of the urban habitat as a customer in its own right that needs to have its own water servicing strategy," Ms Barker said.

KEY LEARNINGS FOR THE WATER INDUSTRY

- The environment as a customer
- Pitching the concept of the urban environment as a customer that deserves servicing could be a key to greater buy-in from relevant government agencies and assist with securing funding.
- The project could also test and act as a demonstration of what the water sector - and other utilities - could do beyond core business.
- Water utilities could explore the merits of building greening projects into their levels of service as water providers; have the projects costed and seek cost recovery from the regulators through their water plans.
- It is important for robust business cases to be developed - and some trailblazing to take place - to engage the private sector and promote discussion with regulators.
- The value of trees – looking for opportunities to maximise this
- Opportunities exist through this project to highlight the value and potential savings to be gained by planting trees in denuded areas.
- While green field areas are easier to deal with through the planning and development process, the inner suburbs require greater attention in terms of developing green streetscapes. In the case of Melbourne it could involve re-engineering whole streets. However, there are a number of opportunities - for instance, greening streets as pipes are being re-laid and prior to resurfacing.

2. DECENTRALISED WATER MASTER PLAN

Dr Bhakti Devi (Manager Water Strategy, City of Sydney, NSW)

In consultation with the community, the City of Sydney has developed a strategic visioning document - Sustainable Sydney 2030. One of the key visions identified in this document was a 70% reduction in greenhouse gas emissions from 2006 levels, through implementation of green infrastructure.

Green infrastructure is an integration of decentralised energy, water and waste management services within the City. The Decentralised Water Master Plan is one of the five master plans that comprise the City's Green Infrastructure Plan.

The community has also expressed an aspiration to reduce by 10% of 2006 consumption levels its reliance on mains water imported from Warragamba Dam and reduce the pollution discharged to waterways through stormwater runoff by at least 50%.

Accordingly, the Decentralised Water Master Plan comprises four sub-plans covering:

- water Use Efficiency;
- Water Sensitive Urban Design;
- stormwater infrastructure improvement; and
- a City-wide Recycled Water Network.

COUNCIL PLAN SHOWS WATER LEADERSHIP

Managing water in the Cities of the Future will not be the sole domain of water utilities, with a number of public and private entities already planning ways to deliver water services to communities.

The Decentralised Water Master Plan strongly reflects the Cities of the Future themes of 'the many values of water' (Principles 6 and 7) and 'adaptive and collaborative water sector' (Principles 11 and 12). The strategy, developed in consultation with Sydney Water aims to provide a model for other cities on how to reduce demands on drinking water supplies through a city-wide recycled water network. The plan would also dramatically improve stormwater quality, reduce impacts of runoff into Sydney Harbour and manage localised flooding.

The recycled water network - which would draw on stormwater, groundwater, black water and greywater - would connect to apartment, commercial and institutional buildings for use in toilets, laundries, cooling towers and gardens.

City of Sydney Manager Water Strategy Dr Bhakti Devi told the workshop a study was under way to look at water management options and opportunities, where there may be synergies with energy and waste infrastructure, and how various bodies could work together to deliver the plan's objectives.

Council, she said, was seeking to be a facilitator and to work with partners to bring about the City's sustainability vision.

“There’s no one entity that can say ‘we do recycled water’. As a council we feel there is a space there, where we can add value and contribute in terms of facilitating the recycled water system. We couldn’t do individually what we could do together with other players - whether utilities, land owners or water users,” Dr Devi said.

Dr Devi said the community’s aspirations for more sustainable water management came to the fore as part of consultation for the Sustainable Sydney 2030 document.

“In addition to many other things which the community and stakeholders expressed their aspirations for, water was one them,” she told the workshop.

“There were two line items which articulated those aspirations. The community said ‘we would like at least 10% of potable water we currently import from the dam to be substituted by locally captured water in the form of recycled water’.

“The other item ... was the community said ‘we would like at least 50% of the pollution we currently discharge through stormwater to the waterways to be reduced’.”

Dr Devi said sustainable water management was critical to climate change adaptation.

“Because of climate change, by 2030 we are expecting to have a decrease in rainfall, increase in evaporation, more hot days and more extreme weather events,” she said.

“And they all have implications for the water infrastructure. In the council area we will be experiencing more flash flooding, strain on our drainage system and sewerage system, and also an increase in water demand.”

A business case would also be developed to determine the public sector contribution that would be required to make the system commercially viable.

KEY LEARNINGS FOR THE WATER INDUSTRY

- Business as usual models can stymie innovation
- The challenge - how can we ‘scale up’ the smaller, piecemeal activities and the good case studies?
- There are challenges for water utilities in planning for demand and capacity in drinking water networks. Industries may reduce their demand on the drinking water supply but then seek access to drinking water if issues arise with the non-drinking water supply.
- Challenges for CBD areas arise with changing demographics and taking loads off sewers and stormwater which haven’t been able to grow with both the increase in daytime and night time residential populations.
- Facilitating sustainability through leadership, resource integration and the sharing of information
- Integration of energy, water and waste management infrastructure is a reflection of the consideration that is being given by the City of Sydney to sustainable design and planning a city of the future.
- The plan signals to developers, builders and renovators that opportunities exist for site-based water sustainability, and also supports those who cannot “do it on their own”.
- Sharing information and lessons learned is important. Any lessons learned from individual aspects of the master plan are being made public so others, such as council peers, can apply that information in their own context.

3. ELLEN BROOK SUSTAINABILITY PROJECT

Sue Murphy (Chief Executive Officer, WaterCorp, WA) and Dr Bruce Hamilton (Deputy Chair of Perth Region NRM, WA)

The Water Corporation has developed a blend of clay and lime-amended biosolids [Lime-amended BioClay® (or LaBC®)] that provides a cost-effective solution to the agronomic and environmental problems of the acidic, sandy soils of the Perth region.

LaBC® will be sold to farmers under contract, and will contribute to improving farm incomes, reducing fertiliser loss and restoring the degraded landscapes of the Ellen Brook catchment to the north of Perth.

Farmers using LaBC® will be required to transform poorly performing annuals-based pastures with perennial pastures, perennial cash crops (such as lavender), farm trees and native vegetation in accordance with a farm improvement plan. This plan is negotiated directly with the farmer and a simple common law agreement will be signed by the farmer and the Water Corporation.

This project has been under way for more than four years, during which time:

- product development and testing;
- regulatory approval from the WA Department of Environment and Conservation to use LaBC® as a product and approval from the WA Health Department to apply LaBC® to land in the Ellen Brook Catchment;
- refurbishment of a derelict coal washing trommel to blend LaBC®; and
- client, industry and community partnerships have all been achieved.

BUILDING 'NEW URBAN FORM' FROM THE GROUND UP

Ellen Brook Sustainability Project is a model of integration - both in terms of addressing multiple problems with one integrated solution, and in bringing together a number of stakeholders with a range of interests. It strongly encompasses the Cities of the Future Principles 5 – 12.

Chief Executive Officer of the Water Corporation, Sue Murphy, explained to the workshop the poor soil on the outskirts of Perth posed numerous challenges.

"It's basically beach sand, so it's water repellent and it doesn't hold water well if it does get wet. It's used in pastoral terms - it has been cleared, so a lot of fertiliser gets put on it for a whole lot of reasons to try to make something positive out of the land," she said.

"That causes a lot of nutrient runoff into the Swan-Canning and, potentially, causes algal blooms and a lot of issues environmentally back in the city area."

Meanwhile, Water Corporation, in managing the State's wastewater, is left with biosolids that are recognised as having nutrient value but are underutilised - "trucked great distances to farming areas and basically given away".

"We have a problem of finding beneficial and commercial uses for our biosolids, we have a community that has a problem with poor soil conditions on the edge of town and we have a farming community that is struggling to make ends meet," Ms Murphy said.

Lime-amended BioClay® addresses all of these issues. Bio-solids from the wastewater treatment plants are mixed with lime to kill pathogens and then clay is added. The lime neutralises acidity in soil - helping to

address WA's problems with Acid Sulfate Soils - the clay improves water retention capacity and the bio-solids act as a slow release fertiliser.

The project has shown how a conventional water utility can extend its core business focus to include environmental improvement, economic improvement and new product development.

"In a lot of the talks we've had earlier today about the role of urban water in general ... organisations like the Productivity Commission are suggesting that we probably shouldn't be in the environmental space, and we shouldn't be in the community good space - we should be economic rationalists.

"But the fact is the customers we supply are the community and do expect us to be in that role.

"So we see ... the role of the integrator is absolutely the role of the water utility and I think this is a great example, in really niche terms, of how we can be fulfilling that role."

The project may be a "niche application" of Cities of the Future principles but holds key lessons about consultation and bringing people together to address disparate problems to come up with a solution.

Deputy Chair of Perth Region NRM, Dr Bruce Hamilton, told the workshop the Lime-amended BioClay® project was a long time coming.

"We have been talking in WA, with our coastal sandy soils in the south-west, of using soil amendment for about 30 years, and it hasn't actually happened," he said. "This is going to be the first time ... the first test case - so it's very significant."

KEY LEARNINGS FOR THE WATER INDUSTRY

- Working together is critical
- Working in partnership and having all stakeholders 'around the table' is crucial for projects such as this to succeed. This includes ensuring the levels of governance - at a higher level and operational level - are in dialogue.
- Local government's role in Cities of the Future projects is crucial.
- A 'step change' is required to appreciate the role of nature and agriculture in cities
- There needs to be a shift to the idea of natural resources, whatever they are, as natural capital or natural infrastructure.
- The project demonstrates how landscapes can be altered in beneficial ways (eg urban landscapes as food producers).
- "New forms of urbanism", such as where we integrate food production into the urban landscape, need to be embedded into structure plans to allow them to be properly designed, mapped and developed.
- There is a need to look at the 'big steps' we can take practically to change the form of our cities and the way we live and use the landscape. While incremental steps are good - there is a need to identify drivers and the support available to make a step change.

4. LOCHIEL PARK

Phil Donaldson - Director Sustainability Policy & Programs, Land Management Corporation (LMC), SA

Lochiel Park is a 106-dwelling green village development about eight kilometres north-east of Adelaide, on a site previously used for horticultural research and fire service training.

- All houses will be serviced by:
- photovoltaic systems;
- a recycled water system [comprising of onsite wetlands, gross pollutant traps and aquifer storage and recovery (ASR];
- gas boosted solar hot water systems; and
- Each house will also be constructed to ensure a minimum 7.5 star thermal performance rating is achieved.

The project targets include:

- reducing residential demand for drinking water by 78% and for energy by 66%; and
- reducing greenhouse gas emissions by 74% .

Sustainable water objectives are to restore Lochiel Park's natural characteristics to minimise pollutant discharge to the River Torrens, and to reduce reliance on drinking water in the public and private realms. The

project includes stormwater capture and filtration through wetlands prior to injection into an aquifer and then recovery for use in the public realm and household laundries and toilets.

SMALLER SCALE MODEL FOR A SUSTAINABLE FUTURE

Since being launched as a potential 'nation leading green village' in 2004, every element of Lochiel Park has been developed to meet high sustainability targets.

While small in scale compared to other communities, Lochiel Park is big on water sensitive urban design, and reducing its ecological footprint through the leading edge management of waste, energy and water.

"In terms of delivering this as a green village, we started off with a process of 'what are we trying to achieve?" LMC Director Sustainability Policy & Programs Phil Donaldson told the workshop participants.

"We set up a framework based on:

- community - communications, interaction, education;
- resources - in terms of efficiency of use (water, energy and waste);
- amenity - in terms of good quality public realm, functionality and biodiversity; and
- heritage - from European, Kaurna [traditional owners] and natural heritage as being important."

"We set some targets around reducing the ecological footprint, 100% recycling of building waste, 50% reduction of biodegradable house waste, 78% reduction in drinking water use (based on 2004 ABS data), 87% of water used is recycled water, 66% reduction in energy use and 74% reduction in greenhouse gas emissions. We wanted to make sure we were achieving what we set out to do. We established an ecological footprint calculation for this development and we found out that, in relationship to the South Australian ecological footprint, Lochiel Park was delivering a 50% improvement in the housing component. So, already, we were reducing the footprint of this development against other developments and suburbs in SA."

Even the site's sustainability centre - developed as part of the infrastructure - is promoting the value of 'green' living. It is used as a training centre for the Housing Industry of Australia's green smart courses and demonstrates education is a fundamental part of developing Cities of the Future.

It strongly encompasses all 12 of the Cities of the Future Principles (and organised under four key themes):

- Liveability and sustainability: residents homes fitted with a computer system that monitors water and energy consumption.
- The many values of water: including water sensitive urban design (WSUD), stormwater management and harvesting, domestic rainwater harvesting and water use efficiency.
- Community choice and knowledge sharing: residents of Lochiel Park were involved in the planning and decision making. A dedicated website for the resident informs them of progress and provides the latest information.
- Adaptive and collarborative water sector: active, adaptive engagement with SA Water, United Water and the City of Campelltown throughout as well as an advisory group which included experts in WSUD.

Like other case studies presented to the workshop, one of Lochiel Park's successes has been engagement with the local community.

"We wanted to include the community in conversations," Mr Donaldson said. "… [and] we made sure anything we were developing in this community was actually related to the integration with the wider community at Lochiel Park." For example, the community around Lochiel Park wanted to retain the site's open area. As a result, 66% of Lochiel Park is dedicated open space that would also serve the neighbouring community as it grows.

Connection to nature is an integral part of the development, and water forms a major component of that connection. Sustainable water initiatives include:

- swales in the central median strips filter medium and subsurface agricultural drainage to collect filtered stormwater for discharge into the River Torrens;
- stormwater from a catchment of almost 190 hectares is collected, treated through a gross pollutant trap, stored via aquifer storage recovery and harvested to provide the 'class A' source water for the recycled stormwater dual reticulation system;
- gross pollutant traps and diversion weir systems are designed to prevent flooding from a 1-in-100-year storm event;
- each home must have a rainwater tank (minimum capacity 1500 litres) connected to at least 80% of the roof area to supply the hot water service; and
- water efficient fixtures must be installed.
- On-site monitoring of different water uses is already showing positive results, with Lochiel Park tracking well towards its target of a 78% saving of drinking water.

KEY LEARNINGS FOR THE WATER INDUSTRY

- Smaller projects provide opportunities for innovation
- Projects such as Lochiel Park - although smaller in scale - are inspiring and provide an opportunity to 'incubate, build and monitor' how elements work, and test methodologies, before applying them on a larger scale.
- Building and maintaining momentum to achieve sustainable outcomes
- The pace of urban development can be slow, meaning it can be challenging to maintain the ambition and targets set at the beginning of a project. There is a need to look at bringing about sustainable and good quality outcomes quicker to maintain momentum and to engender a sustained commitment from customers and the local community.
- Overarching governance structures are crucial - in particular to ensure all relevant stakeholders are 'in the room', and that longer term management of projects is considered.
- Cost-benefit analysis at the community-wide scale
- More attention must be paid to socio-economic aspects of large projects and assessing cost-benefits beyond project sites (for example, benefits for the wider community).

5. CENTRAL PARK

Terry Leckie - Managing Director, Water Factory Company, NSW

The Sustainable Sydney 2030 plan - developed by the City of Sydney in consultation with its community and stakeholders - identifies visions for sustainable management in the areas of energy, water and waste management.

Central Park supports this plan, aiming to achieve the highest environmental rating for a mixed-use precinct in Australia.

To be built over the next 10-15 years, this $2 billion 'vertical community' will include 2000 apartments and 100,000 square metres of commercial space, along with green space to create a liveable and vibrant inner-city community.

CENTRAL PARK - A FUTURE CITY 'ALREADY HERE'

A model for the future - in a city expected to grow by 1.1 million people over the next 25 years - Central Park features sustainable architecture, water recycling and tri-generation energy plants.

Driven by developer Frasers Property, Central Park is being developed from a commercial point of view with the future very much in focus.

From 35-storey high green walls and rooftop gardens, to multiple pipelines delivering water from seven sources, the project demonstrates that Cities of the Future are, in some cases, already here. Strongly reflecting the Cities of the Future themes of 'liveability and sustainability' and 'the many values of water', Central Park will deliver positive outcomes for residents and businesses and will encompass a total water management system.

Central Park will achieve the highest possible environmental rating for the precinct, will become the largest site in Australia powered by its own tri-generation energy plant and will contain the world's largest membrane bioreactor recycled water facility in the basement of a residential building.

Water is a key focus throughout the precinct. A Recycled Water Factory will be situated over five levels of the basement of the development's One Central Park building and multiple pipes will deliver water from seven sources to 5000 customers and 15,000 workers and visitors.

These sources are:

- community sewerage;
- sewer mining from the public water utility sewer;
- rainwater from roofs of community buildings;
- groundwater from the basement drainage system;
- drinking water from public water utility supply;
- stormwater from rainfall runoff; and
- irrigation water from the green walls.

The water systems are to be run privately and Terry Leckie, Managing Director of the Water Factory Company, explained to the workshop the whole-of-water-cycle approach.

"Residents and office workers will have some control over their water use. We have a large metering program here - a building management system we can monitor - and all of this community will be monitored," he said.

"We'll be able to look at trends and manage all of the various water sources. We will have overall water cycle management of all of the water sources and the various water qualities we deliver - we'll manage the whole water cycle.

"Even to the point of retail, where they have a food bazaar that takes up two levels of the first building. With a treatment facility in the basement of that building, if grease traps aren't maintained that can create problems for us; if somebody tips something down that they shouldn't, then that is going to affect us.

"We are managing the grease traps, managing those pre-treatment facilities on their behalf. Rather than leaving [businesses] to manage, we're being very interactive with that.

"The irrigation system, water collection systems are all part of our responsibility too."

Mr Leckie said the project recognised technological change must be incorporated and the designs were kept flexible to allow for new energy, heating/cooling, water and information technology to be integrated.

One exciting area of flexibility was the concept of the community moving from a water user to a water producer. "The target for this community was to be water neutral and we couldn't achieve that on site without exporting water. But, as technologies come on, if this community could become a water producer instead of a water user ... then that changes the way we provide those water services," he said.

"In the next decade this community may collect water from hydrogen fuel cells; they may supply drinking water to the citywide network; they may supply non-potable water to skyscraper farms. Or they may change. We are 11 buildings, so the latter of those buildings [inhabitants] may want to be even greener, enhance that green space and use eco-machines. So, we have a flexible system that allows us to engage in those new technologies, those new ways the community might want us to provide water, produce water and treat water."

KEY LEARNINGS FOR THE WATER INDUSTRY

- Benefits can stretch to already established development
- There are opportunities to use new growth as a catalyst for creating value for surrounding communities. For example, in the case of Central Park, potentially providing recycled water from the site for cooling towers at the neighbouring University of Technology.
- New and complementary business models for water servicing are possible
- Cities of the Future developments can create new servicing models where on-site rainwater harvesting and wetlands management for example, can provide the services traditionally met through centralised large, pipe infrastructure systems.
- Public water utilities and private enterprise are complementary stakeholders when it comes to water - with utilities providing the 'backbone' infrastructure of our cities.
- Mandating use of recycled water through regulation
- Lack of demand and pricing mechanisms for recycled water systems limit the viability of such systems and changes are needed. Utilities could invest in reticulated recycled water infrastructure but would be unable to force people to use it. Potentially, this could be overcome through regulation or planning instruments making it compulsory for developers to connect when they redevelop sites.
- Interactions with the Public Health Regulator
- Seven sources of water will be challenging to manage. Risk management will be of the upmost importance to protect public health.

Conclusion

CONSIDERATIONS FOR PROGRESSING THE CITIES OF THE FUTURE CONCEPT

- What barriers are preventing the desired outcomes?
- What can water utilities do to allow governments and stakeholders to see the benefits of a program/project and hence, want to implement it?
- How can the water industry work better with other industry sectors and learn from past experiences?
- How can we get the economic regulator to build 'being greener' into our levels of service?
- The case studies demonstrate a lot of very good projects but they are piecemeal and localised. How do we scale them up?
- A project like Lochiel Park took 6 years in planning and development for 200 residents, how long would an entire city take?
- With the reduction in reliance on drinking water who pays for this infrastructure and service when a customer may only want to use it once or twice a year as a backup?
- How can a city of the future be maintained?
- How do we include in the cost benefit equation the community-wide benefits? How do you account for the externalities?
- How do we measure the risk involved and overcome it? What level of risk would a city of the future be willing to take?

MESSAGES FOR PROGRESSING THE CITIES OF THE FUTURE CONCEPT

- Water is the fundamental basis upon which we can re-conceive of our cities as complicated ecological systems and cultural systems, and if you position yourself at that level then everything else in the re-conception and reconstruction of Australian cities gets attached to water. Therefore the water industry is in an extremely important position where it must allow itself to indulge in visionary and long term thinking, as Australia's population is growing and that will not change for the foreseeable future.
- In order to build a business case to get the government to fall in line and barriers to dissolve, the water industry needs to think laterally when setting its strategic vision and aspirational goals.
- What I can leave you with is a bit of a reflection and lessons learned from the journey that the Green Building Council has been on. Ten years ago some frustrated architects, building engineers, developers and government bureaucrats got together and said let's do the Sydney Green Games every day of the week, why just wait for the Olympics? Let's do the good stuff all the time, and through a bit of perseverance they essentially created the council and went out there to have a go at it. So you have AWA and WSAA. I believe those two organisations really have to play a key role in this because government and developers are not going to go forth with this on their own, so there needs to be a place where we can all roll up our sleeves and come together.

COMMON THEMES EMERGING

SIX KEY ISSUES

- Cross-sectoral collaboration
- Funding and benefits
- Community involvement and acceptance
- Resource efficiency – making the most out of the resource – recovering it and reusing its biproduct/waste
- Taking a holistic approach – factoring in all resources and energy
- Design and planning are critical to the success

WHAT'S HAPPENING NEXT?

- A CRC for Water Sensitive Cities has just been established thanks to $30m worth of Federal funding. The CRC for Water Sensitive Cities will deliver the socio-technical urban water management solutions, education and training programs, and industry engagement required to make Australian towns and cities water sensitive. A number of WSAA's members are participants in this CRC.
- A set of best practices guidelines for cities wanting to implement the IWA Cities of the Future Principles are being developed by Melbourne Water and GHD. These guidelines will provide the next layer of detail to help the industry realise the vision of Cities of the Future.
- At OzWater 2012 in Sydney from 8-10 May there will be a workshop to develop these best practice guidelines.
- The Cities of the Future steering committee will be hosting a 'Cities of the Future' session at Singapore Water Week and at the IWA World Congress in Korea late 2012.
- Rob Skinner, formerly of Melbourne Water, is leading the collation of a book which is to be published through IWA based on papers and workshops held in the Cities of the Future program over the past 2 years.

WHAT WILL WSAA DO?

RESEARCH AND INNOVATION STRATEGY (IN DEVELOPMENT)

This strategy includes 6 key priority areas; one of these being healthy, liveable communities. WSAA will work with its members to develop a roadmap which identifies and delivers on key research in this area. The focus will be on ensuring:

- social, economic and environmental factors are quantified and included in decision-making processes;
- water utilities evaluate and implement adaptive management approaches for urban water planning to support the development of healthy, liveable cities; and
- sustainable water solutions can be applied on a large scale.

WSAA will then ensure:

- appropriate communication of the roadmap to research funders and providers, government departments and other relevant organisations;
- it develops best practice guidelines and industry codes that reflect research outcomes; and

- research outcomes are shared with members and operationalised 'into the business.'

In particular in the case of Cities of the Future, WSAA will build strategic relationships with the following:

- Green Building Council of Australia;
- Urban Development Institute of Australia;
- Infrastructure Australia;
- Australian Green Infrastructure Council; and
- CRC for Water Sensitive Cities.
- National Urban Water Research Coalition

As a member of this Coalition, WSAA is currently contributing to a National Urban Water Science roadmap (to be presented at OzWater 2012) focussing on the key areas of:

- water security;
- safe and healthy water;
- managing floods; and
- valued water solutions (community and customer value).

All of these key areas impact on Cities of the Future. This roadmap is a precursor to the development of a National Urban Water Science Strategy

POLICY POSITIONS

WSAA will develop a suite of policy positions in 2012/13 addressing issues affecting Cities of the Future including water efficiency, energy efficiency and carbon abatement in water services, water recycling, desalination etc. This will ensure greater understanding amongst our stakeholders of the costs and benefits associated with these issues.

SUSTAINABILITY

WSAA recognizes that most of our member utilities have now adopted a sustainability framework. However, implementing the framework can be problematic so some of our members have developed quantitative or qualitative tools to assist in this regard.

Given the importance of sustainability to Cities of the Future, and the need for smaller-scale, pilot projects to now be scaled up; WSAA proposes to prepare a compendium of sustainability tools. For each tool this will identify its:

- strengths and weaknesses; and
- suitability and relevance, depending on what is being assessed (ie project, plan or program).

CUSTOMERS

WSAA's members are always focused on ensuring their customers get value for money. One of the key learnings out of these case studies is that the 'environment' and 'communities' can be considered as customers in their own right. Therefore, through the development in 2012 of a position paper on customer value, WSAA will explore this issue with its members.

LOCAL GOVERNMENT

Cities of the Future will be successful if they have 'on the ground' support. Often this is provided, or facilitated by local government. In the case of water, this is particularly relevant to the ongoing management of areas of public open space. WSAA is keen to open a dialogue with local government on this issue.

Transport and Energy sectors

The urban water sector is increasingly becoming a top tier issue in planning and delivering services to Australia's communities. Cross-sectoral planning processes must be improved to allow for efficiency in delivery of services which will promote innovation and help keep capital and operating expenses down, and customer bills down.

Appendix – Registered workshop participants

Nicola Nelson	Sydney Water
Peter Dennis	Hunter Water
Steve Kotz	SA Water
Michelle Akeroyd	Water Quality Research Australia (WQRA)
Kate Miles	AECOM
Sue Murphy	Water Corporation
John Wilkinson	Western Water
Robert Cawley	Rous Water
Tim Clune	North East Water
Mark Sullivan	ACTEW Corporation Ltd
Steve Wallner	AECOM
Erin Cini	Element Solutions
John Darmody	MWH
James Cameron	National Water Commission
Kevin Mills	URS
Michael Malouf	Barwon Water
Jennifer McAllister	AECOM
Barrie Turner	Sydney Water
Jeff Foley	GHD
Neil Palmer	National Centre of Excellence in Desalination
Pat McCafferty	Yarra Valley Water
Jan Tanner	Sydney Catchment Authority
Zoe Sofoulis	Centre for Cultural Research, UWS
Chris Davis	National Water Commission
Nicholas Ashbolt	U.S EPA
Tad Bagdon	Queensland Water Commission
Kevin Young	Hunter Water
Peta Maddy	SKM
Shaun Cox	Melbourne Water
Neil Brennan	Central Highlands Water
Rob Franklin	Western Water
Greta Zornes	CH2MHILL
Bill Barber	AECOM

Kaye Power	IPART
Gary Jones	eWater Limited
Mark O'Donohue	Australian Water Recycling Centre of Excellence
Garth Bellingham	Bellingham Strategies
Mark Black	AECOM
Owen Phillis	Melbourne Water
Stephen Answerth	Western Water
Darryl Day	Power and Water
Karen Rouse	SA Water
Mark Bartley	DLA Piper
Mark Pascoe	International Water Centre
Gary Mitchell	NSW Water Directorate
Peter Moore	Water Corporation