CRC for
Water Sensitive Cities

Submission to the 2020 National Water Inquiry

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Introduction

The CRC for Water Sensitive Cities (CRCWSC) is pleased to provide this submission to the Productivity Commission's Inquiry into National Water Reform. We've highlighted what we consider to be the core reform opportunities necessary to transition Australia's cities and towns to water sensitive cities. We support the Commission's earlier findings that:

- Project selection (in urban water management) is not always based on rigorous and transparent assessment of options, limiting the range which are ultimately considered
- Liveability and stormwater management, as defined in the concept of integrated water cycle management[1], are not well integrated into general water planning
- Implementing integrated water cycle management requires significant, ongoing collaboration between agencies, in both policy and planning at a range of different scales
- Local-scale and system-wide water planning are not well integrated
- Statutory land planning and water planning are not well linked.

Over the past nine years, we have created and collated evidence, solutions and cases studies that address these issues. We welcome the opportunity to expand on these ideas, whether in person or by submitting more information.

What is a water sensitive city?

Many of the benefits the Productivity Commission ascribes to integrated water cycle management could also be described as the features of a water sensitive city, where water has a central role in shaping a city:

- People are not disrupted by flooding, and can enjoy reliable water supplies, effective sanitation, healthy ecosystems, cool green landscapes, efficient use of resources, and beautiful urban spaces that feature water and bring the community together.
- Water recycling at different scales through wastewater recovery and stormwater harvesting provides a diversity of water sources and improves the health of downstream rivers and creeks by reducing pollution and flow impacts.
- Water sensitive urban designs integrate nature-based infrastructure into the landscape to provide hydraulic and water treatment functions, as well as amenity benefits such as an aesthetic environment and mitigation of urban health island effects.
- Citizens are active in caring for water and the environment and there is cohesion among the community as their sense of place and collective identity is nurtured through their connection with water.

Enhanced liveability is a key benefit/outcome of a water sensitive city.

[1] In our submission we use the term *water sensitive cities* as a synonym of integrated urban water management or integrated water cycle management. It includes the full range of water services provided in cities.

What reforms are necessary to make water sensitive cities a reality?

We recommend the following six areas for reform. When combined, these reforms can equip regulators, utilities, local government and other parties with the authority and mechanisms to deliver water sensitive cities.

1. **Strengthen government policy support for integrated urban water management**, including by articulating outcomes being sought and embedding these objectives in statutory planning processes.
2. **Operationalise liveability** for the water sector by normalising definitions, metrics, services and outcomes for liveability, and then aligning this with economic, health and environmental regulation of utilities and councils so that they can deliver services.
3. **Better integrate water management with spatial planning**. In particular, linking statutory and water planning at the corridor scale is one way to fast-track the integration of water sensitive city approaches into urban development processes.
4. **Apply fit-for-purpose processes and tools to evaluate options.** We know that not all planning options are on the table when cities consider infrastructure augmentations. However, this is not solely the fault of policy bans on some options. The **processes and tools for evaluating options are no longer fit purpose**. Reform includes standardising metrics and recognising new evaluation frameworks by regulators, especially harmonising the outcomes and metrics sought across health, environmental and economic regulation.
5. **Include local communities as formal partners in local-scale planning and delivery**. We need to establish a policy framework for community participation (and delivery) along with a framework for defining local level objectives and cost recovery mechanisms.
6. **Address gaps in institutional roles and responsibilities**, including:
    a. Confirming accountability for liveability outcomes (see above)
    b. Confirming accountability for managing urban waterways and stormwater
    c. Assigning responsibilities to lead the coordination of integrated planning and delivery

What is the CRC for Water Sensitive Cities?

The CRCWSC was established in 2012 to help change the way we design, build and manage our cities and regions, putting water at the centre.

We have since brought together over 80 organisations from across state, local and federal governments, water authorities, universities and the private sector businesses to identify new ways to respond to the challenges of population growth, climate change and economic constraints as they relate to the water cycle and urban environments.

Over nine years, the CRCWSC has researched and identified practical solutions to urban water management issues that:

- provide the water security essential for economic prosperity through efficient use of diverse available resources
- enhance and protect the health of waterways and wetlands the river basins that surround them, and the coast and bays
- mitigate flood risk and damage
- create public spaces that collect, clean and recycle water.

Outputs include new frameworks and tools for urban planning, water systems, economic evacuation, community engagement and governance, to name a few.

Setting the scene

Our submission is presented in the context of the continuing adaptation and evolution of water management to meet contemporary urban challenges. This context has continued to change since major water sector and government reforms were introduced in the mid-1990s.

Cities are experiencing climate change and resource limits

Following these reforms, from 1997 to 2010, many parts of Australia experienced the Millennium Drought that restricted water use for many years. Supply augmentations that were thought to be decades away were reconsidered based on new planning assumptions. and led to out-of-the-crisis decisions to construct desalination plants in Perth, Sydney, Melbourne, Adelaide and south east Queensland. These investments represent an inevitable outcome of a longstanding government and industry mindset that even now favours large scale, centralised infrastructure over incremental investment in more innovative alternatives.

Ultimately, the drought ended before these desalination plants were commissioned, fuelling a backlash against what was widely perceived as unnecessarily expensive water infrastructure. The backlash also raised questions about the management and apparent 'waste' of alternative water resources, such as recycled water, rainwater and stormwater.

The 'browning' of our cities and towns during the Millennium Drought coincided with a sustained period of rapid population growth in Sydney, Melbourne and south east Queensland. This heightened the awareness of the importance of water for the liveability of these cities, particularly in maintaining green open spaces for recreation and protection from extreme climate events. New policy directions emerged that shifted the focus towards liveability.

Many regional cities report similar needs. During 2019, Australia's east coast experienced another extreme drought. In addition to the impacts of widespread bushfires throughout Queensland, New South Wales, the ACT and Victoria, many regional towns faced 'day zero', when they would literally run out of water. Examples include Dubbo, Nyngan, Warren, Narromine, Cobar, Parkes, Forbes, Cowra, Manilla, Boggabri and Warwick. Stanthorpe (Queensland) officially ran out of water in early 2020, and relied on daily water carting at a cost of $800,000 a month, funded by the state government (ABC 2020).

We need water to deliver ongoing resilience and liveability

These examples clearly demonstrate Australia's cities and towns have reached the practical limits of their region's water resources. Climate change is anticipated to further reduce the capacity of the environment to meet existing needs, even before growth is considered. Nowhere in Australia is this clearer than in Perth where surface water catchments now supply only 10% of the city's drinking water, down from 70%. The other 90% now comes from desalination and groundwater (Hammer et al. in press).

Conventional water systems, designed to meet singular objectives under a set of relatively narrow assumptions, are becoming increasingly vulnerable to this resource trend. Water planners across Australia increasingly recognise the need for more flexible, adaptive water systems to ensure resilience to future uncertainties, and eagerly wait for policy, regulation and city-scale planning to catch up. In the meantime, their customers are paying the price of delay – either the financial cost of paying off crisis-driven investment required to maintain a buffer between supply and demand once this threshold has been crossed, or the opportunity cost that comes from investing only in large, centralised infrastructure that transfers water from rural catchments into cities, but offers little extra benefit beyond the supply of water from a tap.

The solution lies in enhancing liveability through water services and delivering this through integrated planning across the water cycle and across sectors. Governments and water sectors (public and private) are beginning to

adopt policies and agendas to improve urban liveability by offering integrated solutions for greening, cooling, improved amenity, equity, affordability, and safety from climate hazards such as flooding. Delivering these liveability outcomes requires water institutions to operate collaboratively with other sectors and non-traditional stakeholders.

The following sections discuss the key reform opportunities that will take this new direction from 'niche' to 'mainstream' practice.

Creating water sensitive cities and towns

This section summarises the key steps our cities can take to become more water sensitive, using evidence developed by the CRCWSC. Our submission concentrates on the opportunities for policy, institutional and regulatory reform relating to three key questions:

1. How do we operationalise liveability?
2. What will make integrated planning and delivery successful?
3. Why aren't water sensitive cities being funded at scale?

1. How do we operationalise liveability?

The concept of liveability is now sufficiently well established to enable action. Yet the question remains: how can we operationalise these outcomes through water services, and why aren't we doing this now?

Suggested reforms

1. Strengthen government policy support for liveability outcomes delivered through integrated urban water management, including outcomes to be delivered and indicators of progress.
2. Harmonise liveability outcomes and objectives across government portfolios so the water sector contributes to broader community outcomes.
3. Allocate roles and responsibilities to water sector agencies best placed to deliver specific liveability actions.

Benefits

- Community health improvements, and longer terms savings on public health expenditure
- Lower costs for delivering liveability, as least cost delivery approaches are identified and mainstreamed
- Ancillary water sector benefits such as healthier waterways

Evidence

Urban water is about liveability and health

Community health drives the urban water sector: providing clean and reliable drinking water, and removing effluent, to stop the spread of infectious diseases. These services have traditionally been provided through large centralised infrastructure, which has compartmentalised water supply, sewerage and later stormwater services. This compartmentalisation is both physical (in term of infrastructure) and institutional (in terms of responsibility for services).

Changing community expectations mean that urban water management must now respond to broader health challenges and aspirations.

Water provides important liveability and amenity services that have no substitute

Australian cities cannot have quality open spaces and healthy urban waterways without the water sector. The importance of these urban spaces was demonstrated recently when many in Melbourne were denied access during stage four COVID restrictions in 2020 (The Conversation 2020).

Quality (urban) green spaces provide well documented physical health outcomes:

- The public health benefits associated with access to and extent of urban green space include increased physical activity, which is linked to obesity, chronic disease and mortality (Wolch et al. 2014).
- Access to high quality, large public open space in Perth was associated with higher levels of walking. Overall, 28.8% of respondents reported using public open space for physical activity. Those with very good access to large, attractive public open space were 50% more likely to achieve high levels of walking (Giles-Corti et al. 2005).
- Green spaces can reduce the urban heat island effect, which in turn can reduce the health impacts of heatwaves. Heatwaves are Australia's mostly deadly natural phenomenon, responsible for approximately 55% of fatalities caused by natural hazards in Australia since 1900, which is more than any other natural hazard, and more than all other hazards combined (Coates et al., 2014). For example, the Victorian heatwave in 2009 is thought to have caused 374 excess deaths (Department of Human Services, 2009)—more than double the number of fatalities caused by the subsequent Black Saturday bushfires (173 reported by the 2009 Victorian Bushfires Royal Commission 2010).

Research also shows urban green spaces benefit our mental health, by reducing stress, promoting rejuvenation and enhancing social ties:

- A study in Adelaide showed those who perceived their neighbourhood as highly green had a 1.4 times higher chance of having better physical health and a 1.6 times higher chance of having better and mental health, compared with those who reported living in a neighbourhood with the lowest level of perceived greenness (Sugiyama et al. 2008).
- A Perth study found residents near higher quality public open space enjoyed belter mental health than those near low quality public open space (Francis et al. 2012).
- Green spaces improve social cohesion. A study in Baltimore found a 10% increase in the amount of tree cover was associated with a 12% decrease in crime (Troy et al. 2012).

These health benefits can be substantial, but many developed countries continue to take urban water's contribution to liveability as a given, assuming basic services such as water are provided and reliable (Sochacka et al. 2020). Policy is only starting to reflect the connection to water services.

We can consistently describe, measure and report these outcomes

Evaluating projects that deliver these benefits and outcomes has been challenging. The outcomes can be hard to quantify, making it difficult to compare options. Our review of literature and consultation with industry practitioners revealed that few evaluation frameworks include aspects of water sensitivity. To fill this gap, we developed an *Infill Performance Evaluation Framework* (Renouf et al 2020), which evaluates performance using evidence based and industry relevant metrics relating to hydrology and water resource management, urban heat and the quality of outdoor space. Water and urban design practitioners can now objectively compare the liveability metrics of different investment options.

We have shown how to deliver these objectives through proofs of concept

The 'know-what' and 'know-how' of water sensitive infrastructure is no longer a barrier to implementation.

Cities aspirating to become water sensitive now have many real-life examples to draw upon. These water sensitive solutions can deliver multiple social, economic and ecological benefits, allowing them to:

- facilitate out-of-sequence urban development which otherwise challenges the capacity of centralised infrastructure to meet demand growth
- defer or avoid investments for major resource development and trunk infrastructure augmentation
- service diverse urban contexts to meet the local community aspirations and expected levels of service
- respond to changing situations and adapt to new technologies as they emerge, avoiding stranded systems. Implementing hybrid solutions at a suitable scale can repurpose stranded legacy assets and unlock new private-public co-investments, at a time when many governments face increasing resource constraints.

These proofs-of-concept show how we can deliver liveability outcomes (assessed using the Infill Performance Evaluation Framework) *and* basic water services. Examples include using green infrastructure-based drainage systems that cleanse water within the urban landscape while also changing the urban heat profile and amenity value of local street scapes. The CRCWSC has documented many of these proofs-of-concept, including:

- Orange stormwater to potable: building urban water supply diversity (CRCWSC 2018b)
- WA groundwater replenishment trial: a case study of creating the enabling environment for regulatory change (Bettini and Head 2015)
- Salisbury alternative water scheme (CRCWSC 2018c)
- South Bank parklands rain bank (CRCWSC 2018d)
- Central Park recycled water scheme (CRCWSC 2018a).

We have also produced practical guidance and planning tools to foster broader uptake of these approaches, for example:

- Adoption guidelines for green treatment technologies (Fowdar et al. 2018)
- Designing for a cool city: guidelines for passively irrigated landscapes (CRCWSC 2020a)
- Adoption guidelines for stormwater biofiltration systems (Payne et al. 2015)
- WSC Scenario Tool (for comparing urban heat scenarios)
- Investment Framework for Economics of Water Sensitive Cities (for evaluating the costs and benefits of investment options).

The business case stacks up

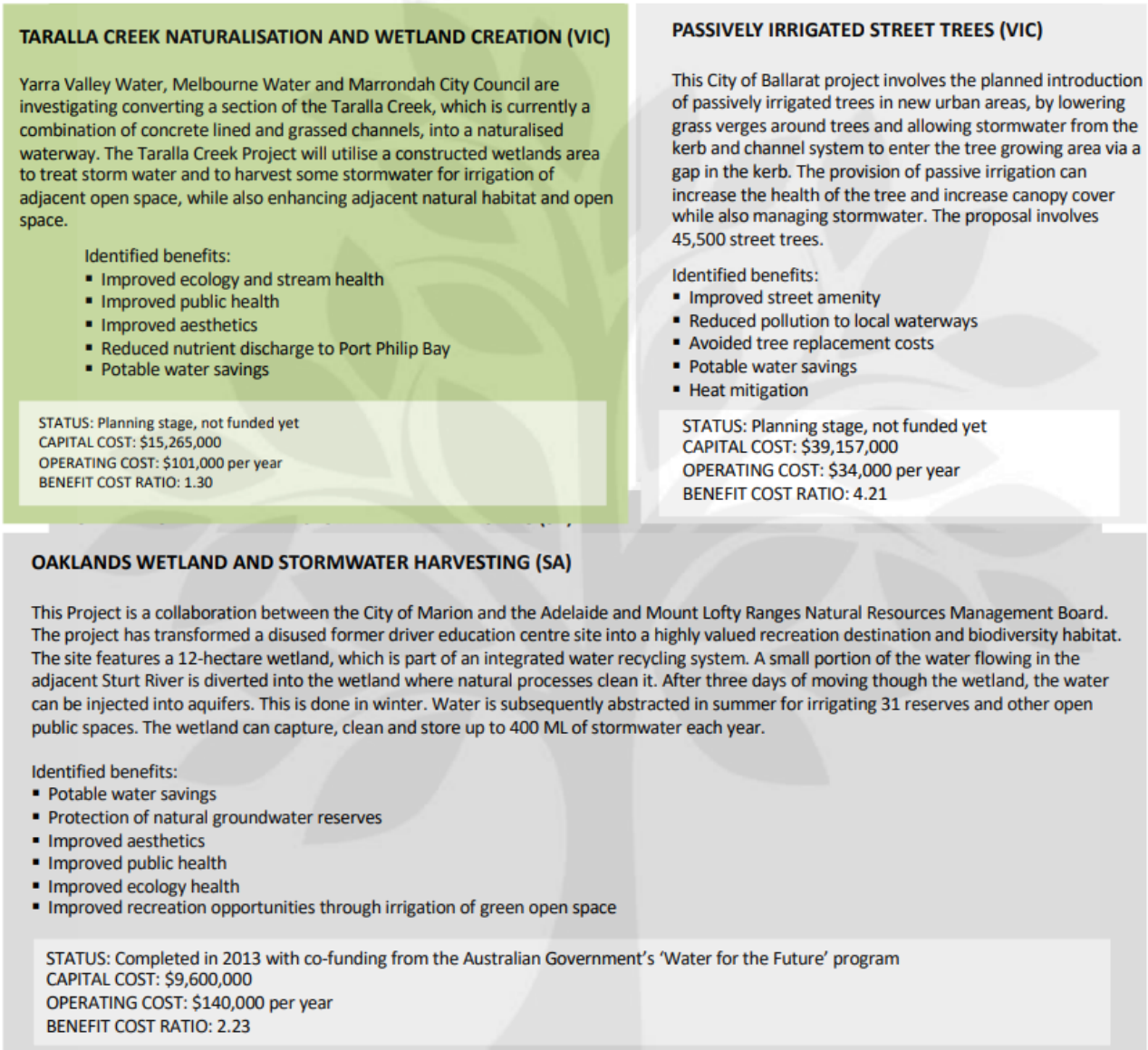
We have evaluated a range of projects and found benefit–cost ratios for water sensitive urban design (WSUD) projects can range from 1.2 to 4.0. That is, every dollar invested may return up to $4 in financial and non-market benefit. Figure 1 summarises the results of several case studies.[2]

Further work highlights the costs of 'narrow' project evaluation and business cases. For example, Leroux and Martin (2014) show that a portfolio approach to major water supply systems (that includes alternative water

[2] The Oaklands Park case study in this report has since been revised following peer review.

sources) allows water managers to hedge against the supply risks across different supply sources, accounting for uncertainties of water flows as well as differences in supply costs. Testing this against historical investment decisions showed optimising the water supply portfolio of a medium-sized city could save between $43 million and $165 million per year.

Figure 1 – Economic evaluation of water sensitive projects



Source: CRCWSC 2020b.

Communities are willing to pay for liveability

Our research also shows that customers are willing to pay for these liveability outcomes.

A study by Iftekhar et al. (2020) examined people's preferences for different restoration options for a major water utility land holding in the suburbs of western Melbourne. The study investigated the Main Outfall Sewer (MOS) reserve, as part of the Greening the Pipeline initiative. There was growing interest to convert the area into parklands for community use, but information on people's preferences for different restoration features was lacking.

The study found that 86% of the population were willing to pay for liveability improvements. All of the willingness to pay estimates were significantly different from zero, meaning that 86% of the sample population had a positive willingness to pay. The study also found a large, negative willingness to pay for the status quo; in other words, a strong willingness to avoid the current, derelict condition. Importantly, only the water sector could deliver this project and its liveability outcomes.

2. What will make integrated planning and delivery successful?

Because water sensitive cities deliver their value by integrating and coordinating investments across the urban water cycle, retaining fragmented responsibilities and informal engagement approaches, with no lead party, is unlikely to be optimal.

Similarly, to achieve its objectives for liveable cities, the water sector needs to connect (i.e. integrate) its strategic and operational activities with its counterparts in the planning system.

Suggested reforms

1. Establish a lead agent responsible for leading collaboration and integration processes
2. Establish frameworks and policy to involve communities in integrated planning for liveability, particularly to scope, plan and potentially deliver local scale water projects
3. Pay special attention to the importance and value of including and empowering Traditional Owners in integrated planning forums and processes
4. Develop instruments and procedural alignment (as required) to integrate water planning with spatial planning at the sub-catchment or corridor scale

Benefits

- Simpler integrated planning processes, which increase efficiency and consistency
- Agreed and accepted integrated planning outputs
- Water services that embed water-cycle outputs and outcomes in existing spatial planning processes

Evidence

Water sensitive cities are made possible through integrated planning and delivery

The Productivity Commission notes all state and territory governments have made general, high level statements about the importance of urban amenity and green open spaces, recognising their contribution to health and wellbeing, city cooling and improved air quality.

It's likely that these objectives will differ within and between communities. Our cities are complex, and so is the concept of liveability, embracing water security, transport infrastructure, personal safety, health and wellbeing, and amenity, among other things. It's likely the relative importance of these features will vary between communities; the objectives for one region may be very different from the objectives for another.

The CRCWSC has developed a WSC Transition Planning Process to help cities and towns identify their vision and objectives, and then develop the strategies and actions necessary to achieve that vision. This is a process of participatory deliberation between a group of diverse stakeholders, who learn from each other as they consider the current system, set out future aspirations, prioritise actions and build capacity for implementation.

Our research shows that this collaboration can be highly effective:

- Perth's Water Sensitive Transition Network is a network of 26 stakeholder organisations. It seized the opportunities from the vision and transition strategy prepared for Perth to lead a self-sustaining transition process driven by the stakeholders themselves, to implement strategic directions. Because its unfunded, its longevity relies on the commitment of individuals. Perth is an exemplar of a city diversifying its water supplies and supporting sustainable urban greening initiatives.
- Water Sensitive Bendigo is a collaborative process to drive Bendigo's transition to a water sensitive city. This cross-agency partnership developed to implement a cross-agency vision and transition strategy for a water sensitive Bendigo. The *Water Sensitive Bendigo* Implementation Plan outlines the immediate priority actions, as well as aspirational actions. The governance is based on a memorandum of understanding between key agencies. These agencies are currently championing a major restoration project to rehabilitate Bendigo Creek (Wanyarram Dhelk), providing a range of liveability benefits to Bendigo's urban community.

Such integrated planning processes are gaining traction, but are seen by some as a distraction from the core business of the water sector.

Community stakeholders are integral to the success of water sensitive cities

The community is a key stakeholder in creating and maintaining water sensitive cities. As noted above, it's likely the objectives for one community will differ from another, so communities play a critical role in shaping investments at the local level. Contributing local innovation and local knowledge to the design of investments may improve their effectiveness. Knowledge of local history can help to optimise investments for local conditions. Community involvement can also inspire personal and collective responsibility, for example, through changes in household practices and communal action in neighbourhood initiatives that improve overall system efficiency.

Community engagement is not new to the water sector, but a mature framework for community-led engagement is still lacking to enable differentiated local and regional planning.

Community involvement includes engaging with First Nations peoples

The Wanyarram Dhelk project in Bendigo shows how traditional ecological knowledge can restore cultural, social and environmental values of a degraded urban creek. The project began in 2016 as a partnership between Dja Dja Wurrung Enterprises (an arm of the Dja Dja Wurrung Clans Aboriginal Corporation) and the North Central Catchment Management Authority (the agency responsible for natural resource management in north central Victoria). In 2018 Dja Dja Wurrung Enterprises secured $500,000 to complete Wanyarram Dhelk Phase 1 and 2 on Country, with Dja Dja Wurrung Enterprises leading and delivering all aspects of the project.

The project combines Traditional Owners' ecological knowledge with contemporary design and technology in partnership—Traditional Owner-led projects provide deeper and more layered returns to Djaara people and their

investors by providing opportunities to fulfil their aspiration to heal Country and water. Dja Dja Wurrung members have deep connections with the waterways and understand how Bendigo Creek should look, smell, sound and feel. Hearing Traditional Owners say that the creek didn't smell right prompted investigations by the project team into pollutant loads entering the creek, and subsequently the design of vegetated, instream ponds that sound and smell as they should, allowing the water to heal.

This project has helped to:

- create opportunities for Djaara people to fulfil their obligations to heal Country and water through on-ground delivery
- build the capacity of the Dja Dja Wurrung Clans Aboriginal Corporation and Dja Dja Wurrung Enterprises to play a leading role in protecting and enhancing the natural environment
- promote education and awareness about Dja Dja Wurrung culture

Planning for First Nations involvement in WSC transition planning processes should consider the financial and other support necessary for their participation and contribution.

Who leads the collaborative process is important

Gaps in institutional capacity may require governance changes. Research from our Integrated Research Project 3 shows effective collaboration requires clear governance arrangements that articulate roles and responsibilities, enable collaboration between the organisations, facilitate decision making processes and appropriately allocate risk between the parties.

For instance, the Brabham Action Learning Partnership (Tawfik et al. 2020) is a multi-stakeholder collaboration dealing with a complex planning problem in Perth. The partnership between research and practitioners was formed to collectively navigate and influence planning approval processes of integrated water solutions. The major insight was that no one agency has responsibility for the success factors, and thus collaboration relies upon goodwill and 'corporate memory' of past trust building.

New legislative requirements, redistribution of responsibilities, and collaborative networks are just some of the ways in which structures can be changed to facilitate coordination. Further considerations include:

- *Merging existing portfolios, departments or functions into a single entity*. For example, reforms of Berlin's administration led to the amalgamation of urban planning and design, housing, building, transport, and environment functions to create one of the world's most comprehensive urban development departments. In Victoria, the Department of Environment, Land, Water and Planning seeks to create 'a liveable, inclusive and sustainable Victoria with thriving natural environments' by bringing together climate change, energy, environment, water, forests, planning and emergency management functions into a single department, and maximising connections between different societal realms (e.g. community, industry and economy) and the environment. Similarly, regional councils like Townsville City Council are in a unique position to integrate activity as they hold a broad range of responsibilities, from strategy and policy, through to planning, regulation and service delivery.

- *Assigning existing organisations new responsibilities, supported by formal accountability mechanisms*. This approach requires organisations to internalise integration principles by, for example, instructing different organisations to develop their own strategies, with targets and timetables that align with a particular integration agenda, such as building resilient communities.

- *Creating a new body that steers coordinated responses to complex, cross-cutting problems.* This could be a new agency that promotes liveability, or an overarching authority that coordinates the work of other agencies in cities towards a common goal. The Greater London Authority, for example, combines

centralised decision making at the city-wide scale with network modes of coordination. The authority, created in 2000 to promote London's economic, social and environmental wellbeing, is duty bound to achieve policy integration by developing mutually consistent and reinforcing strategies (dealing with transport, health, spatial development, culture, economic development and environment policy).

Water planning must be integrated with spatial planning

If the urban water sector is to achieve its objectives for integration, it also needs to connect its strategic and operational activities with its counterparts in the planning system. The planning system's spatial perspective brings different sectors together to resolve the allocation and organisation of different urban functions. In addition, urban planning can implement a range of instruments, backed with varying degrees of statutory force, to guide urban change. These include long-term spatial visions or strategies, policy frameworks, regulations and codes. Despite this, critical linkages with water planning are often overlooked as a result of the different instruments, organisations and levels of governance in use.

When it comes to urban and water planning, procedural alignment needs to specifically address differences in planning horizons. Broadly speaking, integration is easier to achieve at the direction-setting level (e.g. overarching policies and strategies) but is challenged at the implementation level where different regulatory instruments dictate where, what and how: (a) land use and development occurs; and (b) infrastructure is constructed and connected. At this implementation level, conflicting objectives become apparent and trade-offs need to be made. The corridor or sub-catchment is the ideal scale to integrate water and urban planning, yet there are few successful examples of this in across Australia.

3. Why aren't water sensitive cities being funded at scale?

The evidence above demonstrates we now have the tools and metrics to quantify liveability outcomes and differentiate investment options. We also have robust economic tools to value these outcomes in business cases. And there is customer demand for these outcomes. But despite this, liveability remains a value-add to projects, and investment decision making, and its implementation is ad hoc. It remains a contested policy objective.

Funding is often cited as a key challenge facing water sensitive city projects. While such projects have the potential to deliver significant net benefits to the community, the observed level of public and private investment in water sensitive projects is low, relative to the $5.8 billion annual spend on water, sewerage, and drainage infrastructure across the nation. Evidence suggests that the 'authorising environment' for investment decision making is actually the key barrier.

Suggested reforms

1. Strengthen government policy support for water sensitive cities, including articulating measurable outcomes being sought and embedding these objectives, targets and standards in statutory planning processes
2. Update regulatory frameworks to ensure that the amenity, public health and environmental benefits of water sensitive urban design are recognised as a legitimate obligation, enabling water utilities to collect the revenue required to deliver these public good objectives.
3. Improve system level accountability for outcomes by assigning responsibilities to a lead authority that is best placed to: coordinate and/or deliver WSUD projects; collect and distribute the funding required through regulated prices, and; identify beneficiaries that may be charged with specific levies, when appropriate.

Benefits

- Water utilities empowered to collect the revenue required to deliver water sensitive and liveability objectives
- More efficient coordination, investment and delivery of water sensitive and liveability projects
- Accountability for liveability outcomes, including post-investment evaluation

Evidence

Valuing costs and benefits enables better decision making

The Productivity Commission highlights the importance of assessing all of the benefits and costs of relevant options, including water, public health, environmental and urban amenity outcomes. It also notes that this often does not occur.

Partners in the CRCWSC, including state government agencies, local governments and water utilities, also identified an increased capacity for economic analysis as one of their highest priorities. Assigning a monetary value to the environmental, amenity and public health benefits associated with a water sensitive solution in a benefit–cost analysis has been especially challenging for practitioners.

To address this issue, the CRCWSC developed the Value Tool, a comprehensive database of non-market valuation studies. Each study contains a dollar value estimate of the non-market benefits generated from using water sensitive systems and practices. We used a comprehensive search and review process to populate the database, so that only the most robust studies were included. The tool's design was informed by industry stakeholder consultation, and industry experts provided feedback on design and functionality.

Funding can be a (potential) barrier

After an economic assessment has been completed (and worthwhile projects are identified), funding challenges are a perennial barrier to water sensitive city projects. While water sensitive cities have the potential to deliver significant net benefits to the community, the observed level of public and private investment in water sensitive projects is low, relative to the $5.8 billion annual spend on water, sewerage, and drainage infrastructure across the nation.

To explore this issue, Fogarty and Van Bueren (2020) reviewed the funding models, economic regulatory frameworks, policies and mechanisms in use across Australia. They concluded that the 'authorising environment' for investment decision making is the key barrier.

The authorising environment determines what is achievable. Within Australia, financing and funding decisions for water infrastructure projects are made relatively systematically across jurisdictions, and these approaches to financing and funding reflect decisions made within the authorising environment. The Productivity Commission has noted government policy in this area is weak, and has recommended strengthening policy frameworks, specifying the outcomes being sought and allocating accountabilities (PC 2017). Once that is done, objectives can be set, and the question then becomes how to deliver these objectives at the least cost.

Fogarty and Van Bueren identified the following constraints impeding WSUD investment (box 1).

Box 1: Constraints encountered by major water utilities and some possible factors

Economic regulation

- *Economic regulatory regimes too focused on inputs, not outcomes:* Traditional regulatory frameworks are designed to assess the efficiency and effectiveness of a utility's inputs to produce a uniform level of service to customers. Efficiency assessments tend to rely heavily on technical, engineering standards, and whether a utility has used the least-cost combination of inputs to produce the standard. This approach can stifle innovation, because there is no incentive for a utility to strive for better levels of service for customers.
- *Non-market benefits not widely accepted as valid measures:* WSUD yields environmental, health and social benefits—all of which are typically not priced in markets. The lack of market values can lead to these benefits being overlooked by regulators and others when determining allowable levels of expenditure on capital projects.
- *Dominance of the WACC:* The funding available to water utilities through customer revenue is predominantly determined through the allowable return on their suite of assets, as given by an approved weighted average cost of capital (WACC) applied to the value of the utility's 'regulated asset base' (RAB). Small changes to the WACC typically produce very large changes in allowable revenue, and therefore parameters of the WACC attract a great deal of attention from utilities and regulators alike—potentially to the detriment of assessing what projects and outcomes actually matter to customers.
- *Multiple and dispersed beneficiaries:* The benefits of WSUD accrue to both water customers and the broader community. Regulators typically do not allow utilities to charge customers for services that do not relate specifically to a wastewater or water supply service for the benefit of the utility's customers.
- *Distorted prices:* The regulated charges applied by water utilities to customers do not necessarily reflect the cost of servicing an individual customer. For example, all state and territory governments apply postage-stamp prices for water supply within a scheme area (uniform prices across all customers). Some states allow utilities to charge a 'developer contribution' for headworks, while others do not. These pricing policies may have a significant bearing on whether a WSUD project is financially viable.
- *Discretionary versus non-discretionary services:* Following on from the above point, there may be some uncertainty around what a utility's legislative obligations are relating to drainage or stormwater management. Economic regulators are more likely to allow a water utility to pass through a project's costs to customers if the project has a clear legislative driver.
- *Benchmarking projects against LRMC:* Regulators generally favour projects that can supply water at costs below—or near to—what is assessed to be the long run marginal cost (LRMC) of water supply. A regulator is unlikely to allow funding regulators for WSUD projects that do not meet this criteria. However, this begs the question of whether the correct values for LRMC are being used to evaluate projects with long asset lives. Under climate change, LRMC of water supply will increase because more climate-independent water supply will need to be built (desalination and wastewater recycling).

Government policy and governance

- *Outcomes poorly defined:* Statutory planning authorities and policy agencies may not have adequately articulated what outcomes are being sought from WSUD.
- *Multiple parties responsible for WSUD delivery:* The responsibility for funding and delivering WSUD projects is often dispersed across local government, water utilities, and developers. This can make it difficult for any one party to raise sufficient levels of revenue through charges or other mechanisms to fund WSUD.
- *Ill-defined responsibilities for stormwater and drainage:* Unlike water supply and wastewater management services, the parties responsible for managing stormwater and drainage as part of an integrated water cycle, and their respective roles, rights and obligations, are often ill-defined.
- *Uncertainty around public funding for WSUD projects:* Governments may agree to compensate water utilities where there is a legislative obligation for the utility to deliver a service to the broader community. Alternatively, or in addition to this approach, governments may raise funding for WSUD projects through a hypothecated levy on water customers or ratepayers. However, there is often a degree of uncertainty around what is eligible for public funding and the duration of funding.

State government fiscal constraints

- *Constrained state budgets:* Because the majority of water utilities in Australia are government-owned, they are often subject to capital expenditure and/or borrowing constraints by their government shareholders. So even if a WSUD project is economically sound, it may not be prioritised or approved by a government that has a policy objective of reducing debt from its state accounts.
- *Dividend payments:* Publicly-owned water utilities are required to pay dividends to their government owners. While it is reasonable for government shareholders to expect a return on their utility assets, dividend payments may have the effect of reducing the amount of funding available to the utility for re-investing back into service delivery and innovation.

Source: Fogarty and van Bueren 2020.

To address these constraints, they nominate three policy and institutional reforms to establish the authority to deliver WSUD:

- Strengthen government policy support for water sensitive cities, including articulating measurable outcomes being sought and embedding these objectives, targets and standards in statutory planning processes

- Update regulatory frameworks to ensure that the amenity, public health and environmental benefits of WSUD are recognised as a legitimate community service obligation. These obligations may be achieved by either water utilities or other responsible parties who can then collect the revenue required to achieve these public good objectives.

- Improve system level accountability for outcomes by assigning responsibilities to a lead authority that is best placed to: coordinate and/or deliver WSUD projects; collect and distribute the funding required through regulated prices, and; identify beneficiaries that may be charged with specific levies, when appropriate.

Summarising our reform opportunities

Australian cities and towns are making substantial progress towards water sensitivity. However, there is still much to be done. To complete these transitions, and to make this mainstream practice, several barriers need to be addressed. In this regard, we have posed questions about why liveability remains a discretionary outcome, even though this question has been asked many times in the past? Why water sensitive practices are not being implemented at scale, even though the business case can stack up? And whether it is time to formalise practises of integration and coordination to enable the internally and external siloed water sector to reach its potential.

We recommend six areas for reform. Combined, these reforms can equip regulators, utilities, local government and other parties with the authority and mechanisms to deliver water sensitive cities.

1. As a priority, **strengthen government policy support for integrated urban water management** as a precursor to other reforms, including articulating outcomes being sought and embedding these objectives in statutory planning processes. Such reforms should be enacted on a whole-of-government basis to align investment across water, spatial planning and other sectors towards a common goal.
2. The debate about the value of liveability, and water's role in this, is behind us. **Now is the time to operationalise liveability** for the water sector. Specifically, we need to normalise definitions, metrics, services and outcomes for liveability, and to align this with economic, health and environmental regulation of utilities and councils. For example, changing regulatory frameworks to recognise the amenity, health and environmental benefits of water sensitive cities will establish a funding mechanism for utilities (or other responsible parties).
3. **Improving urban liveability also requires cross-sector integration and coordination**, especially better integrating water management with spatial planning. Currently, there is a misalignment of policy, regulatory and planning frameworks between these sectors, even though they seek to achieve the same high level outcomes. Addressing this misalignment will improve the efficiency of what is otherwise a complex process. We also recommend improvements to better link statutory and water planning at the corridor scale. Without a well-integrated corridor scale plan it is very difficult to integrate water sensitive city approaches systematically into urban development processes.
4. We agree that not all planning options are on the table when cities consider infrastructure augmentations, and that this can lead to suboptimal outcomes. However, this is not solely the fault of policy bans on some options. The processes and tools for evaluating options are no longer fit for purpose despite newer alternatives being available and in use by early adopters in the industry. Without reform to make such

approaches universal, the planning process will retain its bias towards 'conventional' options. **Reform requires standardising metrics and regulators recognising new evaluation frameworks**, especially harmonising the outcomes and metrics sought across health, environmental and economic regulation.

5. **It is time for local communities to become a formal partner in local-scale planning and delivery.** Policy responses to issues such as climate change reflect social norms around water management which are in turn influenced by community literacy and empowerment. We can expand the 'authorising environment' to include the community by establishing a policy framework for community participation (and delivery) along with a framework for defining local level objectives and cost recovery mechanisms. This is not yet current practice many Australian cities and towns because the water sector lacks the mandate, tools and frameworks. (We also acknowledge that trust needs to be built with local communities).
6. **We must address gaps in institutional roles and responsibilities** for water sensitive cities, especially:
    a. confirming accountability for liveability outcomes (see above)
    b. confirming accountability for urban waterways and stormwater management in some jurisdictions
    c. assigning responsibilities to an authority/entity to lead the coordination of integrated planning and delivery.

    These reforms will resolve the fragmentation of accountabilities across multiple parties and provide agencies with funding via regulated prices or charging identified beneficiaries, to enable service delivery.

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Cooperative Research Centre for Water Sensitive Cities

Level 1, 8 Scenic Boulevard
Monash University
Clayton VIC 3800

info@crcwsc.org.au

www.watersensitivecities.org.au