Water Sensitive Cities Benchmarking and Assessment

Moonee Valley City Council

E2DESIGNLAB

CRC for Water Sensitive Cities

Water Sensitive Cities Benchmarking and Assessment: Moonee Valley City Council Melbourne

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1. Introduction

Water sensitive cities are resilient, liveable, productive and sustainable. They interact with the urban hydrological cycle in ways that: provide water security for economic prosperity through efficient use of diverse water resources; enhance and protect the health of watercourses and wetlands; mitigate flood risk and damage; and create public spaces that harvest, clean and recycle water. Its strategies and systems for water management contribute to biodiversity, health and wellbeing, carbon sequestration and reduction of urban heat island effects.[1]

Through the planning and delivery of a Water Sensitive Cities conceptual framework, urban areas can exploit the synergies between local water management and urban greening while creating resilient and liveable neighbourhoods. This is achieved by strengthening governance arrangements, building community capital, and investing in multifunctional adaptive infrastructure. This is complimented by the provision of high quality and connected open spaces, protecting and enhancing the ecological values of the urban landscape, providing a diversity of water supply options and recreating a more natural water cycle that restores soil moisture while reducing stormwater runoff.

The purpose of the WSC Index is to guide governments and organisations to transition cities (or municipalities) into liveable, resilient, sustainable and productive places through water related actions.

The WSC Index aims to:

- provide a communication tool for describing key attributes of a water sensitive city.
- articulate a shared set of goals of a water sensitive city.
- provide benchmarking for a city's water-sensitive performance.
- measure the progress and direction of progress towards achieving water sensitive city goals.
- assist decision-makers prioritise actions, define responsibility and foster accountability for water-related practices.

The WSC Index Tool has undergone multiple development phases including a co-design process with industry partners. Its application relies on cross-organisational knowledge sharing and collaboration that strengthens internal relationships and broader industry relationships to deliver commitment to action. The CRC for Water Sensitive Cities, E2Designlab and LindseyB have partnered to apply the Tool across various scales and locations throughout Australia. The process enables the development team to continue to gather information and data for on-going improvement to the usability and functionality of the Tool.

[1] http://watersensitivecities.org.au/

2. WSC Index Tool

The WSC Index Tool identifies all the key components (indicators) of a water sensitive city. The Tool covers 7 goals and assesses 34 indicators that represent important attributes of a water sensitive city. It is designed to benchmark cities and municipalities based on water sensitivity performance and provides users with the capacity to monitor and evaluate potential management actions against performance to make the most impact with available resources. It enables users to explore measures that that deliver improvements in liveability, sustainability, resilience and productivity.

A summary of the goals and indicators of the WSC Index Tool are listed in the following section.

It is anticipated that subsequent benchmarking would be undertaken every two to three years in order to track Council's progress and achievements.

2.1 Process for Rating Indicators

A full day workshop was held at Moonee Valley City Council on the 28th April, 2016. Participants represented a diverse range of internal stakeholders as well as external stakeholders (including representation from Melbourne Water, DELWP, and City West Water). A three-step method for scoring each indicator was used:

1. live polling to gauge individual participants' perspectives on the score for the indicator in question,
2. interactive discussion to uncover evidence and justification to inform the indicator's score, and
3. reach consensus amongst the participants on the score to be assigned.

The live polling used a bespoke web-based tool that participants accessed through their mobile devices to score 1-5, the collective results for which were then showed in real-time. These results were then discussed, with evidence identified (e.g. policy documents, organisational materials, expert views), before reaching consensus on a given rating and level of confidence.

Summary of Goals and Indicators

Ensure good water sensitive governance	Increase community capital	Achieve equity of essential services	Improve productivity and resource efficiency	Promote adaptive infrastructure	Improve ecological health	Ensure quality urban space
Knowledge, skills and organisational capacity	Water literacy	Equitable access to safe and secure water supply	Maximised resource recovery	Diversify self-sufficient fit-for-purpose water supply	Healthy and biodiverse habitat	Activating connected urban green and blue space
Water is key element in city planning and design	Connection with water	Equitable access to safe and reliable sanitation	Low GHG emission in water sector	Multi-functional water infrastructure	Surface water quality and flows	Urban elements functioning to mitigate heat impacts
Sound institutional arrangements and processes	Shared ownership, management and responsibility of water assets	Equitable access to flood protection	Water-related business opportunities	Integration and intelligent control	Groundwater quality and replenishment	Vegetation coverage
Public engagement, participation and transparency	Community preparedness and response to extreme events	Equitable and affordable access to amenity values of water-related assets	Low end-user potable water demand	Robust infrastructure	Protect existing areas of high ecological value	
Leadership, long-term vision and commitment	Indigenous involvement in water planning		Benefits across other sectors because of water-related services	Infrastructure and ownership at multiple scales		
Water resourcing and funding to deliver broad societal value				Adequate maintenance		
Equitable representation of perspectives						

3. Evaluation of Performance

3.1 City State Benchmarking

Figure 1 summarises the City State Benchmarking results for City of Moonee Valley. Percentage attainment for each city state ranged from 100 % as a supply city and sewered city down to 6 % as a Water Sensitive City. This section summarises the key elements that contribute to the overall percentage attainment of each city state.

100% attainment of water supply city and sewered city

The municipality rated 100 % as a water supply city and 100 % as a sewered city. The entire community has equitable access to safe and secure drinking water. Water is affordable at less than 3% of household income and low income earners can access discounted bills (for residents with health care cards). Similarly, everyone has access to safe and reliable sanitation.
All households are connected to the sewer system which is transferred to Western Treatment Plant where the water is treated to 'developed world standards' prior to release to Port Phillip Bay. Local illegal discharges and leaks need to be identified and resolved.

83% attainment of drained city state

The municipality rated 83% as a drained city. Rainfall events generally do not disrupt everyday activities. Everyone is well protected against flood risks. There are known localised flooding

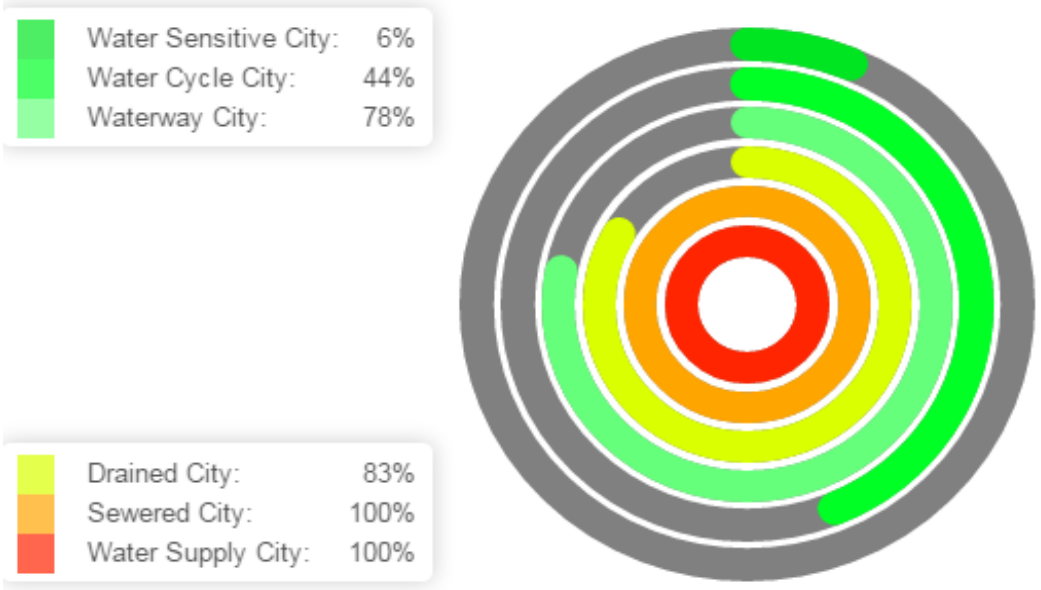

Figure 1. Benchmarking results for Moonee Valley City Council

issues, some being addressed and some not. Regular call outs to problem areas occurs and there is inconsistent application of planning controls explicitly taking flood risks into account. This has resulted in some overland flow paths being built over, exacerbating problems in some areas.

78% attainment of waterway city state

The municipality rated 78% as a waterway city reflecting the well embedded planning and design approaches directed at protecting the water quality discharged to local waterways and connecting local neighbourhoods to waterway corridors.

Significant investment continues to be directed at improving the amenity and liveability values along Moonee Ponds Creek, Maribyrnong River and their tributaries. The waterways are mostly modified and some banks have rock beaching, with fragmented patches of riparian vegetation. The quality and flow characteristics within the waterways fall short in supporting functioning ecosystems.

Council continues to implement WSUD projects, including some stormwater harvesting projects. There are some actions being implemented in terms of addressing known point sources of pollution. Council's introduction of C108 requires stormwater discharges for new developments to be treated to best practice, however improvement in compliance is required.

In-stream biota is poor and riparian biodiversity is low however some valuable pockets of habitat are located throughout the municipality e.g. Napier Park. Although a few blue-green assets (e.g. ponds, wetlands) are present these places are not well connected with active recreation infrastructures such as bike and walking paths (beyond the major waterway corridors).

There are some areas with blue-green infrastructure that excite and engage the local community (e.g. Maribyrnong Park Lake, Blair St Raingarden, Afton Street Wetland) and overall community support for urban greening is increasing. However, most people do not have a good understanding of the water cycle. The bigger picture around water literacy, water recycling, and waterway pollution is being addressed as part of the Education for Sustainability (EfS) program which is mandated in school curriculums.

44% attainment of water cycle city state

The municipality rated 44% as a water cycle city. Decentralised alternative supplies exist but the volume of reuse is not large enough to provide a major component of the municipality's water supply.

Department of Health have undertaken some work at Boeing Reserve around health benefits of stormwater harvesting projects for reuse in local parks. Council acknowledges the broader benefits of water sensitive practices but they are not quantified to anywhere near the level of other sectors.

Project groups, such as the WSUD working group, have multidisciplinary representation; however multi-disciplinary skills are not common. Some scenario planning is undertaken in regards to population growth and climate adaptation. Monitoring and evaluation frameworks could improve as Council's, systems and processes are developed.

Greening the West and Lead West are actively leading change across different sectors of the community.

6% attainment of water sensitive city state

The municipality rated 6% as a water sensitive city. Widespread attributes evident across the municipality are centred on demand management. Following on from the Millennium drought water sensitive practices have led to low end-user potable water demand through the installation of water saving fitting, fixtures and appliances. Bounce back in water usage since the drought is

evident, nevertheless documented water usage is in the range of 200 to 250 litres/person/day for total demand across residential and industrial sectors.

3.2 Water Sensitive Goals

Figure 2 summarises the performance of the City of Moonee Valley against the 7 goals of a water sensitive city. The 7 overarching goals include; ensure good water sensitive governance, increase community capital, achieve equity of essential services, improve productivity and resource efficiency, improve ecological health, ensure quality urban space and promote adaptive infrastructure. The results for the municipality (shown by the dashed blue line) are compared to an idealised water cycle city (shaded light blue area). It can be seen that for the goals of water governance, productivity and resource efficiency, quality urban spaces and adaptive infrastructure the municipality is well aligned to the water cycle city benchmark.

A deficit in attaining key attributes of a water cycle city is evident across the goals of community capital, essential services, and ecological health. An overview of the indicators that fall short of attributes for a water cycle city are listed below.

Increase community capital

Indicator: Water literacy

Current status: Little interest across the community to acquire knowledge of the water cycle. People understand to a degree what they are paying for.

Notes: There is a need to improve water literacy across the community to enable the community to embrace a water sensitive future.

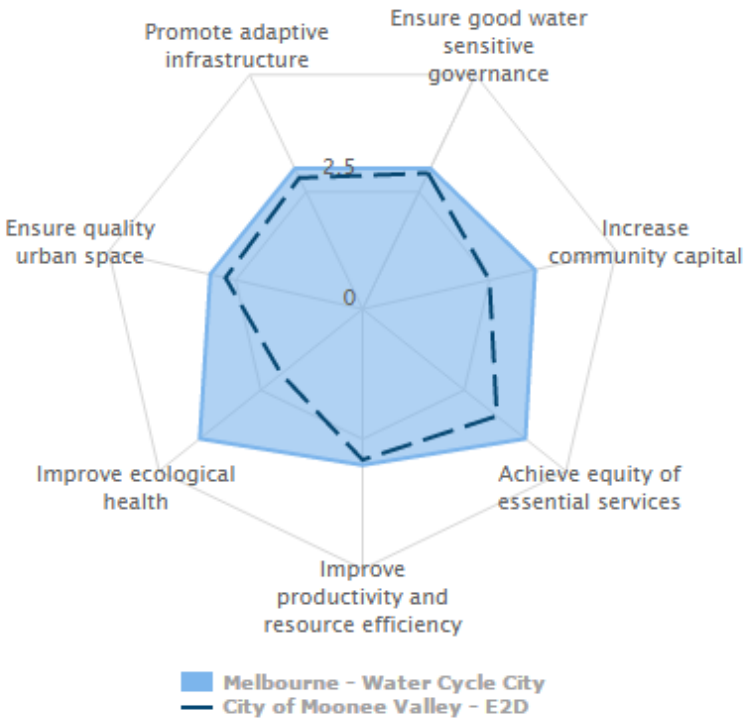

Figure 2. Performance against water sensitive goals

Indicator: Connection with water

Current status: Community feel a connection with water-related assets (e.g. infrastructures and natural assets) within their neighbourhood, however this could be strengthened. Water is

recognised as part of what determines the appearance and feel of the neighbourhood. Water (in the broad sense) in the neighbourhood is appreciated in some areas.

Notes: Increased community connection and appreciation of water helps foster a shared responsibility for minimising human related impacts on the urban water cycle and water-related assets.

Indicator: Shared ownership, management and responsibility of water assets

Current status: Management and responsibility of water assets is largely vested in formal water governance organisations (e.g. utilities, councils). Communities play a minor but noticeable role in the ownership, operation and maintenance of local water management solutions (prominently rain water tanks).

Notes: Shifting towards greater flexibility to own and manage water assets at the most appropriate scale of operation requires the community to become more involved in urban water management. Fundamental to this shift is improvements in water literacy across the community and an understanding of the aspirations of a water sensitive city.

Achieve equity of essential services

Indicator: Equitable and affordable access to amenity values of water-related assets

Current status: Most parks are free, most sports clubs have the same fee for everyone, and distribution of high quality open spaces is not equitable across the municipality. Access to space around waterways is quite varied with some open, accessible and natural but other areas restricted and built out. Council receives complaints about distribution of amenity.

Notes: Equitable access to water related amenity values is particularly important to promote a healthy community and improve the well-being of the more vulnerable sectors of our community.

Improve ecological health

Indicator: Healthy and biodiverse habitats

Current status: Urban habitats (including streamside habitats) are patchy with some areas connected, however, overall biodiversity is low. The quality of the vegetation provides some functioning ecological systems.

Notes: Connecting patches of urban habitat along waterway corridors and streetscapes improves biodiversity whilst creating and progressively linking cooler greener areas across the municipality.

Indicator: Groundwater quality and replenishment

Current status: The quality and/or replenishment of groundwater in the area falls short in supporting valued ecosystem services (e.g. groundwater dependent ecosystems). Councils understanding of groundwater systems and interactions with base flow is generally poor. There is limited permeable surface to allow for groundwater replenishment.

Notes: Groundwater systems are an important component of the urban water cycle. Greater knowledge about the local system will help ensure protection in its own right as well as groundwater dependant ecosystems.

3.3 Water Sensitive Outcomes and Practices

The WSC Index Tool can filter results based on WSC Outcomes and WSC Practices.

WSC outcomes

Water sensitive outcomes assesses the performance of the urban water system against the delivery of Resilience, Sustainability, Liveability and Productivity.

Resilience in this context is defined as the capacity to maintain water system services under acute or chronic disturbances, through adaptation or recovery. Sustainability is the capacity of water system services to deliver benefits for current and future generations. Liveability is the capacity of the water system to deliver a high quality of life for communities (such as thermal comfort, aesthetics, amenity, connection to place, etc.). Productivity is the capacity of the water system services to generate economic value.

The ratings from each indictor can contribute one or more of these outcomes. For example, improving the rating for the indicator 'diversify self-sufficient fit-for-purpose water supply' related to provision of alternative water supplies would improve both resilience and sustainability outcomes.

The results shown in Figure 3 indicate how the City of Moonee Valley compares to water cycle city outcomes (pink open circle). Productivity outcomes are well aligned, and resilience is reasonably aligned, to the desirable outcomes of a water cycle city. Improvements should be directed at actions to deliver enhanced liveability and sustainability outcomes for the community. Delivering these outcomes is closely linked to improving water sensitive practices.

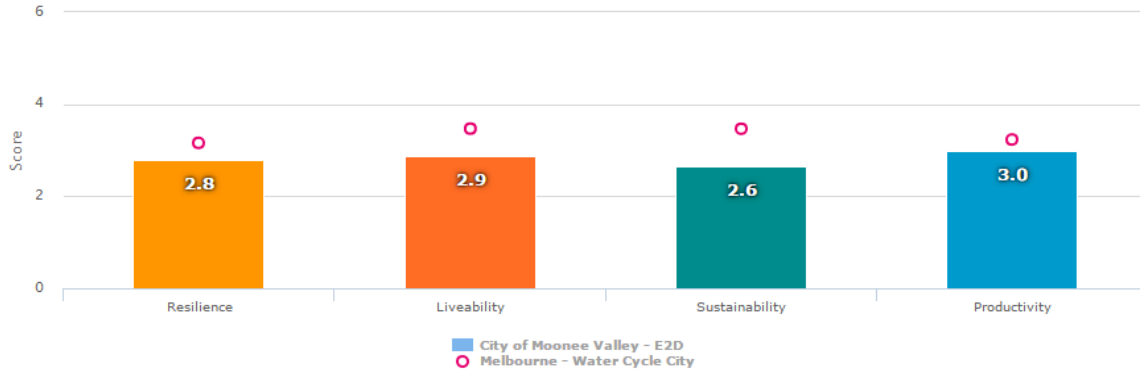

Figure 3. Assessment of water sensitive outcomes
(Attainment of Water Sensitive City status requires a score equal to 5)

WSC practices

The three pillars of practice that are essential to deliver water sensitive services (Wong and Brown, 2009) are:

- Cities as Catchments to provide resources at different scales in fit-for-purpose applications;
- Cities providing Ecosystem Services to integrate urban water management into the urban landscape, providing multiple benefits such as heat mitigation, ecological health and landscape amenity; and
- Water-Sensitive Communities, where people engage in water-conscious behaviours, feel connected to their water environments and appreciate the many values of water.

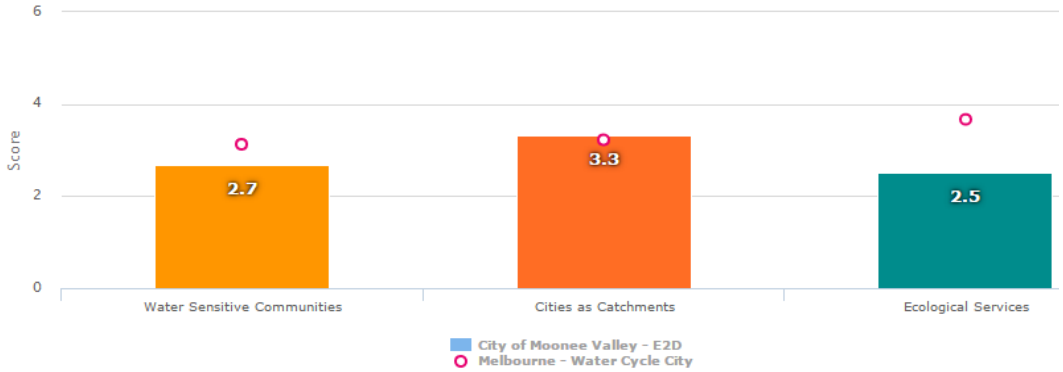

Figure 4. Assessment of water sensitive practices
(Attainment of Water Sensitive City status requires a score equal to 5)

The results shown in Figure 4 indicate how the City of Moonee Valley compares to water cycle city practices (pink open circle). Water sensitive infrastructure practices are well aligned to City as Catchment attributes. Improvements in practice should be directed at:

1. strengthening social capital to empower individuals to make choices that support a water sensitive future, modify behaviours that impact on receiving waters and become actively involved in the planning, management and maintenance of green infrastructure and other water related systems where appropriate.

2. providing high quality and connected open space networks, which support thriving natural systems or engineered systems that mimic natural processes (such as, systems that use soil and vegetation to infiltrate, evapotranspirate, treat and/or reuse urban runoff). Systems may include establishing riparian vegetation along waterway corridors, wetlands, rain gardens, tree pits, green roofs and walls, as well as urban forests. These systems deliver multiple benefits to communities (including mitigation of the urban heat island effect, reduced nuisance flooding, improved health and well-being, etc.) and have widespread community appeal.

4. Council's Nine Point Plan

A nine point action plan has been developed for Moonee Valley City Council as a result of its benchmarking. Actions are listed under the three transition pathways identified in Figure 5 and do not reflect the priority of the actions to be undertaken. Actions are mutually reinforcing and provide an overarching framework to guide initiatives across Council to progress closer towards the aspirations of a water sensitive city.

4.1 On-ground Practices

Action 1: Identify corridors to connect patches of biodiverse habitat to deliver a range of social and ecological services. This may include undertaking urban greening initiatives along waterway corridors, existing open spaces, as well as roads. Protect natural assets and ensure areas do not become progressively built out or disconnected as a result of urban consolidation.

Action 2: Improve and protect the quality of groundwater environments by working with Southern Rural Water to monitor and evaluate the quality and seasonal fluctuations of groundwater depth. Mapping of potential land contamination associated with past land use (such as, old tips and industrial areas) will help water
system planning by complimenting groundwater data to provide a coherent understanding of groundwater systems, interactions with surface waters and identify where site disturbance and infiltration practices should be avoided.

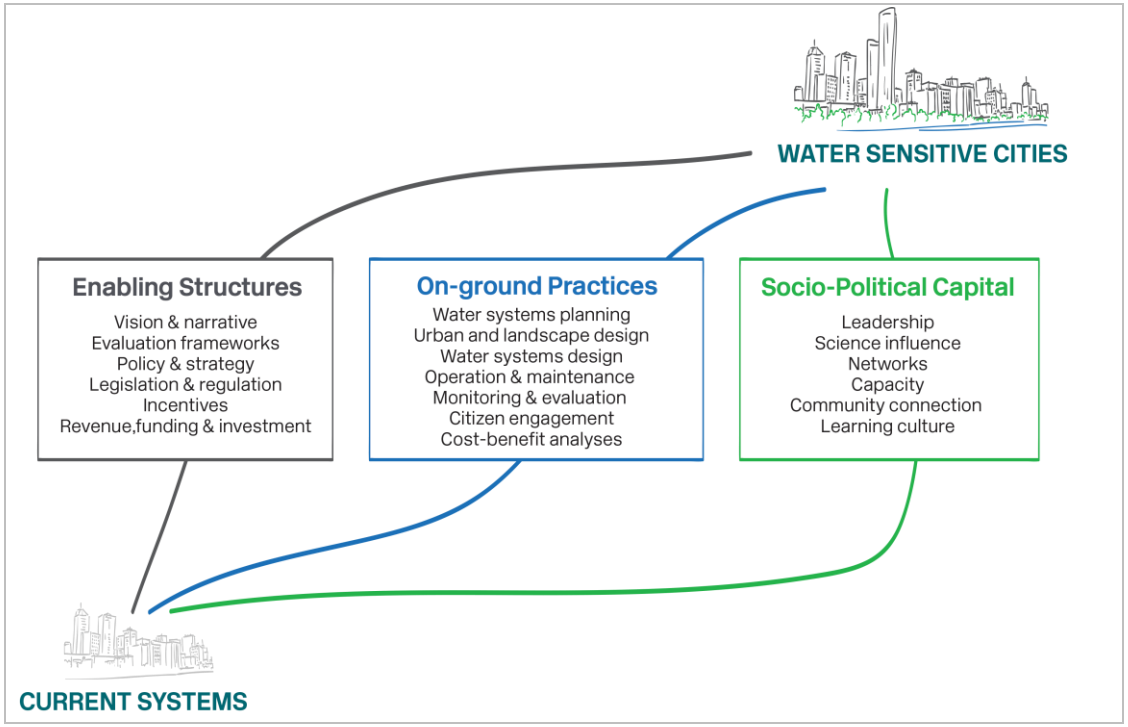

Figure 5. Transition pathways to improve water sensitive practices and deliver water sensitive city outcomes

Action 3: Advance the design of water sensitive projects through provision of guidelines on how to use design urban water systems to deliver multiple benefits. Consideration of co-location of assets

and applications of real time control hybrid infrastructure, green infrastructure design improvements and new technologies.

Action 4: Identify and prioritise opportunities to enhance water-related amenity values and improve access for the more vulnerable sectors of the community. Some opportunities may require opportunistic land acquisition to reconnect patches of parklands to improve networks across catchments beyond waterway corridors. Priority opportunities should be incorporated into open space master plans and other relevant strategic planning documents as they are updated.

4.2 Enabling Structures

Action 5: Update Council's Open Space Strategy to better reflect the Urban Ecology Strategy to ensure protection of ecological values associated with natural and constructed systems. The EPBC Act (1999) protects grasslands as well as indigenous species and this needs to be reflected in the Open Space Strategy to ensure their protection. Options for ensuring appropriate development activities are based on landscape type should be considered. This could extend to stipulating vegetation offsets in areas deemed appropriate for development activities and removal is permitted.

Action 6: Engage community in developing a water sensitive vision and narrative for Moonee Valley that endorses the liveable, sustainable and resilient water agenda. Explicitly link outcomes to broader community aspirations through the vision's collaborative development.

Action 7: Develop policy that coordinates and provides joint accountability between Council departments. Establish dedicated budgetary arrangements from across departments for water sensitive practices (including for the maintenance of infrastructure that delivers multiple benefits to the community). Establish sound institutional arrangements and processes to support policy and make these transparent to the general public.

4.3 Socio-political Capital

Action 8: Undertake a water literacy initiative in conjunction with City West Water to improve community understanding of the urban water cycle and the benefits of green-blue assets, including private water assets such as rainwater tanks. This initiative should seek to create a shared understanding of the necessary changes in practices required to transition towards a water sensitive future beyond water efficiency to see the full enjoyment of the benefits to Moonee Valley of being a water sensitive city. This needs to be directed to all sectors of the community and should include the development of an innovative schools program that ensures attention is given to the urban water cycle.

Action 9: Strengthen organisational learning culture, staff skills and knowledge to enable multidisciplinary and inter-organisational project planning and delivery. Strengthen internal networks through formal and informal activities.

Appendix 1 List of Workshop Participants
Attendance List

Goal – Equity of essential services

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Venta Slizys	Coordinator City Design	MVCC
Scott Daniel	Senior Leisure Facilities Officer	MVCC
Lauren Treby	Health and community planning Officer	MVCC
Kosta Smirnis	Acting Manager Technical Services	MVCC
Luke Rasborsek	Acting Coordinator Engineering	MVCC
Stephanie Mitten	Senior Sustainability Officer (schools)	MVCC
Carole Hammond	Senior Sustainability Officer (community)	MVCC
Hugh McCarry	Coordinator Infrastructure Maintenance	MVCC
Harry Fricke	Senior Sustainability Officer (corporate)	MVCC
Stefan Tsoutsoulis	Engineer Technical Services	MVCC
Vera Mitrovic-Misic	Coordinator Statutory Planning	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Brigid Adams	Senior Project Manager Integrated Water and Catchments	DELWP
Kylie Swingler	Water and Land Officer	Melbourne Water
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water
Brock Tunnicliffe	Compliance Officer, Water Innovations	City West Water
Darren Coughlan	Healthy Urban Habitats	City West Water

Goal – Ensure quality urban space

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Venta Slizys	Coordinator City Design	MVCC
Scott Daniel	Senior Leisure Facilities Officer	MVCC
Lauren Treby	Health and community planning Officer	MVCC
Kosta Smirnis	Acting Manager Technical Services	MVCC
Luke Rasborsek	Acting Coordinator Engineering	MVCC
Carole Hammond	Senior Sustainability Officer (community)	MVCC
Hugh McCarry	Coordinator Infrastructure Maintenance	MVCC
Harry Fricke	Senior Sustainability Officer (corporate)	MVCC
Stefan Tsoutsoulis	Engineer Technical Services	MVCC
Vera Mitrovic-Misic	Coordinator Statutory Planning	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Brigid Adams	Senior Project Manager Integrated Water and Catchments	DELWP
Kylie Swingler	Water and Land Officer	Melbourne Water
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water
Brock Tunnicliffe	Compliance Officer, Water Innovations	City West Water
Darren Coughlan	Healthy Urban Habitats	City West Water

Goal – Ecological Health Indicators

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Venta Slizys	Coordinator City Design	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Kylie Swingler	Water and Land Officer	Melbourne Water
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water
Brock Tunnicliffe	Compliance Officer, Water Innovations	City West Water
Darren Coughlan	Healthy Urban Habitats	City West Water
Hugh McCarry	Coordinator Infrastructure Maintenance	MVCC

Goal – Improve productivity and resource efficiency

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Scott Daniel	Senior Leisure Facilities Officer	MVCC
Harry Fricke	Senior Sustainability Officer (corporate)	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water
Brock Tunnicliffe	Compliance Officer, Water Innovations	City West Water

Goal – Promote Adaptive Infrastructure

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Scott Daniel	Senior Leisure Facilities Officer	MVCC
Luke Rasborsek	Acting Coordinator Engineering	MVCC
Harry Fricke	Senior Sustainability Officer (corporate)	MVCC
Robert Fitzgerald	Asset Information Officer	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water
Brock Tunnicliffe	Compliance Officer, Water Innovations	City West Water

Goal – Ensure good water sensitive governance

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Venta Slizys	Coordinator City Design	MVCC
Christy Arnott	Social Research Officer	MVCC
Lauren Treby	Health and community planning Officer	MVCC
Janice O'Neil	Coordinator Organisational Development	MVCC
Carole Hammond	Senior Sustainability Officer (community)	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water
Michelle Pinan	Strategic Planner, Water Innovations Team	City West Water

Goal – Increase Community Capital

Name	Position title	Organisation
Penny Ball	Senior Sustainability Officer (water)	MVCC
Venta Slizys	Coordinator City Design	MVCC
Christy Arnott	Social Research Officer	MVCC
Lauren Treby	Health and community planning Officer	MVCC
Jim Karabinis	Manager Aged and Disability, Municipal Response Manager	MVCC
Carole Hammond	Senior Sustainability Officer (community)	MVCC
Stephanie Mitten	Senior Sustainability Officer (schools)	MVCC
Michelle Gooding	Coordinator Parks and Gardens	MVCC
Micah Pendergast	Stormwater Regional Coordinator - West	Melbourne Water

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