

TOTAL WATERMARK- CITY AS A CATCHMENT

UPDATE 2014











'CREATING A HEALTHY CITY
IN A HEALTHY CATCHMENT'



AN ECO CITY

We provide solid foundations for the sustainability of Melbourne's communities. We embrace the unfamiliar if it helps us achieve our ambitions. We continue to encourage our community to take positive actions and we lead by example locally, nationally and globally.

CONTENTS

	Strategy snapshot	02
	Progress to date	12
	Strategy implementation	14
	Governance	16
	Climate change adaptation and flood	18
	Water for liveability	20
	Water for the environment	22
	Water use	24

To find out how you can participate in the decision-making process for City of Melbourne's current and future initiatives, visit **melbourne.vic.gov.au/getinvolved**

STRATEGY SNAPSHOT

Total Watermark – City as a Catchment is our plan for integrated water cycle management for the next four years.

Our vision is a healthy city in a healthy catchment. Seeing our city as a catchment means that we recognise the important roles of the natural and man-made catchments, including roads, roofs and impermeable surfaces. We want the whole of Melbourne’s community – residents, workers and businesses alike, to think about water and its role in our future, to help create a healthy city in a healthy catchment.

The water security pressures caused by Melbourne’s recent 13-year drought have fundamentally changed the way we use water – in our homes, offices and public open spaces, for recreation and for commercial and industrial purposes.

Context

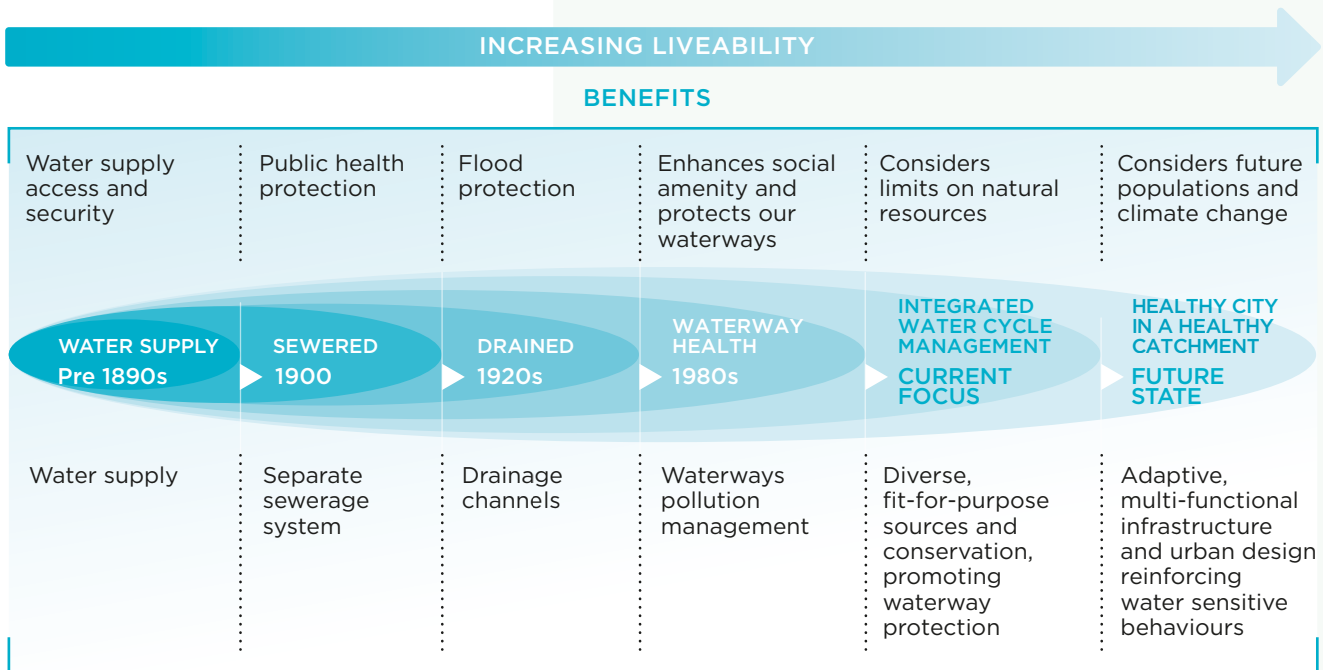
Despite significant progress towards making Melbourne a healthy city in a healthy catchment, there is still work to be done. As a drainage authority and one of the biggest water users in the municipality, City of Melbourne has a leadership role to play in continuing to implement integrated water cycle management. As the climate changes and we have less but more intense bursts of rainfall, we need to be clever about how we design our city to ensure that we use the right water for the right purpose, while minimising flood risk. The need to maintain Melbourne’s liveability is another key challenge making integrated water cycle management vital.

The impact of flooding has necessitated upgraded drainage infrastructure and increased community resilience. The need to better manage water has led to some ingenious and cutting-edge water capture and recycling techniques being implemented by the private sector, government, residents and City of Melbourne. It has also seen the development of an urban water-focused Victorian Government body, the Office of Living Victoria.

City of Melbourne practices integrated water cycle management. This is the coordinated management of all components of the water cycle including water consumption, rainwater, stormwater, wastewater and groundwater, to secure a range of benefits for the wider catchment.

This strategy is part of City of Melbourne’s work to become one of the world’s most sustainable cities. We know that a successful future depends on understanding the risks that climate change poses, reducing our impact and becoming more resilient.

As part of this, our goal is for Melbourne to be carbon neutral by 2020, as outlined in our *Zero Net Emissions by 2020 – 2014 update*. Other key strategies referenced in *Total Watermark – City as a Catchment* include our: *Climate Change Adaptation Strategy, Urban Forest Strategy, Open Space Strategy, Urban Ecology and Biodiversity Strategy and the Municipal Strategic Statement*.



Total Watermark – City as a Catchment engagement process

- In developing this strategy we collaborated with a broad range of partners and water sector organisations including:
 - » Water authorities
 - » Victorian Government departments
 - » Property developers
 - » Regulators
 - » Research bodies and universities
 - » International cities networks.
- From the conception of the strategy, over 15 organisations helped to identify the focus areas, issues and challenges to be addressed. We then consulted further about the actions needed to achieve our objectives and targets.
- An external reference group of leaders in the water sector also provided input and guidance.
- We ran a six-week community consultation, during which community members had the opportunity to provide feedback on the draft document.

Focus areas

This strategy builds on existing knowledge and successes from our 2002 and 2009 *Total Watermark* strategies. It addresses the following areas:

- 1. Climate change adaptation and flood:** a resilient and safe city that is adapted to current and future extreme weather events.
- 2. Water for liveability:** a water cycle that supports the health, wellbeing and enjoyment of everyone who lives, works, visits and plays across and beyond the municipality of Melbourne.
- 3. Water for the environment:** water managed for biodiversity, healthy public open spaces and clean waterways.
- 4. Water use:** efficient use of fit-for-purpose water contributes to the improved sustainability of Melbourne's water supply system.

Fit-for-purpose water use prioritises the appropriate quality of alternative water sources for different demands. The closer the match in the quality of the water to the level needed for end use, the less treatment is required. Reducing water treatment is both energy and cost efficient.

Targets

Given the refocusing of Melbourne's water sector from conservation to integrated water cycle management, our 2009 targets have been revised. The table below outlines our new targets and objectives.

Section	Objectives	Progress will be measured in terms of:
Climate change adaptation and flood	<ul style="list-style-type: none"> Adaptation and flood risk embedded into planning process. The Melbourne municipality has an aware and prepared community. 	<ul style="list-style-type: none"> The level to which climate change adaptation is incorporated into urban planning initiatives. Level of awareness of residents and business about climate change and flood risks.
Water for liveability	<ul style="list-style-type: none"> Water and liveability embedded in planning processes. Access to waterways and public open spaces help support a healthy population. 	<ul style="list-style-type: none"> Implementation of City of Melbourne's <i>Open Space Strategy</i>. Increased frequency and diversity of water-based public activity.
Water for the environment	<ul style="list-style-type: none"> Our major waterways are healthy and clean. Soil moisture supports a healthy urban forest. Optimise stormwater quality. 	<ul style="list-style-type: none"> Health of waterways (measured by Melbourne Water). Decreased runoff (modelled data). Increased infiltration (modelled data).
Water use	<ul style="list-style-type: none"> Optimise fit-for-purpose water use. Water supply infrastructure is planned for current and future demand. 	See below

Section	2018 targets	2030 targets
Water use	Water use <ul style="list-style-type: none"> Council: 30% of all water use sourced from alternative water sources. Municipal: 8% of all water use sourced from alternative sources. 	Water use <ul style="list-style-type: none"> Council: 50% of all water use sourced from alternative water sources. Municipal: 20% of all water use sourced from alternative sources.
Water for the environment	Water quality <ul style="list-style-type: none"> 20% reduction in Total Nitrogen contributed to the waterways from the municipality of Melbourne's catchment (baseline year 2000). 	Water quality <ul style="list-style-type: none"> 30% reduction in Total Nitrogen contributed to the waterways from the municipality of Melbourne's catchment (baseline year 2000).

Our municipal targets and objectives fit within the water sector's broader indicators and objectives for the Melbourne metropolitan area.

Office of Living Victoria's *Melbourne's Water Future* objectives

- A community engaged in whole-of-water-cycle management
- Suburbs – old and new – designed with water in mind
- Resilient water systems
- Improved waterways and bays
- Reduced inefficiency and waste
- Accelerated innovation and world recognition of expertise

Melbourne Water waterway health indicators (baseline year 2007)

Middle and lower Yarra River:

- Improve water quality from moderate to good condition
- Improve vegetation from poor to good condition

Moonee Ponds Creek:

- Improve water quality from poor to moderate condition
- Improve vegetation from very poor to poor condition

Maribyrnong River:

- Improve habitat and stability from good to excellent condition
- Improve vegetation from poor to moderate condition
- Improve river flow from poor to moderate condition

As well as meeting our objectives and targets, we will work with the water sector to implement several major projects to reduce flood risks and improve our integrated water cycle management.

Flagship projects

Over the next four years, City of Melbourne will:

Southbank and Albert Park Lake

Work with Parks Victoria, the City of Port Phillip, Melbourne Water and the Office of Living Victoria to investigate and potentially deliver a project that aims to reduce flood risks in the catchment, including Southbank, and provide an alternative water resource for the surrounding parklands including Fawkner Park.

Elizabeth Street catchment

Work with Melbourne Water and key landowners such as the University of Melbourne and RMIT, to investigate the opportunities to reduce the flood risk in Elizabeth Street. This investigation will involve modelling the effects of interventions, including rainwater harvesting on private land, on the flood extents of 100 year, 20 year, 10 year and 5-year storm events.

Integrated climate adaptation model

Develop a Geographic Information System (GIS) based model in collaboration with the Office of Living Victoria. It will be a municipal wide model that combines many layers of data including drainage, flood, land use, thermal imaging and soil type in conjunction with climate data and projections. We will then introduce integrated water cycle management interventions to the model to quantify their impacts and prioritise these interventions.

The role of water in a healthy Melbourne.

City of Melbourne is committed to practising integrated water cycle management.

The strategy; *Total Watermark* - *City as a Catchment*, adopts sustainable water management practices to build a healthy city in a healthy catchment.

As a drainage authority and one of the biggest water users in the municipality, City of Melbourne has a leadership role to play in continuing to implement integrated water cycle management.

A city's strategies and systems for water management contribute to biodiversity, carbon sequestration and reduction of urban heat island effects.

Fit-for-purpose water use prioritises the appropriate quality of alternative water sources for different demands. The closer the match in the quality of the water to the level needed for end use, the less treatment is required. Reducing water treatment is both energy and cost efficient.

Integrated water cycle management is coordinated management of all components of the water cycle including water consumption, rainwater, stormwater, wastewater and groundwater, to secure a range of benefits for the wider catchment.

City as a catchment is an approach supporting the creation of a water sensitive city. Our vision is of a healthy city in a healthy catchment. Seeing our city as a catchment means that we recognise the important role and linkages of the natural and man-made catchments.

There are four key areas of focus for City of Melbourne in the Total Watermark Strategy:



Climate change adaptation and flood

Taking measures to respond to the actual or expected changes in climate to minimise their impact. These measures reduce the vulnerability of the local natural and human systems (including water) to the effects of climate change by increasing the systems' resilience to it.



Water for liveability

Improving and maintaining the wellbeing of our community through the many characteristics that contribute to making Melbourne a place where people want to live. This relates to economics, planning, health, community and development factors.



Water for the environment

Managing our key waterways (Yarra River, Maribyrnong River, Moonee Ponds Creek) and their current state/health.



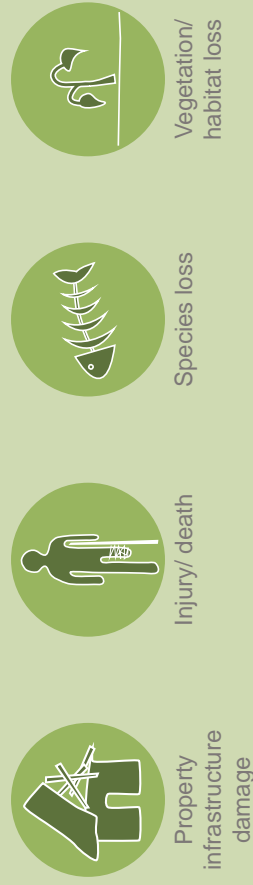
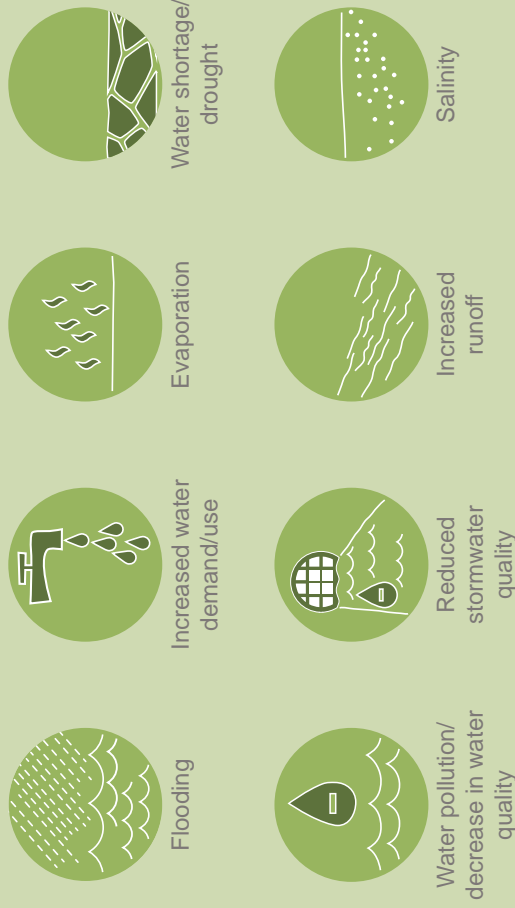
Water use

Ensuring adequate fit-for-purpose water supply for everyone.

How is water management linked to...

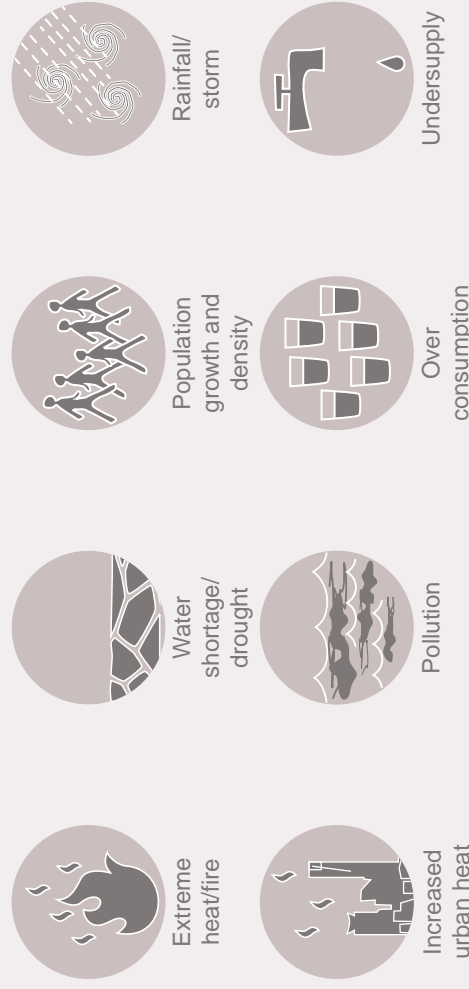
Climate change

The impacts of climate change can affect the amount, quality and flow of Melbourne's water now and into the future which in turn affects our lives and the environment.

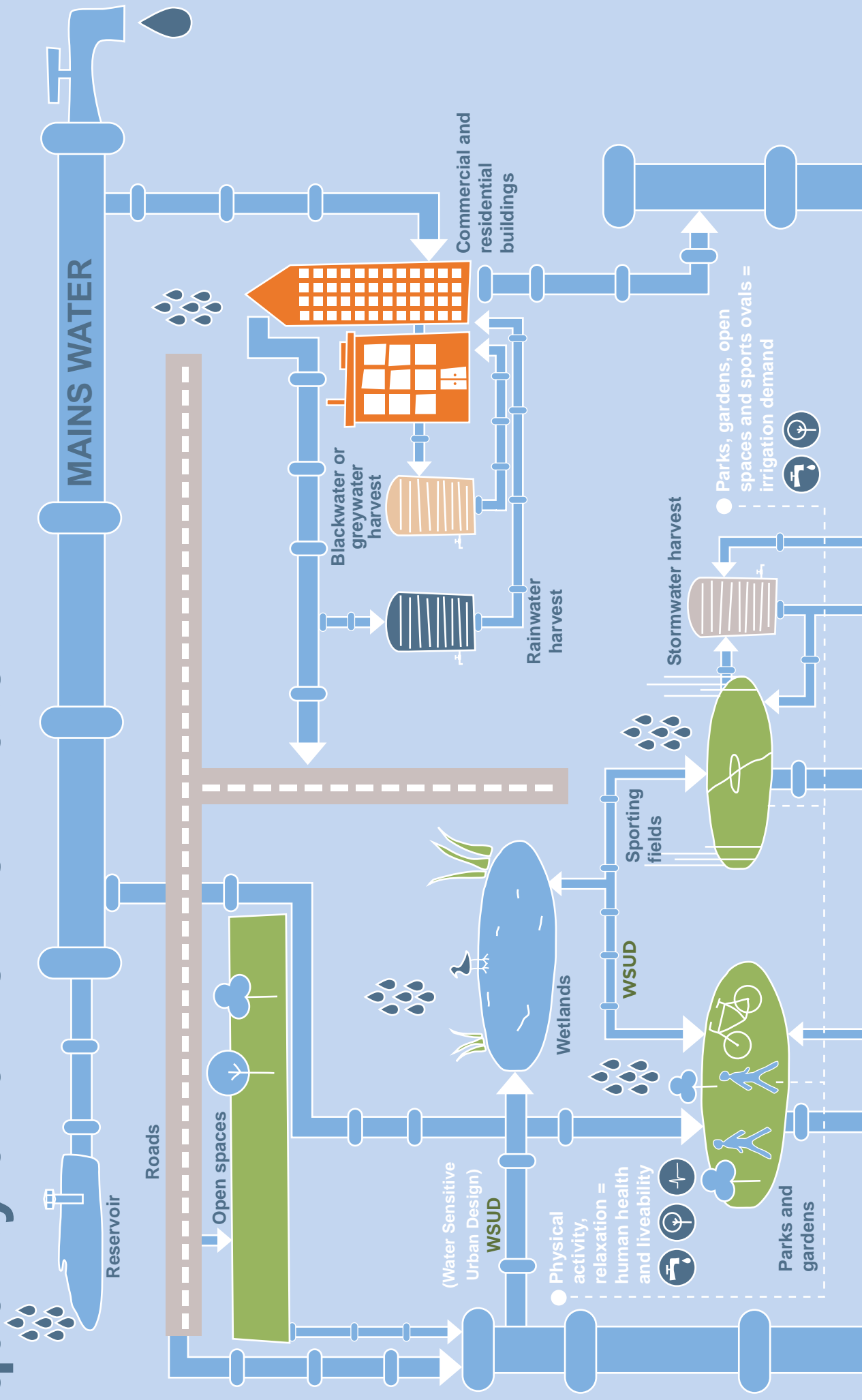


Health and liveability

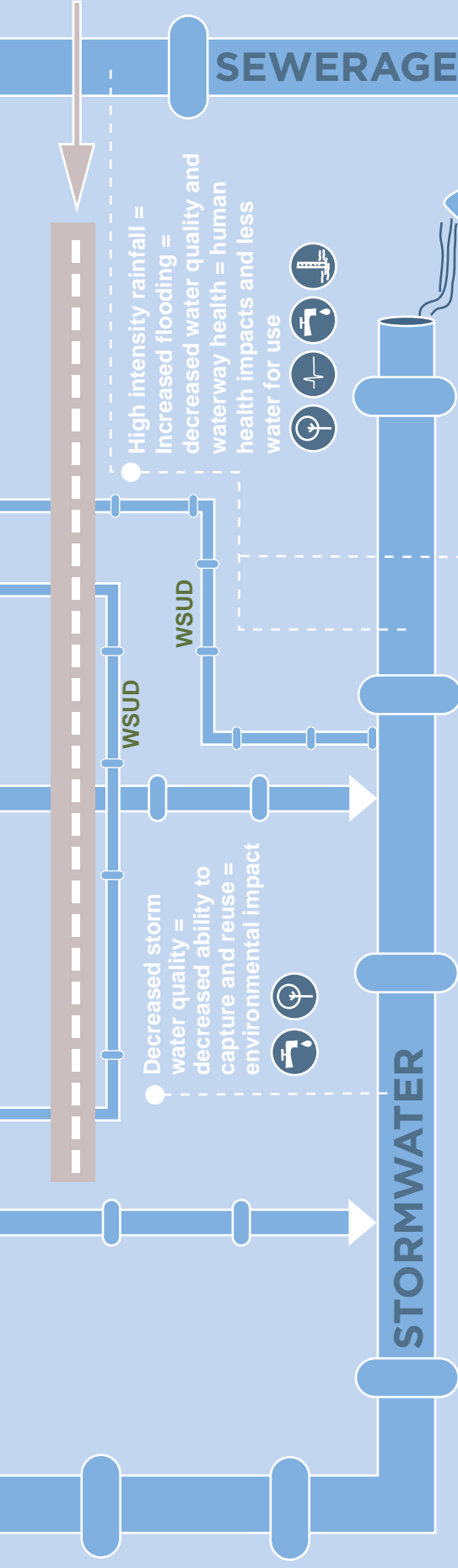
To maintain health and liveability in Melbourne we must have clean, affordable water that is available for use by people and the environment.



Melbourne's water system is complex with many components affecting the amount, quality and flow of water.



Did you know...?

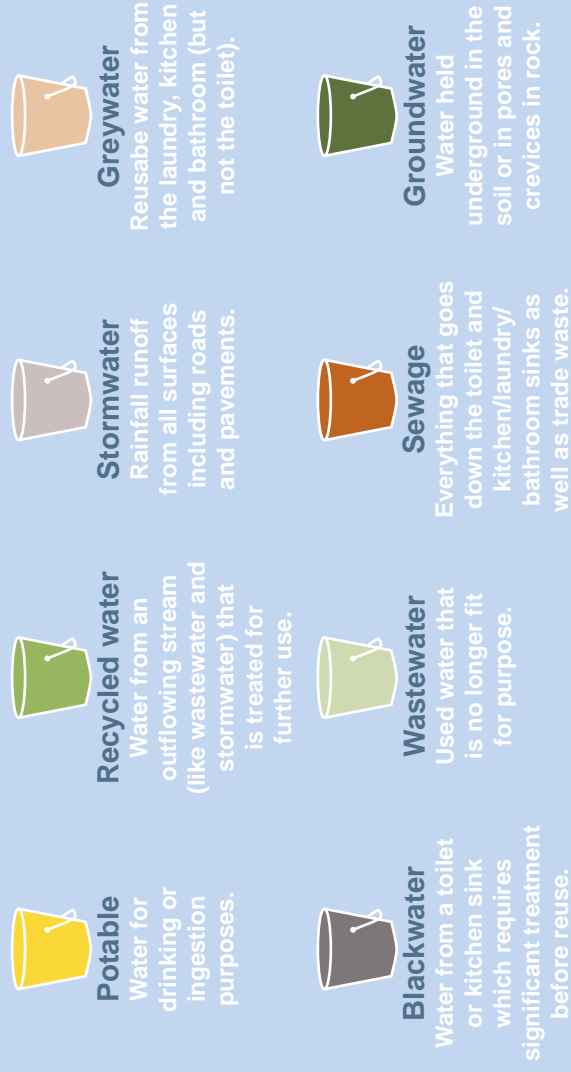


This is how we are using water in Melbourne

Who uses the water?

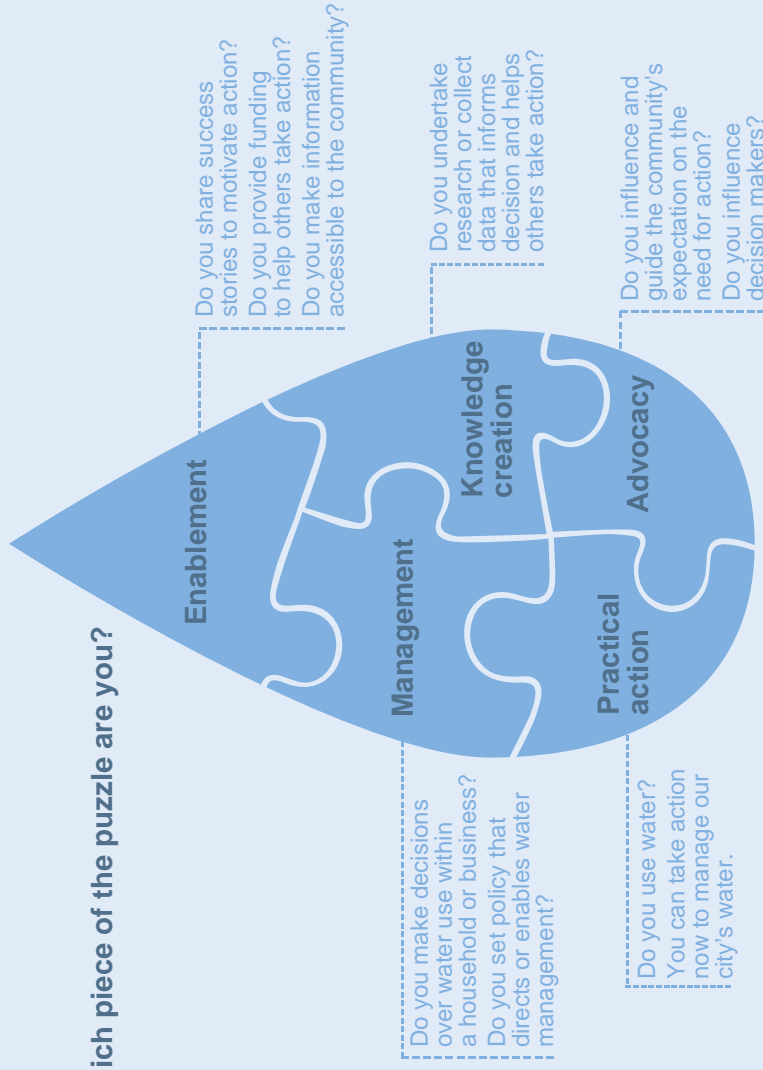


What are the types of water we use?



Working together to create a healthy city in a healthy catchment.

Which piece of the puzzle are you?



Planning influences development and land use across the municipality of Melbourne and therefore can have an impact on water management. To reduce the impact on water in the environment all planning and development decisions must take into account the following:

- Coastal inundation and erosion
- Floodplain management
- Catchment planning and management
- Water quality
- Water conservation
- Water supply, sewerage and drainage
- Stormwater
- Environmentally sustainable development
- Natural assets
- Energy, water and waste efficiency

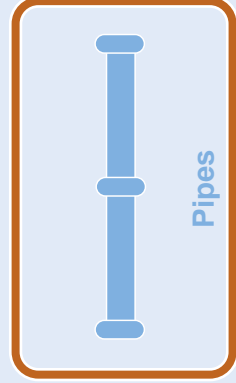
The Office of Living Victoria is leading the transformation of the way our water cycle is managed and how water cycle services are provided across Melbourne. It will work across metropolitan councils to deliver integrated urban planning and water cycle management.

The infrastructure in Melbourne's water system is managed by many stakeholders.

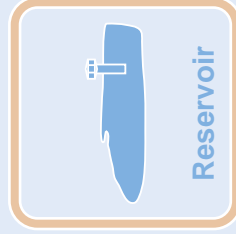
They work together and independently to manage and maintain the system, as well as set policy and direction.



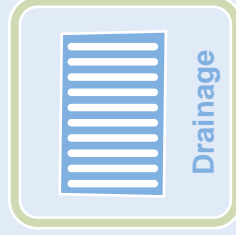
Port Phillip Bay



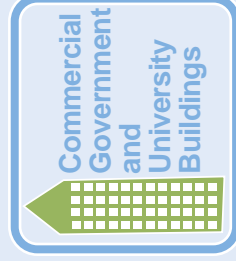
Pipes



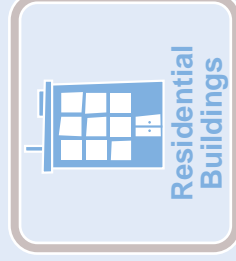
Reservoir



Drainage



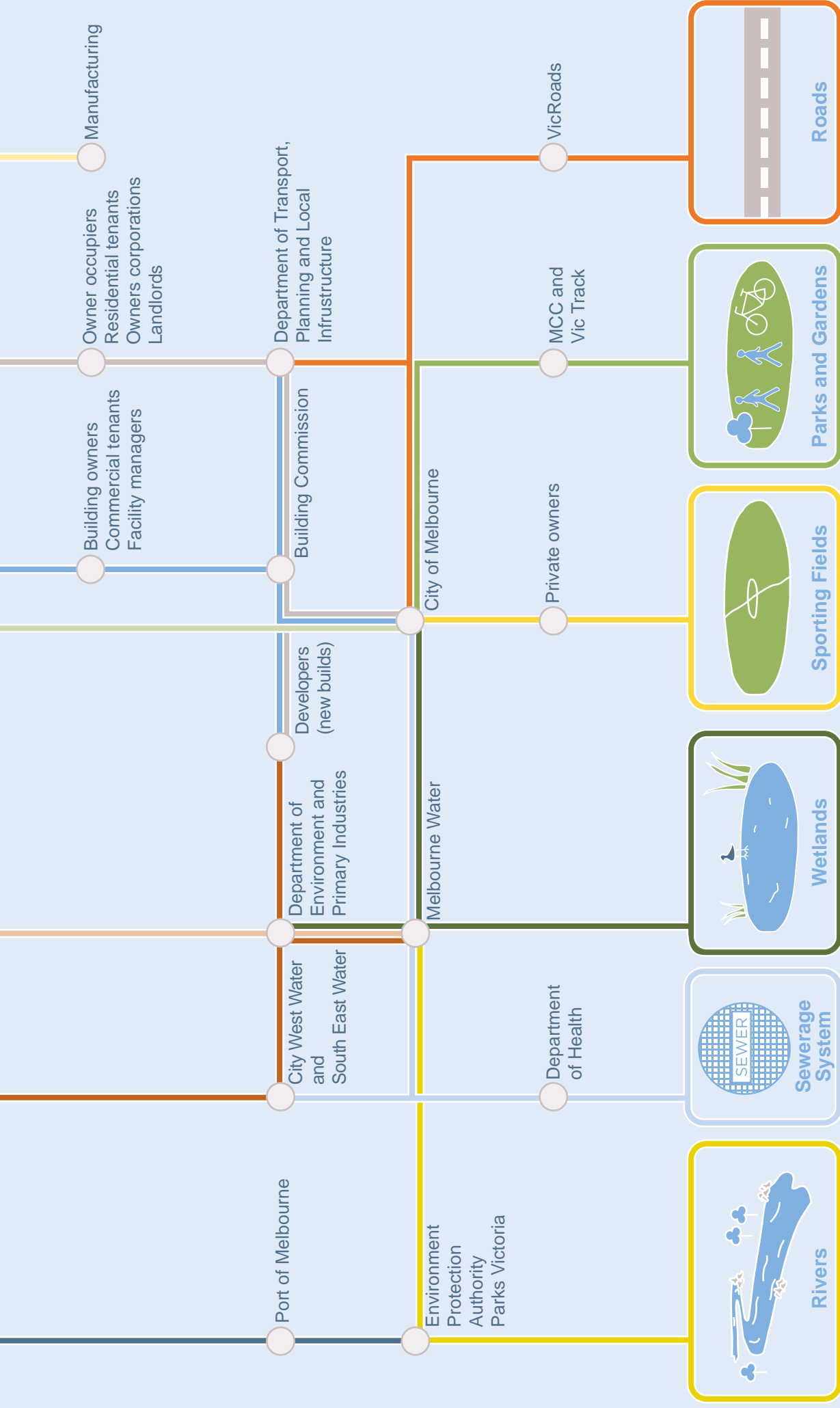
Commercial Government and University Buildings



Residential Buildings



Manufacturing Facilities



Sources

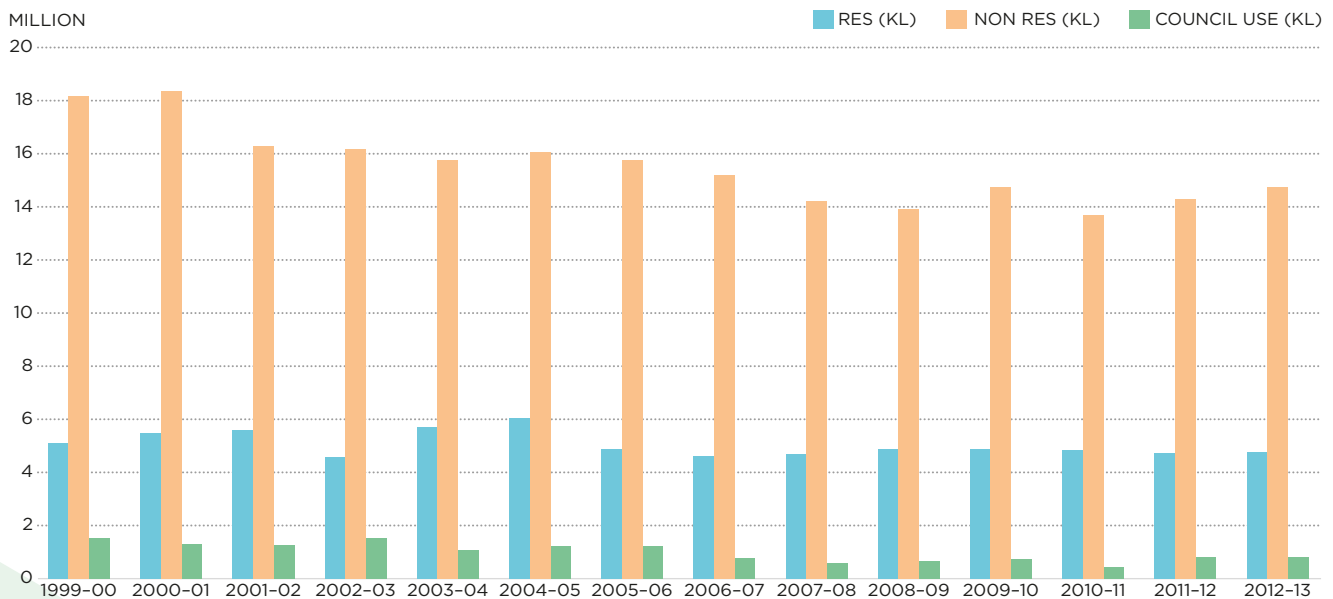
City of Melbourne, Total Watermark – City as a Catchment
http://www.melbourne.vic.gov.au/Sustainability/CouncilActions/Documents/city_as_catchment.pdf
 CSIRO, Climate Change in Australia – Technical Report 2007
 Antarctic Climate and Ecosystems CRC, Sea level rise: Understanding the Past – Improving Projections for the Future, 2008
 Australian Government, Natural Hazards in Australia – Identifying risk analysis requirements, 2007
 Department of Environment and Primary Industries, website
<http://www.epa.vic.gov.au/our-work/publications/publication/2003/november/464-2>
http://www.melbourne.vic.gov.au/Sustainability/SavingWater/Documents/WSUD_Guidelines.PDF
<http://www.melbourne.vic.gov.au/BuildingandPlanning/Planning/MelbournePlanningScheme/Pages/MelbournePlanningScheme.aspx>

PROGRESS TO DATE

Since 2002, the municipality of Melbourne has made significant progress in integrated water cycle management practices. The 2009 edition of *Total Watermark* was developed while Melbourne was in the middle of a drought that lasted over a decade, so the strategy primarily focused on reducing both overall water consumption and reliance on mains water. At that time, many other organisations in Melbourne's

water sector also focused on water conservation. This agenda was highly successful. Residential water consumption in the municipality of Melbourne has reduced by 58 per cent since 2000, and is down by 48 per cent per worker. City of Melbourne has also achieved a 26 per cent reduction in its own water use during this period.

TOTAL WATER CONSUMPTION IN THE MUNICIPALITY OF MELBOURNE FROM BASE YEAR 1999-2000 TO PRESENT



Successes across the municipality since 2008

- Water restrictions and government campaigns such as Target 155 have changed behaviour, reducing water usage.
- Residents have reduced water consumption by purchasing efficient fittings and appliances; choosing drought tolerant plants; recycling household grey water and installing rainwater tanks.
- The Office of Living Victoria has been formed to drive generational change within the sector.
- The water authorities have worked on developing integrated water management plans.

City of Melbourne's successes since 2008

We have:

- Implemented several large stormwater harvesting schemes including those located in: Fitzroy Gardens, Darling Street East Melbourne, the Docklands development, Birrarung Marr, and Alexandra and Queen Victoria Gardens. This has reduced stormwater pollutants such as Total Nitrogen by 32 per cent and decreased our reliance on mains water by 363 million litres.

- Implemented an extensive drought proofing program in open spaces including converting turf to warm season grasses, installation of storm water harvesting tanks and major changes to irrigation practices and systems.
- Incorporated water sensitive urban design into many of our streetscapes.
- Reduced water use in council-owned buildings through efficient fittings and toilets, improving fire sprinkler-testing regimes, cooling tower efficiencies and rainwater harvesting.
- Encouraged building owners and managers to retrofit their buildings and reduce water use through our 1200 Buildings program.

What City of Melbourne and the water sector have learnt

- Our goal to achieve a 100 per cent reduction in potable water use in our parks was based on a potable water offset scheme, and on changing to a drought tolerant landscape. We are now advocating using appropriate volumes of water for irrigation to maintain our horticultural assets in optimum health.

This will require more water in drier times. However, we aim to deliver a large portion of this water from alternative sources.

- Small-scale black water and grey water systems are an expensive source of water and are hard to maintain with the current skill set of maintenance contractors. The water sector is moving towards larger systems to reduce costs and increase efficiency.
- Salinity has been an issue in several projects. To minimise the risk of this challenge in the future, we are enhancing our water testing and carefully considering the type and placement of our infrastructure.

- Data collection and measurement of water use and quality has been challenging. The Office of Living Victoria will implement robust data collection to improve measurement.

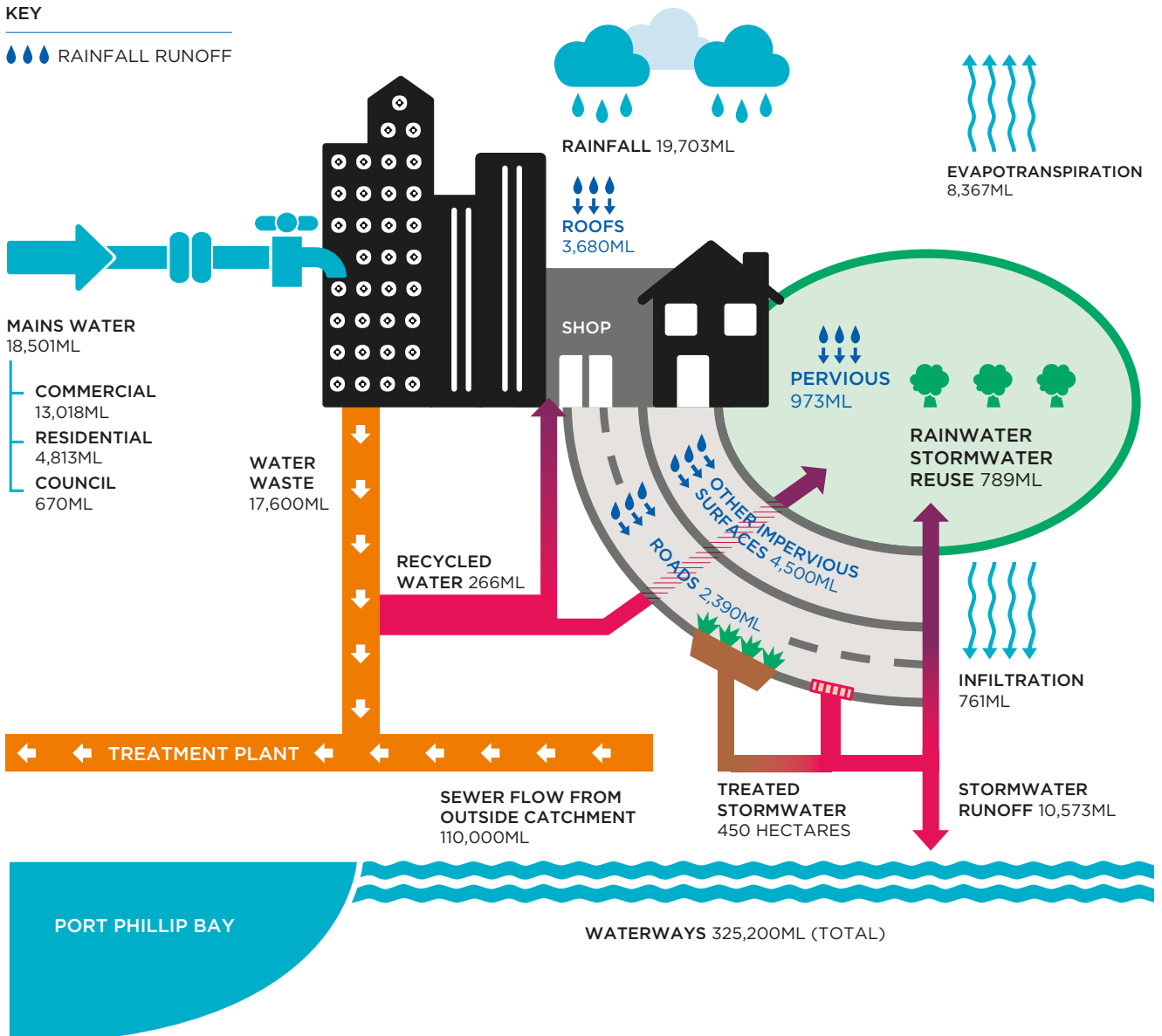
- There are numerous benefits associated with localised solutions including reduced energy use, fit-for-purpose outcomes, and irrigation and amenity benefits.

- Melbourne's commercial and residential buildings can make a significant contribution to the municipality's water management through rainwater collection and reuse, and onsite stormwater management.

MELBOURNE'S WATER CYCLE

KEY

☔☔☔ RAINFALL RUNOFF



STRATEGY IMPLEMENTATION

Total Watermark – City as a Catchment is our overall plan for integrated water cycle management until 2018. It provides our broad direction and focus, including high-level targets. All actions outlined in this strategy are subject to budget approval.

A detailed four-year implementation program will accompany this strategy, setting out a clear timeline for action. The implementation plan will be produced by the end of 2014, and will be evaluated annually. The plan will contain more detail on the flagship projects, specific project-based targets and opportunities for further public/private collaboration.

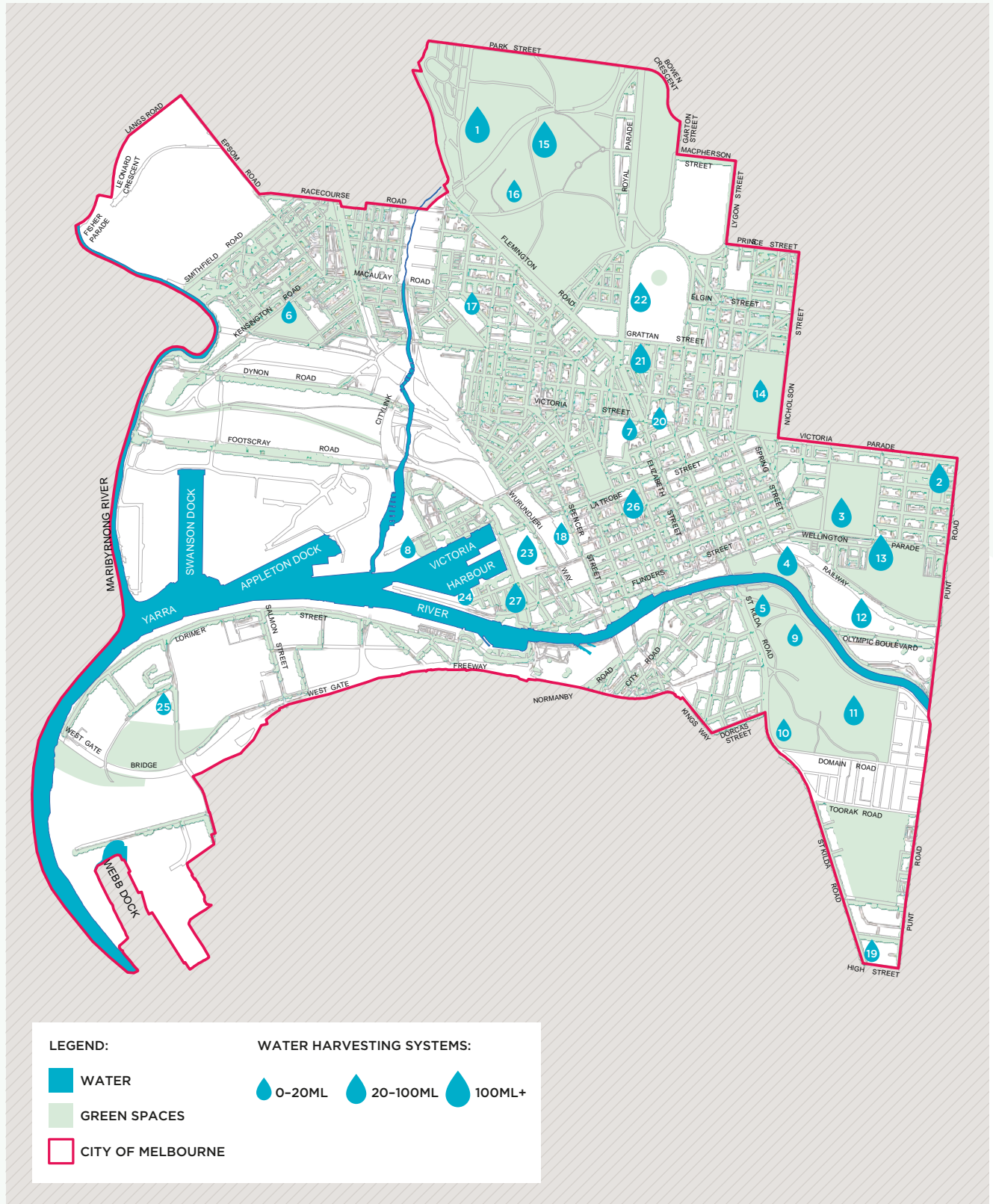
The implementation plan will include an operational budget. Project costs will also be outlined in City of Melbourne's annual budget, which is publically available.

In implementing this strategy, City of Melbourne will also:

- Consider the four key elements outlined in this strategy (climate change adaptation, liveability, environment and water use), in the design and implementation of City of Melbourne projects that impact on our water cycle.
- Continue to trial innovative approaches to fit-for-purpose water use, and communicate these approaches to our stakeholders.
- Run community education activities including the *Living Encyclopaedia* of water projects, in collaboration with the Office of Living Victoria.
- Work with the Office of Living Victoria to develop and implement *Melbourne's Water Future Strategy and Inner Melbourne Regional Plan*.
- Work with Melbourne Water to review and implement its *Flood Management and Drainage Strategy*.
- Support the implementation of other key strategies across the sector including the *Healthy Waterways Strategy – Melbourne Water's strategy for managing rivers, estuaries and wetlands* and the *Yarra Bay Action Plan*.
- Bring stakeholders together to overcome specific challenges. Through the engagement process around this strategy, key members of the sector have identified City of Melbourne as being uniquely placed to do so.
- Review and update City of Melbourne's *WSUD Guidelines*, which outline our approach to water sensitive urban design.



CITY OF MELBOURNE'S WATER, PARKS, TREES AND WATER HARVESTING SYSTEMS



WATER HARVESTING SYSTEMS

COUNCIL

- 1 Royal Park Wetlands (160ML)
- 2 Darling Street, East Melbourne (21.3ML)
- 3 Fitzroy Gardens (69ML)
- 4 Birrarung Marr (30ML)
- 5 Queen Victoria Gardens (20ML)
- 6 Kensington Community Centre (12ML)
- 7 Queen Victorian Market (5ML)
- 8 New Quay Park (2ML)

PUBLIC

- 9 Sidney Myer Music Bowl (15ML)
- 10 The Shrine (5.8ML)
- 11 Royal Botanic Gardens (40ML)
- 12 Melbourne & Olympic Park (45ML)
- 13 MCC Sewer Mine (180ML)
- 14 Royal Exhibition Building Museum (6.4ML)
- 15 Melbourne Zoo (150ML)
- 16 State Netball & Hockey Centre (19ML)
- 17 Public Records Office (2.7ML)
- 18 Southern Cross Station (5ML)

PRIVATE

- 19 Wesley College (20ML)
- 20 200 Victoria Street (4ML)
- 21 University of Melbourne Economics Building (32ML)
- 22 Trinity College (30ML)
- 23 Docklands Stadium (25ML)
- 24 Convesso (20ML)
- 25 Herald Weekly Times - Westgate Park (20ML)
- 26 500 Bourke Street (36ML)

GOVERNANCE

An efficient water sector implements integrated water cycle management

Objectives:

- Private and public organisations working effectively together
- An approach that integrates social, environmental and economic benefits
- Clearly defined water sector roles and responsibilities

Across Melbourne, several levels of government and numerous statutory authorities have responsibility for water use, supply and demand.

Key challenges

Melbourne's water system is very complex, involving a number of authorities and government bodies with responsibilities that overlap in some areas.

In the last four years, water sector cooperation has improved significantly, with organisations working more closely together.

However in order to manage the city's water supply effectively and remove any uncertainty regarding roles, each organisation's remit needs to be clearly defined.

There is also an urgent need to further progress integration throughout the water sector. This would involve the sector working together to consider the many values of water including environmental, human health and climate change adaptation. The sector also needs to consistently take timeframes into consideration when making decisions on infrastructure projects.

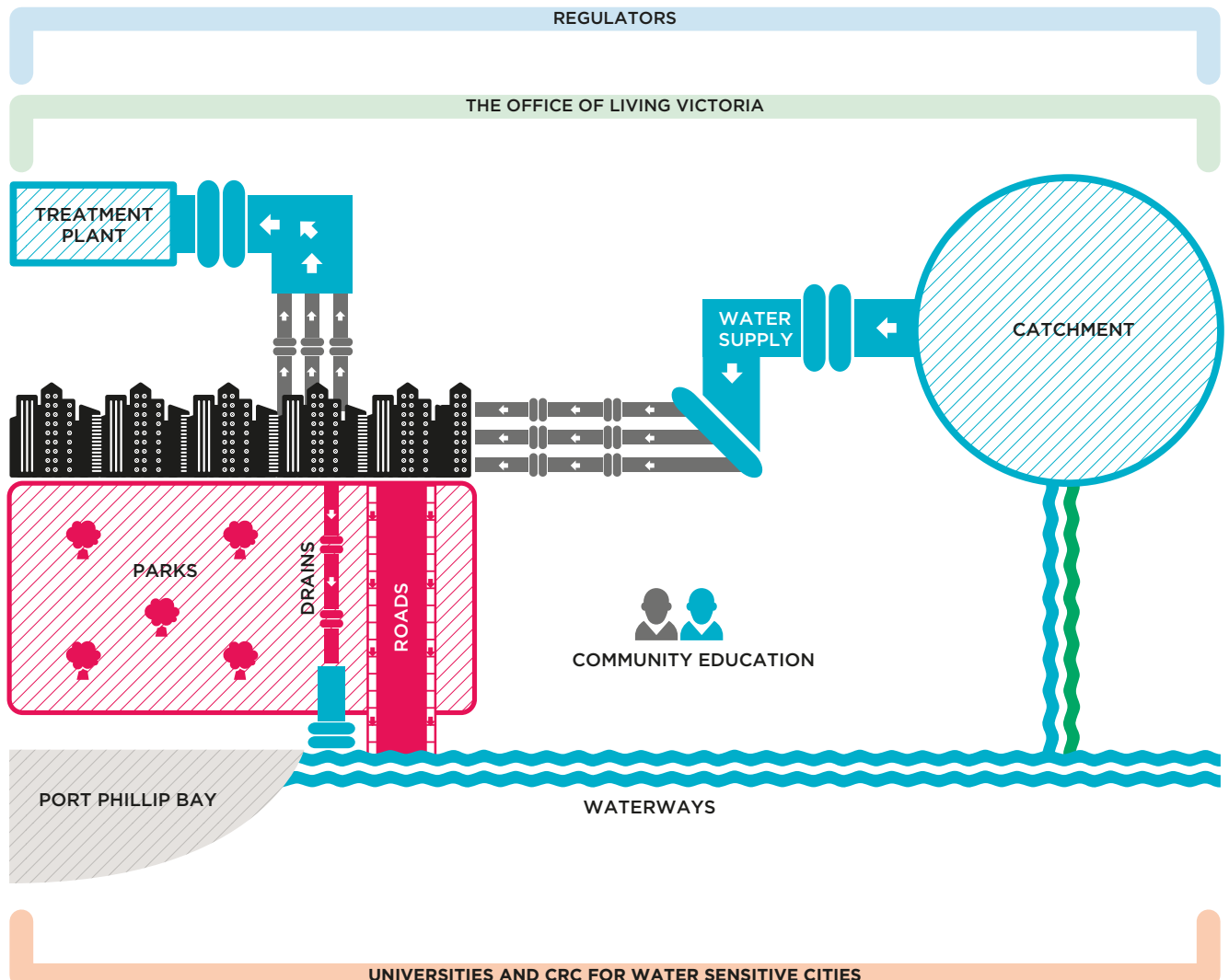
City of Melbourne will contribute to the water sectors' work to:

- Undertake extensive multi-disciplinary and multi-agency collaboration on major projects.
- Respond to fast-changing technology. The sector's planning must include the capacity to implement long-term and large-scale infrastructure projects, while retaining the flexibility to meet future challenges.

- Improve knowledge sharing within the sector. This involves work by the CRC for Water Sensitive Cities, universities, research networks and the Office of Living Victoria.
- Define and communicate clear roles and responsibilities for water management in Melbourne. The Office of Living Victoria will coordinate this work, along with City of Melbourne and other water sector organisations.
- Develop an industry-wide approach to improved data collection and measurement.



MELBOURNE'S WATER SECTOR



Roles and responsibilities:

- City of Melbourne** works across the municipality and is responsible for drainage, implementing and managing alternative water supply projects. We are in charge of water capture, storage and reuse and water usage across the municipality's operations
- The Office of Living Victoria** (Victorian Government) drives change within the water sector, across both metropolitan Melbourne and Victoria. Its role includes increasing agency collaboration to manage catchments and waterways
- Melbourne Water** (Victorian Government) manages Melbourne's catchments and bulk water supply, treats and supplies drinking water and recycled water to the retailers, removes and treats most of the city's sewerage. It also manages waterways and the larger drainage systems in the Port Phillip and Westernport region
- Parks Victoria** (Victorian Government) is the local port manager for Port Phillip Bay, Western Port and Port Campbell, and the waterway manager for the Yarra and Maribyrnong Rivers
- Port of Melbourne Corporation** is the custodian, developer and strategic manager of the port. It ensures the port continues to deliver economic benefits to its customers and the wider community
- Water authorities** – City West Water and South East Water (Victorian Government) provide drinking water, sewerage, trade waste and recycled water services to customers in the municipality of Melbourne, as well as the inner, western and south eastern suburbs
- CRC for Water Sensitive Cities and the universities** bring together multi-disciplinary expertise to undertake research to improve all aspects of water management

CLIMATE CHANGE ADAPTATION AND FLOOD

A resilient and safe city that is adapted to current and future extreme weather events

Objectives:

- Adaptation and flood risk embedded into planning process.
- The Melbourne municipality has an aware and prepared community.

Progressed tracked in terms of:

- The level to which climate change adaptation is incorporated into urban planning initiatives.
- Level of resident and business awareness about climate change and flood risks.

The case for action

To build a healthy city in a healthy catchment we need to consider current and future changes in climate and take actions to minimise their impact. Adaptation measures reduce the vulnerability of the local natural and human systems, including water, to the effects of climate change by increasing the systems' resilience to it.

Over the next 20 years and beyond, while sea level rise involves critical risks, Melbourne is most at risk from heat waves, drought and intense rainfall events. As outlined in detail in City of Melbourne's *Climate Change Adaptation Strategy*, these events are likely to happen sooner, more frequently, and can have significant effects on the community.

Flood – flash flooding is the main threat in an intense rainfall event. Even small flooding events can cause damage to property and transport disruptions. Significant floods can cause mass stranding of passengers, putting more people at risk of injury during the storm. Power outages due to storm damage can also cause transport, traffic chaos and disruption to businesses.

Drought – into the future it is likely that Melbourne will experience lower average annual rainfall. From 1998 to 2007, Victoria experienced annual rainfall 14 per cent below average. By 2070, annual average Victorian rainfall is expected to decrease by 11 per cent but come in more intense bursts.

Heat – climate change modeling predicts that Melbourne is likely to experience an increase in more days of extreme heat. The city already experiences

on average of nine days per annum over 35°C but by 2030 it is predicted this will increase to 11 days, and to 26 days by 2070. The most significant risk from heat waves is the likely increased levels of heat stress and death. This is of particular concern for the elderly and infirm. Heat waves already kill more Australians than any other natural disasters.

Sea level rise – CSIRO predicts that current sea levels will increase by up to 0.8 metres by the end of the century.

Key challenges

Using our urban planning processes effectively is instrumental to becoming more resilient to future climate changes. We need to design and improve our infrastructure to capture water for use where it is needed most, and to minimise risk in flood prone areas.

Another challenge is finding ways to enhance our waterways and public open spaces, as they help to provide a cooling effect and to retain floodwater. We also need to protect and grow our urban forest, as it provides ecological functions, permeability and shading.

To ensure our city is resilient to flood, drought and heat impacts, we need an educated and aware community. Currently, while Melbourne's residents are most concerned about climate events such as drought and heat waves, 59 per cent feel they are not prepared for flood events. While flood risk is only prevalent in certain areas of Melbourne, the majority of businesses do not view it as a significant risk (ORC social research, February 2012).

City of Melbourne will work with the water sector and key partners to:

Enhance the urban planning process

- Consider the risk of flood in future design and re-design of the public and private realm.
- Further integrate our city with our waterways, both natural and man-made, in order to enhance the city and community's resilience to heat impacts.
- Enhance the *Melbourne Planning Scheme* to consider future flood, heat and drought impacts.

Enhance infrastructure

- Design and upgrade the drainage network to cater for current and future flood risk.
- Green infrastructure is used to respond to current and future flood risk.

Increasing community education and awareness

- Enhance Melbourne's emergency management processes including warning systems and broadcasting of information.

Undertake research

- **Urban heat island effect** – research the impact that health, energy use and different mitigation measures may have on heat.
- **Climate projection updates** – interpret the latest climate change research to update our approaches and inform our decision-making.
- **Soil moisture, structural soils and salinity** – research the effectiveness of current interventions and new approaches.

City of Melbourne will:

Enhance the urban planning process

- Incorporate flood, drought and heat risks into the development and implementation of structure plans and broader strategic plans.

Enhance infrastructure

- Ensure we are using fit-for-purpose water in parks, streets, gardens and council buildings.
- Upgrade the drainage infrastructure in the central city and urban renewal areas to cater for a 1 in 20 year flood event by 2030.
- Develop an approach to upgrade the municipality's drainage infrastructure to cater for a 1 in 20 year flood event – based on projected 2100 climate conditions. This will be done in line with Engineers Australia's climate change research findings, to be released in 2015.

Enhance the public realm and waterways

- Increase the permeability of the city through installing permeable pavements, converting asphalt to grass and other initiatives.
- Increase canopy cover and urban forest diversity to minimise urban heat island impacts.
- Increase the number of street trees supported by water capture intervention technologies.
- Implement the actions outlined in our *Open Space Strategy* to:
 - » Mitigate the urban heat island effect
 - » Enhance biodiversity
 - » Improve stormwater quality.

Increase community education and awareness

- Develop and implement a climate change adaptation awareness program, including preparedness for extreme weather events such as flood and drought, to complement the existing *Heatwave Response Plan*.
- Develop and implement an insurance education and awareness campaign to help community members understand their insurance options related to flood risk.

WATER FOR LIVEABILITY

A water cycle that supports the health, wellbeing and enjoyment of everyone who lives, works, visits and plays across and beyond the municipality of Melbourne

Objectives:

- Water and liveability embedded in planning processes
- Access to waterways and public open spaces help support a healthy population

Progressed tracked in terms of:

- Implementation of City of Melbourne's *Open Space Strategy*
- Increased frequency and diversity of water-based public activity

The case for action

We are committed to improving and maintaining the wellbeing and lifestyles of our community. A guaranteed supply of clean, affordable water for use by people, businesses and the environment is also fundamental to making Melbourne a place where people want to live.

The municipality of Melbourne is currently experiencing rapid population growth, leading to a transformation of our residential sector. During the last two decades the population of the municipality of Melbourne has almost tripled, increasing from 35,000 in 1991 to 100,000 in 2011. We are expecting this significant population growth to continue, with an increase of 80 per cent on the 2011 population expected by 2030. Our worker and visitor populations are also increasing rapidly, with 1.2 million daily visitors projected by 2030, up from 800,000 daily in 2013.

Liveability is defined as a measure of the attractiveness of a location as a place to live and work. Economic, social and environmental factors all influence liveability, such as the quality of the natural and built environments; amenity; access to educational and health services; and cultural vibrancy. (Victorian Competition and Efficiency Commission November 2011).

Demographically the city has also changed, shifting towards smaller households with one or two bedrooms, fewer children and higher incomes. An apartment building boom has meant that 93 per cent of new homes built between 2006 and 2012 were apartments. It is expected that at least 4000 dwellings will be built each year going forward. Our planning processes provide the opportunity to incorporate efficient and fit-for-purpose water design into new developments.

Key challenges

Changes in population, behaviour and urbanisation all impact our use of and interactions with water. We need to consider these changes in designing our city to remain one of the world's most liveable into the future.

As City of Melbourne works towards being a healthy city in a healthy catchment, another challenge is to recognise and protect the fundamental roles water plays in our city. These roles include maintaining the health of Melbourne's community through access to clean, affordable water; maintaining the health of our waterways, parks and gardens to provide areas for rest, recreation and exercise; and maintaining our drainage infrastructure to manage flood risk.

City of Melbourne will work with the water sector and key players to:

Enhance the planning process

- Include provisions for water infrastructure in structure plans to cater for future use and allow community interaction with natural water systems.

Enhance Melburnians' health and amenity

- Where appropriate, design our city so we are able to see and interact more with our water systems.
- Improve the quality of waterways and public open spaces to enhance use.
- Ensure flood and heat risk management programs are implemented effectively within the municipality.
- Encourage new and existing developments to include public open spaces to enhance amenity and decrease the urban heat island effect.

Ensure access to clean, affordable water

- Ensure that Melbourne has a responsive water market with dynamic and equitable water pricing.
- Ensure that incentives and regulation are driving the efficient use of potable water.
- Develop and communicate finance models for businesses and individuals to effectively manage their water use.

Undertake research

- Further understand the linkages between human health and access to waterways and public open spaces.
- Further understand the linkages between human health and water quality and availability.

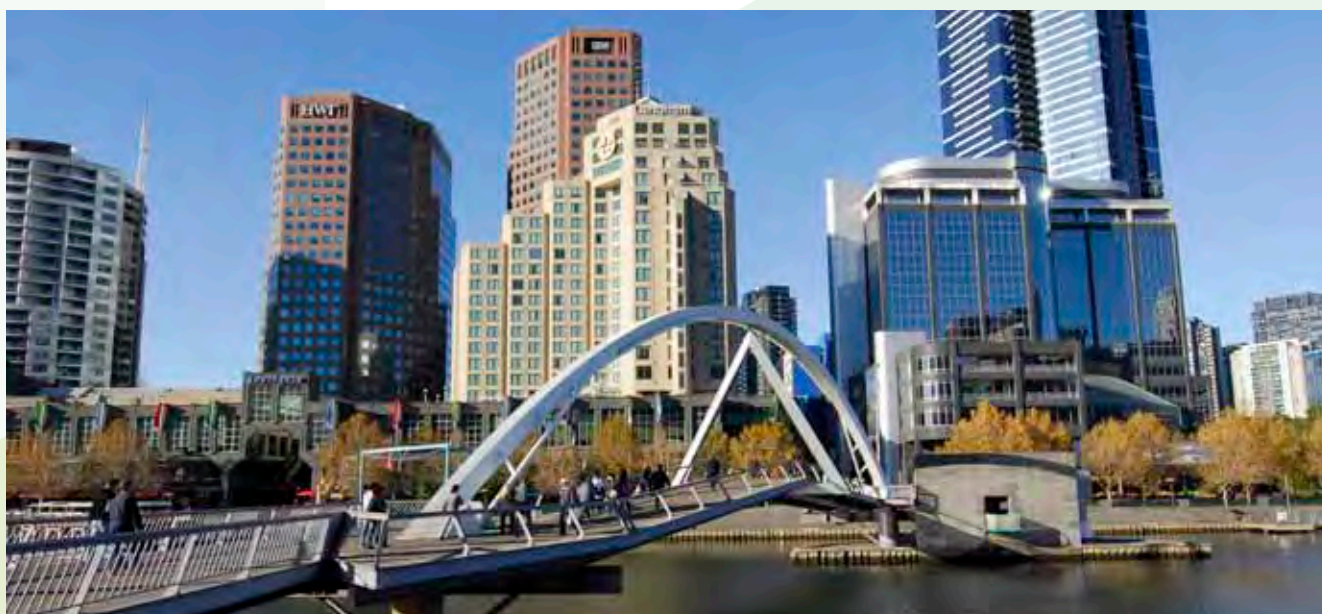
City of Melbourne will:

Enhance the planning process

- Continue to ensure that waterways and the urban forest are a prominent part of Melbourne's identity.

Enhance public open spaces and the use of fit-for-purpose water to cool the environment

- As part of the *Urban Forest Strategy*, City of Melbourne will continue to:
 - » Increase canopy cover and urban forest diversity.
 - » Improve vegetation health and maintain optimum soil moisture levels.
 - » Improve urban ecology and inform and consult the community.
- Help to enhance biodiversity through the development of an *Urban Ecology and Biodiversity Strategy*.
- Develop a *Growing Green Guide* on the installation and maintenance of green roofs, walls and facades.
- Continue to implement the *Municipal Strategic Statement* and structure plan actions relating to water management, in order to enhance Melbourne's parklands, waterways and other open spaces.



WATER FOR THE ENVIRONMENT

Water managed for biodiversity, healthy public open spaces and clean waterways

Objectives:

- Our major waterways are healthy and clean
- Soil moisture supports a healthy urban forest
- Optimise stormwater quality

Progress tracked in terms of:

- Health of waterways (measured by Melbourne Water)
- Decreased runoff (modelled data)
- Increased infiltration (modelled data)

Stormwater quality targets (baseline year 2000)

- **2018** – 20% reduction in Total Nitrogen contributed to the waterways from the municipality of Melbourne's catchment
- **2030** – 30% reduction in Total Nitrogen contributed to the waterways from the municipality of Melbourne's catchment

The case for action

Increased urban density, climate change and an increasing population mean that the way we interact with our local catchment and how we consider water in the environment is becoming ever more important. Of the three major waterways in the municipality, the current condition of Yarra and Maribyrnong Rivers is considered moderate, while Moonee Ponds Creek is in very poor condition. The health of much of Melbourne's urban forest declined greatly during recent drought-related water restrictions, at significant cost to the amenity of the city.

Key challenges

The municipality of Melbourne sits at the bottom of a number of catchments and at the top of Port Phillip Bay, putting us in a uniquely challenging position in regards to the state of our waterways. During the recent prolonged drought, the lack of environmental flows put extreme pressure on certain sections of our rivers and creeks. To enhance the health and biodiversity of our waterways, we need to reduce stormwater pollutants and improve water quality. A whole of catchment approach is needed to manage our waterways.

The way we design, build and retrofit our buildings provides a significant opportunity to enhance the way our city interacts with the local catchment. Incorporating water and public open spaces, where possible, into our built environment, will help towards creating healthy waterways and mitigating the urban heat island effect.

Another key challenge is to protect and enhance our urban forest. Melbourne is internationally recognised for its urban forest and public open spaces, yet many of the city's landscapes were created well over 100 years ago. A significant number of our trees are nearing the end of their lives and landscapes are struggling to adapt to a changing climate.

We need to effectively guide the transition of our landscape to one that is resilient, sustainable, healthy and diverse, and that meets the needs of the community.

City of Melbourne will work with the water sector and key players to:

Enhance our waterways – Yarra River, Maribyrnong River, Moonee Ponds Creek

- Manage the health of our key waterways including limiting the amount of stormwater entering these systems.
- Work with the food and hospitality sectors around appropriate grease and oil disposal.
- Undertake a whole of catchment management approach to enhancing the state of Moonee Ponds Creek.
- Contribute to Melbourne Water's 20-year strategic priorities to enhance the Lower Yarra Catchment, including:
 - » Improving water quality and implementing stormwater treatment systems in new urban developments.
 - » Improving vegetation to benefit amenity and birds.
 - » Working with partners to develop litter prevention programs.

City of Melbourne will:

Enhance our waterways – Yarra River, Maribyrnong River, Moonee Ponds Creek

- Continue to update and implement the *Docklands Waterways Strategic Plan*.
- Continue to run free park ranger education programs for schools and the wider community.

Enhance stormwater quality

- Continue to implement new stormwater quality technologies to improve pollutant loads in stormwater releases and reduce runoff through infiltration and reuse.
- Continue to implement the *Municipal Strategic Statement* and structure plan actions relating to water management, in order to improve water quality in waterways and the bay.



WATER USE

Efficient use of fit-for-purpose water contributes to the improved sustainability of Melbourne's water supply system

Objectives:

- Optimise fit-for-purpose water use
- Water supply infrastructure is planned for current and future demand

2018 targets Water use

- Council: 30% of all water use sourced from alternative water sources

- Municipal: 8% of all water use sourced from alternative sources

2030 targets Water use

- Council: 50% of all water use sourced from alternative water sources
- Municipal: 20% of all water use sourced from alternative sources

The case for action

Climate change, development, population growth, upstream impacts and increased demand for water are all putting pressure on our water quality and supply. In every instance where we use water, we need to optimise fit-for-purpose outcomes.

Fit-for-purpose water use prioritises the appropriate quality of alternative water sources for different demands. The closer the match in the quality of the water to the level needed for end use, the less treatment is required. Reducing water treatment is both energy and cost efficient.

Key challenges

The recent prolonged drought highlighted the need to conserve water and use it in the right way throughout our city. This includes increasing efficiency and fit-for-purpose water use where appropriate in infrastructure, buildings, parks and gardens.

It also means incorporating integrated water cycle management design and water efficiency into new developments.

The quality of our groundwater is another challenge. The city's groundwater and aquifers are generally too saline to be used as a resource. Our aquifers are also not suitable for storage and recovery as they are not porous enough. Stormwater is a more viable alternative water source for the municipality than groundwater.

City of Melbourne will work with the water sector and key players to:

Enhance fit-for-purpose water use

- Work with residents, developers and businesses to explore fit-for-purpose water use options.

- Encourage the uptake of residential water tanks.

Enhance infrastructure and buildings

- Undertake new technology trials regarding fit-for-purpose water use.
- Design a third pipe network for urban renewal areas.

City of Melbourne will:

As the single biggest water user in our municipality, City of Melbourne recognises the need to take a leadership role in implementing and demonstrating fit-for-purpose water use approaches. The actions listed below outline how City of Melbourne will approach this role:

Enhance fit-for-purpose water use

- Continue to implement best practice approaches to stormwater harvesting.
- Use our engagement programs to further encourage efficient water use by building owners, manager and tenants.
- Use fit-for-purpose water supply in our parks, gardens, council buildings and sports grounds.
- Educate the community about how and why City of Melbourne uses water for irrigation.
- Increase the water focus of our 1200 Buildings program.
- Improve water use monitoring and measurement.
- Share information with the public and private sectors about water saving and reuse initiatives.
- Include fit-for-purpose water use considerations into City of Melbourne's asset renewal program.

Enhance infrastructure and buildings

- Continue to implement the *Energy, Water and Waste Efficiency Planning Policy*, requiring all developments to meet water efficiency standards.
- Continue to require developers to incorporate integrated water cycle management design principles into drainage plans prior to receiving planning approval.

FIT-FOR-PURPOSE WATER USE



How to contact the City of Melbourne

Online: melbourne.vic.gov.au

Telephone: 03 9658 9658

7.30am to 6pm, Monday to Friday

(Public holidays excluded)

Translation services

03 9280 0716	አማርኛ
03 9280 0717	廣東話
03 9280 0718	Ελληνικά
03 9280 0719	Bahasa Indonesia
03 9280 0720	Italiano
03 9280 0721	國語
03 9280 0722	Soomaali
03 9280 0723	Español
03 9280 0724	Türkçe
03 9280 0725	Việt Ngữ
03 9280 0726	All other languages

National Relay Service: If you are deaf, hearing impaired or speech impaired, call us via the National Relay Service: Teletypewriter (TTY) users phone 1300 555 727 then ask for 03 9658 9658

9am to 5pm, Monday to Friday

(Public holidays excluded)

In person

Melbourne Town Hall
Administration Building
120 Swanston Street, Melbourne
7.30am to 5pm, Monday to Friday
(Public holidays excluded)

In writing

City of Melbourne
GPO Box 1603
Melbourne VIC 3001



CITY OF MELBOURNE