Strategic directions:

6. Environmentally sustainable development

Montague will be a 'green precinct' with integrated and efficient private and precinct wide energy, water and waste systems and buildings.

6. Environmentally sustainable development

OVERVIEW

Cities consume significant quantities of resources and have a major impact on the environment. Future cities must reduce demand on the finite resources available, be smarter about how they reuse resources and, ultimately, become self-sustaining.

As the climate progressively changes, future cities must also develop buildings and infrastructure that cope better with more flooding, more heat and drought.

The renewal of the Precinct provides opportunities to reduce its potential environmental impacts and footprint while building climate resilience, by becoming a:

- Low carbon city
- Water sensitive city
- Climate adept city.

Cities and places which embrace and implement sustainable development plans reduce their vulnerability to energy price rises and economic shocks. They have less traffic congestion and more transport choices. Lower energy, water and resource inputs reduce costs and save money and resources for the individual household, business and the city.

The sustainable development of Montague, both at its inception and into the future, provides an opportunity to plan for and identify strategies for the delivery of a sustainable built form, a green public realm and public infrastructure in a more sustainable form.

This will significantly reduce the environmental impacts generated in Montague, and contribute to delivering the City of Port Phillip's environmental goals and policies included in: *Toward Zero, Greenhouse Plan, Water Plan, Climate Adaptation Plan, Sustainable Transport Strategy* and the *Open Space Strategy and Greening Port Phillip (Urban Forest) Strategy*.

Low carbon city

Low carbon cities and places provide a distinct competitive and economic advantage and can offer better built spaces to live, work and play.

Council is seeking to create a low carbon city where residents and businesses use energy efficiently to minimise greenhouse gas emissions.

Total annual greenhouse gas emissions for the Port Phillip community, as estimated at the start of 2011, are approximately 1,561,104 tCO2-e (tonnes of carbon dioxide equivalent). Council's city-wide target is to reduce greenhouse gas emissions by 50 per cent by 2020. (This reduction is relative to the 2007 base year.) It will be achieved by:

- Using energy and fuel efficient technologies and renewable energy sources that minimise emissions.
- More people walking, bike riding or taking public transport for most of their journeys.
- Constructing well-oriented, energy efficient and thermally insulated buildings.

Water sensitive city

As the climate changes, there will be less annual rainfall and longer dry periods. Reduced water supplies, coupled with future population growth, are likely to lead to greater water scarcity. Having a range of water supply options becomes essential.

Water sensitive cities and places are resilient to low water availability and the impacts of a drying climate, and provide more capacity to sustain open spaces and provide amenity.

Council is seeking to create a water sensitive city that uses many different, locally-sourced water sources, not just mains water. The city's many water sources are managed to meet the needs of the environment, and improve the health of our waterways and open spaces.

Total annual water use for the Port Phillip community, as estimated at the start of 2011, is approximately 8,108 megalitres (million litres).

Council's city-wide target is to reduce mains water use by 50 per cent by 2020. (This target is relative to 2000/2001 figures, Council's base year.) It will be achieved by:

- Reducing the need for water wherever possible, by using water efficient technologies and reusing local water sources such as greywater, rainwater and stormwater harvesting.
- Using Water Sensitive Urban Design, such as raingardens which channel and capture run-off for the passive irrigation of street trees and landscaped areas.
- Using Water Sensitive Urban Design to improve stormwater quality before it reaches our waterways and bays.

Climate adept city

As the climate progressively changes, the city is expected to experience hotter periods, as well as increases in the severity of flooding and extreme weather.

The City of Port Phillip's biophysical coastal environment has been assessed as one of the most climate vulnerable in Victoria as a high proportion of land fronts the Bay and is historically low lying.

Climate adept cities and places build local resilience to a changing climate and will progressively provide a climate clever and adaptive city that maintains healthy and productive communities, neighbourhoods and places.

Council is seeking to create a climate adept city that uses a combination of built form, infrastructure and vegetation in new ways to create more favourable climate conditions, whilst 'absorbing' some of the impacts of extreme weather events. It will be achieved by:

- Constructing buildings to cope well with flooding and more extreme weather.
- Greening open spaces, building green roofs and walls to create more comfortable indoor temperatures, making them less likely to be affected by heatwaves and extreme seasonal temperatures.
- Providing the drainage and coastal management infrastructure to reduce the impacts of rising seas.

The Structure Plan will ensure a high level of environmental performance for individual buildings and builds in integrated sustainability initiatives across energy, water, waste infrastructure and transport at a local level.

Sustainable infrastructure

Existing infrastructure in Montague is unsustainable and ageing. Montague's significant residential and worker population will require a considerable level of investment in new infrastructure to meet future increases in demand.

This presents an imminent opportunity to address the way that service infrastructure and supply is delivered in Montague.

Strategy 6.1

Facilitate sustainable infrastructure

ACTIONS

- Achieve a 50 per cent reduction in greenhouse gas (GHG) emissions across the Precinct by:
  - Ensuring that new buildings and extensions achieve a level of energy efficiency that is equivalent to 6 Star GreenStar rating or higher. This includes the use of passive design, energy efficient technology/ lighting/appliances, and insulation materials. (See Strategy 6.2)
    For leased buildings, this can be achieved through retrofitting with energy efficient lighting, appliances and technology.
  - Ensuring the use of on-site renewable energy generation (solar panels, solar hot water) and/or accredited GreenPower purchase to at least 10 per cent of energy requirements on-site.
  - Using energy efficient public lighting in the public realm.
  - Constructing physical infrastructure within the public realm using materials with reduced carbon footprint, including recycled materials, and warm mix asphalt.

- Achieve a 50 per cent reduction in mains water use across the Precinct by:
  - Providing local sustainable water management infrastructure within the Precinct.
  - Using potable water substitution initiatives such as on-site water tanks and retention systems.
  - Promoting water efficiency in building fixtures and appliances.
  - Designing the public realm to include rain gardens for street trees and nature strips, retention basins under roads and footpaths and efficient irrigation systems in parks and other landscaped areas. (See Strategy 6.3 and 6.4)

- Achieve a 50 per cent reduction in waste across the Precinct by:
  - Providing infrastructure for efficient resource recovery, recycling and disposal of waste across the city.
  - Providing infrastructure that allows for effective separation of waste streams, optimal recycling and safe collection. (See Strategy 6.5)

- Work with the State Government and utility providers to identify opportunities to establish precinct-scale distributed energy systems in Montague.

- In the community hub, investigate opportunities to develop a central energy plant that serves both the new community facilities and surrounding buildings.

- Investigate the establishment of Central Services Hubs to meet Montague's energy and water needs which incorporate:
  - Distributed energy systems
  - Integrated water management systems.

- Where feasible, distribute heat, cooling, power and water via combined services tunnels.

- Investigate opportunities to develop integrated environmentally sustainable development (ESD) solutions with the Southbank area.

- Integrate on-site renewable energy technologies such as micro wind turbines and solar panels into the design of buildings and the public realm.

RATIONALE

Large, higher density precincts, like Montague, provide a good scale for sustainability innovation in delivering energy, water and waste services to communities at a neighbourhood level.

Distributed energy systems

Distributed energy systems are currently being investigated throughout Victoria and Montague is well positioned for consideration of these technologies.

Distributed energy is any energy generated locally, including renewable energy and more traditional fossil fuel based generation, which includes co/tri-generation.

Renewable energy generation

To achieve the sustainability vision for Montague, new development should be responsible for the generation of a portion of its own energy consumption.

An energy generation target of 10 per cent is in line with other global initiatives. The generation of this energy could come from a suite of sustainable technologies, including photovoltaics and micro-wind turbines.

Integrated water management systems

Integrated water management systems are a means to conserve mains water, utilise alternative water sources and delivery modes, and improve stormwater quality through water sensitive urban design.

South East Water and Melbourne Water are working with the City of Port Phillip and the City of Melbourne to investigate integrated water management options for key renewal areas (including Southbank, Montague and the St Kilda Road Precinct) where substantial population growth is expected. This will provide critical mass and economies of scale.

Central services hubs

Central Services Hubs have been identified in the *Southbank Structure Plan* and other structure plans as an integrated means to distribute water and heat.

Several interconnected Central Services Hubs could be located within the area to meet Montague's energy and water needs.

Central Services Hubs would house co-generation or tri-generation plants and treat and store recycled water.

Three separate water pipes, containing chilled, hot and non-potable water would be housed in a combined services tunnel.

Integration with other Precincts

There is also an opportunity to integrate with development at Southbank and potential development at Fishermans Bend.

Opportunities to deliver shared systems that would benefit both development areas may include shared energy generation systems, and shared stormwater capture and treatment and storage systems. This will also provide a greater critical population to support delivery of the system.

Strategy 6.2

Build ecologically sustainable buildings

ACTIONS

- Require new residential and non-residential developments, alterations and additions to meet Green Star 6 star requirements or equivalent.

- Where any new development triggers a planning permit, an environmental assessment demonstrating best practice must be submitted:
  - For less than 10 dwellings for residential development or for non-residential developments less than 1,000m^2 – a Sustainable Design Assessment (SDA) is required.
  - For residential development of 10 or more dwellings or for non-residential developments above 1,000m^2 - A Sustainable Management Plan (SMP) is required.

- Require green roofs, walls or facades on all new development.

- Implement best practice passive design principles including orientation, shading, natural daylight and natural ventilation to minimise energy use when designing and siting buildings.

- Incorporate energy efficiency measures in all new buildings including:
  - Active shading strategies which minimise unwanted solar heat gains.
  - High-performing building facade and glazing systems.
  - Thermal mass indoor water tanks that act as thermal mass and temperature stabilisers.
  - Building thermal efficiency.
  - Building automation systems and real-time monitoring of each building's operational performance.
  - Proactive energy management to ensure building is operating at optimum.
  - Thermal chimneys that allow for night purging of heated air and improved natural ventilation.

- Encourage the use of recyclable materials that will endure for the life of the development, and minimise environmental and health impacts.

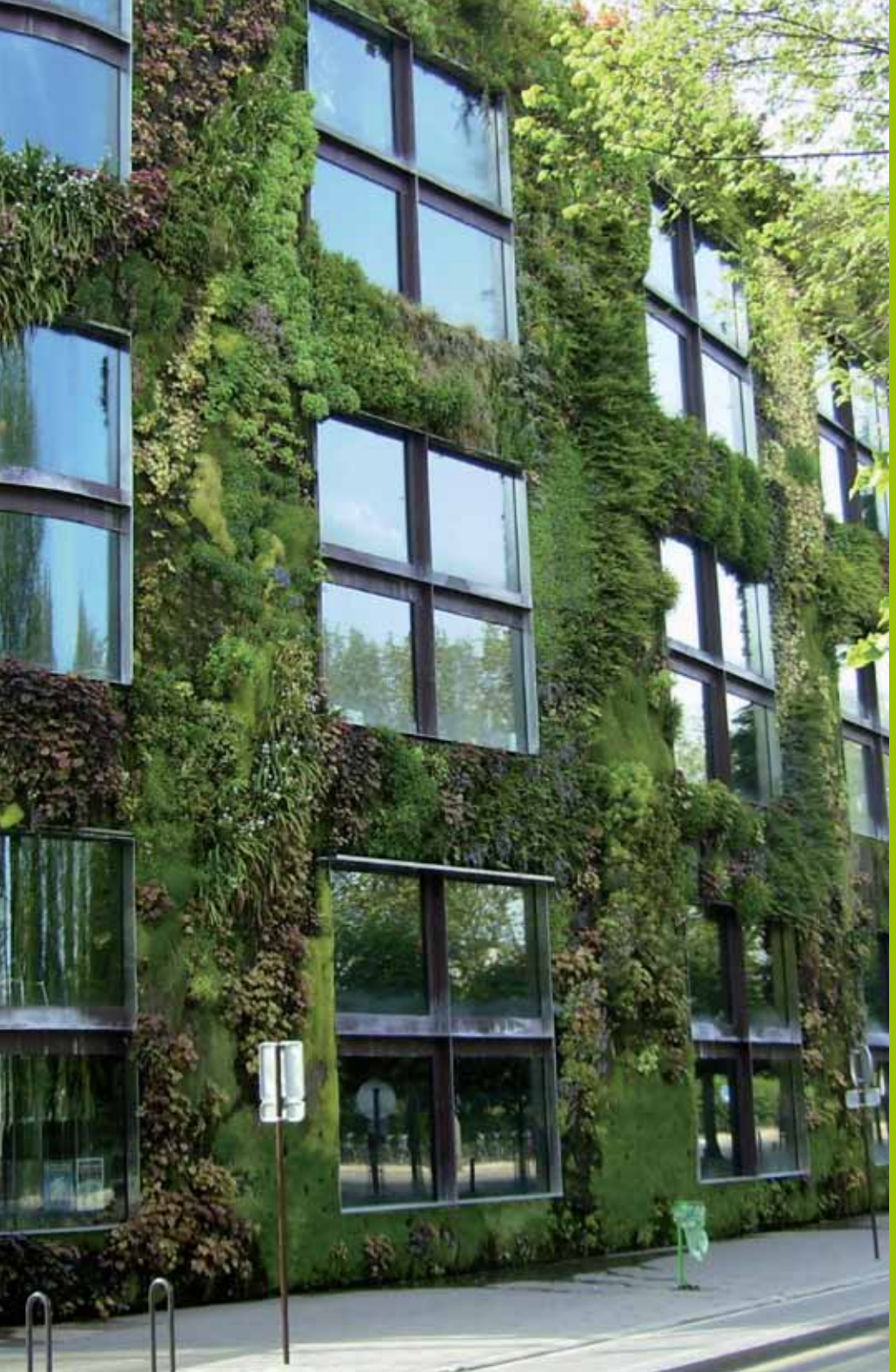
RATIONALE

The Structure Plan seeks to deliver buildings which are environmentally sustainable and utilise the microclimate to passively heat and cool. To ensure this, the Plan mandates ESD standards for residential and non-residential buildings.

Efficient buildings consume fewer resources, minimise adverse impacts on the built and natural environment, save money, increase worker productivity and create healthier environments for people to live and work in. By mandating that all new buildings meet minimum levels of performance, the resources consumed by buildings will decrease.

Buildings and public realm works will also need to be designed to minimise energy use and peak energy demand.

The Structure Plan also requires the provision of roof gardens. Roof gardens provide the benefit of reducing the urban heat island effect, preserving and enhancing biodiversity, improving the city aesthetic, air quality and stormwater. A green roof garden can regulate internal building temperature by acting as thermal insulation. Studies have shown indoor temperatures to be 3 to 4 °C lower than outside temperatures of 25 to 30 °C.



Strategy 6.3

Promote water efficiency and potable water substitution for the Precinct

ACTIONS

- Develop a sustainable water management system that supports the goal of a 50 per cent reduction in potable water use across the Precinct. (This is equivalent to a potable water demand of 115 L/person/day for residential demand and 100 L/person/day for business demand.)

  This system should comprise a range of solutions based on water efficiency, potable water substitution, and the appropriate management of all alternative water sources.

- Partner with South East Water, Melbourne Water, the City of Melbourne and the State Government to provide local sustainable water management infrastructure within the Precinct including:
  - third pipe
  - sewer mining
  - grey water re-use
  - distributed storage systems

- Ensure developments connect to local sustainable water management infrastructure through planning and other mechanisms.

- Ensure that sustainable water management infrastructure supplies water across the Precinct as 'fit for purpose' localised initiatives.

- Collect, treat and re-use 100 per cent of rainwater and stormwater on-site (eg use rainwater and treated water for landscape and building control systems, toilet flushing, irrigation in shared open space areas, swimming pool water, etc.)

- Encourage 'fit for purpose' re-use of greywater, blackwater and stormwater.

- Ensure the efficient use of water in new buildings and extensions through the use of Water Efficiency Labelling (WELS) rated water-efficient fixtures and fittings, and by installing high efficiency appliances.

RATIONALE

Increases in residential and worker population will have substantial impacts on the demand for water. Montague, due to the scale of redevelopment, offers the potential to apply integrated water management by:

- conserving mains water
- utilising alternative water sources and delivery modes
- improving stormwater quality through water sensitive urban design.

An integrated approach to water management will:

- Adapt to changing technologies and needs.
- Ensure resilience to low water availability as a result of climate change.
- Reduce the burden on ageing stormwater infrastructure.
- Reduce the need for costly infrastructure upgrades.
- Mitigate against the effects of overland flooding.
- Support landscaping and vegetation which contributes to the urban forest and urban heat island objectives.
- Improve stormwater quality.
- Enhance the public and private realm through to the use of water as an element in the landscape.

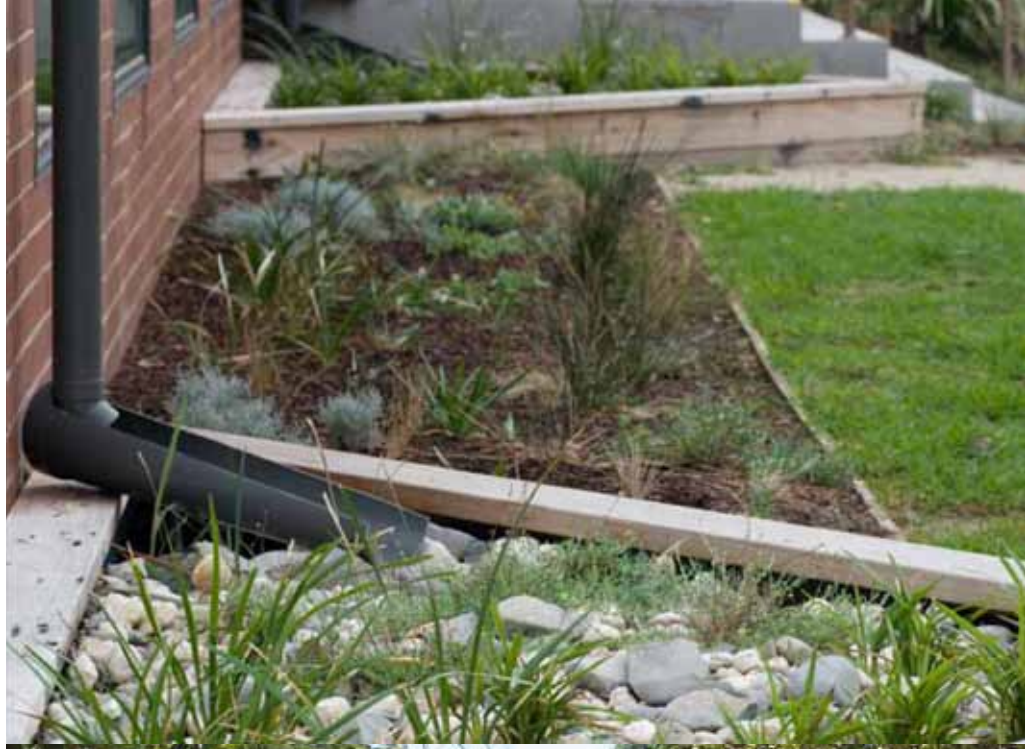
The Precinct will use many different water sources, not just mains water to meet water needs. Water will be accessed from rainwater, stormwater and wastewater and will be delivered 'fit for purpose' to meet the varying needs of the Precinct.

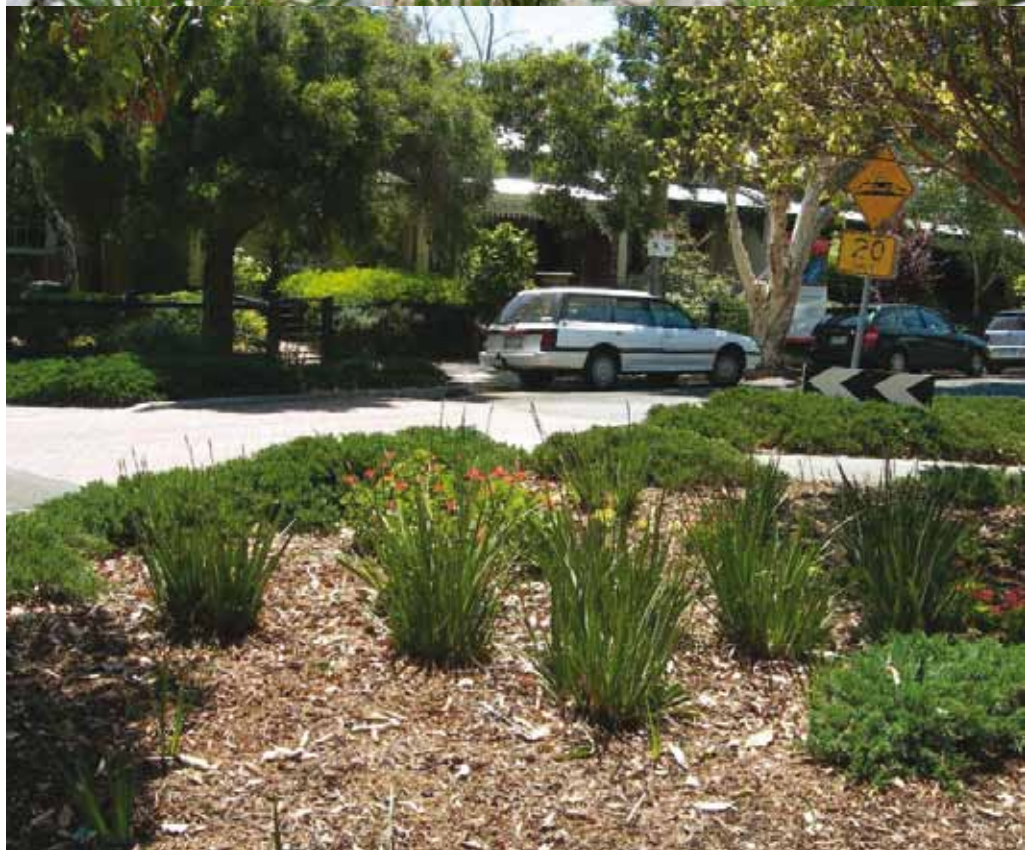
It is proposed that stormwater will be treated and utilised to supply a range of sustainable infrastructure as follows:

- Preliminary treatment of stormwater (removal of sediments, nutrients and other contaminants) through Water Sensitive Urban Design (WSUD).
- Storage in underground tanks located in existing and proposed open space.
- Additional treatment and disinfection.
- Supply distributed energy systems and reticulate chilled and heated water supply throughout the Precinct.

Providing Class A water (the highest class of reclaimed water) to the area would provide an alternate and more affordable water supply that could be used for:

- Toilet flushing and laundry use.
- Heat rejection (in cooling towers, which can be up to 50 per cent of on-site water demand).
- Irrigation for public and private open space, green roofs or green walls. This would significantly reduce the urban heat island effect.
- Redistribution through the area as hot and chilled water (heated via distributed energy systems).





Strategy 6.4

Implement stormwater management solutions in buildings, roads and open space

ACTIONS

- Design buildings and the public realm (including roads, drainage, streetscape works and open space) to collect, treat and reuse rainwater and stormwater to best practice standards.

- Require stormwater treatment measures that improve the quality and reduce the flow of water discharged to waterways, including, but not limited to:
  - collection and reuse of rainwater and stormwater on-site
  - vegetated swales, buffer strips and rain gardens
  - multiple uses of water within a single site
  - directing the flow from impervious ground surfaces to landscaped areas.

- Integrate stormwater treatment into the landscape and encourage the provision of on-site detention systems to reduce loadings on the stormwater system after heavy rains.

- Ensure the design of public open spaces and streetscapes minimises the need for irrigation.

- Ensure that porous / permeable surfaces are used on roads, footpaths and open spaces.

- Comply with best practice performance objectives for suspended solids, total phosphorus and total nitrogen[8]:
  - Suspended Solids – 80 per cent retention of typical urban annual load
  - Total Nitrogen - 45 per cent retention of typical urban annual load
  - Total Phosphorus – 60 per cent retention of typical urban annual load
  - Litter – 70 per cent reduction of typical urban annual load.

Best practice stormwater treatment requirements can be measured through the use of the Melbourne Water STORM assessment tool, MUSIC stormwater modelling or equivalent approved methodology.

- Install pollution traps to prevent rubbish and other contaminants from entering waterways.
- Promote and implement a '100 raingarden concept' by selecting appropriate locations for private and public realm WSUD interventions.

RATIONALE

Water Sensitive Urban Design (WSUD) is an integral element of integrated water management, and is a key mechanism for improving stormwater quality.

WSUD interventions will be incorporated into both the public and private realm to capture stormwater and rainwater for the use in the irrigation of public and private green spaces and raingardens and other 'fit for purpose uses'.

This will reduce the burden on infrastructure, reduce the need for infrastructure upgrades and contribute to mitigating the effect of local overland flooding. A range of options in the water portfolio will provide greater choice to customers in the Precinct.

8 Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999

Strategy 6.5

Develop a climate adept Precinct

ACTIONS

- Ensure public realm infrastructure is designed to minimise flood impacts through improved drainage infrastructure, detention systems, and diversion to established storage systems for reuse or controlled release.
- Require developments to have 50 per cent on-site detention of stormwater.
- Require developments to utilise green walls, facades and roofs to create more comfortable indoor temperatures and improve water quality to our waterways
- Ensure critical services are located to enable easy access during extreme weather.
- Ensure harvested water sources for re-use are not contaminated during extreme weather.

RATIONALE

Building a progressively climate adept city will substantially improve the city's capacity to be resilient to a progressively changing climate, while providing residential and business opportunities.

It will also reduce and minimise the potential liability from impacts of a changing climate.

Strategy 6.6

Implement waste management infrastructure and programs

ACTIONS

- Provide infrastructure to ensure efficient resource recovery and recycling / disposal of personal, consumer waste and food waste, including:
  - Ensuring all food waste is composted on-site.
  - Ensuring all green waste is composted on-site or at a Council facility.
- Ensure that public place recycling is made readily available by providing resource recovery and recycling bins, in particular along the primary and secondary pedestrian streets.
- Require waste management plans for all new developments covering construction and operational waste.
- Ensure adequate and accessible storage space is provided within multi-site private developments and the public realm to enable effective separation of waste streams and to maximise recycling and safe collection.

RATIONALE

Effective waste management can have a substantial impact in key areas of sustainability including; resource efficiency, greenhouse gas abatement, environmental amenity and the community's overall quality of life.

Up to 80 per cent of a product's environmental impacts are already locked in at the design stage when key decisions are made about materials, production, distribution, operation and end-of-life management.