Improving Stormwater Management Advisory Committee

FINAL REPORT

4 September 2018

Department of Environment, Land, Water and Planning
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East Melbourne 3002 Victoria
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Acknowledgement of Victoria's Aboriginal communities

The Victorian Government proudly acknowledges Victoria's Aboriginal communities and their rich culture; and pays its respects to their Elders past and present. The government also recognises the intrinsic connection of Traditional Owners to Country and acknowledges their contribution in the management of land, water and resources. We acknowledge Aboriginal people as Australia's first peoples and as the Traditional Owners and custodians of the land and water on which we rely. We recognise and value the ongoing contribution of Aboriginal people and communities to Victorian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

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Foreword

Victoria's cities and towns are among the most liveable in the world, and our waterways, wetlands and bays are an essential part of the state's character. Waterway corridors and coasts are highly valued and intensively used recreation spaces that often include the most-significant natural areas remaining in urban environments. They reflect important elements of our shared history and heritage and are particularly significant for Traditional Owners. They also provide essential habitat for native plants and animals.

Historically, we have managed stormwater through a drainage-engineering approach, which aims to efficiently remove stormwater generated when rain falls on impervious urban surfaces (such as roads and roofs). Drainage systems capture and convey stormwater along with pollutants into our waterways, many of which fail to meet community expectations for health and amenity.

In 1996, the Environment Protection Authority Victoria, Melbourne Water and local governments (through the Municipal Association of Victoria) formed a partnership to tackle stormwater pollution, establishing the Victorian Stormwater Committee. The committee, which included agencies and stakeholders (such as the development industry), developed new performance objectives for urban stormwater management and a program to support action, based on its landmark 1999 publication *Urban Stormwater: Best Practice Environmental Management Guidelines*. The guidelines introduced and defined a new approach to stormwater management called water sensitive urban design (WSUD) as an alternative to traditional drainage engineering.

The stormwater performance objectives set out in the best practice environmental management (BPEM) guidelines were written into the Victoria Planning Provisions (VPPs) for residential subdivision in 2006 and for apartments in 2017, but they have never been inserted into other parts of the VPPs dealing with commercial, industrial and multi-dwelling developments. Many councils have sought to overcome these gaps with local planning changes. However, while an improvement on the past, what has evolved is an inconsistent and inequitable application of stormwater management requirements across development types and local government areas.

Since the publication of the BPEM guidelines in 1999, WSUD has become a mainstream part of stormwater management practice. Victoria has been an international leader in this move to WSUD, but we are beginning to slip behind other cities (such as Singapore, which 15 years ago looked to Melbourne for innovation and advice, which helped transform it into one of the world's leading water-sensitive cities). Perhaps more significantly, uncertain policy settings are reducing our ability to create and maintain urban landscapes that use water efficiently; are green, cool, pleasant places for people; and that have healthy waterways, wetlands and coasts. WSUD is just as important for our redeveloping suburbs as it is for new suburbs in the growth areas.

As Victoria's population grows, there is a need for stormwater management policy reform including changes to the VPPs, clearer accountabilities for stormwater managers and clearer specifications of what is expected of land and infrastructure managers (such as water corporations, local governments, VicRoads and industrial and commercial businesses).

The committee had only a brief period to consider reforms to the way stormwater is managed in Victoria. We have made a series of modest recommendations, which we believe build on Victoria's significant achievements in WSUD.

While urban stormwater management has little profile in the community, the committee has discovered that engineering, environmental, urban planning and urban design professionals in the development industry, water sector and governments are highly engaged with this issue. We thank the many individuals, groups and agencies that met with the committee, attended workshops or made submissions. We also acknowledge the support of the Department of Environment, Land, Water and Planning team that supported the committee, and we thank them for their hard work and professionalism.

We commend this report to the Minister for Planning and the Minister for Water.

CHRIS CHESTERFIELD

Chair, Improving Stormwater Management Advisory Committee

Contents

Executive summary

Current arrangements for managing stormwater in new developments in Victoria are inadequate for meeting the Victorian Government's policy objectives of protecting the long-term health of urban waterways and bays and for maintaining the resilience and liveability of our towns and cities, particularly with future population growth and climate change.

The state's stormwater planning provisions are inconsistent and therefore inequitable. The provisions exempt many types of development from managing stormwater, including those that create the most harmful stormwater impacts.

Planning reforms

To address these issues, the Improving Stormwater Management Advisory Committee recommends changes to the Victoria Planning Provisions (VPPs) and the state's Planning Policy Framework (PPF).

As the highest priority, the committee recommends extending the range of developments required to meet the state's stormwater management requirements beyond residential subdivisions and apartments to include:

- commercial subdivisions and developments
- industrial subdivisions and developments
- public-use developments
- multi-dwelling residential subdivisions and developments.

The recommended changes to the VPPs will address inequities such as that people buying houses in Melbourne's growth areas and buying apartments are currently investing in stormwater management, but industrial and commercial developers and multi-dwelling residential developers in established suburbs are not.

Many metropolitan and some regional councils have introduced local stormwater planning policies to address these gaps, by extending stormwater management requirements to a broader range of developments. However, having different requirements for different types of developments in different locations adds complexity and confusion to the regulatory picture.

The extensive consultation the committee undertook found strong support across all sectors for more-consistent statewide stormwater management requirements that address a broader range of development types. Stakeholders consulted include representatives of the water sector, councils, the Victorian housing and building industries, environmental groups and academia.

Pending further consultation with stakeholders and the wider community, the development of deemed-to-satisfy solutions (recommendation [rec.] 12), adequate guidance and tools (recs. 13, 14 and 15) and offset processes (rec. 5), the committee proposes that government amend the VPPs to expand the current stormwater management requirements to include single dwellings and large extensions that require planning permits. This will ensure that almost all developments that need planning approval will need to manage stormwater, without increasing the number of planning permits triggered.

Future policy directions

In order to improve stormwater management effectively and efficiently and to improve productivity and liveability across Victoria, a more-comprehensive and flexible suite of actions is needed to complement and enhance the recommended changes to the VPPs.

The committee therefore recommends the following future policy directions:

- amend the building and plumbing controls to ensure that all developments, not just those that require planning approval, manage stormwater
- establish effective offsetting arrangements to increase flexibility and cost-effectiveness and to help make stormwater a valued resource
- clarify the roles and responsibilities of local governments and water corporations
- strengthen compliance requirements
- determine funding sources to support local governments to construct and maintain public stormwater infrastructure
- link water management with urban planning, to help implement integrated water management (IWM) plans
- set stronger, place-based BPEM stormwater performance objectives, to provide greater overall benefits to the community and to protect the environment.

The committee also recommends actions to support the practice change needed to implement the above reforms (such as investment in better guidance, tools, training and capacity-building).

The committee's recommendations will help to deliver the government's policies. They will implement action 19 of the *Yarra River Action Plan*, actions 5.5 and 5.6 of *Water for Victoria* and actions 80 and 94 of the *Plan Melbourne Implementation Plan*, and they will also help achieve the *Port Phillip Bay Environmental Management Plan (2017-2027)* pollutant load reduction targets. The recommendations will also help to implement the new, more-preventative approach to managing environmental harm set out in the *Environment Protection Act 2018*.

Recommendations

Planning reforms

Recommendation 1 – Expand the stormwater planning provisions (phase 1): That the Victorian Government amend the VPPs to expand the current stormwater management requirements to:

- commercial subdivisions and developments
- industrial subdivisions and developments
- public-use developments
- multi-dwelling residential subdivisions and developments.

Recommendation 2 – Expand the stormwater planning provisions (phase 2): That, subject to further consultation, the development of deemed-to-satisfy solutions (rec. 12), adequate guidance and tools (recs 13, 14 and 15) and offset processes (rec. 5), the Victorian Government amend the VPPs to expand the current stormwater management requirements to:

- single-dwelling developments
- extensions over 50 m^2.

Recommendation 3 – Insert an IWM clause into the Planning Policy Framework (PPF): That the Victorian Government amend the PPF to embed the concepts of IWM objectives and strategies.

Future policy directions

Recommendation 4 – Amend the building and plumbing controls: That DELWP progress, through a regulatory impact statement, amendments to the Victorian variation to the Building Code of Australia and supporting regulations, to ensure that consistent stormwater requirements are applied to all development types.

Recommendation 5 – Establish effective offsetting arrangements: That DELWP investigate establishing voluntary stormwater quality offset schemes across Victoria in major metropolitan and regional centres that:

- allow developers and owners to meet stormwater quality obligations off-site rather than on-site
- enable local governments, Melbourne Water and other water corporations to provide off-site stormwater solutions
- establish cost-effective arrangements that achieve statewide and local benefits
- tie payments to off-site stormwater management infrastructure that delivers the same or better environmental outcomes than on-site infrastructure.

Recommendation 6 – Clarify local governments' roles and responsibilities: That DELWP investigate opportunities to clarify councils' stormwater management functions in legislation (such as in the *Local Government Act 1989 or the Water Act 1989).*

Recommendation 7 – Strengthen compliance requirements: That the Victorian Government examine using the provisions of the *Environment Protection Act 2018* to establish clear, enforceable obligations on land and infrastructure (such as roads) managers.

Recommendation 8 – Determine funding sources for public stormwater infrastructure: That DELWP work with councils, Melbourne Water and the Victorian Planning Authority to determine appropriate funding sources for managing and maintaining stormwater infrastructure.

Recommendation 9 – Link water management with urban planning: That DELWP consider amending the VPPs to include linkages with IWM plans (when developed), to ensure new developments within these plans are designed to deliver IWM-servicing solutions.

Recommendation 10 – Set stronger, place-based BPEM stormwater performance objectives: That the EPA consider place-based, and flow, stormwater performance objectives as part of its current review of the BPEM, to protect the ecological health of sensitive downstream waterways and bays, enhance amenity and recreational values and reduce flooding.

Supporting actions

Recommendation 11 – Strengthen enforcement of stormwater construction requirements: That:

- the EPA, DELWP and local governments work together to develop an effective enforcement program to lift the standard of construction site management in Victoria
- the EPA and Melbourne Water review their guidance about construction techniques for sediment and pollution control for larger developments, to make them up-to-date and enforceable.

Recommendation 12 – Prepare deemed-to-satisfy solutions: That DELWP prepare deemed-to-satisfy solutions for typical development types.

Recommendation 13 – Review the STORM and MUSIC tools: That DELWP review current funding and governance arrangements for the STORM and MUSIC modelling tools to ensure adequate investment in updating and maintaining the tools to meet industry needs in Victoria.

Recommendation 14 – Build technical expertise: That the Victorian Government support the development and provision of training to build the capacity of councils and stakeholders to implement the recommended changes to the VPPs.

Recommendation 15 – Improve guidance: That DELWP revise guidance material about IWM to support implementation of the recommended changes to the VPPs.

Recommendation 16 – Improve awareness of the VPP changes: That DELWP promote awareness of changes to the VPPs to the general public and the building and development industries.

Recommendation 17 – Investigate options for rainwater tank maintenance and operation: That DELWP investigate options for improving the maintenance and operation of rainwater tanks.

Recommendation 18 – Broaden rating systems to include IWM: That DELWP examine broadening the Victorian Energy Efficiency Scorecard or other building and development rating systems to include IWM elements (such as stormwater management and water efficiency).

Introduction

About the Improving Stormwater Management Advisory Committee

In April 2018, the Minister for Planning established the Improving Stormwater Management Advisory Committee. It is an advisory committee under Section 151 of the *Planning and Environment Act 1987* to advise the Minister for Planning and the Minister for Water about how to improve stormwater management and strengthen the links between urban planning and water management.

The committee members have extensive planning and water sector experience. The committee chair is Chris Chesterfield, who is Director Strategic Engagement at the Cooperative Research Centre (CRC) for Water Sensitive Cities. Mr Chesterfield, with nearly 30 years' experience in the public, water and environment sectors, is nationally recognised for his leadership in waterway and urban water management. The other committee members are:

- Sue Porter, with more than 35 years' experience as a town planner with local and state governments and in the private sector, and with experience in strategic and statutory planning in rural, urban fringe and urban areas
- Julie Katz, with experience providing strategic advice to the development industry, statutory authorities and state and local governments; she has practised in town planning with state and regional planning authorities for more than 25 years
- Jeremy Cheesman, who is a Director at Marsden Jacob Associates, a natural resource economics and policy advisory practice; he has specialised in water and environmental economics for more than 15 years, and he has particular expertise in the economics of stormwater.

The committee's terms of reference are available on the project's website. The terms require it to advise which types of urban development, of those not currently subject to the state's urban runoff management objectives, should be required to manage their stormwater impacts and how this could be achieved.

The terms of reference also ask the committee to advise about policy to improve stormwater management and to strengthen the links between urban water management and the planning and development system more broadly. The committee was asked to consider the following topics:

- mechanisms in or linked to the planning system that could be used to increase flexibility (such as offset schemes)
- provisions for delivering place-based outcomes to, for example, implement the integrated water management (IWM) plans developed by IWM forums
- protocols or guidance for improving compliance and implementation (such as guidance to encourage broader liveability — for example, urban cooling — benefits or encourage water sensitive urban design [WSUD] outcomes in infill developments)
- information requirements (for example, for WSUD and stormwater management to be reflected in design responses submitted with planning applications)
- other potential mechanisms outside the planning system that could complement changes to planning provisions, to improve stormwater management.

Image: Cooperative Research Centre for Water Sensitive Cities

The committee was not asked to recommend new stormwater management objectives. The best practice environmental management stormwater management performance objectives, also known as the BPEM standards, are written into the BPEM guidelines. These guidelines sit outside the planning system. The Environment Protection Authority Victoria (EPA) is responsible for the guidelines, and it is currently reviewing them.

In May 2018, the Department of Environment, Land , Water and Planning (DELWP) released an *Issues Paper*. The issues paper examined issues and opportunities for managing stormwater through the planning system and invited submissions from stakeholders and the public. During the submission period — from 1 June to 27 July 2018 — DELWP received 47 submissions including 15 from Victorian councils, five from water corporations and seven from environmental and/or community groups.

The committee consulted widely. It held seven workshops, to which it invited relevant organisations to discuss current stormwater management activities and future directions. It reviewed the stormwater management literature and held five workshops with representatives of the water sector, academia, councils, the housing and building industries, environmental groups and government departments. The workshops examined:

- linking IWM and planning policy (on 8 June, with 12 attendees from the Victorian Planning Authority, Melbourne Water and the EPA)
- expanding and rewording stormwater planning requirements (on 26 June, with 32 attendees)
- linking IWM and the planning system (on 27 June, with 39 attendees)
- offsets and funding (on 2 July, with 21 attendees)
- compliance and implementation (on 3 July, with 27 attendees).

A sixth workshop was organised by the Municipal Association of Victoria (MAV) with local government representatives (on 25 June, with 18 attendees).

The committee met one-on-one with representatives of the MAV, the Urban Development Institute of Australia, the Housing Institute of Australia, the EPA, Melbourne Water, the Master Builders Association of Victoria and the Property Council of Australia (Victorian Division). The secretariat met with representatives of VicRoads, on the committee's behalf.

This report, to the Minister for Planning and the Minister for Water, lays out the committee's findings and recommendations.

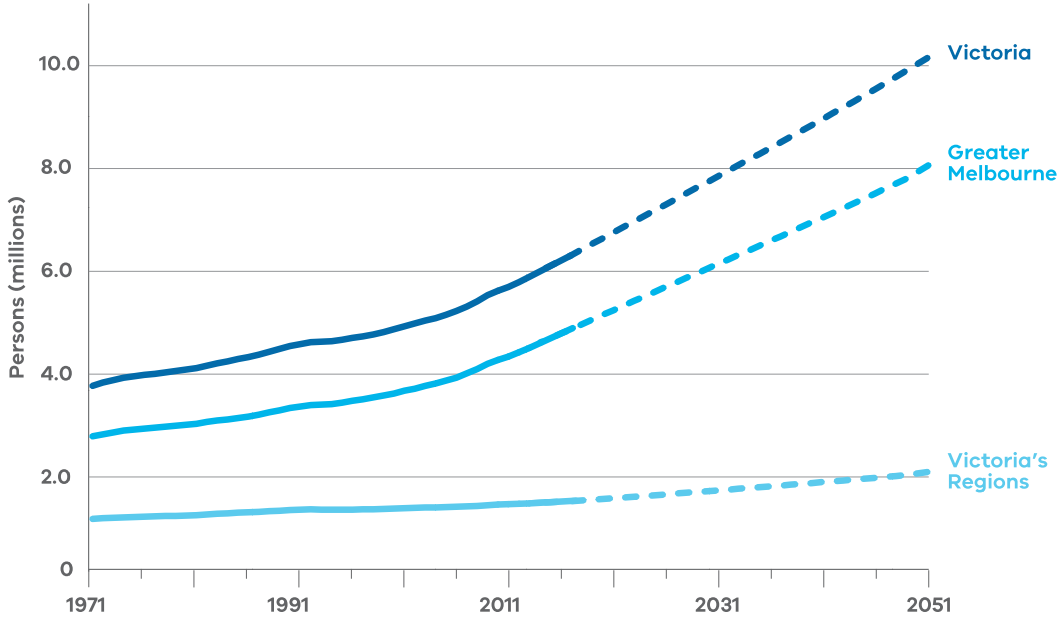
Why improve stormwater management?

The population and urban growth challenge

Victoria's cities and towns are among the most liveable in the world. Much of Victoria's appeal is due to its natural beauty, and it has an international reputation for clean, natural environments and people-friendly urban areas. Victoria's waterways contribute greatly to our liveability, economy, environment and communities. Sustainably managing and protecting our waterways is essential, and it will become even more so as Victoria's population grows and our climate becomes warmer and drier.

Victoria's population is growing rapidly. As Figure 1 shows, it is estimated to grow from just over 6 million people in 2018 to more than 10 million people by 2051. About 8 million people will live in greater Melbourne. The populations of Ballarat, Bendigo and Geelong are estimated to almost double.

Figure 1: Actual and estimated population growth, Melbourne and Victoria, 1971–2051



Source: Victoria in Future 2016

Population growth increases the impervious area of our cities and towns. Total impervious area increases every time new buildings, roads and car parks are built. Modelling indicates that the impervious surface area in Melbourne will be 43% greater in 2051 than it was in 2011 as the city grows and densifies to meet the needs of its growing population.

As the extent of Melbourne's impervious areas increases, so too will the volume of stormwater. DELWP modelling indicates the volume of stormwater generated each year will increase from 700 GL in 2011 to 1,006 GL in 2051.

Redevelopment of built-up areas increases imperviousness. Redevelopment of Victoria's cities and towns replaces areas that were once gardens or bare earth with buildings, roads and car parks. Drainage systems in some developed areas are not sized to cope with the greater volumes of stormwater runoff due to redevelopment. If steps are not taken to mitigate increases in stormwater volumes, there may be a need to upgrade drainage infrastructure; otherwise, there will be more disruption and damage from flash flooding. Requiring developments to manage their stormwater will reduce these outcomes.

Redevelopment provides opportunities to manage stormwater better. While redevelopment — which involves replacing existing buildings, roads and car parks with new development — does not always increase imperviousness, it often does, and it provides us with an opportunity to make better use of stormwater. This can conserve drinking water and help create urban landscapes that are green and pleasant places for people to enjoy, with healthy waterways and coasts.

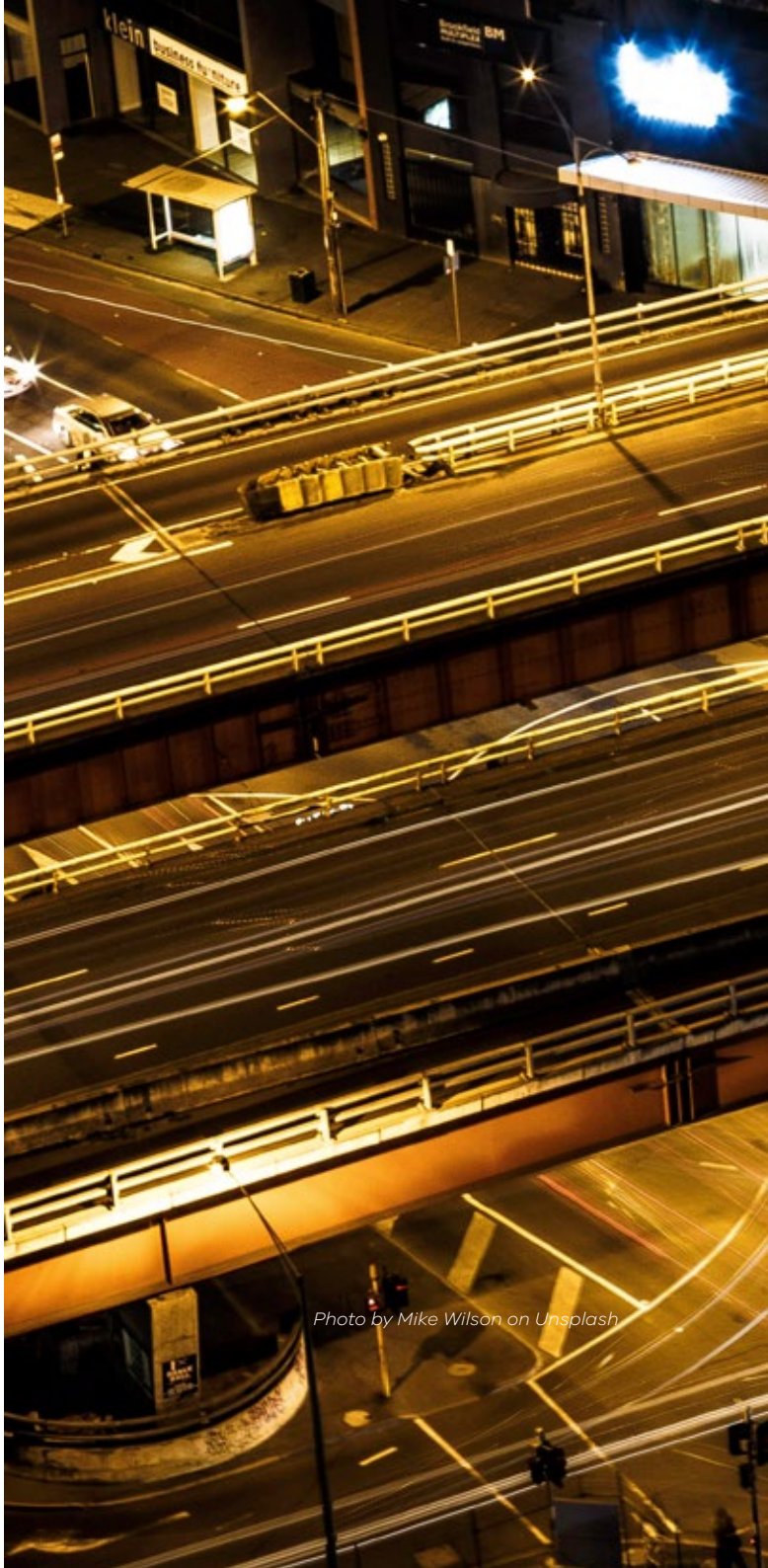


Photo by Mike Wilson on Unsplash

The climate change challenge

Climate change is making Victoria warmer and drier. Compared with historical conditions, Victoria is experiencing higher temperatures (particularly during the warmer months), less rainfall in autumn and early winter and more rainfall during the warmer months in some places. Over the longer term, modelling indicates this trend is likely to continue.

Climate change is putting more pressure on our drinking water supplies. A warmer, drier climate means less water in our dams, and we need more water to keep our cities and towns green. Our water supplies can be augmented by using alternative water sources (such as the rain that falls on urban areas) for keeping landscapes green. WSUD is an alternative to conventional drainage that seeks to retain this water to green our open spaces and streetscapes.

Climate change is also putting pressure on our drainage systems. More-intense rainfall events (such as summer storms) can overload drainage systems and cause flash flooding, which can be a significant cause of disruption and property damage. Augmenting drainage systems is costly. The pressures of more-intense rainfall events can be mitigated by holding rainfall and runoff in the landscape using simple WSUD technology like rainwater tanks and raingardens.

Climate change and population growth will increase the urban heat-island effect. Urban, built-up areas are significantly warmer than surrounding rural areas. Warmer temperatures will exacerbate the urban heat-island effect and its impacts, particularly on people who are old or frail. Greener urban landscapes are cooler and more pleasant for people.

Urban growth and climate change will increase pressure on the city's infrastructure, the environment and urban amenity. The growth and redevelopment of urban areas is an opportunity to treat the rain that falls on them as a resource, to create and maintain urban landscapes that use water efficiently; are green, cool and pleasant places for people; and have healthy waterways, wetlands and coasts.

Protecting our precious waterways and bays

Victoria's waterways are integral to our economy, environment and liveability. For Victorians (and for Melburnians in particular), waterways, wetlands and bays are an essential part of the urban landscape. Waterway corridors and coasts are the most-used recreation spaces. They are often the most-significant natural areas remaining in urban landscapes. They reflect important elements of our shared history and heritage; they are particularly significant for Traditional Owners; and they provide habitats for native plants and animals. These are environments that communities care about and connect with. They must be protected and managed sustainably, even more so as Victoria's population grows and our climate becomes warmer and drier.

Conventional drainage engineering is not good for waterways. It directs large volumes of stormwater into drains, carrying litter and other pollutants into waterways. The large stormwater volumes and the accompanying pollution harm the ecological health of waterways and reduce their amenity for people. Large volumes of stormwater can also cause local flash flooding or widespread flooding of creeks and rivers, which can harm the natural and built environments. Many waterway values have been lost to drainage engineering and land management activities.

Too much stormwater damages and degrades urban waterways. If Melbourne was to develop out to its Urban Growth Boundary using conventional drainage-engineering approaches, one estimate is that over 900 km of streams would be degraded.

Stormwater also reduces opportunities to swim in our bays and lakes and at our beaches. Nearly all stormwater ends up in a receiving water body (such as a bay, lake or the open sea). In Melbourne, rainfall flushes stormwater and other forms of pollution (such as sewage) into the stormwater system and into Port Phillip Bay, making it less safe for swimming. The draft State Environment Protection Policy (SEPP) (Waters) updates environmental quality objectives for water-based recreation. In particular, the microbial standard is changing, from World Health Organization standards issued in 2000 to the National Health and Medical Research Council's 2008 *Guidelines for Managing Risks in Recreational Waters*. More of Melbourne's beaches are predicted to fail the new standard, mainly due to stormwater impacts. More beach closures will affect Victoria's liveability and economy.

To keep Port Phillip Bay healthy, the amount of nitrogen it receives must remain at current levels. About half of all the nitrogen from the catchment currently entering the bay comes from urban stormwater. By 2051, the total nitrogen load from urban areas into the bay is projected to be about 40% more than in 2011, increasing from 1,968 T to 2,670 T by 2051. In the *Port Phillip Bay Environmental Management Plan 2017–2027*, the government committed to ensuring that nutrient and sediment loads do not exceed the 2017 levels and that pollutant loads are reduced where practicable.

Conventional drainage-engineering approaches to managing stormwater will damage the ecological health of waterways, and beaches will close more often from poor water quality.

Facing up to the flooding risk

Much of Melbourne's drainage system was designed to cope with one-in-five-year rain events. More significant rainfall events will create overland flows of stormwater. Urban areas developed since the 1970s have incorporated overland flow paths along roads, to minimise damage and disruption from these events. Older urban areas, lacking overland flow paths, can experience significant damage and disruption from flash flooding.

In 2015, Melbourne Water estimated that about 232,000 properties face at least a 1% chance per year of flooding. Around 90% of these properties would be affected by urban flash flooding rather than flooding of rivers and creeks. It estimated the annual average damage caused by flooding to be nearly $400 million.

Redevelopment of existing areas of Melbourne and other cities and towns will increase impervious areas and increase runoff volumes, leading to increased flash flooding, without measures to limit runoff volumes or upgrade drainage infrastructure.

Practices such as IWM and WSUD can reduce the quantity and improve the quality of urban stormwater. This can reduce pressure on drainage systems and urban flash flooding while protecting the health of our waterways and providing an alternative water resource for greening our cities.

Managing stormwater helps respond to the challenges

WSUD can help manage urban heat-island effects. Stormwater can be used to irrigate private and public green spaces, maintain existing water bodies and help keep soil moist, even when there are water restrictions. Green roofs and walls can be irrigated with stormwater, which mitigates urban heat and improves amenity and wellbeing.

Using stormwater conserves drinking water. In the hotter, drier times to come, people will need more water to keep gardens, parks and ovals green. Using more rainwater and stormwater can help conserve the drinking water supply in drier times. IWM and WSUD can capture, treat and reuse stormwater either on-site or at nearby public spaces.

IWM and WSUD can reduce pressure on drainage systems and reduce urban flash flooding. Without measures to limit runoff volumes or upgrade drainage infrastructure, increased runoff volumes will increase flash flooding.

WSUD can make cities and towns more resilient to climate change and reduce the urban heat-island effect.

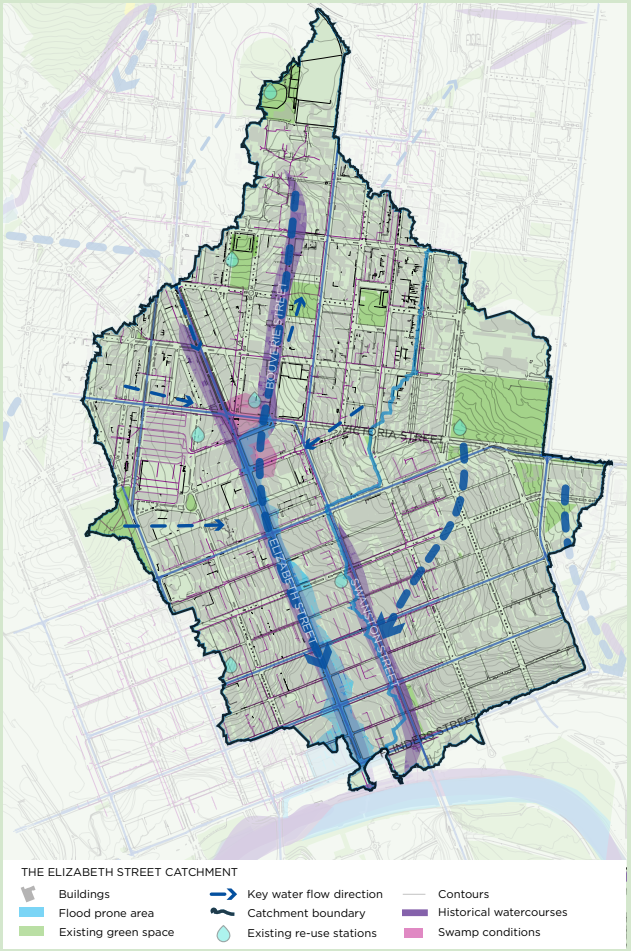
Neville Bowler / Fairfax Syndication
Elizabeth Street in flood, 1972

Case study: Green infrastructure to reduce flooding

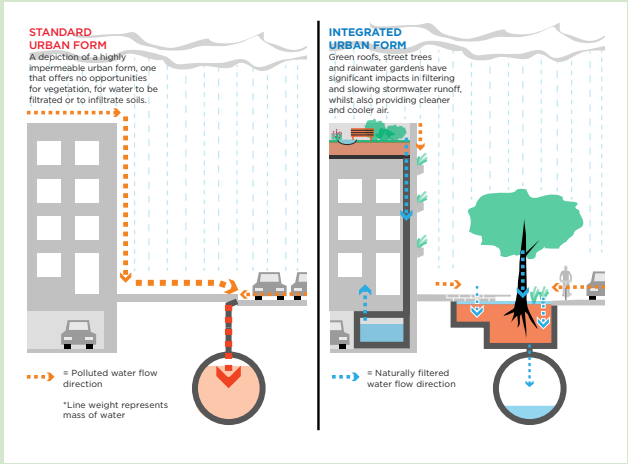
Elizabeth Street Catchment Integrated Water Cycle Management Plan

The Elizabeth Street catchment covers 308 ha. It extends from Melbourne University to Flinders Street Station and is vulnerable to flooding during storm events. Melbourne City Council has developed the Elizabeth Street Catchment Integrated Water Cycle Management Plan, which aims to reduce flooding by containing the stormwater from a 1-in-20-year rainfall event. The plan also aims to increase cooling, open space, permeability, soil moisture and canopy cover; mimic the natural water cycle; improve vegetation health; and provide an alternative water source.

A major project under the plan is the Carlton Squares stormwater harvesting project. The project captures stormwater at the top of the catchment and stores it in tanks under Lincoln and University squares, for use for irrigation of the parks at the squares and at Argyle Square. A sophisticated system using Bureau of Meteorology advance warning of storm events allows the council to purge the tanks, to mitigate the risk of flooding from such an event.



The Elizabeth Street catchment, Melbourne City Council



As well as mitigating flood risk in the catchment, the plan aims to reduce the quantity of polluted water entering the stormwater drainage network during storms and harvest it for irrigation of local parks.

A significant history of investment and practice change

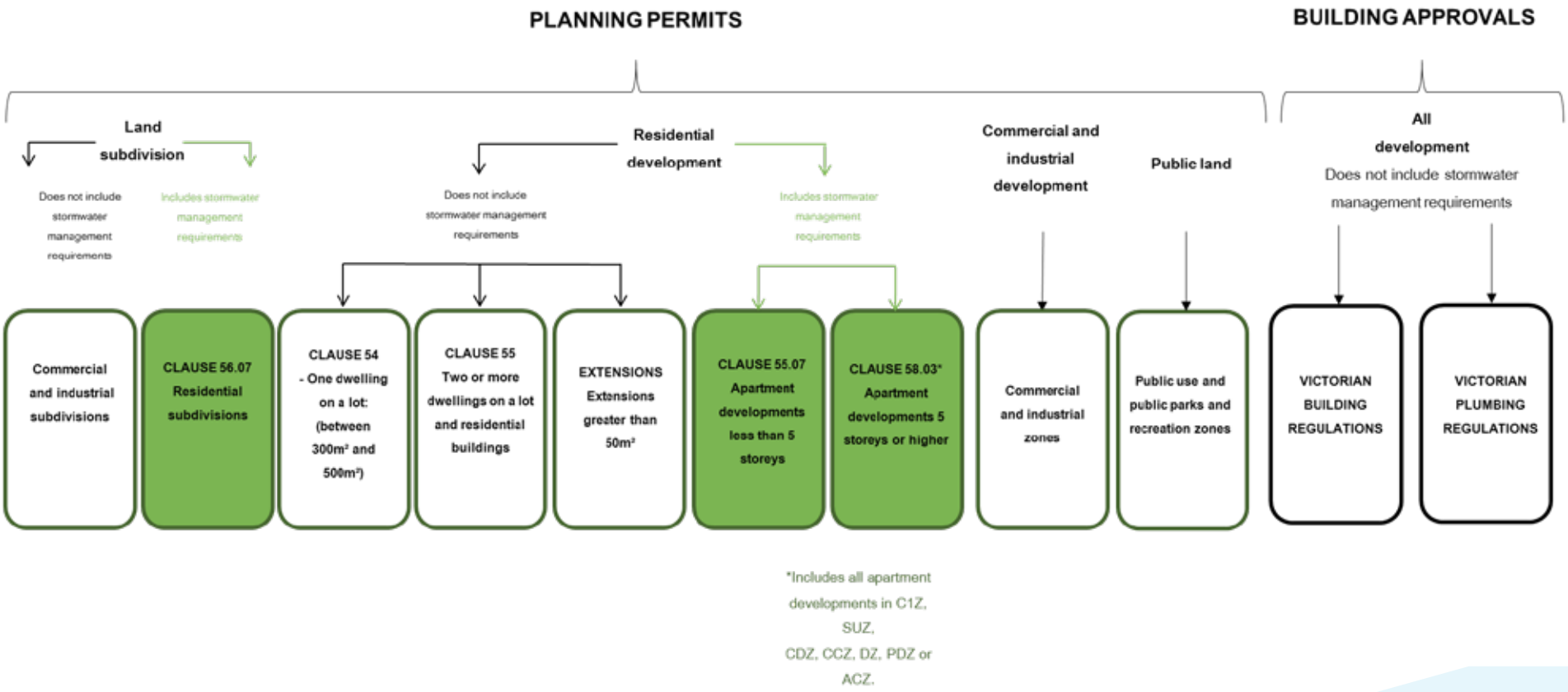
In 1999, the Victorian Stormwater Committee developed the BPEM guidelines, which set out a new approach to stormwater management — WSUD — as an alternative to traditional drainage engineering. The guidelines set out, in Chapter 2, urban stormwater management principles and stormwater performance objectives, the latter setting out percentage reductions (from typical annual urban loads) for nitrogen, phosphorus and total suspended solids, and litter. They also include a flow requirement, rarely applied in practice, to maintain 1.5 year average reoccurrence interval (peak) flows (at pre-development levels). The main intent of the clause is to remove pollutants in urban stormwater.

The state's planning system, through the Victoria Planning Provisions (VPPs), requires some developments to comply with the BPEM stormwater performance objectives, which they do using treatment measures (such as rainwater tanks, wetlands and raingardens). These treatment measures are known as WSUD features or elements.

In 2006, residential subdivisions were required, through Clause 56.07 of the VPPs, to comply with the BPEM stormwater performance objectives. In 2017, apartment developments were also required to start complying with the BPEM stormwater performance objectives.

Figure 2 shows which types of development must comply with the BPEM stormwater performance objectives — shown in the green shaded boxes, with reference to the VPP clause — and those which are not — shown in boxes with no shade. The figure shows that a large proportion of development is not required to comply with the performance objectives. Spatial Economics, a consultancy, predicts that about 60% of the proposed increase in dwellings required to accommodate Melbourne's population growth by 2051 will be accommodated by infill development. That is, the state's stormwater provisions do not currently apply to large areas of land to be developed to support the future growth of Melbourne.

Figure 2: Development types, requirement to comply with BPEM stormwater performance objectives



Victoria has made good progress towards improving stormwater management, and there are long-standing policy commitments by the state and local governments to adopt WSUD and IWM practices.

The Victorian Government is committed to improving stormwater management. The issue is addressed in *Water for Victoria*, the *Yarra River Action Plan*, the *Plan Melbourne Implementation Plan* and the *Port Phillip Bay Environmental Management Plan 2017-2027*, among other plans and strategies. Many of these involve changes to Victoria's planning system, and recent progress to deliver them has been made through initiatives such as the Integrated Water Management Framework for Victoria and the *Better Apartments Design Standards*.

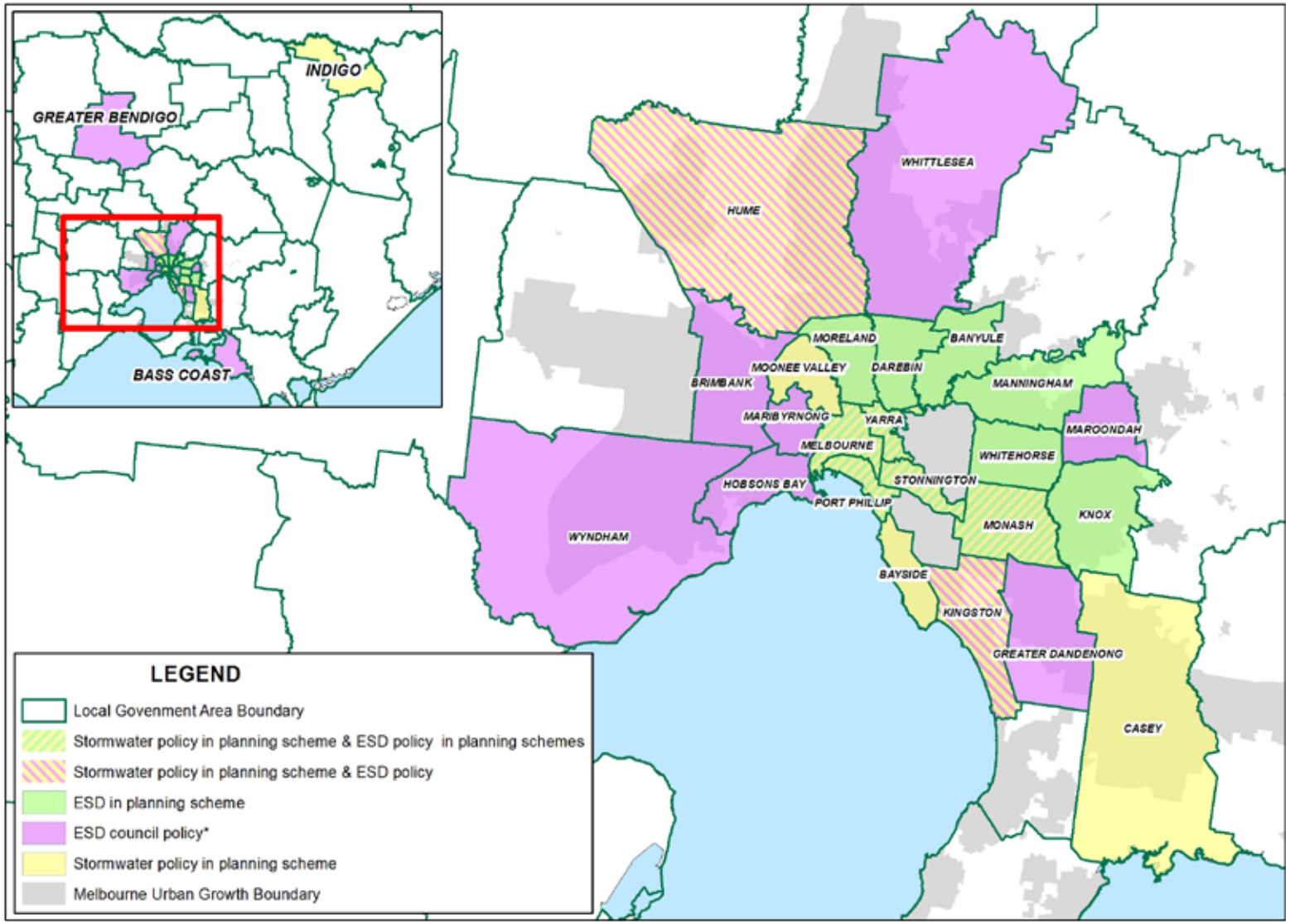
The draft SEPP (Waters) requires all councils to manage stormwater. They can do so with a stormwater management plan or an IWM plan. Councils also have programs and actions to implement WSUD. Successive state governments have invested in supporting councils to implement WSUD and IWM, and they have also invested in research to improve the planning and design of WSUD infrastructure.

Melbourne Water is a leader in WSUD. Melbourne Water is responsible for the health of Melbourne's waterways under Part 10 of the *Water Act 1989*. It makes substantial investments in the health of waterways to meet targets under its *Healthy Waterways Strategy*. It has built WSUD infrastructure (such as wetlands) in built-up and growth areas of Melbourne, and it has run capacity-building and funding programs for councils and developers to help them with WSUD.

Fourteen Melbourne councils and some regional councils have policies that require a broader range of development types to meet the BPEM stormwater performance objectives. These development types include single-dwelling developments, extensions over 50 m^2 and commercial and industrial developments. Figure 3 shows the Victorian local government areas where councils have either amended their local planning schemes (labelled 'Stormwater policies in planning schemes'), or introduced environmentally-sustainable development information requirements (labelled 'ESD policies in practice'), both of which improve stormwater management. Councils with both types of policy are shown with stripes.

Melbourne Water and several councils have introduced stormwater offset schemes to provide developers with greater flexibility in the way they meet stormwater requirements. Melbourne Water's offsets scheme has been operating since 2005. It allows developers to meet part of or all their stormwater quality performance requirements by contributing to works delivered by Melbourne Water. The City of Kingston operates a similar scheme, enabling developers to meet part of or all their performance requirements by contributing to council WSUD works in the public realm.

Figure 3: Councils with stormwater planning scheme amendments or other stormwater policies



Stormwater management policy and regulation are incomplete

Despite the significant policy support for WSUD and advances in WSUD practice, there is still significant variation in the application of standards and a need to refine and strengthen the policy and regulatory framework for stormwater management in Victoria. Best practice in stormwater management and the use of WSUD often depends on the commitment of individuals and organisations, rather than effective policy and regulation, to ensure appropriate practices. Achievement of the government's policy goals is vulnerable to changes in leadership in key organisations and disruption by competing policy agendas.

Victoria needs a statewide approach to stormwater management. The CRC for Water Sensitive Cities has identified that Victoria lacks consistent, clear, statewide regulations to guide future planning and to reduce the dependence on local policy responses. The planning panel considering Amendment C108 (WSUD) to the Moonee Valley Planning Scheme and the Environmentally Efficient Design Advisory Committee both noted that a statewide approach would be better than local planning policy responses. The CRC has also found a statewide policy can accommodate local variations, provided it sets out mandatory requirements and provides decision tools that developers can use to find cost-effective ways to meet the requirements.

Current stormwater management requirements are inconsistent between councils and state policy. This means developers are sometimes unclear about what the requirements are and how they can be complied with, and there is sometimes poor awareness of the policies within councils and inadequate procedures to implement them. Council and development industry stakeholders find the varying stormwater requirements of the state and in the local planning schemes of different councils confusing to comply with and to implement.

Stakeholders want changes to how we manage stormwater in Victoria. Stakeholders' submissions to the committee overwhelmingly support more-extensive, statewide stormwater requirements, especially to address the challenges of climate change and population growth.

Developers want stormwater compliance requirements to be consistent across Victoria, and they also want a reduction in green tape.

The nature of development is also changing over time, with urban renewal contributing a larger proportion and greenfield development a lesser proportion of total development over time. This is eroding the ability of the current requirements to effectively manage stormwater, as they only apply to greenfield developments and apartments.

Despite the significant policy support for WSUD and advances in WSUD practice, there is still a need refine and strengthen the policy and regulatory framework for stormwater management in Victoria.

Case study: Philadelphia's Green City, Clean Waters plan

The Philadelphia Water Department is a stormwater management leader through their Green City, Clean Waters plan, which has greatly improved the health of the city's waterways and reduced the demand on its water supply. Reducing runoff is very important in Philadelphia, which has a combined sewer and stormwater system covering almost two-thirds of the city that is susceptible to overflow from rainfall and snowmelt.

The plan recreates living landscapes to slow, filter and consume rainwater, which reduces water pollution in the city's creeks and rivers. The city measures the plan's progress in 'greened acres', with 1,100 acres greened so far of a planned 9,564 by 2036. The city runs programs and offers grants to encourage residents to install stormwater measures on private properties. For example, its Rain Check program allows people to enter their property details into an online assessment tool to see which stormwater measure best suits them. Then, they go along to a workshop about stormwater management and how their measure will be installed. Finally, an installation is scheduled.

The department also levies a Stormwater Management Service Charge on private properties, based on the area of a property and the average surface area of impervious cover on residential properties throughout the city. It itemises the charge on the property owner's water / sewer bill.

Conclusion

Part A of the committee's terms of reference required it to advise which types of development, of those currently not subject to the state's urban runoff management objectives, should be required to manage their stormwater impacts and how this could be achieved. In preparing its advice, the committee sought to address community concerns, equity considerations and environmental harm.

Part B of the terms of reference required the committee to provide future policy directions on improving stormwater management and strengthening the links between urban water management and the planning and development system more broadly. In preparing to do so, the committee sought directions that were cost-effective and flexible to accommodate future changes in policy, and which avoided complexity, duplication and risk. It also sought to address community views and the underlying causes of harm.

The committee concluded that the policy and regulatory framework for stormwater management and WSUD in Victoria is fragmented and incomplete, and reforms are needed to support the government's priorities to enhance Victoria's liveability, productivity and economic growth.

The committee recommends that the government consider changing the VPPs to establish consistent stormwater planning requirements across all development types. These changes are detailed in the recommendations under 'Planning reforms' in the Recommendations section of this report.

The committee also considers that improving stormwater management in a way that is effective and efficient requires policy changes that go beyond changes to the VPPs and Planning Policy Framework (PPF). It recommends a more-comprehensive suite of actions to complement and enhance changes to the planning system. These include, and are detailed in the recommendations under 'Future policy directions' in the Recommendations section:

- amending building and plumbing controls
- establishing effective offsetting arrangements
- clarifying the roles and responsibilities of local governments and water authorities
- strengthening compliance requirements
- determining funding sources for public stormwater infrastructure
- linking water management with urban planning
- setting stronger, place-based BPEM stormwater performance objectives.

The committee also makes recommendations to support the practice changes needed to implement these reforms (such as investing in better guidance, tools, training and capacity-building). These recommendations are under 'Supporting actions' in the Recommendations section.

Recommendations

Planning reforms

Recommendations 1 & 2 – Expand the stormwater planning provisions

Recommendation 1 – That the Victorian Government expand the stormwater planning provisions (phase 1): Amend the VPPs to expand the current stormwater management requirements to:

- commercial subdivisions and developments
- industrial subdivisions and developments
- public use developments
- multi-dwelling residential subdivisions and developments.

Recommendation 2 – Expand the stormwater planning provisions (phase 2): That, subject to further consultation, the development of deemed-to-satisfy solutions (rec. 12), adequate guidance and tools (recs 13, 14 and 15) and offset processes (rec. 5), the Victorian Government amend the VPPs to expand the current stormwater management requirements to:

- single-dwelling developments
- extensions over 50 m^2.

The issues

The VPP stormwater management requirements only apply to residential subdivisions and, since 2017, apartments. Commercial and industrial developments and a large proportion of infill development are not required to comply with the BPEM stormwater performance objectives.

This situation is inequitable. For example, under the current stormwater requirements:

- people building houses in Melbourne's growth areas must invest in stormwater management, whereas this is not required of industrial or commercial developments or most residential developments in existing suburbs
- government developments on public land are exempt
- compliance requirements for road managers and other infrastructure managers are unclear, as they are not subject to the VPPs.

Spatial Economics, a consultancy, predicts that about 60% of the proposed increase in dwellings required to accommodate Melbourne's population growth by 2051 will be accommodated by infill development. That is, the state's stormwater provisions do not capture large areas of land to be developed to support the future growth of Melbourne.

Industrial and commercial developments are not required to manage stormwater. These developments are currently not obliged to either provide a minimal permeable area nor meet the BPEM stormwater performance objectives, although they typically have large, impervious areas that generate large stormwater flows. Also, stormwater from these developments often contains pollutants, which can seriously harm the health of waterways and bays.

The recommendations will improve the consistency, equity and effectiveness of planning scheme requirements for stormwater management. Consultation indicated widespread support for more-consistent, statewide stormwater standards for a broader range of development types.

Application

The recommended (immediate- and longer-term) changes to the VPPs will require almost all types of development that require planning approval to meet the BPEM stormwater performance objectives. The changes will apply to subdivisions and developments not already covered including all Commercial, Industrial, Public Use, Public Park and Recreation, Special Use, Comprehensive Development, Priority Development, Capital City, Docklands, Urban Growth and Activity Centre zones and multi-dwelling developments (such as townhouses).

Exemptions and local variations

The recommended changes to the VPPs have exemptions. They are:

- any approved development plan, precinct structure plan, structure plan, permit or associated amendment, or an application lodged before any such amendment
- any application relating to a dwelling where a permit for subdivision has been approved that was assessed against Clause 53.16 or the IWM requirement of Clause 56
- any application for subdivision where the permit for the buildings and works was assessed against the IWM requirements of clauses 53.16, 55, 56 or 58.

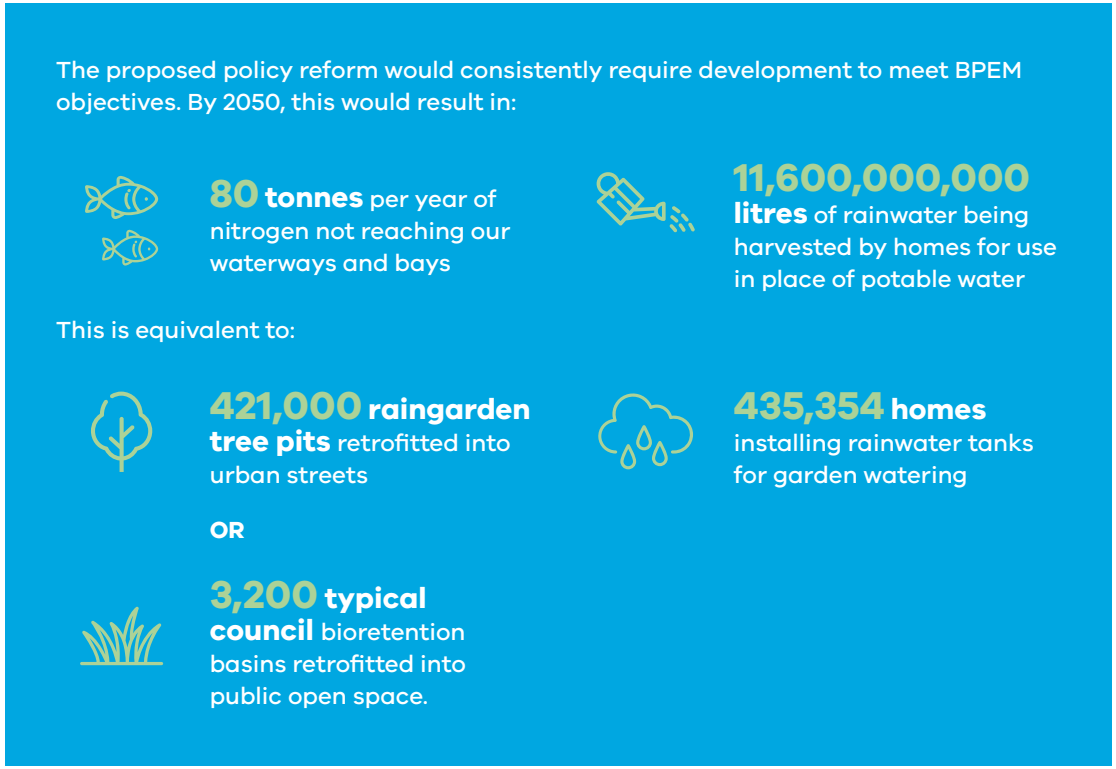
Effects of recommendation 1

The committee analysed the impacts of the recommended changes to the VPPs to inform the development of recommendation 1. The analysis indicated the recommended changes will:

- increase the total urban area in Victoria which will comply with the BPEM stormwater performance objectives by over 12,000 ha by 2050
- enable 11.6 GL a year of urban water demand to be substituted with stormwater by 2050
- abate up to 3.6 T of total nitrogen a year in 2020, increasing to 80 T by 2050.

Figure 4 shows these and other effects diagrammatically.

Figure 4: Effects of recommendation 1



Rationale for recommendation 2

Several actions need to occur before extending BPEM stormwater performance objectives to single dwellings and extensions over 50 m^2.

Due to time constraints, the committee could not resolve some issues with extending the requirements including that only single dwellings and extensions on small (<500 m^2) lots require planning approval, and expanding the requirements to these development types would affect homeowners, who could not be adequately consulted about the recommended changes due to time constraints. As it is impractical to include stormwater management measures on some of these sites, owners are likely to opt for offsets (instead of meeting the requirements on-site). Further work is needed to refine and streamline offsetting arrangements, so the recommendation can be implemented without unreasonably burdening councils or delaying permit applications.

For these reasons, the committee recommends that, before expanding the requirements to single dwellings and extensions:

- there be further consultation
- deemed-to-satisfy solutions be developed (rec. 12)
- adequate guidance, skills and tools be developed (recs 13, 14 and 15)
- offset processes be refined and streamlined (rec. 5).

Several councils were concerned about the recommended changes to the VPPs affecting their local planning controls for stormwater management. The committee is confident the effect will be minimal: the immediate (rec. 1) and longer-term (rec. 2) changes to the provisions will apply to the same properties as do the current local controls, and the requirements will be the same. Also, the Smart Planning Program will seek to align local planning schemes with the VPPs.

Recommendation 3 – Insert an IWM clause into the PPF

Recommendation 3 – Insert an IWM clause into the Planning Policy Framework (PPF): That the Victorian Government amend the PPF to embed the concepts of IWM objectives and strategies.

The PPF currently does not adequately reflect contemporary approaches and government policy relating to IWM and planning. It makes many references to the need to address the environmental impacts of stormwater and water reuse, but it is not clear about the need for IWM. An IWM clause in the PPF will help to ensure that growth and development in Victoria take an IWM approach.

The recommended clause will consolidate three existing water-related PPF clauses (stormwater, water supply, sewerage and drainage and water conservation) into an IWM clause, which will help simplify the PPF and facilitate a more-integrated approach.

Future policy directions

Recommendation 4 – Amend the building and plumbing controls

Recommendation 4 – Amend the building and plumbing controls: That DELWP progress, through a regulatory impact statement, amendments to the Victorian variation to the Building Code of Australia and supporting regulations, to ensure that consistent stormwater requirements are applied to all development types.

Incorporating stormwater management requirements into Victorian building and plumbing controls is critical to ensuring consistent coverage. Many stakeholders advocated for building and plumbing controls to ensure residential developments comply with a minimum stormwater standard. Generally, residential developments, particularly of single dwellings on lots above 500 m^2, don't require planning approval and therefore will not be subject to stormwater management requirements included in the VPPs. However, as most developments require a building permit, incorporating stormwater management requirements into Victorian building and plumbing regulations will ensure more-consistent coverage than relying on the planning provisions alone.

A cost-effective, practical way to comply with the BPEM stormwater performance objectives at the lot scale is by using rainwater tanks. All new homes and home extensions in Victoria are required (through a Victorian variation to the Building Code of Australia) to comply with the 6 Star Standard. This standard requires installation of either a solar hot water system or a 2,000 L rainwater tank (from at least 50 m^2 of the roof area) for toilet flushing or connection to recycled water.

The 6 Star Standard for a 2,000 L tank plumbed to a toilet and the garden could form part of a deemed-to-satisfy solution to comply with the BPEM stormwater performance objectives implemented through the building regulations. This would not require a unique design solution or assessment by approval authorities: these would only be needed if the property owner proposed an alternative solution to the deemed-to-satisfy solution. The deemed-to-satisfy solution could be complemented by putting in place offset schemes as an alternative to meeting part of or all the required standard on-site (rec. 5).

During the Millennium Drought, about 60% of homeowners chose to meet the standard by installing a rainwater tank. This has since fallen to 18% of residential developments.

Implementation

A regulatory impact statement will be needed to test the merits of changing the building and plumbing regulations. Should IWM requirements be included in the building and plumbing regulations, planning scheme provisions should then be reviewed to identify and address any duplication.

Recommendation 5 – Establish effective offsetting arrangements

Recommendation 5 – Establish effective offsetting arrangements: That DELWP investigate establishing voluntary stormwater quality offset schemes across Victoria in major metropolitan and regional centres that:

- allow developers and owners to meet stormwater quality obligations off-site rather than on-site
- enable local governments, Melbourne Water and other water corporations to provide off-site stormwater solutions
- establish cost-effective arrangements that achieve statewide and local benefits
- tie payments to off-site stormwater management infrastructure that delivers the same or better environmental outcomes than on-site infrastructure.

Parts of Victoria already have long-established, successful stormwater offset schemes. Under these schemes, developers pay a financial contribution towards stormwater management works in another location: these works offset the impacts of stormwater not treated in their development. In some situations, stormwater management on-site can be less efficient, more difficult to construct and more difficult to maintain than off-site management. Incorrect siting or poor construction of on-site stormwater management measures can result in poorly performing stormwater management infrastructure that is difficult to maintain or rehabilitate.

Victoria does not have a state-based stormwater offsets framework. However, the use of offsets aligns with Victorian policy. The draft SEPP (Waters) includes a policy principle that environmental goals for Victoria's surface waters should be pursued in the most cost-effective way, including by establishing incentive structures (such as market mechanisms) that enable those best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems. Melbourne Water's *Stormwater Strategy* supports appropriate, cost-effective stormwater management projects and initiatives that achieve multiple outcomes for the community. Victoria's *Precinct Structure Planning Guidelines* support policies that respond to climate change and increase environmental sustainability, including protecting waterways and ecologically-significant areas on-site or off-site.

Melbourne Water's Stormwater Offsets Program is widely used and accepted by industry. The scheme enables developments that can't be serviced by its infrastructure (such as stormwater treatment wetlands) to pay a fee, which contributes to treatment works elsewhere in the catchment to offset the development's untreated stormwater. The offset fee is based on a dollar amount per kilogram of nitrogen. The Essential Services Commission regulates the scheme, which has operated since 2005. Councils can also collect offset contributions from developers under voluntary arrangements with Melbourne Water. VicRoads has also paid offset contributions to Melbourne Water under a voluntary agreement to offset the stormwater impacts of major road projects.

A growing number of Victorian councils including Geelong, Kingston, Melbourne and Moonee Valley have or are introducing stormwater offsets schemes. These schemes allow developers and property owners to pay a fee to the council instead of meeting some or all of their development requirements on-site. The council then uses these funds to invest in public stormwater infrastructure. Other councils are interested in using stormwater offsets, particularly if they can build relatively low-cost public stormwater infrastructure that adds value to public areas.

Some members of the Local Government Infrastructure Design Association also allow developers to make a cash contribution equal to the value of works they would be required to construct. This type of scheme operates outside the planning system through individual agreements between councils and developers. Many councils require developers to enter into Section 173 agreements for the design and maintenance of stormwater management infrastructure.

Image: Cooperative Research Centre for Water Sensitive Cities

Some stakeholders are concerned that offsets can give developers a 'right to pollute' by encouraging poor environmental management practices. However, the committee considers that well-designed stormwater offsetting mechanisms can provide developers and councils with greater flexibility and can lead to more-effective and more-efficient stormwater management outcomes than on-site measures alone.

Without stormwater offsets being more-widely available across the state, full on-site compliance with stormwater quality requirements will not always be possible, it will be less cost-efficient, and it may result in poorly performing stormwater management infrastructure on-site. The committee considers that expanding Victorian stormwater offset schemes can provide the flexibility and economic efficiency of incentive-based schemes and deliver better outcomes for developers and Victorians.

Implementation

An offsets framework should be flexible, to accommodate local variations. A statewide framework will allow for a common approach, to ensure consistency across Victoria, while allowing for local variations. This common approach should draw on existing, successful stormwater quality offset schemes.

To best deliver the recommended changes to the VPPs, stormwater quality offsets should:

- be administered by local governments, Melbourne Water or other water corporations
- not remove or reduce an eligible developer's obligation to meet BPEM stormwater performance objectives
- not undermine on-site compliance with BPEM stormwater performance objectives, where on-site compliance is appropriate
- be voluntary: developers should be free to choose whether they want to comply with all the BPEM stormwater performance objectives on-site, or comply with all the requirements through an offset contribution, or a combination of both
- allow responsible authorities to require minimum on-site compliance where appropriate
- recover from developers the full asset lifecycle costs incurred by the offset provider
- tie the fees collected to deliver equal or better stormwater quality outcomes than those of on-site management allow for future changes in Victorian stormwater, waterway or catchment management policy, legislation and regulation
- be designed with community input
- publicly report what offset fees have been collected and the type and performance of the infrastructure constructed, in a way the community understands and can easily access.

Recommendation 6 – Clarify local governments' roles and responsibilities

Recommendation 6 – Clarify local governments' roles and responsibilities: That DELWP investigate opportunities to clarify councils' stormwater management functions in legislation (such as in the Local Government Act 1989 or the Water Act 1989).

Local governments' stormwater management role is not clearly defined in legislation. The Local Government Bill 2018, which resulted from the review of the *Local Government Act 1989*, does not refer to a councils' drainage responsibilities. This function will be 'saved' in the *Local Government Act 1989*. Relevant legislation and policy includes:

- the *Water Act 1989*, which sets out regional drainage functions that apply to Melbourne Water as the waterways manager
- the draft SEPP (Waters), which requires councils to continue to prepare and implement stormwater management plans
- the *Local Government Act 1989*, which vests ownership of public sewers and drains in councils and gives them powers to manage and control this infrastructure.

There has been progress on clarifying responsibilities for urban stormwater management in Melbourne. DELWP, in partnership with the MAV and Melbourne Water, is leading the Melbourne Urban Stormwater Institutional Arrangements Review between Melbourne Water and 38 Melbourne metropolitan councils. The review will clarify responsibilities for managing urban stormwater in the Melbourne metropolitan area, including whether the current 60 ha catchment boundary convention is the best way to allocate responsibilities between Melbourne Water and local governments. While the review will clarify responsibilities, councils' stormwater management responsibilities should be clear in legislation.

Recommendation 7 – Strengthen compliance requirements

Recommendation 7 – Strengthen compliance requirements: That the Victorian Government examine using the provisions of the Environment Protection Act 2018 to establish clear, enforceable obligations on land and infrastructure (such as roads) managers.

Victoria's land and infrastructure managers do not have clear compliance obligations for stormwater management. Roads comprise about 20% of greater Melbourne's impervious surfaces and so generate very large volumes of stormwater and pollution loads. Melbourne Water is the regional drainage authority for the 13,000 km^2 Port Phillip and Westernport catchment, and it manages nearly 2,000 km of major drains. Local government manages over 25,000 km of minor drains. Water authorities operate extensive sewerage system networks and are increasingly using IWM approaches to make greater use of rainwater and stormwater.

Road and other infrastructure managers (such as Melbourne Water, local governments and water authorities) do not have sufficiently clear and enforceable compliance obligations to manage both stormwater and stormwater infrastructure to protect the environment and liveability of Victoria. There is no system of auditing and reporting on the performance of Melbourne Water, local governments and other infrastructure managers in meeting environmental obligations for stormwater management.

The amended *Environment Protection Act 2018* includes a general environmental duty to minimise, so far as is reasonably practicable, risks of harm to human health and the environment from pollution and waste. A range of measures, from guidance to regulations, can be used to discharge the duty. For example, the general environmental duty could require better stormwater management. This could be achieved through regulations prescribing performance objectives for large-scale operations or new developments, or through guidance and support for small

businesses and homeowners to adopt suitable technologies and behaviours.

Under the Act, obligations can be imposed on land and infrastructure managers to manage environmental risks including stormwater. For stormwater, this could require regional or catchment standards or the coordinated development and implementation of stormwater or IWM plans by local governments, water corporations, catchment management authorities, road managers, developers and others.

Implementation

DELWP should work with the EPA, local governments, water authorities and road authorities to establish clear and enforceable compliance requirements, to ensure stormwater is managed to protect the environment and liveability of Victoria.

Recommendation 8 – Determine funding sources for public stormwater infrastructure

Recommendation 8 – Determine funding sources for public stormwater infrastructure: That DELWP work with councils, Melbourne Water and the Victorian Planning Authority to determine appropriate funding sources for managing and maintaining stormwater infrastructure.

Councils rely on general revenue streams and do not have a dedicated revenue source for constructing, operating and maintaining stormwater infrastructure.

Stormwater infrastructure in new developments is either constructed by the developer or funded through financial contributions to Melbourne Water development services schemes or through infrastructure contribution plans established by the Victorian Planning Authority. Ongoing operating and maintenance costs and the costs of infrastructure upgrades and replacement are funded from general rates.

A perceived lack of funding can be a serious barrier to implementing WSUD to protect the environment and liveability. It can encourage councils to avoid or minimise costs, which can mean passing problems downstream to the next council or polluting waterway or coastal environments.

The Melbourne Urban Stormwater Institutional Arrangements Review provides an opportunity to examine how public stormwater infrastructure is funded (including cost-sharing arrangements) and the use of offsets, market incentives and service charges (as provided for under the Local Government Bill 2018).

Recommendation 9 – Link water management with urban planning

Recommendation 9 – Link water management with urban planning: That DELWP consider changing the VPPs to include linkages with IWM plans (when developed), to ensure new developments within these plans are designed to deliver IWM-servicing solutions.

The planning system needs to link with IWM plans, to guide local IWM-related outcomes. Many stakeholders said the planning system is critical for implementing IWM plans. This would enable better coordination of planning and service providers, to support the delivery of IWM infrastructure and services for new communities. A coordinated approach to IWM planning will also improve the consistency of responses by service providers, which will support the prompt delivery of infrastructure and services suited to local conditions.

The IWM forums recently established by the Minister for Water recommend that IWM plans be developed at the catchment or subcatchment scale. Linking these IWM plans when completed to the planning system will provide a means of implementing agreed approaches to IWM (such as protecting priority waterways from stormwater impacts and alternative water management schemes) early in the planning process.

Implementation

Elements of IWM plans that rely on the planning system for successful implementation include:

- requirements to connect to regional or precinct-scale alternative water supply or wastewater management schemes
- flood-management requirements (such as tanks or other forms of on-site detention) to protect downstream areas prone to flooding
- waterway corridor protection requirements (buffers)
- green spaces and green infrastructure requirements
- streetscape or subcatchment-scale requirements (such as raingardens and wetlands).

Recommendation 10 – Set stronger, place-based BPEM stormwater performance objectives

Recommendation 10 – Set stronger, place-based BPEM stormwater performance objectives: That the EPA consider place-based, and flow, stormwater performance objectives as part of its current review of the BPEM, to protect the ecological health of sensitive downstream waterways and bays, enhance amenity and recreational values and reduce flooding.

The current BPEM stormwater performance objectives are 20 years old. The EPA plans to review and update them in 2019. The review is likely to identify the need for more-specific, place-based standards to reflect local waterway values and sensitivity to urban stormwater disturbance. Melbourne Water's draft *Healthy Waterways Strategy* proposes new, flow-based objectives for stormwater management, particularly for catchments where waterway environments are vulnerable to urban development.

The committee supports developing new BPEM standards to achieve government policy goals to protect the ecological health of sensitive waterways and bays, to enhance amenity and recreational values and to reduce flood risks.

Supporting actions

Recommendation 11 – Strengthen enforcement of stormwater construction requirements

Recommendation 11 – Strengthen enforcement of stormwater construction requirements: That:

- the EPA, DELWP and local governments work together to develop an effective enforcement program to lift the standard of construction site management in Victoria
- the EPA and Melbourne Water review their guidance about construction techniques for sediment and pollution control for larger developments, to make them up-to-date and enforceable.

Poorly managed construction sites can generate significant loads of sediment, litter and other pollutants that damage waterways. The committee heard from many stakeholders who were concerned that common site-management standards for pollution prevention were not being implemented or enforced on Victorian construction sites.

Councils and Melbourne Water often include a condition on planning permits that requires developers to submit site environmental (or construction) management plans detailing how they will manage sediment, erosion, dust, litter and runoff before and during construction. The EPA, Melbourne Water and some councils also provide best-practice guidance.

Recommendation 12 – Prepare deemed-to-satisfy solutions

Recommendation 12 – Prepare deemed-to-satisfy solutions: That DELWP prepare deemed-to-satisfy solutions for typical development types.

There are standard types of developments across urban Victoria for which a set of deemed-to-satisfy stormwater management solutions could be useful. The benefit of deemed-to-satisfy solutions is that they can eliminate the need for onerous design, assessment and approval processes and reduce complexity and delays.

Rainwater tanks are a good example of a potential deemed-to-satisfy solution. They can be a practical, cost-effective way to comply with the BPEM stormwater performance objectives for many development types.

Recommendation 13 – Review the STORM and MUSIC tools

Recommendation 13 – Review the STORM and MUSIC tools: That DELWP review current funding and governance arrangements for the STORM and MUSIC modelling tools to ensure adequate investment in updating and maintaining the tools to meet industry needs in Victoria.

There are two main tools to determine compliance with the BPEM stormwater performance objectives. They are the STORM tool (for use by the general public and professionals alike) and eWater's MUSIC tool (best suited to larger developments and more-complex stormwater management solutions).

Stakeholders find the STORM tool to be very useful, but they want it upgraded. The tool cannot model all the stormwater treatment technologies currently in use or model non-residential developments. It also needs clearer hosting and governance arrangements, to ensure it is supported in the longer term.

The MUSIC stormwater modelling tool is widely used by the development industry and state and local governments. It has been a major factor in the successful adoption of WSUD. However, some stakeholders questioned whether it adequately reflects current science and practice. It needs an upgrade and ongoing investment to maintain it into the future. Like the STORM tool, it also needs clearer hosting and governance arrangements.

Recommendation 14 – Build technical expertise

Recommendation 14 – Build technical expertise: That the Victorian Government support the development and provision of training to build the capacity of councils and stakeholders to implement the recommended changes to the VPPs.

Victoria's stormwater planning requirements are more than ten years old, and many councils have a solid basis of skills to design, build and maintain WSUD infrastructure. However, levels of implementation and compliance vary significantly across council areas. While many councils are successfully implementing Clause 56.07 of the VPPs, the continuing successful roll-out of BPEM stormwater standards needs active support, especially in regional areas.

Implementation

Training could be provided through third parties such as through the existing Clearwater capacity-building partnership hosted by Melbourne Water, through the PLANET program (which is administered by the Planning Institute of Australia) or through the Victorian Planning & Environmental Law Association.

Recommendation 15 – Improve guidance

Recommendation 15 – Improve guidance: That DELWP revise guidance material about IWM to support implementation of the recommended changes to the VPPs.

For more than 15 years, there has been much investment to support implementation of the BPEM stormwater performance objectives. This includes investment in WSUD technology, modelling tools, training and manuals and guidelines for the design, construction and maintenance of WSUD.

The Clearwater capacity-building program has operated since 2004. The program was originally established by local governments and industry, with state government support. Many councils are participants in and provide funding for the CRC for Water Sensitive Cities, based at Monash University. Some 44 regional and rural councils in Victoria are participants in the Local Government Infrastructure Design Association, and the association updated its *Infrastructure Design Manual* in 2018 to include detailed requirements and standards for the design and development of WSUD infrastructure.

However, WSUD is still a developing field of practice. There continues to be strong demand for guidance about designing stormwater management infrastructure and WSUD, particularly for potable water substitution and urban greening.

Recommendation 16 – Improve awareness of the VPP changes

Recommendation 16 – Improve awareness of the VPP changes: That DELWP promote awareness of changes to the VPPs to the general public and the building and development industries.

Some smaller developers and the general community do not have a good understanding of the need for stormwater management standards and implementation requirements. This can lead to inefficiencies and delays.

Implementation

The current Clause 56 and IWM practice notes should be refreshed to provide:

- advice about how to achieve the benefits of WSUD
- best-practice examples about how to integrate across scales
- information about the role of the Victorian Government, water corporations and councils in setting and implementing policy
- advice about requirements for consultation with agencies and developers
- references, sources of advice and case studies (such as Melbourne Water publications and information about Clearwater services).

Recommendation 17 – Investigate options for rainwater tank maintenance and operation

Recommendation 17 – Investigate options for rainwater tank maintenance and operation: That DELWP investigate options for improving the maintenance and operation of rainwater tanks.

Householders may need support maintaining and operating rainwater tanks. Tanks are relatively simple, low-risk and easy to service, but the reliability and performance of tank systems would be improved if water corporations or other providers could assist with their operation and maintenance. South East Water will maintain water-saving features and on-site infrastructure including rainwater tanks as part of the Aquarevo development at Lyndhurst.

With widespread take-up of on-site rainwater tanks to comply with the BPEM stormwater performance objectives, water corporations and others could consider offering services to maintain these systems for property owners.

Recommendation 18 – Broaden rating systems to include IWM

Recommendation 18 – Broaden rating systems to include IWM: That DELWP examine broadening the Victorian Energy Efficiency Scorecard or other building and development rating systems to include IWM elements (such as stormwater management and water efficiency).

There are some building and other development rating systems that assess the sustainability of new developments. They include the Victorian Government's Residential Efficiency Scorecard and Enviro Developer, operated by the Urban Development Institute of Australia. These rating systems help build awareness about the benefits of technologies (such as WSUD), and they inform people's choices. Current rating systems provide little information about the WSUD or IWM features of a development and their benefits.