



‘Water for Bayside’

Integrated Water Management Plan 2019-2039

Table of Contents

PART A.....	3
1. Executive Summary	3
Introduction	3
Key issues and findings	3
Vision statement	4
Goals	4
Objectives and Actions	5
2. Action Plan	7
PART B.....	16
3. Purpose.....	16
4. Policy Context	16
4.1 Council’s Strategic Planning Framework	16
4.2 Council Plan 2017-21.....	16
4.3 Environmental Sustainability Framework	17
4.4 ESF Action Plan 2019 –2023.....	18
4.5 Integrated Water Management Forum Strategic Directions Statement	18
4.6 Policy Summary	19
4.6.1 Bayside Documents	19
4.6.2 State Sector Documents	21
5. Methodology	22
5.1 Rationale.....	22
5.2 Development.....	22
5.3 Strategy Review.....	23
5.4 IWM Opportunities Assessment.....	23
5.5 Dandenong Catchment IWM Forum Engagement	24
5.6 Community Engagement	24
6. Key findings.....	25
7. Objectives	25
8. Implementation and reporting.....	28
Appendix A – Water and Pollutant Balance for Bayside	29
Appendix B – 20 Year Capital Works Program for Stormwater..	32

PART A.

1. Executive Summary

Introduction

Integrated Water Management is a collaborative approach to water planning and management that brings together all aspects of the water cycle. It can provide greater value to communities by identifying and leveraging opportunities to optimise water-related outcomes.

Bayside City Council has developed the Integrated Water Management Plan 2019-2039, called '*Water for Bayside*', to provide clear direction to deliver high priority Integrated Water Management (IWM) and Water Sensitive Urban Design (WSUD) activities. The IWM Plan will also provide direction to make stormwater management a core business activity.

'*Water for Bayside*' outlines a 20 year action plan including flood storage, stormwater harvesting and stormwater treatment projects.

Key issues and findings

The key premise of Water for Bayside is that effective Integrated Water Management can enhance Bayside's liveability.

The following key issues in relation to IWM have been identified and addressed through the development of Water for Bayside.

- Water plays a vital role in the serviceability of sportsground surfaces and Council is required to increase the use of water during periods of drought to maintain serviceability of sportsground surfaces, as experienced in the late 2000's and over the 2018/19 summer and Autumn period.
- A long-term program to implement IWM initiatives needs to be resourced and funded;
- The scope of currently effective planning mechanisms to manage stormwater quality and quantity, through on-site detention requirements in developments, can be investigated to see include further water quality improvement measures can be included.
- Council needs to collaborate and influence to manage stormwater and improve the health of Port Phillip Bay;
- Stormwater assets require long-term asset management to be continuously effective;
- Technical capability needs to be developed within the organisation to embed IWM as a core service; and
- Information on water and flooding changes and needs to be periodically updated to maintain relevance.

Vision statement

Council's Environmental Commitment is stated in its Environmental Sustainability Framework 2016-25:

Bayside City Council is going to safeguard the environment for current and future generations. We will do this by making decisions based on the best available evidence and our learning. We will make sustainable decisions that deliver balanced economic, social and environmental benefits.

Bayside City Council's environmental commitment is to:

- Work in partnership and build strong relationships with our community, government agencies, community organisations and businesses.
- Minimise Council's own ecological footprint
- Advocate for outcomes that deliver high environmental standards and protection.
- Engage with and build the capacity of the community to care for the environment and minimise their own ecological footprint
- Lead by example and demonstrate our commitment to environmental sustainability
- Use Council's legislated and regulatory authority to deliver required standard of environmental outcomes and protection

Goals

Water for Bayside has four goals which reflect the aspirations of the community and will contribute to Council's vision for Integrated Water Management.

The goals of *Water for Bayside* are:

Goal 1: Investigate and identify how water can best be managed and used to enhance Bayside's liveability.

Council has a limited role as an integrated water manager, with direct responsibility for the local drainage and stormwater system, but not water supply, sewerage services or groundwater management. Therefore Council needs to collaborate with other authorities to determine how best to improve liveability for its residents.

For example, managing the extent of flooding from the local drainage system and its alleviation requires collaboration and alignment with other organisations in the catchment, to deliver actions that enhance liveability.

Goal 2: •Improve the health of Port Phillip Bay and waterways through a reduction in stormwater volumes and pollutant loads..

Council manages the recreation and amenity of these natural environmental assets, especially along the Bay foreshore and also Elster Creek. Although Council does not have a direct responsibility for managing these receiving waters, it does manage local roads, nature strips, open space, car parks and public buildings from which

these environments receive stormwater. Council therefore has a vital interest in the health of the Bay and any negative impacts on recreation provision.¹

Goal 3: Preserve potable water supplies

Drinking water, is the most precious of all water sources. As a responsible customer with commitment to sustainable procurement, resource conservation and sound financial management, Council should support a social imperative to preserve drinking water supplies. Increasing the use of stormwater preserves potable water for drinking.

Goal 4 Increase the use of stormwater in Council's reserves

Council has a stated target to reduce potable water use to less than 220,000 kilolitres annually for the irrigation of open space (Council Plan 2017-21), as well as actions to reduce the use of potable water and substitution with alternative water. *Water for Bayside* examines a number of opportunities where stormwater harvesting can achieve substitution of potable water to irrigate open space.

Addressing these goals, along with greater collaboration across Council departments and greater capacity to consider water within the design of Council projects, will enable Bayside to more fully realise IWM opportunities.

Integrated Water Management can help to re-frame services delivered by Council, with significant benefits in further improving Bayside's liveability.

Objectives and Actions

The objectives and actions to achieve these goals are set out in the Action Plan. The issue addressed by each objective is explained below.

Objective 1) Review planning mechanisms to manage stormwater quantity and quality from new development and re-development

The most fundamental issue for stormwater is the extent to which management of its quantity and quality is sufficiently adequate to ensure protection of receiving waters such as Port Phillip Bay.

Quantity management is important as the greater the quantity, the more likely the comprehensive transport of urban pollutants. Quantity management is also critical to the performance of Council's functions as a drainage and flood manager.

Objective 2) Infrastructure Program to Improve Stormwater Quality

Funding constraints can limit the implementation of works or initiatives. A consistent long-term program requires investigation of ongoing funding mechanisms. An ongoing source of funding will be required to implement the program of works.

¹ Bayside's Community Plan (2016-2025) underlines the importance of the Bay. It contains a statement that "*Bayside's beaches and foreshores are the most valued environmental asset, with their protection and maintenance a first order priority* (Bayside Community Plan).

Objective 3) Extend Council's Influence in Stormwater Management

While council is responsible for stormwater run-off from at least 25%² of Bayside's surface area, the opportunity to manage stormwater within that area is limited³. To manage the stormwater, especially the pollutant load⁴, Council needs to extend its influence and engage other landowners.

Objective 4) Improve Stormwater Asset Management

While asset management practices are sound, stormwater management projects need to be included on Bayside's asset register, so that their maintenance and renewal regimes are defined and resourced.

Objective 5) Foster Technical Capability to Sustain Stormwater Management as a Core Service

Like funding, technical capacity is required to effectively deliver an annual stormwater management program. Specialist stormwater expertise will be required on an ongoing basis. These extend beyond capital works delivery skills to monitoring capability and understanding of maintenance requirements. Currently, specific skills in stormwater management at Bayside are limited.

Objective 6) Revise Environmental Sustainability Framework Targets for Stormwater

Targets for stormwater set in the ESF have been reviewed with current information and will be periodically revised to ensure they remain relevant and achievable.

Objective 7) Update Flood Mapping and Document Status

Policy and Strategy documents need to reference up-to-date information, especially in planning.

Objective 8) Reduce Potable Water Demand to Maintain Sportsgrounds

Reduce potable water demand for sportsground irrigation.

² It has been estimated that roads cover 15% of Bayside (DesignFlow, 2016, p. 27). The vast majority of these are managed by council. When footpaths, open space, car parks, council building and other assets are added, a total of around 25% is arrived at.

³ The stormwater harvesting projects proposed for reserves in *Water for Bayside* will only remove 4.2% of the total suspended solids produced annually.

⁴ The estimate of the pollutant load discharged from Bayside is: total suspended solids 1,409,000kg/yr; total phosphorous 3,190kg/yr; and total nitrogen 23,280kg/yr. (DesignFlow, 2016, p. 24).

2. Action Plan

The Action Plan is presented below, focused around the four key goals. The actions have a nominated timeframe, cost, responsibility for implementation, and deliverable (i.e. the outcome).

Timeframes used in the Action Plan have been categorised as follows:

- Short 2019/20 - 2020/21
- Medium 2021/22 - 2022/23
- Long 2023/24 - 2038/39

Costs used in the action plan have been categorised as follows:

- Low <\$50,000
- Medium \$50,000-\$500,000
- High >\$500,000

Objective 1) Review planning mechanisms to manage stormwater quantity and quality from new development and re-development

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Review planning mechanisms to manage stormwater quantity and quality from new development and re-development	1.1	<p>Review the operation and stormwater quality outcomes from the implementation of Clause 22.08, including:</p> <ul style="list-style-type: none"> the uncertainty of requirements for environment management plans as a means of ensuring ongoing effective operation of stormwater treatment assets; any measurable data generated from the operation of 22.08 opportunities to expand scope of implementation; development of recommendations for improvement; the experience of City of Kingston in operating their voluntary in-lieu contributions scheme; how a different planning arrangement to address stormwater quality would align with the Drainage Contributions Plan; and how a revised policy can enable the generation of a funding stream to enable stormwater quality works 	Medium	Medium	Urban Strategy	Report on operation of stormwater quality outcomes from the implementation of Clause 22.08 presented to Council.
	1.2	Establish a stormwater monitoring program for targeted drains to understand pollutants transported to Port Phillip Bay in order to address stormwater quality issues, with assistance from grants for citizen science work where beneficial.	Short	Low	Sustainability & Transport	Stormwater monitoring program established
	1.3	Work with the EPA to investigate how improved sediment control from building sites can be achieved and investigate increased funding for enforcement.	Medium	Low	Amenity Protection	Report on investigation completed.
	1.4	<p>Investigate the establishment of standards for site detention from new or re-development to ensure:</p> <ul style="list-style-type: none"> development does not excessively impact local flooding and overland flow paths can operate more effectively; and the burden of local flood management is shared more equally with those causing increased imperviousness 	Medium	Low	Urban Strategy	Report on investigation into new standards for site detention from new or re-development completed

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
	1.5	<p>Investigate the establishment of ongoing performance monitoring of detention systems in private developments, including:</p> <ul style="list-style-type: none"> • system owners periodically reporting to Council on inspections by a registered plumber that systems is operating according to design; • a registration system for detention systems. • Resourcing spot checks of detention systems. • investigate the suitability of existing software for calculation of Permissible Site Discharge 	Medium	Low	Amenity Protection	Report on feasibility of establishing ongoing performance monitoring of detention systems completed

Objective 2) Infrastructure Program to Improve Stormwater Quality

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Infrastructure Program to Improve Stormwater Quality	2.1	Include the 20 year capital program (Attachment Appendix C) for stormwater improvement in Bayside's capital works program (28 projects - average of 1.4 per year).	Short	Low-High	Sustainability & Transport	Stormwater projects included in capital works program
	2.2	Incorporate a raingarden program for improved biofiltration and infiltration of stormwater within streetscape and drainage projects where physically possible (as per Appendix C).	Short	High	Sustainability & Transport	Raingarden works incorporated within streetscape and drainage projects completed
	2.3	Monitor and review the 20 year capital program after three years of implementation and adjust program as required.	Medium	Low	Sustainability & Transport	Program reviewed
	2.4	<p>Investigate the introduction of a funding mechanism, similar to the Kingston Stormwater Quality In-Lieu Contributions Scheme for private developments.</p> <p>Investigations to include:</p> <ul style="list-style-type: none"> Refinement and revision to Bayside Clause 22.08 and the existing WSUD Compliance Guidelines for New Development (Bayside City Council, 2009); How an agreed works program for stormwater treatment will enable Bayside to reach Best Practice in the next 25-30 years, to justify the need for the In-Lieu Contributions Scheme. Development of Bayside Stormwater Quality In-Lieu Guidelines; Preparation of a Civil Design Requirements for Developers: Part A – Integrated Stormwater Management Work required with DELWP, Melbourne Water and the IWM Forum for advice and support for the adoption of a local policy. 	Medium	Low	Urban Strategy	Investigation report on funding mechanism completed.

Objective 3) Extend Council's Influence in Stormwater Management

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Extend Council's Influence in Stormwater Management	3.1	Participate in the IWM Forum for Dandenong Catchment	Short	Low	Sustainability & Transport	Participation in IWM Forum
	3.2	Deliver Priority Projects in the IWM Forum Strategic Directions Statement for Dandenong Catchment in collaboration with other IWM Forum members, to manage stormwater and improve the health of Port Phillip Bay	Medium	Medium	Sustainability & Transport Open Space, Recreation & Wellbeing	2 Priority Projects from IWM Forum delivered.
	3.3	<p>Investigate the potential for improved runoff water quality from private property whereby householders are encouraged and enabled to increased infiltration of stormwater on private lots and reduce stormwater volumes and the transport of pollutants to the Bay.</p> <p>Investigations to include:</p> <ul style="list-style-type: none"> • how other Councils are influencing this input? • how can grant programs assist? • consideration of soil types • calculation of likely benefits from the grants program including avoided stormwater volumes and pollutant reductions; • the development of suitable terms and conditions for the grants program; • liaison with South East Water to ensure compatibility with the rainwater tank rebate program; • development of information for householders about how infiltration trenches can be compatibly designed and installed with most home gardens; • development of information for householders about how to maintain an infiltration system; • how grant recipients will be followed up over time so that systems are monitored and continue to function optimally; and • the resourcing implications for Council and the potential to outsource the program. 	Medium	Low	Sustainability & Transport	Report on potential introduction of grants program

Objective 4) Improve Stormwater Asset Management

Objective	Actions		Timeframe	Costs	Council Department	Deliverable
Improve Stormwater Asset Management	4.1	Ensure sound asset management practices are applied to all stormwater assets in Bayside and the asset register is kept up to date as each stormwater asset is constructed so that forward planning and budgeting can take place for upgrading and renewing assets.	Short	Low	City Assets & Projects	Process for adding stormwater assets into asset register completed and tested
	4.2	Ensure appropriate performance monitoring for all stormwater harvesting, retention and treatment assets so they operate at an optimal level throughout their life cycle.	Long	Medium	City Assets & Projects	Performance monitoring for stormwater management assets established
	4.3	Audit and review the performance of Gross Pollutant Traps and the 250 side entry pit baskets to examine whether: <ul style="list-style-type: none"> • maintenance regimes are adequate; • trap design is effective and compares favourably with contemporary design; and • the coverage of trapping meets stormwater best practice (70% reduction of annual load). 	Medium	Medium	City Assets & Projects	Audit completed
	4.4	Undertake negotiations with service providers where required to ensure they are appropriately skilled and equipped to maintain stormwater assets in optimal condition and ensure capacity and maintenance plans are in place prior to post-construction handover.	Short	Low	City Assets & Projects	Skills audit of service providers assessed and documented
	4.5	Ensure water meters are placed on all new stormwater harvesting sites to record water use from stormwater and retrofit meters where they might be absent or non-functional on existing harvesting sites.	Short	Medium	City Assets & Projects	Process for adding water meters to new stormwater assets completed and tested

Objective	Actions	Timeframe	Costs	Council Department	Deliverable
4.6	<p>Improve the management of WSUD assets by updating the Drainage Service Driven Asset Management Plan and the asset data system with biofiltration asset performance and maintenance requirements, including:</p> <ul style="list-style-type: none"> • expectations of pollutant removal performance; • current condition; • ponding times; and • renewal requirements to ensure assets are fit for purpose. 	Medium	Low	City Assets & Projects	Report on feasibility of establishing ongoing performance monitoring of detention systems completed
4.7	<p>Undertake an assessment of litter infrastructure to determine:</p> <ul style="list-style-type: none"> • its effectiveness of to address litter within Bayside; • the proportion of litter generated from Bayside versus that from other sources examining impacts on beach and foreshore environments; and <p>impacts on marine ecosystems within Bayside.</p>	Short	Low	Open Space	Report on feasibility of establishing ongoing performance monitoring of detention systems completed

Objective 5: Foster Technical Capability to Sustain Stormwater Management as a Core Service

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Foster Technical Capability to Sustain Stormwater Management as a Core Service	5.1	<ul style="list-style-type: none"> Introduce a Green Infrastructure Working Group to provide for internal collaboration around water issues, stormwater management projects, and advice on other capital works projects which improve liveability. 	Medium	Low	Sustainability & Transport	Green Infrastructure Working Group established

Objective 6) Revise ESF Targets for Stormwater

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Revise ESF Targets for Stormwater	6.1	<p>Revise the ESF target for alternative water use as follows:</p> <p>By 2025, complete two stormwater harvesting projects, with a further two by 2030.</p> <p>In addition, revise the efficiency element of this target as follows:</p>	Short	Low	Sustainability & Transport	Target revised in ESF update report presented to Council
	6.2	Review irrigation practices, especially around use of moisture sensors linked to automated switching for improved application. Set annual targets for efficiency gains based on review recommendations.	Short	Low	Open Space	Irrigation practices reviewed

Objective 7) Update Flood Mapping and Document Status

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Update Flood Mapping and Document Status	7.1	Review the 2011 Flood Management Plan and ensure resources are allocated to progressively undertake flood modelling and flood mapping in cooperation with Melbourne Water.	Short	Low	City Assets & Projects	Process completed and resources allocated to review Flood Management Plan

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
	7.2	Ensure updated flood mapping is included in the development of local Special Building Overlays in the Bayside Planning Scheme.	Medium	Low	Urban Strategy	Process to include updated flood mapping in Planning Scheme completed and tested.
	7.3	Update references to documents within the Bayside Planning Scheme and elsewhere so that the following documents are made redundant for advice and referral: the Stormwater Quality Plan (Fisher Stewart, 2001); the Sustainable Water Management Strategy (CPG, 2011); Integrated Water Management Plan – Final Draft, (DesignFlow 2016).	Short	Low	Sustainability & Transport	References updated

Objective 8) Reduce Potable Water Demand to Maintain Sportsgrounds

Objective		Actions	Timeframe	Costs	Council Department	Deliverable
Reduce Potable Water Demand To Maintain Sportsgrounds	8.1	Reduce the amount of winter grass over-sowing on sportsgrounds that require establishment watering and the use of herbicides in late Spring to enable the summer grass to grow.	Short	Low	Open Space, Recreation and Wellbeing	Reduced establishment watering for winter grass over-sowing
	8.2	Sportsground Reconstruction Program to include the installation of new, more efficient irrigation systems and laying of drought tolerant summer grasses such as Couch and Kikuyu.	Med- long	Med		Reduced potable water use for sportsground irrigation

PART B.

3. Purpose

The Integrated Water Management Plan 2019-2039 ('Water for Bayside') provides a clear direction to deliver high priority Integrated Water Management (IWM) and Water Sensitive Urban Design (WSUD) activities. 'Water for Bayside' outlines a 20 year action plan.

'Water for Bayside' explains Bayside's position on Integrated Water Management. Its development and adoption is an action in Council's Environmental Sustainability Framework. 'Water for Bayside' also aligns with the IWM Forum Strategic Direction Statement adopted by Council in July 2018.

4. Policy Context

4.1 Council's Strategic Planning Framework

The Council Plan 2017-21 sets out Bayside's Strategic Planning Framework. The Framework provides a clear line of sight between the long-term aspirations of the community, reflected in the Community Plan 2025, and the four-year priorities for the elected Council proposed in the Council Plan. These priorities drive Council's major strategies and policies that enable Council to deliver against their vision. Following the development of the Council Plan 2017-2021, the major Council strategies will be reviewed to ensure alignment with the new goals and priorities of Council. Council's Strategic Planning Framework is shown in Figure 1 overleaf.

4.2 Council Plan 2017-21

The Council Plan details strategic actions Council will pursue to achieve its objectives. The Plan includes goals of delivering a liveable city and a sustainable natural environment.

Goal 5 - Environment of the Council Plan 2017-21 states:

Council and the Bayside community will be environmental stewards, taking action to protect and enhance the natural environment, while balancing appreciation and use with the need to protect natural assets for future generations.

The Council Plan 2017-21 (2018 review) includes a strategy under this goal to:

Reduce water consumption in Council's operations and improve the management of stormwater and water quality

Actions within the Council Plan are achieved through initiatives in this Action Plan.

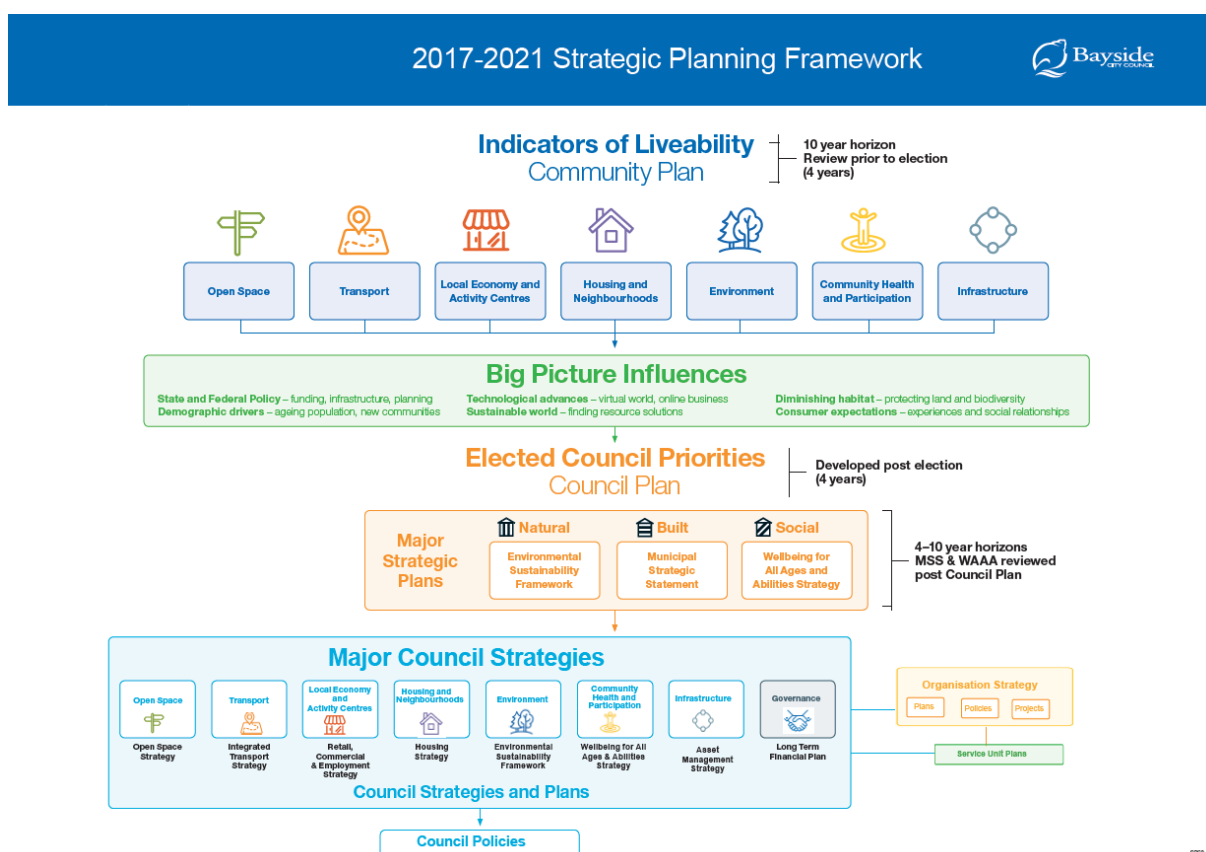


Figure 1: Bayside's Strategic Planning Framework.

Source: Bayside Council Plan 2017-21 (Bayside City Council, 2017)

4.3 Environmental Sustainability Framework

Water for Bayside is aligned with, and supports, the Bayside Environmental Sustainability Framework 2016 – 2025 ('the ESF'). The ESF sets consistent direction and guidance for environmental planning and decision-making within Bayside City Council. It aligns with Council's vision and framework 'Making Bayside a Better Place' and provides clarity, focus and actions for maintaining a high level of liveability and wellbeing for the community – the top priority for Council.

Four goals arose from the consultations to develop the ESF:

Goal 1: <i>Leading the Way</i>	Bayside City Council operates as a model of environmental sustainability.
Goal 2: <i>Community Partnerships</i>	Supporting an empowered and connected community that acts locally to reduce consumption and live sustainably.
Goal 3: <i>Resilience</i>	Developing community and ecosystem resilience for current and future climate change impacts.
Goal 4: <i>Sustainable Places</i>	Advocating and influencing for healthier ecosystems and more liveable Bayside urban areas and infrastructure.

‘Sustainable Water’ is one of the Ten Themes in the ESF to prioritise and achieve the four goals.

4.4 ESF Action Plan 2019 –2023

Objectives to be achieved under the ‘Sustainable Water’ theme in the current ESF Action Plan 2019 –2023 are:

<i>Transition from using potable water to using recycled water or stormwater for Council operations and facilities where practical</i>	Goal 1- <i>Leading the Way</i>
<i>Reduced potable water consumption per household</i>	Goal 2 - <i>Community Partnerships</i>
<i>Improve the quality of stormwater entering the Bay</i>	Goal 4 - <i>Sustainable Places</i>
<i>Retain more stormwater in the landscape</i>	
<i>Manage storm water, debris and waste to protect the water quality of the Bay and enhance the environment</i>	

4.5 Dandenong Catchment Integrated Water Management Forum Strategic Directions Statement

The Victorian Government’s strategic water plan, *Water for Victoria 2016*, Chapter 5, sets clear objectives on the role of water for the creation of liveable cities and towns across the state. *Water for Victoria* Actions 5.7 and 5.8 support representing community values and local opportunities in planning and putting IWM into practice in Victoria.

The *Integrated Water Management Framework for Victoria*, released in September 2017, established IWM Forums to enable delivery of Actions 5.7 and 5.8. The IWM Forums were designed to assist local governments, water corporations, catchment management authorities, the Victorian Planning Authority (VPA) and Traditional Owners to work together to ensure that the water cycle efficiently contributes to the liveability of a region.

Bayside City Council is a partner to the IWM Forum for Dandenong Catchment. The IWM Forum identifies, coordinates and prioritises opportunities and areas that would most benefit from collaborative water cycle planning and management.

Bayside City Council’s participation in the IWM Forum for Dandenong Catchment provides an opportunity to achieve the objectives set in *Water for Bayside* and aforementioned plans and strategies in which water has a role to play. These objectives often require collaboration with other water sector organisations and the IWM Forum provides a platform to form new collaborations and strengthen existing collaborations. It also provides a mechanism for partner organisations to put forward

to the State Government the key strategic water issues, including policy reforms that the partner organisation identifies as a priority for the water sector to progress.

Council endorsed the *IWM Forum Strategic Directions Statement* (SDS) for the Dandenong Catchment in June 2018. The SDS includes a shared vision for the planning and management of water in the Forum Area and seven strategic outcome areas to achieve this vision, developed collaboratively by the members of the IWM Forum. Further, each SDS includes a portfolio of priority IWM projects and strategies (or IWM opportunities) for which the IWM Forum's collaborative partners are committed to progress.

Development of a Catchment Scale IWM Plan was identified in the priority portfolio of opportunities in the IWM Forum SDS. The Catchment Scale IWM Plan will support *Water for Bayside* by providing the scientific basis to measure water improvements in the catchment. As improvement in the catchment cannot be influenced or determined by a single municipality, the Catchment Scale IWM Plan will provide a better assessment of IWM needs on a regional or catchment scale when completed. This will align with the broader objectives of implementing *Water for Bayside*.

Other relevant Strategies and Plans are included in Table 1 below.

4.6 Policy Summary

4.6.1 Bayside Documents

The following table provides an overview of the water-related statements and commitments that have been made via the adoption of these documents by Council.

Table 1: Overview of water-related statements in Council documents

Policy/Strategy/ Plan	Key Water-Relevant statements
1. Community Plan 2025	The community values Bayside's beaches and foreshores as <i>"the most valued environmental asset, with their protection and maintenance a first order priority."</i>
2. Council Plan (2017-2021)	The Plan includes goals of delivering a liveable city and a sustainable natural environment. It includes a target for reducing mains water for irrigation of open space to below 220 ML/yr.
3. Municipal Strategic Statement	Objective 5 under Clause 21.12 is: "to provide a drainage system that promotes the on-site retention and re-use of stormwater run-off, regulates overland flow to prevent flooding and improves water quality, particularly in terms of run-off to the Bay." Strategies to achieve the objective are: "to provide a drainage system that <ul style="list-style-type: none"> • promotes the on-site retention and re-use of stormwater run-off; • regulates overland flow to prevent flooding; and • improves water quality, particularly in terms of run-off to the Bay."
4. Bayside Planning Policy Clause 22.08 Water Sensitive Urban Design	The policy requires that post-construction stormwater run-off should be treated to remove pollutants to Best Practice standard. The objectives of the policy are to: <ul style="list-style-type: none"> • promote the use of WSUD including stormwater re-use; • protect surface water and ground waters in the Port Phillip Bay Catchment from stormwater pollutants; • reduce the effects of peak stormwater flows;

Policy/Strategy/ Plan	Key Water-Relevant statements
	<ul style="list-style-type: none"> integrate stormwater treatment measures into the landscape; and reduce the entry of pollutants into stormwater runoff.
5. ESF	<p>The ESF contains a number of sustainable water targets/objectives:</p> <ul style="list-style-type: none"> sourcing of 55% of water supplies from alternative sources by 2020, with 80% by 2026. a 30% increase in water efficiency by 2020 within council building and operations, with 50% by 2025; and improved quality of stormwater entering the Bay, along with increased retention of stormwater in the landscape and management of debris and waste to protect the water quality of the Bay and enhance the environment.
6. Wellbeing for All Ages and Abilities Strategy	The natural environment was considered to be one element of the environment key to sound health outcomes. The beach and foreshore, water and air quality and sustainability were identified as elements under the natural environment.
7. Flood Management Plan (2011)	<p>The Plan states that Bayside should undertake a catchment analysis for the entire municipality. Actions from the Plan include:</p> <ul style="list-style-type: none"> establish a flood mapping program; undertake modelling of individual catchments and mapping of priority catchments; check preliminary flood hot spots for accuracy and omissions and formalise these; and review Council's drainage budget.
8. Drainage Service-Driven Asset Management Plan [D-AMP]	The Plan's Appendix 5 listed the principles of WSUD and various treatment options that could be employed such as litter traps, infiltration trenches, bio-retention systems, tanks and green roofs.
9. Climate Change Strategy	<p>Actions include:</p> <ul style="list-style-type: none"> continuing to implement water sensitive cities principles set out in the Open Space Sustainable Water Management Plan, including assessing the viability of stormwater harvesting; continuing to work with Melbourne Water to investigate areas at greatest risk from flooding; and initiating a program to encourage the progressive replacement of inefficient irrigation systems.
10. Coastal Management Plan	Establishing a program to capture, treat and utilise stormwater, including upstream management measures to reduce inflows to the Bay and their environmental impact.
11. Open Space Strategy	<p>Council will need to employ strategies such as harvesting of stormwater and "greater emphasis on planned retention and treatment of water prior to discharge to the Bay" (p. 29).</p> <p>Council will apply the following to manage climate change impacts in open space:</p> <p>"improve the capacity of the open space network to capture, retain, filter and cleanse stormwater that enters the network in order to minimise quantity and maximise quality of stormwater entering Port Phillip."</p>
12. Street Tree Strategy	"Bayside will be known for its: tree 'corridors' and quality streetscapes; green city appearance, with a dominant tree canopy and integration of public and private landscapes."
13. Biodiversity Action Plan 2018-27	Action 3.4.2 states that the Council's Project Management Framework should address issues that "includes impacts to native vegetation, wetlands and waterways and other habitat, as well as hydrology issues at Long Hollow Heathland and Balcombe Park".

From the table above, there is clear support for IWM actions and initiatives within a range of strategy, plan and policy documents for Bayside. Protection of the Bay is a high priority and stormwater infiltration, reduction of pollutant loads and litter, and increased water efficiency is clearly supported. There is also support for the role that water plays in supporting street trees and reducing urban heat. Actions within *Water for Bayside* aim to deliver these outcomes.

4.6.2 State Sector Documents

Table 2 below provides an overview of water-related statements and commitments in key State sector documents with relevance to *Water for Bayside*.

Table 2: Overview of water-related statements in key relevant State sector documents

Document	Key Water-Relevant statements
Environment Protection Act (1970)	<p>Part V of the Act covers clean water. Section 39 addresses pollution of waters. It states:</p> <p>“(1) a person shall not pollute any waters so that the condition of the waters is so changed as to make or be reasonably expected to make those waters -</p> <p>(c) poisonous, harmful or potentially harmful to animals, birds, wildlife, fish or other aquatic life</p> <p>The Environment Protection Act enables the preparation of State Environment Protection Policies. Under Part IV (Attainment Program) of the SEPP, key responsibilities for implementing the policy are set out. It is stated that...”<i>municipal councils and relevant State government agencies, have responsibilities to plan or manage Victoria’s surface waters, and activities that impact on them, in an ecologically sustainable manner.</i>” Section 17 states in relation to municipal councils that they have a range of responsibilities which “impact on surface waters including ...urban stormwater...” It is further stated that: it is important that councils “ensure that their ... municipal programs are consistent with the Policy.” “<i>During the lifetime of the Policy, a goal of municipal councils will be to ensure....stormwater and domestic wastewater management is improved</i>”...</p> <p>Schedule F6 to the SEPP (Waters of Victoria) covers Port Phillip Bay. Section 22 states that “<i>protection agencies responsible for drainage...management and land use planning, must ensure that –</i></p> <p>(b) <i>existing stormwater systems are reviewed to identify opportunities for enhancement and are upgraded where practicable and effective in reducing pollutant loads to the Bay with priority given to:....</i></p> <p>(ii) <i>identifying and exploiting opportunities for improving the environmental performance of drainage systems, including the installation of water quality, litter control and flow improvement measures, as part of normal replacement and refurbishment programs.</i>”</p>
Port Phillip Bay Environmental Management Plan – 2016	<p>Action 3-3 seeks to “<i>ensure all urban and rural land use effectively controls impacts from stormwater and runoff and that controls are in place to manage increases in loads.</i>”</p> <p>Action 4-3 seeks to: “<i>identify and prioritise litter hotspots around the Bay and undertake prevention and on-ground stormwater management actions to address sources.</i>”</p> <p>In reference to the setting of nutrient and pollutant targets the following is stated: “<i>to achieve the nitrogen and sediment targets in a sustainable manner will require a paradigm shift for stormwater management.</i>”</p>
Plan Melbourne (2017)	<p>Plan Melbourne supports the implementation of Victoria’s water plan—<i>Water for Victoria</i>. It seeks to integrate urban development and water cycle management to support a resilient and liveable city.</p>

Document	Key Water-Relevant statements
	<i>“Residential development provisions must be updated to mitigate against the loss of tree canopy cover and permeable surfaces as a result of urban intensification.”</i>
Water for Victoria (2016a)	<p>Although Victoria faces a future with less water and will need to do more with less, it is also acknowledged that Victorians want liveable cities and towns with trees and green spaces to cool the urban landscape. <i>“Water corporations, local government ...will work together to enhance public spaces through integrated water management.”</i></p> <p>The following points are set out under “What we will do.”</p> <ul style="list-style-type: none"> - Improve stormwater management for greener environments and healthier waterways; - Works across government for healthy and resilient urban landscapes; and - Put Integrated Water Management into practice. <p>Water for Victoria Actions 5.7 and 5.8 support representing community values and local opportunities in planning and putting IWM into practice in Victoria, through the Integrated Water Management Framework for Victoria, and IWM Forums.</p>
Victorian Floodplain Management Strategy (2016b)	<p>Improved management of urban stormwater flooding is central to integrated water management.</p> <p><i>“The cumulative effect of stormwater management initiatives can help reduce the risk of flooding in urban areas.”</i></p>

As with Bayside’s policies and strategies, there is clear support in State sector documents for Bayside’s role in stormwater management, IWM and initiatives that improve greening and liveability.

5. Methodology

5.1 Rationale

The rationale to develop *Water for Bayside* included:

- Review of past water plans and their proposals for actions and initiatives, retaining or improving existing proposals;
- The need to clearly define the relationship between water and liveability and improve understanding of this relationship within Council’s Strategic Planning Framework;
- Investigation of current water practices at Council and their adherence to local and State policies;
- Identification of new IWM opportunities so that a 20 year program of works can be developed; and
- Investigation of how to embed Integrated Water Management into core business, by setting clear strategic direction.

5.2 Development

In 2015, Bayside City Council successfully sought funding from Melbourne Water’s Living Rivers Program to develop an Integrated Water Management (IWM) Plan that

was developed by an external consultant in 2016. As part of a review of the scope of that work, an Opportunities Assessment was completed in 2017 to determine additional opportunities from those previously identified. A comprehensive Technical Background Paper entitles 'Water For Bayside' was also completed in 2017

This Plan replaces the *Stormwater Quality Management Plan (2001)* and the *Sustainable Water Management Strategy (2011)*, and the draft IWM Plan that was prepared in 2016.

5.3 Strategy Review

Existing documents and strategies were reviewed to inform the development of the IWM Action Plan 2019 including:

- *Community Plan 2025: Building a Better Bayside*
- *Council Plan 2017-2021*
- *Wellbeing for All Ages and Abilities Strategy, 2013 and 2017*
- *Environmental Sustainability Framework (ESF) 2016-2025*
- *Municipal Strategic Statement*
- *Bayside Planning Scheme – Clause 22.08 Water Sensitive Urban Design*
- *Flood Management Plan (2011)*
- *Drainage Service-Driven Asset Management Plan [D-AMP] (2015)*
- *Climate Change Strategy (2012)*
- *Open Space Strategy (2012)*
- *Bayside Coastal Management Plan (CMP), 2014*
- *Street Tree Strategy, 2008*
- *Street and Park Tree Selection Guide, 2016*
- *Street and Park Tree Policy*
- *Stormwater Quality Management Plan (2001)* and the,
- *Sustainable Water Management Strategy (2011)*
- *Draft Integrated Water Management Plan ((DesignFlow, 2016)*

5.4 IWM Opportunities Assessment

An Opportunities Assessment Report (OAR) for IWM was prepared. Prior to undertaking the OAR, an extensive analysis of Bayside's catchments was undertaken. This overview provided a list of potential opportunities to be reviewed via the OAR work, including twelve major projects.

Following desktop analysis, a prioritised list of potential sites and other opportunities to be investigated was assembled, prior to arranging field inspections. Key opportunity sites (see Appendix C), including smaller coastal catchments were investigated and categorised as follows:

- harvesting and reuse opportunities for reserves;
- water quality treatment including GPTs;
- streetscapes – Raingardens & infiltration, passive irrigation for improved tree health; and

- flood management.

The opportunities for harvesting and reuse in reserves were then ranked based upon multiple criterion, to develop projects for concept design. Similarly, a set of road reserves with wide verges (greater than 3-4 meters) was identified as having potential for infiltration and/or bioretention outstands.

The selected viable projects were taken to formal concept designs that allowed preliminary estimate of order of costs to be undertaken. An analysis of risks and constraints for each project was undertaken which involved service checks and also reference to any geological constraints. The site designs were then drafted for inclusion in the final report. The Project outcomes included a projected 20 year capital works program of WSUD/IWM works.

5.5 Dandenong Catchment IWM Forum Engagement

Council's involvement and representation in the Dandenong Catchment IWM Forum from late 2017 has enabled the input and collaboration with other Councils in the catchment on Integrated Water Management issues. Bayside City Council began collaborating with other municipalities in the Elster Creek Catchment in 2017. Involvement in the broader Dandenong Catchment IWM Forum benefited Council through a coordinated approach to IWM projects, learning from other Councils, and the potential for Victorian Government funding. Alignment of Bayside's IWM initiatives with the regional Forum however, required some delay in the development and adoption of *Water for Bayside* by Council.

5.6 Community Engagement

Internal

Extensive internal engagement was undertaken in the review of the draft IWM Strategy in 2016-17, This engagement helped to develop the program of capital works and explained the concept of IWM to internal stakeholders.

The following Table 3 shows the Departments who were engaged and their role or influence.

Table 3: Internal Stakeholder

Team	Role/Influence
City Assets & Projects	Delivering IWM capital works
Urban Strategy	Role of IWM in Masterplans
Open Space	Planning & Coordination of IWM capital works

External

The following Table 4 shows external stakeholders who were engaged and their role or influence.

Table 4: External Stakeholder

Stakeholder	Role/Influence
Local Environmental groups	Support and Understanding of Council position on IWM
Dandenong IWM Forum	Alignment of Bayside IWM Strategy with regional / catchment scale IWM Strategy
Melbourne Water	Partner delivery of major IWM capital works

Community engagement was conducted in July and August 2019.

6. Key findings

The key findings from the development of Water for Bayside and internal engagement were:

- Water plays a vital role in maintaining over 400 hectares of green space in Bayside and Council is required to increase the use of water during periods of drought to maintain serviceability of sportsground surfaces, as experienced in the late 2000's and over the 2018/19 summer and Autumn period.

Irrigation demand could be reduced by reducing the amount of winter grass over-sowing on sportsgrounds as these grasses (typically Rye type grasses) require significant watering during establishment and then the use of herbicides in late Spring to kill off the winter grass and enable the summer grass to grow.

- A long-term program to implement IWM initiatives needs to be resourced and funded
- Current planning mechanisms to manage stormwater require review
- Council needs to collaborate and influence to manage stormwater and improve the health of Port Phillip Bay
- Stormwater assets require long-term asset management to be continuously effective
- Technical capability needs to be developed within the organisation to embed IWM as a core service
- Information on water and flooding changes and needs to be updated to maintain relevance.

7. Objectives

Water for Bayside 2019-2039 has been developed around seven objectives which have been derived through the consultation and reviews. These objectives and the issues that they respectively address are set out below.

Objective 1) Review planning mechanisms to manage stormwater quantity and quality from new development and re-development

The most fundamental issue for stormwater is the extent to which management of its quantity and quality is sufficiently adequate to ensure protection of receiving waters such as Port Phillip Bay.

Quantity management is important as the greater the quantity, the more likely the comprehensive transport of urban pollutants. Quantity management is also critical to the performance of Council's functions as a drainage and flood manager.

Objective 2) Infrastructure Program to improve stormwater quality

Lack of funding significantly constrains the implementation of works or initiatives. A coordinated long-term program requires investigation of ongoing funding sources. An ongoing source of funding will be required to implement the program of works.

Objective 3) Extend Council's Influence in Stormwater Management

While Council is responsible for stormwater run-off from at least 25%⁵ of Bayside's surface area, the opportunity to manage stormwater within that area is limited⁶. To manage the stormwater, especially the pollutant load⁷, Council needs to extend its influence and engage other landowners.

Objective 4) Improve Stormwater Asset Management

While asset management practices are sound, stormwater management projects need to be included on Bayside's asset register, so that their maintenance and renewal regimes are defined and resourced.

Objective 5) Foster Technical Capability to Sustain Stormwater Management as a Core Service

Like funding, technical capacity is required to effectively deliver an annual stormwater management program. Specialist stormwater expertise will be required on an ongoing basis. This extends beyond capital works delivery skills to monitoring capability and understanding of maintenance requirements. Currently, specific skills in stormwater management at Bayside are limited.

Objective 6) Revise ESF Targets for Stormwater

Targets for stormwater set in the ESF have been reviewed with current information and will be periodically revised to ensure they remain relevant and achievable.

Objective 7) Update Flood Mapping and Document Status

⁵ It has been estimated that roads cover 15% of Bayside (DesignFlow, 2016, p. 27). The vast majority of these are managed by council. When footpaths, open space, car parks, council building and other assets are added, a total of around 25% is arrived at.

⁶ The stormwater harvesting projects proposed for reserves in *Water for Bayside* will only remove 4.2% of the total suspended solids produced annually.

⁷ The estimate of the pollutant load discharged from Bayside is: total suspended solids 1,409,000kg/yr; total phosphorous 3,190kg/yr; and total nitrogen 23,280kg/yr. (DesignFlow, 2016, p. 24).

Policy and Strategy documents need to reference up-to-date information, especially in planning.

Objective 8) Reduce Potable Water Demand To Maintain Sportsgrounds

The demand for potable water use in irrigating sportsgrounds to maintain surface serviceability can be reduced by through a reduction in the use of winter grass over-sowing that require significant watering during establishment and then the use of herbicides in late Spring.

8. Implementation and reporting

Implementation of the Water for Bayside Action Plan 2019 -2037 will be monitored and the progress of delivery of actions reported annually.

Key indicators of success of the Plan will be:

- the delivery of capital works in the 20 year IWM Capital Works Program
- completion of scheduled IWM Initiatives in the IWM Action Plan.

This can be measured through:

- Project Completion;
- Annual Reporting; and
- Reporting to the IWM Forum – Dandenong Catchment.

Appendices

Appendix A – Water and Pollutant Balance for Bayside

DesignFlow (2016) prepared a water and pollutant balance for Bayside to illustrate the impact of urbanisation on the water cycle.

The water and pollutant balance considered three stormwater pollutants represented below and thought to be key indicators for a healthy aquatic ecosystem.

Pollutant	Description
Total suspended solids (TSS)	Litter and sediment washed off urban surfaces including sediment eroded by stormwater flows. Can smother natural ecosystems and decrease visual amenity. Sediment can contain other pollutants including heavy metals.
Total phosphorous (TP)	Sources of phosphorous in stormwater include atmospheric deposition, leaves, fertilisers and industrial waste. Phosphorous attaches to sediment and is often linked to suspended solids. Elevated phosphorous concentrations in waterways can lead to excessive growth of plants and algae. As these plants die and decay, they consume oxygen which can lead to very low oxygen concentrations waterways which is harmful to aquatic life.
Total nitrogen (TN)	Sources of nitrogen in stormwater include fertilisers, animal faeces, plant debris and atmospheric nitrogen (deposited by rain). Increased nitrogen levels can also contribute to the excessive growth of aquatic plants and algae.

A1. Pre-development water and pollutant balance

Prior to European settlement, the area currently administered by Bayside City Council was inhabited by the Boon wurrung people. During this time, Elster Creek as well as other small creeks and freshwater drinking points provided a source of freshwater and habitat for people and the diverse local flora and fauna. Sand dunes and cliffs stabilised with coastal vegetation were prominent features. Figure A1 presents the results of the pre-development water and pollutant balance.

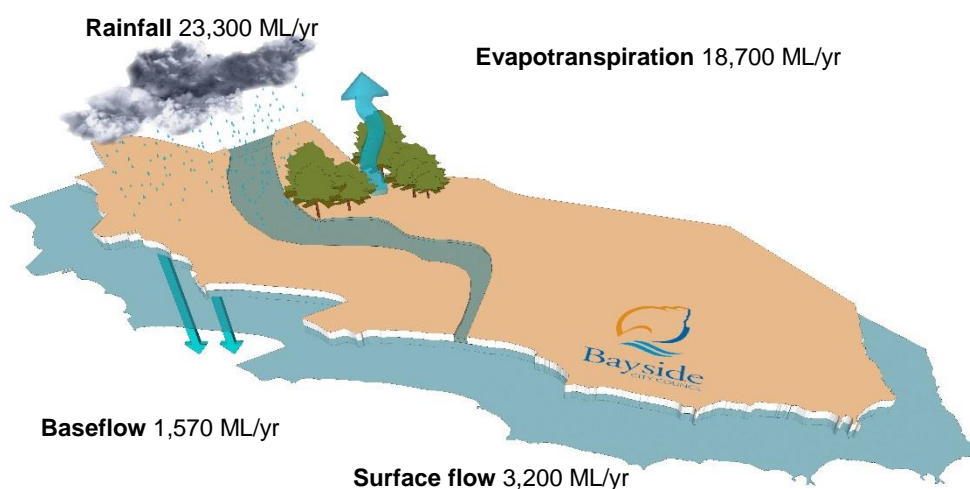


Figure A1 Pre-development water and pollutant balance for Bayside

Pollutant	Pollutant load discharged (includes surface flow & baseflow) (kg/yr)
Total suspended solids	157,000
Total phosphorous	359
Total nitrogen	4,040

Table A1: Pre-development pollutant loads

The pre-development water and pollutant balance indicates that the vast majority of rainfall (23,300 ML/yr) was returned to the atmosphere via evapotranspiration (18,700 ML/yr). Surface flows (stormwater and overland flow) leaving the municipality (3,200 ML/yr) were approximately double the amount of baseflow. Stormwater pollutant concentrations were much lower than today's urbanised catchments. The lower concentrations, coupled with a low proportion of rainfall being converted to runoff, means that the load of pollutants discharged to receiving waterways was much lower.

A2. Current water and pollutant balance

Extensive development since European settlement has resulted in Bayside becoming urbanised with a resulting increase in impervious surfaces. The influence of increasing human population and land use changes is reflected in the current water and pollutant balance (Figure A2).

The current water and pollutant balance uses 2011 water consumption data (provided by South East Water) to align with the most recent population data available from the Australian Bureau of Statistics.

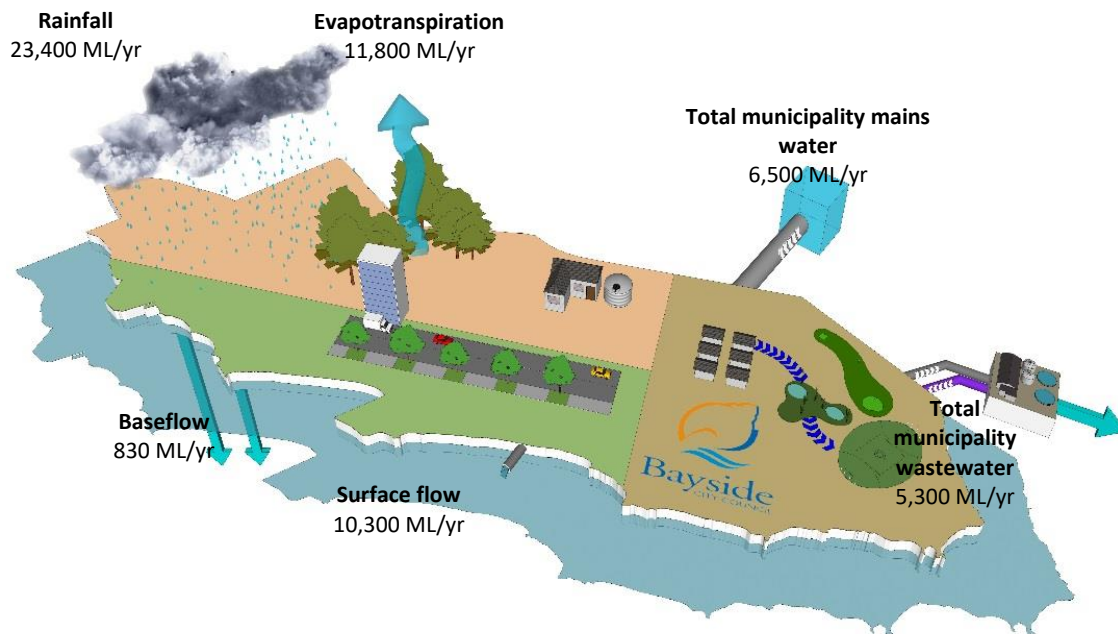


Figure A2: Water and pollutant balance for Bayside based on 2011 water consumption data

Pollutant	Pollutant load discharged (includes surface flow & baseflow) (kg/yr)
Total suspended solids	1,409,000
Total phosphorous	3,190
Total nitrogen	23,280

Table A2: Present day pollutant loads

It can be seen that urbanisation has caused:

- a decrease in evapotranspiration (from 18,700 to 11,800 ML/yr) due to less vegetation cover.
- a decrease in the baseflow volume (from 1,570 to 830 ML/yr) due to more impervious surfaces (and therefore less infiltration)
- a significant increase in the surface flow discharge (from 3,200 to 10,300 ML/yr) due to more hard surfaces
- a significant increase in stormwater pollutant loads (for example the TN load increased from 4,040 to 23,280 kg/yr) associated with higher pollutant concentrations and runoff volume
- a significant amount of mains water to be imported (6,500 ML/yr)
- a significant amount of wastewater to be exported (5,300 ML/yr).

Appendix B – 20 Year Capital Works Program for Stormwater

20 Year Program for IWM	Bus Plan period	2018/19-2021/22				2022/23-25/26				2026/27-29/30				2030/31-33/34				2034/35-37/38				2038/39
	Year	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39
Project	Probable order of cost																					
Reserves																						
Elsternwick Park Nature Reserve Master Plan	Included in Elsternwick Park Nature Reserve Project																					
Steele Reserve Infiltration Improvements	\$55,500	\$330,049																				
Landcox Park Stg 1 - Constructed wetland	\$251,000			\$183,300	\$50,200																	
Landcox Park Stg 2 - Stormwater harvesting	\$268,000					\$214,400	\$53,600															
Hurlingham Park Flood Detention, SW treatment and harvesting	\$365,000																\$16,500	\$275,500	\$73,000			
Peterson Reserve SW treatment and harvesting	\$371,500								\$13,500	\$283,700	\$74,300											
Moorabbin West SW treatment and harvesting	\$360,000										\$16,000	\$272,000	\$72,000									
Banksia Reserve SW treatment and harvesting	\$357,000												\$16,000	\$269,600	\$71,400							
Tjilatjirran Reserve SW treatment and harvesting	\$371,000														\$15,500	\$281,300	\$74,200					
Beaumaris Ccrse Parkland SW treatment (inc GPT) and harvesting	\$276,000							\$18,000	\$258,000													
Ricketts GPT & Outfall modification	\$300,000																		\$15,600	\$227,520	\$56,880	
GPTs																						
Sandringham Abbott St Drain	\$210,000						\$17,850	\$192,150														
Bay St, Brighton	\$144,000													\$12,000	\$132,000							
Streetscape Bioretention & Infiltration																						
North Road, stage 1	\$141,000	\$162,417																				
North Road stage 2	\$198,000		\$16,100	\$181,900																		
Middle Cres, Brighton	\$138,500			\$17,600	\$120,900																	
Murray Road, Brighton East	\$74,000				\$7,500	\$66,500																
Gladstone Road, Sandringham	\$70,000					\$7,500	\$62,500															
Erskine Av, Cheltenham	\$66,500						\$7,500	\$59,000														
Dalgetty Rd, Beaumaris	\$256,000							\$12,500	\$121,750	\$121,750												
Third St, Black Rock	\$151,100									\$8,500	\$142,600											
Fourth st, Black Rock	\$137,000										\$8,500	\$128,500										
Moor St Sandringham	\$96,500												\$7,500	\$89,000								
Bamfield St, Sandringham	\$96,500													\$7,500	\$89,000							
Arthur St Sandringham	\$93,000														\$7,500	\$85,500						
Carew St Sandringham	\$96,500															\$7,500	\$89,000					
Bridge St Sandringham	\$78,500																\$6,500	\$72,000				
Program budget allowance p/a	\$95,000																	\$7,500	\$87,500			
Program budget allowance p/a	\$95,000																		\$7,500	\$87,500		
Program budget allowance p/a	\$95,000																			\$7,500	\$87,500	
D-AMP program adjustments																						
WSUD top up to existing D-AMP program - adding bioretention systems	\$50,000 biennially			\$50,000		\$50,000		\$50,000		\$50,000		\$50,000		\$50,000		\$50,000		\$50,000		\$50,000		\$50,000
Non Structural Programs																						
Infiltration Grants \$ for \$	\$50,000 pa			\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	
Annual Budget Totals		\$492,466	\$16,100	\$482,800	\$228,600	\$388,400	\$191,450	\$381,650	\$443,250	\$513,950	\$291,400	\$500,500	\$145,500	\$478,100	\$365,400	\$474,300	\$236,200	\$455,000	\$233,600	\$422,520	\$194,380	\$50,000



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We acknowledge the Boon Wurrung people of the Kulin Nation as the traditional owners of this land and we pay respect to their Elders past and present. We acknowledge that together we share a responsibility to nurture this land, and sustain it for future generations.