SOUTH GIPPSLAND SHIRE COUNCIL

Integrated Water Management Plan – Strategy Document

South Gippsland Shire Council

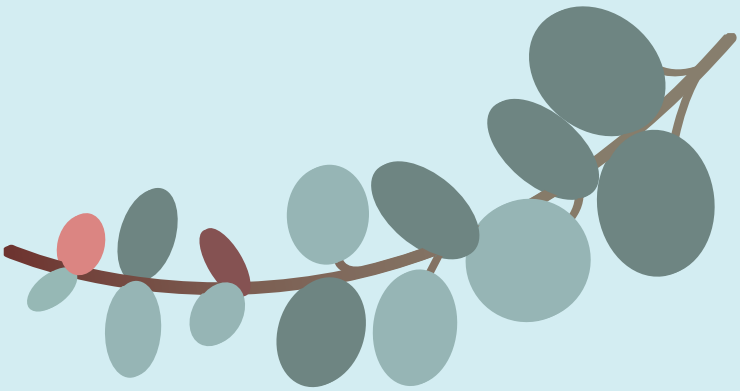
Thank you

Council would like to acknowledge and thank the stakeholders and consultant representatives involved in the preparation of this report.

We thank key stakeholders for meeting the project team, attending consultation sessions, and providing feedback throughout its development.

Acknowledgment of Country

We acknowledge the Bunurong and Gunaikurnai people as the Traditional Custodians of South Gippsland and pay respect to their Elders, past, present, and future, for they hold the memories, traditions, culture, and hopes of Aboriginal and Torres Strait Islander people of Australia.



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Purpose

In line with Victorian state government requirements for Integrated Water Management, South Gippsland Shire Council has developed a plan to address the Shire's specific water-related challenges.

This strategy aims to deliver integrated water management outcomes and outline opportunities for Council to collaborate with stakeholders and other authorities to ensure long-term water security for the region, particularly in the face of climate change and its potential effects on water availability and flooding.

This plan aligns with the collaborative efforts of the Gippsland and Westernport Integrated Water Management Forums, where the South Gippsland Shire Council plays an active role.

Executive Summary

South Gippsland Shire has varied conditions within medium and small towns, from rapidly developing new communities to small rural townships and seasonally inundated coastal tourism hamlets. These towns each have distinctive characteristics highly valued by their local communities. While these towns face many challenges, there is growing recognition of the importance of the water system as one of the foundation aspects of public infrastructure, contributing to their amenity and liveability.

A township's water system encompasses drinking water and alternative water sources, sewerage and wastewater management, drainage and stormwater networks, floodplains and waterways and green-blue infrastructure such as green open spaces and streetscapes. Given population growth and climate change impacts, the functionality and form of the water cycle system will play a critical role in the future adaptability of townships across South Gippsland.

Integrated Water Management is a system-based approach to planning and managing drainage and stormwater, water supply, wastewater, and waterways and retaining water in urban landscapes for environmental, amenity, and liveability outcomes.

South Gippsland Shire Council recognises the importance of the water cycle system in the continued liveability, prosperity and resilience of its townships. Council supports the Integrated Water Management Framework for Victoria (2017) to help all stakeholders work together to improve how the water cycle system contributes to the liveability of its towns.

Council has developed this Integrated Water Management Plan to provide a long-term pathway for dealing with these water-related challenges in a collaborative, integrated manner to benefit the region's communities.

The Plan was developed in consultation with the Department of Environment, Energy and Climate Action, Melbourne Water, South Gippsland Water, Gippsland Water and the West Gippsland Catchment Management Authority.

Through this work, Council has identified an extensive and varied range of water system-related issues across its townships and challenges for the organisation as it seeks to transition towards implementing integrated water management in practice. However, given the extent of legacy water-related issues across South Gippsland, a plan that adds to existing problems is unlikely to be helpful.

The consultation has highlighted the need for the plan to 'add value' through integrated water management thinking rather than an 'add-on' to existing commitments and service delivery obligations.

Consequently, the Plan proposes that Council focus its efforts on integrated water management activities where it can exert a high degree of control, is likely to achieve a positive impact and can implement the activities within current organisational settings and operational constraints. Four strategic directions are proposed in the plan:

1. Enhancing Council's integrated water management capability.
2. Responding to critical water system-related challenges.
3. Trialling place-based integrated water management solutions.
4. Collaborative partnerships for integrated water management outcome.

The high-priority programs and activities identified under each of these strategic directions are shown below.

Direction	Program
1. Enhancing Council's integrated water management capability	
	1.1 Build integrated water management knowledge, leadership, collaboration and accountability.
2. Responding to critical water system-related challenges	
	2.1 Investigating alternative water sources
	2.2 Proactive drainage, stormwater flooding and coastal risks management.
	2.3 Improving Urban Waterways.
	2.4 Using Green Blue Infrastructure to bring water into urban landscapes.
3. Trialing place-based integrated water management solutions	
	3.1 Reducing integrated water management Risks from future development in Foster.
4. Collaborative partnerships for integrated water management.	
	4.1 Supporting the adoption of integrated water management by urban developers.
	4.2 Working with stakeholders to improve flood understanding.

Introduction

South Gippsland Shire spans 3,300 square kilometres and has a population of 30,500. This population lives in diverse areas, from rapidly growing new communities to small rural townships and seasonal coastal tourism hamlets. Whilst there are many challenges facing these towns, there is growing recognition of the importance of the water cycle system as one of the foundation aspects of public infrastructure contributing to their amenity and liveability.

A township's water cycle system includes drinking and alternative water sources, sewerage, drainage, stormwater, floodplains, waterways, and green-blue infrastructure like open spaces, trees, gardens, and nature strips. With population growth and climate change, the water cycle system's functionality and form will be crucial for future adaptability of South Gippsland's townships.

Historically, the complexity of the water cycle system has led to fragmented planning and management across multiple agencies. Over the past decade, intergrated water management has gained traction across Victoria to unite these agencies and address system-wide issues that benefit natural environments, communities and local economies.

South Gippsland Shire Council recognises the importance of the water cycle system to support liveability, prosperity and resilience in each town, and has identified the need to adopt an Integrater Water Management Plan at a municipal scale. Council is a member of the Western Port and Gippsland Integrater Water Management forums, which provide strategic vision, progress, and priorities for integrated water management through their Strategic Directions Statements. In 2022, Council received support from the Victorian State Government through these forums to develop a "Fit for Purpose" Integrated Water Management Plan for its key townships and surrounding areas.

Council has developed this Draft Integrated Water Management Plan to provide direction for the sustainable management of water-system-related challenges in the future and improve its capacity to apply integrated water management to identify opportunities for collaborative stategic integrated water management projects with other partners.

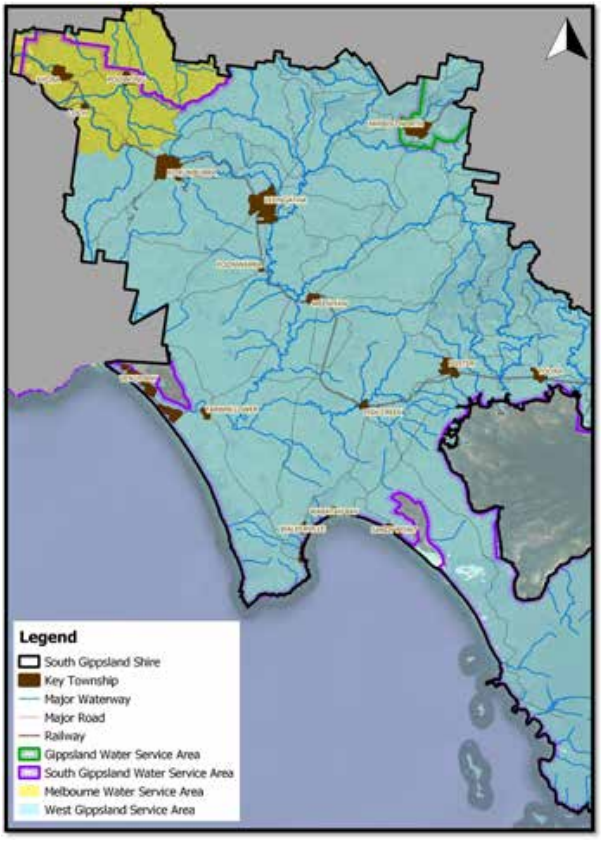
This Plan acknowledges the constraints on the Council's ability to apply integrated water management in practice, given existing capacity, limited resources and competing priorities. The Plan seeks to manage internal and external expectations by focusing on what is most important and achievable within council's sphere of control to change. It focuses on ways to embed integrated water management into existing systems and processes rather than as a new way of doing things. Whilst it identifies several new place-based integrated water management opportunities, the emphasis is on practical actions that enable this transition.

The Plan has been developed in consultation with the Department of Environment, Energy and Climate Action, Melbourne Water, South Gippsland Water and the West Gippsland Catchment Management Authority.

Study Area

South Gippsland Shire Council is located in Victoria, approximately 100 kilometres south-east of Melbourne. South Gippsland comprises of three wards that reflect the significant geographical zones: Tarwin Valley, Strzelecki, and Coastal Promontory. The Traditional Owners of the region are the Bunurong and Gunaikurnai people.

South Gippsland has an area of approximately 3,300 square kilometres and a significant coastline, including Wilsons Promontory. The population is approximately 30,580. The local economy is predominantly agriculturally based, focused on dairy, beef, sheep, viticulture and snow pea cropping. Tourism, forestry and commercial fishing are also critical to the local economy.



Most of South Gippsland (85 per cent) is within the West Gippsland Catchment Management Authority region, and 15 per cent is within the Port Phillip and Western Port Catchment Management Authority, now part of Melbourne Water. The relevant water and sewer authorities are South Gippsland Water, Melbourne Water and Gippsland Water. Melbourne Water provides operational and functional advice regarding waterway, drainage and floodplain management across their region, while the West Gippsland Catchment Management Authority performs similar functions for the east of South Gippsland.

Overall, South Gippsland is considered regional; however, significant residential development growth is proposed in the three larger towns of Leongatha, Korumburra, and Nyora. The rural townships of Fish Creek, Foster, Koonwarra, Loch, Meeniyan, Mirboo North, Poowong and Toora offer country-style living opportunities inland, whilst the coastal townships and hamlets of Sandy Point, Tarwin Lower, Venus Bay, Walkerville South, Walkerville North and Waratah Bay cater for small permanent populations but increase significantly with summer holidaymakers. These key towns are considered within the scope of this Integrated Water Management Plan.

The location of the towns across South Gippsland and other relevant functional water system boundaries can be seen in the accompanying image.

Overview of Integrated Water Management

The water cycle system in urban environments is highly complex and involves multiple players. Councils manage urban drainage, stormwater and green-blue infrastructure; Water Corporations manage drinking water, sewerage and recycled water; and Catchment Management Authorities manage waterway health.

The demand for these water cycle system services generally increases as regional areas develop with population growth. Stormwater and drainage networks need to expand in their extent and capacity to convey rainfall and flood events through urban landscapes whilst demand for drinking water and wastewater services also increases. Metropolitan growth has been a significant factor in causing a decline in urban waterway health and, to a lesser extent, meeting community demand for public parklands and associated green-blue infrastructure for their amenity, recreational values, and community well-being. A drying climate exacerbates the pressures on township-scale water cycle systems across south-eastern Australia.

Historically, the various agencies involved have planned and managed these water cycle system-related challenges in a fragmented manner. However, Integrated Water Management has gained traction across Victoria over the past decade, bringing the players together to collectively address the water cycle and identify solutions that optimise communities' environmental, social, and economic outcomes.

Eight strategic outcomes of an integrated water management approach, as described by the Gippsland Strategic Directions Statement 2022 (DELWP, 2022a) has been used as the architecture for this Plan and is shown below.

System Aspect: Water Sources

Outcome: Safe, secure and affordable water supplies in a changing future.

Goal: Increase the amount of water conserved or alternative water volume supplied to meet an identified demand.

System Aspect: Wastewater

Outcome: Effective and affordable wastewater systems.

Goal: Ensure environmental and public health standards are met while maximising resource recovery.

System Aspect: Drainage, stormwater, Flooding and Coastal Risks

Outcome: Managed flood risks

Goal: Ensure resilience to existing and future flood and coastal sea level risks.

System Aspect: Waterways and Marine Environments

Outcome: Healthy and valued waterways and waterbodies.

Goal: Improved ecological health of riparian areas, hydrology, and water quality.

System Aspect: Water in Urban Landscapes

Outcome: Healthy and valued landscapes.

Goal: Maximise the connectivity, accessibility, greening and vegetation, cooling, aesthetic, and recreational values of landscapes.

System Aspect: Traditional Owners

Outcome: Traditional Owner values, opportunities, and inclusion.

Goal: Ensure that traditional owner values and priorities for water are acknowledged, respected, and enhanced, as well as support traditional owner leadership, participation, and employment in water management.

System Aspect: Community Values of Water

Outcome: Community values reflected in place-based planning.

Goal: Ensure that different communities are considered and included in planning and design and provided with water-systems literacy to enable their involvement.

System Aspect: Economic Values

Outcome: Jobs, economic opportunity and innovation.

Goal: Recognition that water management is an integral part of economic growth.

Developing the Integrated Water Management Plan and Strategic Directions

Council has used a collaborative, place-based planning approach to develop the Integrated Water Management Plan and the strategic directions. This involved engaging various internal and external stakeholders who have a role in townships' water cycle systems.

Internal Stakeholders	External Stakeholders
Infrastructure Planning	South Gippsland Water
Infrastructure Delivery	Gippsland Water
Infrastructure Maintenance	West Gippsland Catchment Management Authority
Open Space and Environment	Melbourne Water
Strategic Planning	Environment Protection Authority
Statutory Planning	Department of Energy, Environment and Climate Action
Environmental Health	Parks Victoria
	Southern Rural Water

The Plan was developed in four phases.

Phase One – Background Investigations

Initiate the project and identify integrated water management challenges and opportunities through reviews of background documentation and engagement with internal and external stakeholders.

Including: inception meeting, literature review, challenges and opportunities contextual mapping with stakeholders and background report.

Phase Two – Water System Assessments and Challenges

Analysis of the water cycle systems for each township and consultation with Council to identify organisational integrated water management challenges.

Including: Develop baseline and future water balance model, Identify organisational challenges to adopt integrated water management and workshop with steering committee and PWG?

Phase Three – Integrated Water Management Opportunities

With stakeholders, identify opportunities to enhance Council's capacity to adopt integrater water management, as well as place-based opportunities for integrated projects across the townships, with concept designs for selected priorities.

Including: long list of integrated water management opportunities, portfolio development of opportunity prioritisation, steering committee workshop and Draft Integrated Water Management Strategy.

Phase Four – Strategy and Outputs

Finalising the Plan.

Including: develop priority integrated water management opportunity concepts, develop implementation roadmap prepare final strategy and outputs, and seering committee presentation.

Strategic Directions for Integrated Water Management

There are four strategic directions for integrated water management for Council to consider, reflecting the different ways in which it can be applied as an approach in practice:

DIRECTION ONE

Enhancing Council's integrated water Management capability.

DIRECTION TWO

Responding to specific integrated water management challenges across South Gippsland.

DIRECTION THREE

Trialling niche integrated water management opportunities in townships.

DIRECTION FOUR

Exploring collaborative integrated water management opportunities with other partners.

Direction One: Enhancing Council's Integrated Water Management Capability

Building Council's capacity to apply integrated water management in practice is expected to deliver benefits across each of the Plans outcome's.

Program 1.1 Building integrated water management knowledge, leadership, collaboration and accountability

This program aims to build cohesion between Council departments and to increase the Council's ability to apply integrated water management principles as early as possible in critical decision-making processes.

Improving Council's ability to collaborate across departments at various stages of planning and design of water-related township infrastructure will help drive the holistic, system-based approach required for integrated water management. Senior management and Councillors must understand what it is and how it can add value to forward strategic planning processes, such as community visioning and place-based planning.

Any infrastructure designed and built now must functionally suit current and future conditions, and integrated water management should be part of this planning. This type of water management requires a shared understanding of the issues, co-design of the preferred solutions and mutual commitment to implementing the agreed solutions. Accountability across departments and teams is required to implement these opportunities.

An essential element of successful integrated water management programs will include the presence of a leader within the organisation, i.e. someone who believes in integrated water management as an approach and is willing to advocate for change internally. This leader should be located within a critical area of the business (e.g. engineering), and they can be essential catalysts for adoption. Roles for the leader could include coordinating actions identified by the integrated water management working group, scanning for potential funding opportunities, and regularly liaising with other integrated water management partners. They can also help raise general awareness, buy-in and culture from across all relevant functional areas.

Activity Number	Recommended Activities
1.1.1	Formalise an integrated water management working group with cross-department representation including an integrated water management lead and assign accountabilities for where possible, and criteria to determine where place-based projects will occur.
1.1.2	Adopt standard approaches to township strategies, township structure and framework plans, and community infrastructure plans township plans that include consideration of integrated water management.
1.1.3	Review the annual Capital Works Program annually to identify opportunities for integrated water management to be adopted effectively and efficiently in the planning and design process.

Direction Two : Responding to Critical Water System Related Challenges

The programs within this strategic direction respond to critical water system-related challenges experienced across South Gippsland townships.

Program 2.1 Invesigating alternative water sources

This program identifies opportunities to investigate the use of alternative, fit-for-purpose water sources for specific uses across South Gippsland. The consultation with stakeholders identified 34 opportunities for alternative, fit-for-purpose water across 11 towns.

Most township-based opportunities for alternative water were small-scale, low impact (in terms of expected reduction in potable water) and high effort to implement and maintain (such as stormwater harvesting and reuse). Consequently, very few practical opportunities currently exist for alternative water across South Gippsland.

One potential opportunity is the Council's use of potable water to deliver road construction and maintenance activities, particularly for dust suppression, resealing, and grading roads. Class C Recycled Water cannot be used for road construction activities, but using Class A Recycled Water may be possible. Various factors must be considered, including the purpose of use, application methods and public accessibility. Public and environmental health are the two critical risk areas that need to be assessed before Class A water can be approved for this use.

The second opportunity is improving the quality of recycled water available to the township of Foster from the nearby treatment plan. This is out of the Council's control, but it could advocate to South Gippsland Water for a plant upgrade, which would open up more recycled water use nodes in the township and help make the investment more viable.

Another aspect of sustainable water use is to continue to pursue water efficiency measures to reduce the Council's corporate potable water consumption at specific sporting reserves and other high water-using facilities. Council could undertake a sustainable water use study to assess the effectiveness of existing demand-side initiative on water efficiency, such as playing surface drainage upgrades, replacement with warm season turf and irrigation efficiencies.

Activity Number	Recommended Activities
2.1.1	Continue to liaise with South Gippsland Water to investigate the potential for using Class B or C water in roads, high potable water use sites and civil construction activities.
2.1.2	Advocate to South Gippsland Water to understand the status and cost implications of the integrated water management project to improve the recycled water quality supply to the Foster Showgrounds and reserves.

Program 2.2 Improving Onsite Wastewater Management Systems and Processes

Many towns in South Gippsland are unsewered, so they rely on privately owned and managed Onsite Domestic Wastewater Management Systems or septics. Council's Domestic Wastewater Management Plan highlights that over 10,000 septic tank systems are used across the Shire.

When these systems fail or are inadequately managed, human pathogen loads in wastewater pose a potential risk to the community and environmental health. This can occur due to legacy-related discharges, old or poorly maintained septics, or locations on subdivided lots that are too small to contain the wastewater.

Council has significant responsibilities under the General Environmental Duty in the planning, installation, and operation of these systems, including:

Planning

- Developing and implementing Domestic Wastewater Management Plans to manage the risks associated with unsewered areas.
- Making recommendations (to the relevant water corporation) on high-risk unsewered areas that require sewer or alternative wastewater servicing.

Installation

- Approving the construction, installation or alteration and use of onsite systems by issuing planning and septic permits that comply with policy and regulations.

Operation

- Monitoring – identifying and addressing potentially polluting onsite systems discharging offsite.
- Inspections – ensuring compliance with relevant permit conditions.

With urban expansion and tourism growth, the extent of this task is increasing, with a growing workload and costs of planning and approvals, compliance, education, monitoring, and problem remediation. This program involves implementing priority actions identified in the Domestic Wastewater Management Plan (2022-2026) to ensure Council can meet its onsite wastewater management system obligations under the General Environmental Duty.

Activity Number	Recommended Activities
2.2.1	Provide regular opportunities to improve community and stakeholder understanding and support of improved wastewater management projects and programs.
2.2.2	Continue the education program to assist property owners in understanding and complying with their legal responsibilities for monitoring and maintaining their wastewater systems.
2.2.3	Ensure that planning and infrastructure proposals adequately address wastewater management needs for townships.

Program 2.3 Proactive Drainage, Stormwater, Flooding and Coastal Risks Management

Council is responsible for managing local drainage and stormwater, including maintaining existing assets, reviewing and approving development applications including proposed new drainage assets, ensuring generated stormwater quality meets the requirements and flood management. Many issues raised through discussions with Council were related to legacy drainage and stormwater issues where retrospective actions have been identified to rectify matters.

Proactive drainage and stormwater management involves initially understanding the existing drainage infrastructure (location and condition of assets) and associated flooding conditions/ capacity constraints. Due to the limited resources (both time and cost), this understanding would enable a risk-based approach to prioritising the legacy issues. Identifying how the problems have occurred and documenting these as lessons learnt/sharing internally will build Council's internal capability and give rise to preventative actions that can be implemented, such as those already identified as part of this Integrated Water Management Plan.

Managing coastal risks related to inundation from sea level rise has also been identified as a critical issue for tourism towns such as Venus Bay, Sandy Point and Waratah Bay. Council's Coastal Strategy Discussion Paper outlines a summary of key priorities to manage and reduce the risk of sea level rise in the community. A key one is ensuring that planning scheme documentation is updated to highlight the risks (through a designated overlay) and removing greenfield growth areas, which are now considered legacy decisions.

These actions are essential as developers and landowners may continue seeking the Council's approval for development within these affected twons, which would increase the number of people and homes affected and isolated during high tidal events due to the existing low-lying single access/egress road. Information about coastal sea level rise risks must also be clearly articulated within planning documentation and through engagement to ensure the community is well-informed and prepared.

Activity Number	Recommended Activities
2.3.1	Prepare a Drainage Asset Management Plan.
2.3.2	Through federal government funding, undertake coastal and estuarine risk mitigation modelling and assessment of disaster risk from coastal levees and structure failure.
2.2.3	Ensure that planning and infrastructure proposals adequately address wastewater management needs for towns including Fish Creek, Tarwin Lower, Toora, Welshpool, and Venus Bay.
2.2.4	Continue to prioritise the actions within Council's Coastal Strategy (2023).

Program 2.4 Improving Urban Waterways

Council has a limited direct land management role in managing urban waterways across South Gippsland.

Some identified locations where Council has direct control over waterway management include:

Stockyard Creek, Foster – The Foster Community Infrastructure Plan (2016) identified several opportunities related to this waterway and its role in local community amenities. With the Catchment Management Authorities and local community, the Council could improve the management, environmental values, amenities, and accessibility of the Stockyard Creek corridor through the township.

Muddy Creek Waterway, Toora – The development of a Management Plan is underway for this waterway that passes through private properties within Toora, and the management plan will be developed in consultation with the community. The responsibility of the relevant property owners to maintain the health of the waterway will be clearly defined.

Leongatha – Opportunities to improve the management of waterways passing through Leongatha have also been identified. This relates to constructed waterways established as part of new developments (including design through to construction and maintenance) and improvements to McIndoe Park drainage which would reduce flood risks and improve visual amenity.

Activity Number	Recommended Activities
2.4.1	Continue connecting existing open space and reserves with new residential developments with footpaths and shared trails.
2.4.2	Request that West Gippsland Catchment Management Authorities to develop a Muddy Creek Waterway Management Plan, which clearly outlines the responsibilities of property owners to maintain the waterway's health and considers resident concerns about flooding of their homes (along the lower portion of Mill St Toora.).
2.4.3	Work with the Catchment Management Authorities to explore opportunities to improve the management of constructed waterways built as part of new developments within developing townships, including design, construction, and maintenance considerations. Example is Stockyard Creek, Foster.
2.4.4	Investigate opportunities to reduce flood risks and improve visual amenity for the open drain running through McIndoe Park in Leongatha.

Program 2.5 Using Green Blue Infrastructure to Bring Water into Urban Landscapes

This program responds to the known challenge of low awareness and knowledge of Green Blue infrastructure/water sensitive urban design techniques across the Shire. It seeks to increase the Council's ability to consider these approaches in retrofitting public infrastructure across its townships.

Green-blue infrastructure (formerly known as Water Sensitive Urban Design) combines the values of green spaces, trees and plants with the water available in urban drainage and stormwater networks. A Green Blue Infrastructure approach to public infrastructure in townships to control water (e.g. roads, verges, kerb and channel drains) aims to use natural processes better to control the quantity, velocity, and quality of water emanating from the urban landscape and improve living assets. Green-Blue Infrastructure principles emphasise the need to consider stormwater as an opportunity to help 'green' townships, primarily by making greater use of rainwater and stormwater where it falls through infiltration and irrigation, conveying it safely and more slowly to reduce velocity and improve water quality.

There are various industry guidelines for Green Blue Infrastructure, including an introductory level guide for it in small towns; - Green Blue Infrastructure - A Guide for small towns in the Central Highlands Region of Victoria (Encader Consulting 2022).




Activity Number	Recommended Activities
2.5.1	Ensure relevant departments are aware of existing industry best practice guidelines and introduce the techniques at existing cross-departmental planning and knowledge-sharing opportunities.
2.5.2	Ensure Green Blue Infrastructure is considered in significant township infrastructure business case/concept design stages.
2.5.3	Support staff attendance at appropriate professional development training opportunities for Green Blue Infrastructure.
2.5.4	Develop internal guidelines that describe how Green Blue Infrastructure can be applied to retrofits of urban infrastructure in townships or a checklist for embedding it in new urban infrastructure design.
2.5.5	Record Green Blue Infrastructure assets in Council asset register.

Direction Three: Reducing Integrated Water Management Risks from Future Development in Foster

This strategic direction identifies programs of activity that would help Council address critical water-related issues at specific townships.

Program 3.1 Reducing Integrated Water Management Risks from Future Development in Foster.

Foster is a rural township subject to some growth and development over the coming years. The Foster Structure Plan (2008) and subsequent studies have guided and informed the township's growth. Recent developments have, however, highlighted that localised constraints are not appropriately captured. This includes construction, flooding and drainage issues associated with poor ground conditions, flat topography and limited pipe grade and cover.

An improved understanding of the Township's constraints is critical for effective development planning, including identifying new drainage infrastructure and upgrade requirements. Gaining this understanding would involve consultation with internal Council departments to identify the specific areas of ground, drainage, and flooding issues within Foster and how they relate to the recent developments within the town. The outcomes of this consultation would inform updates to the Foster Structure Plan and associated studies.

Activity Number	Recommended Activities
3.1.1	Undertake consultation with various Council departments to identify the specific areas of ground, drainage, and flooding issues within townships. Map these issues with the recent development areas that have been constructed, approved, and yet to develop.
3.1.2	Review the specific updates recommended as part of the Foster Structure Plan and associated studies to prevent the reoccurrence of the same problems as part of future development areas and build internal capacity.
3.1.3	Identify other actions relevant to the various Council departments to improve future development outcomes and manage existing flooding issues (through risk-based drainage rectification works).

Direction Four: Collaborative Partnerships for Integrated Water Management Outcomes

This strategic direction identifies opportunities for Council to work collaboratively with other partners, such as the urban development sector, Water Corporations, West Gippsland Catchment Management Authority, community groups and adjacent Councils to implement joint projects that achieve integrated water management outcomes.

Program 4.1 Supporting Adoption of Integrated Water Management by Urban Developers

Council is responsible for statutory planning covering drainage, stormwater, streetscapes and public open space for new developments in small towns. This includes supporting the application of integrated water management to its areas of specific responsibility under Clause 56.07 of the Victorian Planning Scheme, including:

- Clause 56.05-1 Integrated Urban Landscape Standard C12
- Clause 56.07-3 Wastewater Management Standard C24
- Clause 56.07-4 Stormwater management – standard C25

With significant infill and greenfield development occurring in South Gippsland, there are opportunities for Council to work proactively with prospective urban developers to improve the application of integrated water management to achieve long-term community outcomes.

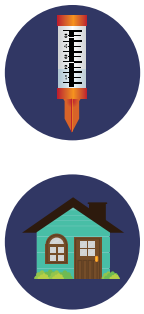
This program focuses specifically on council's role in regulating stormwater management in new developments, which includes:

- Minor or local drainage systems to contain run-off from minor storms to prevent nuisance flooding.
- Major drainage system to provide for the safe and effective passage of stormwater flows and minimise damage to property (including overland flow paths via roads or drainage reserves).
- Water-sensitive urban design or Green Blue Infrastructure, which seeks to retain and infiltrate water into living urban landscapes, thus reducing runoff and improving stormwater quality

However, while the planning scheme clearly states what needs to be managed, it is silent on how this should be undertaken at the development level. Some integrated water management techniques are perceived as novel and unproven, and others may be perceived as too costly in terms of establishment costs or land take. Consequently, it can be challenging for Councils to seek these solutions beyond the minimum requirement.

This requires Council to proactively engage with developers as early as possible in the planning and design stages of the development model. Council should aim to work with developers to achieve sustainable, fit-for-purpose solutions rather than seek to apply regulatory requirements rigorously. The steps Council can take to move towards this include:

- Council to come to a general agreement internally on its expectations for minor and major drainage and Green Blue Infrastructure in new developments, including its preferences for different techniques.
- Consider introducing pre-development applications and a more formalised discovery process of differing views and potential trade-offs.



Activity Number	Recommended Activities
4.1.1	Undertake consultation with various Council departments to identify the specific areas of ground, drainage, and flooding issues within townships. Map these issues with the recent development areas that have been constructed, approved, and yet to develop.
4.1.2	Review the specific updates recommended as part of the Foster Structure Plan and associated studies to prevent the reoccurrence of the same problems as part of future development areas and build internal capacity.
4.1.3	Identify other actions relevant to the various Council departments to improve future development outcomes and manage existing flooding issues (through risk-based drainage rectification works).

Program 4.2 Working with Stakeholders to Improve Flood Understanding

Working with stakeholders to improve flood understanding across key townships is critical for effective flood management and community resilience. Improved flood awareness across Council, Catchment Management Authorities and community leads to more informed decision-making and sharing of flood risks and mitigation measures.

Collaborating with the Catchment Management Authorities provides Council with support in undertaking accurate flood mapping and modelling. In addition to improving flood awareness and preparedness, the flood study outputs can also be used to develop risk management strategies that address specific local priorities.

Council have several ongoing actions to secure funding to complete flood studies for Fish Creek, Toora and Tarwin Lower. A flood study at Nyora has also been identified as a project that will be delivered jointly with Melbourne Water. A number of activities/opportunities have been identified to improve the understanding of the process involved in completing a flood study (inputs and various stages) in addition to ensuring the outputs provide the greatest value for various Council departments (including prioritisation and implementation of structural and non-structural flood risk reduction measures).

Activity Number	Recommended Activities
4.2.1	Work with Melbourne Water to undertake the joint flood mapping project for the township of Nyora.
4.2.2	Advocate to Melbourne Water / Catchment Management Authorities to prepare a guideline for improving flood understanding (including flood study process and outputs).

Integrated Water Management and Council - How can Integrated Water Management Impact Community Aspirations?

Integrated water management is not an end in itself; rather, it is a process of discovering how the water cycle system could enhance a particular township or place. Therefore, the broader aspirations of the community in that place are the starting point for understanding how integrated water management can add value.

The Council Plan 2022-2026 (SGS, 2022) outlines six strategic objectives to achieve Council's vision to "support the whole Shire in creating economic, environmental and social prosperity for this and future generations". There are many opportunities where the outcomes from an integrated water management approach could contribute to the Council Plan Objectives and Priorities.

Council Objective	Relevant Council Plan Priority	Relevant Integrated Water Management Outcomes
Connecting Our People and Places	• Enhance the network of trails and footpaths to improve pedestrian accessibility and flow to create all-ability connections between towns, tourism sites, health services and within local neighbourhoods.	
Economy and Industry	• Strengthen economic resilience and encourage innovation to build the economy of the future.	
Healthy and Engaged Communities	• Develop a strong relationship and partnership with the Bunurong and Gunaikurnai people to support our common environmental, cultural, social and economic objectives.	

Council Objective	Relevant Council Plan Priority	Relevant Integrated Water Management Outcomes
Healthy and Engaged Communities	• Create places and spaces for people to connect and participate in local activities, sports and leisure, and community events, and enjoy our libraries, parks, gardens and coastal areas.	 
Leading with Integrity	• Understand our community's priorities, ensure their needs are met, and engage openly and often.	
	• Place our community at the centre of everything we do and be outward-focused.	 
	• Strategically advocate with our partners to the State and Federal Government on issues and opportunities that impact our community.	
Protecting and Enhancing our Environment	• Use our Strategic Planning mechanisms to prioritise protecting and enhancing our natural environment.	
	• Advocate, plan and encourage the protection of our natural landscapes and coastline.	
	• Plan and implement bio-link corridors to increase the percentage of tree cover and habitat in our Shire and support our community including landowners to partner with us in implementing bio-links.	
	• Build resilience in our community and organisation to mitigate risk and damage caused by extreme weather events.	 

Council Objective	Relevant Council Plan Priority	Relevant Integrated Water Management Outcomes
Sustainable Growth	• Manage urban growth within defined town boundaries to deliver fit-for-purpose infrastructure in partnership with other agencies that share this responsibility. • Protect the character of our communities, including our built, natural and cultural heritage. • Celebrate our communities and foster a sense of pride in the unique characters of our townships. • Support new developments that include diverse block sizes and make a positive long-term contribution to the community, and increased affordable housing opportunities. • Support our coastal communities in responding to existing and emerging risks to their liveability and environmental health.	

Factors Affecting Integrated Water Management Related Challenges and Opportunities

Internal Factors

Integrated Water Management is one of many perspectives that Council staff must consider when undertaking service delivery responsibilities. The challenge for smaller regional councils is how to embed the principles of integrated water management into existing systems and decision-making processes, from the strategic to the operational level whilst financially constrained. Throughout the development of the Plan, staff identified various internal factors that affect the Council's capacity to adopt integrated water management. These are discussed below.

Leadership, Collaboration and Accountability

Local Government is responsible for the planning, design and operation of significant water-related urban infrastructure, as well as through its statutory planning processes. Integrated water management is a complex endeavour for Council, typically with multiple players having responsibilities distributed across the business. Differing understanding of the issues, objectives and priorities between different departments can lead to conflict and loss of opportunities for integration, especially in early planning and design stages—the holistic, system-based approach espoused by integrated water management warrants a need for multi-departmental representation and buy-in through collaboration.

A key challenge facing Council teams is embedding cross-departmental collaboration in the planning and design stage of new and retrofit urban infrastructure. Driving this integrated and collaborative approach can be challenging due to the wide-ranging service delivery roles and highly varied priorities of Council teams.

Introducing integrated water management thinking into existing Council decision-making processes is a way of adding value rather than adding to existing commitments. There are various existing processes where the Council could consider the application of integrated water management principles as seen below. As a general rule, applying integrated water management to strategic, longer-term decision-making (which has long-term implications) is likely to be more productive than short-term operational decisions. Therefore, it is important for the Council to adopt integrated water management in Township strategies, structure plans, and community

Level of decision-making, time frame of consequences	Types of processes within Local Government	Examples	Opportunity for integrated water management to add value
Strategic, Long-term	Corporate Plans	Council Plans	High
	Community or Place-based Plans	Township Strategies	Very High
	Statutory Planning	Township Structure and Framework Plans	Very High
Tactical, Medium-term	Service Plans for functional areas	• Municipal Health and Wellbeing Plan • Community Health Services	High Medium
	Statutory Planning	Town Planning applications	High
Operational, short term	Service Plans	Annual Capital Works Program	Medium

Integrated water management requires a shared understanding of the issues, co-design of the preferred solutions and mutual commitment to implementing the agreed solutions. Accountability across departments is required to ensure the integrated water management opportunities identified in this plan are achievable.

Awareness, Knowledge and Skills

Throughout the consultation process, it was identified that there is currently low capability to apply IWM as an approach. Integrated water management is just one area of potential service delivery for a Council, so securing time and resources to build capability can be challenging. It can also be difficult to secure staff with the required level of competency to implement an integrated water management approach.

Therefore, the development of the council's overall awareness and knowledge of Green Blue Infrastructure or Water Sensitive Urban Design techniques via formal training and the development of relevant local guidelines or practice notes will assist in building the integrated water management capabilities of the Council.

Perceived Technical and Financial Barriers

A critical barrier to implementing an integrated water management approach is the perceived technical and financial challenges. Historically, there has been concerns about alternative integrated water management solutions being more costly than conventional approaches and more complex to install and operate. There has also been concerns raised regarding community ownership, the uptake and maintenance of onsite stormwater management assets, which could be worsened with alternative integrated water management solutions. Leadership from within Council is required to support innovative integrated water management business cases whilst balancing resourcing and unintended consequences. This Plan is a part of the process required to overcome the technical and financial barriers, so that Council has a strategic direction in relation to integrated water management that outlines the value proposition of Green Blue Infrastructure and potential opportunities can be investigated.

Resources

One of the most common constraints raised by Council staff is their inability to secure the resources necessary to support the appropriate maintenance and renewal of existing water-related urban infrastructure, let alone build new integrated water management based infrastructure. Council has ongoing challenges with managing ageing infrastructure and the need for renewals or upgrades. This is evident when analysing Council's ten-year capital works plan which highlights the allocated expenditure is focused on retrofits of existing infrastructure due to age and capacity issues.

Budgets for water-related urban infrastructure typically do not factor in integrated water management based solutions. This makes it hard to mount a case for reviewing allocated resources against anything other than the business-as-usual option or trying alternatives. Adopting integrated water management solutions can also be perceived as more costly than conventional options. Collaboration and longer-term systems thinking are needed to leverage new approaches and mount compelling business cases. These business cases must also define the ongoing capital expenditure, operations, and maintenance requirements to secure appropriate funding.

Adoption of Integrated Water Management in New Developments

Statutory planning for new development drives developers to achieve minimum requirements for stormwater and drainage management, at least at the establishment cost, rather than integrated water management solutions that offer optimal benefit. Council has observed issues with developers meeting the minimum requirements, especially with stormwater management-related aspects of development.

There are also limited internal skills to appropriately assess the technical merits of water-related urban infrastructure proposals. Some integrated water management related aspects of new developments that enhance amenity and liveability and improve water retention are considered 'over and above' the minimum requirements by developers and, therefore, rarely considered. Good examples are green-blue infrastructure features and interconnecting green spaces through shared paths and trails.

Community Engagement

Integrated water management solutions in small townships, such as a Green-Blue Infrastructure streetscape retrofit, can differ significantly from the community's expectations. Therefore, engaging the community in the scoping, visioning, and co-design of the integrated water management solution is essential. However, this requires extensive community engagement at the township level, which can be costly and time-consuming.

External Factors

Urban Growth

While South Gippsland is not a fast-growing Shire l within regional Victoria, there is significant development pressure and an expectation of ongoing growth in the number and scale of residential subdivisions currently being considered. Most of the urban growth occurs in Korumburra, Leongatha, and Nyora.

Council has undertaken strategic planning for these developing townships, with existing community infrastructure plans and drainage strategies in place to inform future development. Urban development in these towns will increase the demand for potable water, sewerage and potentially recycled water services from the relevant water corporations. Longer-term strategies are in place to cope with these service changes.

For Council, the most significant water-system-related impacts of urban development growth are managing the increased volume, intensity and decreased quality of stormwater runoff due to the increase in impervious surfaces compared to the undeveloped landscape. New urban development is required to provide on-site stormwater management following Clause 56 of the Victorian Planning Provisions. However, Council's historical experience demonstrates the difficulties encountered in ensuring that stormwater treatment assets delivered by developers will function as intended for an acceptable design life.

The introduction of the Environmental Protection Agency's General Environmental Duty in 2017 highlights the need and responsibility of local government and all Victorians to reduce the harm to human health and the environment from pollution and waste. This also relates to the Environmental Protection Agency's Urban Stormwater Management Guidance (Publication 1739.1) introduced in 2021, which outlines the typical Best Practice Environmental Management Guideline pollutant removal targets and stormwater volume reduction targets. Integrated water management, for future developments, will be more critical to achieving these additional requirements.

The General Environmental Duty also applies to Councils' roles in preventing breaches regarding onsite domestic wastewater management systems. Many of Shire's townships are unsewered and rely on privately owned and managed onsite wastewater management systems. With urban expansion and tourism growth, onsite wastewater management system management is beginning to present challenges for Council, which is expected to meet the growing workload and costs of planning and approvals, compliance, education, monitoring, and remediation of problems. Advocacy to water authorities for sewer is required.

Climate Change

The projected impacts of climate change are increasingly significant to consider in urban landscapes and water cycle system planning and management. The Gippsland Integrated Water Management Safety Data Sheet identifies as a priority the need to adapt water management to achieve the best outcomes for a growing population and changing economy under climate change (DELWP, 2022a).

The Westernport catchment covers the north-western portion of South Gippsland (consisting of Nyora, Poowong and Loch Townships within the Integrated Water Management Plan scope). The catchment is predicted to become hotter and drier, with lower rainfall expected to reduce reservoir inflows and decrease river flows (DELWP, 2022b).

However, the reduction in average annual rainfall is expected to be accompanied by an increased frequency and intensity of short-duration rainfall events, which are expected to increase the risk of flooding. Temperatures are expected to increase by an average of 1.3°C by 2040 (under a medium climate change Scenario 4) across the Greater Melbourne Metropolitan Region, which in turn is expected to increase forest and grassland fire risk in South Gippsland's rural communities and high-value native forests.

Similar climate change impacts are anticipated for the other parts of South Gippsland, and additional sea level rise risks are expected to impact the low-lying coastal townships of Tarwin Lower, Venus Bay, Sandy Point, and Waratah Bay.

Urban Landscape Liveability

Township liveability and amenity are becoming increasingly crucial for South Gippsland's residential community. Green open spaces, natural shade, and walkability are essential characteristics of a liveable community, and they are becoming even more so with the increasing number of extreme heat days per year.

Creating these features in existing and new urban landscapes requires a more holistic approach to renewing urban design and community infrastructure assets. The Gippsland Integrated Water Management Forum has identified 'Increasing community wellbeing through improved liveability' as a priority focus for integrated water management efforts across the region.

Economic Outlook

The key industries contributing to South Gippsland Shire Council's current economic output include food and fibre, construction, energy and tourism. South Gippsland Shire Council's estimated annual economic output is $3.8 billion, with 3,700 businesses supporting 11,000 jobs. The Economic Development Strategy was prepared in 2021 to achieve Council's vision of 'creating a thriving, diverse and sustainable local economy built on the region's natural advantages. A key consideration is that the economy in Gippsland is changing, and to accommodate future growth and support businesses, integrated water planning and management is essential. The following key integrated water management aspects are directly related to economic growth:

- The Gippsland Integrated Water Management Forum has identified several water-intensive industries within Gippsland, highlighting the importance of increasing alternative fit-for-purpose water sources.
- A sustainable and growing economy utilises the natural environment and improves liveability. To achieve this, the Economic Development Strategy has highlighted the importance of supporting enabling infrastructure with a critical strategic action of advocating for continuous infrastructure improvements to manage adverse impacts on receiving environments.
- More businesses and tourism will pressure existing drainage and wastewater systems, particularly in townships such as Fish Creek, which are not sewered and have wastewater overflow issues.

Traditional Owner Involvement

South Gippsland Shire Council has strong Aboriginal cultural significance to the region's Traditional Owners, the Bunurong and Gunaikurnai people. There is growing recognition of the role of Traditional Owners in all water cycle system-related projects.

The Gippsland Integrated Water Management Forum has outlined the 'need to consider the water needs, impacts and opportunities for Traditional Owners in all projects, not just those that involve Traditional Owner organisations as project leads or implementation partners' as a priority focus for integrated water management.

Implementation Roadmap

This section presents a five-year roadmap for implementing the programs and activities outlined in the strategic directions.

The priorities expressed through this roadmap reflect Council's desire to focus its efforts on integrated water management activities where it can exert a high degree of control, is likely to achieve a positive impact and can implement the activities within current organisational settings and operational constraints.

- Ongoing – Activities which require ongoing review and updates on an annual or as needs basis.
- High priority – Likely to deliver a strong positive impact with relatively low effort, implement in the short term, preferably within two years.
- Medium priority – Likely to deliver positive impact with higher effort, implement in the medium term, within two to five years.
- Low priority – likely to deliver some positive impact, but with significant effort required, implement over the longer term, beyond four to five years.

The following cost and staff resourcing implications have also been applied where applicable:

- Cost to implement
    - Nil – Activities which require internal staff capacity and no budgeting / external funding
    - Low – less than $50,000
    - Medium – $50,000 to $150,000
    - High - $150,000 - $300,000
    - Very High - >$300,000
- Staff Implications
    - Low – redirection of existing staff effort; no additional staff resources likely to be required
    - Med – partial additional staff resources likely to be required
    - High – significant additional staff resources likely to be required

Please note that this implementation roadmap may change based on factors such as alignment with other initiatives, changing council priorities, funding availability, commitment from different partners, etc.

It is expected that many actions will require collaborative efforts between interested Departments across Council. Most activities need to be scoped further to be implementation-ready.

Program	Activity	Priority	Cost Implications	Resource Implications	Estimated Costs / Planned Resources
1. Enhancing Council's Integrated Water Management Capability					
	1.1 Build Integrated Water Management Knowledge, Leadership, Collaboration and Accountability				
1.1.1	Formalise an Integrated Water Management Working Group with cross-department representation including an lead and assign accountabilities where possible, criteria to determine where place-based projects will occur and to monitor this plan.	High	Nill	Medium	Business as Usual
1.1.2	Adopt standard approaches to Township Strategies, Township Structure and Framework Plans and Community Infrastructure Plans Township Plans that include consideration of integrated water management.	Medium	Nill	Medium	Business as Usual
1.1.3	Review the annual Capital Works Program annually to identify opportunities for integrated water management to be adopted effectively and efficiently in the planning and design process.	Ongoing	Nill	Medium	Business as Usual

2. Responding to Critical Water System Related Challenges					
	2.1 Investigating Alternative Water Sources				
2.1.1	Continue to liaise with South Gippsland Water to investigate the potential for using Class B or C water in roads, high potable water use sites and civil construction activities.	Medium	Nill	Medium	Business as Usual
2.1.2	Advocate to South Gippsland Water to 1. understand the status and cost implications of the Integrated Water Management Project to improve the recycled water quality supply to the Foster Showgrounds and reserve 2. for sewerage schemes in unsewered towns.	Medium	Nill	Medium	Integrated Water Management Forum
	2.2 Improving Onsite Wastewater Management Systems and Processes				
2.2.1	Provide regular opportunities to improve community and stakeholder understanding and support of improved wastewater management projects and programs.	Ongoing	Low	Medium	Integrated Water Management Forum
2.2.2	Continue the education program to assist property owners in understanding and complying with their legal responsibilities for monitoring and maintaining their wastewater systems.	Ongoing	Medium	Medium	Business as Usual

2.2.3	Ensure that planning and infrastructure proposals adequately address wastewater management needs for townships.	Ongoing	Medium	Medium	Business as Usual
	2.3 Proactive Drainage, Stormwater Flooding and Coastal Risks Management				
2.3.1	Prepare a Drainage Asset Management Plan	High	High	High	Business as Usual
2.3.2	Under the upcoming federal government grant undertake coastal and estuarine risk mitigation modelling and assessment of disaster risk from coastal levees and structure failure.	Medium	High	Medium	Internal Staffing Costs Only
2.3.3	Continue to seek funding from state and federal government to improve flooding understanding across multiple Townships (including Fish Creek, Tarwin Lower, Toora, Welshpool, and Venus Bay).	Low	High	High	Internal Staffing Costs Only
2.3.4	Continue to prioritise the actions within Council's Coastal Strategy (2023).	Ongoing	Low	Medium	Business as Usual
	2.4 Improving Urban Waterways				
2.4.1	Continue connecting existing open space and reserves with new residential developments with footpaths and shared trails.	Ongoing	Low	Medium	Annual Budget Consideration Required

2.4.2	Encourage the West Gippsland Catchment Management Authority to develop a Muddy Creek Waterway Management Plan, which clearly outlines the responsibilities of property owners to maintain the waterway's health and considers resident concerns about flooding of their homes (along the lower portion of Mill St Toora).	Medium	Low	Medium	Integrated Water Management Forum
2.4.3	Work with the Catchment Management Authority to explore opportunities to improve the management of constructed waterways built as part of new developments within developing townships, including design, construction, and maintenance considerations. Example is Stockyard Creek, Foster.	Medium	Low	Medium	Integrated Water Management Forum
2.4.4	Investigate opportunities to reduce flood risks and improve visual amenity for the open drain running through McIndoe Park in Leongatha.	Medium	Low	Medium	<$25,000.00 May need consulting services. This does not include construction.

	2.5 Using Green Blue Infrastructure Green Blue Infrastructure to Bring Water into Urban Landscapes				
2.5.1	Ensure relevant departments are aware of existing industry best practice guidelines and introduce the techniques at existing cross-departmental planning and knowledge-sharing opportunities.	Ongoing	Low	Medium	<$10,000.00
2.5.2	Recommend Green Blue Infrastructure is considered in significant township infrastructure business case/concept design stages.	Medium	Low	Medium	Business as Usual
2.5.3	Support staff attendance at appropriate professional development training opportunities for Green Blue Infrastructure.	Ongoing	Medium	Medium	<$25,000.00
2.5.4	Develop internal guidelines that describe how Green Blue Infrastructure can be applied to retrofits of urban infrastructure in townships or a checklist for embedding GBI in new urban infrastructure design.	High	Medium	Medium	<$10,000.00
2.5.5	Record Green Blue Infrastructure assets in Council asset register.	Medium	Medium	High	Annual Budget Consideration Required

3. Trialing Place-Based Integrated Water Management Solutions					
	3.1 Reducing IWM Risks from future development in Foster				
3.1.3	Undertake consultation with various Council departments to identify the specific areas of ground, drainage, and flooding issues within townships. Map these issues with the recent development areas that have been constructed, approved, and yet to develop.	High	Nil	Medium	Business as Usual
3.1.2	Review the specific updates recommended as part of the Foster Structure Plan and associated studies to prevent the recurrence of the same problems as part of future development areas and build internal capacity.	Medium	Low	Medium	Internal Staffing Costs Only
4. Collaborative Partnerships for Integrated Water Management					
	4.1 Supporting the Adoption of Integrated Water Management by Urban Developers				
4.1.1	Liaise directly with developers and their consultants to understand barriers to adopting integrated water management and how the Council could improve collaboration during the planning and design process.	High	Low	Medium	Internal Staffing Costs Only

4.1.2	Prepare an Integrated Water Management Guide for developers explaining South Gippsland's broader community aspirations for new developments and the role of integrated water management in minor and major drainage and Green Blue Infrastructure.	Medium	Medium	Medium	<$25,000.00 May need consulting services.
4.1.3	Establish an approach to manage legacy stormwater requirements.	Low	Medium	High	<$25,000.00 May need consulting services.
	4.2 Working with Stakeholders to Improve Flood Understanding				
4.1.1	Work with Melbourne Water to undertake the joint flood mapping project for the township of Nyora.	High	Medium	Medium	$30,000.00
4.1.1	Advocate to Melbourne Water / Catchment Management Authorities to prepare guidelines for improving flood understanding (including flood study process and outputs).	High	Medium	Medium	Internal Staffing Costs Only

Glossary

Baseflow	Baseflow is the portion of the streamflow that is sustained between precipitation events, fed to streams by delayed pathways.
Best Practice Environment Management	Best Practice Environment Management in the context of stormwater management refers to the guidelines published by Commonwealth Scientific and Industrial Research Organisation which outline the urban stormwater pollutant reduction targets required for many developments.
Catchment	A catchment is an area of land where water collects when it rains, often bounded by hills and eventually flowing to a wbody of water such as a creek, river, dam, lake or ocean; or into a groundwater system.
Climate Change	Advocate to Melbourne Water / Catchment Management Authorities to prepare guidelines for improving flood understanding (including flood study process and outputs).
Community	Includes individuals, public and private landholders, community groups and business owners.
Commonwealth Scientific and Industrial Research Organisation	Industry, Science and Resources. It is an Australian Government statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949*.
Department of Environment, Energy and Climate Action	Supports Victoria's natural and built environment to ensure economic growth and liveable, sustainable and inclusive communities. The Water and Catchments group of the Department assists the Minister for Water, develops and implements state policies and programs, and oversees the administration of organisations including catchment management authorities.
Environmental Protection Act	An independent federal agency, created in 1970, that sets and enforces rules and standards that protect the environment and control pollution
Fit for Purpose (Water Supply)	Water of a quality that is appropriate for its intended use.
Green Blue Infrastructure	This concept represents an approach to sustainable urban development, which prioritises the protection, enhancement and restoration of existing ecosystems, hydrological and landscape features. It includes aspects that are living ('green') and manage water ('blue') and can also be referred to as Water Sensitive Urban Design.

General Environmental Duty	The general environmental duty is at the centre of the *Environment Protection Act 2017* and it applies to all Victorians, and all businesses located in Victoria. It makes it clear that businesses have a responsibility to reduce risk to human health and the environment. It states that you must manage your activities to reduce the risk of harm to human health and the environment and from pollution or waste.
Gippsland Water	Water authority supplying clean drinking water and wastewater services to towns and communities in the Gippsland region. Mirboo North is the only township within South Gippsland Shire that is located in Gippsland Water's service area.
Greenfield Land	Undeveloped land identified for residential or industrial/commercial development, generally on the fringe of metropolitan Melbourne.
Grey Water	Untreated and relatively clean water (when compared to Sewerage) from baths, sinks, washing machines and kitchen taps.
Infiltration	Infiltration is the process by which water on the ground surface enters the soil.
Integrated Water Management Forum	A meeting of urban water management organisations to identify, prioritise and commit to the investigation of integrated water management opportunities.
Melbourne Water	Melbourne Water is an Australian statutory authority owned by the Victorian State Government, which controls and manages much of the water bodies and supplies in metropolitan Melbourne, the capital of Victoria.
Onsite Wastewater Management Systems	These systems are multi-stage systems that collect, treat, and disperse wastewater generated by a home or business. They are typically refered to as septic systems and are required when the subject property cannot be connected to a nearby reticulated sewage system.
Potable Water	Water that is suitable for human consumption
Rainwater	Water that has fallen as rain or has been collected from rainfall.
Recycled Water	Water derived from sewerage systems or industry processes that is treated to a standard appropriate for its intended use. Class A is the highest quality of recycled water, with the widest range of uses including those which involve direct human contact. It is produced according to strict guidelines developed by Environmental Protection Act Victoria and the Department of Health. Class B and C recycled water is treated to a lesser degree and can be used to irrigate sports fields, golf courses and other uses but has restrictions around human contact.

Runoff	The portion of rainfall which actually ends up as streamflow, also known as rainfall excess.
State Environment Protection Policy	Under the *Environment Protection Act 2017* (the Act) the state environment protection policies and waste management policies no longer have a formal legal role. This is because the Act introduces new duties such as the general environmental duty and new subordinate instruments.
Sewage	Wastewater produced from households and industry.
Sewerage	The pipes and plants that collect, remove, treat and dispose of liquid urban waste.
South Gippsland Water	Water authority supplying clean drinking water and wastewater services to towns and communities in the Gippsland region. Most of South Gippsland Shire is within South Gippsland Water's service area.
Stormwater	Runoff from urban areas. The net increase in runoff and decrease in groundwater recharge resulting from the introduction of impervious surfaces such as roofs and roads within urban development.
Urban Water Cycle	The cycle of water through urban environments. Distinguished from the natural urban water cycle by the transfer of water through built infrastructure and the high runoff rates generated by impervious surfaces.
Waterway	Rivers and streams, their associated estuaries and floodplains (including floodplain wetlands) and non-riverine wetlands.
Wetlands	Areas, whether natural, modified or artificial, subject to permanent or temporary inundation, that hold static or very slow-moving water and develop, or have the potential to develop, biota adapted to inundation and the aquatic environment. Wetlands may be fresh or saline.
West Gippsland Catchment Management Authority	*The Catchment and Land Protection Act 1994* established 10 catchment and land protection regions, each with a catchment management authority responsible for the integrated planning and coordination of land, water and biodiversity management.
Water Sensitive Urban Design	A set of principles that can be applied to sustainably manage water, providing opportunities for the development industry, local government and their communities to achieve more liveable cities with vibrant and healthy waterways. Specific assets such as wetlands, raingardens, swales, etc are considered Water Sensitive Urban Design assets and can also be referred to as Green Blue Infrastructure.

References

Department of Environment, Land, Water and Planning (2018) Westernport Integrated Water Management Forum Strategic Directions Statement. State of Victoria Department of Environment, Land, Water and Planning 2018

Department of Environment, Land, Water and Planning (2022a) Gippsland Integrated Water Management Forum Strategic Directions Statement. State of Victoria Department of Environment, Land, Water and Planning 2022

Department of Environment, Land, Water and Planning (2022b) Western Port Catchment Integrated Water Management Plan Summary. State of Victoria Department of Environment, Land, Water and Planning 2022

Department of Environment, Land, Water and Planning (2022c) IWM Progress Report March 2022

Encader Consulting (2022) Green-Blue Infrastructure: A guide for small towns in the Central Highlands Region.

Appendix

Appendix A – Larger Township Context

Leongatha

Leongatha is the largest urban settlement in the South Gippsland Shire and an essential service centre for nearby townships and rural districts. The Township has a current population of 4,700 people with an annual growth rate of over two per cent, with an expected population of almost 7000 by 2026.

This population growth is expected to be complemented by increased commercial and retail activity and the need for new and upgraded community infrastructure, including open space areas and stormwater management assets. Council has undertaken several studies which have informed the future growth areas and outline of infrastructure likely required.

- Flood impacts result from inadequate stormwater management within new residential areas, not considering the existing downstream drainage system capacity and concentrate flows.
- Stormwater management assets for new developments are not planned appropriately, resulting in ad hoc detention and stormwater assets being constructed.

- Constructed waterways / open drains have limited access and poor visual amenity.

- Limited connectivity (shared paths and trails) and green-blue infrastructure are needed to maximise existing and future open space areas.
- Integrated water management has not been considered for future developable areas, including limited consideration for multi-functional assets.

Korumburra

Korumburra is the second largest urban settlement in the South Gippsland Shire and the primary service centre for the western section of South Gippsland Shire Council. Its population was 4,500 in 2016, and it is expected to increase to approximately 6,500 by 2036. It is an important business, industry, education, health, and community centre for the South Gippsland region.

The township is surrounded by rural hinterland mainly used for dairy, beef, and snow pea farming. As the population grows, the proportion of families, retirees, and youth will increase. Significant population growth fuels the demand for accessible, coordinated, well-designed community infrastructure.

Integrated community facilities and services are vital for creating healthy communities that support social inclusion and enhance residents' well-being. New residential developments must be linked with existing areas and the town centre to ensure a socially vibrant town centre that provides equitable, accessible facilities and services for everyone in the community. Council has prepared various plans to assist with the targeted growth and planning of the Town.

- Increase in potable water demand as more development occurs.

- Flood impacts at existing downstream properties from upstream residential developments (due to insufficient flood storage & inappropriate conveyance).
- Challenges implementing practical and compliant stormwater and flood management assets/controls within new development areas.

- Sediment and erosion issues

- Limited connectivity (shared paths/trails) and blue-green infrastructure to make the most of existing and future open space areas.

Nyora

Nyora is in the northern part of South Gippsland and has approximately 1300 people. Due to its proximity to the southeastern suburbs of Melbourne, the town has been identified as having a high potential for future development. The Nyora Development Strategy was prepared in 2016. It included hydraulic TUFLOW modelling to understand existing flood conditions and a stormwater management strategy that outlined the detention, treatment, and conveyance assets required within the growth areas.

Since the strategy's implementation, new residential developments have occurred, including the construction of stormwater management assets. Additional growth areas not covered by the Nyora Strategy and challenges associated with the proposed stormwater management assets have highlighted the need to update the strategy.

The critical integrated water management issues for Nyora relate to urban development planning and design. If considered as early as possible in the planning and design of new urban landscapes, integrated water management solutions are more likely to successfully deliver improved liveability and community resilience.

- Existing drainage and flooding issues are expected to worsen with future development.
- Risk of failure of dams and resultant downstream impacts on developing areas.
- Limited feasibility of drainage infrastructure proposed as part of the Nyora Development Strategy.

- Limited connectivity (shared paths/trails) to make the most of existing and future open space areas.

Foster

Foster is located in the southeastern part of South Gippsland and recorded as having a population of 1,842 in 2016. Based on the 2021 census data, the current population has since increased to 2,044 people. Foster is a rural township with some urban and population growth expected over the coming years.

The critical integrated water management issues for Foster relate to the Township's existing stormwater drainage infrastructure and challenges associated with limited topography and poor ground conditions when proposing and constructing new drainage infrastructure. Development feasibility challenges related to achieving the 60-metre-wide constructed waterway buffer requirements and enhancing the Township's connectivity have also been raised.

- Flat topography grades and poor ground conditions result in challenges associated with drainage planning and flooding impacts.
- Unknown risk and impacts of existing dams on downstream properties.

- Development feasibility challenges with allowing for the 60-metre constructed waterway buffer Catchment Management Authority requirements.

- Limited connectivity (shared paths/trails) and blue-green infrastructure to make the most of existing and future open space areas.

Mrboo North

Mirboo North is located in the northeast part of South Gippsland and recorded a population of 2,300 people in 2016. It's considered a rural township, and slow growth is expected over the coming years. The Council prepared the Mirboo North Community Infrastructure Plan (2014) and Structure Plan Refresh (2017) to inform future planning and growth actions.

Mirboo North is the only township within South Gippsland that Gippsland Water services. Gippsland Water provides a reticulated wastewater and potable water system for the Township. The critical Integrated Water Managemnt issue relates to the absence of a reliable alternative water supply for the township in addition to Council's and the community's limited understanding of existing flooding conditions.

- Reliable alternative water supply not available.

- Limited understanding of existing flooding conditions and overland flow paths results in new developments and worsening flood impacts (with insufficient attenuation/conveyance of flows).

Fish Creek

Fish Creek is a picturesque township and popular tourism destination surrounded by idyllic lush countryside. However, the small town of about 800 residents relies on septic tanks to deal with its wastewater. This issue is more prominent in peak seasons where upward of 4,000 daily visitors can be expected. This has led to health and environmental risks for the small town, with heavy rain causing overflows and wastewater to run down to the main street and into the nearby creek from which the city draws its name.

Despite its small population, Fish Creek is one of the last towns on the way to Victoria's famous destination, Wilsons Promontory. It attracts many tourists, putting further stress on septic systems.

- Wastewater management issues resulting in overflows to receiving waterways and odour problems, especially during peak seasons.

- Limited understanding of existing flooding conditions and overland flow paths results in new developments and worsening flood impacts (with insufficient attenuation/conveyance of flows).

- Limited connectivity (shared paths/trails) and blue-green infrastructure to make the most of existing and future open space areas.

Appendix B – Green Blue Infrastructure Explained

Leongatha

Green Blue Infrastructure refers to natural and built assets within urban landscapes that are living (green) and which manage water (blue).

Green Infrastructure Assets:

Live vegetation (turf, grasses, shrubs, trees) and soils that grow them and the places we find them (gardens, nature strips, road edges, parks, public open spaces).

Blue Infrastructure Assets:

Those associated with collection movement, retention and use of water in urban landscapes (tanks, gutters, swales, drains, ponds, wetlands, waterways).

Benefits of Green Blue Infrastructure:

Social

- Improved urban amenity and Improved urban amenity and livability
- Cooler landscapes reduce the urban heat island effect
- Improved community physical and mental health

Environmental

- Enhances urban and aquatic biodiversity
- Increased tree canopy and decrease air pollution
- Increased stormwater/rainwater infiltration and moisture retention in soil

Economic Benefits

- Improved township entrances, 'kerbside appeal' for visitors.
- Better public open space - more significant usage and patronage
- Increased opportunity for the use of alternative water

Appendix C – Principles of Green Blue Infrastructure

Ensure Responsive and Integrated Design

Ensure infrastructure needs are evidence based, service focused and integrated with other planning and service delivery functions.

Increase Multifunctionality

Enhance the ability to allow different functional uses and activities within the same site to maximise the benefits to people and nature.

Apply Holistic, Systems Thinking

Adopt whole of life cycle and systems-based thinking in planning and design, spanning water, land, biodiversity and social systems and their interactions and consideration of environmental, social and economic values.

Protect, Enhance and Restore Natural Green Features

Where possible, protect the extent of natural green assets within the urban landscape and enhance the quality of those assets, or restor green assets where appropriate.

Increase Green Blue Connectivity

Improve connectivity of green and blue spaces to promote movement of people and biodiversity and strengthen connections between people and nature.

Increase Stormwater Detention, Retention and Reuse

Increase detention, retention, treatment and reuse of water that falls on the urban landscape close to its source and reduce velocity and volume of discharge.

Diversify Water Supplies

Where possible, use fit for purpose alternative source of water to reduce pressure on potable supplies.