Bass Coast Shire Council

Drainage Services Asset Management Plan | 2024-2028



BASS COAST



Acknowledgement of Country

Bass Coast Shire Council acknowledge the Bunurong as the Traditional Owners and Custodians of the lands and waters, and pays respect to their Elders past, present and emerging, for they hold the memories, the traditions, the culture and Lore.

Bass Coast Shire Council celebrates the opportunity to embrace and empower the Aboriginal and/or Torres Strait Island Communities in their diversity.

Bass Coast Shire Council will create opportunities for future recognition and respectful partnerships that will honour the Traditional Owners and Custodians, and Aboriginal and/or Torres Strait Islander Peoples.

Diversity and Inclusion

Diversity and Inclusion Bass Coast Shire Council is committed to providing communications and engagement that is welcoming, safe, accessible and inclusive for our community including First Nations, Culturally and Linguistically Diverse (CALD), Lesbian, Gay Bisexual, Transgender, Queer, Intersex and Asexual (LGBTQIA+) peoples, people with disability and of all ages.

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Document Control

Document ID: Drainage Services Asset Management Plan

Version	Date	Revision Details	Author	Summary of changes
1.5	24 June 2015	Drainage Services AM Plan - Initial Version	Assetic, LG	Final Draft v1.5 - Adopted
2	17 June 2020	Drainage Services AM Plan - Version 2	Assetic, PP, SH	Final Draft v2 - Adopted
3.4	15 May 2024	Drainage Services AM Plan - Version 3	Iinsights, PP, SH	Final Draft v3.4 - Adopted
Adoption of the document | Council Meeting - 15 May 2024				

1 Executive Summary

1.1 The purpose of the Plan

The purpose of this Drainage Services Asset Management Plan (DSAMP) is to inform Council's commitment to best practice asset management and provide principles for sound decision making regarding stormwater asset investment.

The DSAMP documents the overall planning framework to guide and improve Council's long-term management of its stormwater assets to cater for the community's required levels of service into the future. This is detailed in the Levels of Service section. The DSAMP defines the state of Council's stormwater assets as at the 2024 Financial Year, the funding required over the next ten years to achieve Council's adopted asset performance targets and planned asset management activities over a 10-year planning period.

This DSAMP is to be read in conjunction with Council's Asset Management Strategy. Figure 1 outlines the links between Council's strategic planning processes and the process for the development of asset management plans.

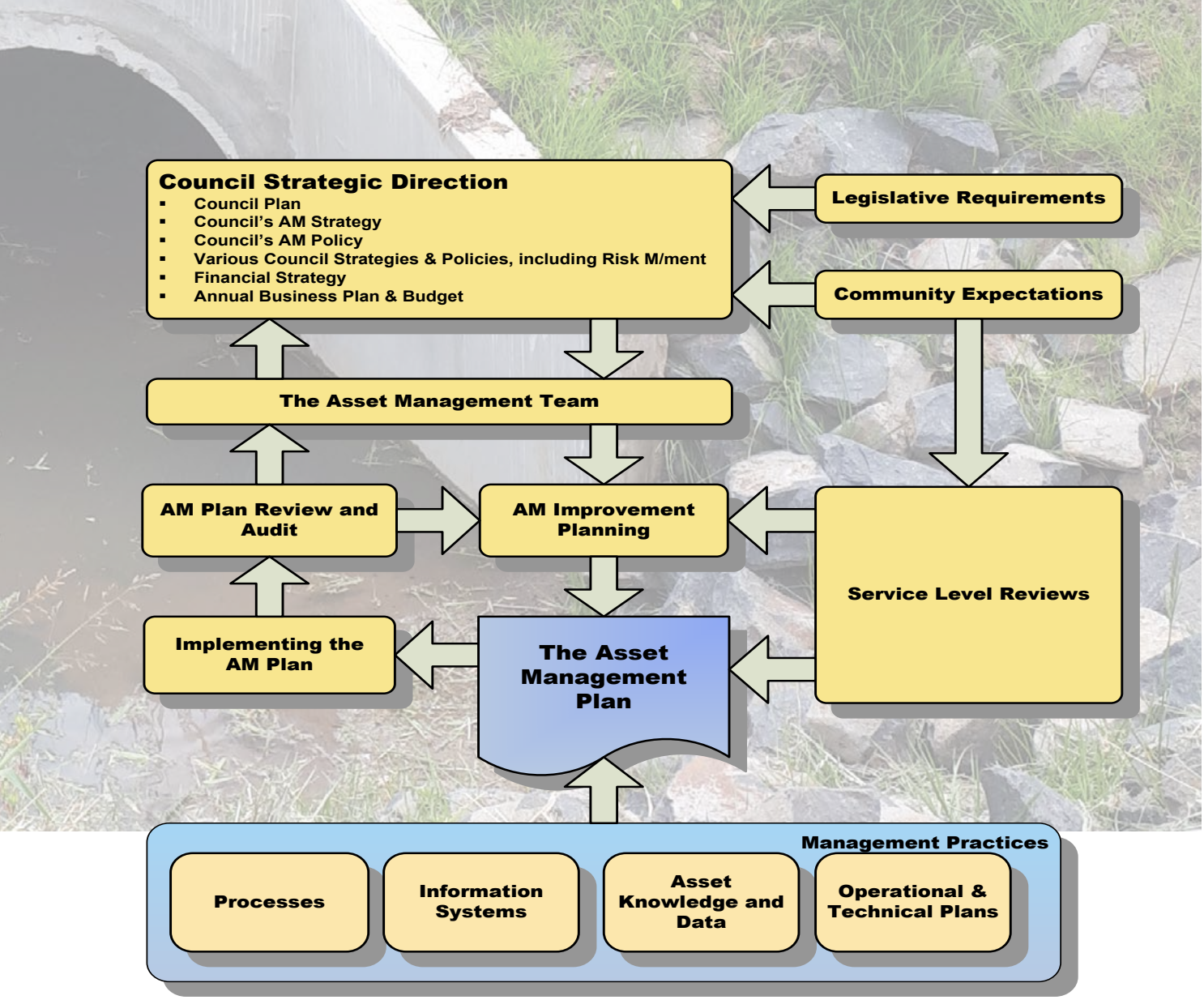


Figure 1 – Link between the DSAMP and Council's Strategic Planning Process

Asset Management Plans provide guidance to the Council Plan and to the Strategic Resource Plan. These long-term plans set the short-term funding levels available which, in turn, refine the Plans and provides input to the Annual Budget. From this the Capital Works Program for infrastructure maintenance and renewals is developed.

Council's role is to locally govern for all residents, visitors and ratepayers, and provide a range of programs and services that meet the needs of our community. This role is succinctly encapsulated through the Council's Vision:

Our townships are vibrant, rich with culture and full of life, each with its own distinct character. Drawing on our creativity, innovation and resilience we've created a thriving and diverse economy that supports sustainable agriculture and industry.

1.2 Current State of Council's Assets

Council engaged the services of an external valuer who performed a revaluation assessment as at 30 June 2023.

Asset Type	Replacement Cost	Accumulated Depreciation	Fair Value	Annual Depreciation
Stormwater Pits	$45,622,899	$11,787,763	$33,835,136	$456,229
Stormwater Pipes	$153,269,198	$37,461,599	$115,807,599	$1,126,932
Rain Gardens	$12,442,823	$1,556,096	$10,886,727	$417,357
End Walls	$2,616,177	$705,055	$1,911,122	$23,783
Detention Basins	$9,764,665	$3,175,310	$6,589,355	$53,585
Totals	**$223,715,762**	**$54,685,823**	**$169,029,939**	**$2,077,887**

Table 1 - Assets Valuations as at 30 June 2023

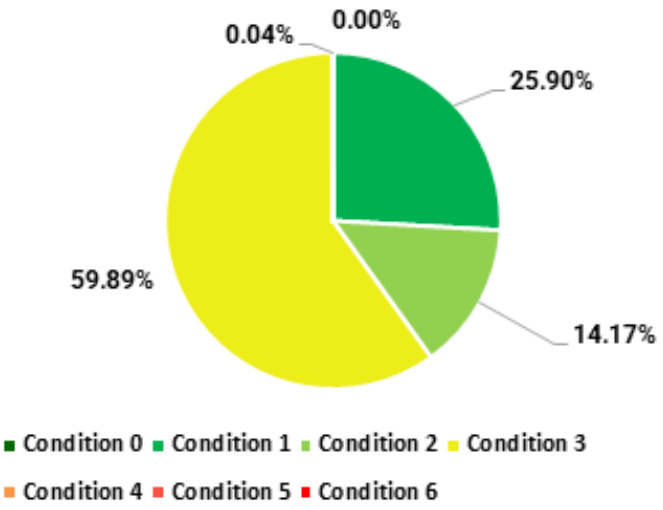
The following dashboard provides a high-level overview of the current condition (asset health) of all stormwater assets owned and maintained by Council. The asset health is a numerical score assigned to each major stormwater component (asset) to represent its current performance (i.e. where is the asset on its lifecycle path). Utilising predictive modelling software and techniques, we can then simulate each assets degradation (the way it moves from one condition state to another throughout its lifecycle) to predict when assets will fail and require future treatment intervention.

Refer to Table 4 – Asset Condition Rating Guidelines for condition definitions.

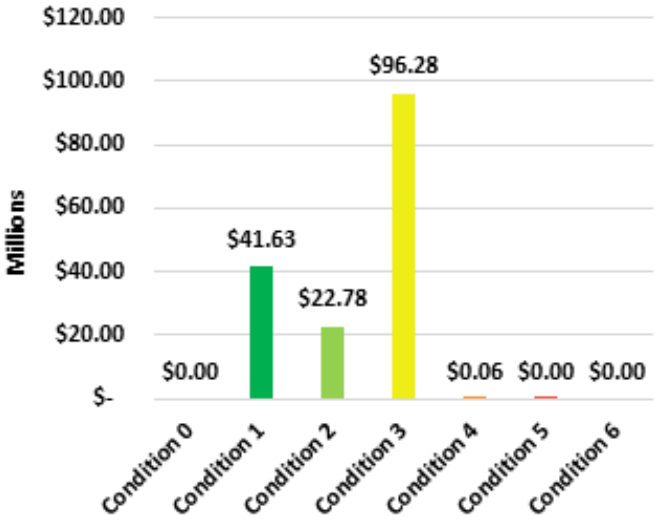
Stormwater Pipes

Asset Value	Asset Component Quantities	Backlog Value	Average Condition (Asset health)
$160.74M	21,662	$1.4K	2.3 out of 6

Stormwater Pipes Condition Distribution



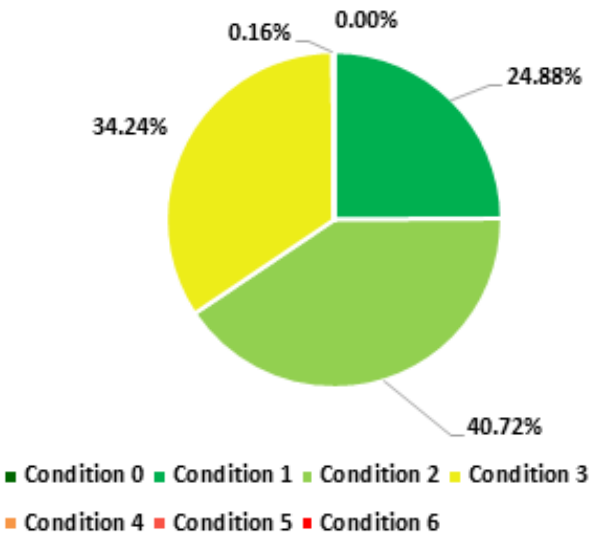
Stormwater Pipes Condition Distribution by Replacement Value



Stormwater Pits

Asset Value	Asset Component Quantities	Backlog Value	Average Condition (Asset health)
$48.75M	19,077	$1.6K	2.1 out of 6

Stormwater Pits Condition Distribution



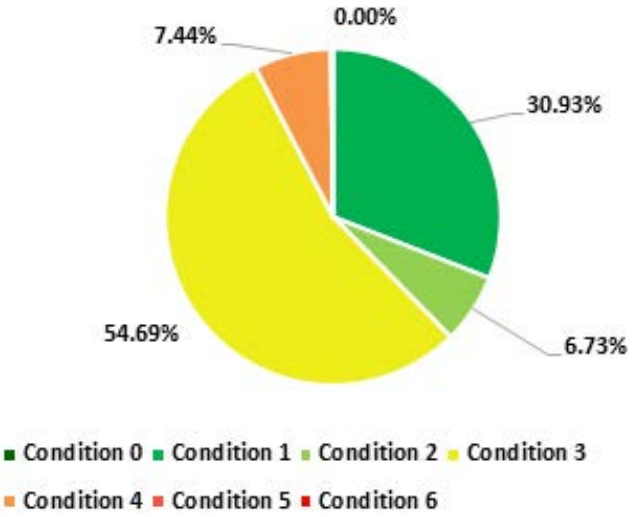
Stormwater Pits Condition Distribution by Replacement Value



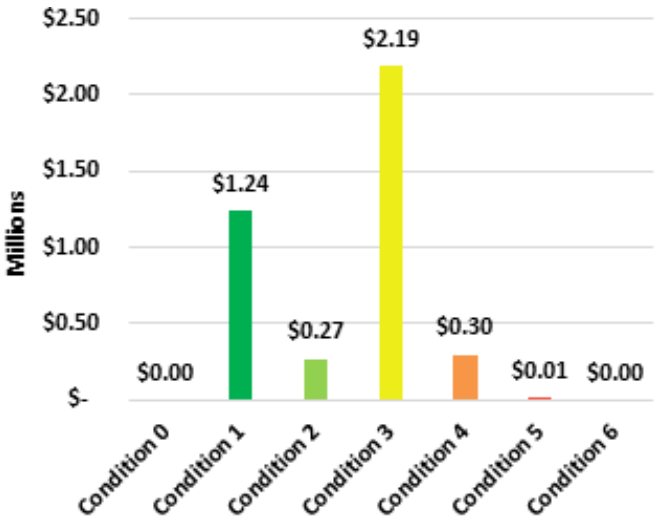
Endwalls

Asset Value	Asset Component Quantities	Backlog Value	Average Condition (Asset health)
$4.0M	1,392	$8.5K	2.4 out of 6

Endwalls Condition Distribution



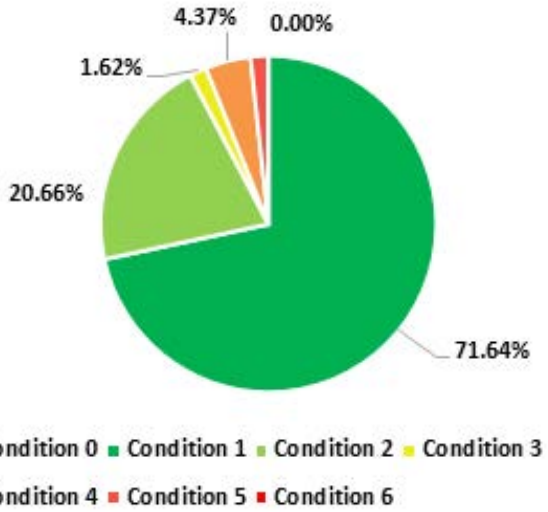
Endwalls Condition Distribution by Replacement Value



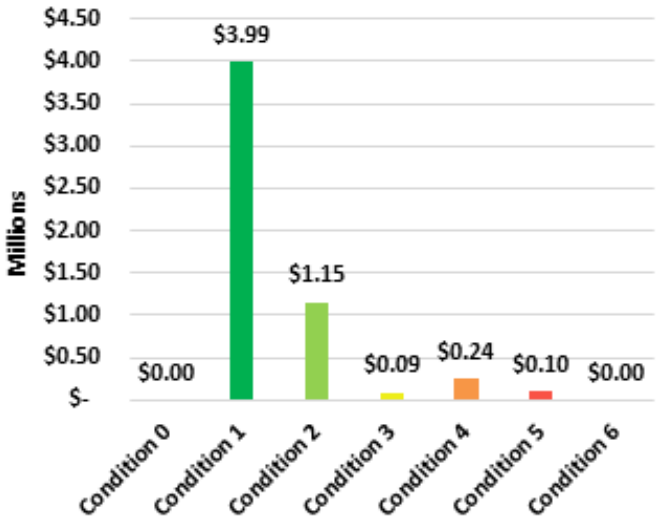
Rain Gardens

Asset Value	Asset Component Quantities	Backlog Value	Average Condition (Asset health)
$5.57M	266	$95.3K	2.4 out of 6

Rain Gardens Condition Distribution

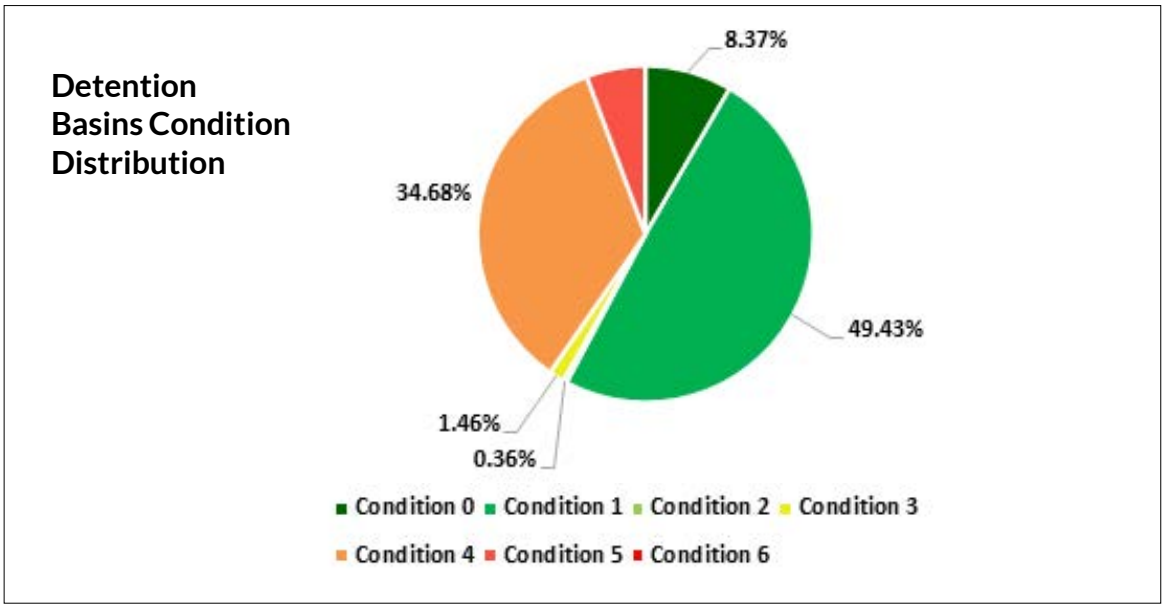


Rain Gardens Condition Distribution by Replacement Value



Detention Basins

Asset Value	Asset Component Quantities	Backlog Value	Average Condition (Asset health)
$10.65M	141	$60.6K	1.7 out of 6



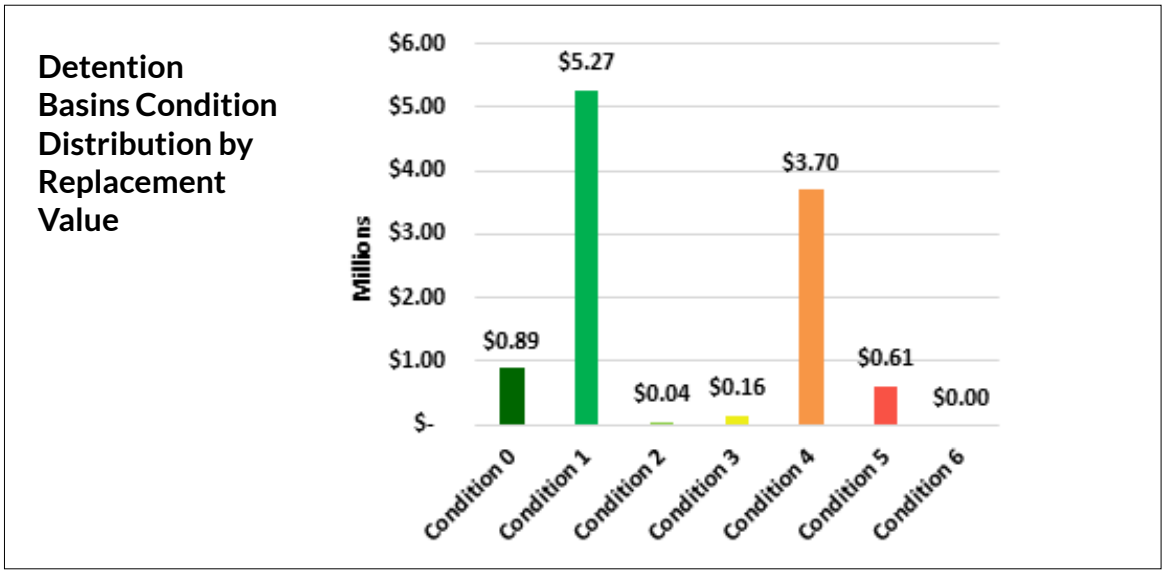


Figure 2 – State of Assets Snapshot as at FY2022

1.3 Asset Funding Levels

New assets required to meet the demands of population growth will typically be acquired from land developments and constructed by private developers who then gift these assets to Council. An additional source of assets can occur through the 'Urban Road and Drainage Improvement Policy' through a special charge process. It is estimated that because of proposed developments such as those in Wonthaggi, Council will be gifted some $83 million worth of assets.

Recommended Funding Levels

Spend Type	2024/25 ($)	25/26 ($)	26/27 ($)	27/28 ($)
Capital Asset Renewal	150,000	150,000	150,000	150,000
Capital Asset Capacity Renewal	850,000	820,000	920,000	850,000
Total Capital	**1,000,000**	**970,000**	**1,071,000**	**1,000,000**
Maintenance	1,006,844	1,053,736	1,102,904	1,154,460
Asset Management Operational	85,000	290,000	290,000	290,000
Depot Operational	551,328	681,355	691,582	702,013
Total Maintenance & Operations	**1,643,172**	**2,025,091**	**2,084,486**	**2,146,473**

Table 1 - Desired 10-Year Funding Strategy

1.4 Monitoring and Improvement Program

The improvement action items identified can be found in the Plan Improvement and Monitoring Section.

28/29 ($)	29/30 ($)	30/31 ($)	31/32 ($)	32/33 ($)	33/34 ($)
270,000	400,000	430,000	485,000	500,000	550,000
1,000,000	687,163	757,296	1,000,000	1,000,000	876,244
1,270,000	**1,400,000**	**1,430,000**	**1,485,000**	**1,500,000**	**1,550,000**
1,208,522	1,265,213	1,324,665	1,387,013	1,452,400	1,520,978
210,000	210,000	210,000	210,000	210,000	210,000
712,654	723,507	734,577	745,868	757,386	769,133
2,131,176	**2,198,720**	**2,269,242**	**2,342,881**	**2,419,786**	**2,500,111**





2 Asset Class Information

2.1 Background

Any rain that falls on roofs or is collected via paved areas like driveways, roads or footpaths is called stormwater. The stormwater drainage system within Bass Coast Shire is a combination of pits, pipes, road culverts, open channels and road reserves, which carry the stormwater and dispose it in Melbourne Water or West Gippsland Catchment Management Authority main drains, the sea and/or other catchments. It also includes quality protection devices such as gross pollutant traps (GPTs) and rain gardens, that contribute to maintaining water quality.

Council's stormwater asset portfolio provides a vital service to the community. These stormwater assets represent a significant investment by Council and are of vital importance to providing the Shire with a stormwater drainage system. The function of the stormwater drainage system is to protect people, property, and public health, by safely and efficiently collecting, transporting and disposing of stormwater runoff.

2.1.1 Stormwater Assets Included in this Plan

The stormwater drainage assets considered in this DSAMP, are described as including all assets directly associated with Council's stormwater drainage system, for which Council is the responsible authority.

In all, this DSAMP covers over 44,000 stormwater assets as classified by their asset subclass and set out in Table 2 – Stormwater Quantity by Asset Subclass. The quantities reported encompass assets utilised in the 2023 stormwater drainage revaluation, incorporating both existing assets and those gifted or constructed post-revaluation. This approach ensures a comprehensive and current representation of the asset portfolio in this DSAMP.

Asset Subclass	Quantity	Length (m)
Pipes	21,306	552,396
Box Culverts	356	5,504
Pits	19,057	-
GPTs	37	-
Ponds	8	-
Wetlands	18	-
Basins	115	-
End Structures	3,211	-
Rain Gardens	161	-
Swales	114	-
Total	**44,383**	**557,900**

Table 2 - Stormwater Quantity by Asset Subclass

A detailed list of all stormwater assets for which Council has included in this DSAMP are recorded in Council's Asset Register.



2.1.2 Stormwater Asset Exclusions

Melbourne Water and West Gippsland Catchment Management Authority are among ten catchment management authorities in Victoria[1]. They oversee regional drainage, flood mitigation, and sustainable land and water use in their areas, including the Bass Coast municipality.

They are also responsible for the management of the water ways that pass through the municipality such as the Bass River and Powlett River.

The DSAMP therefore excludes all stormwater assets owned and maintained by these authorities. Councils Unlined channels and swales are also not considered in this DSAMP and may be included in future revisions following implementation of improvement actions within this plan.

It should also be noted that household drainage systems from within private properties up until the drainage discharge point, are not maintained by Council. These systems are maintained by the property owners.

[1] Victorian CMA Actions and Achievements Report 2020/2021

2.1.3 Major and Minor Drainage Systems

Drainage systems are typically composed of two distinct elements[2]. The underground piped network is designed to handle stormwater flows for minor storm events (stormwater events ranging from 50 per cent AEP to five per cent AEP[3]). This network has ample capacity to manage nuisance flows, reducing the frequency and volume of surface flows.

In contrast, the major drainage system is designed to accommodate flows exceeding the capacity of the piped network. It often includes floodways, road reserves, and/or natural waterways. The primary purpose of the major drainage system is to prevent stormwater damage to properties by safely transporting excess stormwater to receiving waterways. The operational frequency of the overland drainage system is dictated by the design criteria established for the piped network.

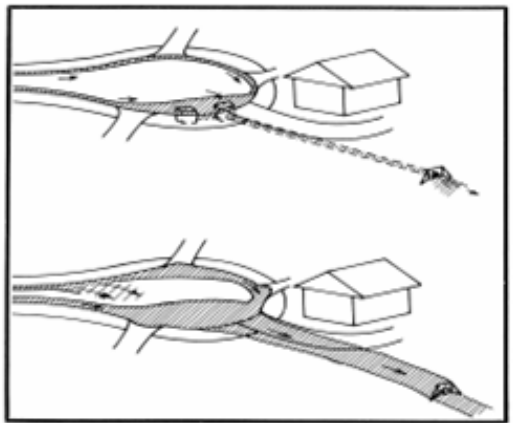


Figure 3 – Drainage system behaviour during minor & major storm events – Australian Rainfall & Runoff 1987

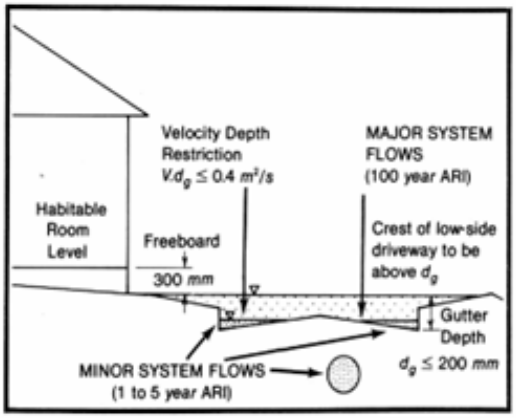


Figure 4 – Possible major & minor design standards – Australian Rainfall & Runoff 1987

[2] Source: Australian Rainfall and Runoff, A Guide to Flood Estimation, 14/5/2019, Chapter 3.5.1. Capacity to Manage Flooding
[3] Annual Exceedance Probability - the probability of an event being equaled or exceeded within a year.

2.1.4 Storm Intensity

Rainstorms vary in intensity and duration and therefore the quantity of water runoff also varies from one occasion to another. Accordingly, drainage systems are designed to be able to cope with the runoff from storms up to a predetermined designed rainstorm. Typically, the design rainstorm is discussed in terms of the Annual Exceedance Probability (AEP) with which it occurs. For example, a storm event that has a chance of occurring once every five years or in other words has a 20 per cent chance of occurring every year. To achieve the desired clarity of meaning, technical correctness, practicality and acceptability, the acceptable industry terms and the suggested frequency indicators, are detailed in Section 2.2.5 of the Australian Rainfall and Runoff, A Guide to Flood Estimation.

It should be noted that the lower the AEP interval, the greater the intensity of the expected storm, and the larger the drainage pipe sizes required and corresponding cost. For example, a storm event with a 100 per cent AEP (chance of occurring every year) will typically have a lower intensity than a two per cent AEP (chance of occurring once every 50 years).

2.1.5 Storm Duration

Storm duration is an important consideration for the design of a drainage network. A 20 per cent AEP storm that lasts for one hour will produce a different stormwater runoff outcome than a 20 per cent AEP storm that lasts for 24 hours. Either may, in fact, cause flooding problems depending on the size of the catchment and the nature of the existing drainage downstream. The former is likely to cause localised flooding of a few houses, whereas the latter may cause a local creek to rise and have broader scale flooding problems.

The design process must use judgment to assess the typical storm duration and frequency that will occur for any particular location.

2.1.6 Impact of Drainage Design on our Daily Life

All drainage systems are designed for a defined AEP. Therefore, all systems have a finite flow capacity and once that capacity is exceeded, the stormwater runoff will seek other flow paths. If not planned correctly, that route may well be through private property, and occasionally, the buildings as well. Unfortunately, this is more common in older developed areas of the municipality as most existing systems have not been designed with an 'escape route' in mind.

In addition, the urban consolidation involving multi-unit development and changes in property owner habits (i.e. building larger garages or covered outdoor entertaining areas) is having an impact of increasing the impermeability and thus the amount of stormwater runoff. This further reduces the service level provided by the existing drainage system. In general, there is little that can be done to increase the overall capacity of the system to cater for the increased flows as it would be prohibitively expensive to consider replacing existing pipes including the larger main drains that run to the creeks.

One common method of trying to minimise the impact of the higher densities is by requesting developers to provide onsite water detention systems at the time of development.

The final impact of the provision of drainage services lies in the definition of 'flood prone' as accepted by Local Government and the insurance industry. In general, property affected by storm events of one per cent AEP (i.e. Has a one per cent chance of occurring in any given year) may be considered as flood prone.

As the underground drainage system in Bass Coast does not cover this level of service, greater emphasis is therefore placed on establishing that the consequences of storm events of one per cent AEP is managed by the major flow paths. This is further discussed in the Levels of Service Section.

The major flow path is built into the roads through both the layout and the capacity of the kerb and channel. Most importantly it consists of a sympathetic layout of roads that is capable of carrying all flows that the underground drainage system cannot.

Where stormwater flows are considerable and the shape of the road inappropriate to act as a major flow path, generally the only satisfactory solution is reconstruction of the road. However, that is expensive and often has the additional complication of utility services, which are buried in the road pavement close to the surface.

2.1.7 What are the Stormwater Drainage issues in Bass Coast?

The specific drainage issues within Bass Coast are:

- Undercapacity drainage - some of the earlier drainage has been designed to cater for frequent storm events, that typically can occur every year and not for storm event intensities typically associated with storms that have a 5-50 per cent AEP
- Limited space – the high density of development in many areas of Bass Coast means that it is difficult to establish retarding basins or overland flow paths, given proximity of housing estates and terrain
- Some overland flow paths pass through private property
- Not all properties discharge to an underground drainage system – this leads to a higher level of nuisance flows
- Limited capacity of downstream catchment management authorities drains

2.2 Stormwater Information Management

All information pertaining to location, type, dimensions, materials, known constructed dates and condition of these assets are recorded and stored in Council's Asset/ Finance Register. At the time of preparing this DSAMP, it is estimated that Council's Asset Register is 80 per cent up to date.

2.3 Current State of the Assets

The distribution of Council's 19,131 stormwater pits portfolio by type and quantities is illustrated in Figure 5 – Distribution of Pit Assets by Type.

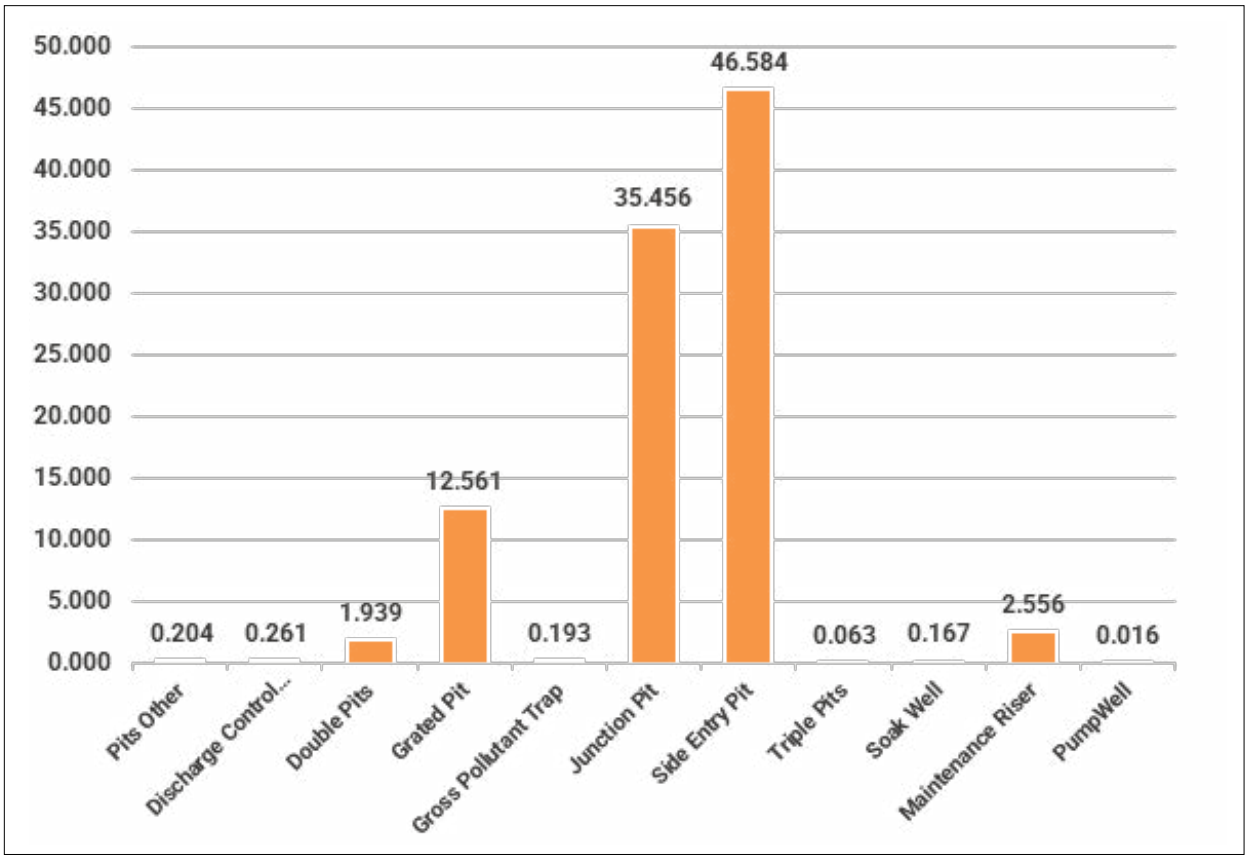


Figure 5 – Distribution of Pit Assets by Type

The distribution of Council's 557.9kms of stormwater pipes by type and quantities is illustrated in Figure 6 – Distribution of Stormwater Pipes by Size.

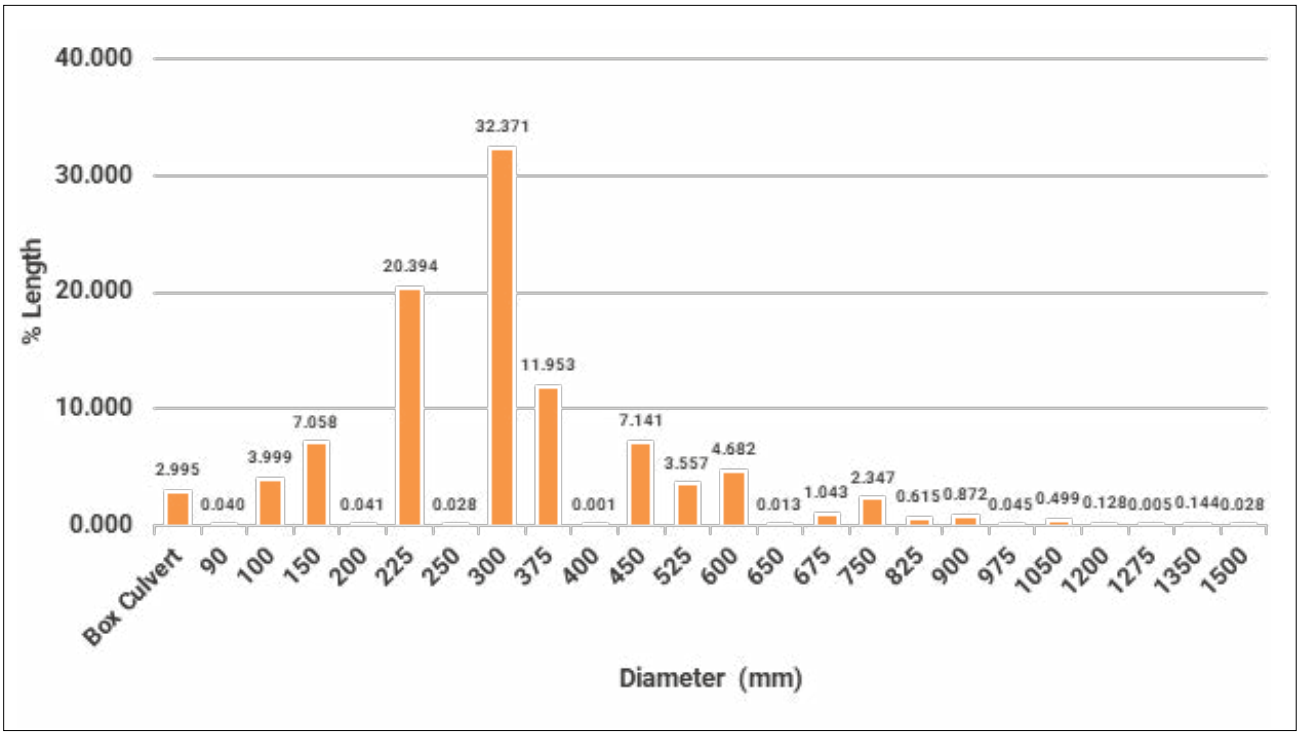


Figure 6 – Distribution of Stormwater Pipes by Size

The distribution of Council's 275 raingardens by type and quantities is illustrated in Figure 7 – Distribution of Rain Garden Assets by Type.

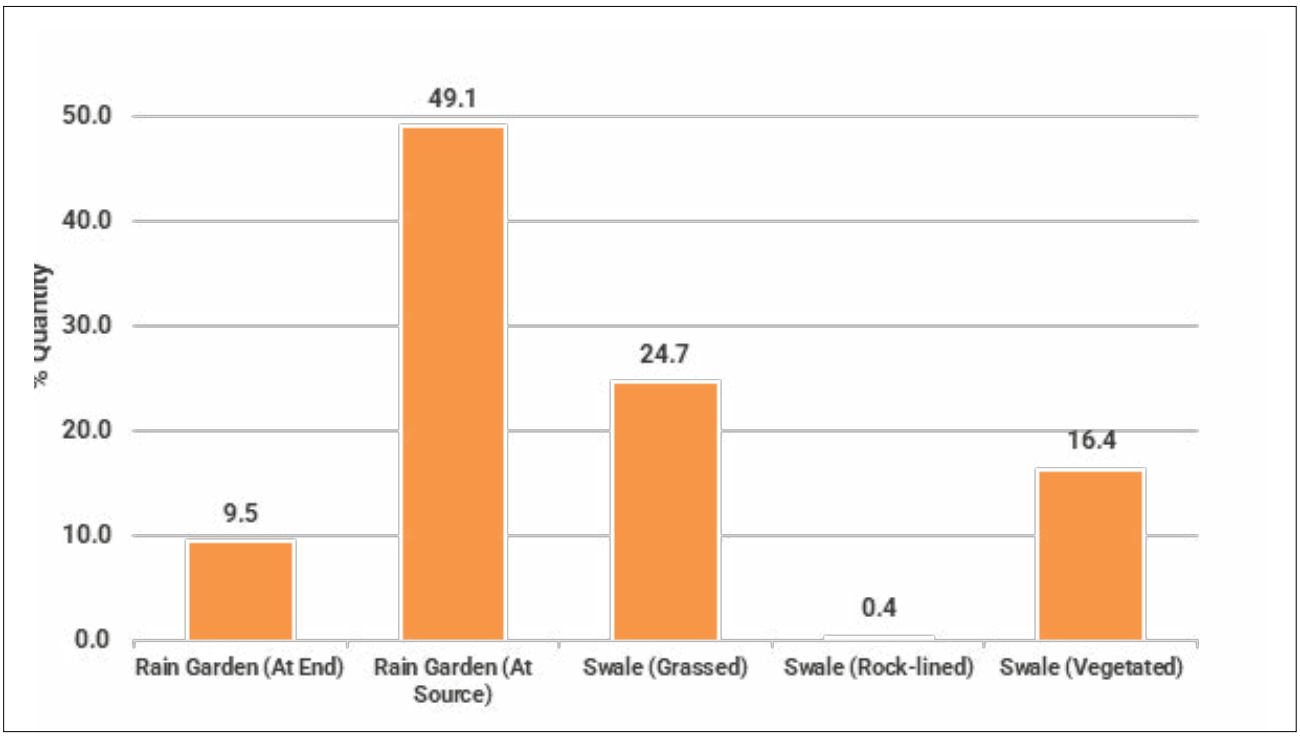


Figure 7 – Distribution of Rain Garden Assets by Type

The distribution of Council's 141 Water Sensitive Urban design (WSUD) assets such as detention basins and ponds by type and quantities is illustrated in Figure 9 – Distribution of WSUD Assets by Type.

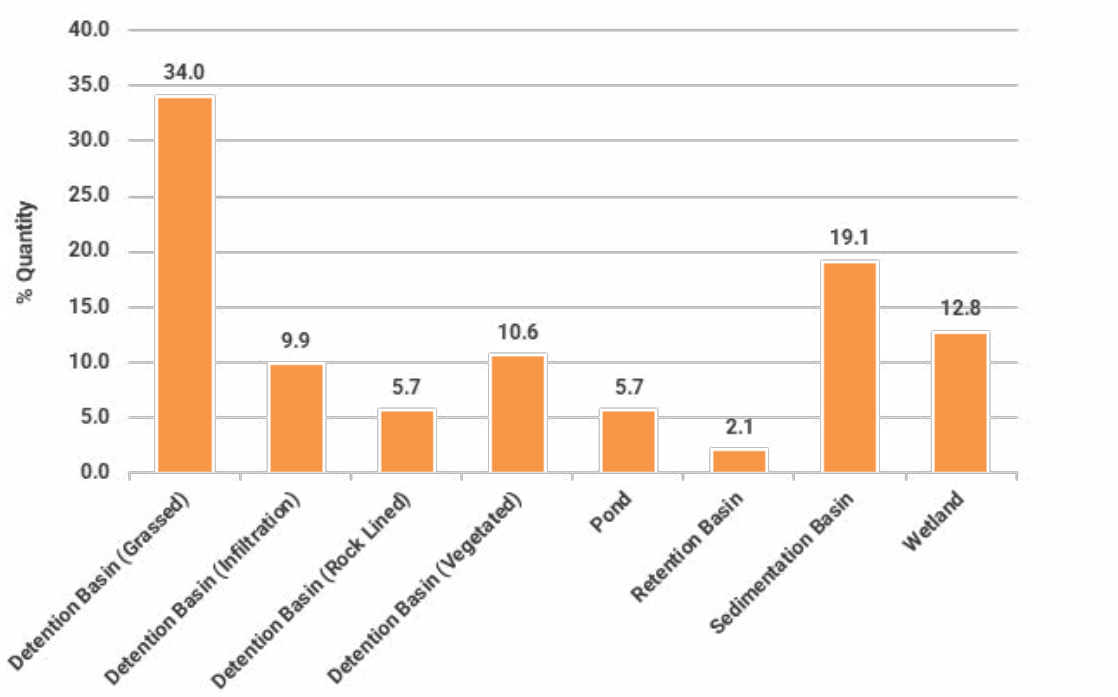


Figure 9 – Distribution of Detention Basin Assets by Type

2.3.1 Asset Valuation

Council engaged the services of an external valuer who performed a revaluation assessment as at 30 June 2023, however at the time of preparing this plan, the asset values had not been uploaded into Council's finance system.

Asset Type	Replacement Cost	Accumulated Depreciation	Fair Value	Annual Depreciation
Stormwater Pits	$45,622,899	$11,787,763	$33,835,136	$456,229
Stormwater Pipes	$153,269,198	$37,461,599	$115,807,599	$1,126,932
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End Walls	$2,616,177	$705,055	$1,911,122	$23,783
Detention Basins	$9,764,665	$3,175,310	$6,589,355	$53,585
Totals	**$223,715,762**	**$54,685,823**	**$169,029,939**	**$2,077,887**

Table 3 - Unaudited Stormwater Asset Class Valuations[4]

Table 3: Stormwater Asset Class Valuations, identifies the annual asset depreciation of Council's stormwater assets to be in the order of $2.01 million per annum. The average annual depreciation (asset consumption) is considered a measure of the wearing out or other loss of value of the asset that arises from its use, passing of time or obsolescence environmental changes.

While depreciation has been a traditional yardstick for asset management, it is recognised that it has limitations in offering a holistic understanding of asset health. Modern practices advocate for a more nuanced and sustainable approach, emphasising the importance of strategic lifecycle modelling and planning in developing long-term financial projections.

Council acknowledges sustainability-based analyses over the conventional reliance on depreciation figures by recognising that future funding requirements for stormwater drainage assets are primarily influenced by many factors which also include capacity and functionality concerns, rather than the typical end-of-life asset renewals. This insight positions Council at the forefront of innovative asset management practices, as we proactively address challenges with a sustainability-driven perspective.

[4] Valuations details sourced from Drainage and WSUD Valuation Methodology Report 30 June 2023.

2.3.2 Current Replacement Costs

The total value of stormwater assets for which Council is responsible for and included in this DSAMP is currently estimated at $237.5 million dollars[5]. The break-up of the asset type by replacement value is illustrated in Figure 10 – Stormwater Assets by Asset Type Estimated Replacement Values.

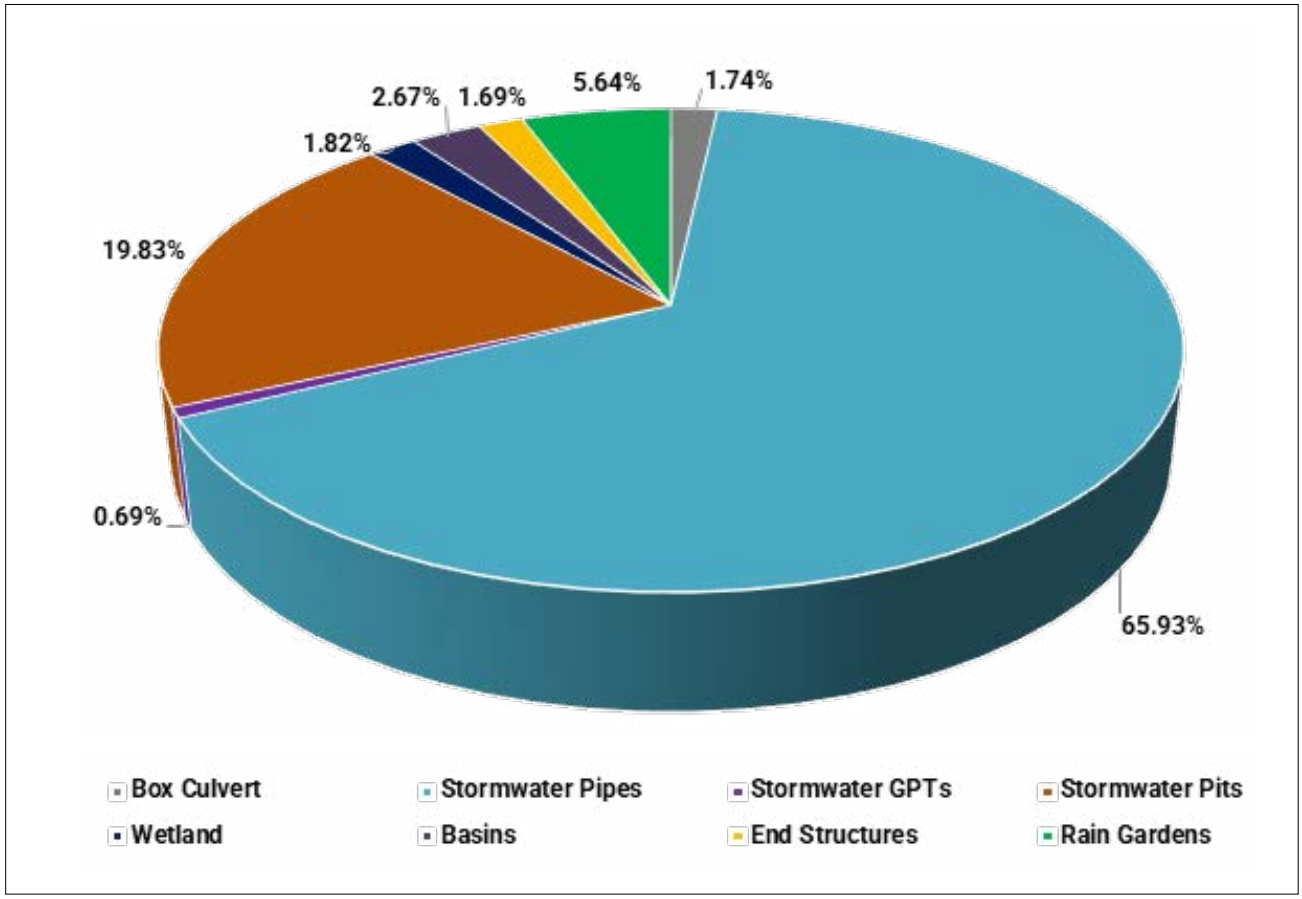


Figure 10 – Stormwater Assets by Asset Type Estimated Replacement Values

[5] Replacement cost estimated from 2023 unaudited revaluation dataset, plus all new assets gifted / constructed assets post the revaluation.

2.3.3 Condition Assessment

Council has documented a stormwater condition assessment methodology that is used to assess the condition of its stormwater drainage assets. Council's Stormwater Business Process Manual (SWBPM) provides further information on the methodology for rating and assessing the condition/performance of these assets.

Typically, network wide condition assessments are undertaken on a three to four year cycle (coinciding with the financial revaluations) and used to identify where assets are within their defined useful lives at any given point in time.

To date, Council has undertaken one round of visual statistical sampling condition assessments of the underground drainage system. Statistical sampling is a recognised and widely used method, since the drainage pipes are buried below the ground, and a visual assessment of the drainage pipe network is difficult to determine without the assistance of CCTV or alternative camera technology methods. However, for the sampling to provide affective results, the assets selected for visual assessment need to be undertaken as a random sampling.

Due to the extensive network of Council-owned drainage pipes and pits, the exercise of undertaking visual inspections is a costly one and Council does not have the available financial resources required to undertake extensive visual condition assessments for the entire drainage network.

Future iterations of this DSAMP will have further condition analysis undertaken to provide an indication of the performance of these assets.

Table 4 – Asset Condition Rating provides an overall view with regards to a standardised and consistent approach to applying an overall condition score and is by no means an extensive method for Council's stormwater asset stock. Detailed condition assessment methodologies in relation to these assets are documented in the Drainage Business Process Manual.

Condition	Rating	Description
0	New	Brand new asset or recently rehabilitated to as new condition. Only cyclical routine maintenance is required.
1	Very Good	A stormwater asset that is in excellent overall condition however is not new. It is providing its intended level of service.
2	Good	A stormwater asset that is in good overall condition with some possible early stages of slight deterioration evident which is minor in nature and causing no serviceability issues. No indicators of any future obsolescence and providing a good level of service.
3	Fair	A stormwater asset that is in fair overall condition with some deterioration evident, which may be slight or minor in nature and causing some serviceability issues. Providing an adequate level of service with no signs of immediate or short-term obsolescence.
4	Poor	A stormwater asset that is in poor overall condition with moderate to high deterioration evident. Substantial maintenance required to keep the asset serviceable. Asset will need to be renewed, upgraded or disposed of in the near future. This is reflected via inclusion in the 10- year Capital Works Plan.
5	Very Poor	A stormwater asset that is in extremely poor condition or obsolete. The asset no longer provides an adequate level of service and/or immediate remedial action required to keep the asset in service in the near future. Considered under capacity. Requires renewal or upgrade works within following 1-2 years
6	End of Life	Stormwater asset has physically failed and/or has no availability.

Table 4 - Asset Condition Rating Guidelines

In 2016, Council engaged a contractor to undertake physical Inspections of just over 250 water sensitive urban design (WSUD) assets throughout the municipality. WSUD assets comprise of rain gardens, bioretention swales, wetlands and detention basins, as examples. The inspection criteria used in the visual assessment of these assets in documented in the Bass Coast Shire Council, WSUD Asset Inspection Summary report, October 2016, V2015_001.

2.3.4 Current Asset Performance

Based on available sampled visual data, Council's existing stormwater assets are estimated to be in good condition as shown in the following figures below. Refer to Table 4 – Asset Condition Rating Guidelines provides further details on the condition descriptions.

Of the 21,662 existing stormwater pipes and culverts totalling some 552.3kms in length, the average condition is 2.3 out of 6, with condition 0 representing an asset in brand new condition and condition 6 representing an asset that has failed or exceeded its design life.

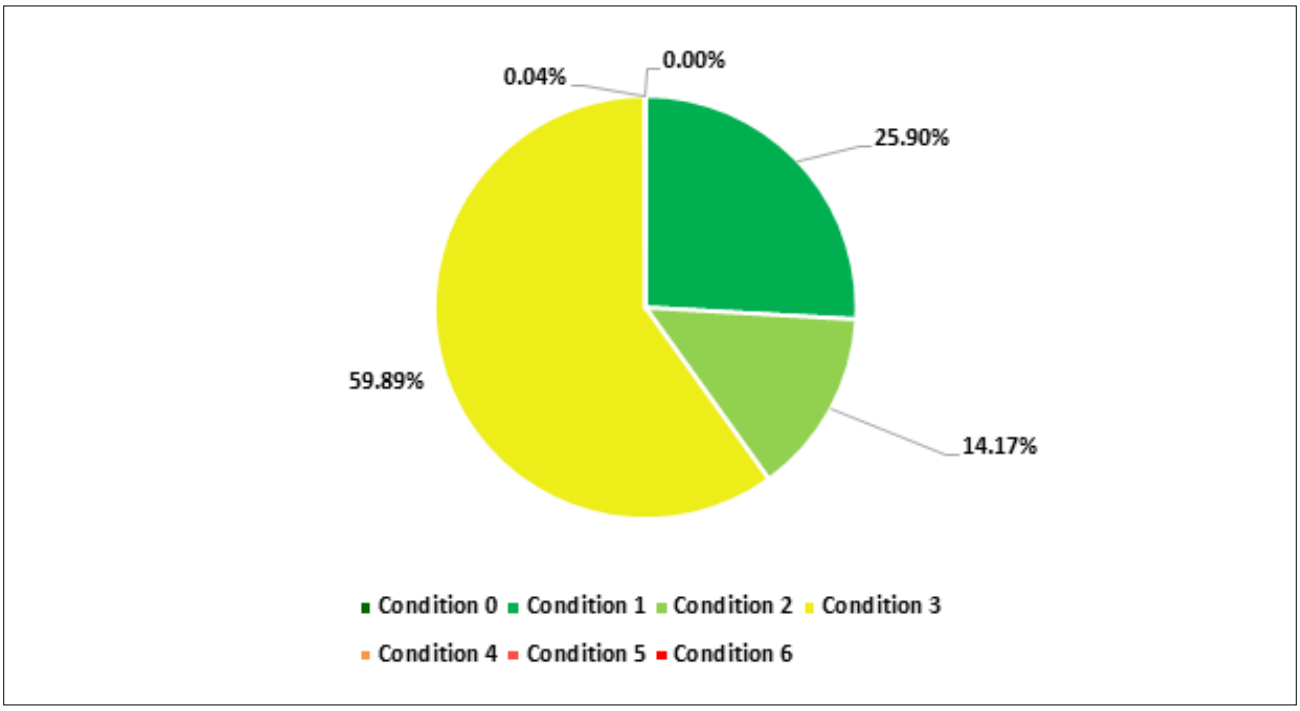


Figure 11 – Distribution of Stormwater Pipe Conditions by Replacement Cost

There are 19,077 existing stormwater pits with an average condition of 2.1 out of 6. Over 60 percent of the network is estimated to be in condition 1 and 2.

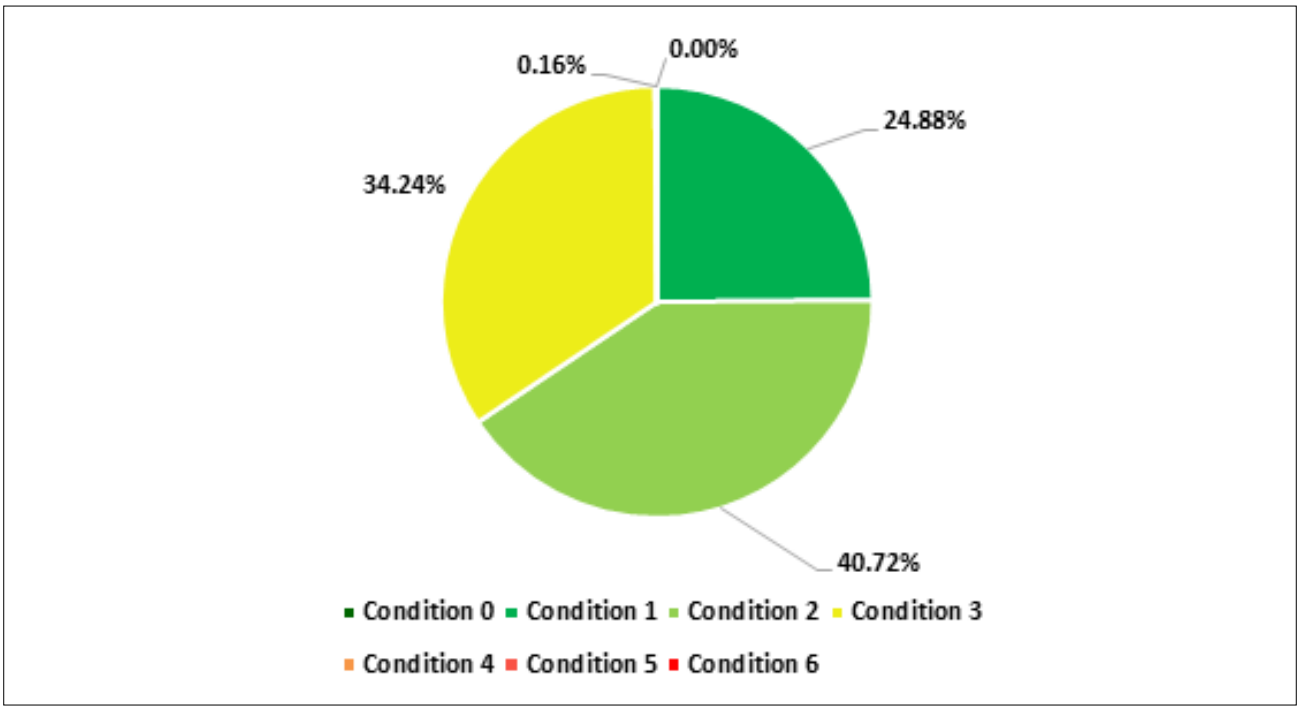


Figure 12 – Distribution of Stormwater Pit Conditions by Replacement Cost

There are 266 existing rain gardens with an average condition of 2.4 out of 6. Over 6% of the network is estimated to be in condition 4 or worse with over 71% of the network estimated to be in condition 1.

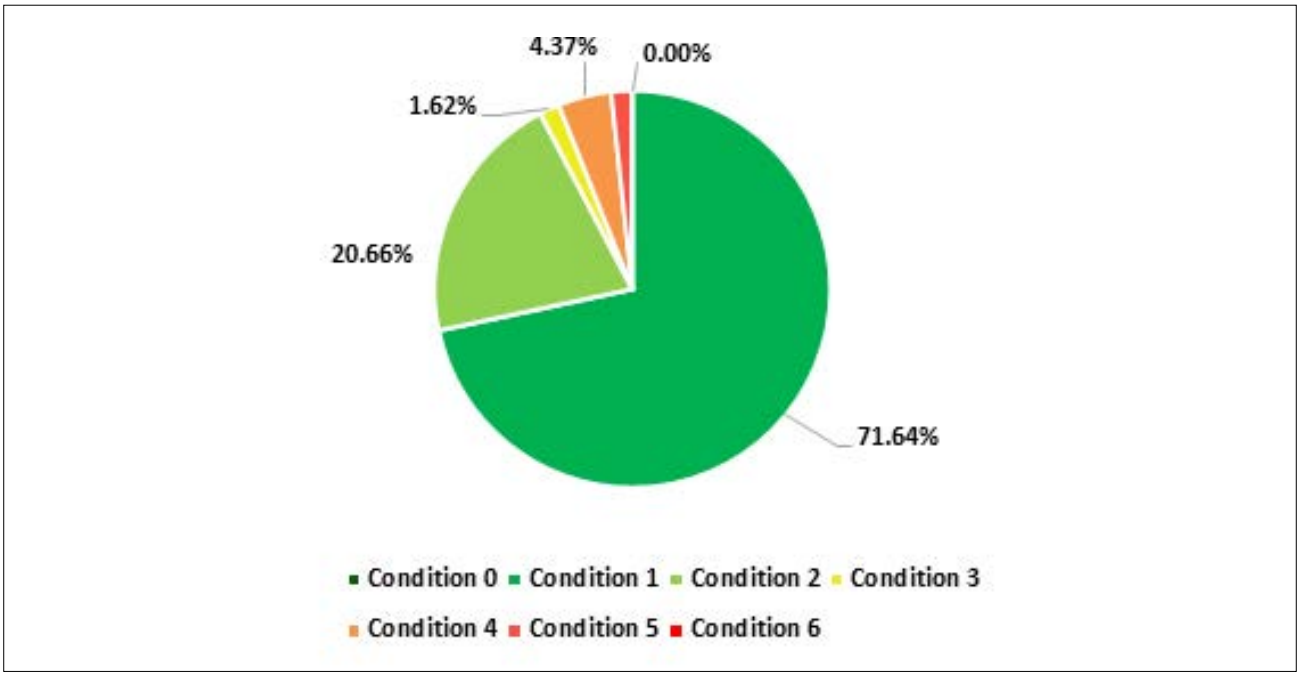


Figure 13 – Distribution of Rain Garden Conditions by Replacement Cost

There are 1,392 existing headwalls with an average condition of 2.4 out of 6. Over 7 per cent of the network is estimated to be in condition 4 with over 37 per cent of the network estimated to be in condition states 1 and 2.

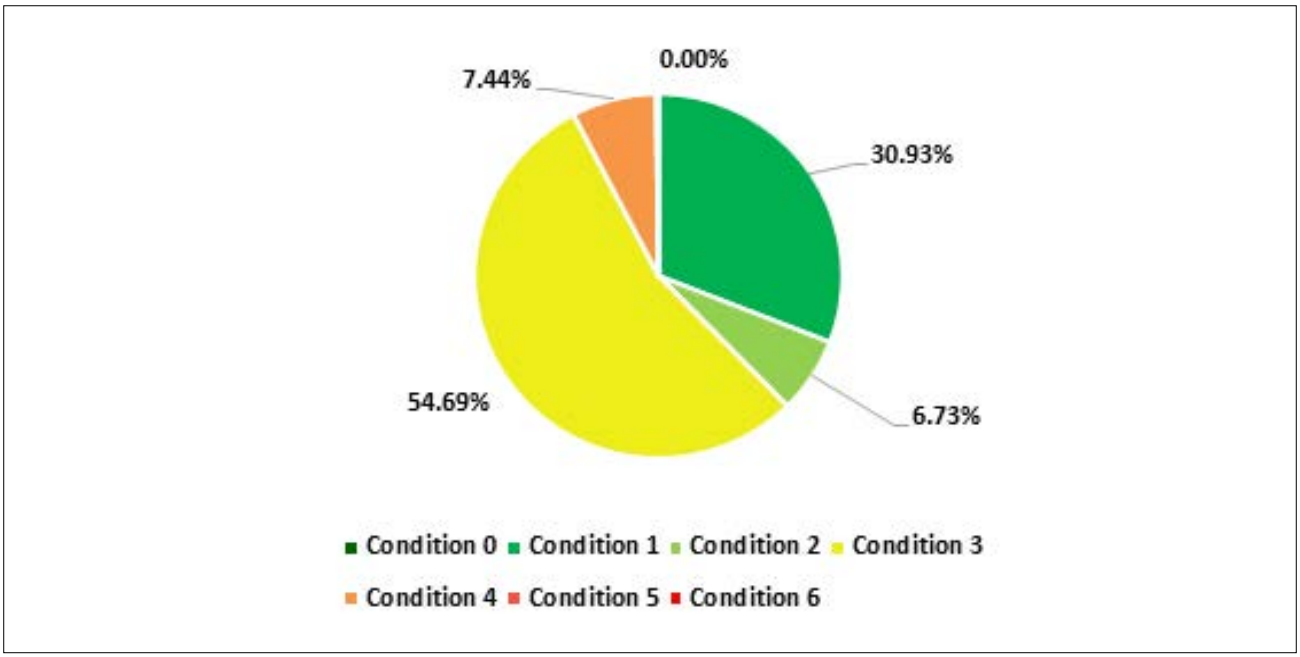


Figure 14 – Distribution of End Wall Conditions by Replacement Cost

There are 141 existing drainage basins with an average condition of 1.7 out of 6. Just over 40 per cent of the network is estimated to be in condition 4 or worse, with over 58 per cent of the network estimated to be in condition states 1 and 2.

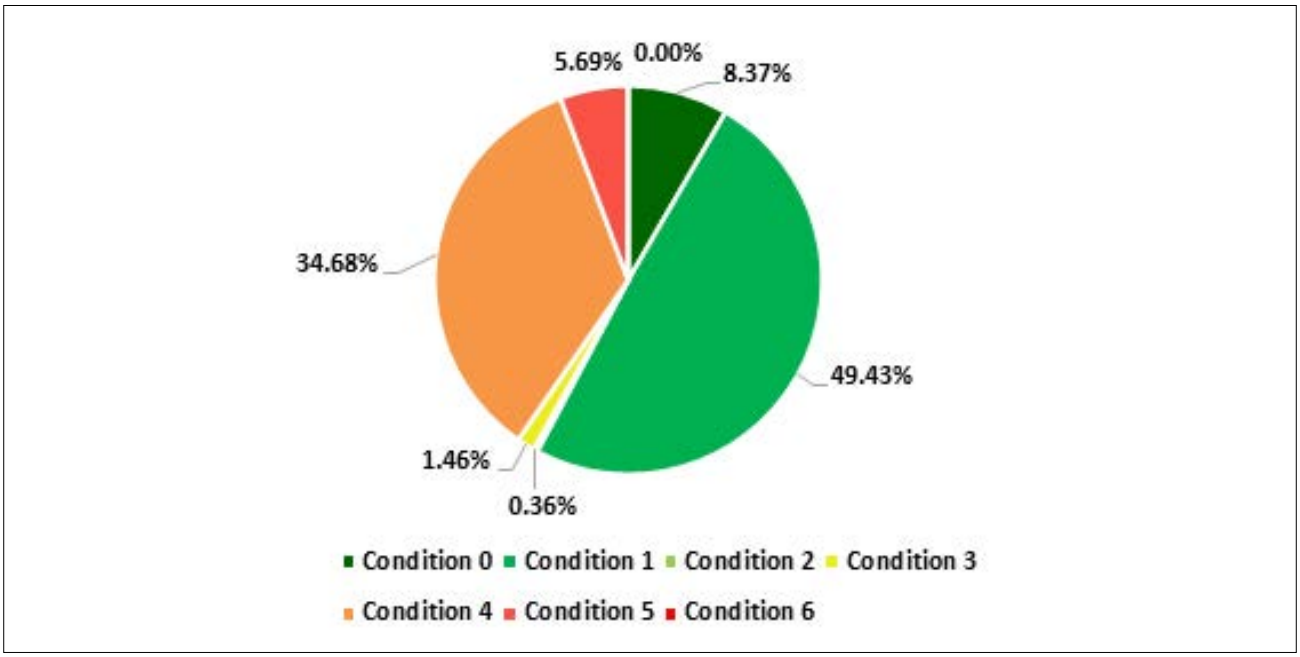


Figure 15 – Distribution of End Wall Conditions by Replacement Cost



Best practice asset management with regards to stormwater assets, utilises statistical sampling of the underground pipes using Closed Circuit TV (CCTV) methods to determine the structural condition and serviceability of pipes, whilst capacity analysis studies determine the drainage networks fitness for purpose in regard to meeting the required drainage design standards.

Locations where deficiencies in service performance exist during storm events not exceeding 1 in 10 AEP, are currently and progressively being identified by Council officers from requests and will be prioritised as part of a long-term rolling program of works. This is particularly relevant where 'hot spot' location coincides with major road rehabilitation projects.

The framework documented in Council's Asset Management Policy, and the strategies documented in the Asset Management Strategy and supported by this DSAMP, will place Council in a good position to address the asset issues currently faced.



2.4 Lifecycle Management

Lifecycle Management is an essential component of any good asset management plan. This section of the DSAMP identifies the processes required to effectively manage, maintain, renew and upgrade Council's stormwater assets.

2.4.1 Operations and Maintenance Plan

Operations activities can be described as activities that are delivered on a day-to-day basis necessary to meet levels of service delivery requirements. Operational activities can include service delivery items such as clearing debris from the pits and pipes. Operational activities also include proactive and reactive inspections, undertaken by in-house technical staff and/or specialist contractors. Operations activities do not improve the condition of assets.

Over time, minor faults can occur within the stormwater drainage portfolio. Council addresses the repairs and maintenance of these faults (i.e. broken pit lid, collapsed section of pipe) based on defined intervention levels and response times. The intervention level defines the condition, state or risk level associated with an asset/component, i.e. the point in time at which the asset is considered to be below an acceptable level of service. Maintenance is scheduled as soon as the asset reaches this point.

Operations and maintenance activities do not improve the condition of the stormwater, but rather enable the stormwater assets to deliver their service levels as related to their function.

For the levels of service delivered on a day-to-day basis (i.e. responding to customer requests for maintenance faults and responding to localised asset failures), these intervention levels[6] are currently documented in Council's Road Management Plan in Table 10.7 and the Drainage Business Process Manual. At present, Council considers that these current operations and maintenance service levels meet the community's needs and expectations.

[6] Intervention level define the activity or defect and response time to attendance or repair.

2.4.2 Renewal/Replacement Plan

Activities such as renewal, rehabilitation, reconstruction, and replacement will return the degraded service of the asset back to its original condition. The extent of service improvement depends on the nature and type of treatment.

The nature of Council, being an urban environment in some areas and a rural environment in other parts, means that the some of the municipality is generally considered to be fully serviced by the existing stormwater drainage system and in other parts, new assets will be required as a result of developments.

At present, the program of major renewal works on Council's stormwater drainage network is progressively developed from drainage capacity studies, the results of requests and known localised flooding locations. The rule-base which reflects the policy decisions that Council employs to determine when they will select assets for inclusion on their capital works program for renewal works, is documented in the Drainage Business Process Manual.

In future, this rule-base will include renewal works identified from CCTV surveys and taking into consideration known localised flooding locations.

The built nature of new stormwater assets will always be provided in accordance with relevant Australian Standards and the Infrastructure Design Manual.

2.4.3 Upgrade/Expansion Plan

Upgrade and expansion works are associated with improving service levels beyond the original designed capability or modern-day equivalent. Additionally, expansion works include activities that extends the capacity of an existing asset, to provide higher levels of service and/or meet changes in asset resilience requirements. Upgrade/expansion is different to renewal/replacement which only improves the degraded service capability within the boundaries of the original designed capability.

Upgrade/expansion of existing assets are typically identified from various sources such as drainage capacity studies, and/or proposals identified by strategic plans.

Council between 2015 to 2018 engaged the services of an experienced engineering firm to undertake several drainage flood mitigation studies, which investigated and identified appropriate measures to mitigate the effects of flooding within Council's catchment areas. The studies identified all problem locations within 60 sites throughout the municipality, where the existing pipe network or overland flowpaths do not have sufficient capacity to meet the desired minimum level of service adopted for all properties being 3 Star or better.

The estimated cost to mitigate these known deficiency issues which includes increasing pipe sizes, re-grading floodways or creating new overland flowpaths has been estimated at just over $27 million. Further works undertaken by Council officers, identified that only 20 per cent of the 60 sites were deemed to present an immediate issue.

It's acknowledged that further work is required to improve the findings of the studies and that future drainage capacity studies will need to be expanded to include the whole municipality and also incorporate climate change into the development of remedial candidate project works. These future studies should ensure that the project costs are improved and also develop and document a framework in order to priortise the potential project candidates over a 10-year and 20-year horizon.

At present, Council has identified the drainage upgrade candidate projects that will be undertaken over the following 10 years and these funding requirements are documented in Table 18 – Desired 10-Year Funding Strategy. These project candidates have been deemed to be of highest priority as during times of extreme storm events, these locations will flood and will result in the inundation of property or be a public health hazard.

2.4.4 Creation/Acquisition Plan

New stormwater assets are typically acquired from developers. New assets required to meet population growth demands will be typically acquired from land developments and constructed by private developers who then gift these assets to Council.

Council can also acquire new stormwater infrastructure by constructing new assets to alleviate drainage capacity issue, construct new pipes or lined open channels to replace creeks or unformed water courses, construct new pits to improve inlet capacity or construct new GPTs to improve water quality outcomes of water entering localised creeks/rivers.

2.4.5 Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition, relocation or transfer of ownership. At present there are no plans to dispose of any assets.

However at present, there is a project with Melbourne Water to review all assets and identify if the responsibility and management of any of these assets need to be handed over to Melbourne Water, thereby resulting in a disposal from the asset register.

2.5 Leadership and Accountability

Council's Asset Management Policy for Infrastructure Assets 2022-26 defines the roles and responsibilities within Council for asset management.

The Asset Management Steering Group (AMSG) has been drawn from across Council administration to coordinate asset management related matters. Meetings are held regularly and chaired by the Manager Infrastructure Delivery. Council is in the process of developing an Asset Management Responsibility Assignment Matrix that details the organisational relationships and lines of responsibility with regard to asset management over the asset lifecycle.





3 Levels of Service

3.1 Customer Research and Expectation

The most recent customer satisfaction survey[7], which was conducted in 2023, asks the opinions of a random selection of local people about the place they live, work and play and offers councils a long-term measure of how they are performing.

It is acknowledged that past surveys have not specifically gauged the community's satisfaction with regards to Council's provision of stormwater drainage services. However, Figure 12 illustrates the satisfaction with Council's overall performance between 2019 to 2023 and provides comparison performance with the State-wide average and similar like large municipal Victorian municipalities.

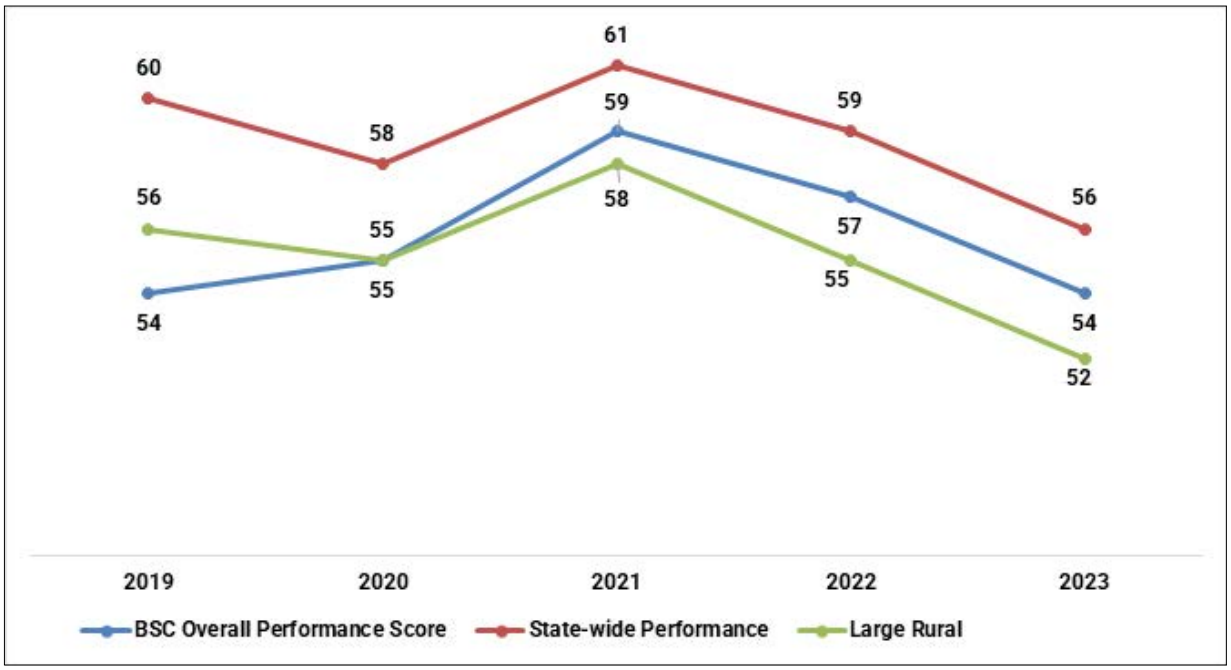


Figure 16 – Bass Coast Community Survey Satisfaction Overall Performance

[7] 2023 Local Government Community Satisfaction Survey – Conducted by JWS Research

The 2023 perceptions of Council's overall performance indicates a decline, marking a departure from the peak overall performance rating of 59 observed in 2021. While these decreases may not be deemed as highly significant, they have set in motion a trend resembling the scores recorded in 2019. With the exception of waste management, where performance remains on par with last year's, Council's performance on all other service areas evaluated also declined, and significantly so in the area of making decisions in the interest of the community. Section 3.2 illustrates how Council's management of its stormwater assets will be aligned to achieve the community's interests.

Future surveys should include specific questions to the community regarding stormwater services, to identify and measure the importance and performance in delivering this service to the community.

3.2 Strategic and Corporate Goals Alignment

The Council Plan 2021-25 sets out six strategic objectives to make Bass Coast the place that the community wants it to be. The Council Plan 2021-25 describes what these strategic objectives are, why they are important and the actions we will take to ensure we address the key challenges and opportunities we will face.

This DSAMP is prepared and aligned with these strategic objectives and has been aligned to deliver cost-effective, transparent, realistic, and affordable service levels in accordance with community expectations.

Relevant Council goals and objectives and how these are addressed in this DSAMP are detailed in the table over the page.



Strategic Objective	Outcome
Protecting our Natural Environment	Building resilience and protecting and enhancing our natural assets.
Healthy Community	An inclusive community that embraces its lifestyle and supports health and wellbeing.
Our Places	Strengthening the connection between people and the public places they share.
Growing our Economy	Progressing opportunities for visitation economy and business growth in harmony with our natural environment and sustainable values.
Sustainable Development	Prepare for growth while ensuring the intrinsic values and character of Bass Coast are retained.
Leading for our Community	Demonstrating leadership through good governance, transparency and accountability.

How Strategic Objectives are addressed in the DSAMP
Encourage and promote the use of rainwater tanks and the reduction of hard surface areas to reduce the volume of stormwater entering into the network. Harvested water will help minimise reliance on potable water. Ensure all new and upgraded Council facilities include stormwater retention devices.
Provision of stormwater assets (i.e. drainage, culverts, pits, etc.) that are fit for purpose and well maintained, which will minimise nuisance surface water enabling the community to enjoy regular activities and events.
Provision of design for capital works, built assets management, civil and landscape infrastructure planning.
Progressively upgrade stormwater drainage network to alleviate known high risk flooding issues.
Stormwater drainage assets are fit for purpose and use where design standards allow. Provision of 10-year capital improvement programs in order to reduce asset renewal gap and to ensure that assets are fit for the purpose they were intended for.
Incorporating climate factors into strategic asset modelling to simulate climate impact analysis for decision making. Implement the Council's Climate Change Action Plan 2020-30. This DSAMP will help lead Council to establish mature asset management practices for its stormwater drainage assets enabling a strong understanding of what funding is required to sustain the asset base and identification of opportunities for new initiatives. Asset management has the long-term goal of providing services that meet community expectations most cost-effectively. This DSAMP describes proactive approaches to asset management, and the use of data to inform decision-making. Provision of 10-year capital improvement programs in order to reduce asset renewal gap and to ensure that assets are fit for the purpose they were intended for.

Table 5 - Council's Strategic Objectives and how these are addressed in this Plan

3.3 Key Stakeholders

Assets controlled by Council are utilised by a broad cross-section of the community. It is critical that assets are maintained and renewed based on need and fit for purpose. Asset users are key stakeholders of this DSAMP.

The table below identifies stakeholders where consultation is necessary when Council seeks input in relation to the determination of levels of service and intervention levels.

Stakeholder Group
Internal Stakeholders
Elected Council
Executive Team
Manager Asset Management
Coordinator Asset Management
Coordinator Asset Management Systems
Asset Management Systems Team
Drainage Assets Officer
Manager Infrastructure Maintenance
Senior Asset Services Engineer
Coordinator Development Services
Asset Accountant
Coordinator Roads
Roads Asset Officer
Response Team Leader
Coordinator GIS
Strategic Planner
External Stakeholders
Community
Service Providers
Maintenance Personnel (contractors)
State and Federal Government Depts
Council's Insurer

Role or Involvement
Custodian of the asset, with Councillors representing the residents and setting strategic direction as per the Corporate and Operational Plans.
To ensure that Asset Management policy and strategy is being implemented as adopted, and to ensure that long-term financial needs to sustain the assets for the services they deliver are advised to council for its strategic and financial planning processes.
Provision of budgets, expenditure, issues re renewal, upgrade and new expenditure.
Provision of information in relation to Asset Management. Identify development of drainage strategies.
Provision of information, asset and valuation data.
Inputting data drainage data into the AM system.
Day to day management of drainage renewal program. Monitoring and reviewing community service levels outcomes.
Provision of budgets, expenditure, issues re maintenance expenditure.
Specialist advice on the delivery of drainage assets.
Approval of drainage plans within land developments.
Provision of financial information.
Provision of resources and planning regarding the maintenance of drainage and road assets.
Day to day management of roads renewal program which includes renewal works for roadside drains and kerbs.
Response to customer requests in relation to drainage customer requests.
Provision and maintenance of GIS for use by asset team and others.
Planning for future developments and in particular infrastructure provision to service those developments.
General users of the water and drainage network.
Those external bodies or agencies that provide services to the community.
To ensure provision of the required/agreed level of maintenance services for asset components.
Periodic provision of advice, instruction and support funding to assist with management of the drainage network.
Insurance and risk management issues.

Table 6 – Key Stakeholders

3.4 Legislative Requirements

There are many legislative requirements relating to the management of Council assets. Legislative requirements that impact the delivery of Council stormwater services include:

Legislation
Local Government Act 2020
Road Management Act 2004
Public Health Act and Well being Act 2008
Catchment and Land Protection Act 1994
Planning and Environment Act 1987
Occupational Health and Safety Act (Vic) 2004 and Occupational Health and Safety Regulations 2007
Environment Protection Act 2017
Water Act 1989

Requirement
Sets out role, purpose, responsibilities and powers of local governments including the requirement to develop, adopt and keep in force an Asset Plan. The scope of the Asset Plan is a period of at least the next 10 financial years and must include information about maintenance, renewal, acquisition, expansion, upgrade, disposal and decommissioning in relation to each class of infrastructure asset under the control of the Council.
Purpose is to establish a coordinated management system for public roads that will promote safe and efficient State and local public road networks and the responsible use of road reserves for other legitimate purposes, such as the provision of utility services and drainage.
The purpose of this Act is to enact a new legislative scheme which promotes and protects public health and wellbeing in Victoria. Impacts cooling towers.
Includes setting up a framework for the integrated management and protection of catchments (S1). The Act establishes the catchment management authorities (S11).
The purpose of this Act is to establish a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians.
Governs the key principles, rights and duties in relation to occupational health and safety.
The purpose of this Act is to create a legislative framework for the protection of the environment in Victoria having regard to the principles of environmental protection.
Includes providing for the integrated management of all elements of the terrestrial phase of the water cycle (S1). The Act gives the rights and responsibilities for the use flow and control of water e.g. S16. The Act creates the waterway management authorities (e.g. Melbourne Water).

Table 7 – Legislation Relevant to Management of Stormwater Assets



Regulations, standards and guideline requirements that impact the delivery of Council's stormwater services are outlined.

Regulation / Standard / Guide
Bass Coast Planning Scheme
Australian Rainfall and Runoff
Blue Green Algae Protocol
Local Government (Planning and Reporting) Regulations 2020
ISO 55000 Suite, 2014



Requirement
Provides a framework in which decisions about the use and development of land in Bass Coast, and allows for the implementation of State, regional and local policies affecting land use.
A national guideline document for the estimation of flood flows in Australia.
Provides information to councils on how to address the various issues arising from blue-green algae outbreaks.
The Local Government (Planning and Reporting) Regulations 2020 have replaced and substantially replicated the Local Government (Planning and Reporting) Regulations 2014, by prescribing the information to be included in councils' Council Plan, budget, and annual report, as well as continuing to provide a mandatory system of performance reporting for all councils. The only variations in the Regulations 2020 reflect the new strategic plans being introduced by the Local Government Act 2020, specifically the four-year budget, and the 10-year Financial Plan.
The International Organization for Standardization's ISO 55000:2014 Asset Management (ISO 55000) provides a global guide to better practice in asset management, including asset information management. ISO 55000 specifies that entities should align information requirements to asset management needs and risks, along with requirements for collecting, managing, evaluating, and ensuring consistency and availability of information for asset management decision-making.

...continued over the page.



Regulation / Standard / Guide
Australian Accounting Standards Board (AASB)
All other relevant Australian Standards
All Local Laws and relevant policies of the Organisation
Asset Management Accountability Framework 2016 (AMAF)
International Infrastructure Management Manual, Sixth Edition, IPWEA, V6.0, 2020

Requirement
Provides direction and guidance on the financial and reporting expectations of entities, to ensure a consistent approach to accounting records. The following regulations apply to Council: AASB 116 Property, Plant & Equipment – prescribes requirements for recognition and depreciation of property, plant and equipment assets. AASB 136 Impairment of Assets – aims to ensure that assets are carried at amounts that are not more than their recoverable amounts. AASB 1021 Depreciation of Non-Current Assets – specifies how depreciation is to be calculated. AAS 1001 Accounting Policies – specifies the policies that an organisation is to have for recognition of assets and depreciation. AASB 1041 Accounting for the reduction of Non-Current Assets – specifies the frequency and basis of calculating depreciation and revaluation basis used for assets; and AAS 1015 Accounting for acquisition of assets – method of allocating the value to new assets on acquisition.
AS/NZ Standards such as Risk Management Standard.
Construction standards, Maintenance contracts, etc.
The Department of Treasury and Finance's (DTF), AMAF establishes a flexible and non-prescriptive set of requirements which aim to ensure Victorian public sector Accountable Officers manage asset portfolios appropriately. The AMAF, although not compulsory for Victorian councils, provides useful guidance on how councils can manage their asset information. The AMAF sets out that agencies must maintain asset information—both financial and non- financial—to support asset planning, and performance monitoring and reporting.
The IIMM has been developed with public and private sector industry input from Australia, New Zealand, United States Canada, South Africa and the United Kingdom to promote best management practice for all infrastructure assets.

Table 8 – Regulations & Standards Relevant to Management of Stormwater Assets

The following is a summary of policies relevant to this asset class. Many of these policies are available from Council.

Policy
Asset Management Policy for Infrastructure Assets 2022-2026
Risk Management Plan
Asset Capitalisation Policy 2018
Bass Coast Shire Council Stormwater Management Plan Vol 1 and 2, 2003

Requirement
The Policy acknowledges Council's commitment to asset management and provides a consistent asset management approach with clear principles and guidelines in order to manage Council's assets for the current and future community. It establishes a framework to ensure a structured, coordinated, cost effective and financially sustainable approach to asset management across the organisation.
Sets the overall framework for ongoing and systematic identification, assessment and management of risk within the framework of ISO 31000-2018, Risk Management - Guidelines.
Provides consistent guidelines, in accord with relevant Accounting Standards and State Government Policy, regarding which Council assets are to be capitalised (as opposed to expensed).
The purpose of the Stormwater Management Plan is to protect and enhance the local waterways by improving the quality of stormwater draining from these urban areas.

Table 9 – Policies Relevant to Management of Stormwater Assets

3.5 Level of Service

The levels of service documented in this DSAMP reflect the current levels of service provided by Council, for the benefit of the community, in the context of Council's financial and human resources, whilst meeting its statutory requirements.

The levels of service that have been adopted are considered reasonable as demonstrated by industry standards and benchmarks.

3.5.1 Flood Mitigation Levels of Service

Typically, Council's minor drainage system has been designed for a 20 per cent AEP storm event. This is a storm of intensity and duration that long-term historical records indicate should occur on average every once every five years. The major drainage system should be designed for a one per cent AEP storm event.

The minimum Flood Mitigation Levels of Service (LoS) adopted by Council is 3 Star as set out in Table 10.

It is based on one per cent AEP storm events (i.e. 1 in 100 years on average) and uses a star rating system to categorise the expected flooding outcome. A rating of 1 Star represents significant flooding of private properties and 5 Star has minimal impact on the community. The mid-point 3 Star aligns with Melbourne Water's target for flood mitigation and is considered the minimum acceptable standard as although it results in community disruption, there will be little damage to buildings and other structures.

Level of Service	Dwellings & Businesses in Urban Areas	Dwellings & Businesses in Rural Areas	Roads
5 Star	No inundation of property in a 1% AEP	No inundation of property in a 1% AEP. Rural properties not inundated for periods longer than 5 days. Access to the property is not impacted.	No water over the road in a 1% AEP.
4 Star	Inundation of property but no water lapping dwelling or business or under dwelling or business in a 1% AEP	No inundation of property in the vicinity of a dwelling, shed or similar structure in a 1% AEP. Rural properties are not inundated for periods longer than 5 days in a 1% AEP. Access to the property is not denied for more than 1 day in a 1% AEP.	Depth of water at lip of edge of traffic lane less than 100mm in a 1% AEP.
3 Star	Inundation of dwelling or business below floor level in a 1% AEP event	Inundation of dwellings and/or sheds below floor level in a 1% AEP event. Rural properties are inundated for periods longer than 5 days but less than 8 days in a 1% AEP. Access to the property is denied for more than 1 day but less than 2 days in a 1% AEP.	Depth of water at edge of traffic lane between 100mm and 200mm in a 1% AEP.
2 Star	Inundation of dwelling or business up to 300mm above floor level in a 1% AEP event.	Inundation of dwellings and/or sheds up to 300mm above floor level in a 1% AEP event. Rural properties are inundated for periods longer than 8 days but less than 15 days in a 1% AEP. Access to the property is denied for more than 2 days but less than 5 days in a 1% AEP.	Depth of water at edge of traffic lane between 200mm and 300mm in a 1% AEP.
1 Star	Inundation of dwelling or business 300mm above floor level in a 1% AEP event.	Inundation of dwellings and/or sheds over 300mm above floor level in a 1% AEP event. Rural properties are inundated for periods longer than 15 days in a 1% AEP. Access to the property is denied for more than 5 days a 1% AEP.	Depth of water at edge of traffic lane greater than 300mm in a 1% AEP.

Table 10 – Level of Service – Flood Mitigation

For clarity, the performance standard for each Star rating has been shown in Figure 13. It should be noted that, flooding of roadways can still occur with a 5 Star standard of performance during a one per cent AEP storm event. Also, it should be noted that any flooding that occurs during a less intense storm event (e.g. 10 per cent AEP or once in 10 years) will be less extensive.

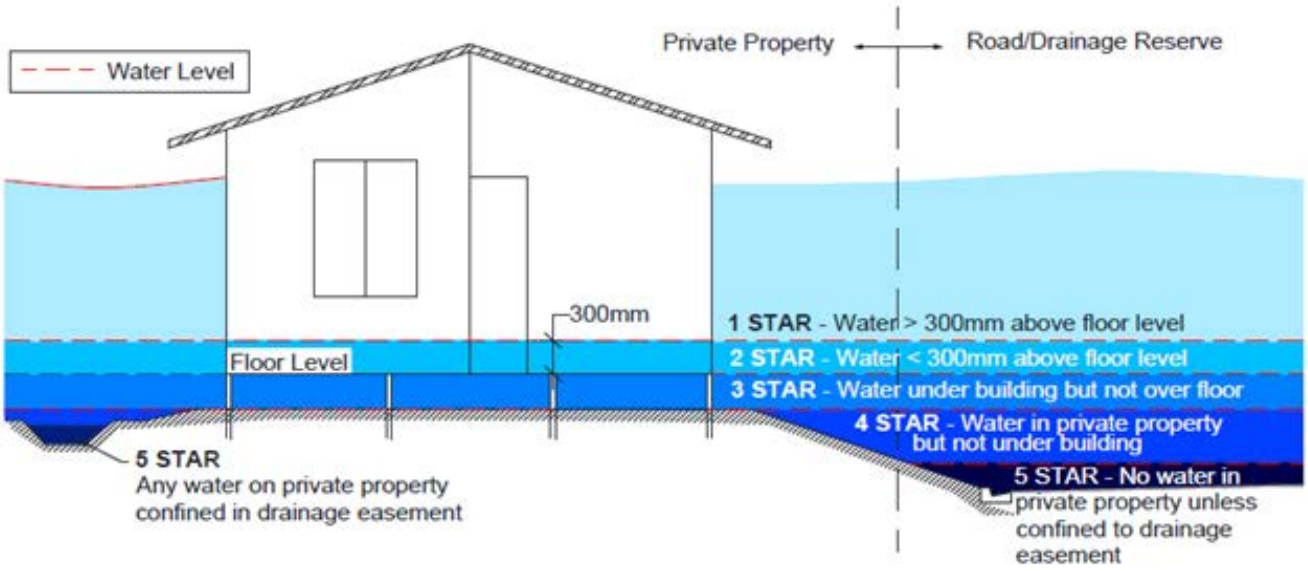


Figure 17 – Levels of Service Standards for Dwellings and Businesses

The flood capacity modelling investigations commissioned by Council in 2017 and 2018 were based on one per cent AEP storm events (i.e. 1 in 100 years on average) for our municipality and considered approximately 64 sites within the municipality and not all sites within the municipality. It identified that across the towns modelled 62 per cent of the properties meet the 5 Star and 4 Star requirements, 29 per cent are assessed as 3 Star, eight per cent as 2 Star and less than one per cent as 1 Star.

While the reports identified flood mitigation works to a value of just over $27.8 million as necessary to lift all properties to a minimum of 3 Star, further validation work was undertaken by Council estimates the cost at around $16 million. This is because not all sites modelled and studied were considered as requiring further investigation and those sites that did require further investigation, the final infrastructure solution required is often more than what was allocated and costed for in the studies.

In view of the current drainage network performance and the rectification costs involved, it is recommended that the long-term target levels of service for flood mitigation should be:

- 3 Star for existing urban areas; and
- 5 Star for new developments in urban areas.

Council acknowledges that it will need to undertake additional flood modelling as the current models are considered out of date and they will need to consider how properties assessed as 1 and 2 Star, can be increased to a 3 Star rating or above, recognising that in some cases, building new infrastructure may not be possible to mitigate flooding issues, due to environmental and geographic constraints.

3.5.2 Customer Levels of Service

Council's Customer LoS that have been adopted as a result of this DSAMP are detailed as follows:

Key Performance Measure	Level of Service	Performance Measure	2024 Performance
CUSTOMER LEVELS OF SERVICE			
Customer Satisfaction	Stormwater assets meet community needs	>50 community survey satisfaction obtained from the annual LGA Survey.	Data to be collected.
Quality	Protect the quality of receiving waters	Installation of GPT's as appropriate at strategic locations across the municipality.	Data to be collected.
	Response time to customer requests	> 80% of all drainage requests adequately responded to within target timeframes.	Data to be collected.

Table 11 – Customer Levels of Service

3.5.3 Technical Levels of Service

Supporting the community service levels are operational or technical measures of performance.

Technical service measures are linked to annual budgets covering operations, maintenance, renewal and upgrade activities as defined in the Lifecycle Management Section.

Key Performance Measure	Level of Service	Performance Measure	2024 Performance
TECHNICAL LEVELS OF SERVICE			
Condition	Condition assessment of stormwater assets every 3 years.	Overall Condition Index to be in condition 2 (out of 5) or better.	2.15 out 5
Quality	Stormwater assets maintained to an acceptable level.	Lesser than 5% of the total network in condition above score 4.	<1%

Table 12 – Technical Levels of Service

4 Future Demand

This section identifies the effect of expected growth and consequent demand on Council's stormwater asset infrastructure. Forecasting future demand is essential in determining lifecycle management for assets. The management of stormwater assets within the municipality is directly affected by growth in the number of assets and growth in the number of developments.

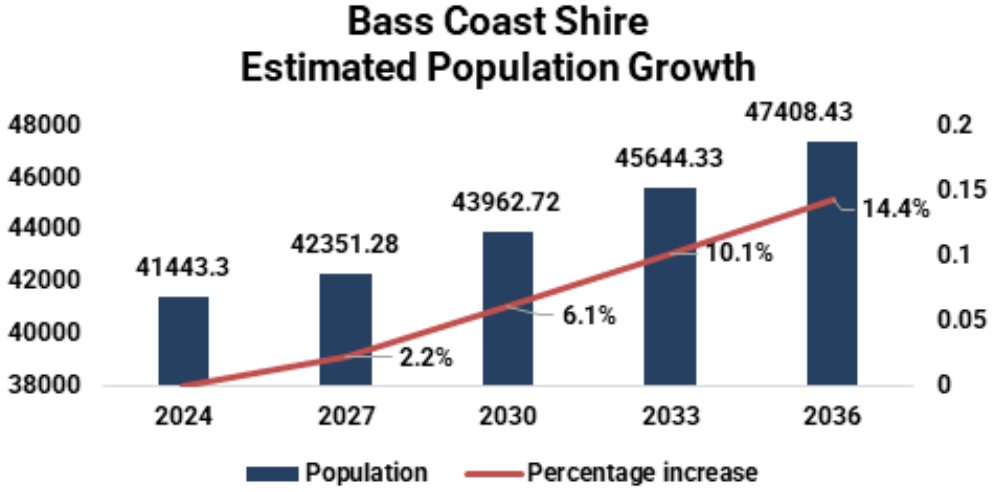
4.1 Demand Drivers

The main drivers affecting demand include demographic changes in population; environmental factors influencing infrastructure capacity and design requirements; and technological change and improvements in maintenance and management of infrastructure.

4.2 Demand Forecasts

Bass Coast Shire has long been a popular tourist and holiday home destination and is now one of several peri urban municipalities in Victoria that has been attracting strong demand for housing from permanent residents. The present position and projection for demand drivers due to population growth that may impact future service delivery and utilization of assets are identified and documented in Table 13 - Demand Factors, Projections, and Impact on Services.

Demand Factor	Present position	Projection
Population Growth	The Bass Coast Shire population forecast for 2024 is 41,443 and is forecast to grow to 47,408 by 2036	



Source: Population and household forecasts, prepared by forecast.id (informed decisions), March 2023.

Table 13 – Demand Factors, Projections, and Impact on Services

The emerging needs of population growth suggests that demand for stormwater assets (pipes, drains, road culverts) will need to cater for additional new and upgraded stormwater assets over the following 10 years. Over the past five years, Bass Coast has experienced an average of 648 dwelling approvals per annum. Over the next 15 years, projections indicate that between 534 – 656 additional dwellings will be required per year, resulting in the need for approximately 10,000 additional dwellings in the Shire by 2036[8].

[8] Bass Coast Residential Market Supply Demand Assessment August 2022, by Urban Enterprise

4.3 Changes in Technology

Council is continuously monitoring new asset treatments that may be available to increase the life of its assets. The industries that supply the goods and services used in the provision and maintenance of drainage assets are continually developing and evolving their products. While improvements in source materials like pipes and pits will only flow through slowly as the network is renewed and expanded, improvements in inspection and maintenance systems will have more immediate benefit.

Potential areas of improvement include:

- CCTV and other systems that are used to identify pipe faults and assess condition.
- GPS and other geo-location tools for more efficient identification of assets and work locations.
- Pit and pipe cleaning systems and tree root removal systems.
- Re-lining systems that will allow the life of existing pipes to be extended without the need for expensive excavations. Utilising advanced trenchless technology when renewing pipes, will minimise the disturbance of the road reserve in highly populated areas.
- Predictive stormwater flow tools that will provide improved identification of potential flooding.
- Implementing water sensitive urban design features, will reduce the flow rates from new developments and provides for higher quality water runoff and opportunities to re-use the stormwater

Council uses a variety of communication channels to monitor potential developments and will investigate on a case-by-case basis where a development appears to provide either efficiency on monetary benefits.

Over past years, Council has employed several changes in technology that have affected the functional levels of service of Council's drainage system, including the use of rubber ring jointed pipes to allow for movement of the pipe, improvement in bedding and backfill standards and the installation of GPTs to improve the quality of stormwater before reaching the receiving waterways.



4.4 New Assets from Growth

Currently Bass Coast has a population of around 41,443 which is set to grow to around 47,408 by 2036. Due to this population growth and development, Council is expecting to be gifted $83 million in new stormwater assets necessary to service this growth[9]. This expenditure will be funded via developer contributions. As additional information becomes available with regards to new growth and development areas, Council will continue to identify the community infrastructure needs and these will be included in future revisions of this DSAMP in greater detail.

With the commitment of new stormwater asset growth, it is reasonable to anticipate that Council's stormwater asset portfolio replacement values will increase from $223.71 million as at 2023 to approximately $306 million by 2036. The current annual depreciation is also expected to increase from $2.1 million per annum to $2.8 million per annum by year 2036.

When new assets are acquired, or assets are expanded or upgraded, this results in an increase in commitment of annual operational and maintenance funding to ensure continued service delivery of the asset over its lifecycle.

[9] Wonthaggi northeast expecting some $136M of developer contributed infrastructure with 61% of that attributed to stormwater drainage.

4.5 Climate Change

Climate change has seen an increased risk of extreme weather events including storm events, heatwaves, flooding, sea-level rise and fire events across the globe. Council has declared a Climate Emergency and adopted a Climate Change Action Plan 2020-30 with a vision that our homes, buildings and infrastructure are comfortable, efficient and resilient to the impacts of climate change.

Climate change is expected to significantly impact stormwater drainage assets by intensifying precipitation patterns and increasing the frequency of extreme weather events. The increase of rainfall patterns may lead to a surge in runoff leading to more localised flooding, placing greater stress on Council's existing drainage network. To address these challenges, a review of infrastructure design and management practices becomes imperative. This involves improving the capacity of existing drainage systems to handle the larger volumes of stormwater, integrating sustainable drainage solutions to minimise environmental impact, and formulating adaptive strategies that can adeptly respond to the evolving risks associated with a changing climate. In essence, climate change necessitates a proactive and holistic approach in reshaping stormwater infrastructure to ensure its resilience and effectiveness in the face of evolving environmental conditions.

Whilst Council's Climate Action Plan will help minimise our footprint, it is recognised that further work is required to identify and address the impacts of climate change on Council's stormwater drainage network.

The first iteration long term financial plan (LTFP) modelling included in this DSAMP, incorporates climate impacts factoring extreme temperature, extreme rainfall, flooding, sea level rises, dryness and storm surge which were sourced from the Infrastructure Asset Vulnerability Assessment (AVA) report by SECCA[10]. The LTFP model simulated the climate risk impacting high risk assets by shortening useful lives and increasing treatment costs, recognising the need that as these assets are selected for capital renewal works, that future enhancements to address climate change impacts such as introducing one-way valves on pipes that discharge into the ocean, will be necessary.

Council also recognises that it will need to undertake additional flood modelling as the current models are considered out of date and they will need to incorporate current climate change factors into the new model to understand future impacts and what these implications mean to Council from a level of service and financial affordability perspective.

Also, Council will investigate if using different materials instead of conventional type pipes in areas where there is increased soil movement or water table issues as a result of climate change, will help improve the management of our assets.

[10] SECCCA is a collaboration of nine councils in Victoria's south-east making a regional response to climate change

4.6 Demand Management Plan

The demand for stormwater assets in Bass Coast will increase proportionally with the predicted population growth and predicted demographic changes.

Demand for new services will be managed through a combination of managing existing assets, upgrading existing assets and providing new assets to meet demand and demand management. Demand management practices include non-asset solutions, insuring against risks and managing failures. Opportunities identified to date for demand management are shown in Table 14.

Service Activity	Demand Management Plan
Increase in demand to upgrade localised areas that flood	- Review all stormwater studies and develop a master upgrade list, which details high level project descriptions, project costs and a criticality ranking which considers economic, social and environmental benefits. - Not all properties discharge to a drainage system – this leads to a higher level of nuisance flows. As properties are identified, ensure that stormwater discharge complies with Council's current local laws and standards. - Review road design standards to ensure that all roads when reconstructed meet the current criteria to be able to act as overland flow paths during storm events of 1 in 100 years ARI. - When undertaking road reconstruction works, explore options of increasing permeable surfaces.
Development of new residential subdivisions which can affect future capacity requirements	- Placing planning controls on the amount of discharge that a new development may discharge to Council's drainage system by storing flows by via on-site retention systems.

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Service Activity	Demand Management Plan
Development of new residential subdivisions which can affect future capacity requirements	- All new developments will be managed through the planning and engineering subdivision process with Development Control Plans enabling contributions from new developments allocated to upgrade existing downstream drainage systems, where impacted as a result of new developments. - Ensure all new and upgraded council facilities include stormwater retention devices.
Identified areas where a lack of capacity exists	- Undertake further drainage capacity analysis where required and identify areas of the drainage network that need to be upgraded to meet current design standards. - Use the criticality rating for locations that are most likely to be affected by storms and implement a proactive capacity upgrade program.
Non-asset based solution through education and information programs	- Encourage and promote the use of rainwater tanks and the reduction of hard surface areas to reduce the volume of stormwater entering into the network.
Community expectations	- Monitor community expectations through annual and targeted community surveys or deliberative engagement.

Service Activity	Demand Management Plan
Limited capacity of downstream Melbourne Water drains – hence limiting the capacity of Council's drainage system.	- Work closely with Melbourne Water and West Gippsland Catchment Management Authority to identify problem areas and solutions to mitigate.
Climate Change	- Utilise the latest research and climate projections to periodically reassess climate risk to Council's assets, and to include best practice climate adaptation principles in the AM Plan. - Potential for increased need for reactive maintenance for storm and flood damage repair. Assets will need to be built and renewed to a standard that may require different materials, methods of construction and other innovative approaches.

Table 14 – Demand Management Plan Summary

5 Risk Management Planning

5.1 Asset Criticality / Hierarchy

To manage Council's stormwater assets more effectively, they have been categorised based on the level of importance and criticality. The objective of the criticality framework is to apply a score to each stormwater asset.

The criticality of each element of the network is determined by considering factors such as:

- Pipe and pit sizes
- Materials
- Pipe gradients
- Total water flows
- Land use
- Location

Using these inputs, a Consequence Score is calculated for each network element which then allows the stormwater assets to be ranked and a Criticality Score applied between 1 and 5, with 1 representing the lowest criticality and 5 the highest. The scores have been added to each asset in the Asset Register, so that decisions in relation to drainage provision, maintenance and fault response can be appropriately prioritised[11].

The methodology and framework is documented in Council's Drainage Criticality Business Process Manual 2019.

The stormwater hierarchy adopted by Council considers the varying risk and service levels associated with the stormwater asset portfolio and is summarised as follows on the opposite page.

[11] The criticality scoring was used to assist in prioritising and selecting which pipes and pits, would be sampled using visual techniques in 2023 for the asset revaluations.

Consequence Score	Consequence Level	Criticality Cumulative % Point Score Range	Consequence Description
1	Minor	0-30%	Assets which on failure will not affect operational reliability.
2	Moderate	31-50 %	Asset which on failure will have a minor impact pm operational reliability.
3	Moderate	51-75 %	Assets important to the effective day to day operations of the system where redundancy or contingency should be available for restoration of service or operation.
4	Major	75-95 %	Assets considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service or operational control.
5	Severe	95-100 %	Assets if they fail would cause disastrous consequences.

Table 15 – Asset Criticality / Hierarchy for Stormwater Assets

Council has developed a Criticality Assessment of the stormwater drainage network.

5.2 Risk Management Plan

Council's Risk Management Plan[12] sets the overall framework for addressing risk within the framework of ISO31000-2018. The Risk Management Plan outlines Council's commitment to manage its resources and responsibilities in a manner which is intended to minimise harm or loss. The elements of this framework are illustrated in Figure 18.

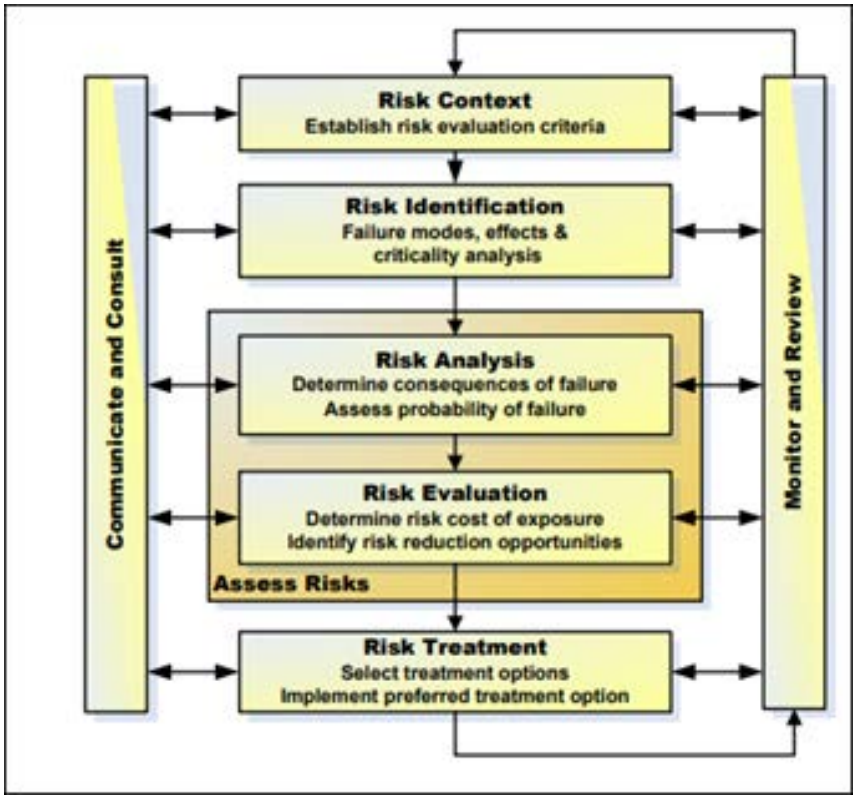


Figure 18 – Risk Management Process, Source: ISO31000:2018

[12] https://www.basscoast.vic.gov.au/about-council/strategies-and-policies/plans

5.3 Risks Assessment

Council has developed an asset criticality, giving higher importance to risk assessment and the appropriate levels of inspection and maintenance for each classification as documented in 'Bass Coast Shire Council Risk Management Plan'.

Critical assets are those which have a high consequence of failure causing significant loss or reduction of service. Similarly, critical failure modes are those which have the highest consequences. By identifying critical assets and failure modes, investigative activities, condition inspection programs, maintenance and capital expenditure plans can be targeted at the critical areas. Activities may include items such as increased inspection frequency and higher maintenance intervention levels.

5.3.1 Risk Plan

An assessment of risks associated with service delivery from Council's stormwater assets has identified the critical risks that will result in significant loss, 'financial shock 'or a reduction in service.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action), and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment cost after the selected treatment plan are implemented is shown in Table 16 over the page.



Service or Asset at Risk	What Can Happen	Risk Rating
Pipes and Pits	Exceed capacity	High
Pipes and Pits	Blockages creating inundation of roads and adjacent properties	High
WSUD	Blockages and pollutants entering waterways	High
Pump Stations	Failure of pump at Moore St and Tedwood Crt Pump Wells	Medium
Pump Stations	Failure of pump at Tenby Point drainage basin	Medium
Climate Change Impacts	Asset Vulnerability	High

Risk Treatment Plan	Residual Risk	Treatment / Costs
Continue undertaking/reviewing Floodplain management studies/plans and develop a master Implementation Plan List that is prioritised. Plan for funding higher priority projects.	Medium	Costs to be determined.
Identify and develop a list of pipes and pits that need to be regularly inspected. Inspection of pits and pipes in areas where regular blockages occur.	Medium	Costs to be determined.
Identify the location and cleaning frequencies of all GPTs as per the manufacturer's instructions. Allocate resources to the task. Identify all outfalls that are non GPTs and investigate costs to upgrade these.	Medium	Costs to be determined.
Introduce regular inspections to mitigate risk.	Low	$10,000 p.a.
Introduce regular inspections to mitigate risk.	Low	$5,000 p.a.
Drainage assets that are at high risk of impact from climate change, require further modelling.	Medium	Costs to be determined.

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Service or Asset at Risk	What Can Happen	Risk Rating
Pits deeper than 1m	Failure to provide emergency maintenance	Medium
Pipe Function	Utilities boring through pipes	High
Open drains	Incomplete records	High
Open drains	Failure to maintain	Medium
Outfalls	Erosion	Medium
Assets not recorded in asset register	Unknown assets will not be included in maintenance and renewal plans	Medium

Table 16 – Critical Risks and Treatment Plan

Risk Treatment Plan	Residual Risk	Treatment / Costs
Confined space accreditation for depths deeper then 1m provided to maintenance staff.	Low	$8,000
Continue to provide Dial Before you dig data that is accurate. Maintain and improve asset data. Regulatory enforcement where contractors do not take our permits for works.	Medium	Costs to be determined.
Capture the physical attributes and current condition of all Open Drains and load data into Council's asset register.	Medium	Costs to be determined.
Regular inspections to ensure weeds are controlled, culverts ends are cleaned, and culverts remain clear.	Low-Medium	Costs to be determined.
Regular inspection and repairs as necessary, stabilisation of banks.	Low-Medium	Costs to be determined.
Establish a process to identify and add unknown assets to asset register and GIS when found through customer reports, maintenance or planning activities.	Low-Medium	Costs to be determined.

6 Financial Summary

The provision of adequate financial resources ensures that Council's stormwater asset portfolio is appropriately managed and preserved. Financial provisions below requirements impact directly on community development and if prolonged, results in substantial needs for "catch up" expenditure imposed on the community in the future. Additionally, deferred renewal results in increased and escalating reactive maintenance as aged assets deteriorate at increasing rates.

6.1 Forecasted Funding Requirements

The objective of this Section is to model the deterioration of Council's stormwater assets portfolio, by developing a simulation model using predictive modelling software.

This process typically involves setting up life cycle paths for each stormwater asset / component, along with their inspected condition, identifying the appropriate treatments and unit rates to deliver these treatments and configuring the treatment rule base (matrices based on selected condition criteria that when matching will drive a treatment based on the condition).

By utilising the above process and setting up the criteria and logic within the predictive modelling software, it is typically possible to model the future costs of Council's stormwater asset portfolio renewal requirements and also to predict the future condition of these assets under varying funding scenarios.

As identified in Section 4.5, Council's LTFP models have simulated stormwater drainage condition outcomes and funding required due to the potential impacts of climate change incorporating the climate elements referenced the SECCA, AVA.





6.2 Forecast 10-Year Funding

The 10-year funding considered sufficient (in the short term) to enable the stormwater portfolio to achieve its current useful lives through capital and maintenance activities is as follows:

Spend Type	2024/25 ($)	25/26 ($)	26/27 ($)	27/28 ($)
Capital Asset Renewal	150,000	150,000	150,000	150,000
Capital Asset Capacity Renewal	850,000	820,000	920,000	850,000
Total Capital	**1,000,000**	**970,000**	**1,071,000**	**1,000,000**
Maintenance	1,006,844	1,053,736	1,102,904	1,154,460
Asset Management Operational	85,000	290,000	290,000	290,000
Depot Operational	551,328	681,355	691,582	702,013
Total Maintenance & Operations	**1,643,172**	**2,025,091**	**2,084,486**	**2,146,473**

Table 17 – Desired 10-Year Funding Strategy

28/29 ($)	29/30 ($)	30/31 ($)	31/32 ($)	32/33 ($)	33/34 ($)
270,000	400,000	430,000	485,000	500,000	550,000
1,000,000	687,163	757,296	1,000,000	1,000,000	876,244
1,270,000	**1,400,000**	**1,430,000**	**1,485,000**	**1,500,000**	**1,550,000**
1,208,522	1,265,213	1,324,665	1,387,013	1,452,400	1,520,978
210,000	210,000	210,000	210,000	210,000	210,000
712,654	723,507	734,577	745,868	757,386	769,133
2,131,176	**2,198,720**	**2,269,242**	**2,342,881**	**2,419,786**	**2,500,111**

6.3 Financial Ratios

Asset management ratios provide insight into an organisation's performance and success in managing its assets. Council's asset management ratios for its asset portfolio calculated as at 30 June 2023 are shown in Table 19 – Key Asset Management Ratios.

Ratio	Description
Asset Renewal Funding Ratio	The extent with regards to how the organisation is funding their capital works program when comparing allocated capital works expenditure with the desired expenditure which has been derived from prediction modelling and/or service level agreements.
Remaining Service Index Ratio	The overall health of the organisation's asset stock in terms of measuring past asset consumption, via the amount of accumulated depreciation. The lower this ratio is, the more the asset stock has been consumed, which also indicates that not enough capital expenditure has been allocated to the asset.
Maintenance Sustainability Ratio	Measures the level of maintenance funding spent per annum, as a % of asset replacement value on the asset portfolio.

Table 18 – Key Asset Management Ratios

Calculation	Target	2023 Performance
Funded capital expenditure on renewals divided by the planned/desired capital expenditure.	>75%	114.42%
Written down value (fair value of the portfolio) divided by the total current replacement value.	>70%	79.81%
Total maintenance funding per annum / Total Replacement Value, expressed as a percentage.	2-5%	1.79%



7 Plan Improvement and Monitoring

This section outlines how Council will measure its asset management performance. The identified action items in Table 20 will enable Council to improve its asset management capability, to enhance asset value and deliver more for stakeholders while balancing cost, risk and performance.

7.1 Assumptions

The key assumptions made in this DSAMP and risks that these may change are shown below.

Key Assumption	Risk of Change to Assumption / Impact to Model
Maintenance funding levels will be progressively increased to represent as a minimum, 2% of the asset base replacement value.	Medium
The funding needs for new &/or upgrade of stormwater assets will be identified via capacity analysis studies and funding sought from grants and/or developer contributions. As identified, these will be incorporated into future DSAMP revisions.	Medium
Capital renewal treatments are like for like and do not account for additional costs to upgrade and/or utilise new technologies and materials.	Medium to Low
Asset register currency pertaining to asset quantities.	Medium to Low
Network strategic sampling CCTV condition inspections will be funded on an annual basis and incorporated into the Operational budget.	Low
Current human resource plan will not change in the near future.	Low

Table 19 – Key Assumptions made in DSAMP and Risks of Change

7.2 Improvement Plan

The Asset Management Improvement Plan which is set out in Table 21 below details the key improvement tasks. Completion of these tasks will improve Council's asset management capabilities for this asset class.

Task No	Improvement Items
1.	Review and test levels of service with regard to all stormwater assets owned or maintained by Council as part of the deliberative engagement process.
2.	Finalise the draft Stormwater Business Process Manual for adoption and implementation.
3.	Continue to fund cyclic CCTV sampling inspections (undertaken as part of 2023 valuations) of underground pipes and update pipe conditions within the asset register.
4.	Identify and capture asset data pertaining to stormwater asset types such as minor road culverts, open drains and basins and incorporate into future DSAMP reviews.
5.	Identify and maintain a register of known flooding locations and undertake updated drainage capacity analysis as required, to determine capacity and functionality conditions to assist in identifying future works.
6.	Continue with prediction modelling and lifecycle costing analysis of the stormwater drainage system to inform Section 6 of this plan.

Responsibility	Timeline
Asset Manager	December 2024
Asset Manager	December 2024
Asset Manager	On-going
Asset Manager	June 2026 / On-going
Asset Manager	December 2024
Asset Manager	On-going

...continued over the page.

Task No	Improvement Items
7.	Develop and implement an asset handover process to enable 100% asset data capture of new assets gifted or constructed to be captured in Council's asset register on an annual basis.
8.	Future community surveys should include specific questions to the community regarding stormwater services, to identify and measure performance in delivering this service to the community.
9.	Review and finalise the draft responsibility matrix with a view to identify and streamline roles and responsibilities.
10.	Develop and implement frameworks to improve and further develop its lifecycle AM processes to ensure that all lifecycle costs are identified and included in all capital investment decisions.
11.	Flood modelling studies and reports are recognised to be out of date and should incorporate climate change factors into the new model to understand future impacts.
12.	Undertake an analysis of all outfalls that are not GPTs and determine costs to upgrade all these outfalls to GPTs to address water quality.

Table 20 – Improvement Actions

Responsibility	Timeline
Asset Manager	December 2025
Asset Manager	June 2025
Asset Manager	June 2025
Asset Manager, Project Managers, Finance Manager	June 2024
Asset Manager	June 2026
Asset Manager	December 2025

7.3 Monitoring and Review Procedures

The DSAMP has a planning horizon of 10 years, and it is based on details documented within the Asset Management Strategy. This DSAMP will be reviewed on a rolling four-year cycle and amended to recognise any changes in service levels, needs arising from drainage capacity studies and/or resources available to provide those services as a result of the budget decision process.

7.4 Performance Measures

The effectiveness of this DSAMP can be measured and monitored based on Council's annual strategic indicators as follows:

- The performance of Council against the levels of service documented in Section 3.5; and
- Performance against the Asset Management Ratios documented in Section 6.3.

Bass Coast Shire Council

Drainage Services Asset Management Plan | 2024-2028

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