TWEED
SHIRE COUNCIL

Tweed Shire Council Stormwater Drainage Asset Management Plan

Version 3.3.1

August 2024

Version Control

This Document is a live Council document and is subject to periodic review. The validity and currency of the document is critical in applying its content as it contains significant asset management and performance data that is "real-time" based.

If you are reading this document please check the version date and the endorsement date below to make sure that the document is current.

Version	Version Month	Year	Endorsed Date	Status
V1.2	November	2009		Draft for Internal Comment
V1.3.1	January	2010		Draft Final
V1.3.1	December	2010		Final
V1.3.2	December	2010		Final updated for CSP
V2.3	April	2017		Update of 2010 Drainage AMP
V3.0	March	2021		2021 AMP Draft
V3.1	September	2021		2021 AMP Draft Updated
V3.2	November	2021		LTFP & Financial Reconciliation Updated
V3.3	February	2022		Chart updated
V3.3.1	August	2024		Final

NB:

1. Primary number changes to Versions (egg V1.0 to V2.0) will be made when the document undergoes its regular review and when significant changes are made to standards and guidelines for inspections, intervention levels or work.
2. Secondary number changes (V1.0 to V1.1) will apply to minor amendments that do not materially impact the document and are intended only to clarify or update issues.
3. Tertiary number changes (V2.1.1 to V2.1.1) are related to document updates and reviews undertaken by Assetic and TSC.

Endorsement Table

Name	Title	Endorsed & Signature	Date

Contents

1 Executive Summary

1.1 Background

The Asset Management Plan is prepared to provide a record of:

- The state of Council's infrastructure for stormwater drainage assets;
- The 10-year funding required to achieve Council's adopted asset performance targets; and
- Planned asset management activities for the current financial year.

The fundamental purpose of this Stormwater Drainage Asset Management Plan (Stormwater Drainage AMP) is to improve Council's long-term strategic management of its stormwater drainage assets. It aims to demonstrate reasonable management of Council's stormwater drainage assets in the context of available financial and human resources.

The Stormwater Drainage AMP achieves this by setting standards, service levels and programmes which Council will develop and deliver. The standards and service levels have been set in accordance with user needs, regulations, industry practice and legislative codes of practice.

This Stormwater Drainage AMP encompasses the following Drainage Infrastructure asset types:

- Pipes
- Channels
- Minor Culverts
- Pits
- Gross Pollutant Traps (GPT)
- Inlets
- Outlets
- Headwalls

1.2 Current State of Council's Assets

Details of the State of Council's stormwater drainage assets are contained in Section 2.

The value of the stormwater drainage asset stock as at 30th June 2021 is shown in the following table.

Asset Class	Replacement Value	Accumulated Depreciation	Written Down Value	Annual Depreciation
Pipes	$206,115,142	$73,085,333	$133,029,810	$2,089,487
Pits	$46,158,996	$17,411,755	$28,747,242	$574,107
Total	**$252,274,138**	**$90,497,088**	**$161,777,052**	**$2,663,594**

The estimated Stormwater Drainage condition as at 30th June 2021 is as follows. Refer Section 2.3.

Asset Class	Brand New	Very Good	Good	Fair	Poor	Very Poor	End of Life
	Score 0	Score 1	Score 2	Score 3	Score 4	Score 5	Score 6
Pipe Network	7.7%	7.8%	18.2%	51.8%	1.7%	12.7%	0.0%
Pit Network	6.4%	10.1%	1.1%	52.0%	19.4%	11.1%	0.0%

This condition information has been used in the predictive modelling to determine the required funding levels for asset renewal and maintenance detailed in Section 5 and summarised in Section 1.3.

1.3 Asset Funding Levels

The recommended capital and maintenance long term financial plan (LTFP) is shown in the below table.

	Capital			Maintenance	Total
Year	Pipes	Pits	Total	Pipes & Pits	Pipes & Pits
1	$998,172	$249,320	**$1,247,492**	1,016,963	$2,264,455
2	$1,392,217	$347,445	**$1,739,662**	1,093,788	$2,833,450
3	$1,402,484	$350,561	**$1,753,045**	1,129,447	$2,882,492
4	$1,412,940	$353,086	**$1,766,026**	1,184,793	$2,950,819
5	$1,423,604	$355,785	**$1,779,389**	1,268,428	$3,047,817
6	$1,434,435	$358,566	**$1,793,002**	1,387,173	$3,180,175
7	$1,445,503	$361,352	**$1,806,855**	1,534,314	$3,341,169
8	$1,456,873	$363,673	**$1,820,546**	1,709,234	$3,529,780
9	$1,468,356	$366,882	**$1,835,238**	1,882,301	$3,717,539
10	$1,480,182	$370,033	**$1,850,215**	2,018,845	$3,869,060
Total	**$13,914,766**	**$3,476,70**	**$17,391,469**	**19,344,900**	**$36,736,369**

Tweed Shire's committed funding is shown in the below table.

Year	Capital	Maintenance	Total
1	$1,247,760	$1,002,954	$2,250,714
2	$1,740,315	$1,033,008	$2,773,323
3	$1,753,121	$1,053,670	$2,806,791
4	$1,766,183	$1,074,742	$2,840,925
5	$1,779,508	$1,096,239	$2,875,747
6	$1,793,099	$1,118,172	$2,911,271
7	$1,806,963	$1,140,541	$2,947,504
8	$1,821,102	$1,163,350	$2,984,452
9	$1,835,525	$1,186,616	$3,022,141
10	$1,850,237	$1,210,345	$3,060,582
Total	**$17,393,813**	**$11,079,637**	**$28,473,450**

1.4 Action Plan

Asset Management Plans must be a dynamic document, reflecting and responding to changes that occur over time. This Asset Management Plan is referenced during the annual budget preparation to ensure resourcing is allocated for the completion of deliverables.

This Asset Management Plan has a life of 4 years and is due for revision and updating within 1 to 2 years of each Council election.

A detailed Action Plan generated from the review of this Asset Management Plan is shown in Table 25, for those activities and processes that will need to be monitored, developed and fine-tuned over time. The actions for improving this Plan are categorised into the following groupings; Policies and Guidelines, Service Level and Lifecycle Analysis, Financial Planning and Asset Management Practices.

The high priority improvement action items have been identified as follows:

- Obtain Council endorsement of this Asset Management Plan;
- Collect CCTV condition information for a statistical sample of the drainage network to refine prediction models, utilising Council's data collection manuals;
- Refine inventory information for the entire drainage asset network;
- In line with OLG mandate, undertake a comprehensive revaluation of the Shire's Drainage Assets;
- Train Depot staff in using Stormwater Drainage AMP service levels, Stormwater Drainage AMP intervention levels, Stormwater Drainage AMP inspection regime; and
- Develop process to ensure that new asset data from developments, is transferred into Council's asset register on an annual basis.

It must be noted that this Asset Management Plan is not a stand-alone document but is in fact robustly related to Council's Asset Management Policy and Strategy, Resourcing Strategy and Community Strategic Plan.

2 Current State of Council's Assets

2.1 Key Indicators

2.1.1 Key Assets Covered by this Stormwater Drainage AMP

Tweed Shire Council owns and manages approximately 390kms of stormwater drainage pipes and channels and minor road culverts which are constructed and located within the road and open space reserves, many of which are in varying condition.

Council also owns and manages some 17,650 stormwater pit structures located within the road and open space reserves and private land, many of which are in varying condition. It should be noted that pits, refer to any one of the following – kerb inlet, drop inlet, manhole or junction.

The extent of Council's stormwater pipes and pits asset stock represented by the pipe and pit types, is illustrated in Table 1 - Stormwater Drainage Asset Quantities by Type as in June 2015 and June 2021

Stormwater Drainage Asset Quantities				
Drain Types	***2015 Lengths (m)***	**2021 Lengths (m)**	**Difference (m)**	**Difference**
Channel	*32,490*	33,274	784	2%
Minor Culvert	*7,325*	6,848	-477	-7%
Pipe	*338,546*	350,118	11,572	3%
Total	***378,361***	**390,240**	**11,879**	**3%**
Pit Types	***2015 Structure (No.)***	**2021 Structure (No.)**	**Difference (No.)**	
Field Inlet	*2,749*	2,821	72	3%
Gross Pollutant Trap	*177*	186	9	5%
Headwall	*1,793*	1,940	147	8%
Kerb Inlet	*8,108*	8,461	353	4%
Manhole	*3,980*	4,240	260	7%
Junction	*2*	2	0	0%
Total	***16,809***	**17,650**	841	**5%**

Table 1 - Stormwater Drainage Asset Quantities by Type as in June 2015 and June 2021

The most common pipe sizes which comprise the stormwater drainage network are 375mm and 450mm in diameter which represent some 55% of the network length, while 64% of the pit network comprises of kerb and field inlets. Industry practices inform us that there is no discernible correlation between pipe size and condition and hence it is assumed that size does not affect condition. Therefore, condition is assigned taking into account the construction period of the sub-divisions.

Large culverts are included in the Transport Asset Management Plan.

2.1.2 What are the Useful Lives of Council's Stormwater Assets?

The following table describes the expected useful lives that Council has adopted for Stormwater Drainage assets.

Asset Types	Useful Life (Years)
Pipes	100
Pits	80
Headwalls	80
Minor Box Culverts	80
Minor Pipe Culverts	100
Grass Channels	50
Rock Channels	80
Concrete Channels	100

Table 2 - Stormwater Drainage Assets Expected Useful Lives

The majority of pipes, channels and pits were constructed from 1986 to 2002 which accounts for some 72% of the underground system being constructed during these periods, while some 12% are in the order of 75 years or more of age. The mean age of the stormwater drainage system is between 27 to 35 years old, the average is 30 years old.

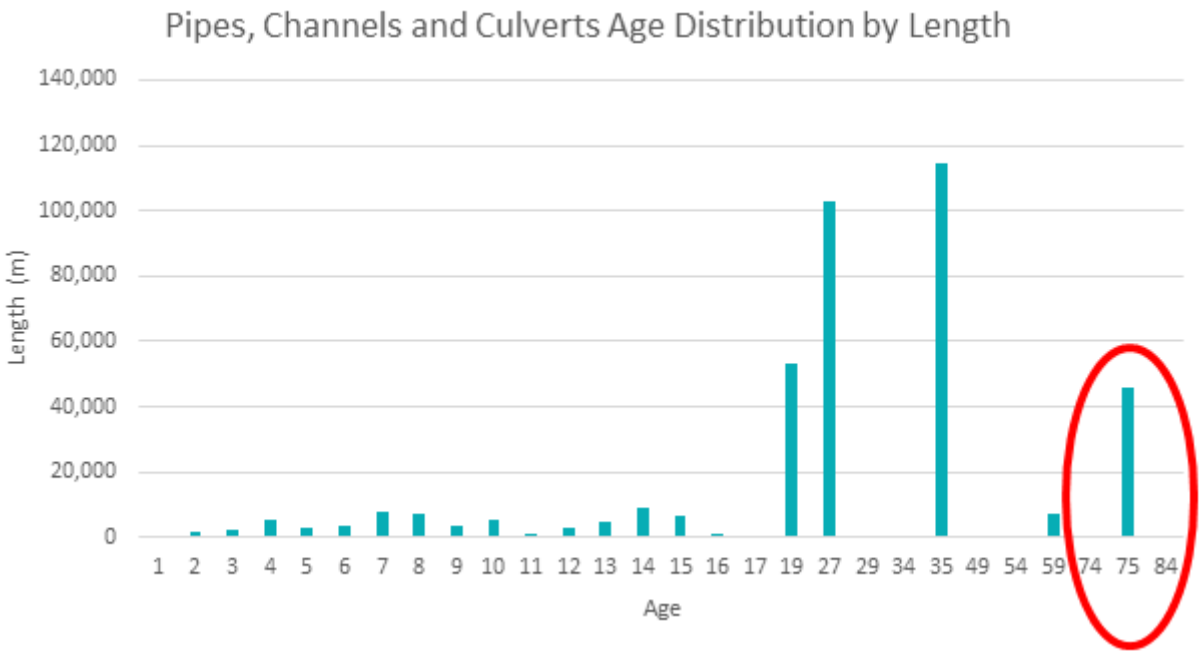

Figure 1 - Pipes, Channels and Culvert Age Distribution by Length

Approximately 45km of stormwater drainage pipes and 500m of minor culverts are 75 years old. These assets display some localised defects and are expected to be gradually renewed in a decade's time.

2.1.3 Stormwater Drainage Assets Hierarchy

In accordance with the International Infrastructure Management Manual, Council acknowledges that the primary purpose of an asset hierarchy is to ensure that appropriate management, engineering standards and planning practices are applied to the asset based on its function. It also enables more efficient use of limited resources by allocating funding to those assets that are in greater need and the costs are better justified.

Council has adopted a stormwater drainage hierarchy as defined in Table 3 below. The stormwater drainage hierarchy classification provides a consistent classification for these assets, predominantly based on their role taking into account the varying risk levels associated with the capacity of the above ground and underground system and/or the risk associated with localised flooding during typical storm event.

The hierarchy classification has been documented as follows:

Hierarchy	Definition
SW1	All underground stormwater pipes, pits and drainage outlet structures that comprise the underground stormwater network
SWD1	Major Open Drain – Such as Banora Western Drainage Scheme
SWD2	Minor Open Drain – Such as earth or concrete invert drains
SWD3	Road Reserves and overland flow paths

Table 3 - Stormwater Drainage Hierarchy

Without an adequate stormwater drainage hierarchy, there may be inefficient allocation of resources, user expectations may vary and the scheduling of stormwater works and priorities made more difficult.

Council has different maintenance interventions, inspection frequencies and response times for each drainage classification.

Council's stormwater drainage pipes and drainage channels are constructed with a variety of materials. The quantum of Council's stormwater drainage pipe and channel asset stock by material type is illustrated below in Table 4. 99% of pits are constructed of concrete material, as this has been the standard design specification over the past 50 years.

Structure Type	Material Type	*2015 Length (m)*	2021 Length (m)	Difference (m)	Difference
Drainage Channels	Concrete	*212*	403	191	90%
	Grass	*3,052*	3,352	300	10%
	Grout mattress	*931*	931	0	0%
	Rock	*3,719*	3,719	0	0%
	Natural	*24,576*	24,869	293	1%
Drainage Pipes and Minor Culverts	PVC Pipe	*5,625*	5,739	114	2%
	Concrete Box Culvert	*6,650*	6,174	-476	-7%
	Concrete Pipe	*333,584*	345,041	11,457	3%
	Steel Pipe	*12*	12	0	0%
Grand Total	**Grand Total**	*378,361*	**390,240**	**11,879**	3%

Table 4 - Distribution of Stormwater Drainage Network by Material Types as in June 2021

The most predominant material type comprises of concrete construction followed by natural open channels. The remainder of the stormwater drainage asset stock comprises of PVC, Rock, Grout Mats, Steel and Grass.

It should be noted that in 2015, Council's stormwater drainage network consisted of approximately 378kms of stormwater drainage pipes and channels and 16,809 pits. This indicates that from 2015 to 2021, there has been an increase to Council's stormwater drainage asset stock in the order of 3% for pipes and 5% for pits. This equates to 12kms of new pipes and channels and 841 pits, which have been either gifted to Council by developers or constructed by Council where stormwater drainage did not previously exist to mitigate minor flooding occurrences.

2.2 What does it Cost

The replacement value of Council's stormwater drainage asset stock as at 30th June 2021 and 30th June 2015 is shown in the following Table 5.

Asset Class	2021 Replacement Value	*2015 Replacement Value*	2021 Accumulated Depreciation	*2015 Accumulated Depreciation*	2021 Written Down Value	2021 Annual Depreciation
Pipe Network	$206,115,142	*$181,551,007*	$73,085,333	*$58,117,435*	$133,029,810	$2,089,487
Pit Network	$46,158,996	*$40,067,490*	$17,411,755	*$13,322,684*	$28,747,242	$574,107
Grand Total	**$252,274,138**	***$221,618,497***	**$90,497,088**	***$71,440,119***	**$161,777,052**	**$2,663,594**

Table 5 – Financial Revaluation Values as in June 2021 and June 2015

The total replacement value and accumulated depreciation had been increased by 14% and 27% respectively from June 2015 to June 2021.

2.3 Asset Class Status

Council has documented a detailed stormwater drainage condition assessment manual that has been used to assess the stormwater drainage network condition and referred to as 'Stormwater Drainage Business Process Model V2.1'. Table 6 below provides an overall view with regards to the details of the condition rating scales and community perception scales for Council's stormwater drainage asset stock.

Condition Rating	Community Rating	Description of Asset Condition
0	Brand New	A new stormwater asset or recently reconstructed drainage asset.
1	Excellent	A stormwater asset in excellent overall condition however is not new and shows no signs of distress or defects.
2	Good	Sound construction with good condition and no distortion with limited ageing or may show minor distress upon close inspection such as sporadic fine cracking or isolated minor defects with no associated distortion.
3	Fair	Reasonable construction showing some aging and or signs of distress, such as fine to moderate cracking and or minor distortion. The extent of such defects will typically affect less than 20% of the asset targeted for assessment and can be rectified with minor maintenance works.
4	Poor	Stormwater asset displays substantial deterioration from material oxidation and or may display significant locations (20% to 50%) of distress, such as cracking or localised disintegration of the asset structure. Major renewal work required.
5	Very Poor	Stormwater asset displays significant locations of distress (greater than 50%) as a result of cracking, material disintegration or distortion as defined in condition four above. Extensive renewal work required.
6	End of Life	Failed or non-functional stormwater assets.

Pits	Pipes	Condition Score
		**1**

Pits	Pipes	Condition Score
		**2**
		**3**
		**4**
		**5**

Table 6 – Stormwater Drainage Assets Condition Measurement Scales

2.4 Snapshot of Council's Stormwater Drainage Network Condition

At present, reliable historical performance data is not available to assess how the stormwater drainage network has behaved as result of the actual capital expenditure. However future iterations of this report will be able to assess and track the performance of Council's stormwater drainage network compared to the actual expenditure and treatments. In the absence of CCTV inspections, Council has used age as the condition of pipes and pits.

Condition Rating	Equivalent Age
0	92% to 100% useful life remaining
1	75% to 92% useful life remaining
2	58% to 75% useful life remaining
3	42% to 58% useful life remaining

4	25% to 42% useful life remaining
5	8% to 25% useful life remaining
6	0% to 8% useful life remaining

Table 7 - Stormwater Drainage Assets Condition and Age Conversion

Figure below illustrates the 2021 condition distribution of stormwater pipes by replacement cost.

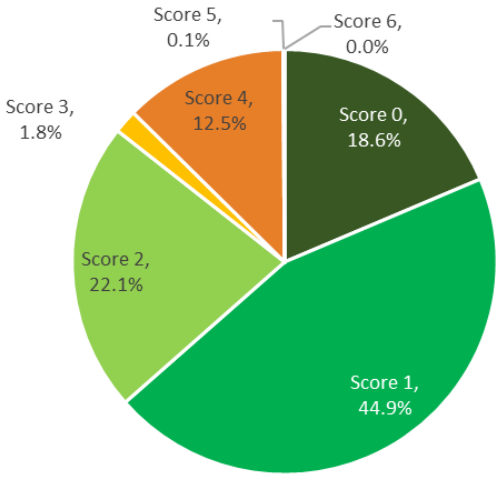

Figure 2 – Pipe Condition Distribution by Replacement Cost

Figure below illustrates the 2021 condition distribution of stormwater pits by replacement cost.

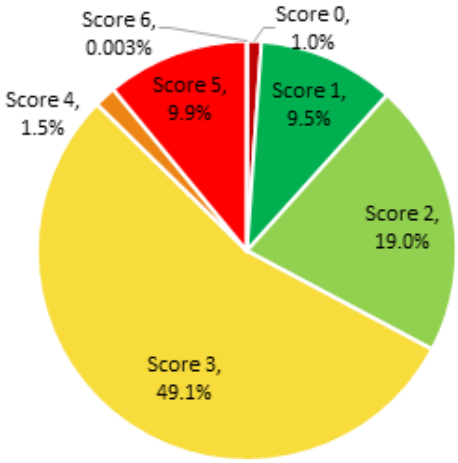

Figure 3 – Pit Condition Distribution by Replacement Cost

Asset Class	*Brand New*	*Very Good*	*Good*	*Fair*	*Poor*	*Very Poor*	*End of Life*
	Score 0	*Score 1*	*Score 2*	*Score 3*	*Score 4*	*Score 5*	*Score 6*
Pipe Network	*18.6%*	*44.9%*	*22.1%*	*1.8%*	*12.5%*	*0.1%*	*0.0%*
Pit Network	*1.0%*	*9.5%*	*19.0%*	*49.1%*	*1.5%*	*9.9%*	*0.003%*

Table 8 – Stormwater Drainage Assets Condition Distribution as in June 2021

The above table identifies that as at the last desktop condition assessment which was undertaken in June 2021, 1.8% stormwater drainage pipes and 49.1% pits are in fair condition, whilst some 13% of pipes ($25 million) and 11% of pits ($5 million) are in condition score 4 to 6. Some of the $30 million of stormwater drainage assets gradually need to be renewed or replaced in the next two decades.

3 Levels of Service and Condition Assessment

At Tweed Shire, we have defined two tiers of levels of service: Strategic Levels of Service and Operational Levels of Service.

3.1 Strategic Level of Service

Strategic Levels of Service are what we expect to provide in terms of key customer outcomes.

Appropriateness includes measures such as;

- Accessibility to users 24 hours a day, 7 days a week; and
- Relevance of the service being provided – in terms of demand characteristics, future demographics, current backlogs and where the pressure points are.

Affordability includes acknowledging that we can only deliver what we can afford.

The Strategic Levels of Service are tabulated in the table below as:

Service Criteria	What will Council do?	Performance Standard / Measure
Appropriateness	Provide fit for purpose drainage infrastructure with adequate capacity to manage current population water flow requirements.	Drainage pipes will be clear, working and functionally up to standard. Performance will be measured on the basis of incidents. <450 flooding complaints per annum.
Customer Satisfaction	Drainage assets meet community needs.	>60% customer satisfaction.
Responsiveness	Provide maintenance and risk related repairs, based on reactive incidents.	As per maintenance service levels.
Affordability	Provide cost-effective maintenance and construction programs that will also lower long-term costs of drainage asset provisions.	Life Cycle asset costs and renewal gaps in future.

Table 9 Strategic Levels of Service

3.2 Operational Level of Service

Operational Levels of Service are what we will do in real terms, i.e. reliability, functionality and adequacy of the services provided. Typically, this Stormwater Drainage AMP has documented our standards – i.e. at what point will we repair, renew or upgrade to meet the customer outcomes listed in the strategic levels.

Operational levels of service are also referred within Council as Technical Levels of Service and have been defined for each of the following:

- **New Asset** – If we provide new stormwater drainage structures / assets, then what design and maintainability standards shall apply to make them meet our strategic outcomes.
- **Upgraded or Reconstructed Asset to original standard** - If we upgrade or reconstruct stormwater drainage assets, then what design and maintainability standards shall apply to make them meet our strategic outcomes.
- **Maintenance** – When will we intervene with a maintenance repair and what will be our responsiveness in terms of customer requests for maintenance faults.

3.2.1 Capital Levels of Service – New Assets, Reconstructed Assets, Upgraded Assets

New or Upgraded stormwater drainage assets are provided in accordance with the following:

- Tweed Shire Council Development Design Specification D5;
- Tweed Shire standard drawings;
- Australian Rainfall and Runoff Guidelines; and
- Tweed Shire Council Stormwater Drainage Service Provision Manual.

3.2.2 Maintenance Levels of Service

For the Levels of Service delivered on a day to day nature (i.e. responding to customer requests for maintenance faults), refer to the following manuals, available for display at the Shire's offices:

- Tweed Stormwater Drainage Maintenance LoS V1.1.

The service manuals documents include:

1. The task or work expected to be undertaken, e.g. remove debris from drainage pit or pipe to reduce flooding hazard.
2. The schedule of inspections to be undertaken of specified matters at specified intervals;
3. The circumstances under which intervention action is to be taken with respect to repair or maintenance needs for defects reported or found on inspection;
4. The priority to be given to intervention level;
5. The type of priority intervention action that will be carried out;
6. Provision, as far as practicable, for the unpredictable, i.e. emergencies, natural disasters; and
7. Assessment of resources required delivering the specified maintenance services.

Responsibility for immediate dangerous situations with respect to stormwater drainage assets is initially assessed or undertaken by Councils operational staff or the after hour's response team.

3.3 Condition Assessment Framework

The Councils "Tweed Stormwater Business Process Manual" provides further information on the methodology for rating the condition of the drainage assets.

As the bulk of the drainage system is buried underground, Tweed has adopted two methods of apply condition rating scores to its drainage network and this is by visual and non-visual assessment.

The non-visual assessment relies on two main factors which contribute to the allocation of a condition score and they are:

- Age of the asset; and
- Known capacity issues / blockage issues.

The visual assessment relies on the use of CCTV cameras to view the asset and the factors which contribute to the allocation of a condition score are:

- Structural soundness of the structure; and
- Known capacity issues / blockage issues.

4 Demand Management

Future demand for stormwater drainage assets is affected by the following factors:

- Population growth and associated urban development;
- Changing community expectations; and
- Environmental impacts of pollutants entering the receiving waterways.

These factors will affect the addition of new assets to the stormwater drainage network system as well as the renewal and upgrade requirements for the existing network.

4.1 Future Demand

Statistical information from Australian Bureau of Statistics confirms that the Tweed Shire is experiencing and will continue to experience growth.

	Forecast year						Change between 2016 and 2036	
	2011	2016	2021	2026	2031	2036	Total change	Avg. annual change
2011 consensus	88,437	91,175	97,954	106,506	116,269	125,953	34,778	1.2%
2016 consensus		93,742	97,767	102,185	108,930	120,070	26,328	0.9%

Table 10 Population Forecast

Source: Australian Bureau of Statistics, Regional Population Growth, Australia (2011 & 2016 consensus).

In the absence of comprehensive service strategies, population trends can be used as a guide to ascertain future demand.

For example, if the service levels are to be retained, Council will have an increase in its asset stock via developer contributed asset and will also need to increase the number of staff it has providing services to these residents.

There is currently 390km of underground and above-ground stormwater drainage asset stock maintained by the Tweed Shire Council, which is an increase of 12km over the Council's 2015 stormwater drainage network of approximately 378km. This indicates that from 2015 to 2021, there has been an increase to Council's stormwater drainage asset stock in the order of 3% for pipes, accompanied with population growth.

4.2 Current Stormwater Asset Utilisation

Stormwater drainage assets provide public safety, property protection, clear access for pedestrian and vehicular traffic from stormwater runoff flows during minor and major storm events and are utilised by all residents and visitors to the Shire.

In general, the stormwater drainage network is considered to provide adequate capacity across developed areas of the Shire. Development standards have been in place that has ensured that the majority of urban growth areas have provided stormwater drainage infrastructure to cater for minor and major storm events. There are of course older areas and some areas where the intensification of development over time has led to the stormwater drainage systems being under capacity or without adequate discharge points, and therefore over utilised. These areas will require stormwater capacity studies to identify necessary upgrades, and reassessment of stormwater drainage asset utilisation as they occur.

4.3 Current Issues Influencing Service Demand

Demographic characteristics / trends affect the demand for drainage assets.

There is a lack of adequate formal stormwater drainage within some older developed areas. Redevelopment in existing urban areas results in increased stormwater flows and often results in the need to upgrade the existing stormwater drainage system.

Stormwater drainage systems in new subdivisions, will be constructed to current stormwater drainage standards. However, some of these developments will need to be linked with existing systems which might be under capacity and will require upgrading.

Other effects of development in urbanised areas include the need to improve stormwater quality which makes its way to local receiving waterways as a result of litter and debris entering the stormwater system.

4.4 Changes in Technology

Over past years, the Tweed Shire has employed a number of changes in technology that have affected the functional levels of service of the Shire's stormwater drainage system. Such changes have included:

- The use of rubber ring jointed pipes in new subdivisions/developments to allow for movement of the pipe;
- The use of different pipe materials such as, fibre reinforced concrete (FCR);
- Improvement in bedding and backfill standards;
- The installation of gross pollutant traps (GPTs), to improve the quality of stormwater before reaching the receiving waterways; and
- The use of retarding basins to control stormwater flows.

The most significant changes into the foreseeable future will be with respect to:

  - Utilising trenchless methods of repairing existing underground drainage pipes, which minimises the use of new materials and minimises the requirements to excavate the roadway or nature strip;
  - Employing methods of improving stormwater quality; and
  - The collection of water for reuse for irrigation of reserves and flushing of toilets.

4.5 Demand Management Plan

It is envisaged that the Tweed Shire will undertake a drainage capacity analysis in the near future to identify areas of the Shire's existing drainage system that are deficient in terms of the capacity to transmit stormwater flows and protect residential and commercial property and other assets from nuisance and major flooding. Capacity analysis of these areas will be undertaken to determine the appropriate upgrade/extension to the stormwater drainage network.

Tweed has identified the following methods of minimising the effect of increased impervious areas and in turn the effect on the current capacity of the Shire's drainage system such as:

- Placing planning controls on the amount of discharge that a new development may discharge to the Shire's drainage system by storing flows via on-site retention systems;
- Placing planning controls on the point of discharge for new and existing developments; and

- Imposing standards of design on new developments including requiring the provision of retarding basins to minimise the impacts on any existing drainage systems and the installation of stormwater quality treatment devices.

4.6 New Assets from Growth

Based on the increase in drainage stock of 12km from 2015 to 2021 and the projected annual population increase of 0.9%, it is estimated that the existing 400km of drainage network will be increased by another 18km over the next 5 years.

It is estimated that the additional values of these assets will increase Council's Stormwater asset portfolio stock from $300 million to approximately $250 million in net present value. Total additional depreciation expense is estimated to be $0.07 million.

As these are new drainage assets they are not expected to add significant amount to maintenance and operational funding requirements in the next 5 years.

5 Asset Funding Levels

A key objective of this Stormwater Drainage AMP has been to match the level of service provided by Council's stormwater drainage network to the expectations of the users (i.e the community) within available resources. This requires a clear understanding of the user needs, expectations and preferences.

To achieve and sustain acceptable standards of service for Council's stormwater drainage asset network requires an annual commitment of funds. These funds provide for regular and responsive maintenance and for timely renewal or replacement of the asset. The provision of adequate financial resources ensures that the stormwater drainage network is appropriately managed and preserved. Financial provisions below requirements impacts directly on community development and if prolonged, results in substantial needs for "catch up" expenditure imposed on ratepayers in the future. Additionally, deferred renewal results in increased and escalating reactive maintenance as aged assets deteriorate at increasing rates.

5.1 Forecasted 10 Year Stormwater Drainage Asset Funding Requirements

Council has developed a simulation model for the condition analysis of the Council's stormwater drainage network using prediction modelling software (Assetic Predictor©).

The objective of this analysis is to model the performance of the Tweed Shire Council's stormwater drainage network.

This process involved setting up:

- Remaining life profiles based on condition and age;
- Identifying the current treatments and unit rates to deliver these treatments; and
- Setting up treatment decision matrices defined for optimal interventions for each treatment.

By utilising the above process and setting up the criteria and logic within the Assetic Predictor© modelling software, it has been possible to model the future costs of Council's stormwater drainage asset stock renewal requirements and to predict the future condition of Council's stormwater drainage asset stock based on three budget options.

Council has commenced a program to comprehensively assess the condition of all underground stormwater assets in the shire. This process requires CCTV inspections of every asset which is costly and time consuming. To date, this program has not been finalised and therefore, asset condition has been assigned using estimating methods based on the age of the assets within their various areas across the LGA, in conjunction with limited CCTV including in areas where known defects have been reported.

In addition, Council has implemented a process, whereby stormwater drainage condition data is updated to reflect the changes in condition as a result of major renewal and upgrade works. This ensures that Council's stormwater drainage condition dataset is reflecting current condition states.

Tweed Shire Council recognises that the basis of sound Strategic Asset Management models is having asset specific condition criteria and accurate data. Future iterations of this Plan will have improved condition analysis undertaken on a statistical basis to provide an indication of condition and flood mitigation risk planning to identify capacity issues. At present, this is difficult to ascertain and hence will be revised at a later stage.

Whilst in previous years, most Council's would collect asset condition data to plan for their forward capital works programs, it is now becoming increasingly necessary within the industry to collect such data to satisfy such requirements as the National Asset Management Assessment Framework and the Integrated Planning and Reporting Guidelines for local government in NSW.

The 2021 strategic modelling analysis predicts the performance of Council's stormwater drainage asset stock by calculating the results of three different funding options. The length of time predicted for each

option was for a period of 10 years until the year 2032. The results of the analysis have been graphed in the following section.

The overall performance of the Tweed Shire Council's stormwater drainage asset stock has been established by predicting the behaviour of every individual stormwater drainage segment after allocation of treatments based on the optimised decisions determined for each funding option.

The condition graphs in **Section 5.2** illustrate the predicted results of the stormwater drainage asset stock modelling analysis for each of the different funding options. These funding options are described as follows:

Option 1 - This funding option models how the stormwater drainage asset stock would improve or deteriorate if Council's current financial budget allocation as outlined in Council's current Long Term Financial Plan is adopted over the following 10 years. **$1.4 mil** in average annual Pipe Capital Renewal funding allocation and **$0.35 mil** for pits over 10 years, 1% inflation factor applied to budget and costs.

Option 2 - This funding option models what would happen to the future condition of the stormwater drainage asset stock if the budget allocation identified in funding Option 1 were to be increased by 15% each year over the following 10 years. **$1.6 mil** in average annual Pipe Capital Renewal funding allocation and $ **$0.4 mil** for pits over 10 years, 1% inflation factor applied to budget and costs.

Option 3 - This funding option models what would happen to the future condition of the stormwater drainage asset stock if the budget allocation identified in funding Option 1 were to be reduced by 15% each year over the following 10 years. **$1.2 mil** in average annual Pipe Capital Renewal funding allocation and **$0.3 mil** for pits over 10 years, 1% inflation factor applied to budget and costs.

Maintenance funding

When determining the required maintenance in year 2021 based on the distribution of the stormwater drainage asset stock, Council has adopted an 'As a percentage of Replacement Cost' approach to determine the Required Annual Maintenance. This is consistent with the International Infrastructure Management Manual and other industry standards. The percentage of the Replacement Cost adopted for Stormwater drainage assets is as follows. Pits maintenance expenditure is modelled as a part of pipes maintenance expenditure.

Stormwater Drainage Asset Condition	Pipe Multiplication Factor of Replacement Cost
0	0.0%
1	0.0%
2	0.0%
3 – Satisfactory	3%
4	3%
5	3%

Table 11 – Multiplication Factors to Determine Maintenance Requirements

The maintenance requirement estimates are determined from the Assetic Predictor© modelling software, which will base its financial outputs as a direct result of the asset stock condition as predicted by each of the Funding Options.

Each Funding Option will have a direct impact of the predicted asset stock distribution for each condition state and as a result, will require different funds based on this outcome. The predicted maintenance funding could be different to Council's LTFP.

	Current 10 Year Long Term Financial Plan Budget	Current 10 Year Long Term Financial Plan Budget + 15%	Current 10 Year Long Term Financial Plan Budget - 15%
CAPITAL BUDGET $			
Year	**Option 1**	**Option 2**	**Option 3**
1	998,172	1,147,905	848,476
2	1,392,217	1,601,074	1,183,393
3	1,402,484	1,612,800	1,192,100
4	1,412,940	1,624,879	1,200,967
5	1,423,604	1,637,128	1,210,047
6	1,434,435	1,649,637	1,219,221
7	1,445,503	1,662,224	1,228,664
8	1,456,873	1,675,346	1,238,257
9	1,468,356	1,688,545	1,248,144
10	1,480,182	1,702,164	1,258,095
Sub Total	**13,914,766**	**16,001,703**	**11,827,365**
PREDICTED MAINTENANCE EXPENDITURE $			
Year	**Option 1**	**Option 2**	**Option 3**
1	1,016,963	1,011,973	1,412,382
2	1,093,788	1,081,786	1,626,160
3	1,129,447	1,110,314	1,791,895
4	1,184,793	1,158,416	2,164,836
5	1,268,428	1,235,373	2,376,858
6	1,387,173	1,322,537	2,678,116
7	1,534,314	1,474,189	2,821,732
8	1,709,234	1,649,297	2,889,387
9	1,882,301	1,807,601	2,590,417
10	2,018,845	1,963,867	2,272,189
Sub Total	**14,225,285**	**13,815,354**	**22,623,972**
TOTAL CAPITAL & MAINTENANCE EXPENDITURE $			
Year	**Option 1**	**Option 2**	**Option 3**
1	2,015,135	2,159,878	2,762,382
2	2,486,005	2,682,860	2,989,660
3	2,531,931	2,723,114	3,169,030
4	2,597,733	2,783,296	3,555,742
5	2,692,032	2,872,501	3,781,674
6	2,821,608	2,972,174	4,096,980
7	2,979,817	3,136,413	4,254,784
8	3,166,107	3,324,643	4,336,770
9	3,350,657	3,496,146	4,052,274
10	3,499,027	3,666,031	3,748,664
Grand Total	**28,140,052**	**29,817,056**	**36,747,960**

Table 12 – Pipe, Channel and Culvert Capital and Maintenance Funding Options

	Current 10 Year Long Term Financial Plan Budget	Current 10 Year Long Term Financial Plan Budget + 15%	Current 10 Year Long Term Financial Plan Budget - 15%
CAPITAL BUDGET $			
	Option 1	**Option 2**	**Option 3**
1	249,320	286,390	212,118
2	347,445	400,024	295,807
3	350,561	403,157	297,974
4	353,086	405,912	300,207
5	355,785	409,118	302,429
6	358,566	412,406	304,815
7	361,352	415,468	307,170
8	363,673	418,264	309,566
9	366,882	421,829	312,027
10	370,033	424,795	314,540
Total	**3,476,703**	**3,997,363**	**2,956,654**

Table 13 – Pit Capital Funding Options

5.2 Predicted Service Level Results v/s Funding Options

The average condition and the distribution of condition 4, 5 and End of Life are used to analyse the effectiveness of each funding option.

Pipes Predicted Average Condition				% of Condition 4, 5 & EoL Pipes		
Year	**Option 1**	**Option 2**	**Option 3**	**Option 1**	**Option 2**	**Option 3**
0	1.45	1.45	1.45	12.61%	12.61%	12.61%
0	1.45	1.45	1.45	12.61%	12.61%	12.61%
1	1.64	1.64	1.65	12.61%	12.61%	12.61%
2	1.73	1.72	1.74	12.60%	12.52%	12.69%
3	1.79	1.78	1.81	12.08%	11.88%	12.28%
4	1.86	1.84	1.88	11.44%	11.13%	11.75%
5	1.94	1.91	1.96	10.99%	10.56%	11.42%
6	2.01	1.98	2.05	10.39%	9.84%	10.93%
7	2.04	2.00	2.09	9.92%	9.27%	10.64%
8	2.08	2.04	2.13	9.29%	8.53%	10.29%
9	2.11	2.06	2.16	8.79%	7.92%	9.79%
10	2.13	2.08	2.19	8.05%	7.06%	9.17%

Table 14 – Pipe Network Predicted Average Age Percentage & Distribution of Condition 4, 5 and EoL

It should be noted that funding option 2 to increase current budget by 15% has the lowest life cycle cost, the best average condition, and the least percentage of Condition 4, 5 and End of Life pipes. In summary, the more budget, the better the pipe condition.

Pits Predicted Average Condition				% of Condition 4, 5 & EoL Pits		
Year	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3
0	2.70	2.70	2.70	11.39%	11.39%	11.39%
1	2.70	2.69	2.70	11.39%	11.39%	11.39%
2	2.70	2.69	2.71	10.84%	10.76%	10.92%
3	2.86	2.84	2.87	10.09%	9.89%	10.28%
4	2.87	2.85	2.89	9.33%	9.02%	9.64%
5	2.84	2.82	2.87	8.58%	8.16%	9.00%
6	2.83	2.80	2.85	7.83%	7.29%	8.36%
7	2.81	2.77	2.84	7.08%	6.44%	7.73%
8	2.79	2.75	2.83	6.34%	5.58%	7.09%
9	2.77	2.73	2.81	5.64%	4.77%	6.51%
10	2.76	2.71	2.81	5.19%	4.21%	6.17%

Table 15 – Pit Network Predicted Average Age Percentage & Distribution of Condition 4, 5 and EoL

Similar to pipe network modelling, the less budget (Option 3), the worse the pit condition.

5.3 Condition rating, backlog and funding options summary

When calculating asset backlogs, a multiplication factor of 0.5 has been considered for condition 4 assets. For example, a long section pipe in condition 4, however, half length of the asset might be in good condition, therefore only the remaining half-length is considered to be in backlog.

The estimated value of the Stormwater Drainage network backlog of works (i.e. worse than condition 3) as at June 2021 is as follows:

	Option 1	Option 2	Option 3
Current Stormwater drainage Asset Backlog	$17,762,073	$17,762,073	$17,762,073
Total Stormwater drainage Stock Backlog at Year 10	$16,956,474	$14,104,691	$19,855,526
Backlog Movement	-$805,599	-$3,657,382	$2,093,453

Table 16 Stormwater Assets Backlog Analysis

The outcomes of the three financial options for pipes, culverts, channels and pits that have been modelled are detailed in Table 17.

Option	Total Capital Over 10 Years	Total Maintenance Over 10 Years	% Pipes in Condition 4 to 6 at Y10	% Pits in Condition 4 to 6 at Y10	Backlog Movement	Average Pipe Condition at Year 10	Average Pit Condition at Year 10
1	$17,391,469	$14,225,285	8.05%	5.19%	-$805,599	2.13	2.76
2	$19,999,065	$13,815,354	7.06%	4.21%	-$3,657,382	2.08	2.71
3	$14,784,019	$22,623,972	9.17%	6.17%	$2,093,453	2.19	2.81

Table 17 – Strategic Modelling Comparison of 3 Funding Options for Pipes, Culverts, Channels & Pits

Net Cost of Strategy = Total Capital Cost over 10 years plus Total Maintenance Cost over 10 years less Backlog movement over 10 years.

	Option 1	Option 2	Option 3
Net Cost of Strategy	$30,811,156	$30,157,037	$39,501,444
Net Cost of Strategy compared to Option 1	-	98%	128%
Order of Highest Benefit	**2**	**1**	**3**

Table 18 Net Cost of Strategy Comparison

Net Cost of Strategy is a useful indicator of overall funding efficiency. Option 2 provided the most cost effective budget scenario despite requiring 15% more capital budget than Option 1), due to the slight reduction in maintenance cost and by significantly reducing backlog.

The figure below illustrates each financial option's trend of budget spending and resulting predicted average pipe condition over the following ten years. Option 2 (15% more capital budget, green line) will achieve the best average condition.

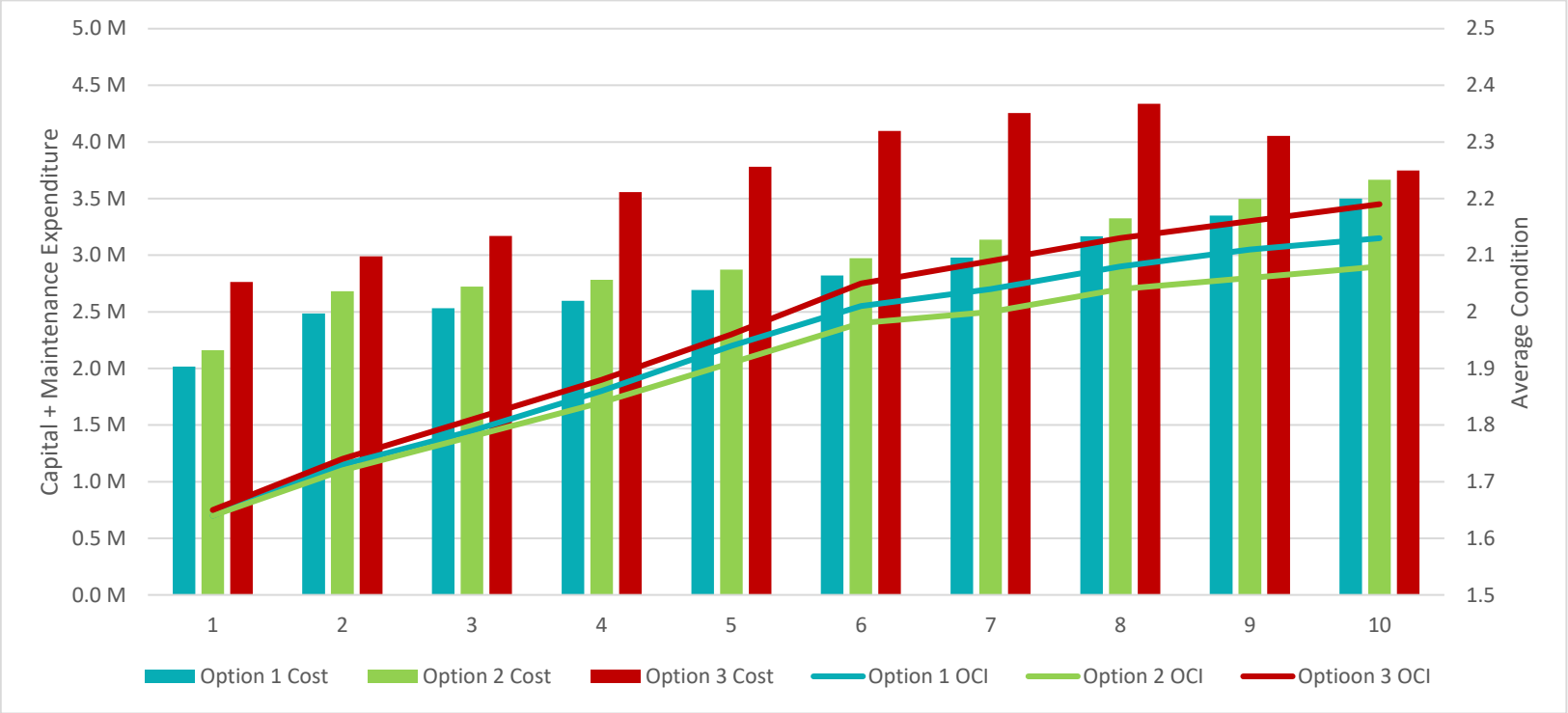

Figure 3 – 10 Year Projected Average Pipe, Channel and Culvert Condition vs Budget Comparison

The figure below illustrates each financial option's trend of budget spending and resulted predicted average pit condition over the following ten years. Similar to the pipe modelling, more capital expenditure is forecasted to result in better average pit condition.

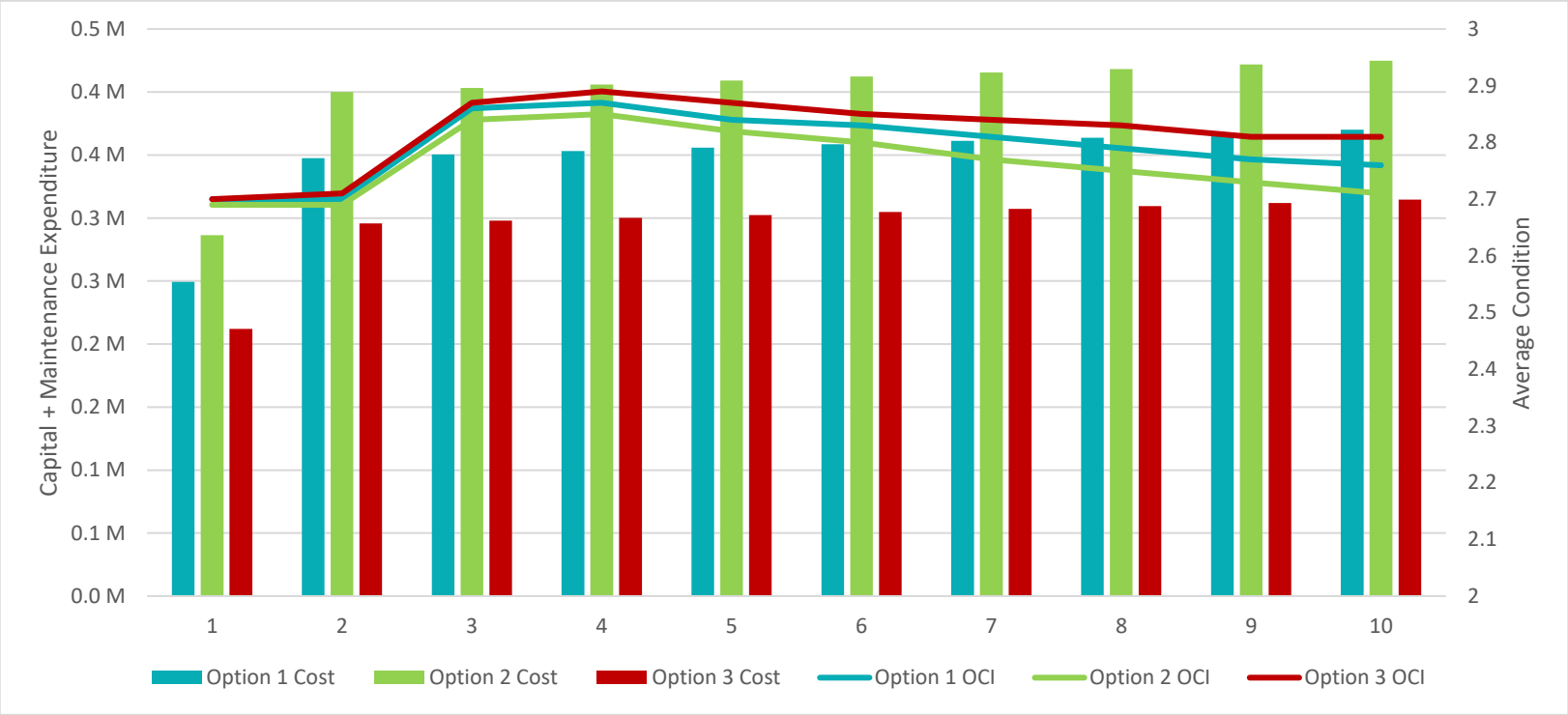

Figure 4 – 10 Year Projected Average Pit Condition vs Budget Comparison

It should be noted that additional CCTV field assessments of the underground drainage network are required to establish a firmer base for the above forecasts. There may also be unknown portions of the stormwater drainage system that require upgrading due to capacity issues or where new drainage systems are required.

5.4 Historical Stormwater Drainage Expenditure

Typically, where more than 50% of the stormwater drainage asset requires rectification or the entire stormwater drainage asset requires rectification, this work is referred to Council's capital works program for prioritisation and reconstruction.

Capital expenditure refers to works undertaken to address major condition or service capacity issues such as removing an existing stormwater drainage pipe or pit and constructing a new stormwater drainage pipe or pit of the same design (considered to be renewal expenditure as it returns the life or service potential of the asset to that which it had originally) or constructing a larger stormwater drainage pipe so that it can cater for increased stormwater flows (considered to be upgrade expenditure as it enhances the existing asset to provide a higher level of service).

These capital treatment works are undertaken to improve the overall condition of the stormwater drainage asset stock and provide an improved service to users of Council's stormwater drainage network.

Where conditions such as cracking or broken pipes and pits occurs or differential pipe displacement occurs and the defects requiring repairs is undertaken on less than 50% of the stormwater drainage asset (not totalling more than $5,000), the work is determined to be maintenance expenditure.

The following table identifies the historical stormwater drainage expenditure.

Activities	*2017/2018*	*2018/2019*	*2019/2020*	*2020/2021*	*Average*
Stormwater Drainage Capital New	*$4,390,000*	*$1,569,000*	*$380,000*	*$789,773*	*$1,556,027*
Stormwater Drainage Capital Renewal	*$381,000*	*$356,000*	*$578,000*		
Stormwater Drainage Maintenance	*$1,132,368*	*$1,163,163*	*$1,206,272*	*$1,071,796*	*$1,152,125*
Total	*$5,903,368*	*$3,088,163*	*$2,164,272*	*$1,861,569*	*$2,708,151*

Table 19 - 2017-2021 Historical Capital & Maintenance Expenditure

5.5 Funding Requirement Recommendations

The key recommendations for the Tweed Shire Council as determined by the stormwater drainage strategic modelling prediction analysis are as follows:

Capital Renewal Recommendation - Tweed Shire Council adopts the stormwater drainage capital works budget allocation for renewals as documented in **Table 12** and **Table 13** by Funding Option 1 in line with their current committed Long Term Financial Plan. The overall total financial commitment by Council will require some **$17.4 million** (1% inflation factor included) over the following 10 years to fund both the pipe and pit asset network portfolios.

This equates to an average capital expenditure of $1.7 million per year for the following 10 years and as a result, it is predicted that the current asset backlog will reduce by approximately $0.8 million whilst the pipe average condition moves from 1.45 to 2.13 and pit average condition moves from 2.70 to 2.76.

Maintenance Recommendation - Tweed Shire Council continues to fund the annual maintenance budget allocations for stormwater drainage maintenance activities as documented in **Table 12** and for Option 1. The overall total financial commitment by Council will require some **$14.2 million** over the following 10 years to fund both the pipe and pit asset network portfolios. This equates to an average expenditure of between **$1.4 million** per year for the following 10 years.

	Capital			Maintenance	Total
Year	Pipes	Pits	Total	Pipes & Pits	Pipes & Pits
1	$998,172	$249,320	**$1,247,492**	$1,016,963	$2,264,455
2	$1,392,217	$347,445	**$1,739,662**	$1,093,788	$2,833,450
3	$1,402,484	$350,561	**$1,753,045**	$1,129,447	$2,882,492
4	$1,412,940	$353,086	**$1,766,026**	$1,184,793	$2,950,819
5	$1,423,604	$355,785	**$1,779,389**	$1,268,428	$3,047,817
6	$1,434,435	$358,566	**$1,793,002**	$1,387,173	$3,180,174
7	$1,445,503	$361,352	**$1,806,855**	$1,534,314	$3,341,169
8	$1,456,873	$363,673	**$1,820,546**	$1,709,234	$3,529,780
9	$1,468,356	$366,882	**$1,835,238**	$1,882,301	$3,717,539
10	$1,480,182	$370,033	**$1,850,215**	$2,018,845	$3,869,060
Total	**$13,914,766**	**$3,476,703**	**$17,391,469**	**$14,225,285**	**$31,616,754**

Table 20 – Recommended Capital and Maintenance Funding

Funding for creating, renewing or maintaining Council's stormwater drainage network is obtained from a number of sources.

Source of Funds	Description
Ordinary Rate Revenue	Funding required for the maintenance of the stormwater drainage asset network is heavily reliant on Council's rate revenue as the main source of funds and as such, competes with other Council projects and programs for funds, such as building and recreation works.
Loan Borrowings	A large majority of the renewal program is financed by loan borrowings. This provides for the cost and benefit of the stormwater drainage asset to be shared across the life of the assets and its users.
Developer Contribution Plan	Council obtains funds from developers under the Developer Contributions Plan for stormwater drainage assets. Developers who undertake works within the Shire are required to pay a contribution which is utilised by Council to fund the upgrade of existing stormwater drainage network to be able to meet the service needs of the community in future due to the population growth.

Table 21 - Source of Funds for Stormwater Drainage Assets

5.6 Committed Funding

Council has adopted Option 1 for its Long Term Financial Plan which allows capital expenditure of $17,393,813 and maintenance expenditure of $11,079,637 on stormwater drainage assets of over the next 10 years. It is forecasted that Council will need more maintenance expenditure from year 5 (2025-2026 FY).

Year	Capital	Maintenance	Total
1	$1,247,760	$1,002,954	$2,250,714
2	$1,740,315	$1,033,008	$2,773,323
3	$1,753,121	$1,053,670	$2,806,791
4	$1,766,183	$1,074,742	$2,840,925
5	$1,779,508	$1,096,239	$2,875,747
6	$1,793,099	$1,118,172	$2,911,271
7	$1,806,963	$1,140,541	$2,947,504
8	$1,821,102	$1,163,350	$2,984,452
9	$1,835,525	$1,186,616	$3,022,141
10	$1,850,237	$1,210,345	$3,060,582
Total	**$17,393,813**	**$11,079,637**	**$28,473,450**

Table 22 – Committed Funding

5.7 Financial Ratios

Tweed Shire Council's asset management ratios for its stormwater drainage asset stock calculated as at 30th June 2021 are as follows:

Ratio	Definition	Calculation	Industry Target	June 2021	June 2022 Forecast
Asset Sustainability Ratio	Represents an estimate of the extent to which the infrastructure assets managed by Council are being replaced as they reach the end of their useful lives, using the annual depreciation charge. Depreciation represents an estimate of the rate at which the infrastructure asset has been historically consumed over its useful life. This indicates whether Council is renewing or replacing its existing assets stock at the same rate at which the asset stock has been calculated to have been /being consumed.	Capital Renewal Expenditure / Depreciation Expense	90%	30%	47%
Remaining Service Potential Index	Represents the overall health of the asset stock in terms of measuring past asset consumption, via the amount of accumulated depreciation. The lower the ratio, the more the asset stock has been consumed, which also indicates that inadequate capital expenditure has been allocated to the asset.	Written Down Value / Current Replacement Value	>70%	64%	62%

Ratio	Definition	Calculation	Industry Target	June 2021	June 2022 Forecast
Average Annual Asset Consumption Ratio	Is the measure of the amount of Council's asset base consumed during a year based on the asset stocks replacement value.	Annual Depreciation / Depreciable Amount	0-3%	1.6%	1.5%

Table 23 – Asset Management Ratios

6 Asset Management Practices

This section outlines the decision-making tools Council currently uses, to determine long term maintenance, renewal and upgrade expenditure for its stormwater drainage assets. Asset management systems are generally categorised as follows:

- **Asset Management Systems** – The information support tool used to store and manipulate asset data; and
- **Data** – Data available for interrogation by information systems to produce outputs.

6.1 Accounting / Financial Systems

Tweed Shire Council currently utilises Technology One - Financials software system. The Manager Financial Service has accountability and responsibility for this system.

6.2 Asset Management Systems

Tweed Shire Council currently utilises the 'myData' software system for asset management purposes. The system stores inventory, attribute, condition, financial and historical data.

All information pertaining to location, type, dimensions, materials, known construction dates and where available, condition of these stormwater drainage assets are recorded and stored in Council's Asset Register which is myData. At the time of preparing this Stormwater Drainage AMP, it is estimated that Council's Asset Register is 68% up to date.

The Financial Services Unit and the Engineering Division share accountability and responsibility for this system.

Assetic Predictor has been used for the prediction analysis to determine the future strategies and capital expenditure (Capex) plans contained in Section 5 of this Plan.

Currently, Council utilises the Reflect with Insight software (Asset edge provided) as well as myData to store maintenance records and information. This system will be assessed in the near future.

Tweed also utilises Open Spatial and Weave as its Geographical Information System (GIS). The GIS system stores asset and other information spatially.

6.3 Accounting Framework

The following Accounting Framework applies to Local Government in New South Wales:

- Local Government Code of Accounting Practice and Financial Reporting;
- AASB 13 Fair Value Measurement – prescribes fair value measurement of assets;
- AASB 2022-10 Amendments to Australian Accounting Standards – Fair Value Measurement of Non-Financial Assets of Not-for-Profit Public Sector Entities
- 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 in excess of their recoverable amounts; and
- AASB 108 Accounting Policies – specifies the policies that Council is to have for recognition of assets and depreciation

The Council's asset materiality threshold limit has been set at $5,000.

6.4 Information Flow Requirements and Process

The key information flows into this Stormwater Drainage AMP are:

- The asset register data on material types, design data such as dimensions, and invert levels, replacement cost, age, remaining life of the asset;
- The unit rates for categories of work/material;
- The adopted service levels;
- Projections of various factors affecting future demand for services;
- Historical maintenance and capital works treatments;
- Correlations between maintenance and renewal, including decay models; and
- Data on new assets acquired by Council.

The key information flows from this infrastructure and asset management plan are:

- The assumed Capital Works Program and trends;
- The resulting budget, valuation and depreciation projections; and
- The useful life analysis.

These will impact the Long Term Financial Plan, Council Plan, annual budget and departmental business plans and budgets.

As the 'myData' system maintains core asset data and financial data, the flow of information is entered directly into this one system.

Information is updated within 'myData' on an as required basis.

7 Action Plan

7.1 AM Document Register

Document	Adopted	Proposed Revision	Comment
Tweed Shire Council Asset Management Policy - Version 1.4	Adopted by Council at its meeting on 21 June 2011 Minute No: 371	2016	
Tweed Shire Council Asset Management Strategy 2010.	Adopted by Council at its meeting on 21 June 2011 Minute No: 371	2016	
Tweed Shire Council Drainage Assets Management Plan December 2010	Adopted by Council at its meeting on 21 June 2011 Minute No: 371	2016	
Tweed Stormwater Business Process Manual V2.0	2017		
Tweed Stormwater Business Process Manual V2.1	2021		
Tweed Stormwater Drainage Maintenance LoS V1.1	2008		Incorporated into Tweed Stormwater Business Process Manual V2.1
Tweed Stormwater Drainage AMP V3.0	June 2021		Draft
Tweed Stormwater Drainage AMP V3.1	September 2021		Amended
Tweed Stormwater Drainage AMP V3.2	November 2021		Updated with new LTFP
Tweed Stormwater Drainage AMP V3.3	February 2022		Chart Updated
Tweed Shire Council Asset Management Policy - Version 1.5	Adopted by Council at its meeting on 16 June 2022 Agenda No: 26.2	2025	
Tweed Shire Council Asset Management Strategy 2021.	Adopted by Council at its meeting on 16 June 2022 Agenda No: 26.2	2025	
Tweed Stormwater Drainage AMP V3.3.1	Adopted by Council at its meeting on 16 June 2022 Agenda No: 26.2	2025	

Table 24 – Asset Document Register

7.2 AM Practice Improvements

7.2.1 Performance Measures

The effectiveness of the Asset Management Plan can be measured in the following ways:

- The degree to which the required cash flows identified in this AMP are incorporated into Council's Long Term Financial Plan and Strategic Management Plan;
- The degree to which the detailed works programs, budgets, business plans and organisational structures take into account the 'global' works program trends provided by the AMP; and
- The performance of Council against the Strategic Levels of Service documented in the Drainage Business Process and Level of Service Models.

7.2.2 Improvement Plan

The asset management improvement plan generated from this Asset Management Plan shown in the following table.

Improvements	Urgency	Importance	Responsible Officer	Time Line	Policy or Procedure Required?
Policies and Guidelines					
Obtain Council approval: • Levels of service. • Funding Gaps and Future Funding Levels. • Capex Prioritisation.	H	H	Manager Roads and Stormwater	Immediate	Asset Management Policy endorsement.
Service Levels and Life Cycle Analysis					
Collect CCTV condition information for a statistical sample of the drainage network to refine prediction models, utilising Council's data collection manuals.	H	H	Senior Engineer – Assets and Maintenance	Immediate	Yes
Refine inventory information for the entire drainage asset network.	H	H	Senior Engineer – Assets and Maintenance	18 months	Yes
Undertake work with regards to identifying parts of the stormwater system which are under capacity.	M	H	Engineer – Flooding and Stormwater	Immediate	Yes
Test the current levels of service to determine if they are achievable for current budgets.	M	M	Senior Engineer – Assets and Maintenance	12 months	No
Financial Planning					
Incorporate the prediction modelling process into Council's annual budgeting and capital works identification.	M	H	Senior Engineer – Assets and Maintenance	12 months	Yes
Continue with condition audits of the drainage asset network to enable financial modelling and capital works program development.	M	M	Senior Engineer – Assets and Maintenance	ongoing	No
Evaluate maintenance priorities and allocate appropriate funding.	M	H	Manager Roads and Stormwater and Senior Engineer – Assets and Maintenance	12 months	No
In line with DLG mandate, undertake a comprehensive revaluation of the Shire's Drainage Assets.	H	H	Manager Roads and Stormwater & Manager Finance	36 months	No

Asset Management Practices					
Implement integration within the Asset Management System software that has integrated capability for: • Asset register. • Works management. • Prediction	M	L	Senior Engineer – Assets and Maintenance	24 months	No.
Develop process to ensure that asset condition data is transferred into Council's asset register, in a timely manner.	H	M	Senior Engineer – Assets and Maintenance	12 months	Procedures only
Develop process to ensure that treatment data is transferred into Council's asset register on an annual basis.	H	M	Senior Engineer – Assets and Maintenance	12 months	No but update Business Process Manual.
Develop process to ensure that new asset data from developments, is transferred into Council's asset register on an annual basis.	H	H	Engineer – Flooding and Stormwater and Senior Engineer – Assets and Maintenance	12 months	Procedures only
Link asset management system to GIS system	M	M	GIS Officer and Senior Engineer – Assets and Maintenance	18 months	No
Test use of new technology & data collection methods (ie. iPads)	L	L	Senior Engineer – Assets and Maintenance	24 months	No
Train Depot staff in using activity guidelines, Stormwater AMP service levels, Stormwater AMP intervention levels, Stormwater AMP inspection regime	H	H	Senior Engineer – Assets and Maintenance	12 months	No
Refine the current system so that it can generate a work order with an automatically generated response time. This response time is based on Council's service level matrix and is preconfigured in the system based on asset hierarchy.	M	M	Manager Information Technology and Manager Roads and Stormwater	24 months	No

Table 25 – Improvement Plan

7.2.3 Monitoring and Review Procedures

This Asset Management Plan will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision process.

Ongoing monitoring of this Stormwater Drainage Assets Management Plan is required to:

- Ensure compliance with the proposed improvement program milestones;
- Ensure compliance with adopted standards and procedures for condition and performance; and

- Consider any external factors that is likely to influence the achievement of the strategies of this Stormwater Drainage AMP.

A full review of the Stormwater Drainage Asset Management Plan should take place every three to five years to document progress and set out proposals for the next five years.

8 References

1. Community Strategic Plan
2. NSW Local Government Act 1993
3. Australian Bureau of Statistics Website
4. Tweed Flood Mitigation Asset Management Plan 2004
5. Tweed Shire Financial Statements 2017-2018, 2018-2019, 2019-2020
6. Tweed Shire Urban Land Release Strategy February 2008
7. Tweed Shire Council, Community profile, communities working together May 2008

9 Glossary of Terms

Accrual Accounting	Recognition of revenues as they are earned and expenses as they are incurred.
Administration	Council staff.
Asset	Is an item with service potential or future economic benefits controlled by Council as a result of past transactions or other past events.
Asset Accounting	Is financial accounting as it relates to assets.
Asset Management	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.
Asset Register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, and technical information about each.
Asset Renewal	The process of improving the service potential an asset delivers through such methods as upgrade, refurbishment or replacement.
Asset Values	A determination of the value of the asset, which depends on the purpose for which it is required.
Capital Expenditure	Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. Capital expenditure increases the value of the asset.
Components	Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality.
Condition Monitoring	Continuous or periodic inspection, assessment, measurement and interpretation of the resultant data, to indicate the condition of a specific component so as to determine the need for some preventative or remedial action.
Current Replacement Cost	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset.
Data Management	The management of data that is held within the Corporate computer system to ensure its structure complies with the requirements and specifications of the system.
Depreciated Replacement Value	The replacement cost of an existing asset less an allowance for wear or consumption having regard for the remaining economic life of the existing asset.
Depreciation	The wearing out, consumption or other loss of value of an asset wether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for by the allocation of the cost (or revalued amount) of the asset less its residual value over its useful life.
GIS	Geographic Information System. GIS is a system of computer software, hardware and data and personnel to help manipulate, analyse and present information that is tied to a spatial location.
Level of Service	The defined service quality for a particular activity (i.e. pit repair) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.
Maintenance	All actions necessary for retaining an asset as near as practical to its original condition, but excluding rehabilitation**.** The work needed to maintain an asset in a condition that enables it to reach its service potential and may expand the assets service life. *Note maintenance does not include modification of an asset from its original design.*
Maintenance Program	A specific plan of identified maintenance activities to be undertaken & recorded for an asset or aggregation of assets.
Community Strategic Plan	A plan containing the long-term objectives and strategies of the community. Strategic plans have a strong external focus and identify major targets, actions and resource allocations relating to the long term survival, value and growth.
Performance Monitoring	Continuous or periodic quantitative assessments of the actual performance compared with specific objectives, targets or standards.

Planned Maintenance	Planned maintenance activities fall into three categories (i) Periodic - necessary to ensure the reliability or to sustain the design life of an asset. (ii) Predictive - condition-monitoring activities used to predict failure. (iii) Preventive - maintenance that can be initiated without routine or continuous checking (e.g using information contained in maintenance manuals or manufactures' recommendations) and is not condition based.
Rehabilitation	Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally involves repairing the asset to deliver its original level of service (i.e. heavy patching of roads etc.) without resorting to significant upgrading or renewal, using available techniques and standards.
Renewal	Works to upgrade, refurbish or replace existing facilities with facilities of equivalent capacity or performance quality.
Repair	Action to restore an item to its previous condition after failure or damage.
Replacement	The complete replacement of an asset that has reached the end of its life so as to provide a similar, or agreed alternative, level of service.
Replacement Cost	The cost of replacing an existing asset with a substantially identical new asset, in today's dollar terms.
Residual Value	The net market or recoverable value, which would be realised from disposal of an asset or facility at the end of its life.
Risk Assessment	The process used to determine risk measurement priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels and other criteria.
Risk Management	A management technique used to identify and analyse potential risks and to implement appropriate responses.
Useful life	The period over which a depreciable asset is expected to be used. The period over which a depreciable asset is expected to be used.
Valuation	Assessed asset value which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels, market value for lifecycle costing and optimised deprival value for tariff setting.
Written Down Value	Is the appropriate value of an asset in current dollar terms minus its accumulated depreciation.