

Wastewater Asset Management Plan

May 2019

v 3.1

(Water & Wastewater Unit)

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 below to make sure that the document is correct.

Version	Version Date	Status
1.0	April 2011	Final Draft - Water Unit Submission to EMT
1.1	April 2011	Final Draft - Water Unit Submission to Council for Exhibition
2.0	February 2013	Final Draft - Water Unit Submission to Manager Water
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1 Introduction

1.1 Background

This Asset Management Plan (AMP) outlines how Tweed Shire Council meets their responsibilities and delivers their wastewater services in a manner that is both functional and cost effective. It assists Council in the decision making process and is presented at a high level to provide key information that can be used in the determination of levels of service and funding required. The AMP is to be read with Council's Asset Management Policy, Asset Management Strategy and Asset Management Manual.

Wastewater infrastructure assets covered in this AMP include:

- Gravity Mains;
- Manholes;
- Rising Mains;
- Vacuum Mains;
- Vacuum Chambers;
- Pump Stations; and
- Treatment Plants.

Further details of the wastewater assets managed by Council can be found at Council's website at <https://www.tweed.nsw.gov.au/WaterAndWastewater>.

1.2 Review Period

This AMP will be reviewed every 4 years, commencing 1st July of each election year ready for public exhibition in April the following year.

1.3 Wastewater Supply Principle Objectives

Council's principal objectives for the provision of wastewater services are:

- To provide wastewater services within a strategic business planning framework;
- To meet legislative requirements including licence conditions for the systems operation and discharges to the environment;
- To provide additional system capacity to meet sustainable growth projections;
- To efficiently and sustainably operate the wastewater systems;
- To provide an equitable, responsive and cost effective wastewater service;
- To provide a high quality, reliable and sufficient wastewater service;
- To promote water cycle education including conservation and reuse;
- To manage assets on a whole of life cost basis to ensure the on-going effective provision of wastewater services; and
- To put in place a sound management regime for all matters relating to the provision of the wastewater service.

Council has several roles with respect to wastewater services:

- to co-ordinate the setting of community outcomes for wastewater services;

- to monitor and report the progress that is being made towards achievement of those outcomes;
- to provide wastewater services to the urban community;
- to properly manage the wastewater assets;
- to ensure that sewage is collected and treated to a standard that protects public health; and
- to ensure the impact of the wastewater service on the environment is minimised.

Council services the main urban communities of the Shire. Council works with the wider rural community to ensure appropriate onsite wastewater management and re-use systems are installed.

2 Current State of Council's Assets

2.1 Key Indicators

The extent of Council's wastewater asset stock along with their replacement value as of 30th June 2018 is shown in

Table 1. These figures are updated annually, the latest figures can be found at Council's website at <https://www.tweed.nsw.gov.au/WaterFactsAndFigures>.

Table 1 Asset Key Indicators

Asset Class	Quantity	Gross Replacement Cost	Depreciated Replacement Cost	Percent Depreciated	Annual Depreciation Expense
Gravity Mains	541 km	\$241,092,679	\$196,783,432	18%	\$2,073,003
Manholes	12,456	\$59,002,687	\$51,946,764	12%	\$435,827
Rising Mains	201 km	\$88,731,851	\$70,763,745	20%	\$1,187,848
Vacuum Mains	2.3 km	\$379,769	\$348,903	8%	\$3,957
Vacuum Chambers	40	\$743,803	\$665,964	10%	\$13,344
Pump Stations	184	\$88,997,227	\$58,704,780	34%	\$2,620,903
Treatment Plants	8	\$220,729,374	\$161,935,875	27%	\$5,056,817
TOTAL		\$699,677,390	\$541,149,462	23%	\$11,391,699

2.2 Wastewater Asset Status

The condition rating scales used for assessing Council's wastewater assets¹ is shown in Table 2.

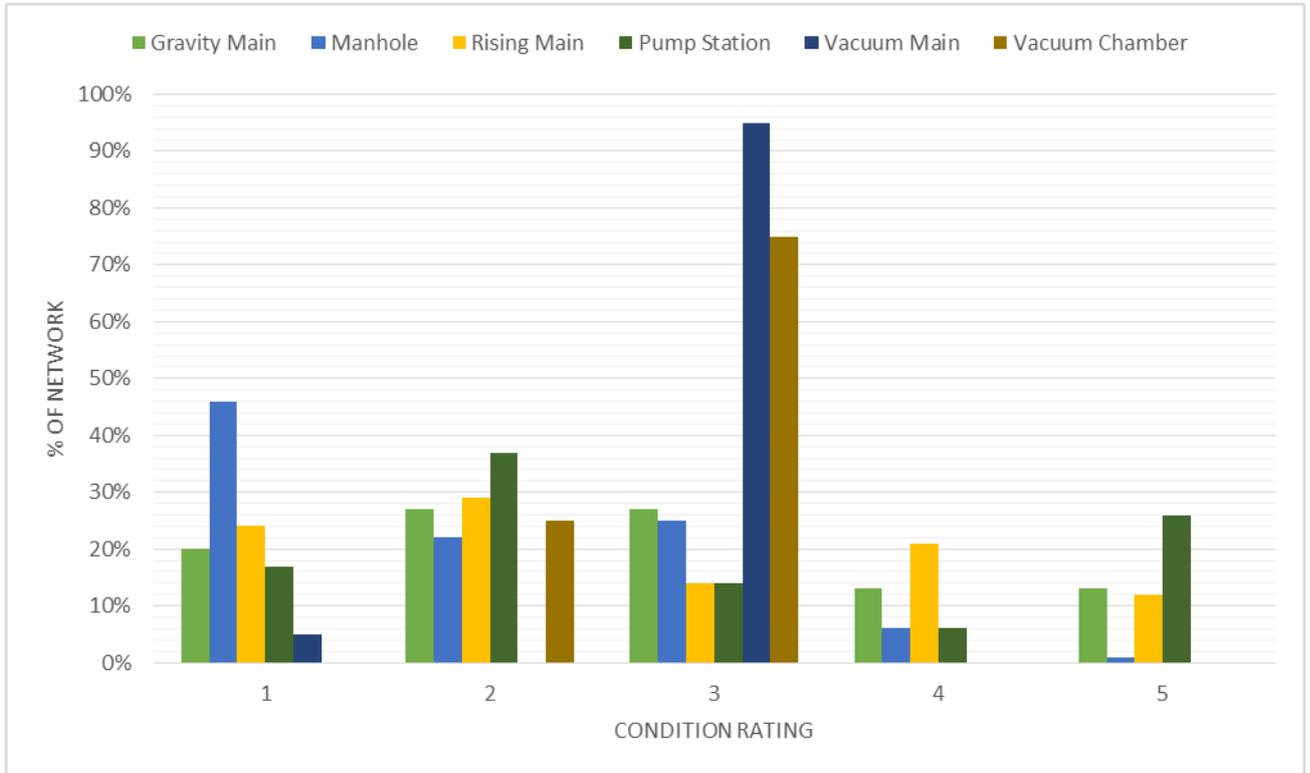
Table 2 Condition Grading

Condition Rating	Community Rating	Description of Asset Condition
1	Excellent	Excellent physical condition. Observable deterioration is insignificant. No adverse service reports.
2	Good	Observation and/or testing indicates that the asset is meeting all service requirements. Sound physical condition; minor deterioration/minor defects observed.
3	Fair	Moderate deterioration evident; minor components or isolated sections of the asset need replacement or repair now but not affecting short term structural integrity.
4	Poor	Serious deterioration and significant defects evident affecting structural integrity. Asset is now moving into zone of failure.
5	Very Poor	Failure imminent. Need to replace most or all of asset. Asset life less than or equal to its useful life.

¹ Treatment plants are currently not assessed in this method.

The breakdown of each wastewater asset class's condition rating, as of June 2018, is shown in Figure 1.

Figure 1 Asset Class Condition Breakdown



The replacement value of each wastewater asset class broken down into their condition ratings, as of June 2018, is shown in Figure 2.

Figure 2 Asset Class Condition Breakdown for Replacement Value

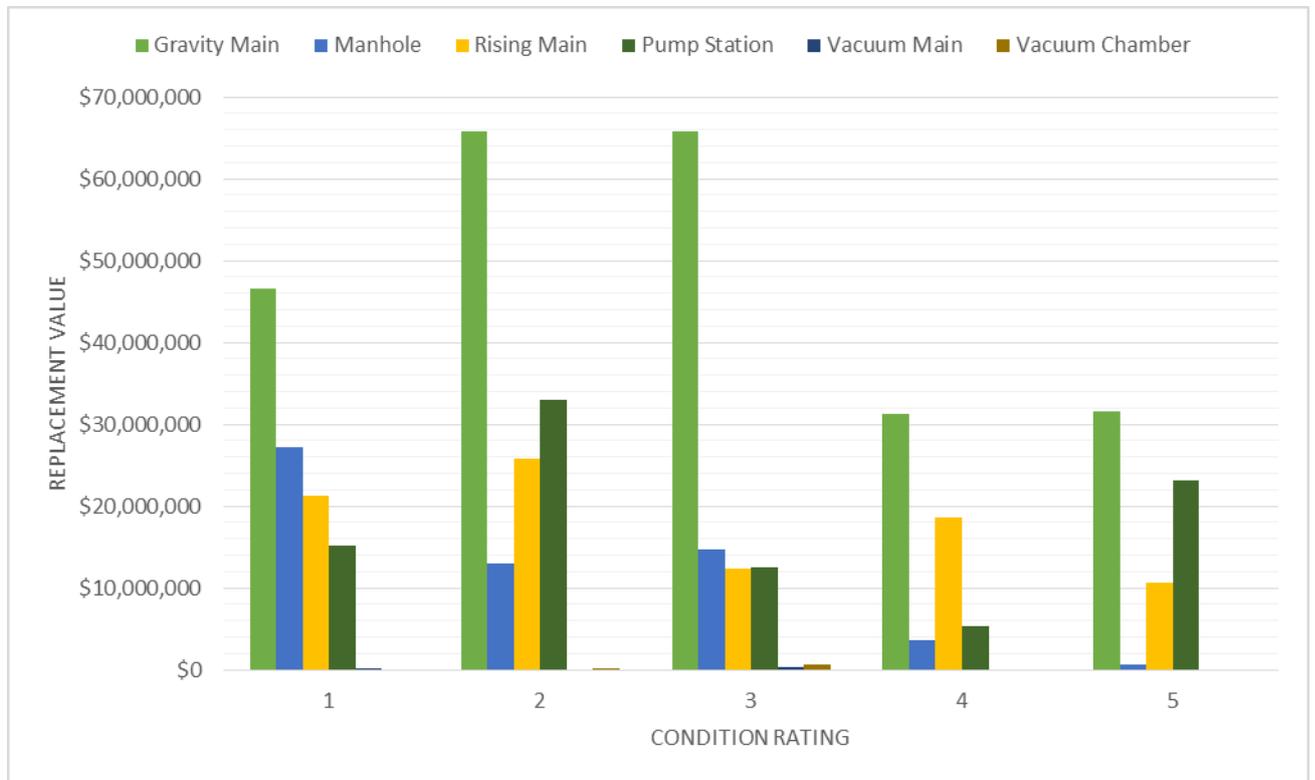
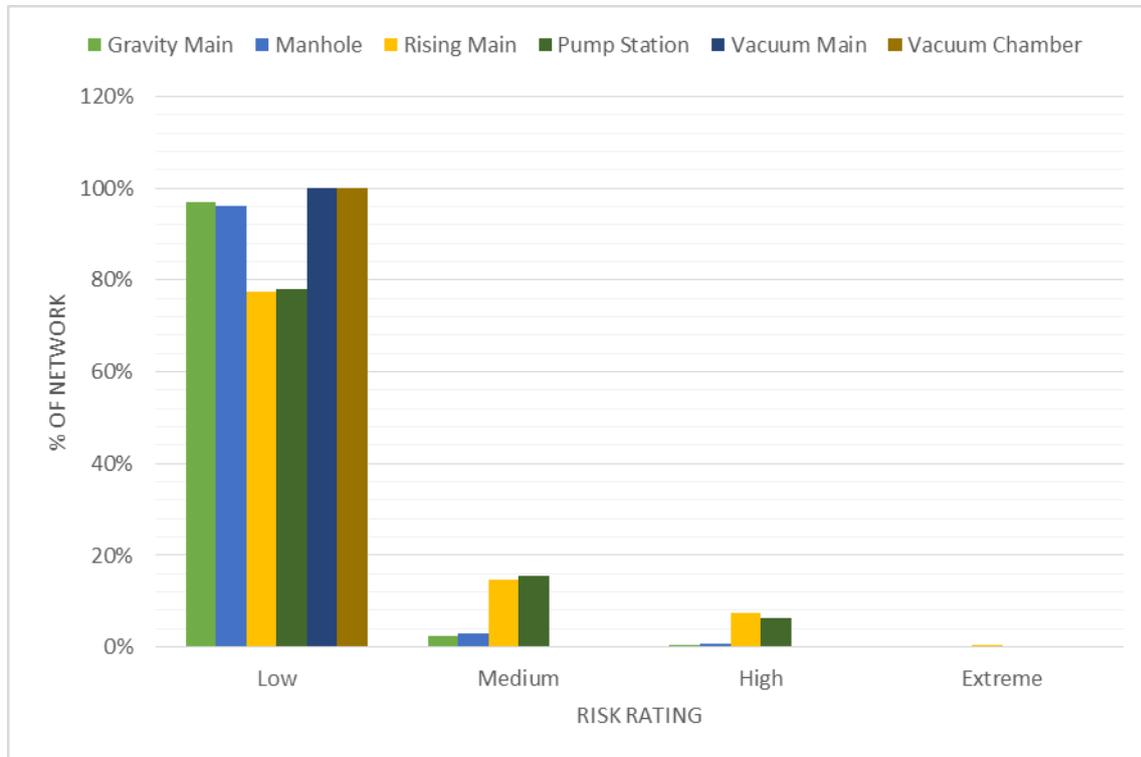


Figure 3 shows the breakdown of risk ratings for wastewater asset classes as of June 2018. The risk rating has been determined using asset condition against consequence of failure; refer to 6.1 for further details.

Figure 3 Asset Class Risk Rating Breakdown



2.3 Asset Registers

Council has three asset registers, one register for maintenance management, the second for non-maintenance assets, and the third for financial reporting purposes.

The maintenance system, MEX, holds the majority of above ground and accessible assets, including mechanical and electrical equipment and their life cycle history information. Maintenance records for this equipment are entered into the database. This system has work procedures developed for mechanical and electrical equipment at treatment plants and pumping stations, however it is only in the very early stages of implementation for some civil and underground assets, such as critical control valves.

The assets that do not require regular maintenance, typically below ground assets such as wastewater reticulation pipework, have their relevant spatial attributes and asset data contained in the Munsys Oracle spatial database and viewed through Weave.

The financial register, Assetic, is used for financial reporting and auditing purposes and contains a list of all Council's wastewater assets grouped by financial classifications.

Overall, the confidence in the asset data registers is relatively high and is regularly reviewed and updated. This includes making sure that data is not captured for data's sake, and that resources are available to keep the data up to date.

3 Levels of Service

3.1 Legal and Regulatory Requirements

In determining levels of service Council needs to meet many legislative requirements, including Federal and State legislation and State regulations, along with industry best practises, standards and guidelines.

General legal and regulatory requirements for asset management are set out in the:

- Local Government Act 1993.
- Local Government Amendment (Planning and Reporting) Act 2009.
- Local Government (General) Amendment (Planning and Reporting) Regulation 2010.

Specific legal and regulatory requirements for wastewater assets are listed below:

- Ozone Protection Act 1970.
- Waste Disposal Act 1970.
- Trade Practices Act 1974.
- Environmental Planning and Assessment Act 1979.
- Water Supply Authorities Act 1987.
- Independent Pricing and Regulatory Tribunal (IPART) Act 1992.
- Protection of the Environment Operations (Waste) Act 1996.
- Protection of the Environment Operations Act 1997.
- Water Management Act 2000.
- Waste Avoidance and Recovery Act 2001.
- Water Industry Competition Act 2006.
- Public Health Act 2010.
- Clean Energy Act 2011.
- Plumbing and Drainage Act 2011.
- Water NSW Act 2014.

Standards, guidelines and specifications relevant to wastewater assets are:

- Guidelines for Best Practice Management of Water Supply and Sewage 2007.
- WSAA Water Supply and Sewer Codes.
- ISO 55001 Asset management – Management systems – Requirements.

3.2 Operational Level of Service

Table 3 details customer's expectations for the wastewater service and Council's service indicators and target levels. The information is grouped under service attributes for the quadruple bottom line categories of environment, social/cultural, economic and governance

Table 3 Wastewater Levels of Service

Quadruple Bottom Line	Service Attributes	Customer Expectations	Level of Service Indicator	Target
Environment (protecting the environment)	Sustainable	Potential environmental impacts will be identified and properly managed by Council in providing and managing the service.	Energy consumption	< 220kWh per 1000 connected assessments
				< 200 net tonnes CO2 (equivalents of GHG emissions per 1000 connected assessments)
			Percentage of effluent volume recycled	15%
	Efficient		Wastewater system overflows	< 10 overflows per 100 km of gravity mains per year.
				< 1.6 overflows per 1000 connected assessments.
			Odour complaint events	< 1 complaint per 1000 connected assessments.
			Number of moderate / major wastewater environmental incidents.	Nil
Percent increase in annual wastewater volume treated	< percentage increase in population growth			
Social/cultural) (supporting community life)	Quality	Ensure these wastes do not impact on public health	Effluent Quality compliant with the Environmental Protection Licence.	100%
			Number of moderate / major wastewater public health incidents.	Nil

	Reliable	Connected assessments can be assured of a continuous service.	Unplanned interruption time.	Service to 95% restored in < 5 hours.
			Notified planned interruption time.	Service to 95% restored in < 12 hours.
			Number of unplanned interruptions.	< 10 per 1000 connected assessments per year.
			Number of gravity main sewer chokes.	< 40 per 100 km of mains per year.
			Number of wastewater rising main failures.	< 10 per 100 km of wastewater rising mains per year.
Social/cultural (supporting community life)	Available	Properties designated rateable to wastewater are able to connect to the system.	Residential wastewater services installed in 10 working days of application	100%
	Sufficient	Council will provide a wastewater service of sufficient capacity.	Percent of properties meeting design flow as determined from the current land use zoning density and Council's publicised design criteria	100%
		Council will ensure assets are of sufficient capacity	Inspection and testing of assets acquired from land developers prior to Council's acceptance	100%
Economic (strengthening the economy)	Capacity	Council will provide a wastewater service sufficient to meet planned demand.	Planned annual capital expenditure for growth.	> 85%
	Affordable	The service is being provided at a reasonable cost.	Annual residential bill will be comparable across region and metropolitan centres	< 10% annual increase
Governance (civic leadership)	Responsive	Information and requests in relation to the service and complaints will	Notification time for planned interruptions to affected connected assessments.	> 48 hrs

		be dealt with properly and in a timely manner.	Availability of information on problems with wastewater system provided on Council's Service Centre line.	< 30 mins.
	Equitable	Customers are treated equally with charges fairly calculated and spread.	A fixed charge per assessment and volumetric and liquid trade waste charges for high volume / strength discharges.	Annual review and adoption of user pays tariff charges
	Compliant	Council meets its legislative requirements.	Number of occurrences where legislative requirements are not met	Nil
			Industrial connections licensed under Council's Trade Waste Policy	100%
Effective	Customers satisfied with the level of service provided.	Number of wastewater system customer requests.	< 10 per 1000 connected assessments	

4 Managing Demand into the Future

Planning for future growth and demand is imperative to provide economically sustained services to meet the future needs of the region. Council recognises that future demands for wastewater services will be influenced by:

- Population growth and demographics.
- Changes in community expectations.
- Industrial demand.
- Technological change.
- Changes in legislation.
- Integrated Water Cycle Management Initiatives.

Technological change has the ability to impact on the demand for a service. These changes can reduce or increase the demand for wastewater infrastructure. Relevant examples are:

- Household water saving devices such as dual flush toilets, low-flow shower heads and front-loading washing machines which reduce water demand and flows in sewers.
- Use of rain water tanks for some internal household use - reducing demand on the potable water supply system yet contributing an unmetered discharge to the sewer system.
- Grey water re-use schemes.

Similarly, technological advances can have an effect on the cost of maintenance and operation of assets. Relevant examples are:

- Advances in treatment process may make further quality improvements cost effective, but will likely raise overall costs of service.
- Advances in effluent treatment may enable a greater re-use of effluent and stormwater in the place of potable water which will likely increase overall cost of service.
- Improvements in pump efficiency and network design will decrease power consumption.
- Material improvements increase the base lives of assets.
- Advances in pump station monitoring for overflow detection.

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.

In addition to assets constructed by Council, new wastewater assets are also acquired from land developments. Acquiring these new assets commits Council to

fund the additional operating, maintenance and renewal costs associated with the assets. Council undertakes hydraulic modelling to determine what infrastructure is required to service new development and maintain levels of service for existing customers.

5 Operations and Maintenance Plans

5.1 Operations

The purpose of Operations is to ensure that service objectives (Levels of Service, statutory & regulatory requirements and obligations) are achieved at the least cost and that the impact of any breakdowns or outages is minimised.

Existing operational systems, processes and procedures routinely deliver services that comply with levels of service and regulatory requirements. Rapid changes in the operating environment in terms of customer expectations, improved environmental outcomes, resource conservation, and higher regulatory standards will require commensurate improvements in operations.

Key operational matters include:

- Asset condition and monitoring program.
- Monitoring of operational performance.
- Review and documenting of operating procedures.
- Conducting a review of energy usage.

Operational activities are those regular activities that are required to continuously provide the service including asset inspection, effluent quality testing, telemetry systems, electricity costs, plant and overheads.

5.2 Maintenance

Maintenance covers all actions necessary for retaining an asset as near as practicable to an appropriate service condition whilst minimising risk of failure until the end of their useful life. It includes instances where portions of the asset fail and need immediate repair to make the asset operational again but excludes rehabilitation or renewal.

Maintenance includes reactive, planned and specific maintenance work activities:

- Reactive maintenance is unplanned repair work carried out in response to service requests. It includes undesired breakdowns as well as maintenance for less critical assets that are intentionally run to failure, or for situations where scheduled maintenance is not possible.
- Planned maintenance is repair work that is identified and managed through a maintenance management system maintenance which can be fixed-time intervals or condition based intervals (e.g. every 10,000 pump run hours).

These activities are programmed based on inspections, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

- Specific maintenance is replacement of higher value components/subcomponents of assets that is undertaken on a regular cycle including repainting, building roof replacement, etc. This work generally falls below the capital/maintenance threshold.

Current maintenance expenditure levels are considered to be adequate to meet required service levels. Assessment and prioritisation of reactive maintenance is undertaken by operational staff using experience and judgment.

5.3 Operations and Maintenance Strategy

Council will operate and maintain assets to provide the defined level of service to approved budgets in the most cost-efficient manner. The operation and maintenance activities include:

- Scheduling operations activities to deliver the defined level of service in the most efficient manner.
- Undertaking maintenance activities through a planned maintenance system to reduce maintenance costs and improve maintenance outcomes. Undertake cost-benefit analysis to determine the most cost-effective split between planned and unplanned maintenance activities (50 – 70% planned desirable as measured by cost).
- Maintain a current infrastructure risk register for assets and present service risks associated with providing services from infrastructure assets and reporting Extreme and High risks to management and Council.
- Review current and required skills base and implement workforce training and development to meet required operations and maintenance needs.
- Review asset utilisation to identify underutilised assets and appropriate remedies, and over utilised assets and customer demand management options.
- Maintain a current hierarchy of critical assets and required operations and maintenance activities.
- Review and update as required Operations and Maintenance Manuals.
- Develop and regularly review appropriate emergency response capability.
- Review management of operations and maintenance activities to ensure Council is obtaining best value for resources used.

6 Capital Renewal Plan

Renewals works are capital work on an existing asset to replace or rehabilitate it to a condition that restores the capability of the asset back to an acceptable level of service.

Council preforms renewal analysis based on broad assumptions and best available knowledge to date. Modelling is not an exact science and deals with long term averages across the entire asset stock. Work will continue on improving the quality of our asset registers and systems to increase the accuracy of our renewal models. Renewal work is carried out in accordance with Water Services Association of Australia (WSAA) standards and plumbing codes.

Council’s wastewater asset renewal policy is risk based. Subsequently, asset renewal determination is a combination of consequence of failure and condition. As a result of this policy:

- Some high risk assets will be replaced before they reach their useful life.
- Some low risk assets will remain in service past their useful life and will not be replaced until they become a maintenance problem.

6.1 Prioritising Renewals

Assets requiring renewal will generally be identified from estimates of remaining life and condition assessments obtained from the asset register and models. Assetic Predictor is used to predict at what time in the future an asset will require replacement based on this risk matrix shown in Table 4.

Table 4 Risk Matrix

		CoF				
		1	2	3	4	5
OCG	6	Low	Medium	High	Extreme	Extreme
	5	Low	Medium	High	Extreme	Extreme
	4	Low	Low	Medium	High	Extreme
	3	Low	Low	Low	Medium	High
	2	Low	Low	Low	Low	Medium
	1	Low	Low	Low	Low	Low
	0	Low	Low	Low	Low	Low

Asset Consequence of Failure (CoF) is determined using a number of factors including:

- Environmental impact.
- Type of customer.
- Disruption to customers.
- Disruption to transport.
- Risk to public health and safety.
- Difficulty of repair.
- Quantity spilt to environment.
- Occupational health and safety.

Overall Condition Grade (OCG) is calculated from a number of condition grades:

- Course Condition Grade (CCG) based on age versus useful life.
- Performance History Grade (PHG) based on the service history of the asset (number and frequency of failures).
- Field Condition Grade (FCG) based on observed physical condition of an asset obtained from repairs carried out, programmed inspections and pipe thickness measurements.

Asset replacements are programmed as follows:

- Extreme Risk – In the financial year its risk is first predicted as Extreme.
- High Risk – In the period between the first year its risk is predicted as high and before the first year its risk is predicted to become Extreme.
- Medium/Low Risk –When the asset becomes a maintenance problem based on its service history.

7 Asset Funding Levels

7.1 Forecast 10-Year Funding Required

The Long Term Financial Plan for Council's expenditure on renewals, growth and operating of wastewater assets over the next 10 years as of July 2018 is shown in

Table 5. This 10 year forecast is updated annually, the latest figures can be found at Council's website at <https://www.tweed.nsw.gov.au/WaterFactsAndFigures>.

Table 5 10 Year Funding Forecast

Year	Renewal Expenditure	Growth Expenditure²	Operating Expenditure
2019	\$4,474,750	\$1,553,000	\$23,017,039
2020	\$3,144,068	\$1,441,620	\$23,053,222
2021	\$3,388,780	\$170,350	\$23,449,777
2022	\$2,429,872	\$1,008,784	\$23,919,569
2023	\$8,935,075	\$1,075,500	\$24,445,304
2024	\$10,179,242	\$11,184,650	\$25,169,570
2025	\$8,313,500	\$13,841,500	\$25,701,006
2026	\$7,739,500	\$28,087,500	\$26,329,375
2027	\$8,570,000	\$10,725,000	\$26,941,363
2028	\$9,099,500	\$2,164,500	\$27,712,802
Total	\$66,274,287	\$71,252,404	\$249,739,027

² Where a project incorporates both renewal and growth components, 100% of project costs are reported under Expenditure Growth.

7.2 Financial Ratios

Infrastructure asset management performance indicators for wastewater assets are calculated annually and are published in Council's financial statement under special schedule 7. The latest financial statement is published on Council's webpage at <https://www.tweed.nsw.gov.au/ManagementPlan>. These indicators are a requirement of the Code of Accounting Practice and Financial Reporting under Special Schedule 7. The financial ratios used for performance indicators include:

- Infrastructure renewal ratio.
- Infrastructure backlog ratio.
- Asset maintenance ratio.
- Cost to bring assets to agreed service level.

8 Improvement Plan

Ongoing monitoring, review and updating of this plan is undertaken to improve the quality of asset management planning and accuracy of the financial projections. This process uses improved knowledge of customer expectations and enhanced asset management processes, systems and data to optimise decision making, review outputs, develop strategies and extend the planning horizon.

The priority asset related improvement actions over the next 4 years considered to be the most important for delivery of the wastewater service are listed in Table 6.

Table 6 Improvement Plan

Delivery Programme Key Actions	Responsibility	Financial Year			
		18/19	19/20	20/21	21/22
Formally document risk based asset renewal planning process	Engineer, Asset Management	X	X		
Review current supporting Asset Management documentation with view of consolidating and streamlining into new process and procedural documentation	Engineer, Asset Management	X	X		
Continue to extend coverage of risk based asset renewal planning to treatment plants	Engineer, Asset Management		X	X	X

Delivery Programme Key Actions	Responsibility	Financial Year			
		18/19	19/20	20/21	21/22
Continue to enhance drawing register and develop process for capturing and storing asset information	Engineer, Asset Management		X	X	X
Improve condition assessment of major rising mains	Engineer, Asset Management		X	X	X
Develop high level criticality assessments of treatment plants to determine critical spares, conditioning monitoring programs and renewal plans	Engineer, Asset Management		X	X	X
Develop a consistent data structure for linkage of the maintenance and financial asset registers	Engineer, Asset Management		X	X	X

END OF REPORT



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