

Gwydir Shire Council

Sewerage Services Asset Management Plan

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Executive Summary

Introduction

This Asset Management Plan (AMP) has been developed to guide and provide a foundation for the responsible management of Gwydir Shire Council's sewerage assets and services, aligned with contemporary best practice and standards and the requirements of the NSW Integrated Planning and Reporting framework.

The AMP has been developed with reference to Council's Asset Management Policy and Asset Management Strategy and should be read in conjunction with those documents. It also provides alignment between Council's Long-Term Financial Plan, Community Engagement Strategy, Community Strategic Plan, Operational and Delivery Plans.

Asset Portfolio

This AMP covers the key sewerage infrastructure assets owned or controlled by Council that underpin the delivery of critical wastewater services to the community. These assets include civil, electrical, gravity main, manholes, and mechanical assets, pipework and fittings, and rising mains. The scale and value of the portfolio is summarised below¹.

Table 1 Sewerage asset numbers and value

Sewerage	Number	Value
Civil	50	\$ 7,514,400
Electrical	23	\$ 534,096
Gravity Mains	768	\$ 8,604,451
Manholes	266	\$ 1,221,600
Mechanical	60	\$ 740,900
Pipework and Fittings	2	\$ 37,400
Rising Mains	8	\$ 305,424
Total	1,177	\$ 18,958,271

The condition of Council's assets is assessed and rated on an industry-standard five-point scale from 'Excellent' to 'Very Poor'. The breakdown of the sewerage asset portfolio's condition by replacement value, based on the currently available asset register data, is shown in Figure 3.

¹ 'Number' represents the count of individual asset line items in the GSC Asset Register. 'Value' is estimated replacement value based on original acquisition costs recorded in the Asset Register.

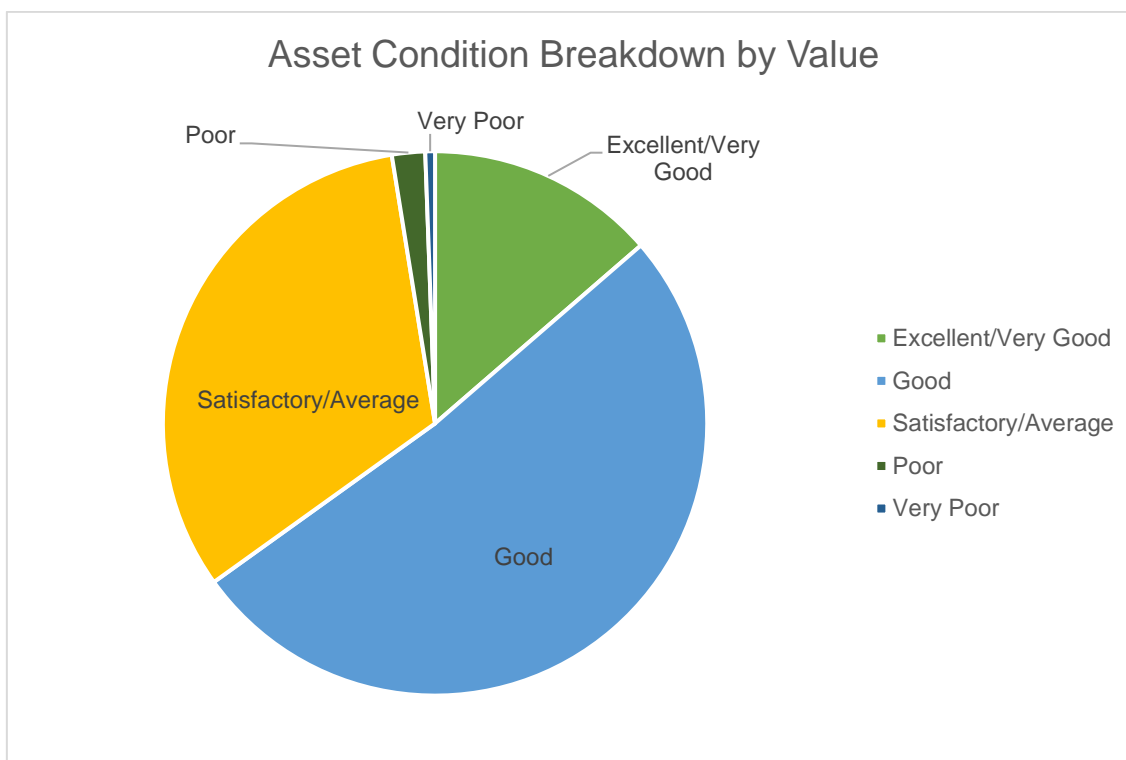


Figure 1 Asset condition breakdown by value

The large majority (68%) of assets by value can be seen as being in the two highest levels of condition, indicating that current management and maintenance regimes for sewerage assets are effective in maintaining overall condition and managing risk.

Asset Demand

The primary demand drivers of population growth, demographics, and climate change have been considered in assessing likely sewerage service demand on assets, and together suggest minimal levels of growth in demand are likely to occur across the 10-year AMP planning period.

Changes in demand arising from these drivers will be managed through a combination of managing existing assets, upgrading of existing assets, providing new assets to meet demand, and demand management.

Levels of Service

Council tries to maintain close and regular engagement with the community on Levels of Service, in line with its Community Engagement Strategy 2022-2026. In the case of Sewerage services, engagement on Levels of Service was last conducted in 2015. It is intended that these be review and refreshed as an improvement initiative of this AMP.

Risk Management

Council’s risk assessment processes are set out in the Gwydir Shire Council Risk Management Action Plan and asset-related risks are identified, treated and managed in accordance with both that plan and the Infrastructure Risk Management Plan. Critical risks are those assessed as either ‘Very High’ or ‘High’ under this framework and are regularly reported to Council. Climate change and associated asset resilience is an increasing source of sewerage service and asset risk, and consequently an increasing area of management focus.

Financial Projections

Capital and operating expenditures for the sewerage asset class have been based on life cycle modelling and include expenditures for operations, maintenance, renewal, growth and acquisitions, and disposal. The total expenditure forecast across these categories, and the breakdown across the ten-year planning horizon, are shown in Figure 2.

The total projected expenditure across the ten years is \$7.50 million with an annual average of \$.681 million. Anticipated capital renewal peaks in 2025 and 2030 will be reviewed with a view to smoothing the overall expenditure profile.

In summary, this sewerage AMP is anticipated to be fully funded, with total funding across the ten-year period expected to meet the combined expenditure requirements.

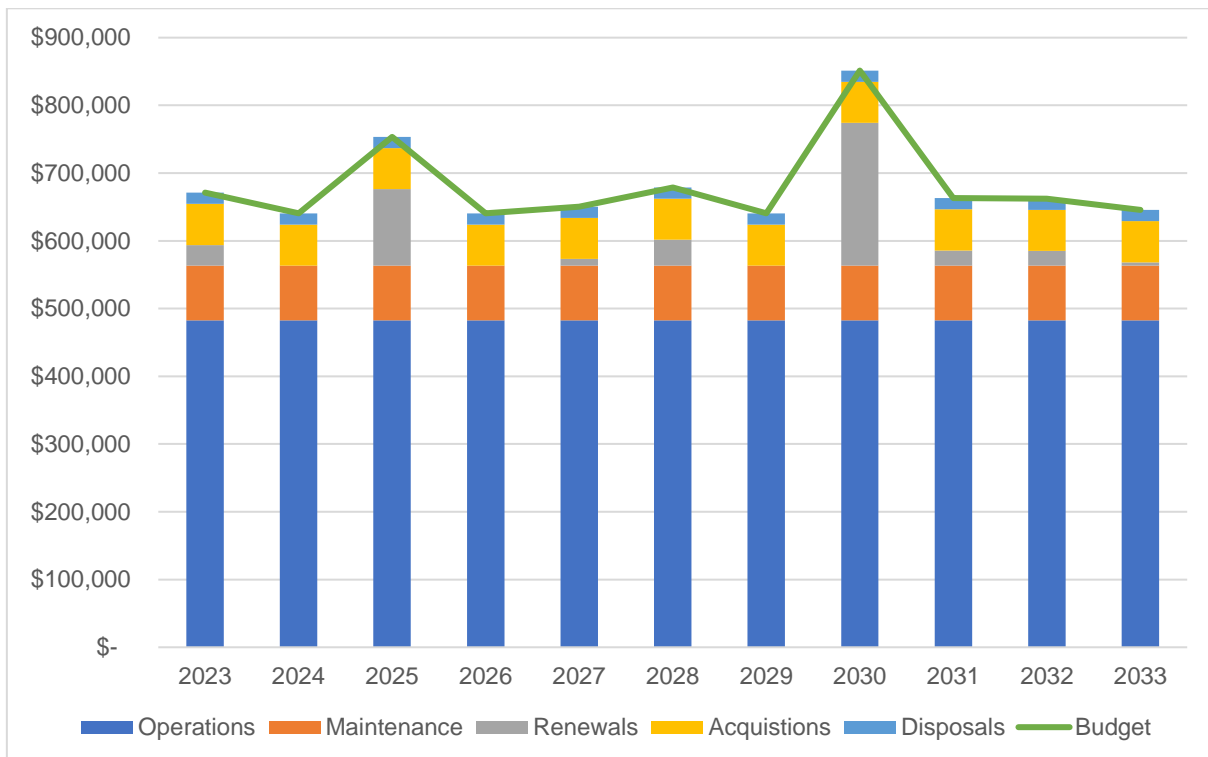


Figure 2 Life cycle expenditure forecast - sewerage assets

Plan Improvement and Monitoring

This AMP has identified several specific improvement initiatives which are consolidated with those of other asset classes in Council's Asset Management Improvement Plan, which is part of its Asset Management Strategy document. Key among these are:

- Developing and implementing an asset criticality assessment framework as a basis to identify and prioritise critical assets, and develop appropriate strategies to mitigate risks
- Improving and formalising condition assessment processes, data and reporting
- Reviewing Levels of Service with community input, and the development of appropriate measures and targets
- Further investigating climate related impacts on demand, and risks
- Improving financial processes, tools and data to support more detailed budgeting.

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1. Introduction

1.1 Background

Gwydir Shire Council (Council) is required under the *Local Government Act 1993* (the Act) and the associated Integrated Planning and Reporting framework to develop and implement a series of plans, including Asset Management Plans (AMPs) for all critical assets owned or managed by Council.

Council views this framework as a foundation for the improvement of its asset management practices, and this AMP to guide the responsible management of Council's sewerage assets and services, aligned with contemporary best practice and standards.

1.2 Context

The goal for local governments in managing infrastructure assets is to meet customer-defined Levels of Service (LoS) in the most cost-effective manner for present and future stakeholders. The key elements of infrastructure asset management are:

- Providing defined LoS and monitoring performance in accordance with stakeholder expectations
- Undertaking works to maintain compliance with LoS
- Managing the impact of growth through demand management and infrastructure investment
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined LoS
- Identifying, assessing, and appropriately controlling risks
- Linking to and informing the Long-Term Financial Plan (LTFP), which identifies required forecast expenditures and how they will be allocated.

This AMP supports achievement of that goal by documenting how Council will manage its assets to sustainably deliver required sewerage services, identify and manage associated risks, and responsibly plan and deploy Council funds and resources. It reflects and incorporates the latest available information and asset data as at June 2023.

The AMP has been developed with reference to Council's Asset Management Policy and Asset Management Strategy and should be read in conjunction with those documents. It also provides alignment between the Long-Term Financial Plan, Community Engagement Strategy, Community Strategic Plan, Operational and Delivery Plans.

The AMP is aligned to guidance provided in the ISO 55000 suite of Asset Management standards, the Institute of Public Works Engineering Australasia (IPWEA) NAMS+ toolkit and International Infrastructure Management Manual (IIMM), while meeting the requirements of the NSW Government's Integrated Planning and Reporting framework.

1.3 Scope

This AMP covers the key sewerage infrastructure assets owned or managed by Council that underpin the delivery of critical sewerage services to the community. These assets include sewerage assets relating to civil, electrical, gravity mains, manholes, mechanical, pipework and fittings and rising main infrastructure. A more detailed summary of the sewerage asset portfolio is provided in Section 2.

This AMP covers a 10-year timeframe to 2033 and will be reviewed annually in line with Integrated Planning and Reporting Framework requirements.

1.4 Strategic Framework

1.4.1 Integrated Planning & Reporting

The NSW Government's Integrated Planning and Reporting framework (IP&R) mandates that all NSW Councils develop and implement an integrated hierarchy of planning documents, summarised briefly below².

- **Community Strategic Plan**, which outlines the goals and objectives of the community as defined through the Community Engagement Strategy.
- **Community Engagement Strategy**, which demonstrates how Council plans and undertakes community engagement activities.
- **Resourcing Strategy**, which details how the delivery of programs resulting from the Community Strategic Plan are managed and resourced. It includes:
 - Long-Term Financial Plan
 - Workforce Management Plan
 - Asset Management Planning.

1.4.2 Asset Management Planning

The IP&R's Asset Management Planning requirements are met by, and documented in, Council's Asset Management Policy, Asset Management Strategy and asset class-specific AMPs. These are, in turn, supported by Council's asset management processes, people, information and systems. The documents that together make up Council's asset management framework are summarised in Table 2.

Table 2 Key Council asset management documents

Document Name	Key Document Contents
Asset Management Policy	Documents and confirms Council's commitment to asset management, and the principles and approach to be adopted in its planning and implementation.
Asset Management Strategy	The Asset Management Strategy outlines: <ul style="list-style-type: none">• The Asset Management Objectives (AMOs)• Strategies to meet the AMOs• How the AMP is implemented• How Council will develop, implement, and continually improve its asset management capability• Relevant background information on matters including governance, roles and responsibilities, supporting information systems and processes that are applicable to all AMPs.
Asset Management Plan (this document)	The AMP outlines the approach to delivering asset management objectives for the relevant asset class. The document details the asset class-specific risks and strategies to support and align with Council-wide asset management policies and strategies, demand factors, levels of service, risk management practices, financial resources required, and improvement initiatives.
Long-Term Financial Plan	Provides a 10-year budget forecast to demonstrate financial sustainability and how the Operational Plan and Delivery Programs are resourced.

² Further details of the IP&R are contained in Council's separate Asset Management Strategy document

Delivery Plan	Describes Council's commitment to deliver over a 4-year period to meet the strategic goals and objectives. Describes what can be delivered with the available resources.
Operational Plan	Identifies annual projects and activities to deliver against the Delivery Plan.

1.5 Governance, roles and responsibilities

The successful delivery of asset management relies on a defined governance model and the relationships between executive management, corporate services, operational services and delivery services.

Council's organisational and governance structure, and the key asset management responsibilities, are described in Council's Asset Management Strategy.

In the context of sewerage assets, the key asset management roles are performed by the following Council positions and/or business units.

Table 3 Asset management roles

Broad Asset Management Role	Responsible Council Party
Asset Custodian	Town Utilities and Plant Manager
Asset Manager	Town Utilities and Plant Manager
Asset Maintainer	Town Utilities and Plant Manager

2. Asset Portfolio

This section provides an overview of the assets covered by this AMP.

2.1 Asset Types and Value

The composition of the sewerage asset base is summarised in Table 4 below³. In total, the asset portfolio has a current value of \$18,919,475.

Table 4 Asset numbers and value

Sewerage	Number	Value
Civil	50	\$ 7,514,400
Electrical	23	\$ 534,097
Gravity Mains	768	\$ 8,604,451
Manholes	266	\$ 1,221,600
Mechanical	60	\$ 740,900
Pipework and Fittings	2	\$ 37,400
Rising Mains	8	\$ 305,424
Total	1,177	\$ 18,958,271

The asset register also captures a mixture of subcomponents and attributes (such as material) of the sewerage assets. Condition assessments, remaining life and valuations are done to this subcomponent level. These include:

- Pits, ponds, site works, structures, tank and well structures for civil assets
- Control panels and telemetry for electrical assets
- AC, cast iron, fibreglass, PVC, uPVC and VC pipework for gravity main assets
- Aeration, dosing system, generator, lifting, mechanical, mixer and pump equipment for mechanical assets
- AC, cast iron and DICL for rising main assets.


2.2 Asset Condition and Performance

2.2.1 Condition Assessment Process

The physical condition of assets provides an important indicator of their ability to perform their required function, their likelihood of failure, and their expected operations and maintenance costs, and is consequently a key input to asset management planning.

³ 'Number' represents the count of individual asset line items in the GSC Asset Register. 'Value' is estimated replacement value based on original acquisition costs recorded in the Asset Register.

Condition assessments and capturing of condition data are undertaken regularly as part of routine maintenance or as part of a program of rolling annual inspections which covers all sewerage assets every few years, or as budget and resourcing allows. Council intends to continue to improve its collection of asset condition data and to document its approach in future revisions of this AMP.

	<p>Improvement Action 1: Update future versions of this section of the AMP to include details of condition assessment frequencies, methodologies, and reporting.</p>
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In line with industry standards and NSW Office of Local Government guidance, Council uses a five-point scale to assess and rate asset condition, as summarised in Table 5.

Table 5 Condition ratings and descriptions

Rating	Condition	Description
1	Excellent / Very Good	New or as new condition. Only planned cyclic inspection and routine maintenance required.
2	Good	Good condition with minor defects. Minor routine maintenance along with planned cyclic inspection and maintenance.
3	Satisfactory / Average	Average/fair condition with some significant defects requiring regular maintenance on top of planned cyclic inspections and maintenance.
4	Poor	Poor condition with asset requiring significant renewal/ rehabilitation, or higher levels of inspection and substantial maintenance to keep the asset serviceable.
5	Very Poor	Very poor condition. Asset physically unsound and/or beyond rehabilitation. Renewal required.

2.2.2 Asset Condition Profile

A breakdown of the sewerage asset portfolio's condition by replacement value, based on the currently available asset register data, is shown in Figure 3.

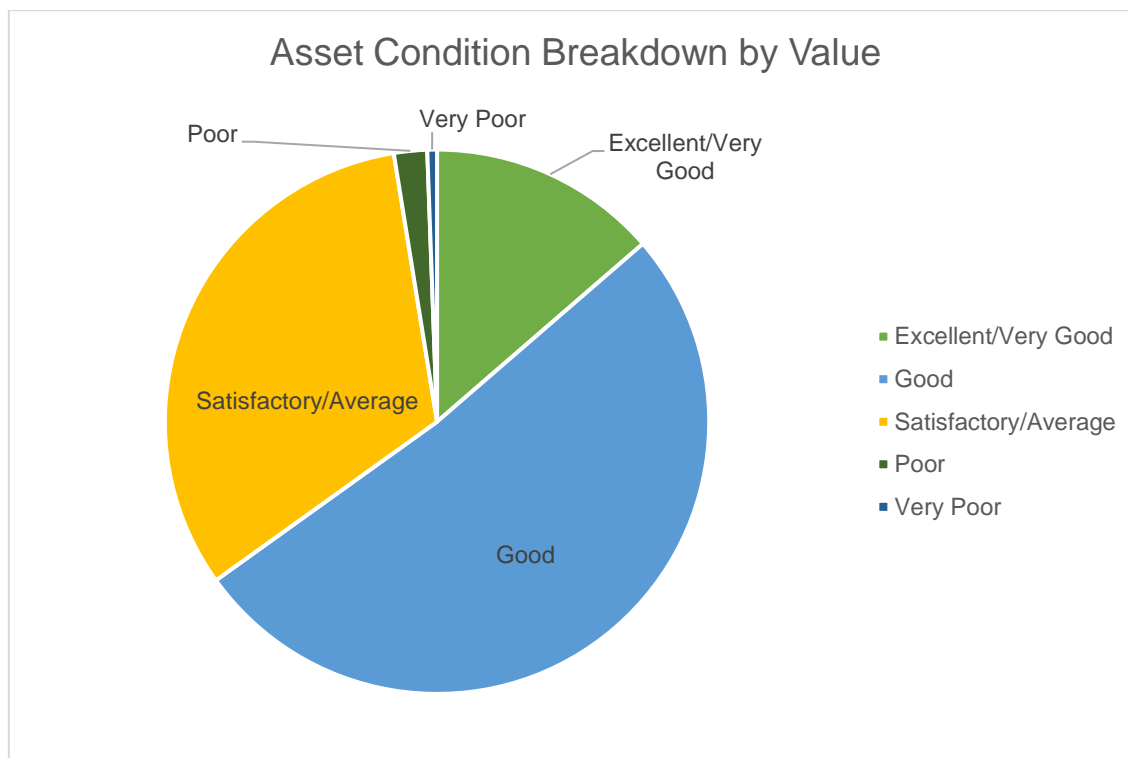


Figure 3 Asset condition breakdown by value

The majority (68%) of assets by value can be seen as being in 'Excellent', 'Very Good' or 'Good' condition, indicating that current management and maintenance regimes for sewerage assets are appropriate, and that major renewal investment is unlikely to be required in the medium term. Those assets assessed as Poor or Very Poor will be the subject of more detailed inspection and assessment to ensure that risk to service delivery is mitigated.

Of those assets in poorer levels of condition, the following have been identified for investigation of appropriate rectification works and investment.

Sewerage Assets Requiring Major Reconstruction

From the asset register, several individual assets were rating 'Poor' or requiring major reconstruction, renewal or replacement. These are summarised below.

Table 6 Assets in Poor condition potentially requiring major reconstruction or replacement

Sewerage Asset	Subcomponent
Geddes Lane	Manhole
Gwydir Highway	Manhole
Elizabeth Kenny Lane	Manhole
Hope Street	Manhole
134 Maitland Street	Manhole
Long Street	Manhole
Long Street	Manhole

Geddes Street	Manhole
Holden Street	Manhole
Plunkett Street	Manhole
Plunkett Street	Manhole
Hope Street	Manhole
Hope Street	Manhole
Hope Street	Manhole
Electrical and Telemetry	Electrical
Electrical and Telemetry	Electrical
Fencing	Civil
Warialda Sewerage Telemetry Upgrade (WO 5991)	Electrical
Long Street	Manhole
Long Street	Manhole
Long Street	Manhole
Long Street	Manhole
Kulaba Avenue	Manhole
148 Maitland Street	Manhole
Long Street	Manhole
Stewart Street	Manhole
Stephen Street	Manhole
Geddes Street	Manhole
Holden Street	Manhole
Show Ground	Manhole
Sports Ground	Manhole
Show Ground	Manhole
Sports Ground	Manhole
Holden Street	Manhole
Holden Street	Manhole
Geddes Street	Manhole
Browns lane	Manhole
Geddes Street	Manhole
Geddes Street	Manhole

Unserviceable Assets

Assets shown in the asset register to be rated as 'Very Poor' or unserviceable are shown in Table 7.

Table 7 Assets rated Very Poor

Sewerage Asset	Subcomponent
Bingara Reticulation - An5An7	Gravity Main

Bingara Reticulation - Ag14Ag15	Gravity Main
Warialda Reticulation - Bt3 - Bt4	Gravity Main
Over the road from 5 Bowen Street inside SPS gate	Manhole
Geddes Street - Field	Manhole
Withers lane	Manhole
Hope Street	Manhole
Withers lane	Manhole
Electrical and Telemetry	Electrical
Hope Street	Manhole
Corner of 16 Dinoga Street	Manhole
40 Heber Street	Manhole

3. Asset Demand

Asset demand is driven by a range of factors including levels of service, population growth, climate change, technology, legislation requirements and economic factors. The following section outlines the key demand drivers relevant to Council’s sewerage asset portfolio and provides analysis to summarise their potential impacts on this asset class.

3.1 Demand Drivers

3.1.1 Population Growth and Demographics

Population is one of the most direct drivers of sewerage asset demand. Data from the latest Australian Bureau of Statistics Census of Population and Housing for the Gwydir Shire LGA shows a gradual long-term decline in population between 1996 and 2021 of approximately 17%. Looking forward, the online NSW Population Projections Explorer indicates the population of Gwydir Shire will gradually rise to 5,576 or approximately 11%, by 2041. This represents a relatively small rate of growth over the next ten years, indicating that growth in asset demand will be gradual and manageable.

Changes in the population of Gwydir Shire since 1996 is shown below.

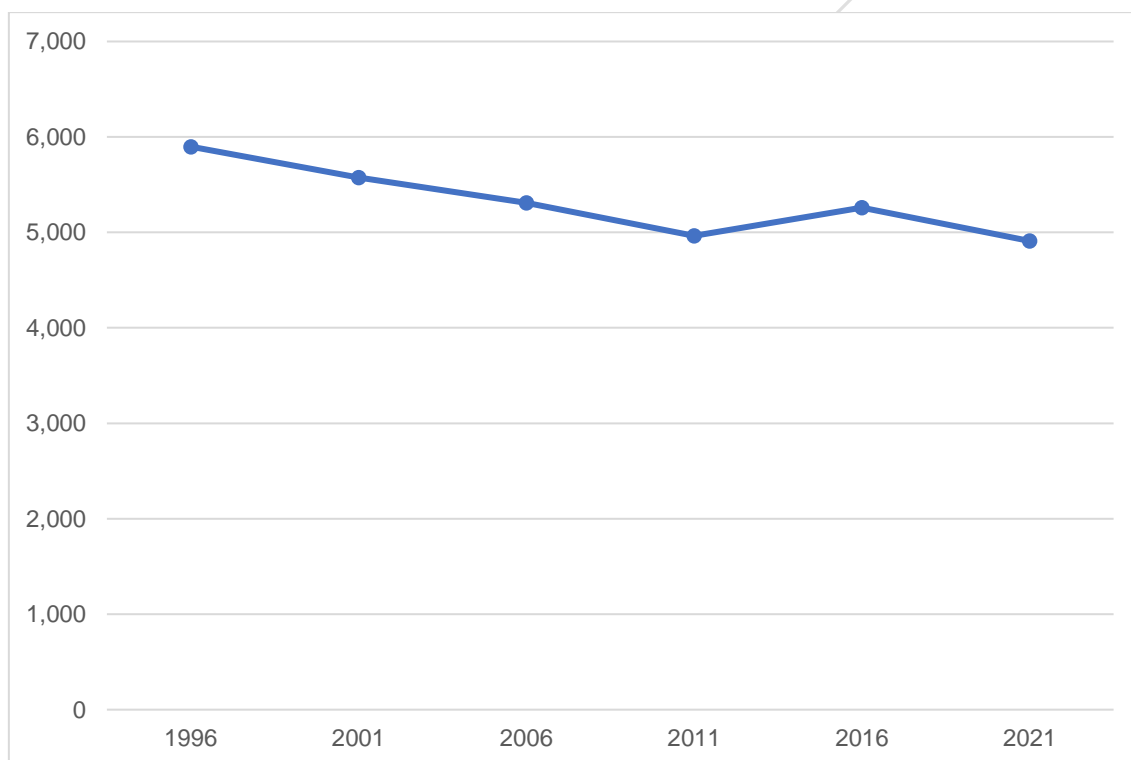


Figure 4 Gwydir LGA population

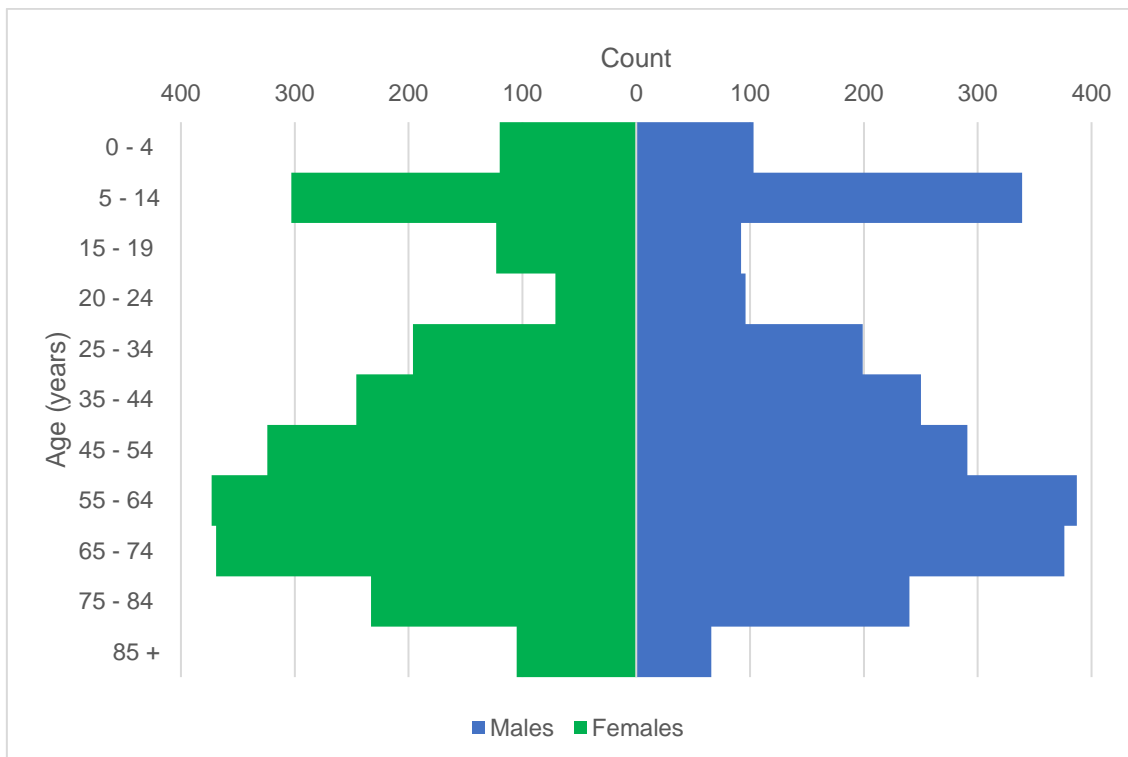


Figure 5 Gwydir LGA demographic distribution (2021)

The distribution of ages indicates a greater proportion of people over the age of 45, with a median age of 50 years. As with many regional areas, Gwydir Shire is also experiencing an ageing population trend, and slight increase in dwelling occupancy rate of 0.0 to 0.5 % per annum. When coupled with the relatively low population growth rates, these demographic factors suggest minimal levels of growth-related demand are likely to occur across the 10-year AMP planning period.

3.1.2 Climate Change

The results of climate change can have a significant impact on the assets being managed and the services that they provide. In the context of the asset management planning process, climate change can be considered as both a future demand driver and a risk.

How climate change will impact on assets can vary significantly depending on the location and the type of services provided, as will the way in which Council responds to and manages those impacts. As an increasingly important input to its asset management planning, Council should consider both how to manage existing assets given potential climate change impacts, and then also how to create resilience to climate change in any new works or acquisitions.

A NSW government climate report⁴ projects anticipated changes to temperature, frequency of hot days and cold nights, rainfall and fire conditions for the medium and long terms for the New England Northwest region, which includes, but is not specific to, Gwydir Shire. The projections nonetheless provide a good starting point for undertaking a hazard risk assessment and identifying potential management options.

⁴ NSW Government Office of Environment & Heritage, New England North West Climate change snapshot, November 2014.

Table 8 Climate change snapshot summary


Effect	Trend	Near Future (2020-2039) Projection	Far Future (2060-2079) Projection
Temperature	Increase	Maximum temperatures to increase by 0.7 °C. Minimum temperatures to increase by 0.7 °C.	Maximum temperatures to increase by 2.2 °C. Minimum temperatures to increase by 2.3 °C.
Number of hot days (maximum temperature above 35 °C)	Increase	7 additional hot days per annum.	24 additional hot days per annum.
Number of cold nights (minimum temperature below 2 °C)	Decrease	9 fewer cold nights per annum.	26 fewer cold nights per annum.
Rainfall	Variable	Changes in annual rainfall ranging from -9 % to +13 %.	Changes in annual rainfall ranging from -8 % to +24 %.
Forest Fire Danger Index (FFDI)	Increase	Increase in number of days with a FFDI above 50 (Severe). Increase in average FFDI.	Further increase in number of days with a FFDI above 50 (Severe). Additional increase in average FFDI.

Climate change has potential impacts on both demand for, and the management of, Council's sewerage assets and the services provided by them. These include reduced volumes and quality of inflows to treatment plants during dry or drought periods, potential flood and storm related inflow and infiltration negatively impacting operations and maintenance, and potential infrastructure damage from floods and fire. Some examples of these impacts and potential responses are shown in Table 9.

Table 9 Impact of climate change on assets

Climate Change Description	Projected Change	Potential Impact on Assets and Services	Example Management Actions
Storms and floods	Increased frequency and severity.	Localised flooding damage. Loss of service. Power outages. Sewer inflow and infiltration.	Locate switchboards and pumping stations away from flood-prone areas. Preventative works. Community education on stormwater management.
Drought and increased temperatures	Reduced water usage.	Reduced inflows to sewerage systems and treatment plants. Sub-optimal treatment operations flows and influent quality.	Review and optimise treatment plant capacities and operating modes.
Fire	Longer, more severe fire seasons.	Destruction of infrastructure. Loss of service.	Manage potential vegetation fuel sources with hazard reduction burning ahead of fire season. Invest in fire resistant building materials. Appropriate site selection for assets and infrastructure.

Council recognises the importance of understanding climate implications and that these continue to be monitored and addressed in future versions of this AMP.

	<p>Improvement Action 2:</p> <p>Undertake a climate change impact review and risk assessment to determine what mitigation measures and management strategies are appropriate for this asset class.</p> <p>Update this Section of the AMP to include key findings and any mitigation measures.</p>
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3.2 Demand Management

In the case of Sewerage assets, changes in population-driven demand are expected to be minimal and able to be readily accommodated through gradual network and facility augmentation. Any significant climate-related demand impacts will be monitored by Council, and appropriate demand management responses considered as and when required.

4. Levels of Service

Levels of Service (LoS) are used to link the business outcomes of the asset owner with the assets used to provide the services. LoS are required to:

- Describe the service outputs the organisation intends to deliver to customers via the asset portfolio
- Relate to service attributes such as quality, reliability, timeliness, accessibility, and cost
- Be measurable and recordable
- Providing a basis for the setting of 'trigger points' for reviews of maintenance strategies, renewals and asset replacements, upgrades and provision on new assets.

4.1 Community Engagement

Key to the development of LoS is close and regular engagement with the community. Council's Community Engagement Strategy 2022-2026 lists the various strategies Council employs to inform the community and seek feedback. These include:

- Digital surveys and suggestion box
- Social media channels
- Staff newsletters
- Advertising
- Deliberative panels
- Rate notice flyers
- TV and radio
- QR codes
- Community meetings
- Newspaper articles
- E-newsletters
- Notice boards
- Community newsletter and mailouts
- Mayoral column
- YouTube posts
- Face to face and one on one discussions.

Council tries to maintain close and regular engagement with the community on LoS. In the case of Sewerage services, engagement on LoS was last conducted in 2015 and it is intended that these be reviewed and refreshed as an improvement initiative of this AMP.

4.2 Levels of Service and Measures

LoS are clear statements of the outcomes expected to ensure the relevant goals and outcomes for the asset portfolio are being met. They should align with Council’s asset management objectives and strategies, and thereby provide a clear line of sight between Council’s goals and its delivery of service outcomes.

4.2.1 Customer Levels of Service

Customer (or Community) LoS are statements or measures that describe the service outcomes as they are perceived by, and in terms relevant to and valued by, the customer receiving the services. They are often expressed in terms of quality, function, safety, capacity, etc. These are backed up by one or more Technical Levels of Service, and a practical means of measurement of achievement. Technical Levels of Service

4.2.2 Technical Levels of Service

Technical LoS state how a particular activity or service area is measured in a practical sense. Each technical performance measure is linked to a customer performance measure, in many cases providing a more detailed version or measure where the future target is a planned improvement from the current.

Table 10 provides some examples of LoS and their outcomes from an asset management perspective.

Table 10 Levels of service definitions

Performance Measure	Definition
Customer Levels of Service	
Quality	The asset is in a reasonable operating condition and meets its intended purpose.
Function	The asset meets operational / user requirements, fulfils its purpose and is compliant to all legislative/regulatory criteria/requirements.
Safety	The asset is safe to operate / use and maintain.
Technical Levels of Service	
Operations	The asset is managed in a manner that ensures that it meets the operational requirements and, delivers its intended purpose at the highest standard as practical.
Maintenance / Renewal / Upgrade	The asset is managed throughout its lifecycle at a standard to ensure the asset reliably meets its design performance requirements.
Cost Effectiveness (Budget)	The asset is managed to meet service levels in a cost-effective effective manner throughout its lifecycle.

Table 11 provides examples of the sewerage LoS that are currently adopted by Council based on the community consultation and engagement undertaken in 2015.

Table 11 Desired sewerage levels of service

Performance Measure	Level of Service Objective	Performance Measure Process	Current Level of Service	Optimal Level of Service
Community Levels of Service				
Quality	Provide a safe and efficient collection and disposal service	No of odour complaints to be compliant with EPA license requirements	Satisfactory	95% reporting satisfied or higher satisfaction level for sewerage service
Function	Ensure the sewerage service meets Department of Health and EPA approval conditions	Approval conditions compliance	Satisfactory	No non-compliance events per year system
Safety	Provide safe suitable drainage systems	Compliance with the EPA license conditions. No of environmental incidents	Satisfactory	Less than 3 per annum
Technical Levels of Service				
Operations	Provide appropriate sewerage services to meet user requirements	Service maintenance request response	Satisfactory	90% of planned and reactive service requests are completed within agreed performance limits
Function/Accessibility	Ensure sewerage services are available to all occupied properties	Number of properties able to connect to sewerage services	Satisfactory	Sewerage services are available to 97% of residential and commercial properties
Renewal	The system is maintained to a high standard to ensure future services is available at a minimal cost	Complete annual works program	Satisfactory	100% of Works program complete
Safety	Effectiveness of Work Health and Safety programs and working methods Statement/Standard Operating Procedures	Time lost resultant from injuries	Satisfactory/Ongoing	No lost time due to injuries per year

Council recognises that community service and value expectations change over time, and that it is now opportune to re-engage with the Gwydir Shire community to review and, if necessary, revise sewerage LoS.



Improvement Action 3:

Review existing and potential performance measures, Level of Service metrics, and targets with stakeholders, and publish and adopt these as the basis for future asset management planning decision making. Update this section of future versions of this AMP accordingly.

4.3 Legislative Requirements

There are many legislative requirements applicable to the management of sewerage assets, examples of which are shown in Table 12.

Table 12 Legislative requirements

Legislation	Requirement
Local Government Act	Sets out role, purpose, responsibilities and powers of local governments including the preparation of a long term financial plan supported by asset management plans for sustainable service delivery.
The Australian Accounting Standards	The Australian Accounting Standards Board Standard, AASB 116 Property Plant & Equipment requires that assets be valued, and reported in the annual accounts, which also includes depreciation value (i.e. how fast are these assets wearing out).
Environmental Planning and Assessment Act 1979	Sets out guidelines for land use planning and promotes sharing of responsibilities between various levels of government in the state.
Protection of the Environment Operations Act 1997	Sets out Council responsibility and powers of local area environment and its planning functions.
Water Management Act 2000	Determining developer charges. Water rights, licences, allocations.
Local Government Regulation 1993 (Savings and Transitional)	Determining developer charges.
Independent Pricing and Regulatory Tribunal Act 1992	Gives powers to the Independent Pricing and Regulatory Tribunal to inquire into and regulate prices. IPART has developed a set of consistent pricing principles to be adopted by local government authorities. Charging guidelines. Trend towards a user pay system in the industry.
Soil Conservation Act 1938	Conserves soil resources and farm water resources and the mitigation of erosion and land degradation. Preservation of watercourse environments.
Local Land Services Act 2013	Promotes the coordination of activities within catchment areas. Council believes this Act has implications for the management of river quality and quantity. Requirement for ongoing management plan.
Public Health Act 2010)	Prevention of the spread of disease. Effluent disposal methods. Supply and delivery of water.
Work Health and Safety Act 2011 (and Regulations)	Council's responsibility to ensure health, safety and welfare of employees and others at places of work. Likely to be cost implications. Impacts all operations. Note public safety – insurance.

There are also often requirements under Australian Standards regarding the design, construction/installation, operation, maintenance, and disposal of assets that are not legislative (referenced in an Act or Regulation) but should be considered as part of “best practice” asset management.

This list is not exhaustive. Additional Standards (such as the ISO 55000 suite), guidelines (such as the International Infrastructure Management Manual or IIMM) should also be considered, and other regulation and legislative requirements may exist (or existing documents may change) which are related to Sewerage. This Section will be reviewed and updated by Council as required.

5. Risk Management

5.1 Risk Assessment Process

Risk Management is defined in ISO 31000:2018 Risk Management – Principles and Guidelines as: “coordinated activities to direct and control with regard to risk”.

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure.

Under Councils’ current risk management process, risks are rated as Very High, High, Medium and Low. Examples of critical risks, being those assessed as ‘Very High’ (requiring immediate corrective action) and ‘High’ (requiring prioritised corrective action identified in the Infrastructure Risk Management Plan together with the estimated residual risk after the selected treatment plan is implemented), are summarised in Table 13. These risks, when apparent, are reported to management and Council.

Table 13 Risk and management for sewerage assets

Service or Asset at Risk	What can Happen	Risk Rating	Risk Treatment Plan
Pump Station	Hydraulic overflow	VH	<ul style="list-style-type: none"> Reduce stormwater infiltration
Pump Station	Power failure resulting in sewerage overflow	H	<ul style="list-style-type: none"> Detention time Backup generator Telemetry alarms
WSTP	Overflow	H	<ul style="list-style-type: none"> Secondary storage Backup pumps Backup power
Mains	Tree root penetration, pipe dislocations – causing sewerage overflows	H	<ul style="list-style-type: none"> Sewer main relining

5.2 Critical Assets

Contemporary best practice in relation to asset risk management is to use a process of asset **criticality assessment** to rate and identify critical assets as the basis for development of priorities and strategies to minimise asset risk.

According to ISO 55000:2014, a critical asset is “an asset that has potential to significantly impact on the achievement of the organisation’s objectives”.

Assets can be safety-critical, environment-critical or performance-critical and can relate to legal, regulatory or statutory requirements.

Council does not currently have a formal asset criticality framework, and recognises that this would improve upon its current, less formal process, help it to conform with leading practice, and more fully meet the requirements of the IP&R. Accordingly, it is proposed that this be pursued as a priority item in the Asset Management Improvement Plan.



Improvement Action 4:

Formulate and implement an asset criticality framework and apply to all assets, as the basis for development and prioritisation strategies for risk mitigation. Update this section of future versions of this AMP accordingly.

5.3 Climate Risk and Resilience

As noted in Section 3.1, climate change poses significant potential risks and challenges in relation to the management of Council's sewerage assets. These range from unreliability of inflow volumes and quality, potentially affecting treatment processes and costs, to the need for increased resilience to the impacts of floods, fire, storms and drought.

As previously noted, climate change impacts and risk assessment will continue to be monitored to determine any required changes to measures and management strategies for this asset class.

6. Asset Lifecycle Management

Reliably and cost-effectively delivering value from assets across their full life cycle is a fundamental principle of asset management. This section outlines the core lifecycle activities employed by Council in managing its assets.

6.1 Lifecycle Management Overview

Lifecycle management brings together and 'joins up' the decision making associated with each stage of an asset's life, including acquisition, maintenance and operation, and eventual refurbishment, renewal or disposal.

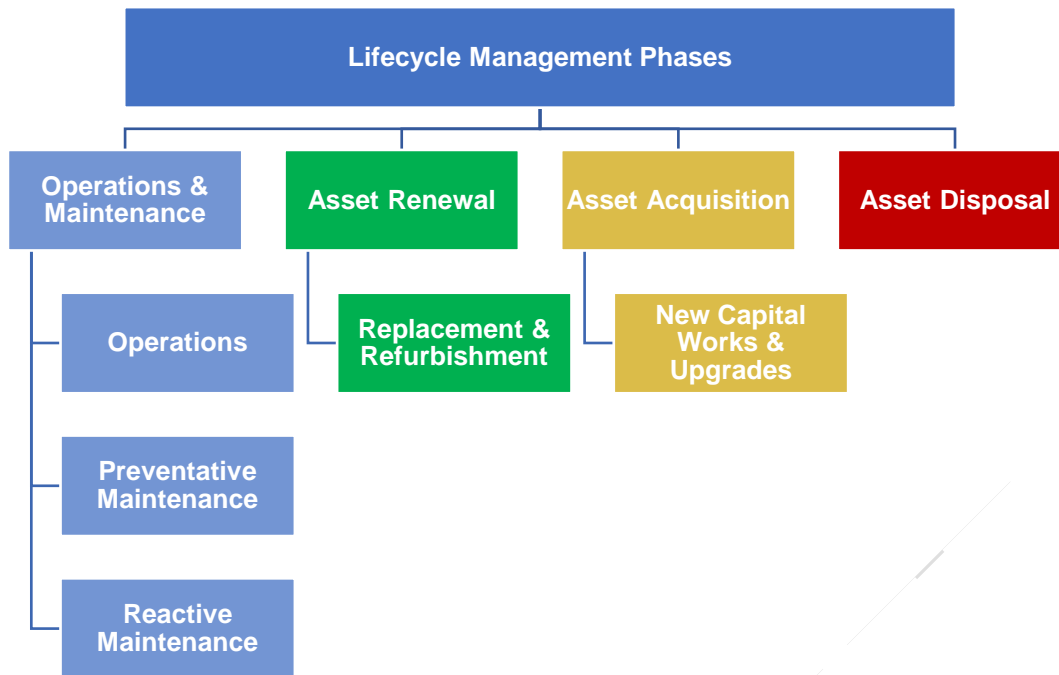


Figure 6 Lifecycle management phases

6.2 Operations and Maintenance

Operations and maintenance strategies determine and guide how the asset will be operated and maintained both on a day-to-day and longer-term basis.

Operations includes regular activities to provide services. Examples of typical operational activities include the various aspects of sewage treatment, and monitoring and managing networks.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. Council's maintenance tasks typically fall under three categories:

- Reactive maintenance: correction of malfunctions and failures on an as-required basis.
- Preventative maintenance: regular and predictable maintenance activities which can be scheduled, such as inspections, application of protective coatings, lubrication, replacement of defective or worn components, etc.
- Mandatory maintenance: activities that are required to ensure legislative compliance such as test and tagging fire equipment or safety equipment testing.

Council's maintenance strategies, including the mix of the above forms of maintenance and the thresholds and frequencies at which interventions are undertaken, are currently risk-based, but reliant on operator experience and generally only informally documented and communicated. The proposed adoption of an asset criticality framework (discussed in Section 5.2) will provide a more transparent and accurate basis for the selection of maintenance and management strategies, and thereby improved management of risk.

Historical costs associated with operations and maintenance are discussed below.

6.2.1 Operations

Council captures and reports operational costs at a detailed level. Historical costs from the past five years have been compiled, adjusted for inflation and used to forecast expenditure for the next 10 years for this AMP. Council's historical operations costs are shown in Table 14.

Table 14 Historical operations expenses

Operations Cost Description	2019	2020	2021	2022	2023	Total
Office Administration Expenditure	\$ 273	\$ 235	\$ 161	\$ 571	\$ 416	\$ 1,656
Treatment	\$ 57,972	\$ 72,641	\$ 58,276	\$ 58,569	\$ 55,513	\$ 302,971
Employee Costs	\$ 48,393	\$ 73,086	\$ 86,254	\$ 88,169	\$ 73,409	\$ 369,312
Office Administration Expenditure	\$ 14,648	\$ 12,880	\$ 9,735	\$ 21,618	\$ 35,986	\$ 94,867
Sundry Expenses	\$ 225,621	\$ 232,581	\$ 240,869	\$ 256,491	\$ 351,238	\$ 1,306,800
Utilities	\$ 39,489	\$ 36,450	\$ 31,676	\$ 28,690	\$ 31,682	\$ 167,988
Plant Hire (Internal)	\$ 5,601	\$ 5,601	\$ 6,711	\$ 6,711	\$ 6,733	\$ 31,357
Overheads / Internal Recharges	\$ 18,243	\$ 19,650	\$ 11,716	\$ 14,312	\$ 44,605	\$ 108,527
Chemicals	\$ 7,620	\$ 11,907	\$ 1,775	\$ 2,737	\$ 4,843	\$ 28,882
Total	\$ 417,861	\$ 465,030	\$ 447,174	\$ 477,869	\$ 604,425	\$ 2,412,359

The calculated average annual operations cost assumed in the lifecycle cost modelling for this AMP is \$482,472 in current (2023) dollars.

6.2.2 Maintenance

Council also captures and reports maintenance costs at a detailed level. Historical costs from the past five years, adjusted for inflation, have been used to forecast expenditure over the next 10 years. Council’s historical maintenance costs are show in Table 15.

Table 15 Historical maintenance expenses

Maintenance Cost Description	2019	2020	2021	2022	2023	Total
Building Maintenance	\$1,427	\$703	\$838	\$806	\$384	\$ 4,159
General Maintenance				\$1,476		\$ 1,476
Pump Station Maintenance	\$28,455	\$52,508	\$23,016	\$26,109	\$60,686	\$ 190,774
Sewer Mains Maintenance	\$36,031	\$32,980	\$74,012	\$33,388	\$31,607	\$ 208,018
Total	\$ 65,914	\$ 86,191	\$ 97,866	\$ 61,779	\$ 92,677	\$ 404,428

The average annual maintenance cost used for lifecycle cost modelling is \$80,886 in 2023 dollars.

6.3 Renewals and Replacement

Renewal, Replacement and Refurbishment are capital investment works aimed at restoring the service potential of an existing asset to its original level of performance (but not to a higher level⁵). The terms are often used interchangeably or collectively referred to as Renewals, which is the term used in this AMP.

⁵ Increasing the service potential to a higher level of performance or capacity is regarded as new capital or acquisition.

Replacement strategies are designed to provide for the progressive replacement of individual assets that have reached the end of their useful lives. This is managed at a rate that maintains the standard and value of the portfolio as a whole.

Refurbishment strategies allow existing assets to be restored to original service potential through reconditioning or rehabilitation of component parts.

Council’s renewal planning approach is to endeavour to refurbish where possible, rather than replace, subject to asset condition and the best value-for-money solution. For planning purposes, however, like-for-like replacement costs are generally assumed.

Developing forecast models for renewals based on expected deterioration and asset lives is a practical way of identifying future expenditure requirements. In their simplest form, and in the approach used by Council, life cycle renewal models use rules such as ‘replace at end of standard useful life’ to identify the timing and quantum of renewal expenditures.

Required levels of expenditure on the renewal plan will vary from year to year and will reflect:

- Age profile of assets
- Condition and performance profiles
- Ongoing maintenance demands, and
- Varying useful lives of individual assets across the portfolio.

Failure to maintain an adequate renewal program will be reflected in a decline in the overall standard of the asset portfolio. Where the actual program falls below budget targets, the shortfall will be reflected in the depreciation of the overall asset portfolio value, resulting in a lower level of service and an increased need for reactive maintenance.

Council’s historical renewal capital expenditure over the past 5 years is shown in Table 16.

Table 16 Historical renewals expenditure

Expenditure	2019	2020	2021	2022	2023	Total
Renewal Capital	\$ 24,848	\$ 58,534	\$ 84,085	\$ 85,405	\$ 51,242	\$ 60,823

6.4 Acquisitions

Acquisitions are new assets that did not previously exist, or works which will upgrade, augment or improve an existing asset beyond its existing capacity. They may result from growth, demand, social or environmental needs. Assets may also be donated or contributed to Council by developers.

Upgrades to assets should be considered when there is an inability to meet capacity or other LoS requirements, to address new safety risks, or to meet regulatory or statutory requirements. They may also be considered if there is a compelling business case benefit to implementing new technology, or when sourcing of components becomes impractical due to obsolescence. Opportunities for upgrades and new works are generally identified through development plans, corporate planning processes and monitoring of the latest regulations.

Council’s evaluation and approval of acquisitions generally includes consideration of the associated future life cycle costs (operations, maintenance, depreciation and replacement) to ensure long-term sustainability of funding.

Council’s historical capital acquisition expenditure over the past 5 years is shown in Table 17.

Table 17 Historical new capital expenditure / acquisitions

Expenditure	2019	2020	2021	2022	2023	Total
Acquisitions	\$ 2,061	\$ 6,881	\$ 353,307	\$ 325,553	\$ -	\$ 137,560

6.5 Disposals

Disposal is the retirement or sale of assets that have become surplus to requirements or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Underutilisation
- Obsolescence
- Undeveloped
- Provision exceeds required level of service
- Assets replaced before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means
- Potential risk of ownership (financial, environmental, legal, social, vandalism).

Costs associated with the loss of value on sale, decommissioning, demolition, removal and disposal of assets can be significant and are considered in the life cycle costing of the portfolio. Historically, Council's annual disposal costs have been relatively minor, albeit with an increase in 2023, as shown in Table 18.

Table 18 Historical asset disposals

Expenditure	2019	2020	2021	2022	2023	Total
Disposals	\$-	\$-	\$-	\$-	\$82,291	\$82,291

The five-year average of disposal costs of \$16,458 has been assumed in the forward forecasts.

7. Financial Plan

This section summarises the whole-of-life asset expenditure forecasts for management of this asset class in accordance with established asset management strategies, the desired levels of service, and planned budgets. Projections have been developed using a life cycle cost model (LCCM).

Unless otherwise stated, all values are in current (2023) dollars.

7.1 Operations Expenditure

The forecast operations expenditure shown in Figure 7 is reflective of an assumed continuation of the expenditure levels of the past 5 years. This represents an annual expenditure of \$482,472 in real terms. This is considered reasonable given the expected minimal growth of the physical asset portfolio over the forecast period.

The forecast operations expenditure is expected to be in line with available budget across the 10-year planning period.

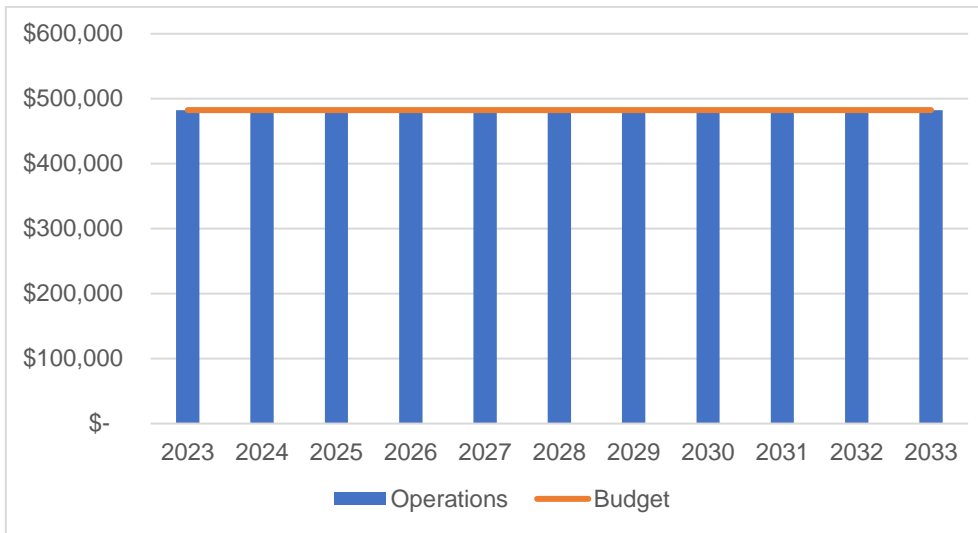


Figure 7 Forecast operations expenditure

7.2 Maintenance Expenditure

The forecast maintenance expenditure shown Figure 8 is reflective of an assumed continuation of the maintenance expenditure levels of the past 5 years. This represents an annual expenditure of \$80,886 in real terms. This is considered reasonable given the expected minimal growth of the physical asset portfolio over the forecast period, and the expected continuation of existing maintenance strategies and practices. It is expected that as Council’s asset data quality and asset management practices improve over time, and with the adoption of an asset criticality approach, savings in unplanned maintenance, in particular, should reduce. Such efficiency dividends have not been incorporated into the projections, however.

As with operations expenses, maintenance expenditure is expected to be within or in line with budgeted funds.

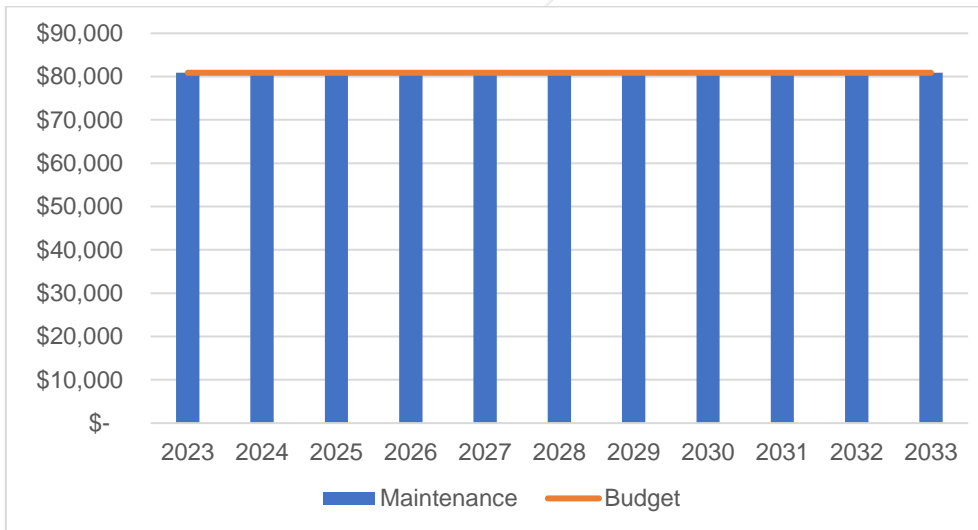


Figure 8 Forecast

maintenance expenditure

Figure 8 Forecast maintenance expenditure

7.3 Renewal Capital Expenditure

The capital renewal expenditure forecasts include asset renewals, replacement, and capital refurbishment. They do not include upgrades or enhancements of existing assets, or new assets, which are covered in the next section.

Capital renewals expenditure is projected to vary year by year as shown in Figure 9, but the sum of the ten-year expenditure is expected to be within the total budgeted funds for the period.

The peak expenditures broadly reflect the renewal of the highly degraded and life expired assets listed in Section 2.2.2. These projected peaks will be the subject of more detailed investigation in the lead-up to those years with a view to smoothing the overall expenditure profile.

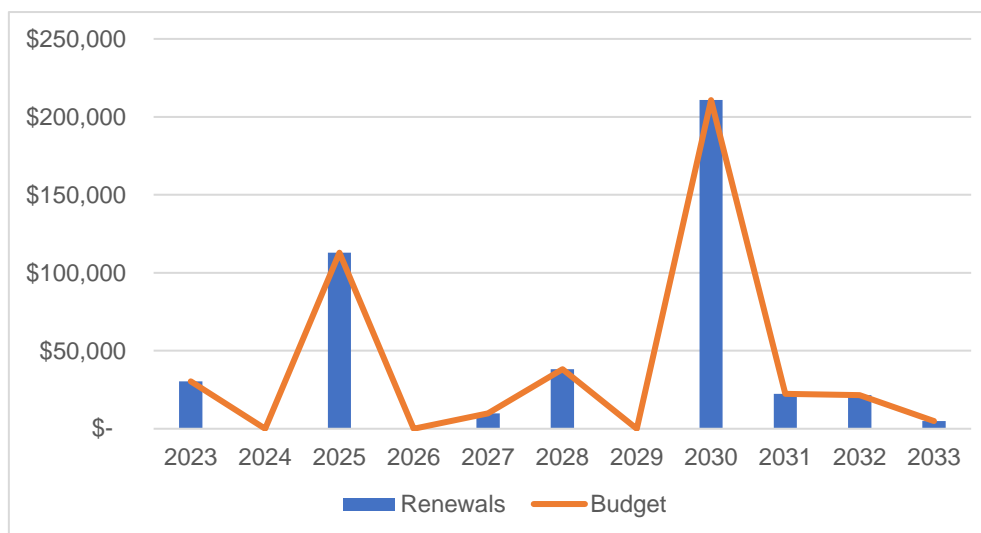


Figure 9 Forecast renewals expenditure

7.4 New Capital / Acquisitions

Capital expenditure to be funded by Council to accommodate growth, augmentation of capacity, or new assets is assumed to be negligible for sewerage assets over the forecast period. There are presently no specific assets identified for acquisition within the life of the plan, however provision has been made for an annual equivalent to the average of the past five years.

7.5 Disposal Costs

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. There are presently no specific assets identified for disposal within the life of the plan, however provision has been made for an annual equivalent to the average of the past five years.

7.6 Combined Asset Lifecycle Cost Summary

The combined asset lifecycle forecast summary is presented in Table 19 below, and graphically in Figure 10 overpage.

The total projected expenditure across the ten years is \$7.50 million with an annual average of \$0.682 million. The expenditure profile is relatively even across this period with the exception of notable peaks in 2025 and 2030, as discussed in Section 7.3.

Table 19 Life cycle expenditure forecast

Year	Operations Expenditure	Maintenance Expenditure	Renewal Capital	New Capital / Acquisition	Disposal Costs	Total
2023	\$ 482,472	\$ 80,886	\$ 30,356	\$ 60,823	\$ 16,458	\$ 670,995
2024	\$ 482,472	\$ 80,886	\$ -	\$ 60,823	\$ 16,458	\$ 640,639
2025	\$ 482,472	\$ 80,886	\$ 112,927	\$ 60,823	\$ 16,458	\$ 753,566
2026	\$ 482,472	\$ 80,886	\$ -	\$ 60,823	\$ 16,458	\$ 640,639
2027	\$ 482,472	\$ 80,886	\$ 9,831	\$ 60,823	\$ 16,458	\$ 650,470
2028	\$ 482,472	\$ 80,886	\$ 38,170	\$ 60,823	\$ 16,458	\$ 678,809
2029	\$ 482,472	\$ 80,886	\$ -	\$ 60,823	\$ 16,458	\$ 640,639
2030	\$ 482,472	\$ 80,886	\$ 210,757	\$ 60,823	\$ 16,458	\$ 851,396
2031	\$ 482,472	\$ 80,886	\$ 22,407	\$ 60,823	\$ 16,458	\$ 663,045
2032	\$ 482,472	\$ 80,886	\$ 21,647	\$ 60,823	\$ 16,458	\$ 662,286
2033	\$ 482,472	\$ 80,886	\$ 4,861	\$ 60,823	\$ 16,458	\$ 645,500

In summary, this sewerage AMP is anticipated to be fully funded, with total funding across the ten-year period expected to meet combined expenditure requirements.

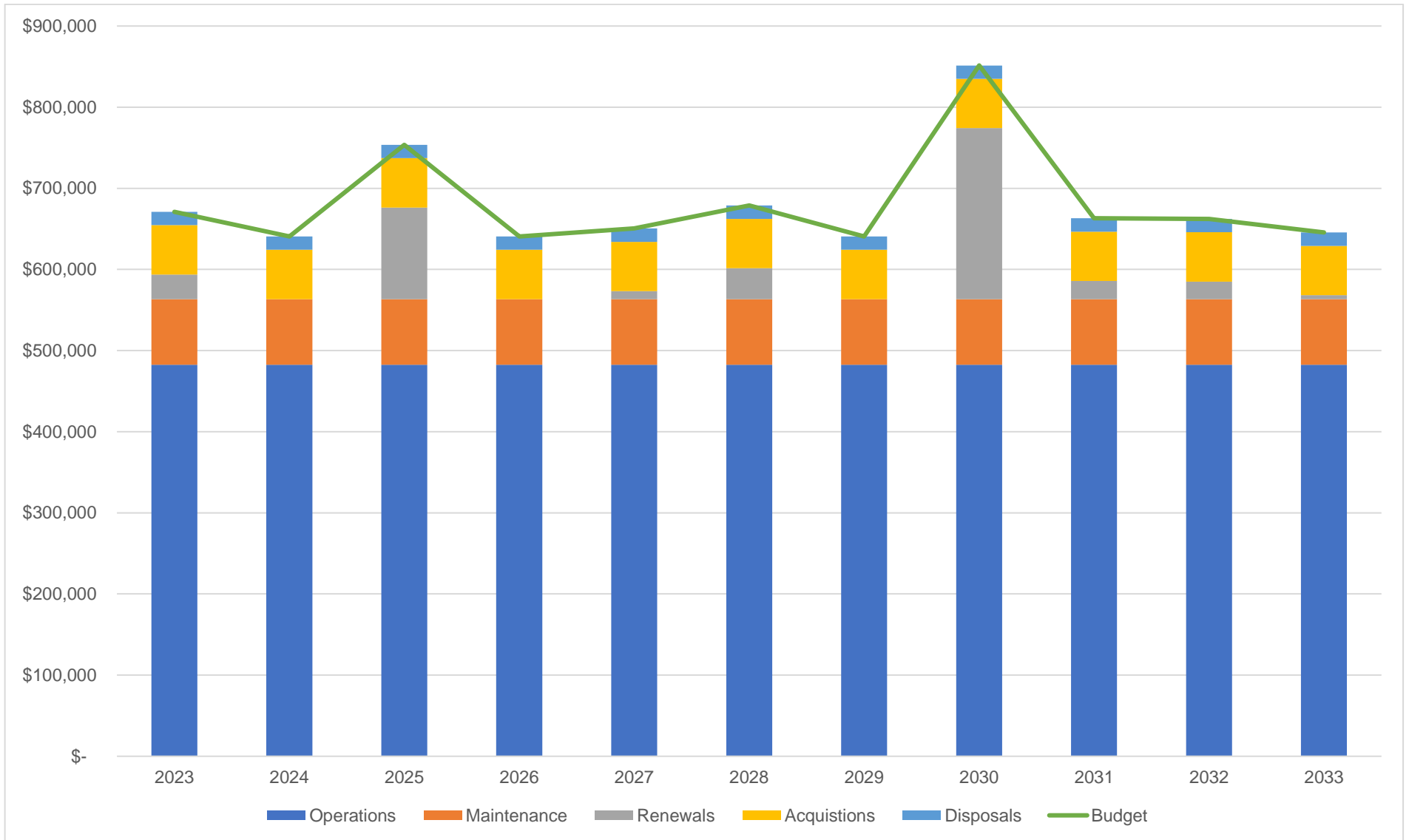


Figure 10 10-year life cycle expenditure forecast

8. Plan Improvements and Monitoring

8.1 Responsibility for Plan Reviews

This plan reflects the desire of Council to effectively manage their assets and ensure alignment with their strategic documents and ISO 55000 best practice standards.

The Asset and Services Team will provide the overarching management of the Asset Management planning process. The AMP will be reviewed and updated regularly to ensure it remains current and reflects the required levels of service and forecasted financials across operations, maintenance, renewals and capital expenditures.

8.2 Asset Management Plan Updates

The AMP includes three elements that need to be reviewed and updated on the following recurrent cycle by the relevant asset custodian, shown below.

Table 20 AMP update schedule

Element	Update Plan	Minimum Recurrent Cycle
Asset Management Plan	Up-to-date data from condition assessments and valuations will be recorded in the asset register.	Annual
	Update the asset summary sections based on condition and asset data.	Annual
	Review the document and update as changes occur with governance structures, new asset management systems, procedures or practices are implemented.	Four Yearly (coinciding with change of Council)
Lifecycle Cost Model	Update when condition data changes, new assets have been created or existing disposed. Update rates used to calculate refurbishment and replacement costs and update upgrades and new works lists.	Annual
Support Documents	Review and update sections on levels of service, risk, criticality, and improvement plan.	Annual

8.3 Asset Management Plan Improvements

In developing this AMP document areas of improvements were identified and actions developed. The list of improvement actions for this asset class is summarised below. Due dates are given to provide an indicative priority only. Reference should also be made to Council's Asset Management Strategy where a consolidated list of initiatives is provided in the Asset Management Improvement Plan, across all asset classes.

Table 21 AMP improvement actions

Item	AMP Section	Improvement Initiative	Responsibility	Due Date
1	5.2	Formulate and implement an asset criticality framework and apply to all assets, as the basis for development and prioritisation strategies for risk mitigation.	Engineering Services Director	31/03/25
2	2.2	Update future versions of the AMP to include details of condition assessment frequencies, methodologies, and reporting.	Asset Custodian	30/06/25
3	3.1.2, 5.3	Undertake a climate change impact review and risk assess outcomes to determine what mitigation measures or other management strategies are appropriate for the asset class. Further guidance on risk management due to climate change can be found in the Climate Risk Ready NSW Guide.	Asset Custodian	31/12/24
4	4.2	Review potential performance measures and Level of Service metrics with stakeholders to identify measures of customer and technical objectives. A process should be initiated to develop measures that are SMART (Specific, Measurable, Attainable, Relevant and Time-based) for each Level of Service	TBA	30/06/25
5	7	Progressively improve financial processes to allow budgeting at the level of operations, maintenance, renewal capital, and new capital, for each AMP asset class.	Assets and Data Finance Officer, CFO	30/06/25

Appendix A

References

References

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Gwydir Shire Council, Operational Plan 2022/2023.

Gwydir Shire Council, Asset Management Strategy 2023.

ISO 31000:2018 Risk Management – Guidelines

Appendix B

Glossary

Term	Description
Asset	An item, thing or entity that has potential or actual value to an organisation (such as plant, machinery, buildings, etc).
Asset Management (AM)	The coordinated management of activities of an organisation to deliver on its objectives.
Asset Management Framework (AMF)	The overarching AM hierarchy including the AM Policy, Objectives, Strategy and Asset Management Plans.
Asset Management Objectives	Results to be achieved with respect to asset management.
Asset Management Plan (AMP)	<p>Long-term plans (usually 10-20 years or more for infrastructure assets) that outline the asset activities and programmes for each service area and resources applied to provide a defined level of service in the most cost effective way.</p> <p>OR</p> <p>Documented information that specifies the activities, resources and timescales required for an individual asset or a grouping of assets, to achieve the organisation's asset management objectives.</p>
Asset Management Policy	A high level statement or an organisation's principles and approach to asset management.
Asset Management Strategy	<p>A high level action plan that gives effect to an organisation's Asset Management Policy. Documents and specifies how the organisational objectives are to be converted into AM objectives, the approach for developing AM Plans and the role of the AM system in supporting the achievement of AM Objectives.</p> <p>OR</p> <p>ISO55000 definition: Documented information that specifies how the organisational objectives are to be converted into asset management objectives, the approach for developing Asset Management Plans. And the role of the AM system in supporting achievement of the AM objectives.</p>
Asset Management System	A set of interrelated or interacting elements of an organisation, including the AM Policy, AM Objectives, AM Strategy, AM Plans, and the processes to achieve these objectives.
Capital Expenditure (CAPEX)/Capital Investment	Expenditure used to create new assets, renew assets, expand or upgrade assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of asset stock.
Condition	The physical state of the asset.
Condition Assessment (Condition Monitoring)	The 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 preventive or remedial action.
Condition Grade	A measure of the physical integrity of an asset or component.
Customer	Any person who uses the asset or service, or is affected by it or has an interest in it either now or in the future. This definition does not necessarily require that payment is made for use of the assets.
Decommission	Actions required to take an asset out of service.
Demand Management	Actions taken to influence demand for services and assets, often undertaken as part of sustainability initiatives and/or to avoid or defer required asset investment.
Disposal	Actions necessary to decommission and dispose of assets that are no longer required.

Facility	A complex comprising many assets which represents a single management unit for financial, operational, maintenance or other purposes.
Infrastructure	Stationary systems forming a network or a portfolio of assets serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components. The network may include normally recognised ordinary assets as components.
ISO 55000: International Standard for Asset Management	<p>The globally recognized standard for asset management. Consists of three separate documents:</p> <ol style="list-style-type: none"> 1. ISO 55000 – the concepts and definitions which underpin the standards, 2. ISO 55001– the requirements that make up the standard for effective and efficient AMS, and 3. ISO 50002 – guidance on implementing, maintaining and controlling the AMS. <p>The standard was released in early 2014 and replaced the long-standing British Standard commonly known as PAS 55.1</p>
Leadership	A process of guiding and maximising the efforts of a team towards the achievement of a shared vision.
Level of Risk	The level of risk is its magnitude. It is estimated by considering and coming consequences and likelihoods. A level of risk can be assigned to a single risk or to a combination of risks. A consequence is the outcome of an event and has an effect of objectives. Likelihood is the chance that something might happen.
Level of Service	The parameters or combination of parameters that reflect social, political, economic and environmental outcomes that the organisation delivers. Levels of service statement describe the outputs or objectives an organisation or activity intends to deliver to customers.
Life	A measure of the anticipated life of an asset or component, such as time, number of cycles, distance intervals, etc.
Lifecycle	The time interval that commences with the identification of the need for an asset and terminates with the decommission of the asset or any liabilities thereafter.
Lifecycle Cost	Encompasses all AM strategies and practices associated with an asset or group of assets that results in the lowest lifecycle cost.
Long Term Financial Plan (LTFP)	Provides a framework for delivering cost effective services, maximising value and financial sustainability.
Maintenance	Details the specific planned and unplanned maintenance actions for an asset or facility.
Maintenance Plan	Details the specific planned and unplanned maintenance actions for an asset or facility.
Operation	The active process of utilising an asset which will consume resources such as manpower, energy, chemicals and materials.
Performance Measure	Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.
Planned Maintenance	<p>Planned maintenance activities fall into three categories:</p> <ul style="list-style-type: none"> • Periodic – necessary to ensure the reliability or to sustain the design life of an assets.

	<ul style="list-style-type: none"> • Predicative – condition monitoring activities used to predict failure. • Preventive – maintenance that can be initiated without routine or continuous checking (e.g. Using information contained in maintenance manuals or manufacturer’s recommendations) and is <u>not</u> condition-based.
Refurbishment	Major (capital) works to restore the capacity or performance capability of a life-expired asset to its as-new level.
Renewal	Works to replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability, or the refurbishment of such assets to achieve similar performance and service outcomes. (see also Refurbishment, Replacement)
Remaining Useful Life	The time remaining until an asset ceases to provide the required service level or economic usefulness.
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.
Risk	The effect of uncertainty on objectives. Risk events are events which may compromise the delivery of the organisation’s strategic objectives.
Stakeholder	A person or entity that can affect, be affected by, or perceived themselves to be affected by a decision or activity.
Strategic Plan	A plan containing the long-term goals and strategies of an organisation. Strategic plans have a strong external focus, cover major portions of the organisation and identify major targets, actions and resource allocations relating to the long-term survival, value and growth of the organisation.
Sustainability	Sustainability is the capacity to endure. In the context of AM it is about meeting the needs of the future by balancing social, economic, cultural and environmental outcomes or needs when making decisions today.
Unplanned Maintenance	Corrective work required in the short-term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.
Useful Life	The period over which an asset or component is expected to be available for use by an entity.
Valuation	The process of determining the worth of an asset or liability. 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.
Whole life cycle	Refer Lifecycle.