



Gilgandra Shire Council

Sewerage Network Asset Management Plan

Version 3.0 December 2016

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Issue	Revision	Date	Author	Reviewed by	Approved by
	0.1	June 2016	Jacqui Hansen	Mike Brearley and Mike Cuthbert	
Draft	1.0	June 2016	Jacqui Hansen		Mike Brearley
A	2.0	August 2016	Jacqui Hansen	Mike Brearley	Jacqui Hansen
	3.0	December 2016	Jacqui Hansen	Mike Brearley	Jacqui Hansen

Sewerage Asset Management Plan

1. Executive Summary

Council provides an environmentally responsible and cost effective sewerage service to the town of Gilgandra. Gilgandra's sewerage network meets the Levels of Service to which the community has agreed and for which they are willing to pay, and satisfies all the applicable statutory requirements.

The Sewerage network had a fair value of **\$23 million** as of 30 June 2016.

This plan assists Council in the decision making process for its sewerage system. It is presented at a high level to provide key information that can be used in the negotiation of the level of service and funding required to deliver that level of service. The following tables identify the asset categories in this plan and the ten (10) year average costs for the various expenditure types. Figure 1.1 on the following page also indicates the proposed expenditure over the next ten years. Figure 1.2, also on the following page, outlines the proposed operating and capital expenditures over the coming ten years.

Table 1.1: Sewerage Asset Portfolio Overview (in 2016)

Component	Asset Type	Details	Current Replacement Cost
Sewer mains	Reticulation Gravity	31.5 km	\$10,866,385
	Rising Mains	5.1 km	\$913,373
Sewage Pumping Stations	Submersible	16 stations	\$6,160,859
Sewage Treatment Works	Disinfection UV	3000 EP	\$205,014
	Trickling filter process	3000 EP	\$3,036,268
	Preliminary	3000 EP	\$111,590
	Site works	3000 EP	\$425,597
	Sludge Lagoons	3000 EP	\$301,032
Recycled Water Mains	Trunk – Effluent Reuse	2.5 km	\$456,738
Recycled Water Pumping Station	Located at the STW	1 station	\$228,369
Recycled Water Reservoirs	HDPE lined pond at STW, used as buffer storage	4 ML	\$55,934
TOTAL			\$22,761,158

Figure 1.1 identifies the proposed expenditure over the next 10 years. The projected budget amounts are based on 2015 dollars.

Table 1.2: What will we spend per year over the next 10 years (2016 \$)?

Expenditure Type	Planned Expenditure
Operations and Maintenance Budget	\$540,000 steady per year
Renewal Budget	\$333,200 per year
Upgrade and New Budget	\$216,205 per year in years 1-9 \$2,730,000 in year 10 for new oxidation pond at the sewer treatment plant

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What will we spend over the next 10 years (2016 \$M)?

The expenditure required to provide the target level of service in the AM Plan, compared with planned expenditure currently included in the Long Term Financial Plan, is shown in the following graphs.

Figure 1.1: What will we spend over the next 10 years (2016 \$M)?

Gilgandra SC - Projected and Budget Expenditure for (Sewer_S2_V3)

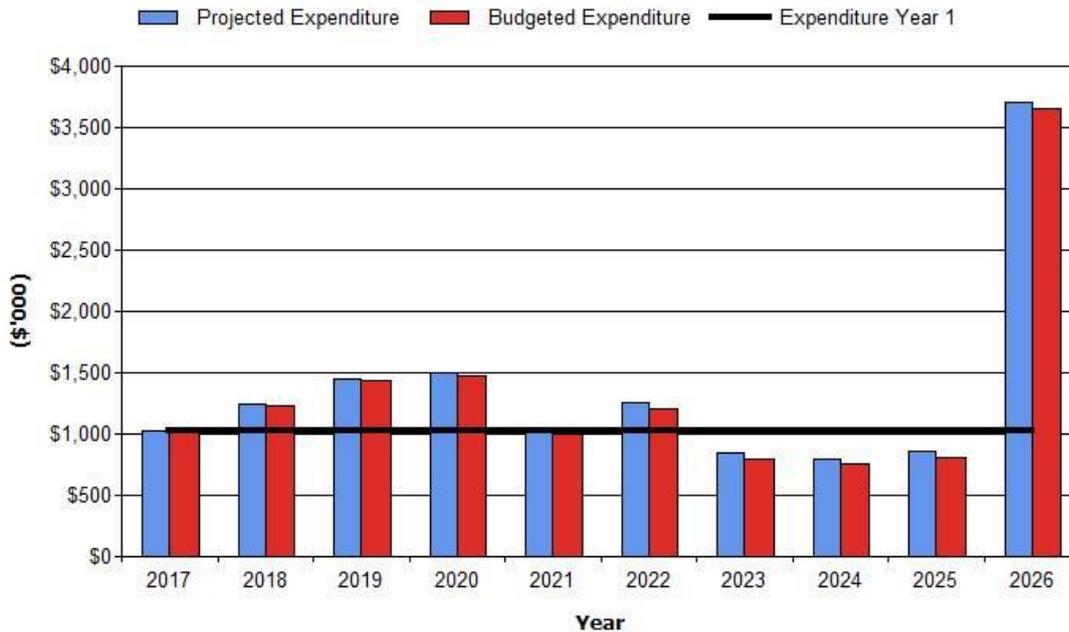
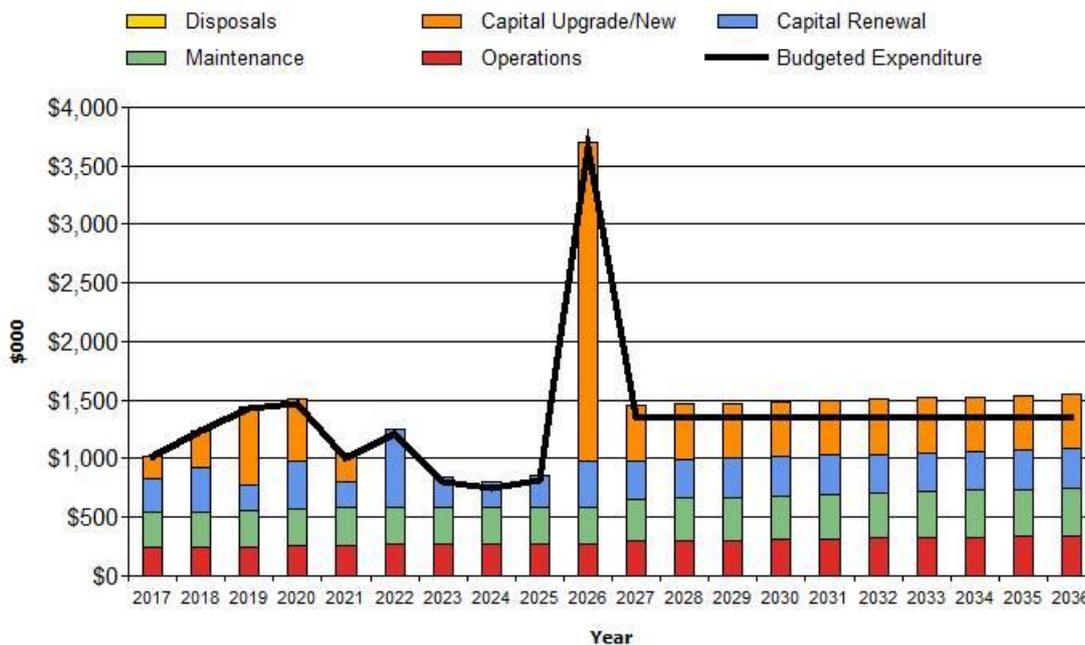


Figure 1.2: Projected capital and operating expenditure

Gilgandra SC - Projected Operating and Capital Expenditure (Sewer_S2_V3)

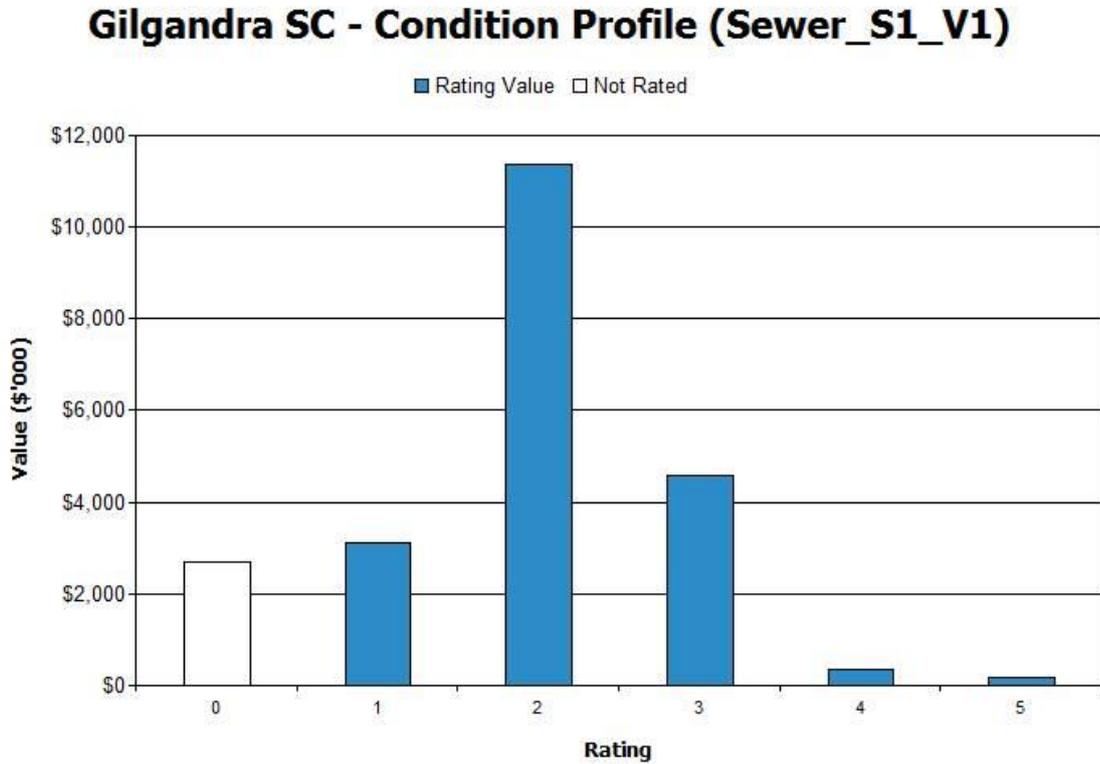


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The current condition of our assets is shown in the following graph based on the value of each asset in each of 5 conditions ranging from 1 to 5, with 1 being near new and 5 as a completely failed asset. A condition grading of zero (0) indicates that the condition of the asset is based on typical useful life as it could not be individually determined during most recent valuation (January 2016).

What condition are our assets currently (\$M)?

Figure 1.3: Condition profile

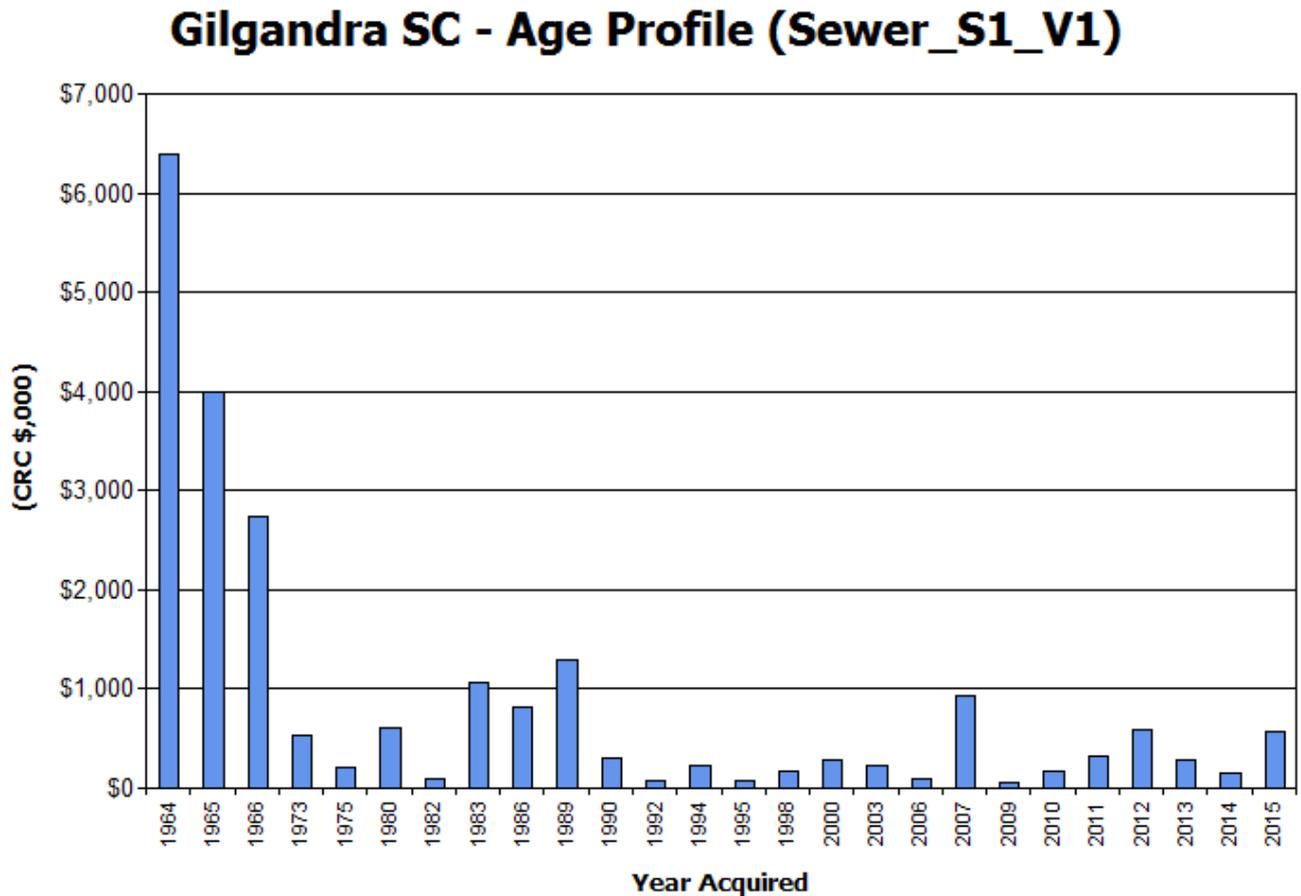


The process of managing our sewerage assets is one of continuously improving the knowledge Council has. This includes maintaining up to date asset registers, condition ratings, the value of work completed on the asset and the rate at which assets deteriorate and reach their intervention level. Section 13 contains details of the plan to further improve the details contained in the next Plan.

What is the age of our assets?

Gilgandra was first provided with centralised sewerage in the 1960s. Mains laying commenced in 1964. The sewerage treatment works was completed in 1965, and the earliest sewage pumping stations (SPS 1 to 5) installed in 1966. Water recycling was introduced at the sewerage treatment works in 2007 hence the spike in current replacement costs in that year.

Figure 1.4: What is the age of our assets?



Acknowledgements

This plan has been prepared by Jacqui Hansen and Mike Brearley, of Brearley & Hansen; consultants engaged by Gilgandra Shire Council to assist them in this process.

The development of this plan has extensively relied on knowledge and input of the staff of Gilgandra Shire Council, particularly Rolly Lawford and Brad Perera.

Acknowledgements also to Zlatco Tonkovic of Yabbie Pond Pty Ltd for the comprehensive "Gilgandra STP Upgrade Options Investigation Report". August 2016, used to inform this plan.

Disclaimer

This document is an Asset Management Plan for sewer network assets, prepared to a format developed by Oranasoft, using the NAMS Plus online asset management tools for scenario modelling. It has been prepared for this purpose, using information made available by the client in accordance with the client's instructions. Users of this document should note the assumptions and approximations used. Any use of the document outside of the stated purpose is at the user's risk.

2. Strategic Objectives

Council operates and maintains the sewerage network assets to achieve the following strategic objectives:

1. Provide infrastructure to a standard that supports the outcomes identified in Council's Community Strategic Plan.
2. Ensure that the system is maintained at a safe and functional standard as set out in this asset management plan.
3. Ensure that services are managed to meet the objectives of Council's Asset Management Policy and Asset Management Strategy.

Gilgandra Shire Council has developed a comprehensive community engagement strategy to ensure a broad range of opinions; ideas and visions were captured to help shape the Gilgandra Community Strategic Plan.

To assist in the delivery of the objectives in this plan, a number of key documents & systems have been prepared and should be referred to in considering the findings presented:

Table 2.1: Where can I find additional information?

Document / System	Content
Community Strategic Plan	Outcomes and Strategies identified by the community
Council Asset Policy	How we manage assets
Asset Management Strategy	Overall direction of asset management and portfolio summary
GIS	Geographical information system that produces maps of assets
Water and Sewerage Strategic Business Plan	It gives details and supporting information for Council's Community Strategic Plan, Delivery Program and Operational Plan and Budget. To be developed following completion of this Water Asset Management Plan.

The Gilgandra Shire Council CSP Outcomes supported by the Sewer Network Asset Management Plan include:

- ✓ 4.1.1 Develop and implement asset management policies, strategies and plans
- ✓ 4.1.2 Develop and implement forward works infrastructure programs and plans

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3. Services Provided & Classification

Criticality ratings and condition ratings have reviewed and updated to reflect optimum asset management practices. This allowed Council to have a more realistic grading of its assets.

Table 3.1: Criticality ratings for assets

Criticality Grade	Sewer
AA	Rising mains 150mm and 200mm
A	Rising mains 100mm
A	Gravity mains 225mm and 300mm
B	Rising mains 50mm and 80mm
B	Gravity mains 100mm and 150mm
C	Water mains – effluent recycling

The criticality rating identifies different intervention levels for different assets depending on their assessed criticality and consequence rating. The sewerage network had a fair value of **\$23 million** as of 30 June 2016, and details of the major sewerage infrastructure components are contained in Table 3.1 together with their replacement cost.

Table 3.2: What is provided?

Classification	Asset	Dimension	Current Replacement Cost (\$)
AA	Rising mains 150mm and 200mm	1.7km	\$400,457
A	Rising mains 100mm	1.6km	\$257,560
A	Gravity mains 225mm and 300mm	3.0km	\$1,653,216
B	Rising mains 50mm and 80mm	1.9km	\$255,357
B	Gravity mains 100mm and 150mm	28.5km	\$9,213,169
C	Water mains for effluent recycling	2.5km	\$456,738
AA	Treatment Works	1	\$4,079,499
AA	Pump Stations	16	\$6,160,859
AA	Water Pump Station located at the sewer treatment works	1	\$228,369
AA	Water Reservoir -HDPE line pond at the sewer treatment works	4ML	\$55,934
Total			\$22,761,157

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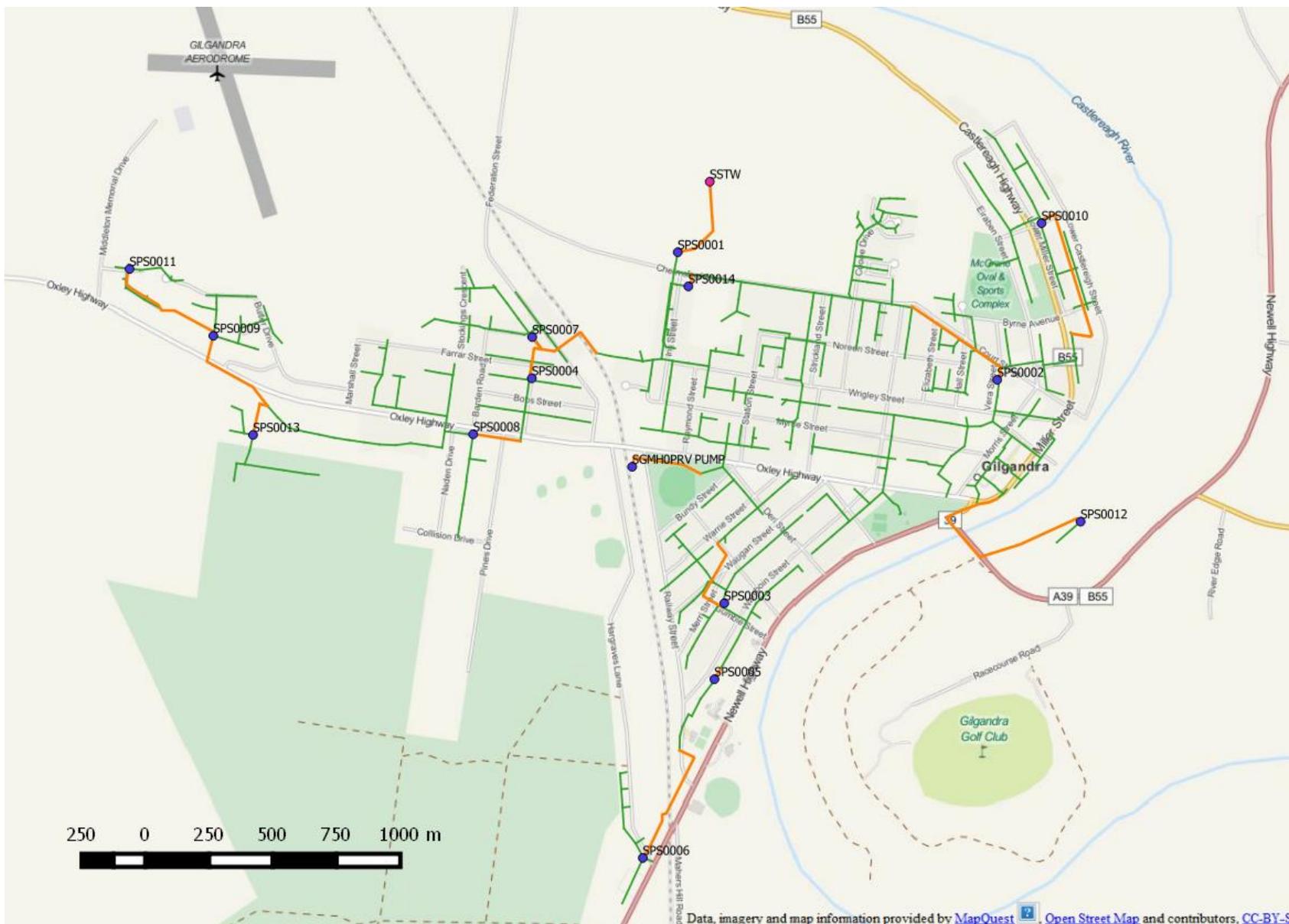


Figure 3.1 What are the key elements of our sewerage service?

- Green lines – reticulation mains
- Orange lines – rising mains
- Blue dots – sewage pumping stations
- SSTW – sewage treatment works

Data, imagery and map information provided by [MapQuest](#), [Open Street Map](#) and contributors, [CC-BY-S](#)

4. Level of Service

Council is responsible for providing cost effective sewerage services to the town of Gilgandra, that meet the Level of Service to which the community has agreed and for which they are willing to pay, and which satisfy all statutory requirements.

Level of service indicators have been developed for the services provided by the sewerage network based on the objectives set in the Community Strategic Plan. These objectives have been used to define Community Levels of Service (CLOS) which relates to how the community receives the service in terms of safety, quality, quantity, reliability responsiveness, cost efficiency and legislative compliance.

From these CLOS, Technical LOS (TLOS) have been developed that detail how these services will be delivered in terms of quantity, frequency and standard.

Finally, Key Performance Measures and how they will be measured provide the detail on how we determine whether we are delivering what they community are asking for.

Table 4.1 summarises at a high level what the community desires for each asset and how Council will deliver it. The CSP Ref column identifies the Community Strategic Plan objective that is being supported by the asset group and the LOS defined.

Table 4.1: What does the Community want?

CSP Ref	Category	The Community Wants (Community LOS)	How we Deliver this (Technical LOS)	How Measured
4.1	A community with well constructed, maintained and managed public infrastructure including water supply and sewerage	Reliable sewerage service	Incidence and duration of unplanned interruptions	Frequency of sewerage main breaks and chokes
				Frequency of property connection sewer breaks and chokes
				Average sewerage interruption duration
		Frequency of sewerage complaints		
		Safe treatment of sewage	Source management, including liquid trade waste management Operation of equipment in accordance with manuals and procedures Testing of sewage	Percentage of sewage volume treated that was compliant

Note: The CSP reference number relates to the Community Strategic Plan outcome that are supported by the Community LOS identified.

5. Condition of Our Assets

Prior to commencement of this Sewerage Network Asset Management Plan, Gilgandra Shire Council's portfolio of water and sewer assets were valued in accordance with "Fair Valuation" principles. The valuation relied upon a current condition assessment of the assets.

In December 2015, a field survey, involving a physical inspection of the ground-level facility assets in Council's sewer network was conducted. Items such as the treatment plant and sewage pumping stations were inspected.

The object of the survey was to uncover any evidence that would challenge the default useful life for that asset class such as corrosion (or lack of), obvious mechanical/electrical defects or structural damage. Field survey sheets were completed and a photographic record also was made.

Field surveyors used this information to determine a grading of condition according to the criteria in **Error! Reference source not found.1**.

Table 5.1: Description of condition gradings (NZWWA, 2008, p29)

Grade	Condition	Description ¹
1	Very Good	Some wear or discolouration but no evidence of damage. Can include repaired assets where the repair is as good as the original. New or near new condition
2	Good	Deterioration or minor damage that may affect performance. Includes most repaired assets.
3	Moderate	Includes repaired where the repair is deteriorated. Clearly needs some attention but is still working. Structure in need of repair.
4	Poor	Either not working or is working poorly because of damage or deterioration. Condition or structure is poor or structural integrity in question.
5	Very Poor	Replace or repair. Needs urgent attention.

A grading of zero (0) was allocated if the condition could not be determined and valuation proceeded based on typical useful life.

For pressure pipelines, useful lives were reviewed in terms of pipe media and breakage history. The breakage history of the various material/age/sizes of pipe in the network was used to challenge the default useful lives provided in the Local Government Asset Accounting Manual, and considering the experience of other comparable utilities.

Table 5.2 below, provides a suggested series of responses based on the condition gradings applied. For longer life assets (say, having a typical life of 50 years or greater), a timeframe for repair or renewal is suggested.

Table 5.2 Suggested action timescales for condition gradings (NZWWA, 2008, p30)

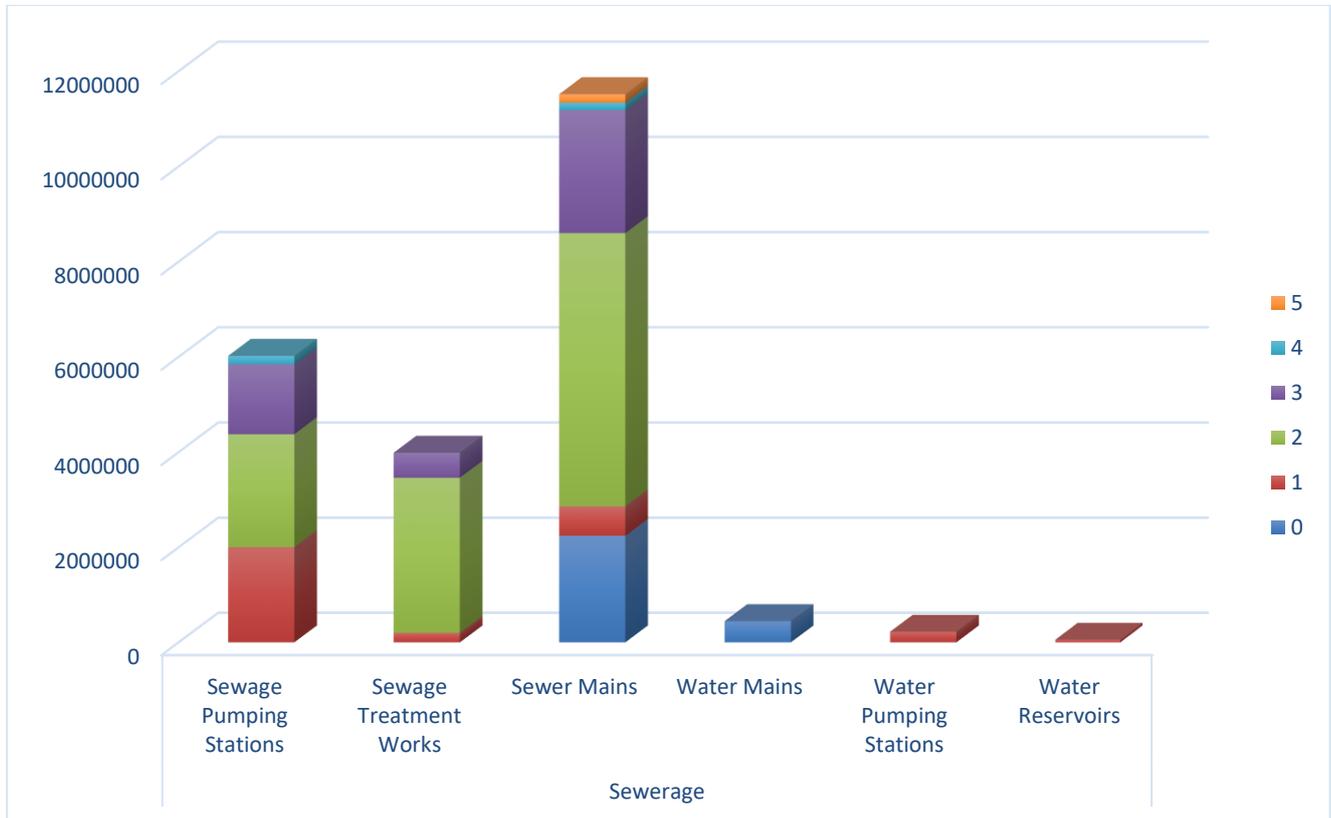
Grade	Condition	Action	Repair for longer life assets
1	Very Good	No Action required	No action needed within 20 years.
2	Good	Monitor to see if there are changes	Some action needed within 20 years
3	Moderate	Consider specialist assessment.	Some action needed within 10 years
4	Poor	Get specialist assessment or repair.	Action needed within 3 years
5	Very Poor	Replace or repair	Action required within one year.

¹ Based on New Zealand Water & Wastes Association (2008) Visual Assessment of Utility Assets. The terminology used in the International Infrastructure Management Manual is unhelpful as it refers to 'repairs' while many water supply and sewerage assets are not subject to any maintenance until they are near end of life.

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The condition of asset is maintained in the Asset Register. Note, a condition grading for the water main (used to convey effluent for recycling from the sewer treatment works) was not formally determined (condition grade zero) as to date there is no evidence to suggest that its useful life would be significantly greater or less than typical for these long life assets. The true useful life of this main will become evident later in its life cycle. Therefore for the purposes of this asset management plan, pipes with a condition grading of zero can be interpreted as having a condition grading of 1.

Figure 5.1: What Conditions are our assets?



The valuation process identified assets that require attention in the short term.

- **Sewage Pumping Station 12.** Sewage pumping station 12 is located at the caravan park and is the site of an unauthorised dump point for recreational vehicle waste. This sewage pumping station has many issues, exacerbated by the dump point.
 - The structural components of SPS12 show extensive evidence of sulphide attack.
 - The material loss in the roof may be a safety risk.
 - Poor quality penetrations are likely to accelerate the sulphide attack.
 - Metal components are heavily corroded.
 - The riser tube has failed.
 - The electrical cabinet is corroded.

This asset is condition graded 4 (poor) and repairs are recommended within three years. This asset requires urgent attention. Funds have been allocated (\$300,000) 2017/18 to rehabilitate this pumping station and upgrade it to meet demand.

- **Sewage Treatment Works (STP).** The existing Gilgandra STP consists of inlet works, primary sedimentation tank, trickling filters and humus tank. The final effluent undergoes UV disinfection, a system recently installed. Treated effluent is pumped to a neighbouring property, approximately 1.7 km to the north of the STP site, to be stored in a dam and beneficially reused in a pivot irrigation system to irrigate pasture and fodder crops. Prior to the pipeline, the effluent was evaporated on site in a series of ponds.

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Due to the older nature of the plant design, the STP requires a high labour input, Council operations staff report that the plant experiences on-going operational issues such as rag and solids carry-over from the primary sedimentation tank, resulting in nozzle blockages on the trickling filters. Council reports that there is a significant leak from the primary sedimentation tank. Council operations staff also report operating problems with sludge carry-over from the trickling filter humus tank, resulting in fouling of UV tubes and biofilm accumulation in the recycled water delivery pipeline.

The primary and secondary stages of the sewage treatment works have been assigned a condition grade of 3 with a residual life of 10 years. This is because while these elements are in reasonable condition for their age, these portions of the plant are approaching technical obsolescence.

Council is exploring rehabilitation options with the relevant regulators (NSW Office of Water and Environmental Protection Authority). Council is seeking solutions to improve the operational capacity of STP in the short term (next five years) and upgrade the facility to contemporary standards within the decade.

At this time, the lowest capital and operating cost STP rehabilitation option for Council may be the construction of a pond system for irrigation effluent quality. Preliminary estimates indicate that this option is likely to cost \$2.73 Million.

Several short term improvements are included over the next five years:

- Upgrading of SPS No 1 - \$518,000
- Upgrading of SPS No 2 - \$245,000
- Construction of new wet weather detention ponds - \$664,000

These short term improvement works are consistent with the rehabilitation strategy for the plant.

In the interim, there are a number of smaller renewal projects planned for the STP, such as replacement of the five digester valves, upgrade of electrical switchboards and modifications to the existing gantry. These capital works will keep the STP operational until the full rehabilitation can take place.

6. Operations

Operational activities are those regular activities that are required to continuously provide the service. These activities include asset inspection, electricity costs, fuel and overheads. The Operational Plan summarises the specific projects and activities to be achieved to meet the commitments in the Delivery Program. It spells out how the commitments of Delivery Program will be delivered as individual projects and activities that will be undertaken each year. It also forms the council's operating budget for the year.

Council conducts CCTV inspections and reporting of 39km of the sewerage network.

Regular inspection and maintenance of sewerage maintenance holes is carried out.

Council has a customer request system to identify problems and inspect and rectify as required.

Regular inspection and maintenance of the above ground infrastructure is also carried out by staff.

The Operational Plan for Council's sewerage system includes but is not limited to:

- Sewage Treatment Operations/Maintenance;
- Recycled water application and Storage Systems Operation/Maintenance;
- Pipelines Operation/Maintenance; and
- Sewage Pumping Station Operation/Maintenance.

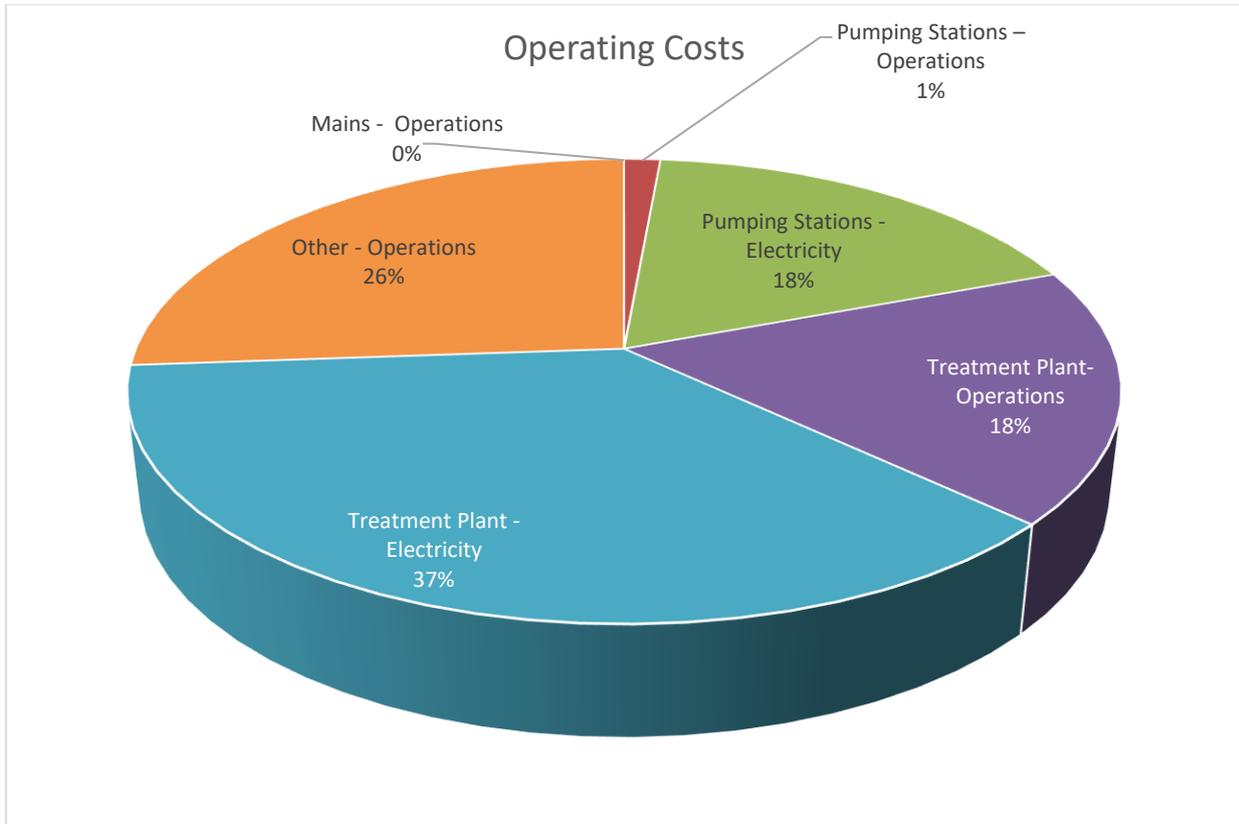
Table 6.1: When do we undertake Inspections?

Inspection	Frequency
Condition Assessments of all Above Ground External Assets	Every six months
Distribution Network	Annually
Manhole	Annually
Safety Inspections	Quarterly

Table 6.2: What are our Operational Costs?

Activity	Three year average (12/13, 13/14 & 14/15)
Mains - Operations	0
Pumping Stations – Operations	\$1,052
Pumping Stations – Electricity	\$13,366
Treatment Plant- Operations	\$13,252
Treatment Plant – Electricity	\$27,567
Other – Operations	\$19,555
Total	\$74,791

Figure 6.1: What is the breakup of our Operating Costs?



In addition to Operational Costs, other “Management” expenses associated with running a sewerage network include:

- Administration costs
- Interest on debt
- Insurances

Management expenses (2012/13, 2013/14 and 2014/15) average \$150,000 per year.

7. Maintenance

Routine maintenance is the regular on-going work that is necessary to keep assets operating to ensure they reach their expected useful life. It includes work on an asset where a portion may fail and need immediate repair to make it operational again. It may be either planned (where works are programmed based on condition or according to a cycle), or reactive (in response to a failure, an event which leads to damage such as a storm or vandalism).

Table 7.1: What are our Maintenance Activities and the frequency we undertake them?

Activity	Frequency
CCTV Inspections	Annually
Maintenance Hole Inspection	Annually
Sewer Vent Inspection	Every four years
Safety Inspections	Every four months
Smoke Testing	Every 4 years
Ground Water Monitoring	Monthly

Adjusting Levels of Service

Some Levels of Service are non-negotiable, due to the health risks and legislative requirements. Other Levels of Service, such as response times to failures and customer complaints, may have scope for adjustment. Currently Council's LOS are based on the following principles:

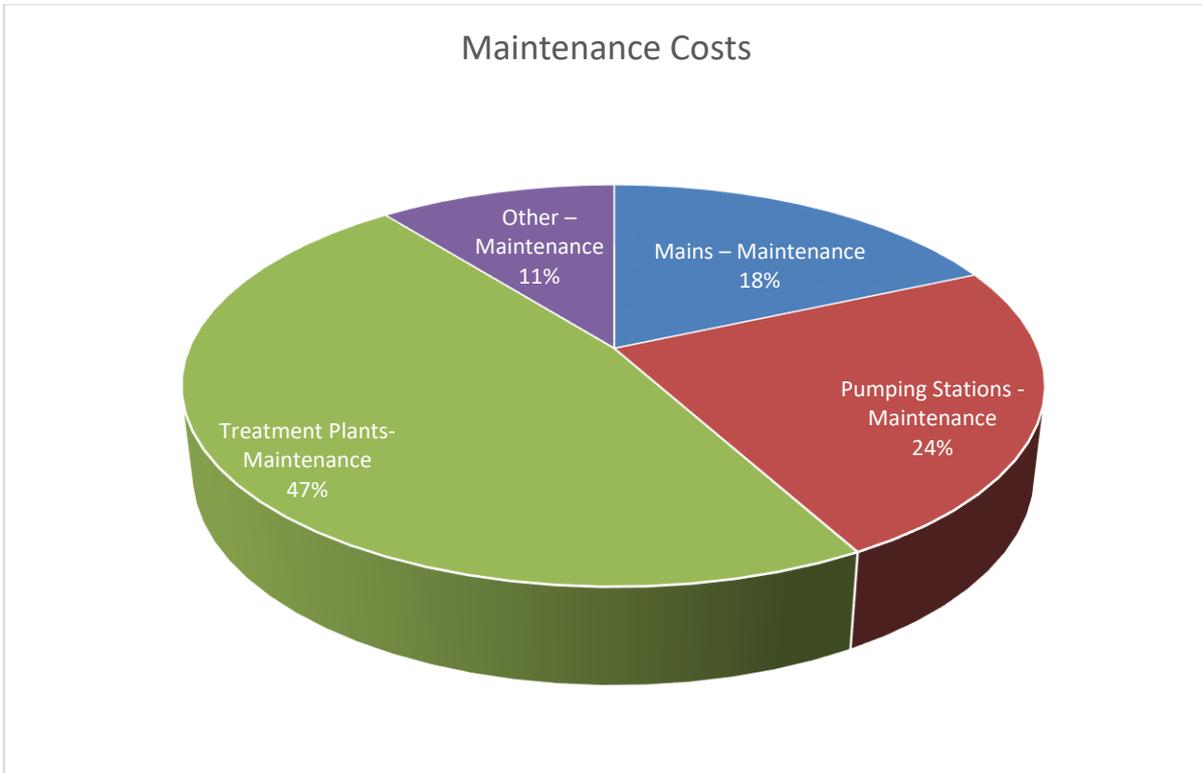
- The community has access to a sewerage system that has sufficient capacity for current and projected growth requirements
- Sewage treatment and effluent disposal is managed in accordance with the principles of ecologically sustainable development
- The operation of the sewerage treatment system results in high quality services to customers
- All trade waste dischargers in the Shire are licensed with a charging structure that reflects costs of treatment and encourages onsite treatment of trade waste

The proposed maintenance programs are detailed in Appendix A.

Table 7.2: What are our Maintenance Costs?

Activity	Three year average (12/13, 13/14 & 14/15)
Mains – Maintenance	\$51,950
Pumping Stations -Maintenance	\$67,209
Treatment Plants- Maintenance	\$134,203
Other – Maintenance	\$29,998
Total	\$283,360

Figure 7.1: What is the breakup of our Maintenance Costs?



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8. Capital Renewal / Rehabilitation

This includes work on an existing asset to replace or rehabilitate it to a condition that restores the capability of the asset back to that which it had originally. Estimated useful lives are shown in Table 8.1 below.

Table 8.1 Asset Useful Lives

Asset Class	Asset Type	Adopted Useful Life
Sewage Pumping Stations	Mechanical/ Electrical	Varies (average 28 years)
	Structural	Varies (average 55 years)
Sewage Treatment Works	Trickling filter process	61years
	Disinfection -Civil works	81years
	Disinfection -Mechanical/ Electrical	60 years
	Site works	91years
Sewer Mains	Condition grade 5 (1982-1989)	28-35 years
	Condition grade 5 (1964)	53 years
	Condition grade 3 (1982-1989)	55-62 years
	Condition grade 0, 1 or 2	70 – 80 years
Recycled Water Mains	PE (2007)	80 years
Recycled Water Reservoir	HDPE lined pond at the STW (2007)	50

The adopted useful lives of assets shown in the table above are based on a condition grading approach. The useful life of an asset can vary markedly, due to factors such as construction methods, manufacturing defects, the host environment and the maintenance regime applied. Condition grading was used to adjust the useful life based on the observed condition of the asset.

Renewal will be undertaken using 'low-cost' renewal methods where practical. The aim of 'low-cost' renewals is to restore the service potential or future economic benefits of the asset by renewing the assets at a cost less than the full replacement cost.

This Asset Management Plan contains an analysis based on broad assumptions and best available knowledge to date. Modelling is not an exact science so we deal 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.

Assets requiring renewal will be generally identified from estimates of remaining life and condition assessments obtained from the asset register and models. Candidate proposals will be inspected to verify the accuracy of the remaining life estimate and to develop a preliminary renewal estimate. Verified proposals are ranked by priority and available funds and scheduled in future works programmes.

Details of planned renewal activities proposed in the current Delivery Program are contained in Table 8.2

Table 8.2: What will we spend over the next 10 years on Renewal Projects (2015 \$,000)

Year	Network Renewal Projects	Estimate (\$'000)
2017	Pump Station No 10 - Mavis Street - modification of concrete lid and security hatch, repositioning of switchboard (Renewal Component = 50%)	52.5
2017	Various Mains – cleaning, camera inspections and reporting	60

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Year	Network Renewal Projects	Estimate (\$'000)
2017	Sewer manholes and reticulation main repairs – numerous locations	21
2017	SPS No 8 install new SPS including electricity and telemetry – renewal component	150
	2017 Total	283.50
2018	Telemetry Upgrade (Renewal component = 50%)	91.35
2018	Various Mains – cleaning, camera inspections and reporting	50
2018	Sewer Pump Station No 12 Upgrade -renewal component = 50%	150
2018	Sewerage Treatment Plant Rehabilitation - Investigation	50
2018	Effluent Treatment Area - Upgrade of electrical switch boards	36
2018	Effluent Treatment Area - Modification to the existing gantry	4
	2018 Total	381.35
2019	Mains replacement and/ or lining	100
2019	Sewerage Treatment Plant rehabilitation - investigation	50
2019	Sewage Treatment Works – Effluent Treatment Area - install aeration system in ponds	80
	2019 total	230
2020	Various mains – cleaning, camera inspections and reporting	50
2020	Main replacement and relining	100
2020	Sewer Pump Station Maintenance and Renewal	60
2020	Sewer Pump Station No 6- renew mechanical/ electrical	71
2020	Sewer Pump Station No 11 – renew mechanical/ electrical	68
2020	Sewer Pump Station No 13 – renew mechanical/ electrical	69
	2020 total	418
2021	Main replacement and lining	100
2021	Sewer Pump Station maintenance and renewal	60
2021	Effluent Treatment Area - desilt effluent pond	60
	2021 total	220
2022	Main replacement and lining	100
2022	Sewer Pump Station maintenance and renewal	60
2022	Effluent Treatment Area - desilt effluent pond	60
2022	Sewer Treatment Works – Effluent Treatment Area – pump station maintenance and renewal	80

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Year	Network Renewal Projects	Estimate (\$'000)
2022	Sewer Pump Station No 2 – renew mechanical/ electrical	291
2022	Sewer Pump Station No 9 – renew mechanical/ electrical	79
	2022 total	670
2023	Various Mains - Main cleaning, camera inspections and reporting	100
2023	Main replacement and lining	100
2023	Sewer Pump Station Maintenance and Renewal	60
	2023 total	260
2024	Various Mains - Main cleaning, camera inspections and reporting	50
2024	Mains Replacement and/or Lining	100
2024	Sewer Pump Station Maintenance and Renewal	60
	2024 total	210
2025	Various Mains - Main cleaning, camera inspections and reporting	50
2025	Mains Replacement and/or Lining	100
2025	Sewer Pump Station Maintenance and Renewal	60
2025	Effluent Treatment area - De-silt Effluent Pond	60
	2025 total	270
2026	Mains Replacement and/or Lining	100
2026	STP UV Disinfection system after settlement pond – renew mechanical/ electrical	138
2026	STP UV Disinfection mechanical/ electrical	150
	2026 total	389
	Grand Total	\$3,332

Table 8.2 above indicates that, based on current projections Council intends to spend approximately \$333,200 per annum on network renewal projects.

Which assets require renewal in the next ten years?

Remaining useful lives were determined during the condition assessment process. The following specific assets appear to be reaching end of life and require renewal within the coming ten years.

- There is approximately 500m of sewer main at rated at condition grade 5 by the 2015 CCTV assessment.
- The majority of Council's sewage pumping stations have electrical/ mechanical componentry reaching end of life over the next ten years.
- The sewage treatment plant will require renewal within the next decade as previously identified.

Planning for rehabilitation of the Gilgandra Sewage Treatment Plant (STP)

Discussion

Information related to the Gilgandra Sewage Treatment Plant is sourced from the report "Gilgandra STP Upgrade Options Investigation Report" (2016), prepared by Zlatco Tonkovic of Yabbie Pond Pty Ltd.

Given the age of the STP, the highly manually intensive nature of operation and technology obsolescence, Council must rehabilitate the STP. In addition, the existing plant does not have the capacity to treat wet weather flows, which currently bypass the STP and flow directly to the old evaporation ponds. The integrity of the liner of the evaporation ponds is of concern and there is likely to be leakage into the groundwater of bypassed untreated wastewater. The old evaporation ponds are located within the 1 in 100 year ARI flood contour.

Council has adopted the off-river effluent disposal strategy since 2009 and this is Council's current long-term strategy for effluent management. It is most likely to continue for the next 10 to 20 years as long as Council has in place an "End User Agreement" with the property owner. Otherwise Council is exposed to the risk of the property owner discontinuing supply of reuse water and then Council would need an alternative disposal option.

Therefore, the STP upgrade options considered will focus on treating the wastewater to irrigation effluent quality standard. These options do not require any high level nutrient removal and the current EPA licence load limits will be used as the benchmark for sizing process upgrades.

Given the potential risk that irrigation option may cease in future, Council will also compare the cost of the irrigation upgrade option with a purpose designed biological nutrient removal (BNR) plant and discharge to river option.

All upgrade options considered need to incorporate upgrading Sewer Pump Station No 1, raw sewage rising main and inlet works with enhanced screening and grit removal equipment. The existing STP elements including the inlet works, PSTs, Trickling Filters, Humus Tanks and Anaerobic Digesters are considered to be at the end of their design life and are not able to be integrated cost-effectively into the new upgrade.

At this time, the lowest capital and operating cost STP rehabilitation option for Council may be the construction of a pond system for irrigation effluent quality. Preliminary estimates indicate that this option is likely to cost \$2.73 Million. This figure has been used in the development of this AM Plan and in Council's financial modelling for the Sewer Fund (FINMOD).

Sewerage Asset Management Plan

9. Capital Upgrades & New Assets

Upgrades enhance an existing asset to provide a higher level of service, for example widening an existing road seal. New assets are those created to meet an additional service level requirement or increase the size of a network, for example, new subdivisions, or extension of the sewerage network.

The requirements for new assets may result from growth, social or environmental needs.

New assets and upgrade/ expansion of existing assets are identified in accordance with Council's Best Practice obligations. The scheduling of new (and upgrade) capital works are based upon an adopted level of service negotiated with the community, total asset management planning and development servicing planning which identifies the need for the new assets and the financial planning required to fund them.

In general, Gilgandra Shire Council undertakes limited upgrade and new asset works. These projects only occur when a new subdivision is developed or a deficiency in the actual level of service provided is identified.

Table 9.2: What will we spend over the next 10 years on Upgrade Projects (2016 \$,000)

Year	Capital Upgrade Projects - Internal Level of Service and Growth	Estimate (\$'000)
2017	Pump Station No 10 - Mavis Street - modification of concrete lid and security hatch, repositioning of switchboard (Upgrade Component = 50%)	52.5
2017	Pump Station No 8 - Warren Road - install new SPS including electricity and telemetry – upgrade component of the project	150
	2017 Total	202.5
2018	Telemetry Upgrade (Upgrade component = 50%)	91.35
2018	STP Concrete slab for geo-tubes	75
2018	Sewer Pump Station No 12 Upgrade (Upgrade component = 50%)	150
	2018 Total	316.35
2019	Construct new detention pond to store and treat wet weather flows	664
	2019 total	664
2019	Upgrade SPS No 1 with higher capacity pumps and new rising main	518
	2019 total	518
2020	Upgrade SPS No 2 with higher capacity pumps	245
	2021 total	245
2021	No capital upgrade works proposed	
2022	No capital upgrade works proposed	
2023	No capital upgrade works proposed	
2024	No capital upgrade works proposed	
2025	STP new Oxidation Ponds	2,730
	2025 total	2,730
	Grand Total	4,676

Table 9.1 above indicates that, based on current projections Council intends to spend approximately \$467,600 per annum over the next ten years on capital upgrade projects to improve internal levels of service and meet the needs of growth.

Short Term Sewage Treatment Plant (STP) Upgrade Requirements

Council is planning to comprehensively rehabilitate the STP within 10 years. In the interim, whilst planning occurs, funding is sourced and approvals obtained, important upgrade works are required to keep the STP in operation.

Of most concern is the capability of the Gilgandra STP to handle wet weather. The current limitation on treatment at the STP is the peak hydraulic capacity of the existing plant and the need to bypass flows greater than approx. 1200 kL/d to the old evaporation ponds. There are concerns about the structural integrity of the evaporation ponds. The old evaporation ponds are also located within the 1 in 100 ARI flood contour, which is not ideal.

The following short-term upgrade requirements are listed in order of priority.

1. Upgrade of PS No. 1 with higher capacity pumps and new rising main to a new wet weather detention pond. Estimated cost \$518,000.
2. Upgrade of PS No. 2 with higher capacity pumps. Estimated cost: \$245,000.
3. Construction of new 11.5 ML (70m X 150m X 1.5m deep) clay-lined wet weather detention pond to store and treat bypass wet weather flows. Estimated cost \$664,000.

10. Disposal Plan

Disposal is any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. Assets with a condition rating of 5 (poor condition), failing to meet the required Level of Service or technically obsolete, may be considered to be a redundant asset or not utilised and therefore decommissioned and disposed unless it is considered critical infrastructure.

Gilgandra Shire Council does not have plans to dispose of any sewerage network assets.

11. Financial Plan

The Best Practice Management of Water Supply and Sewerage Guidelines set out the principles for sewerage pricing as follows:

- Full cost recovery without significant cross subsidies. Pricing must raise enough revenue so that the sewer fund achieves a positive Economic Real rate of Return (ERRR) in most years over the next 30 years
- Compliant residential charges that are independent of land value
- Compliant non-residential charges
- Adopted Development Servicing Plan with commercial developer charges
- Compliant trade waste fees and charges
- Appropriate trade waste policy and approval for all dischargers

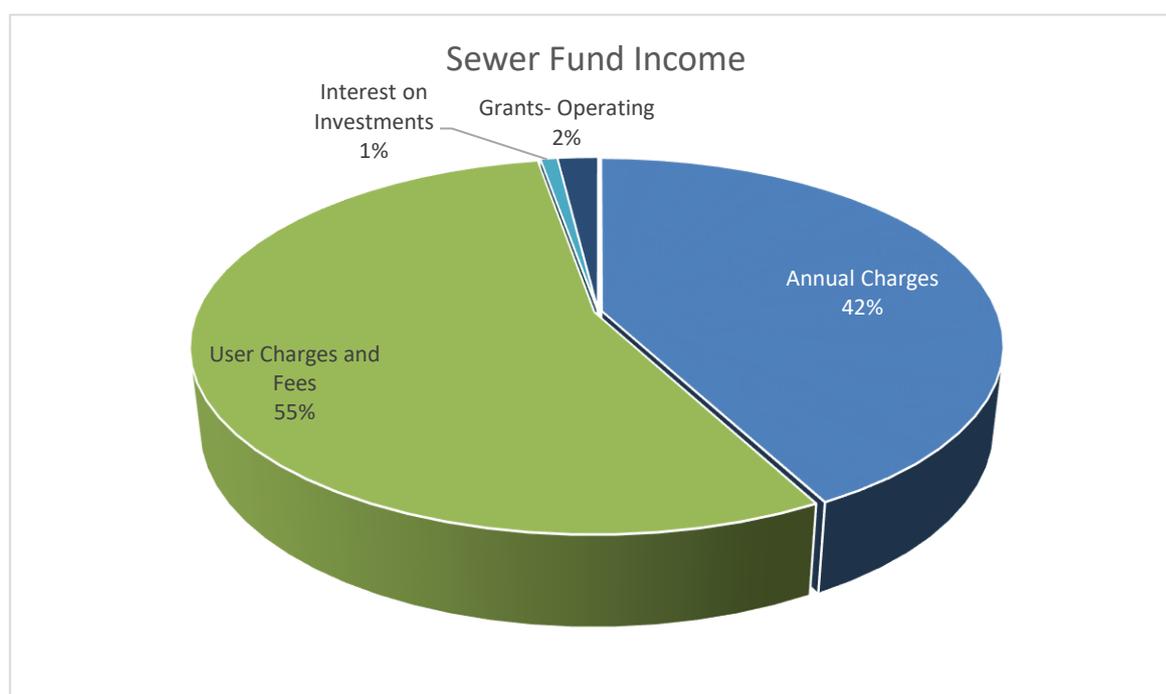
The primary purpose of sewerage pricing is to determine fair pricing of services which achieves full cost recovery and provide strong pricing signals to enable each customer to balance the benefits and costs of using the utility's services. Funding for management of assets can come from a variety of sources as detailed in the table below.

Table 11.1: Where does our Income come from?

Activity	2016/17	2015/16	2014/15	2013/14
Annual Charges	\$372,162	\$334,381	\$314,004	\$312,399
User Charges and Fees	\$513,013	\$477,898	\$410,534	\$363,591
Interest on Investments	\$28,569	\$9,542	\$4,573	\$4,157
Grants- Operating (pensioner subsidy)	\$18,739	\$18,177	\$12,715	\$12,753
Total	\$932,483	\$839,998	\$741,826	\$692,900

Source: Council's Operational Plans (2013/14, 2014/15, 2015/16 and 2016/17) Forecast Operating Statements

Figure 11.1: What is the breakup of our income streams?



Sewerage Asset Management Plan

Source: Council's Operational Plans (2013/14, 2014/15 and 2015/16) Forecast Operating Statements

Modelling of Scenarios

Providing services from infrastructure in a sustainable manner requires the matching and managing of service levels, risks, projected expenditures and financing to achieve a financial indicator of approximately 1.0 for the first years of the asset management plan and ideally over the 10 year life of the Long Term Financial Plan.

For this Asset Management Plan, two different scenarios were modelled using the NAMS Plus online asset management tools.

1. Scenario 1 – Using the Asset Register to determine projected renewals from remaining useful life
2. Scenario 2- Using planned renewals from Council's Sewer Capital Works 30 year Plan

Gilgandra Shire Council's sewerage assets are typically in reasonable condition. The condition assessment which took place in late 2015 identified some assets reaching end of life in the next ten years. These assets have been discussed in detail in Section 8 of this Plan Capital Renewal/ Rehabilitation.

According to the Scenario 1 modelling, Council is overspending on asset renewal in the short term. However, this modelling approach only reflects activities of an advanced maintenance nature at a level of detail, which is not reflected in the asset register.

The recent condition assessment undertaken to inform the sewer valuation process identified serious strategic issues with the sewage treatment works. Council subsequently commissioned a detailed report on the options for the Gilgandra sewage treatment plant, which was completed in August 2016 ("Gilgandra STP Upgrade Options Investigation Report" prepared by Zlatco Tonkovic of Yabbie Pond Pty Ltd). Council has updated its Capital Works planning to reflect the recommendations in this report.

It was therefore necessary to model Scenario 2 using the renewal expenditure itemised in the Sewer Capital Works 30 Year Plan. The projects in the Sewer Capital Works 30 Year Plan have been sourced from:

- Staff - based on their detailed knowledge of the asset portfolio and its renewal needs.
- The recommendations of the 2015 condition assessment, and
- *Gilgandra STP Upgrade Options Investigation Report.*

It can be considered an indicator of the renewal spending actually required to replace assets in the short term as they approach end of life and before they fail.

The Scenario 2 modelling revealed that Council's proposed spending on asset renewals was appropriate and lead to balanced financial indicators.

Whilst the proposed spending on asset renewals is appropriate, Council needs to substantially increase its income in sewer fund to fund these works. If sewer rates are not increased, the spending proposed in this Asset Management Plan will be unaffordable.

Financial modelling of the sewer fund has been undertaken using FINMOD and is documented in the Financial Plan V2.0 (December 2016). Two scenarios have been modelled, with and without grant funding for the rehabilitation of the STP.

This Asset Management Plan should be read in conjunction with the Water & Sewerage Financial Plan, which documents the required increase in sewer rates.

12. Key Performance Measures

Key Performance Measures (KPM's) based on condition has been developed by considering environmental, health and safety, and infrastructure capabilities. The KPM's will be reviewed to align with the Technical LOS and the Strategies identified in the CSP that support the outcomes identified in Levels of Service section of this document.

Table 12.1 Performance Measures

Key Performance Measure	Level of Service	Target	Current
Incidence and duration of interruptions	Sewerage service meets needs of community with minimal planned and no unplanned interruptions	<10	15 sewer breaks and chokes in 2014/15 reporting period
Sewer Overflows	Number of sewer overflows requiring reporting to the environmental regulator	Nil	Nil in 2014/15 reporting period
Compliance with environmental regulator	Compliance with licence requirements including discharge volume.	Fully compliant	Fully compliant in 2014/15 reporting period

13. Plan Improvements

The Asset Improvement Plan is intended to provide improvements in the knowledge of our assets and their management. This plan will ensure that progress is made on improving asset management processes and procedures and that progress can be verified and quantified. This improvement plan should ensure asset management progresses at reasonable pace and moves in the "right" direction - that is "improvement" is embedded in the process.

In addition to the Asset Management Strategy improvements, the following improvements are proposed over the next 12 months:

Task	Expected Completion
Consult with DPI Water and EPA regarding the preferred strategy to upgrade the Gilgandra Sewage Treatment Plant and the availability and timing of grant funding	On-going
Prepare Version 2.0 of the Water and Sewerage Financial Plan based on the 30 Year Capital Works Plan Version 2.0 to estimate a typical residential bill and to confirm financial sustainability of the sewerage fund. Briefing to Councillors on funding strategies for sewer fund. Adoption of Financial Plan and associated funding strategy for inclusion in 2017/18 budget.	Completed
Refine this AM Plan once the Financial Plan has been adopted (this version)	December 2016

14. Risk Management Plan

Council is committed to assessing risks associated with hazards and mitigating assessed risks where practicable.

Delivering services through infrastructure is broad, complex and involves significant capital outlays. Managing risks is a key element in the management of infrastructure assets, particularly in the balance of desired/required levels of service and available funding. Significant capital projects could involve significant losses unless they are managed carefully. Such projects may also involve unbalanced cash flows, when large initial investments are necessary before any returns are obtained.

For assets with potentially long lives, risks associated with changing economic conditions, varying levels of demand for services, new competition and maintenance and disposal requirements needs to be analysed and managed to ensure the investment is worthwhile.

Size is not the only consideration. Projects or programs which are inherently complex will also benefit from particular attention to risk management. This might occur when there are important economic or financial aspects, sensitive environmental or safety issues, or complex regulatory and licensing requirements.

Systematic management of risk is a large task requiring a continuous improvement approach. Most service areas are managing operational risk and our challenge is to manage all risks through a consistent framework of asset management plans and risk management plans.

From this Plan the following key risks have been identified:

Table 14.1 Critical Risks and Treatment Plans

Major Asset Failure	Risk Treatment Plan
Failure of treatment plant or major equipment, collapse of trunk main, pumping station problem (choke, explosion, fire)	Shut down affected areas and assess damage Make areas safe Check welfare of staff and public, provide first aid Communicate with customers, regulator and authorities Liaise with emergency services Provide temporary services or reconfigure service delivery if possible Provide emergency equipment (pumps, generators, manual systems) Apply restrictions if necessary Use public education to manage restrictions Conduct repairs and begin planning for permanent repairs or replacement
Chemical or toxic spill (such as sludge)	
Natural disaster: earthquake, bushfire, storm wind or drought	

One of the outcomes of this assessment is the determination of **Critical Assets**. Critical assets are specific assets which have a high consequence of failure but not necessarily a high likelihood of failure. By identifying critical assets and critical failure modes, Council can appropriately target and refine inspection regimes, maintenance plans and capital expenditure plans. Operations and maintenances activities may also be targeted to mitigate critical assets failure and maintain service levels. These activities may include increased inspection frequency, higher maintenance intervention levels, etc.

Table 14.2 Critical Assets

Critical Assets	Critical Failure Mode	Treatment Plan
Sewage treatment works	Civil, electrical or mechanical failure	Scheduled maintenance and regular inspection regime to ensure that it is functioning as required
Sewer pump stations and rising mains	Power failure, pump failure or blockage	Scheduled maintenance of pumps and equipment. Regular inspections.

15. Appendix A: Budgeted Expenditures Accommodated in the LTFFP

NAMS.PLUS3 Asset Management Gilgandra SC

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Sewer_S2_V3 Asset Management Plan

First year of expenditure projections **2017** (financial yr ending)

Sewer

Asset values at start of planning period

Current replacement cost	\$22,760 (000)
Depreciable amount	\$14,492 (000)
Depreciated replacement cost	\$13,563 (000)
Annual depreciation expense	\$291 (000)

Calc CRC from Asset Register

(000)

This is a check for you.

Operations and Maintenance Costs for New Assets

	% of asset value
Additional operations costs	1.08%
Additional maintenance	1.30%
Additional depreciation	2.01%
Planned renewal budget (information only)	

You may use these values calculated from your data or overwrite the links.

Planned Expenditures from LTFFP

20 Year Expenditure Projections

Note: Enter all values in current **2017** values

Financial year ending	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
Expenditure Outlays included in Long Term Financial Plan (in current \$ values)										
Operations										
Operations budget	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80	\$80
Management budget	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165	\$165
AM systems budget	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total operations	\$245	\$245	\$245	\$245	\$245	\$245	\$245	\$245	\$245	\$245
Maintenance										
Reactive maintenance budget	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150
Planned maintenance budget	\$145	\$145	\$145	\$145	\$145	\$145	\$145	\$145	\$145	\$145
Specific maintenance items budget	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total maintenance	\$295	\$295	\$295	\$295	\$295	\$295	\$295	\$295	\$295	\$295
Capital										
Planned renewal budget	\$284	\$381	\$230	\$418	\$220	\$670	\$260	\$210	\$270	\$389
Planned upgrade/new budget	\$203	\$316	\$664	\$518	\$245	\$0	\$0	\$0	\$0	\$2,730
Non-growth contributed asset value	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Asset Disposals										
Est Cost to dispose of assets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Carrying value (DRC) of disposed assets	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0