



SEWERAGE

ASSET MANAGEMENT PLAN 2020



Asset Management Plan

Activity			
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Council Adoption			

Changes to be Incorporated in Next Review

Number	Date of Change	Reason for Change
1	18 February 2021	Initial Issue
2	11 March 2021	Changes as a result of audit.

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OVERVIEW

The Infrastructure Group manages the sewerage network of pipes, pumping stations and treatment plants for the collection, treatment and disposal of sewage in order to enhance the health and wellbeing of Invercargill residents. The network has a total replacement valuation as detailed below:

Date of Valuation: June 2019

Table 0.1 Valuation of Network

Asset Group	Replacement Cost	Depreciation Replacement Cost	Annual Depreciation
Pipe Fittings (manholes, cleaning eyes, etc.)	\$24,412,896	\$10,432,808	\$252,679
Pipes	\$225,836,444	\$82,887,003	\$2,500,446
Pumping Stations – 32	\$10,791,392	\$4,331,500	\$261,031
Treatment Plants – 3	\$50,389,234	\$26,818,590	\$1,063,055
Total	\$311,429,966	\$124,469,901	\$4,077,211

The Invercargill City Council’s role in providing the sewerage network is:

“The building blocks, including water, sanitation and roading, for a safe, friendly city is provided for all members of the community.”

The Asset Management Plan is the tool for the Infrastructure Group to demonstrate responsible asset stewardship and achieve compliance with statutory financial reporting requirements.

LEVEL OF SERVICE

The community has been consulted in relation to key performance measures through analysis of customer service requests and complaints, the Long Term Plan process and in relation to specific contracts. Community desires for the sewerage network are:

- A safe sewage collection and disposal system
- Continuity of operation of the sewerage activity
- Assurance that sewage is adequately treated so that the receiving environment is protected
- Community input on the level of the sewerage service

The sewerage activity contributes to these desires in the following ways:

Table 0.2 How the Activity Contributes

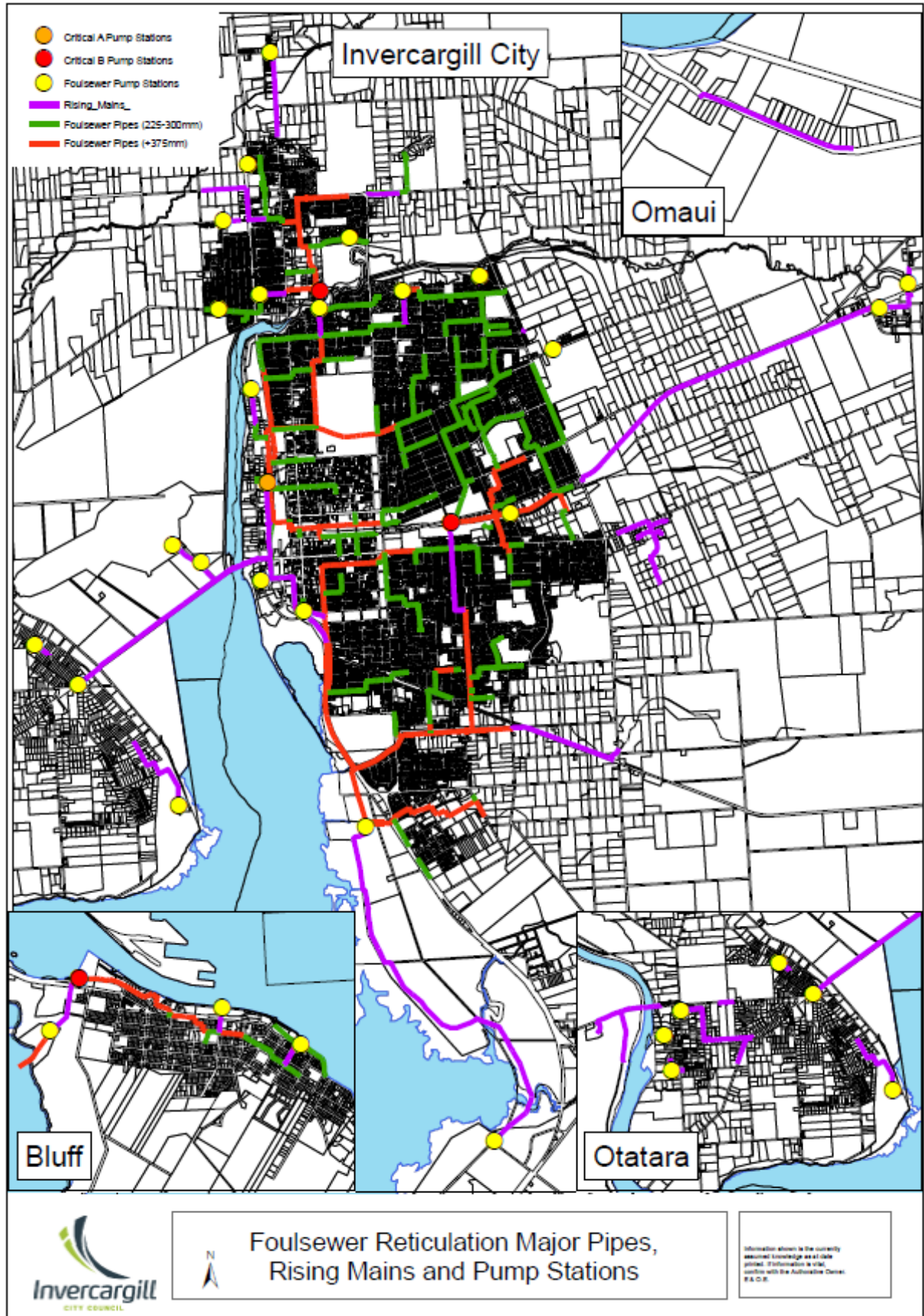
Community Outcome	Council’s Role	How the Activity Contributes
Enhance our City	Invercargill’s economy continues to grow and diversify	The sewerage activity receives and treats trade waste
Embrace innovation and change	The development of future industry is encouraged	
Preserve its character	The building blocks (including sanitation) is provided for all members of the community	The sewerage activity protects public health by the safe collection of sewage

ASSET INFORMATION

The City has three sewerage networks consisting of a total of 368 km of pipe in a variety of materials and in sizes ranging from 40 millimetres diameter to 1,500 millimetres diameter. The largest material category is earthenware (comprising 58% of the network) and the largest size category is 150 millimetres diameter (comprising 69% of the pipe network). The separate sewerage networks are located at Omaui, Bluff and Invercargill, serving populations of approximately 70, 2,080 and 46,220 respectively and each having its own treatment plant.

The sewerage system includes 32 pumping stations ranging in size from those serving only a few households, to the Mersey Street station, serving a population of about 26,000.

Figure 0.1 Sewerage Reticulation Major Pipes, Rising Mains and Pump Stations



The three treatment plants produce high quality effluent, and Council holds discharge consents which will expire in 2025 for the Bluff plant, and 2029 for the Omaui and Clifton (Invercargill) plants. The National Policy Statement for Freshwater Management and the Southland Water and Land Plan will have significant impact on our future discharge consents.

The pipe network is aging with the oldest parts of the network now over 100 years of age, which is the assumed economic life of the pipes. The Plan includes funding for renewal of aging pipelines, and a start has been made to the investigation and prioritisation of renewal needs, including CCTV inspection of approximately 8% of the network, and a flow monitoring survey. The CCTV inspection shows the network to be in generally good condition structurally, and analysis of maintenance records shows low numbers of system blockages and collapses, confirming the generally good condition of the pipe network. However, a flow monitoring survey has revealed high levels of stormwater infiltration in some areas, and it is likely renewal work will focus on these areas to address the impact of sewage overflows.

It is becoming more apparent in some catchments that direct infiltration from private property stormwater systems into the sewer network is occurring and further investigation will need to be assessed.

Pump Stations and Treatment Plants are in good condition, and programmes are in place to ensure ongoing maintenance and renewal as items of mechanical and electrical plant reach the end of their economic lives.

RISK MANAGEMENT

Management practices focus on ensuring the reliability of critical assets. Generally pipelines of 225 millimetres diameter or larger, pump stations and treatment plants are considered to be critical assets, as failure can cause serious disruption to service delivery over a substantial area and raise public health and safety concerns. The immediate concerns of failure of mechanical and electrical plant at pump stations and of blockage or collapse of pipelines, causing surcharge of sewage, are addressed by Council's operation of a 24 hour emergency call centre, and 24 hour on call emergency response crews.

As part of the development of the asset renewal programme, the Infrastructure Group uses a risk management process consistent with Standard AS/NZ 4360 to identify critical assets and specific risks associated with the sewerage asset.

In prioritising and programming capital works, consideration is given to risk and benefits, affordability, and existing performance with respect to levels of service and life cycle.

FINANCIAL FORECAST

30 year forecasts for both the operating and capital budgets are shown in Figure 8.2. The following graphs summarise this information. The financial information is based on 2019 dollars, adjusted for inflation.

Figure 0.2 Total Expenditure Over 10 Years

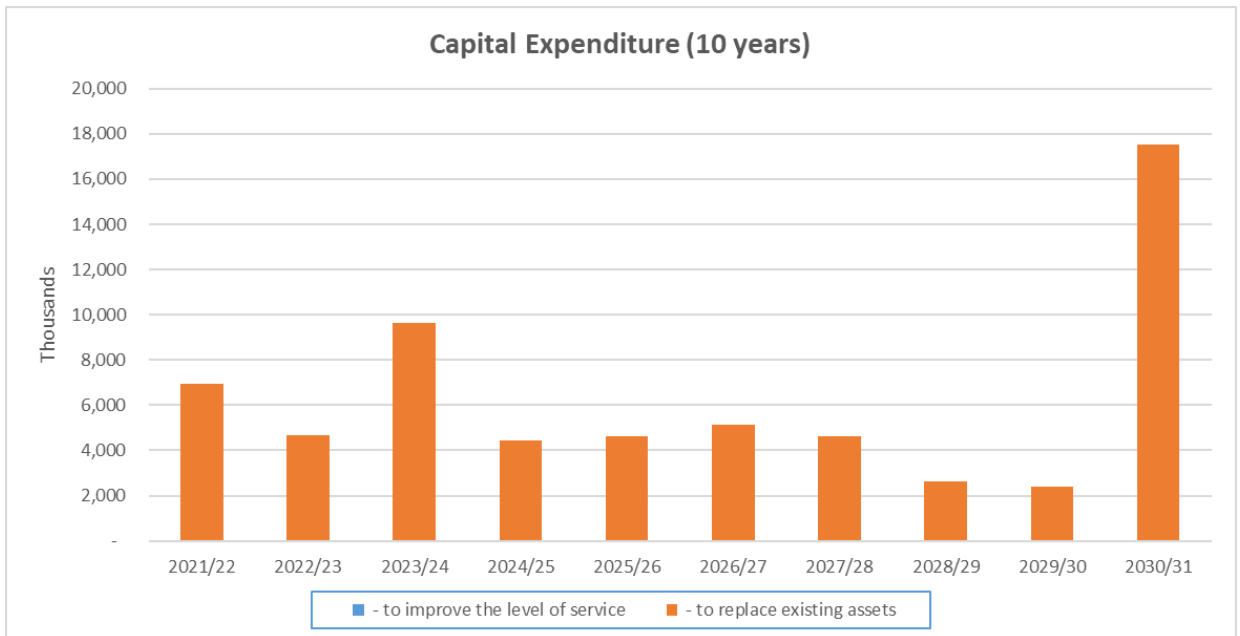
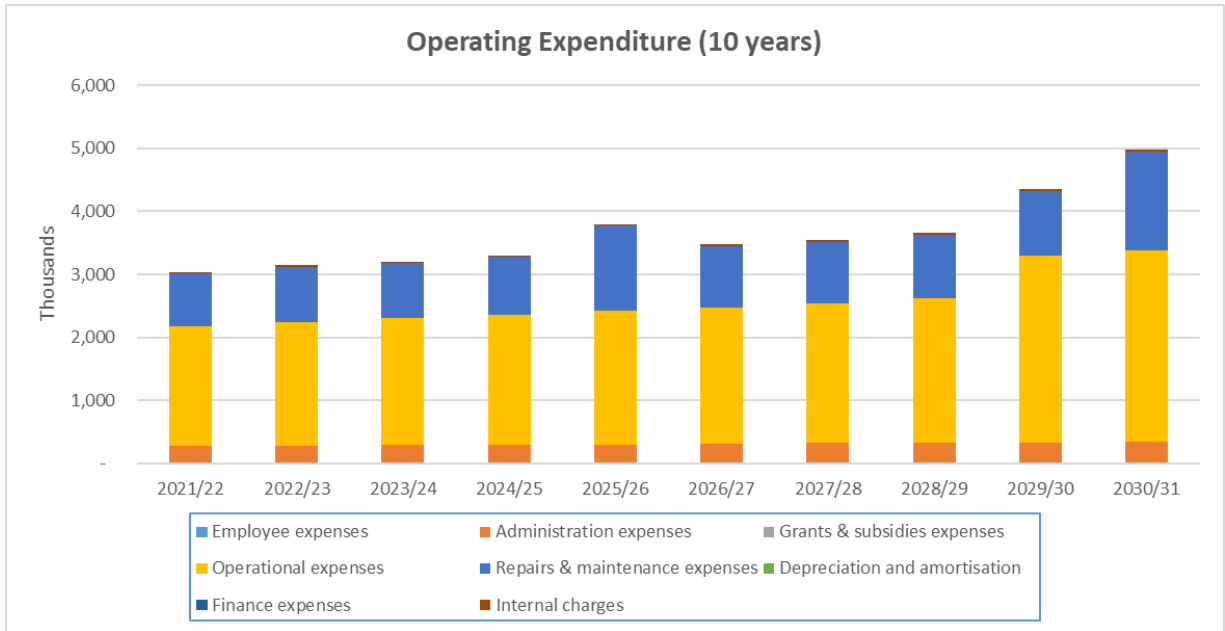
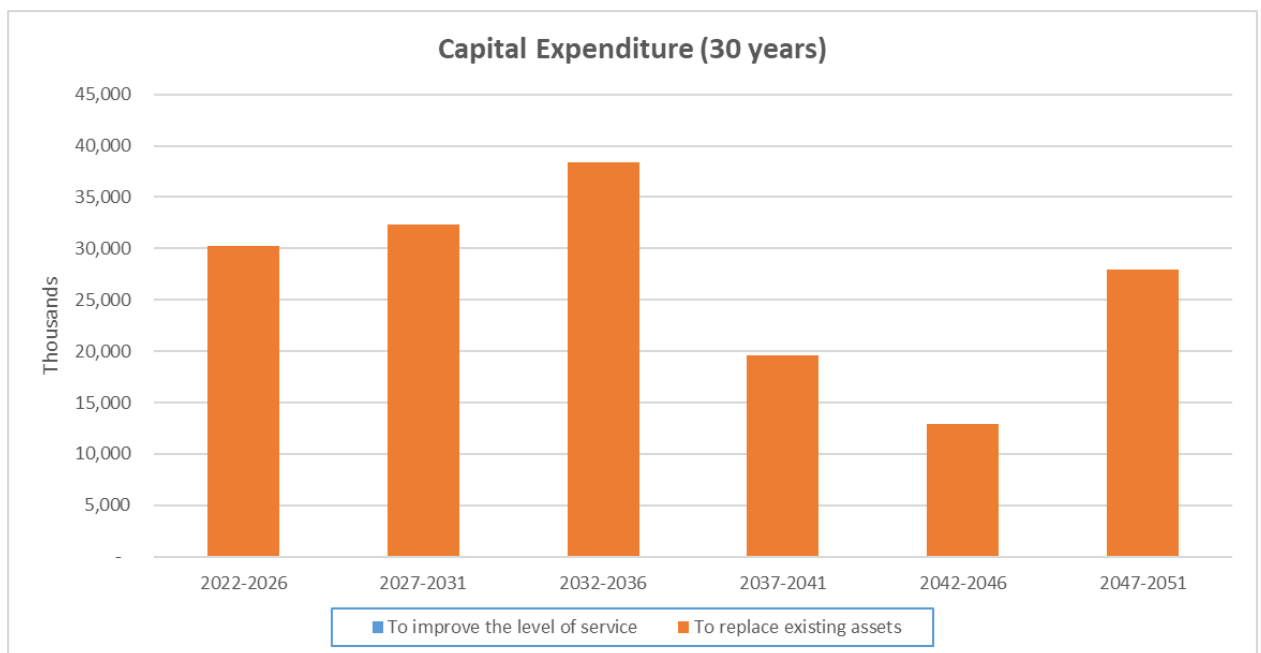
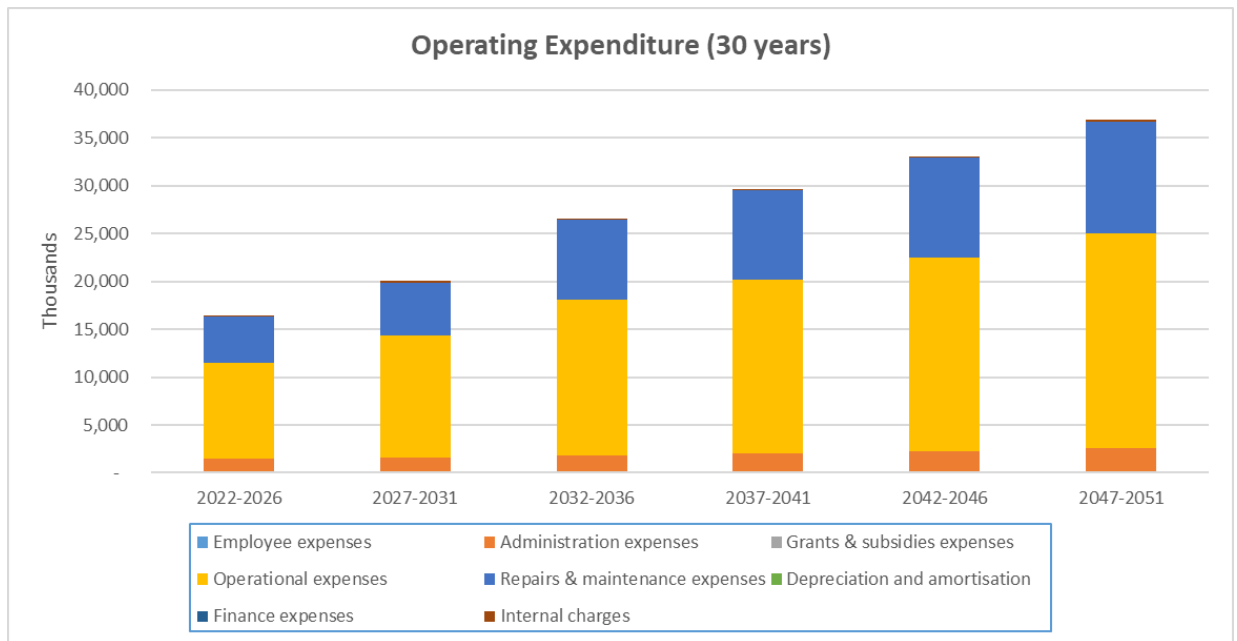


Figure 0.3 Total Expenditure Over 30 Years



The renewals programme for pipelines is based on an assumed optimum pipe asset life of up to 100 years, and further assessment is required to confirm this life. Asset renewal budgets may require review to reflect confirmed optimum pipe asset life.

The renewal budget is based on the expected year of renewal for the sewer asset which is then smoothed over 5-7 years to remove yearly spikes. The assets are valued every three years, most recently in June 2019, and budget is based on the optimised replacement value.

As pipe assets are renewed they will be sized to current design standards.

The renewals programme for electric and mechanical equipment within pump stations and treatment plants is based on assumed asset lives. These are reassessed

annually, and renewal priorities adjusted, depending on performance and records of past maintenance requirements to ensure ongoing high performance of these facilities.

DEVELOPMENT

Population growth projections for Invercargill during the next 20 years are low, although some subdivisional development and new housing is foreseen. It is anticipated that any extensions to the sewerage network as a result of subdivisional development will be funded by the developers.

The Council has purchased land at Awarua for industrial development, and provision has been made for an extension of the sewerage network to this area.

KEY ASSET MANAGEMENT ASSUMPTIONS

Growth

- Population change will follow the Statistics New Zealand high growth projection
- There will be no significant change in per capita sewage generation
- The majority of infrastructure required to service new developments will be funded by developers

Levels of Service

- There will be no significant changes in levels of service
- No upgrading of existing infrastructure will be required as a result of urban development, provided the anticipated development is evenly spread across the urban area
- Future condition assessments will not indicate additional remedial / replacement works to those scheduled in work programmes

Natural Disasters

No provisions have been made in the Asset Management Plan for the cost of repairing damage or other additional costs consequent upon a natural disaster such as a major flood or substantial earthquake.

Financial

See the financial strategy and the assumptions register for financial assumptions.

IMPROVEMENTS TO PLANNING

This Asset Management Plan highlights a need for improved quality of management practices to ensure optimum operation of the sewerage system.

Improvements will focus on:

Table 0.3 Improvement Programme 2020

Item	Current Practice	Areas for Improvement
Knowledge of Assets / Data Management	<p>Pipe Network</p> <ul style="list-style-type: none"> ➤ Data – knowledge of pipe age, materials, sizes and location is very good ➤ Condition – knowledge of pipe condition from 5% of asset record on CCTV and graded in accordance with pipe inspection manual <p>Electro Mechanical Plant</p> <ul style="list-style-type: none"> ➤ Condition regularly maintained and inspected ➤ Condition assessed annually ➤ Rated three yearly <p>Structures (buildings, manholes, etc.)</p> <ul style="list-style-type: none"> ➤ Buildings maintained and assessed regularly – upgrading needs assessed for Asset Management Plan 	<p>Continue to update records</p> <p>Continue pipe inspection programme to improve knowledge of asset condition</p> <p>Current practice adequate</p> <p>Current practice adequate</p>
Valuation, Depreciation and Effective Lives	<ul style="list-style-type: none"> ➤ Valuation guidelines 	<p>Reassess effective lives of pipe network based on improved condition assessment</p>
Asset Costing	<ul style="list-style-type: none"> ➤ Replacement costs based on continuing records of renewal contracts 	<p>Current practice adequate</p>
Asset Renewal and New Works Strategy	<ul style="list-style-type: none"> ➤ Forward 30 year plan based on age and condition ➤ Annual Plans consider: <ul style="list-style-type: none"> ○ Condition ○ Age ○ Capacity ○ Co-ordination with other asset upgrades / renewals 	<p>Improve asset condition assessment to better identify renewal needs</p>
Service Level Specification and Measurement	<ul style="list-style-type: none"> ➤ Meeting most performance measures ➤ Customer focussed service levels only recently measured ➤ Surveys used to assess customer needs 	<p>Continue to measure and assess performance against service levels</p>
Review, Audit and Continuous Improvement	<ul style="list-style-type: none"> ➤ Annual financial audit ➤ Annual service level audit ➤ Peer review of Asset Management Plans 	<p>Current practice adequate</p>
Operations and	<ul style="list-style-type: none"> ➤ Competitively tendered 	<p>Continue current practice</p>

Item	Current Practice	Areas for Improvement
Maintenance Strategy	maintenance contracts in place for major maintenance and operational items ➤ Quality contract management procedures in place	
Consent Compliance	➤ Discharge consents to five freshwater streams	Monitor and implement identified improvements
Risk Plans	➤ Lifelines Project identifies risk and response strategies for major events ➤ Asset Management Plan identifies asset failure risk and response strategies	Current practice adequate Improve risk management strategies Identify high value risk assets
Sustainability	➤ Develop strategy	

1. Introduction

1.1 ABOUT THIS PLAN

The sewerage activity is one of the core infrastructure activities addressed in the Invercargill City Council Long Term Plan (LTP). This Sewerage Asset Management Plan (AMP) is, therefore, strongly linked to the overall strategic direction for the City. The LTP is the document that alerts the community to the key issues and strategies of the activity.

The government's Three Waters review will have major impacts on this AMP within in the next 3-5 years but at this stage it is unclear what that will mean, therefore it has not been considered.

The purpose of this Plan is to outline Council's tactical planning response to the sewerage activity. The Plan outlines the long term management approach for the provision and maintenance of the sewerage activities services. Under Council's significance and engagement policy, the sewerage networks in Invercargill, Bluff, Omaui, Otatara and Kennington are deemed to be a strategic asset and therefore are significant in ensuring Council's capacity to contribute towards the Community Outcomes, and the current and future needs of the community. The Plan demonstrates responsible management of the assets on behalf of customers and stakeholders, and assists with the achievement of strategic goals and statutory compliance. The AMP combines management, financial, engineering and technical practices to ensure that the level of service required by the customers is provided and delivered in a sustainable and efficient manner. This Plan is based on existing levels of service, currently available information and existing knowledge, and judgement of Council staff.

A programme of Asset Management improvements is planned to improve the quality of decision making and to improve the knowledge of Council's assets and customer expectations. These future enhancements will enable Council to optimise life cycle asset management activities and provide a greater degree of confidence in financial forecasts.

This Asset Management Plan has been prepared by Invercargill City Council's 3 Waters Operational Manager acting as the Drainage Manager, with the support of experienced asset management and engineering staff. The Plan has been peer reviewed by Asset Management consultants, The Plan is reviewed every three years, and is next scheduled for review in 2023.

1.2 ACTIVITY OVERVIEW

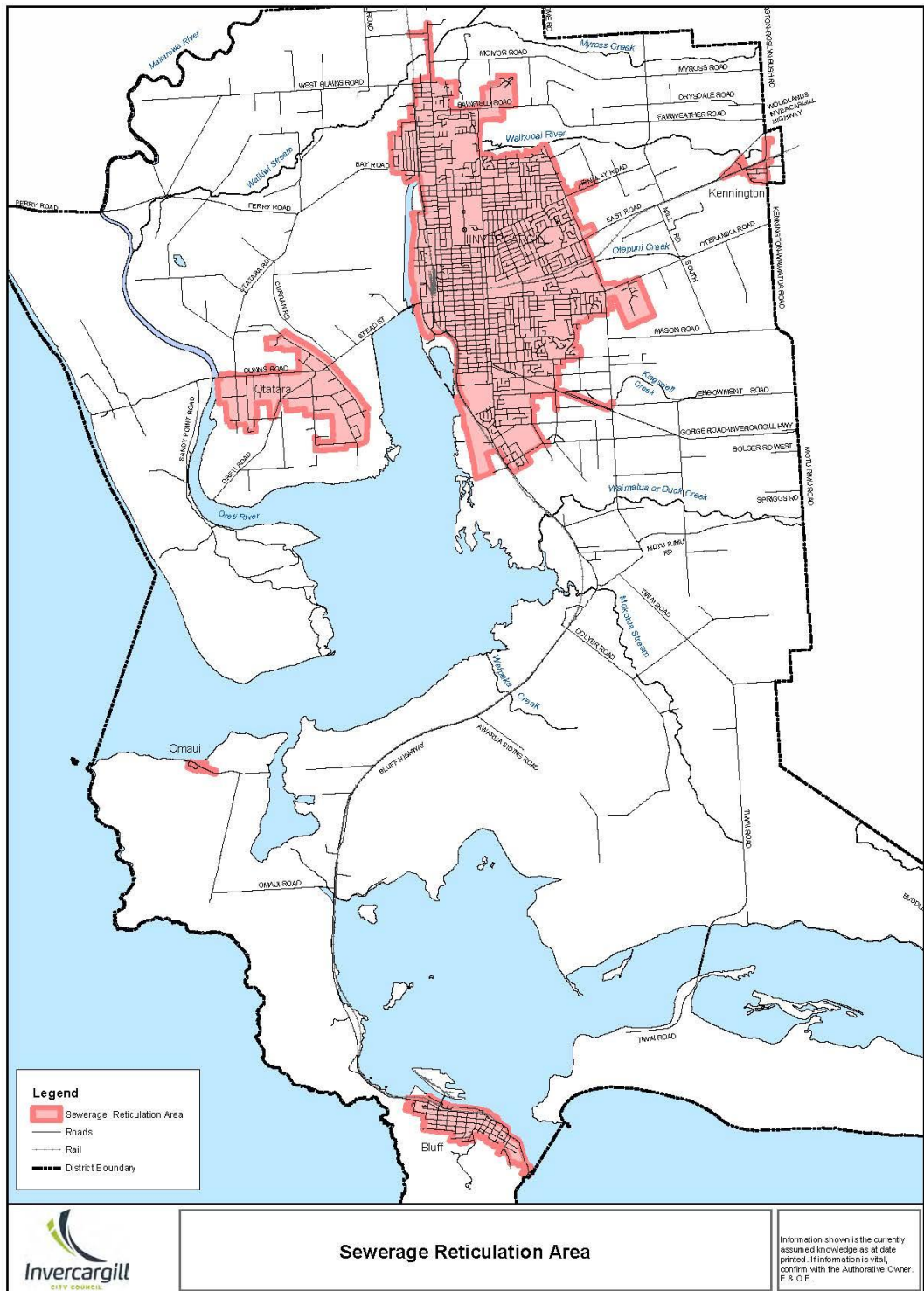
Council owns and maintains assets on behalf of the community, providing a sewage disposal service to each property in Invercargill, Bluff, Otatara, Omaui and Kennington residential areas. Treated effluent is discharged from the Clifton Wastewater Treatment Plant to the New River Estuary, from the Bluff Wastewater Treatment Plant to Foveaux Strait, and from the Omaui Oxidation Pond to land adjacent to the community.

Invercargill City Council holds consents issued by Environment Southland for these discharges.

Legislation requires that Council manages its sewerage assets in an efficient and effective manner. This Asset Management Plan provides a strategy for the Council to do so.

The city has three sewerage networks consisting of a total of 368 km of pipe in a variety of materials and in sizes ranging from 40 millimetres diameter to 1,500 millimetres diameter. The largest material category is earthenware (comprising 58% of the network) and the largest size category is 150 millimetres diameter (comprising 69% of the pipe network). The separate sewerage networks are located at Omaui, Bluff and Invercargill, serving populations of approximately 70, 2,080 and 46,220 respectively and each having its own treatment plant.

Figure 1.1 Sewerage Reticulation Area



The sewerage system includes 32 pumping stations ranging in size from those serving only a few households, to the Mersey Street station, serving a population of about 26,000.

The most recent valuation of the activity (dated June 2019) assessed the total Replacement Value of the assets at \$311,119.630.

The sewerage activity is managed and operated by staff employed directly by Council, and maintenance and capital works are carried out by contract under supervision by Council staff.

No other communities within the Council's territory are supplied with a sewage disposal service other than the urban communities of Invercargill, Otatara, Kennington, Omaui and Bluff. Property owners outside of these areas are responsible for the provision and maintenance of on-site wastewater treatment and disposal systems within their own properties.

2. Strategic Context

2.1 ALIGNMENT WITH STRATEGIC GOALS

2.1.1 Community Outcomes

Council has developed its own Council-focused ‘Community Outcomes’ for the Long Term Plan that will fulfil the requirements of ‘Community Outcomes’ under the Local Government Act.

The Community Outcomes have been derived from Council’s vision:

“Our City with heart” / “He Ngākau Aroha”

Table 2.1 Community Outcomes

Community Outcomes		
Enhance our City	Preserve its Character	Embrace Innovation and Change
We will know success when:		
Invercargill’s population is over 1.2% of the New Zealand population	Invercargill is celebrated for preserving its heritage character	Invercargill’s culture is embraced through community projects
New residents feel welcomed and embraced by Invercargill culture	Ease of access throughout the City is maintained	The development of future industry is encouraged
Healthy and active residents utilise space (including green space) throughout the City	Our natural and existing points of difference are celebrated	Technology is utilised in both existing and new City services
Invercargill’s economy continues to grow and diversify	The building blocks (including water, sanitation and roading) for a safe, friendly City is provided for all members of the community	Residents of, as well as visitors to, Invercargill give positive feedback and have great experiences
Invercargill’s business areas are bustling with people, activities and culture	Strong, collaborative leadership of the City is demonstrated	Invercargill has the ‘wow factor’ with the right facilities and events to enjoy

2.1.2 Rationale for the Activity

The removal of sewage from residential, industrial and commercial properties protects public health, supports city growth, and contributes to the general wellbeing of the community. In urban areas, sewage disposal is most effectively achieved by means of reticulated (piped) sewerage systems. This allows the costs associated with maintaining high standards and efficient infrastructure to be spread over the community.

Council does acknowledge Central Government intent to reform delivery of the 3 waters which sewerage is included to the extent that service delivery may be removed from direct Council control in the future. For the purpose of this plan it has been assumed that Council will continue to manage and operate the sewerage activity.

2.1.3 Activity Objectives

The objectives of the sewerage activity are:

- To safeguard public health and the environment
- To support economic growth of the community
- To provide a cost effective sewage collection service
- To provide a service meeting the requirements of the Local Government Act 2002, and maintain its capacity to do so
- To meet the requirements of the Health Act 1956 which requires the Council to improve, promote and protect public health within the district

The alignment of the sewerage activity and the Community Outcomes are:

Table 2.2 Alignment of the Sewerage Activity Community Outcomes

Community Outcome	Council's Role	How the Activity Contributes
Enhance our City	Invercargill's economy continues to grow and diversify	The sewerage activity receives and treats trade waste
Embrace innovation and change	The development of future industry is encouraged	
Preserve its character	The building blocks (including sanitation) is provided for all members of the community	The sewerage activity protects public health by the safe collection of sewage

Council will know that it is achieving the Community Outcomes above when the following results are realised:

- Industry can establish in Invercargill, with access to effective and economic trade waste disposal systems
- Community public health and environmental values are protected
- Levels of service (as developed in Section 3.3) are achieved

2.2 BUSINESS DRIVERS

2.2.1 Regulatory Framework

Council operates under a number of legislative frameworks. The Local Government Act 2002 and Health and Safety at Work Act 2015 are the most prevalent to Council's core business.

The Local Government Act is the overarching framework that regulates what Council's scope is as well as their ability to conduct day-to-day business.

The Health and Safety at Work Act ensures that as an employer we are meeting all requirements to care for our employees in a safe manner at all times.

Both aspects of legislation are paramount to the day to day running of business and most departments within Council will operate under specific provisions of both Acts, alongside any other relevant legislation.

2.2.2 District Plan and Council Policies

Under provisions provided in the Local Government Act 2002, Council has the ability to create policies, bylaws and plans.

Council operates under a number of policies, some internal. These policies are reviewed regularly in line with legislative requirements.

Council currently operates under a number of bylaws, some that were created out of need to resolve nuisance and others that are requirements under the Local Government Act or were resolved to become a bylaw through Central Government.

Further, Council operates under a District Plan. This Plan is derived through the Resource Management Act 1991. It gives effect to national policy statements on a variety of environmental issues, and is about managing the use, development and protection of natural and physical resources in a way that enables the community to provide for their holistic wellbeing.

The sewerage activity controls trade waste discharges through a trade waste bylaw (Invercargill Bylaw 2017/1 Trade Waste). The bylaw is modelled on a New Zealand Model Bylaw and provides for Council to control and limit the discharge of trade waste to the sewerage network.

The District Plan includes provision in its Code of Land Development to ensure that new sewerage infrastructure is constructed to adequate standards to meet community needs.

2.2.3 Long Term Plan

The Local Government Act 2002, Schedule 10 requires the development of 10-year Long Term Plans. Asset Management Plans are the foundation to providing a robust basis for the long-term forecasts.

In 2014, an amendment to the Act inserted a statement that asset management planning should be a fundamental part of Council's prudent stewardship of community resources over the long term, a requirement to produce a 30 year infrastructure strategy for core assets. The Infrastructure Strategy is required to address:

- Identification of strategic issues and options
- Outline how infrastructure assets will be managed
- Indicative capital and operating expenditure forecasts
- Significant CAPEX decisions – cost options for each
- Assumptions on life cycle, demand and levels of service

The Asset Management Plan records the current and desired Levels of Service and determines the Maintenance and Capital Works Programmes and their associated budgets required to make assets meet their desired Levels of Service.

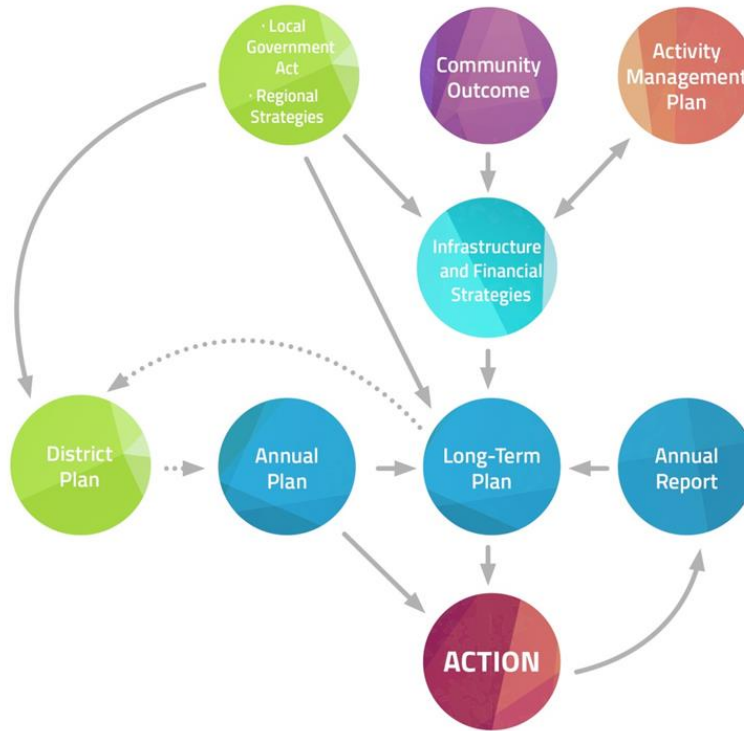
- The Long Term Plan confirms Maintenance and Capital Works Budgets that are approved by Council to meet Community Outcomes.
- Asset Management Plan underpins the activities in the Long Term Plan and is implemented through expenditure programmes in asset areas. Adoption of the budgets for these programmes is carried out through the Long Term Plan process. Changes to budgets for programmes may occur during the consultation process and adoption of Long Term Plan budgets.

Variations between this Plan and the most recently adopted Long Term Plan / Annual Plan are recorded in the "Table of Changes to be Incorporated in Next

Review” at the beginning of the Plan. The consequences of any variations will be reflected in subsequent reviews of the Long Term Plan / Annual Plan.

The diagram below shows how the Asset Management Plan feeds into Council’s Infrastructure and Financial Strategies, and relates to Council’s other plans.

Figure 2.1 How this Plan Feeds into and Relates to Council’s Other Plans



2.2.4 Activity Management Framework

Figure 2.2 Activity Management Framework



The Asset Management System is the set of people, processes, tools and other resources involved in the delivery of asset management.

The Asset Management Policy (Appendix 2.01) outlines the principles, requirements and responsibilities for asset management.

The Asset Management Strategy (Appendix 2.02) sets the asset management objectives, practices and audit and review processes.

2.3 STRATEGIC ISSUES AND CHALLENGES

The key corporate strategic issues and challenges facing the Invercargill City Council are:

- The City's changing demographic profile
- The community's willingness and ability to pay
- An expectation from the community to provide and retain services in a more effective manner at a lower cost
- Encouraging growth projects whilst ensuring financial and operational sustainability for future generations
- Ensuring that Council works in a financially prudent manner that promotes the current and future interests of the community
- Responding to the changing natural environment
- Retaining Invercargill's character within its built environment
- How Council will adapt to technology changes
- Balancing Council's regulatory obligations with customer service

Specific issues related to the sewerage activity are:

- Aging infrastructure, requiring investment in maintenance and renewal programmes to continue to achieve levels of service
- New Discharge Consents Conditions requiring improved discharge water quality
- Climate change driven sea level rise, which will compromise sewerage functionality
- Climate change driven increase in rainfall intensity leading to the possibility of greater infiltration into the sewerage network

2.4 KEY ASSUMPTIONS

2.4.1 Internal Factors

Table 2.3 Key Assumptions - Internal Factors

Assumption	Level of Uncertainty	Area of Impact and Potential Financial Impact
<p>Population</p> <p>At 30 June 2020, the estimated population of Invercargill was approximately 57,100¹.</p> <p>The population growth for Invercargill is around 1%².</p>	<p>Moderate – risk that actual numbers will vary.</p>	<p>Infrastructure and Housing.</p> <p>Significant increases in population may create a demand for infrastructure and services beyond existing capacity.</p> <p>Significant decrease in population would adversely impact on the community's ability to fund current levels</p>

¹ [Subnational population estimates \(TA, SA2\), by age and sex, at 30 June 1996-2020 \(2020 boundaries\) \(stats.govt.nz\)](https://stats.govt.nz)

² As above.

Assumption	Level of Uncertainty	Area of Impact and Potential Financial Impact
		of infrastructure and services.
<p>Household Growth</p> <p>The number of households will increase as the population ages and size of households decrease slightly.</p> <p>The size of household will vary between 2.25 and 2.35 people over the time of the infrastructure strategy, requiring 2,300 more homes than in 2013</p>	Moderate – risk that actual numbers will vary.	<p>Infrastructure and Housing.</p> <p>Significant increases in the number of households may create a demand for infrastructure and services beyond existing capacity.</p>
<p>Ageing Population</p> <p>Those aged 65 and older will form 23% of the population in 2031, which is higher than the current aged population in 2020.³</p>	Low – increasingly older population is reasonably certain.	<p>Council Services and Recreation Assets.</p> <p>An increase in the number of those people 65 years and older will increase the number of ratepayers on fixed incomes and may have an impact on the ability of the community to afford infrastructure and services.</p>
<p>Resource Consents</p> <p>Resource consents will be obtained with reasonable conditions and negligible impact on how Council provides its services.</p>	Moderate – change is imminent but extent of which is unknown.	<p>3 Waters.</p> <p>Capital expenditure may be required if the conditions attached to resource consents require changes to how Council delivers its services.</p>

As assumptions deal with matters of uncertainty and complexity, actual results will vary, even though they are based on the best information available. If events differ significantly from the assumptions, material variances to this Plan may result. The sewerage activity is particularly susceptible to the following assumptions:

➤ **Resource Consents**

Future resource consents are expected to have more strict consent conditions requiring action by Council to improve discharge quality. If greater improvements than anticipated are required, Council could incur significant cost to comply. Consent renewals for the Bluff Wastewater Treatment Plant in 2025, and the Clifton Plant in 2029 may require significant upgrades.

➤ **Useful Life of Significant Assets**

³ NZ Census Area unit forecast

Asset life has been assigned to sewerage assets, ranging up to 100 years for some pipe categories. Renewal expenditure is the greatest single cost item for the activity. Significant variance in asset life will increase or decrease the activity's budget requirement.

➤ **Asset Valuation**

The 2019 valuation has seen a significant increase in pipe valuations, and this has fed through to a major budget increase requirement.

2.4.2 Financial Factors

Table 2.4 Key Assumptions - Financial Factors

Assumption	Level of Uncertainty	Area of Impact and Potential Financial Impact
<p>Inflation</p> <p>Asset values and the capital work programme will increase by the accumulated Local Government Cost Index inflation on the last valuation value.</p>	<p>Moderate – inflation forecasts are not always accurate.</p>	<p>Cost change factors are based on information developed for Councils by Business and Economic Research Limited (BERL). Significant variations from these adjustments will be identified in future Annual Plans and Annual Reports.</p>
<p>Local Economy</p> <p>A recessionary period is expected for the first five years of the LTP and longer-term structural changes to the economy beyond this time. This will lead to higher unemployment and lower GDP.⁴</p>	<p>Medium</p>	<p>The shape of the recession (u or v) is as yet unknown. The relative impact across regions, based on industries impacted most by COVID-19, as well as potential impacts of proposed Tiwai closure and SIT amalgamation needs to be better understood by Council in order to reduce this uncertainty. Significant errors in this area could have a significant impact on Councils budgets over the forecast period⁵.</p>
<p>Useful Life of Significant Assets</p> <p>Assets will remain useful until the end of their average useful life, assuming asset average life expectancy assumptions are correct.⁶</p>	<p>Low Assets may need renewal earlier if this assumption is incorrect and change the renewal profile. Or may allow delayed renewal in other cases.</p>	<p>A shorter useful life for assets would create a financial burden on the community.</p> <p>Review the appropriateness of assets at the time of approval including, where appropriate, whole of life cycle assessment.</p>

⁴ BERL Local Government Cost Adjustor Forecasts – Three Scenarios Reference No: #6109

⁵ <https://www.infometrics.co.nz/industry-concentrations-and-the-fall-of-think-big/> ;
<https://www.infometrics.co.nz/examining-the-nz-industries-hit-hardest-by-the-covid-19-pandemic/> ;

BERL Local Government Cost Adjustor Forecasts – Three Scenarios Reference No: #6109

⁶ Council will use national standards is asset revaluation.

Assumption	Level of Uncertainty	Area of Impact and Potential Financial Impact
		Increase knowledge of asset conditions to better predict the average use of life if assumptions are lower than expected.
Financial – Expected Interest Rates on Borrowing Expected interest rates on borrowing will be 2.5%	Low	The treasury report from Bancorp projects the ICC Borrowing interest rate are currently at 2.20% in 2020, and is expected to fall and remain under 2% for the next 10 years. Significantly higher interest rates would impact Council's financial position.
Financial – Forecast on Return on Investments Return on cash and term deposits are forecasted to expect a negative rate at some stage within 2020/2021. Dividends from ICHL will be \$4.8m + CPI	Medium	<p>Lower than expected returns on investments are forecasted. Term deposit rates currently vary from 0.5% for under 6 months to a flat 1% for longer. Most forecasts still expect a negative rate at some stage within 2020/2021</p> <p>This would have a negative impact on Council's overall revenue and cash position, which would increase the burden on ratepayers.</p> <p>Council will consider strategic reliance on dividends noting increased levels of economic uncertainty</p>

2.4.3 External Factors

Table 2.5 Key Assumptions - External Factors

Assumption	Level of Uncertainty	Area of Impact and potential Financial Impact
Local Governance Amalgamation will not occur during the life of the Plan.	Low – to continue shared services, although amalgamation is low risk.	Shared Services, Policy and Governance. Boundary changes would require a review of the Long Term Plan with its associated community consultation.
Legislation There will be changes to legislation that have an impact on what and how	Moderate – difficult to know what central government will	Services, Finances and Governance.

Assumption	Level of Uncertainty	Area of Impact and potential Financial Impact
Council provides services.	implement, particularly if a change in government.	Significant legislative change can impose significant financial and service delivery costs on Council.
<p>Natural Disasters</p> <p>There will be no major catastrophes that impact on Invercargill or its economy.</p>	High – it is certain the Alpine Fault will rupture in the future but uncertain as to when and the impact.	<p>Infrastructure, Services, Housing and Population.</p> <p>A Civil Defence emergency in the District would impact financially on Council and the community. The financial risk to Council is reduced by maintaining insurance cover for emergency events.</p>
<p>Climate Change</p> <p>Climate change impacts will arise over the life of the Long Term Plan and current trends will be allowed for when planning infrastructure and services.</p>	Moderate – long term trend of rising temperatures and more frequent intense weather events is reasonably certain, short to medium term impacts are less certain.	<p>Water availability, coastal hazards (roading and infrastructure), services, air quality, agriculture, farming and biosecurity.</p> <p>The effect of climate change occurring more quickly than anticipated may require Council to review and change its current activities and levels of service. This could have a significant financial impact on the community.</p>
<p>Technology</p> <p>Changes in technology will affect how Council carries out its activities. This will have a financial implication over the 10 year plan.</p>	High – certainty of diversification in technology is ever-growing. Impact of changing technology cannot be quantified.	<p>Employment, Local Economy and Services (delivery).</p> <p>New technologies will likely have an increased financial cost in the short term.</p>

2.4.4 2021-2031 Long Term Plan Assumptions

Population			
Assumption	Level of certainty	Impact of uncertainty	Council response
<p>Population growth At 30 June 2020, the estimated population of Invercargill was approximately 57,100⁷⁸.</p> <p>The population growth for Invercargill is around 1%⁹. This rate has been observed during eight of approximately the past twelve years, making it a reasonable assumption for the current plan.</p> <p>Based on a 1% growth assumption, the expected population for 2031 is estimated to be around 62,810.</p> <p>Covid-19 might significantly change the previous growth forecasts for Council. Population growth is expected to be minimal in the short term as a result of Covid-19 limiting the ability of students and migrant workers to travel, along with continued aging of the population.</p>	Medium	<p>Council is not planning for a major change in population during the life of the current plan.</p> <p>There are multiple uncertainties related to population growth in Invercargill:</p> <ul style="list-style-type: none"> • While International students currently in New Zealand are able to return to SIT for study, the number of EFTS¹⁰ to date for 2021 is only 337. This is compared to 775 in 2020. • Riding out recession impacts of Covid-19 Alert Levels 4 and 3 • Proposed Tiwai Aluminium Smelter closure • Mid-range population forecast but noting underlying increase in population that has already surpassed StatsNZ estimates 	<p>The critical infrastructure and resources that Council provides were designed for a city with a population larger than we are now. Council has appropriate infrastructure and resources to service our population without significant financial impact as we have plenty of room to grow.</p> <p>This is in line with the higher forecast of the Southland Regional Development Strategy.</p> <p>Council will continue to monitor change in population growth during the life of the current long term plan to prepare for/respond to any significant changes realised from the multiple uncertainties identified.</p>

⁷ [Subnational population estimates \(TA, SA2\), by age and sex, at 30 June 1996-2020 \(2020 boundaries\) \(stats.govt.nz\)](#)

⁸ [Stats NZ Overview of data quality ratings, interim coverage and response rates, and data sources for 2018 census](#)

⁹ As above.

¹⁰ EFTS – Equivalent Full Time Student

<p>Diversity The population will continue to become more diverse. The Maori population will grow from 17% to 19%¹¹. The Asian population will grow from 6% to 9%¹².</p>	<p>Medium</p>	<p>Interruptions to travel may affect international migration although it is not expected to effect this assumption significantly. Impact of uncertainty is low.</p>	<p>Council continues to explore new ways of engaging and ensures a balanced sample in customer research to ensure it understands changing needs and expectations.</p>
<p>Ageing population Those aged 65 and older will form 23% of the population in 2031, which is higher than the current aged population in 2020¹³ (estimated at 10,000 of 57,100, or 17.51%)¹⁴.</p>	<p>High</p>	<p>The pattern of aging in the population is a long-term trend which is not expected to be disrupted.</p>	<p>The needs of older people and younger people are different from those in the working age and Council will continue to consider the needs of all users of its services.</p>
<p>Households The number of households will increase as the population ages. The size of households will decrease slightly and may vary between 2.35 and 2.25 people over the time of the infrastructure strategy¹⁵</p>	<p>Medium</p>	<p>The impact of a potential decline in numbers of students and migrant workers on demand for housing is uncertain.</p>	<p>Council's infrastructure has sufficient capacity to accommodate the potential increase in population and/or demand.</p>

¹¹ Growth in line with NZ stats estimate of 2% growth in the Southland region (NZ. Stats, population projections)

¹² Growth in line with NZ stats estimate of 3% growth in the Southland region (NZ. Stats, population projections)

¹³ NZ Census Area unit forecast

¹⁴ [Subnational population estimates \(TA, subdivision\), by age and sex, at 30 June 2018-20 \(2020 boundaries\)](#)

¹⁵ To calculate the projected average occupancy rates we took past and projected population data from Statistics New Zealand and cross referenced this to past and projected number of households. The average occupancy is the total population divided by the total occupied households.

Economy			
Assumption	Level of certainty	Impact of uncertainty	Council response
<p>COVID-19 The lockdown and potential future impacts of COVID-19 may negatively impact residents' ability to pay rates. This could lead to a short term cashflow impact and increased rates arrears. Rates arrears could increase further.</p>	Medium	To date there has been little impact on our rates receipts and the response to the new rates postponement and remission policy has led to a number of ratepayers contacting Council to go onto a payment plan for their rates.	Council has adopted an additional policy for postponement and remission of rates. This policy allows ratepayers financially impacted by COVID-19, to delay payment of up to 1 year's rates. Council staff will work with affected ratepayers to set up affordable payment plans.
<p>Economy A recessionary period is expected for the first five years of the LTP and longer-term structural changes to the economy beyond this time. This will lead to higher unemployment and lower GDP.¹⁶</p>	Medium	The shape of the recession (u or v) is as yet unknown. The relative impact across regions, based on industries impacted most by COVID-19, as well as potential impacts of proposed Tiwai closure and SIT becoming a subsidiary of Te Pūkenga needs to be better understood by Council in order to reduce this uncertainty. Significant errors in this area could have a significant impact on Councils budgets over the forecast period ¹⁷ .	<p>Council will focus on efficiency savings. Investment will only be made in activities which can be serviced.</p> <p>Council will continue to review its work programme and priorities as the level of uncertainty reduces.</p>
<p>Community funding Council can expect to see increased funding applications from groups as a result of Covid-19</p>	Medium	The immediate impact of Covid-19 has been seen in the local community, with reduced funding available from major	Council acknowledges the potential community expectation that Council

¹⁶ BERL Local Government Cost Adjustor Forecasts – Three Scenarios Reference No: #6109

¹⁷ <https://www.infometrics.co.nz/industry-concentrations-and-the-fall-of-think-big/> ; <https://www.infometrics.co.nz/examining-the-nz-industries-hit-hardest-by-the-covid-19-pandemic/> ; BERL Local Government Cost Adjustor Forecasts – Three Scenarios Reference No: #6109

<p>and its impact on Community Trust of Southland and Invercargill Licencing Trust's ability to fund.</p>		<p>community funders including the Community Trust of Southland and Invercargill Licencing Trust and Foundation.</p>	<p>will be positioned to distribute grants to fund community wellbeing related activities.</p>
<p>Economic diversification Volatility in the global economy may affect one or more of Invercargill's key export industries. This will drive diversification but will slow growth. There may be a delayed effect through the risk of impacted industries abandoning properties.</p>	<p>Medium</p>	<p>The relative impact needs to be better understood by Council to reduce uncertainty, as significant errors could have a significant impact on Council budgets over the forecast period¹⁸. This may directly impact rates and ability of Council to fund projects.</p>	<p>Council will continue to monitor changes in the global markets.</p>
<p>Central Business District Following a period of static activity until 2023 when the City Block development is complete, the CBD will become more vibrant and have increased connectivity.</p> <p>Council will work in collaboration with others to enable strategic activities and initiatives to support the success of the CBD.</p>	<p>High</p>	<p>The city centre is at the centre of Council's vision. As with any major investment of this type there is a level of uncertainty as to the impact of the development on future use patterns within the city. If the development does not succeed in drawing people to the city centre it will have an impact on Council strategy.</p>	<p>Council strategic activities and economic development activities delivered through Great South will align to support the success of the city centre projects</p> <p>Streetscape works will be designed to support connectivity to the city centre. Council will need to plan for the structural change this is anticipated to involve.</p> <p>Council has support for heritage buildings through the Regional Heritage Strategy and associated funds to support businesses managing high costs of older buildings.</p>

¹⁸ <https://www.infometrics.co.nz/industry-concentrations-and-the-fall-of-think-big/> and <https://www.infometrics.co.nz/examining-the-nz-industries-hit-hardest-by-the-covid-19-pandemic/>

<p>Tourism Tourism numbers will slowly increase, returning to 2019 levels by 2031.</p>	<p>Low</p>	<p>The tourism sector is the hardest hit in the economy and is not expected to fully recover out to 2030.</p> <p>This may have an impact on the Airport and other infrastructure needs that may or may not be required in short term as tourist numbers reduce.</p>	<p>Council expects some impact, but tourism is not a major proportion of Invercargill's GDP so the effect is expected to be relatively minor.</p>
<p>International education The numbers of International students studying at the Southern Institute of Technology will slowly increase back to 2019 levels by 2031.</p>	<p>Low</p>	<p>Students are an important part of the economy, creating significant demand. The impact on retail, hospitality and housing could be significant.</p>	<p>Council is working with Great South on economic development.</p>

Social and cultural

Assumption	Level of certainty	Impact of uncertainty	Council response
<p>Māori culture Māori culture will become more visible in the city.</p>	Medium	Increased awareness of the need to recognise Maori culture and tikanga (methodology), with a particular focus on partnership, participation and protection.	Council will invest more in Maori engagement to ensure strategic projects reflect Maori culture in the city.
<p>Socio-economic The impact of COVID-19 is yet to be realised, and there may be changes in Invercargill's socio-economic patterns over time.</p> <p>Māori have been disproportionately affected by the economic crisis brought about by the COVID-19 containment measures, and it is expected to continue to play out over the ten year recovery period.¹⁹</p>	Medium	<p>With GDP softening the long range economic outlook will hinge largely on the ability for the current and successive governments to provide economic stimulus.</p> <p>This may have an impact on Council activities that rely on users discretionary spend for revenue</p>	Council acknowledges the potential community expectation that Council will be positioned to distribute grants to fund community wellbeing related activities.

¹⁹ BERL (July 2020). Economic Scenarios to 2030. The post-COVID-19 scene.

Resilience

Assumption	Level of certainty	Impact of uncertainty	Council response
<p>Community wellbeing The COVID-19 response measures will have long term impacts on the wellbeing of communities, requiring a long term perspective response.</p>	Medium	The situation is evolving and will continue to be monitored.	Council has tasked Great South, the regional development agency, to focus on resilience and economic diversification. A Community Wellbeing Fund has been established.
<p>Community resilience The amalgamation of Southern Institute of Technology with Te Pūkenga, and the potential loss of zero fees advantage, will have an uncertain long-term effect on Invercargill's population and economy.</p>	Medium	<p>The effects of COVID-19 on immigration will impact student numbers in the short to medium term.</p> <p>The risk of losing the zero fees advantage could have an impact on our growth strategy.</p>	Council funds Great South to promote the region and continues to monitor and plan for the impact.
<p>Community resilience Tiwai Point Aluminium Smelter will continue to operate until 31 December 2024.</p>	Medium	A transition plan will be developed to prepare for the eventual closure. It is not yet clear where and how the impact will be felt in the community.	Council is working with the Just Transition team and Great South on economic diversification.
<p>Natural disaster No natural disaster is expected to impact the City during the life of the plan.</p>	Medium	<p>The impacts of a disaster will be assessed at the time and an appropriate response prepared.</p> <p>Infrastructure renewals are undertaken using resilient design practices.</p>	Council has a focus on resilience. Council continues to support and invest in Emergency Management Southland.

Environment – Climate Change

Climate change impacts will vary across regions in Southland. The following is a summary of impacts taken from the *Southland climate change impact assessment, August 2018* report.

Assumption	Level of certainty	Impact of uncertainty	Management response
<p>Mean annual and extreme temperatures (days where temp. exceeds 25°C) are expected to increase with time: By 2040: mean annual temperature increase of 0.5-1°C with 0-10 more hot days per annum. By 2090: mean annual temperature increase of 0.7-3°C, with 5-55 more hot days per annum.</p>	High	<p>Water - Longer period of drought may result in increased demand, whilst flood events create turbidity and increase the cost to treat for consumption.</p> <p>Flood Banks – increased temperature results in more extreme weather events, with a corresponding increase in height and frequency of storm surges.</p>	<p>A planned pathway for the review of these assumptions and the impacts will minimise large impacts upon activities.</p>
<p>Annual rainfall is expected to increase: By 2040: +0-10% By 2090: +5-20% Increased frequency of high rainfall days, i.e. increase in intensity of rainfall.</p>	High	<p>Roading - increased frequency and intensity of rainfall may require extra drainage works in the road network that may alter long-term maintenance costs</p> <p>Stormwater – increased frequency and intensity of rainfall events resulting in increased demand on the network.</p> <p>Wastewater - Increased frequency and intensity of rainfall events results in infiltration and inflows that increase volumes to be treated.</p>	<p>A planned pathway for the review of these assumptions and the impacts will minimise large impacts upon activities.</p>
<p>Mean sea level is expected to rise. By 2040: 0.2-0.3 m By 2090: 0.4-0.9 m</p>	High	<p>Errors in modelling will have significant impact on capital works programme required</p> <p>Stormwater – increased tailwater levels require consideration for outfall design.</p>	<p>A planned pathway for the review of these assumptions and the impacts will minimise large impacts upon activities.</p>

		Flood Banks – Renewals need to consider increased sea level during design life. Sewerage – Clifton outfall may need to be pumped long term.	
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Council operations

Assumption	Level of certainty	Impact of uncertainty	Council response
<p>Council services and structure Council is planning for the current structure to deliver the current set of services, with the exception of water and sewerage.</p>	Medium	If amalgamation does occur, costs to the ratepayer will remain the same, although revenue and financing will be done by a different operator.	Council will proactively engage with neighbouring authorities and central government to ensure that the best result is achieved from any amalgamation.
<p>Water Reform As a result of the Central Government directed Waters Reform, it is assumed there will be a change in water reticulation and sewerage delivery services within the life of the plan. This will result in a structural change for Council in relation to the ownership of assets and associated debt capacity. The services will continue to be delivered, but these will be provided by another party. This will include increased regulatory requirements as required by the new regulatory authority.</p>	High	<p>The services will continue to be delivered but these will be provided by another party.</p> <p>This will be managed in line with Government best practice, and will remain within the Council financial and 10-year assumptions.</p>	<p>Council will assess proposed reform options when Central Government has provided their final recommendations to Local Government entities.</p> <p>Council will proactively engage with neighbouring authorities and central government to ensure that the best result is achieved from any reforms.</p> <p>Council is incorporating management of this potential outcome through planning for management of debt.</p>
<p>Legislative changes There will be changes to legislation that have an impact on how Council will provide services. These changes may affect the Council organizational structure but not change the level of service received by the customer/ratepayer.</p>	High	Changes may affect the Council organizational structure but not change the level of service received by the customer/ratepayer.	Management will continue to engage with Government and plan for changes in services in response to policy and regulation changes as these arise.
<p>Consents</p>	Medium	If unexpected consent conditions	Council will work with the

Council will continue to carry out legislation-directed ordinary functions while factoring in an increase to required quality for consent conditions.		are imposed there may be unexpected costs to compliance.	Regional Council early to minimise the risk of unexpected consent conditions. The cost of obtaining consents, knowing environmental standards are increasing, will be built into activities.
The Funding Assistance Rate (as advised from Waka Kotahi NZTA) will reduce by 1% each year until reaching 51% funding assistance in the 2023/2024 and then remain at 51% for the life of the plan.	High	Increase in demand on rate funding for roading activities, including the forecast NZTA portion of the city centre streetscape project.	Continue to engage with NZTA on funding assistance.
Asset life Assets will remain useful until the end of their average useful life, assuming asset average life expectancy assumptions are correct. ²⁰ Infrastructure installed in the 1920s are nearing the end of their lives and require renewal within the term of the Infrastructure Strategy.	High	Assets may need renewal earlier if this assumption is incorrect and change the renewal profile. Or may allow delayed renewal in other cases.	Review the appropriateness of assets at the time of renewal including, where appropriate, whole of life cycle assessment. Increase knowledge of asset conditions to better predict the average use of life if assumptions are lower than expected.
Investment property and Forestry Investment Property and Forestry Assets are valued on a yearly basis. They are expected to increase in line with inflation. This is reflected in our Financial Strategy, and Accounting policies.	High	Variation in valuations have no cash flow implications for Council.	Continue to value Investment Property and Forestry assets on an annual basis.
Capital programme delivery Implementation of a Project Management Office will	High	It may take longer to implement the Project Management Office than	Active management of project processes, including

²⁰ Council will use national standards is asset revaluation.

<p>increase effectiveness of delivery of the capital programme over the Long-term Plan. 75% of the capital programme will be delivered In Year 1, 80% in Year 2, 85% in Year 3.</p>		<p>expected, including as a result of challenges in attracting qualified personnel. Availability of contractors may have a greater impact than expected. Delay in the programme will result in higher costs as a result of inflation.</p>	<p>engaging consultants as required, active and early engagement with contractors. Management of the programme rather than individual projects will enable contractor availability as well as funding levels to be actively managed. The financial risk of higher levels of delivery than expected across multiple areas will be monitored. Any impact of delayed capital expenditure on renewals on maintenance budgets will be actively managed.</p>
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Financial forecasting

Assumption	Level of certainty	Impact of uncertainty	Council response
<p>Inflation Operational forecasts and capital work programmes will increase by the accumulated Local Government Cost Index inflation forecast by BERL.</p>	Medium	Cost change factors are based on information developed for Council's by Business and Economic Research Limited (BERL). Significant variations to inflation would have an impact on Council's financial management.	Council will continue on the planned pathway for the Capital Works programme and review operational revenue & expenses each year.
<p>Asset revaluation Asset values will increase by the accumulated Local Government Cost Index inflation forecast by BERL on the last valuation value. Revaluation occurs in 2021/22 and every third year therefore.</p>	Medium	Changes in the valuation or life of Council assets may have a significant impact on Council's financial management and capital programme.	Council will continue on the planned pathway for the Capital Works programme and monitor with after each revaluation cycle.
<p>Interest rates - Borrowing Expected interest rates on borrowing will be 2.5%.</p>	High	The treasury report from Bancorp projects the ICC Borrowing interest rate are currently at 2.20% in 2020, and is expected to fall and remain under 2% for the next 10 years. Significantly higher interest rates would impact Council's financial position.	2.5% would allow some upside if the situation changed (interest rates increase or credit rating decreases); but Council have potential to go to 2.25% or 2% to lower costs.
<p>Interest rates – Cash and Deposits Return on cash and term deposits are forecasted to expect a negative rate at some stage within 2020/2021.</p>	Medium	Term deposit rates currently vary from 0.5% for under 6 months to a flat 1% for longer. Most forecasts still expect a negative rate at some stage within 2020/2021.	An assumption of 0.5% should be comfortable and if rates do increase again in the future, this will put Council in a more positive position.
<p>Dividends from ICHL will be \$4.8m + CPI.</p>	Medium	This would have a negative impact on Council's overall revenue and cash position, which would increase the	Council will consider strategic reliance on dividends noting

		burden on ratepayers.	increased levels of economic uncertainty.
External Funding It is assumed Council will achieve the level of external funding as estimated.	High	The immediate impact of Covid-19 has been seen in the local community, with reduced funding available from major community funders including the Community Trust of Southland and Invercargill Licencing Trust and Foundation.	Council acknowledges the challenge of obtaining external funding at this time. Should Council not be able to obtain funding as indicated this would impact project scope and in some cases require further consultation.

3. The Service We Provide

3.1 CUSTOMER PROFILE

3.1.1 Our Stakeholders and Community

Council recognises there are a wide range of customers and stakeholders with an interest in how the sewerage activity supply is managed. The resident community, specific interest groups within the community and regulators are just some of the groups that Council needs to engage with to ensure they are delivering the right service at an affordable cost. The identified stakeholders are:

Table 3.1 Our Stakeholders and Community

External Stakeholders	Area of Interest	Engagement
Invercargill Community	Service provision to customer	Liaise
Invercargill Ratepayers	Rates impact	Consult through AMP, Annual Plans and surveys
Environment Southland	Governance	Discharge Consents – negotiation / compliance
Contractors and Consultants	Service provision to Council	Liaise
Southland District Health Board and Ministry of Health	Community Health	Liaise
Ministry for Environment, Department of Conservation, Iwi, Fish and Game, and Southland Environmental Group	Environmental impact sustainability	Liaise
Audit New Zealand	Governance and Operation	Audit

Internal Stakeholders	Area of Interest	Engagement
Councillors and Directors	Governance and leadership	Report
Infrastructure Managers	Common service goals	Liaise
Engineering Services and Information Technology	Technical support	Liaise
Finance and Corporate	Financial assistance and Group Manager – Finance and Corporate Services	Liaise
Planning and Regulatory	Compliance	Liaise

3.1.2 How We Engage our Communities

Council is currently developing an Engagement Strategy that will shape how each area of Council, including elected members and staff, will engage with our Community in the future. It is anticipated that the Engagement Strategy will assist in delivering positive outcomes to the Community by identifying how the different groups within our Community wish to be engaged on different topics.

Although developing an Engagement Strategy, Council already engages with the District's ratepayers on a number of levels:

- Public Forums at Council and Committee meetings
- Public requests to be heard as a specific Agenda item
- Regular features in the newspapers and rates newsletters which inform ratepayers of issues
- The City Focus radio show that highlights current topics that the Council is addressing
- The Mayor holds appointments with residents who wish to raise issues of concern
- Community Engagement processes when Council is considering making a significant decision
- Formal consultation through the Special Consultative Procedure for issues such as the Long Term Plan and some bylaws
- Facebook page where individuals can ask questions and express opinion to Councillors and staff

For significant sewerage projects which may affect a section of the community, public meetings are held, and specific information mailed to households who may benefit or be affected by the project to provide an opportunity for feedback, and for residents to communicate their desired outcomes. For example, for the Kennington sewerage extension, public meetings were held during the planning stage, and letters mailed to households with key points during the project implementation.

Annual meetings are held with residents in the area surrounding the Clifton Wastewater Treatment Plant to understand how the plant impacts on their properties, particularly in regard to odour. The Key Performance Indicators include a record of odour complaints from this area.

3.1.3 Community Research

In 2013 the Council carried out a Customer Service Level Survey (Appendix 1.06) to provide information on ratepayers and residents' assessment of Council's services and to understand:

- What residents want from Council activities;
- How they perceive the value for money of those activities; and
- The level of service desired.

In 2016 a second research project was undertaken, with further research undertaken in 2020. This project had a slightly different focus. The results from both the service level survey and research project, combined with expert knowledge of staff working in the sewerage activity, have helped establish a foundation of levels of service statements.

Customer requests for service are logged by customer service staff and attended to by the activity. This information is another platform which can be used to understand the community requirements.

3.1.4 Key Service Attributes Valued by Customers

Council's 2013 Service Level Survey told Council that the Community assessed the three most important aspects of the Sewerage Activity as:

1. Treatment and disposal

2. The uninterrupted collection
3. Community impact of disposal

The 2016 Levels of Service Survey showed that most residents (98%) consider drainage (stormwater and sewerage) to be essential services, and that rates funding should be maintained (67%) or increased (32%) to ensure the level of service is maintained or improved. (Results contained in Appendix 1.08).

3.2 SERVICE DRIVERS

3.2.1 Community Expectations

The Local Government Act 2002 requires Council to consult with affected and interested parties in making decisions. To implement level of service changes, options analysis and the selection of the best practicable and preferred option, has to be done by a coherent, integrated and transparent process.

Council ensures that all interested stakeholders have an opportunity to influence level of service decisions by:

- Asset Management Plans available on the Council Website and on request
- Engagement with key stakeholders throughout the development of significant capital proposals
- Public opportunity to make submissions on strategic targets through the Long Term Plan process
- Consulting with affected persons on specific projects (as required by the Resource Management Act 2001)
- Community consultation utilising focus groups

3.2.2 Legislative Requirements

The following documents are referred to as a guide to generally accepted industry practices:

- Resource Management Act – The guiding legislation for all activities which will have an impact on the natural and human environments.
- The National Policy for freshwater management provides local authorities with updated direction on how to manage freshwater under the Resource Management Act.
- Regional Water Plan for Southland – Resource consents for treated effluent discharges to surface water are granted by Environment Southland under the provisions of this Plan.
- Proposed Southland Water and Land Plan – This plan was notified by Environment Southland in 2016, and seeks to update the provisions of the current Regional Water Plan for Southland. Currently this plan is under appeal.

Key Legislation

- **Local Government Act 2002 Schedule 10** requires that the Long Term Plan contain information on the assessment and management of the implications of changes in demand or service levels. This means that Local Authorities should disclose:
 - Whether they intend to change the service levels for an asset over the life of the Plan

- What they expect will happen either to demand for the service and / or consumption of the service
- Demonstrate how risks are to be managed
- **Local Government Act 2002, section 17A** – requires local authorities to review the cost – effectiveness of current arrangements for meeting the needs of the community for good quality local infrastructure and local public service.
- **Resource Management Act 1991 and 2001** requires Council to:
 - Sustain the potential of natural and physical resources to meet the reasonable foreseeable needs of future generations
 - Comply with the District and Regional Plans
 - Avoid, remedy or mitigate any adverse effect on the environment
 - Take into account the principles of the Treaty of Waitangi in exercising functions and powers under the Act relating to the use, development, and protection of natural and physical resources
 - Comply with resource consents issued for sewerage discharges
- **Health Act 1956** Under the Health Act 1956, the Council must promote and conserve the public health within the City. The sewerage activity ensures that sewage is removed from properties and adequately treated before discharge to the environment to minimise the risk of disease.
- **Hazardous Substances and New Organisms Act 1996** requires Council to ensure that hazardous materials are stored, transported, and disposed of in a compliant manner. Within the sewerage activity, Council controls discharges of hazardous substances to the sewerage system through the Trade Waste bylaw.
- **Health and Safety at Work Act 2015** requires Council to provide safe and healthy work places, identify and document work place hazards, and take steps to eliminate, isolate, and minimise hazards.

3.2.3 Industry Standards and Guidelines

The following documents are included as generally accepted industry practices:

- Resource Management Act – The guiding legislation for all activities which will have an impact on the natural and human environments. Resource consents to discharge treated effluent from Wastewater Treatment Plants are granted by Environment Southland under the provisions of the Resource Management Act.
- New Zealand Infrastructure Management Manual – The accepted industry practices on which this Plan is developed.
- Guidelines for the Safe Application of Biosolids to Land in New Zealand.
- New Zealand Building Code.
- Invercargill City Council Code of Practice for Land Development, and associated technical specifications, standards and guidelines, ensure that sewerage infrastructure is developed in a manner which protects both the public and the environment, and which can be cost effectively maintained with the appropriate design life of the various components of the system.

The Code of Practice for Land Development refers to a range of New Zealand Standards for construction techniques and materials.

- Invercargill Trade Waste Bylaw – Modelled on the New Zealand Model Trade Waste Bylaw, sets requirements for discharge of trade waste from industry to the sewerage network.

Key industry practice considerations included within these documents are:

- Pipe materials and design lives
- Installation details
- Testing and monitoring
- Procurement of services or goods
- Standards for Treatment and Disposal of Sewerage
- Standards for Beneficial use of Biosolids

3.2.4 Potential Significant Negative Effects

The sewerage activity protects the public health of the community by the safe removal of sewage from the community to wastewater treatment plants, and adequate treatment prior to discharge of effluent to ensure that receiving environments are protected from contamination. The activity does however carry a risk of potential adverse effects due to inadequate operational, maintenance and renewal strategies, as a result of inappropriate material being discharged to the network, or as a result of extreme natural events including flooding and earthquakes.

The potential negative effects of the sewerage activity are:

- ***Environmental***

- Disposal of poorly treated effluent can cause environmental degradation.
- Discharge of sewage from sewerage network reticulation due to blockage or overloading can contaminate waterways.
- Discharge of prohibited materials, or over strength or excessive volumes of tradewaste can cause failure of treatment systems, and non-compliance with treatment plant discharge consents.
- Inappropriate disposal of treatment bi-products (biosolids) can cause environmental degradation.

- ***Sustainability***

Currently the Invercargill City Council has no sustainability strategy.

- ***Social***

- Odours from the sewerage activity (Reticulation or Treatment Plants)
- Health and safety risks associated with operation of the activity
- Property damage resulting from activity failures

- ***Cultural***

No potential negative effects identified.

- ***Economic***

The cost to the community as a result of property damage caused by system failures.

➤ **Mitigation Methods**

The potential negative effects of odour, reticulation overflow due to blockages and effluent, and biosolids disposal are considered significant by Council and are mitigated by ensuring:

- Treatment Plant Effluent Discharges are regulated by conditions of resource consents issued by Environment Southland, and monitored to ensure contaminants are within consented limits.
- Biosolids are produced and applied to land in accordance with the “Guidelines for Safe Application of Biosolids to Land in New Zealand” and are regulated by conditions of resource consents issued by Environment Southland. Soils within the disposal area are monitored to ensure contaminants are within consented limits.
- The reticulation network and treatment plants are managed to minimise the occurrence of odour and to reduce the risk of blockage or overloading. Asset Renewal programmes are carried out to industry standards. Despite these measures, asset or operational failures leading to odour and / or overflow cannot be entirely eliminated. Council has contracted maintenance services to ensure prompt response and repair in accordance with defined standards.
- Tradewaste Consents are issued to major tradewaste dischargers, with conditions limiting the strength and volume of waste able to be discharged to the network. Council laboratory staff monitor discharges to ensure compliance with consent conditions.
- Council will develop a Sustainability Strategy.

3.3 CURRENT LEVELS OF SERVICE

3.3.1 Current Customer Levels of Service, Performance Measures and Targets

Measures of the overall activity, covering the aspects of service of most interest to the community. These measures are the focus for community consultation in the Long Term Plan and are reported on in the Annual Report.

The current activity measures and the target levels of performance are shown in Table 3.5.

The target levels of service are intended to apply for the initial 8-10 years of the Asset Management Plan. Changes to target levels of service may be initiated by:

- Customer expectation
- Legislative or resource consent change
- Changes to contract key performance indicators
- Analysis of performance indicating target levels are unrealistically high or low

3.3.2 Current Technical Levels of Service, Performance Measures and Targets

The technical measures are used by the asset managers in the day to day management of the assets and are reported on in this Asset Management Plan.

These measures are aligned with, and support the achievement of, the activity measures.

The current technical and operational measures used for monitoring asset management performance are shown in Table 3.2.

3.3.3 National Non-financial Performance Measures

From 30 July 2014, in accordance with the Local Government Act 2002, Section 261B, mandatory performance measures have been applied for sewerage and the treatment and disposal of sewage as shown in Table 3.2

3.4 LEVELS OF SERVICE ISSUES AND CHALLENGES

3.4.1 Current Levels of Service Gaps

➤ ***Environmental Standards***

Council monitors the quality of effluent from each of the three treatment plants as required by the Discharge Consents, and consistently achieves the required discharge quality. However, due to the condition of the sewerage network and the private drains connecting into it from properties, there is some contamination of stormwater, which will require correction as a condition of the stormwater discharge consent.

➤ ***Reliability***

While service level targets for reliability are currently satisfactory, assets are aging, with 17% of the pipe network reaching its assigned service life in the 2020s. Asset condition will deteriorate with age and compromise reliability.

➤ ***Availability and Timeliness***

Maintenance contractors have at times struggled to meet continuity of service and timeliness targets for removal of blockages affecting service to included properties.

3.4.2 Possible Responses to Gaps

➤ ***Environmental Standards***

- Where stormwater contamination source is identified as sewerage network, repair are made.
- The sewerage model will be used to identify area of concern and the information will then be used to assist in the formation of capital works programme
- Target maintenance and renewal of sewerage network to reduce contamination of stormwater.

➤ ***Reliability***

Target Renewal Programme to maintain performance standards.

➤ ***Availability and Timeliness***

Work with contractor to ensure timeframes are achieved.

Table 3.2 Current and Future Activity Key Performance Measures

The Sewerage Activity **preserves the character** of our City through the safe collection and treatment of sewerage, and ensuring that receiving waters are not adversely affected by effluent discharge. The Sewerage Activity ensures a low level of interruption to the network and resolves issues in a timely manner. The Sewerage activity **enhances our city** by receiving and treating trade waste efficiently, and responding to consent applications in a timely manner.

The following mandatory performance measures for the sewerage activity are required to be reported on annually from July 2014. The related Invercargill Technical Target Levels of Service are listed

MEASURE 2021-2031	TARGET
Number of dry weather sewerage overflows per 1,000 properties - DIA Performance Measure 1 (system and adequacy)	Max. 4
Compliance with the Council's resource consents for discharge from its sewerage system - DIA Performance measure 2 (discharge compliance) - measured by the number of: - Abatement notices - Infringement notices - Enforcement orders - Convictions	Compliance with the Council's effluent discharge consents
The Council's response to issues with its sewerage system (expressed per 1000 connections to the City's sewerage system) - DIA Performance Measure 3 (fault response times) Attendance time within 1 hour (from the time Council receives notification of fault to the time service personnel reach the site) - DIA Performance Measure 3 (fault response times) Resolution time within 4 hours (from the time Council receives notification of fault to the time service personnel confirm resolution of the fault) - DIA Performance Measure 3 (fault response times)	Response time to emergency blockages – <one hour Attendance time to emergency blockages – <one hour Resolution time for blockages – <6 hours
The total number of complaints received by Council about any of the following, expressed	Max 4

per 1,000 properties - DIA Performance Measure 4 (customer satisfaction):	
<ol style="list-style-type: none"> 1. System faults 2. System blockages 3. Odour 4. Council's response to sewerage system issues 	

Measure	2016/17	2017/18	2018/19	2019/20	2021/22 Target	2022/23 Target	2023/24 Target	2024-31 Target
Number of dry weather sewerage overflows per 1,000 properties - DIA Performance Measure 1 (system and adequacy)	0.77	1.02	0.45	0.59	Max. 4	Max. 4	Max. 4	Max. 4
Compliance with Council's resource consents for discharge from its sewerage system - DIA Performance measure 2 (discharge compliance)	0	0	0	0	Max. 0	Max. 0	Max. 0	Max. 0
DIA Performance Measure 3 (fault response times)								
(a) The median response time to attend emergency blockages	3 minutes	25 minutes	21 minutes	18 minutes	<1 hour	<1 hour	<1 hour	<1 hour
(b) The median response time to resolve emergency blockages	1 hour 46 minutes	1 hour 48 minutes	1 hour 4 minutes	1 hour	<6 hours	<6 hours	<6 hours	<6 hours
DIA Performance Measure 4 (customer satisfaction) The number of complaints received about:	0	0	0	0	Max. 0	Max. 0	Max. 0	Max. 0
<ol style="list-style-type: none"> 1. sewage odour 2. system faults 3. system blockages 4. Council's responsiveness 	2.91	2.46	1.00	1.26	Max. 4	Max. 4	Max. 4	Max. 4
(expressed per 1,000 properties connected to the Council's sewer system)								

4. Demand for Our Services

4.1 DEMAND FORECAST

4.1.1 Factors Influencing Demand

This Asset Management Plan reflects Council's assumptions for the Long Term Plan as set out in the background paper: Long Term Plan – Background and Assumption 2018-28.

Factors affecting the sewerage activity are:

- Population and household growth, and aging population
- Legislation and resource consents
- Inflation
- Growth in local economy
- Depreciation, asset revaluation, and useful life of significant assets
- Natural disasters
- Climate change
- Technology

4.1.2 Projected Growth or Decline in Demand for the Service

➤ *Population and Household Growth, and Aging Population*

Population in Invercargill is expected to increase slightly to peak at 56,300 in 2028, before decreasing to 55,500 in 2043, based on Statistic New Zealand medium population projections. The low population projection shows a decrease over this time period, with the high projection indicating an increase. Refer to Appendix 14.08 for further details.

Table 4.1 Population Projection

Population at 30 June							Population change 2013-43	
2013	2018	2023	2028	2033	2038	2043	Number	Average annual (percent)
53,200	55,300	55,900	56,300	56,300	56,000	55,500	2,300	0.1

A demographic shift towards an older population is predicted. This is expected to result in an increase in the number of households, as more people live alone, but is not expected to result in a significant increase in the volume of domestic sewage.

The Invercargill City District Plan 2013 provides for limited extension of the urban zone to provide for residential development, and it is expected a further increase in households will result from infill development, as large existing urban properties are subdivided to provide additional residential sites. The trunk sewerage pipes and treatment plants are of sufficient capacity to accept sewage from a significantly larger population than is expected, and a need for upgrading due to population growth is not anticipated.

There will remain a demand for rural residential options, but Council does not intend to extend the sewerage network to service these properties, and will expect them to provide suitable on-site effluent disposal systems.

➤ ***Growth in Local Economy***

The local economy is expected to grow and diversify and this is likely to result in additional industries with a need to dispose of trade wastes. The sewerage activity has some capacity to accept trade waste from new development industrial zones within the city, including the Awarua Industrial Estate. Trade wastes are regulated and controlled by the Trade Waste Bylaw to ensure that trade wastes do not compromise the operation of the activity.

➤ ***Asset Valuation and Useful Life of Significant Asset***

As an asset based activity, it is critical to meeting the desired Levels of Service that asset life is carefully monitored, and that assets are renewed before failure. A significant number of assets are now at, or near, the end of their assigned service life and renewal programmes are part of this Asset Management Plan.

The renewal of assets is planned at the rate of asset consumption. This inherently leads to periods of increased renewal costs. The planned renewals are smoothed over a period of 5-7 years to minimise the impacts of changing renewal budgets on the ability of the local market to deliver these renewals. The renewal budgets are set from the asset valuations and therefore changes in asset valuations due to increased costs feedback to these renewal budgets. Any inconsistencies in asset valuations are corrected during the next revaluation cycle (every three years).

4.2 CHANGES IN SERVICE EXPECTATIONS (FUTURE LEVELS OF SERVICE)

4.2.1 Anticipated Changes in Demand for Service

The following are likely to affect the demand for the sewerage activity:

➤ ***Legislative Change***

Legislative changes can significantly affect the Council's ability to meet minimum levels of service, and may require improvements to infrastructure assets. Changes in environmental standards and the Resource Management Act 1991 may affect sewage disposal standards and options.

Invercargill City Council holds consents issued by Environment Southland to discharge treated effluent from the Bluff Wastewater Treatment Plant until 2025, and from the Clifton and Omaui Plants until 2029.

The National Policy Statement for Freshwater Management and Environment Southland's 'Southland Water and Land Plan' is likely to place more pressure on Council to improve the reliability of the sewerage and stormwater networks to ensure that discharge of contaminants to waterways is avoided.

➤ ***Climate Change***

Climate change will have an effect on this sewerage activity long term, in the way we deal with inflow and infiltration and how we discharge our treated effluent.

➤ ***Technological Change***

Technological advances applicable to the life cycle management of sewerage assets are being made in the following areas:

- 'Trenchless' technology - repair and rehabilitation techniques which do not require the excavation of pipelines offer savings in both direct and indirect (disruption to traffic, property owners and commerce) costs.
- Treatment systems - new techniques to improve cost effectively and reliability of sewerage treatment.
- Asset management systems - software which allows the more effective storage, analysis and reporting of asset information.
- Invercargill City Council will monitor and investigate advances in technology, and introduce them as appropriate.

➤ ***Industrial Development***

Invercargill City Council has an objective to encourage industries to the District. Some industries, particularly those servicing the rural sector, have high water and effluent treatment demands. If effluent is accepted into the sewerage system, impacts on the reticulation and treatment systems need to be considered.

➤ ***Rural Residential Communities***

Invercargill has a number of small rural residential clusters with onsite wastewater treatment systems, some of which are failing, and on sites with limited options for replacement systems. In some cases the extension of the sewerage network or the provision of small sewerage treatment systems to service these communities may be an economic solution.

4.3 EXPECTED IMPLICATIONS FOR THE ACTIVITY

4.3.1 Legislative Change

The National Policy Statement for Freshwater Management and Environment Southland's 'Southland Water and Land Plan' is expected to have some significant implications for the sewerage activity, relating to the quality of effluent discharges, and cross contamination between sewerage and stormwater. With the Southland Water and Plan currently under appeal, the full implications for the sewerage activity will not be known for several years, when the limit setting process on the various Southland waterways is completed.

However it is expected that the discharge consents will be affected as follows:

➤ ***Bluff Waste Water Treatment Plant Discharge (expires 2024)***

This discharge is high quality, with very low impacts on receiving waters. It is anticipated that upgrade will not be required.

➤ ***Omaui Oxidation Pond Discharge (expires 2029)***

This discharge is to land, adjacent to the coastal marine area, and impacts on Coastal Marine Area (CMA) have not been observed. An upgrade requirement is not anticipated for consent renewal.

➤ ***Clifton Waste Water Treatment Plant Discharge (expires 2029)***

This discharge is to the New River Estuary, and adds to high nutrient loading from other sources. It is likely that a significant treatment upgrade will be required at significant cost.

➤ ***Stormwater Discharge Consent***

Application has been made for renewal of these consents, with expiry date subject to conditions. Council has proposed monitoring to identify cross contamination of stormwater with sewerage, and proposes to address issues identified as part of the pipe network renewal programme for both networks.

4.3.2 Technology Change

Council will monitor and investigate advances in technology where appropriate to improve performance against Levels of Service and cost effectiveness.

4.3.3 Rural Residential Communities

Where appropriate, Council will consider options to extend the sewerage network, or apply small scale community sewerage schemes to address issues with failing onsite effluent systems.

4.4 FUTURE DEMAND ISSUES AND CHALLENGES

4.4.1 Possible Demand-related Responses

No specific programmes are proposed for growth and demand related works, as low levels of growth are expected in Invercargill during the life of the Plan.

However, provision has been made for growth in the following areas:

➤ ***Residential Growth***

The District Plan provides for residential growth in several areas of the urban area, and in Otatara. The Plan specifically identifies Retreat Road as an area for residential development, although budgets and timelines for this development have not yet been determined. The provision of sewerage reticulation will be part of the subdivision development and funded by the developer. As part of subdivision assessment, the adequacy of infrastructure into which the subdivision feeds will be considered, and, if necessary, upgraded as part of development. Because the overall population is not expected to increase significantly, it is anticipated that the capacity of trunk sewers and treatment systems will not be compromised.

➤ ***Awarua Industrial Development***

The Council has rezoned land at Awarua for Industrial Development, and it is expected that industry wishing to establish in the area will require effluent treatment. Council intends to collect and convey effluent to the Clifton Treatment Plant, and, depending on strength, effluent may be pre-treated at Awarua either by the industry or by Council. Because industry requirements vary considerably, it is intended to consider and provide services in negotiation with industry as they establish, with funding to be recovered as a cost against the development, including the costs of pre-

treatment systems at Awarua, or of capacity upgrades of the Clifton Treatment Plant.

4.4.2 Possible Non-Asset Solutions

Demand Management involves implementing non-asset related solutions to manage the demand for a service. Non-asset solutions include:

- Control of trade waste discharges
- Onsite disposal versus reticulation system
- Reduction in infiltration

Invercargill City Council will implement the following demand management strategies to minimise the need for investment into sewerage assets:

➤ ***Trade Waste***

The quantity and type of trade waste that enters public systems can considerably affect costs and treatment options. The Invercargill City Council Bylaw 2017/1 - Trade Waste provides for review and control of trade waste discharges and requires trade waste consent holders to consider cleaner production pathologies. As the Council has an objective to encourage industries to the District, trade waste volumes may increase, requiring changes to treatment plants. Trade waste charges have been developed to recover costs.

➤ ***Onsite Disposal Versus Reticulated System***

While the major urban areas of the City have a reticulation system, smaller townships and rural properties use onsite disposal systems. The issue of choosing between systems will apply to new subdivisions and lifestyle block development. It may be more economical for properties to be serviced by onsite disposal rather than extending the public reticulation system. Any onsite disposal system will need to meet the environmental standards for discharge required by the operative regional water plan.

➤ ***Reduction in Infiltration***

As the reticulated systems age, the need to control the quantity of infiltration and inflow becomes more important in order to reduce the need to increase the capacity of the sewerage system. Invercargill City Council has been conducting flow monitoring and infiltration surveys, and video inspections of sewers to identify pipes which are deteriorating structurally, or which are subject to high levels of infiltration. The original flow monitoring survey was done in 2003, and identified areas of high infiltration, as shown in Figure 4.1. Pipe renewal programmes have included renewals in these areas. A follow up flow monitoring survey was conducted in 2017, and will be used to update the areas of high infiltration, and to identify maintenance issues to improve performance or renewal programme priorities for future years.

Inspections of on-property drainage systems (required as a condition of the City's stormwater consent) have identified issues within properties which have been contributing to high infiltration, including structural damage and blockages of pipes, and cross connections and leakage between the drainage systems. Where these issues are identified, the property owner is required to have the problem rectified. These inspections will continue

for at least the 15 year term of the stormwater discharge consent. The results of these surveys and of maintenance records will be used to identify maintenance issues to improve performance or renewal programme priorities for future years.

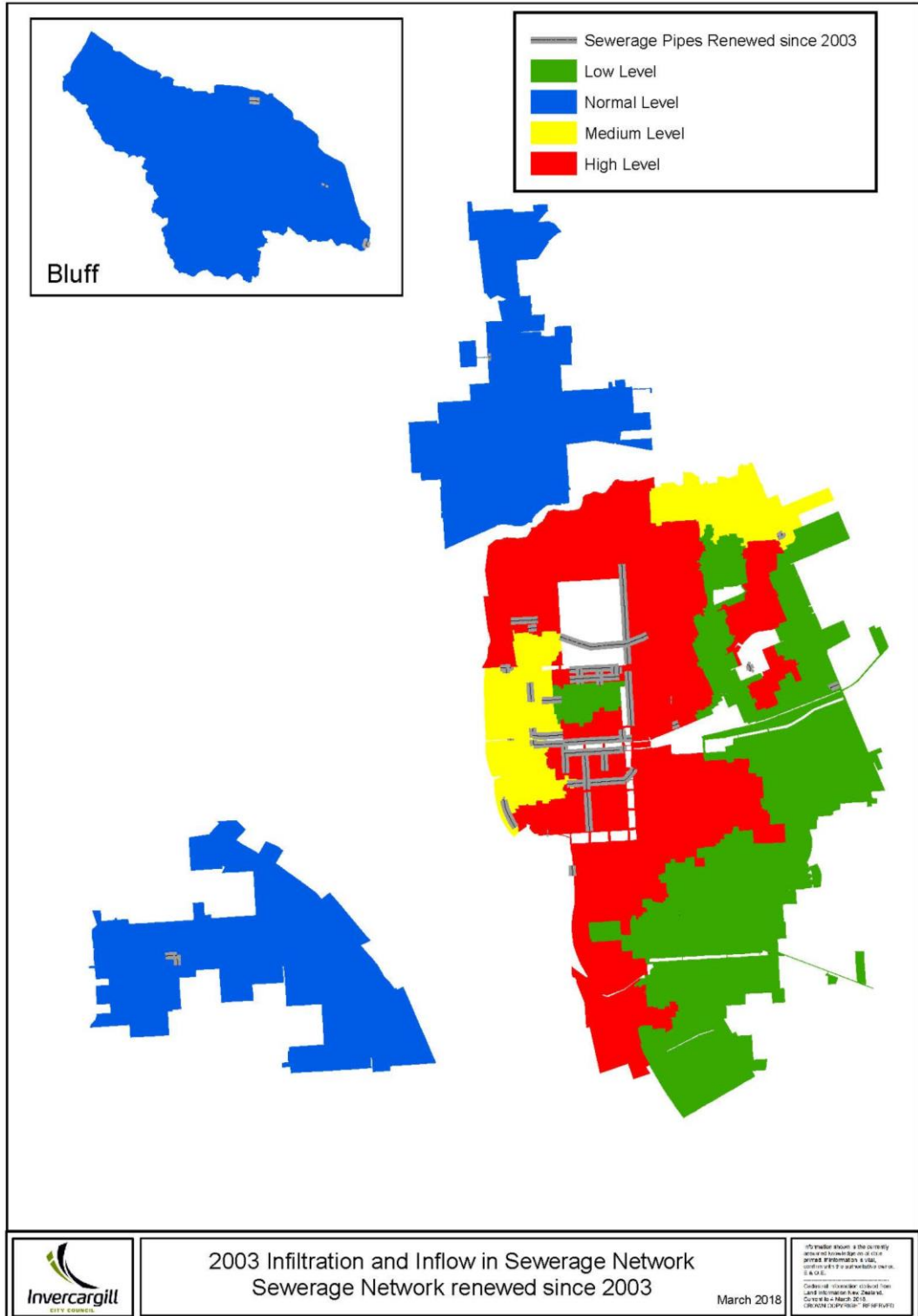
4.4.3 Managing Expectations

Customers of the sewerage network activity expect:

- Adequate sewerage drainage to remove sewage from the properties and to protect the health of the community
- Prompt response to requests for service relating to maintenance issues
- Protection of receiving water from contamination through cross contamination of stormwater
- Manage treatment plant effluent discharges to avoid adverse effects on the receiving water

There is no intention to try to change customer expectations.

Figure 4.1 2003 Infiltration and Inflow in Sewerage Network



5. Asset Profile

5.1 ASSET OVERVIEW

The City has three sewerage networks consisting of a total of 367 km of pipe in a variety of materials and in sizes ranging from 50 mm diameter to 1500 mm diameter. The largest material category is earthenware, comprising 79% of the network and the largest size category is 150 mm diameter, comprising 72% of the pipe network. The separate sewerage networks are located at Omaui, Bluff and Invercargill, serving populations of approximately 70, 2,080 and 46,220 respectively and each having its own treatment plant.

The sewerage system includes 32 pumping stations ranging in size from those serving only a few households, to the Mersey Street station, serving a population of about 26,000.

The three treatment plants produce high quality effluent, and Council has discharge consents which will be current until 2025 for the Bluff plant and 2029 for the Omaui and Clifton (Invercargill) plants.

As the population of Invercargill is not expected to significantly increase during the next 30 years, expansion of the sewerage system is not planned, although some extensions are possible as a result of subdivision, and will be funded by the developer.

The pipe network is aging with the oldest parts of the network now 100 years of age, which is the assumed economic life of the pipes. The Asset Management Plan includes funding for renewal of ageing pipelines, and some investigation and prioritisation of renewal needs has been initiated, including CCTV inspection of 8% of the network, and a flow monitoring survey. The CCTV inspection shows the network to be in good condition structurally, and analysis of maintenance records shows low numbers of system blockages and collapses, confirming the generally good condition of the pipe network. However, flow monitoring surveys have revealed high levels of stormwater infiltration in some areas, and it is likely renewal work will focus on these areas to address the incidence of sewage overflows.

Pump Stations and Treatment Plants are in good condition, and programmes are in place to ensure ongoing maintenance and renewal of mechanical and electrical plant at the end of their economic lives.

The following asset information is contained within Appendices:

- Sewerage System Map - Appendix 14.01
- Pipe Age, Material, Size Profiles - Appendix 14.02
- Pump Station Register - Appendix 14.03
- Resource Consents Wastewater Treatment Plants - Appendix 14.04
- Wastewater Treatment Plants and Renewal and Maintenance Schedule - Appendix 14.05

Location of Detailed Information

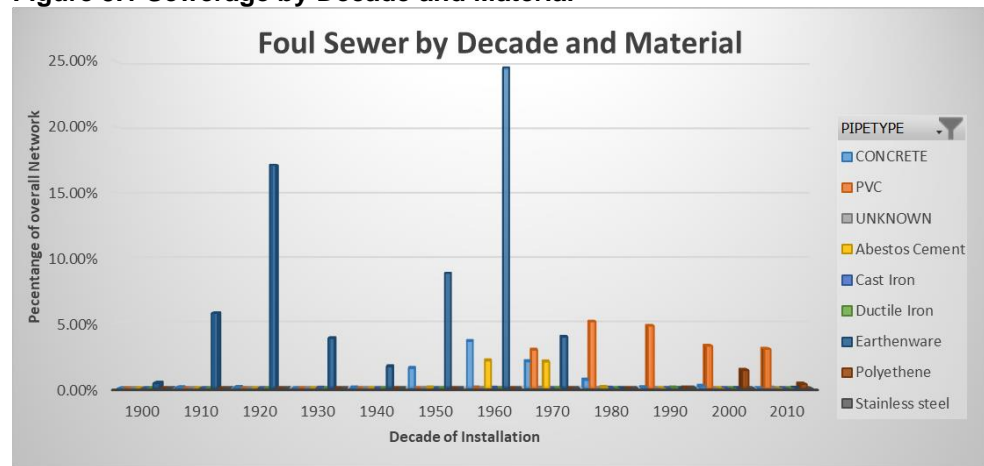
Invercargill City Council retains detailed pipe, pump station and treatment plant asset data and maintenance records on an in-house Asset Management Database. This is accessed through a GIS database and CityMap.

5.2 ASSET DESCRIPTION

➤ Sewerage Pipe Network

The pipe network consists of 367 km of pipe in the Invercargill urban area, Otatara and Bluff, and serves a connected population of approximately 45,000 people as well as a number of trade waste discharges.

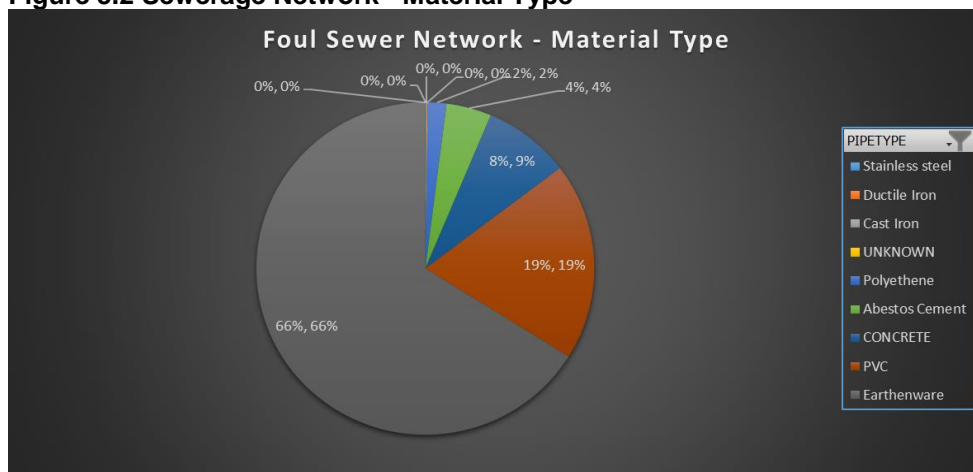
Figure 5.1 Sewerage by Decade and Material



Maps of the areas served and major drains are included in Appendix 14.01. Age, size and material profiles of the pipe network are shown in Appendix 14.02. Major features are:

- Pipe ranges in size from 40mm diameter to 1,500mm diameter, with 69% being 150mm diameter.
- 64% of pipe is earthenware. Other materials are summarised below.
- Pipe laid prior to 1980 is mostly earthenware, and since 1980 mostly PVC. Some asbestos cement pipe was laid between 1960 and 1980, and larger pipes (generally 525 mm diameter and larger) are reinforced concrete.

Figure 5.2 Sewerage Network - Material Type



➤ **Pump Stations**

Invercargill has a total of 32 sewage-pumping stations as listed in the Sewerage Pumping Station schedule. The stations vary in size from those with less than 10 connected properties to the Mersey Street Pumping Station. Mersey Street Pump Station serves the major part of Invercargill, including the Commercial and Business Centre, with an estimated connected population of 23,000.

All stations are equipped with electric pumps and have sufficient capacity to deal with peak infiltration flows, and stand-by capacity to deal with pumps being out of service due to breakdown or maintenance requirements. The major stations (Mersey Street, Preston Street, Lindisfarne Street, and Bluff main sewage pumping stations) are equipped with stand-by generators which will operate the stations at full capacity in the event of power failure.

In the event of power failure at the smaller stations, wet wells can be emptied by a suction tanker while power supply is restored, or power can be supplied by a mobile power generator.

Pumping stations are designed to deal with the expected sewage flows from their respective catchments and also with significant amounts of groundwater and stormwater inflow and infiltration. However, as the pumping stations are generally located in the lowest part of catchments and often close to waterways, they are susceptible to stormwater flooding during extreme rainfall condition (greater than five year return period rainstorm) or as a result of stopbank damage due to flooding.

➤ **Wastewater Treatment Plants**

Invercargill has the following sewage treatment and discharge facilities (see Appendix 14.05 for a detailed schedule of assets):

- **Clifton Waste Water Treatment Plant**

The Clifton Waste Water Treatment Plant receives and treats sewage from the urban area of Invercargill, servicing a population of approximately 46,220 people and a number of trade waste discharges. An average daily inflow of 25,000 m² is received, and treated in primary sedimentation tanks, secondary trickling filters and tertiary facultative ponds. The primary treatment plant was built in 1969, the secondary plant in 1992 and the tertiary facultative ponds in 2004. Aerated basins were built in 2006 to treat industrial effluents.

The discharge is to the New River Estuary, and is covered by a discharge consent which expires in 2029.

The Treatment Plant also holds consents to discharge stormwater and leachate to land at the biosolids drying area, and for air discharges, all expiring in 2029, and a consent expiring in 2027 to discharge biosolids to land at Sandy Point.

Discharge consent conditions were reviewed in 2010 and since then the plant has fully complied with consent conditions.

- **Omaui Oxidation Pond**

The Omaui Oxidation Pond was constructed in 1989 and receives domestic sewage from approximately 70 people. The discharge is to land adjacent to the pond, and has a consent which will expire in 2029.

- **Bluff Wastewater Treatment Plant**

The Bluff sewage reticulation collects sewage from approximately 2,080 people, and a number of trade waste dischargers who are predominately fish processors. Sewage is treated at the Bluff Wastewater Treatment Plant. An average daily inflow of 1,800 m³ is received and treated in an aerated lagoon, followed by clarification and UV disinfection. The plant was constructed in 2000.

The discharge is to Foveaux Strait at Ocean Beach and is covered by a consent which will expire in 2025.

5.3 CRITICAL ASSETS

Criticality of 3 Water assets has been reviewed by Council in a study led by Paul Utting of Project Max. The results of the review are contained in the report "Invercargill City Council: Defining Asset Criticality for Water Services, June 2017". Refer to Appendix 14.09 for further details.

Criticality reflects the consequences of failure irrespective of whether the asset is new, or nearing the end of its useful working life. Typically, as an asset ages it moves from a low likelihood of failure to a higher likelihood.

Some risk factors such as earthquake or flooding are independent of asset age or condition.

The asset's criticality, as measured by the consequence of failure, does not usually change with time.

5.3.1 Asset Criticality Criteria

The following considerations were identified as covering all reasonably conceivable consequences of failure:

Table 5.1 Asset Criticality Criteria

Rank	Consideration	Description
1 =	Health (sickness)	Causing sickness for individuals or groups within the community. Typically, this might be gastro-intestinal arising from contamination of drinking water or contact with polluted water.
1 =	Health (injury)	Causing injury or death due to circumstances associated with the asset failure. Usually occurring suddenly.
3 =	Loss of Service (domestic)	The water service is not available to the household. Initially this causes inconvenience but rapidly escalates into major health issues and disruption to normal life for the affected consumers.
3 =	Key Customers and Business Impacts	This is also related to water services not being available to business customers and reflects impact on their ability to trade and the longer term economic welfare of the City.
5	Environment	Impacts on the natural environment, particularly flora and fauna. Also intended to reflect disruption to water based recreation when pollution occurs.
6	Damage (property)	This is primarily associated with damage to private property, e.g. houses, vehicles, landscaping. Damage to business premises would typically be considered under Key Customers and Business Impacts as the key issue is the time to recover and any impacts on overall business viability.
7	Damage and disruption to other utilities	The failure of a water services asset might have relatively little impact on water services customers. However, if it takes out another major utility asset in the process, the impact might still be significant. This would include railways, arterial roads, bulk power transmission, key fibre-optic routes, etc.
8	Compliance	Most major compliance breaches will be accompanied by health or environmental consequences that would take priority at the time. This consideration is intended to capture multiple, lower level breaches that ultimately reflect adversely on the Council.
9	Financial (on Council)	If an asset needs to be replaced its cost will inevitably fall on Council and this is not an avoidable consequence. However, if the cost is significant and has not been predicted then this can be very disruptive to Council's programme. It can also apply to situations where a large repair cost is incurred that could have been avoided with a pro-active renewal prior to failure.
	Image / Legal / Reputation	These are often included in corporate risk strategies and can be relevant at the corporate level. However, they are unlikely to occur in relation to water services in the absence of consequences occurring in one of the above considerations. As they do not occur in isolation they are not included as 'stand-alone' considerations. However they will inevitably occur when high criticality failures occur and need to be planned for as part of the response.

The general definitions of Levels of Criticality are included in the following table:

Table 5.2 General Definitions of Levels of Criticality

Criticality Level	General Description
Insignificant / Minor 1 & 2	Insignificant is at a level of incidents affecting only a few customers and causing minor inconvenience. Failure of the asset is quite site-specific. Minor is similar but affecting groups of customers, but with the response completed within the target Levels of Service. Failure of these assets may be indicative of overall deterioration.
Low 3	This group includes several types of assets that justify management at a more intense level than 1 or 2. This would include situations where adverse effects justify an escalation of the provider's normal response. It also includes assets that receive regular (or event specific) inspections for security, graffiti, maintenance, cleaning, operational status, etc. Such inspections may be augmented by SCADA monitoring for status and operational purposes. Asset failures can occur but are expected to have relatively minor consequences.
Moderate 4	Assets in this group are likely arterial with significant impacts when failure occurs. Monitoring and pro-active management would be in place but not to the 'avoid at all costs' level of Major. Single failures might occur and this would trigger an urgent response to avoid recurrence.
Major 5	This is likely to be the highest Consequence of Failure that a provider would choose to adopt. The asset involved would be highly monitored and pro-actively renewed with a strong focus on avoidance of any failure occurring.
Extreme (Catastrophic) 6	This column is intended to indicate the most extreme outcomes that could conceivably occur. Ideally assets would be re-configured to avoid this possibility even if the Likelihood of Failure is considered to be very low.

5.3.2 Identification of Critical Assets

Assets identified as having the highest criticality are included in the following table:

Table 5.3 Identification of Critical Assets

Criticality	Assets Falling Into that Category
Extreme	<ul style="list-style-type: none"> • Mersey Pump Station rising main
Major	<ul style="list-style-type: none"> • Large, deep pipes • Pipes under buildings • Gravity stream crossings (aerial and syphon) • Clifton Waste Water Treatment Plant • Major pump stations – Mersey, Preston, Lindisfarne, Bluff Main and Kekeno • Rising mains for above • Bluff Waste Water Treatment Plant pond bank • SCADA
Moderate	<ul style="list-style-type: none"> • Deep pipes (any diameter not included above) • Suburban pump stations • Suburban rising mains • Bluff Waste Water Treatment Plant

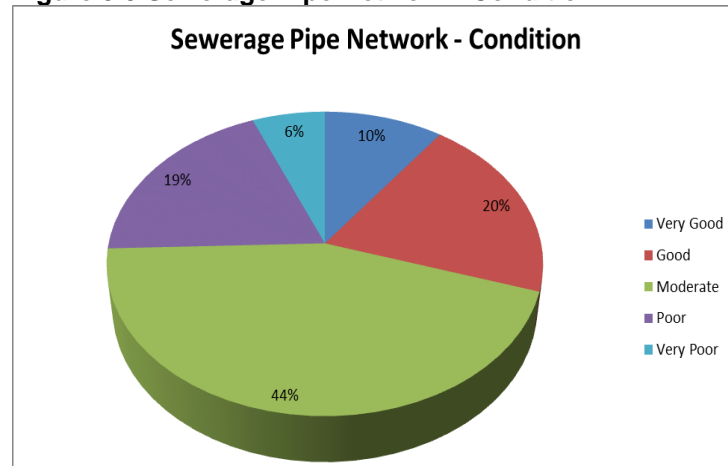
5.4 ASSET CONDITION

5.4.1 Summary of Current Asset Conditions

➤ *Pipe Networks*

Information on the condition of the pipe networks is limited, with knowledge of condition based on maintenance records, the knowledge and experience of staff, and on CCTV and physical inspection of parts of the system. The relatively low number of blockages, and high availability of the system indicate that for its age, it is in reasonable condition. Approximately 8% of the system has been recorded on CCTV and graded in accordance with the New Zealand Pipe Inspection Manual, which indicates moderate to good structural condition of pipes. The flow monitoring programme however, indicates high infiltration and potential for overflow in parts of the system. The condition of the pipe network is summarised as follows:

Figure 5.3 Sewerage Pipe Network - Condition



➤ *Pump Stations*

The pump stations and their mechanical and electrical plant vary in age up to approximately 30 years, with condition of plant at each station detailed in Appendix 14.03. A comprehensive maintenance and renewal strategy assist to maintain the stations in good operating condition.

➤ *Treatment Plants*

Buildings, structures and plant at each of the three Treatment Plants are regularly inspected, and an assessment made of maintenance and renewal requirements made on an annual basis (see Appendix 14.05). Subject to the continuing maintenance and renewal programme, the plants are in good operating condition.

5.4.2 Condition Monitoring

The following strategies are used to monitor the condition of sewerage assets to feed into upgrading and renewal programmes, and to ensure that levels of service are maintained and assets upgraded or renewed in the most timely and cost effective manner.

Monitoring of the various assets classes include:

➤ *Pipe Networks*

- *Maintenance Records* – Request for service, records of maintenance activities and inspections of pipes during repair are analysed to assist in rating of pipe condition.
- *CCTV Inspections* – Critical assets are inspected by CCTV and condition is graded in accordance with the guidelines in the New Zealand Pipe Inspection Manual.
- *Pipe Material Testing* – Samples of pipe are physically tested to determine condition and decay rates.

➤ **Pump Stations**

- *Alarm Monitoring* – Most pump stations are connected by telemetry to Council's 24 hour call centre with faults recorded. Where necessary, repair crews attend to faults, and alarm records assist in condition rating.
- *Operator Inspection* – Operators visit pump stations at least once a week to attend to operational issues, and to check mechanical and electrical systems.
- *Annual Inspection* – All pump stations are inspected annually to determine maintenance and renewal needs.

➤ **Treatment Plants**

- *Operation Monitoring*
 - The Bluff and Clifton Treatment Plants are automatically operated and performance is continually monitored, monitoring data feeds operational maintenance and renewal strategies. During times when the plants are unmanned, they are connected by telemetry to Council's 24 hour call centre, and alarms are raised in the event of plant failure or operation outside of normal ranges.
 - The Omaui oxidation pond is monitored weekly by Council staff with future plans to upgrade the site to allow for remote monitoring.
- *Operator Inspection* – Operators are on duty seven days a week to attend to operational duties, and to check mechanical and renewal needs.
- *Annual Inspection* – All equipment is inspected and assessed annually to determine maintenance and renewal needs.

5.5 ASSET CAPACITY AND PERFORMANCE

5.5.1 Capacity and Utilisation

Capacity in parts of the sewerage network is compromised by high levels of infiltration which can cause pipes to overflow during high intensity rain events. Council has started a flow monitoring programme to identify areas most affected by infiltration, and will address these issues in the pipe renewal programme.

The existing system included 15 constructed overflows as detailed in Table 5.4 below, which have been sealed off in 2020. The overflow locations are shown in Appendix 14.01.

Table 5.4 Location of Emergency Overflows

Number	Location	Pipe Size (mm)
1.	48 Ross Street	300
2.	Corner Moana and Waihopai Streets	200
3.	182 Lamond Street	150
4.	Roseburn Place	150
5.	Lindisfarne Street and Otepunui Creek (to creek)	150
6.	Corner Tweed and Conyers Streets	300
7.	Corner Iona and Christina Streets	250
8.	Opposite 96 Moulson Street	225
9.	Corner Rowan and Lamond Streets	150
10.	Corner Forth and Nith Streets	150
11.	Mersey Street, north bank Otepunui Creek (to creek)	450 x 225
12.	Clyde Street Pump Station	150
13.	Grey Street Pump Station	150
14.	442 Tay Street	150

5.5.2 Performance – Environmental

➤ **Pipe Network**

Flow monitoring has confirmed that parts of the sewerage network suffer from excessive amounts of stormwater infiltration / inflow. The model will be further extended to assist in prioritising sewerage renewal and upgrading projects.

The 15 known emergency sewerage overflows sites (listed in Table 5.4) are still regularly monitored to confirm performance of the network.

➤ **Pump Stations**

In the interests of public safety and in recognition of Council's responsibilities under the Resource Management Act, to avoid discharge of sewage to land or waterways, pump stations have the following facilities:

- Standby gensets for major pump stations, and mobile gensets for smaller stations to maintain pump capacity in the event of power supply failures.
- Spare pump capacity to ensure design flows can be maintained if a pump is out of service for breakdown or maintenance.
- Telemetry connection to alert Council's 24 hour monitoring centre in the event of station failure.
- On call service providers to attend to station failure at any time.

➤ **Treatment Plants**

Council holds discharge consents for each of the three treatment plants and is fully compliant with consent conditions. Details of the consents are included in Appendix 14.04. The treatment plants have similar provisions to pump stations to provide back up in the event of electro / mechanical failure.

➤ **Reliability / Availability**

The sewerage pipe network has a high degree of reliability and availability, with maintenance records showing a low number of blockages (less than

20 per year for 100 km of pipe) and few incidents of repeat blockage. The performance targets for service availability to individual properties have fallen short of the Level of Service targets.

➤ **Responsiveness**

In order to maintain levels of service to users of the sewerage network, Council's maintenance contract requires a 24-hour response crew to be available, and attendance within one hour of instruction for emergency work. Work is defined as emergency work when there is a danger to public health and safety, the potential for damage, loss to property or environment, or the service itself is compromised.

Council employed staff are available on 24 hour call to attend to treatment plant and pump station equipment failures. Council's maintenance contract requires a fitter and electrician to be available on 24 hour call out for emergency repair work.

➤ **Maintenance**

Maintenance contracts provide for assets to be maintained to a high standard to ensure continuity of service.

➤ **Health and Safety**

Issues of worker and public health and safety are dealt with in accordance with the requirements of the Health and Safety in Employment Act 1992. Contractors working on the assets, and Council employed work groups are required to identify and regularly review potential hazards to public and staff, and to maintain health and safety plans and hazard registers detailing means of protection from hazards. Accidents and health and safety incidents are required to be reported in accordance with the Act.

5.6 SUMMARY OF ASSET TRENDS, ISSUES AND CHALLENGES

The measured Levels of Service show the sewerage activity to be performing at a high level, consistently meeting the target levels of service. However, Levels of Service may be compromised in future years by the following issues:

➤ **Asset Service Life**

The renewal plan has been developed based on assumed service lives of assets, coupled with known condition ratings. As over 17% of assets will reach their renewal age in the 2020's, it is important that renewal expenditure is increased to ensure that asset performance levels are maintained.

➤ **Environmental Standards**

The new stormwater discharge consent, and the limit setting process within the proposed Southland Water and Land Plan, is expected to require significantly improved quality in Invercargill's stormwater discharges. Where stormwater is being contaminated from the sewerage network, defects will need to be remedied.

When Wastewater Treatment Plant discharge consents come due for renewal in 2025 and 2029, quality improvement on these discharges are also likely to be required.

6. Sustainability, Risk and Resilience

6.1 SUSTAINABILITY

The Local Government Act requires Council to take into account the social, economic and cultural interests of people and communities, the need to maintain and enhance the quality of the environment and the reasonably foreseeable needs of future generations by taking a sustainable development approach.

Sustainability can be defined as:

Development which meets the needs of the present generation without compromising the future generation from meeting their own needs
(Brundtland Report, 1987).

The ability to improve the sustainable outcomes in the provision of infrastructural services is highest during the planning and design phase. Asset type, location and design can significantly impact sustainability outcomes, e.g. accessibility, urban form, land-use, heritage, health and wellbeing. Good planning and design can lead to improved economic and social benefits.

The operation of infrastructure has ongoing impacts - particularly as they relate to energy use and emissions, runoff, noise, light, ecological impacts, safety, etc. Operation can provide ongoing employment and economic benefit.

The construction of infrastructure impacts on material use, energy, water, waste, etc. Construction can provide employment, with potential to target 'social' procurement.

The sewerage activity contributes to the sustainable development of the City by provision of:

- Safe sewage collection and disposal system to enhance public health within the community
- Trade and industrial waste collection to provide employment and economic benefits
- Treatment systems to reduce impacts of the City on the environment

6.1.1 Social and Cultural

The sewerage activity provides one of the building blocks for a safe, friendly city. This Asset Management Plan aims to provide a system that is continuously available to residents through maintenance and renewal plans to replace asset prior to failure, and to minimise times when the service is unavailable to any property.

The treatment plants ensure that natural areas are available for recreational activities without risks to public health, and that ecological values are sustained.

6.1.2 Environmental

Council hold consents for discharges from each of its three treatment plants. The consents include conditions limiting contaminants in the discharges to air, water and land to protect the receiving environments from unsustainable drainage.

Council seeks to operate the activity in ways that minimise the use of resources and effects on the environment.

Strategies include:

- Selection of plant and pipe materials to maximise useful service life
- Minimisation of wastage during construction
- Selection of energy efficient plants and energy audits of operating plant
- Use of biogas for plant energy needs where appropriate and economic
- Reduction of greenhouse gases, e.g. by flaring surplus biogas
- Design for adaption and resilience to hazards and climate change

6.1.3 Economic and Financial

Council's goal is to continue to provide the sewerage activity which achieves the desired levels of service in the most effective manner by:

- Recognising the consumption of assets over their lifetime and funding their renewal through depreciation
- Categorising capital versus operational expenditure
- Allocating costs and preparing forecasts over the long term (30 years and beyond)
- Reporting on financial performance
- Researching and identifying practical and cost effective alternative service delivery options

6.1.4 Summary of Sustainability Challenges and Issues

➤ *Population and Demographics*

Population is expected to remain static, or to grow by a small amount over the planning period, and to age, with a trend to a larger number of smaller households. There may be affordability issues as a smaller number of working age people are expected to fund increasing standards of service provision.

➤ *Tradewaste Users*

Businesses seeking to establish or increase their activities in Invercargill will contribute additional tradewaste to the sewerage system. Council will need to monitor tradewaste through the tradewaste bylaw, and set contamination limits on individual businesses to ensure treatment capacity is not compromised. Council may be able to provide additional treatment systems for tradewaste, and recover costs through tradewaste charges.

➤ *Increasing Environmental Standards for Effluent Discharges*

The National Policy Statement for Freshwater Management and the proposed Southland Water and Land Plan is expected to set higher standards for effluent discharges from a wastewater treat plant, and is likely to involve more complex and expensive treatment systems.

➤ *Serviceability of Aging Pipe Network*

As both public pipe networks and on property wastewater systems age, leakage and cross contamination between sewerage and stormwater

networks can be expected to increase, and may result in failure to comply with stormwater discharge consent conditions. As part of the strategy to improve stormwater quality, Council will need to continue to improve the integrity of both the stormwater and sewerage networks, and to require property owners to address issues with on property cross contamination.

➤ **Climate Change**

The sewerage activity will be impacted over the next 80-100 years and beyond, both by a change in rainfall intensities (inflow and infiltration) and sea levels rise (discharge from Clifton Wastewater Treatment Plant).

6.2 RISK

The Council recognises that it is obliged to manage effectively and to review regularly its risks at a strategic, operational and project level. The Council has done this by developing a Risk Management Framework and a range of risk management processes that apply across the organisation. Risk assessment is a major consideration in planning and budgeting processes at all levels within the Council. Risks must be considered and documented as part of the justification for undertaking our activities. Risk assessment and monitoring must form part of the management of operational activities. The Chief Executive and the Council encourage the taking of controlled risks to better improve the effectiveness and efficiency of the services and functions that the Council provides on behalf of the community, provided the resultant exposures are acceptable.

6.2.1 Risk Framework / Standard

Council has previously adopted a risk management process that is consistent with Australian/New Zealand Standard AS/NZ 4360 which defines risk assessment and management. The key risk criteria adopted for assessing the consequences of identified risks are:

- Community Health and Safety
- Loss of Service – Extent / Duration
- Service Delivery – Customer Impact
- Invercargill City Council Financial Impact
- Financial Community
- Corporate Image and Reputation
- Legal Compliance

It should be noted that Council is undertaking an organisation wide review of risk management practices and this may impact on how risk is assessed and managed. Results from this review will be included in Management Plans where necessary and risk assessments will be updated as required.

6.2.2 Critical Assets Decision-Making

Critical assets are “those which have a high consequence of failure, but not necessarily a high probability of failure”. This is important as it draws attention to those assets which are the most important, irrespective of the likelihood of failure of the asset. Critical assets typically require more proactive management to minimise or eliminate this risk.

The likelihood of failure of an asset is often difficult to assess, however condition and age are parameters that provide an indication. The worse the condition of the asset, the more likely it is to fail.

Assets which are both extremely critical and more likely to fail should have higher priority and be replaced or rehabilitated earlier in their lifecycle than others, and at lower levels of criticality “run to failure” may be perfectly acceptable.

6.2.3 Risk Identification and Assessment

The highest ranked risk events are developed in accordance with the procedures in Section 6.2.1 and detailed in Table 6.1 below.

Causation of risk events result from the exposure of the various individual assets of the sewerage system to threats which have been categorised as below:

- Natural Disasters
 - Flood
 - Earthquake
 - Wind
 - Lightning

- Asset Feature
 - Condition
 - Performance (insufficient capacity, leakage, backflow)

- Other
 - Legislative change
 - Poor practice

Key risks are summarised in Section 6.2.4.

Table 6.1 Risk Assessment

Strategic Outcome	Level of Service Failure Indicators	Asset Sub Group	Caused by	Consequences							Weighted Averaged Consequence Score	Likelihood	Risk Severity	Control	
				Legal Compliance (0.20)	Corporate Image and Reputation (0.10)	Service Delivery – Customer Impact (0.15)	ICC Financial Impact (0.20)	Financial – Community (0.15)	Health and Safety (0.20)	Current Practice				Recommended Actions	
Preserve its character	Sewerage discharge to land / water request for service increase	Pipe Network	Rising main burst	3	3	2	2	2	2	2.3	C	M	Reactive maintenance renewal plan emergency response		
			Major pipe blockage / collapse	3	3	3	3	2	1	2.5	D	M	Emergency response inspection / renew deteriorating assets		
			Minor pipe blockage / collapse	1	1	2	1	1	1	1.15	A	H	Reactive maintenance emergency response renewal plan		
			Subsidence over pipe	2	1	1	1	1	1	1.2	C	L	Reactive maintenance		
		Pipe Network Pump Stations	Flooding – larger than five year return period	1	3	3	3	2	2	2.3	E	L	Emergency response - lifelines		
		Pump Stations	Major earthquake	6	5	5	6	5	3	5	F	H	Emergency response - lifelines		
		Pump failure	2	2	3	2	1	1	1.8	D	L	Inspect / maintain 24 hour emergency response standby pumps			
		Power failure major stations	3	4	3	2	2	3	3.1	C	H	Standby electrical genset emergency 24 hour response			

Strategic Outcome	Level of Service Failure Indicators	Asset Sub Group	Caused by	Consequences							Weighted Averaged Consequence Score	Likelihood	Risk Severity	Control	
				Legal Compliance (0.20)	Corporate Image and Reputation (0.10)	Service Delivery – Customer Impact (0.15)	ICC Financial Impact (0.20)	Financial – Community (0.15)	Health and Safety (0.20)	Current Practice				Recommended Actions	
			Power failure – small stations	2	3	3	1	1	1	1.4	C	L	Asset management planning / maintenance mobile standby genset 24 hour emergency response		
Enhance our City	Discharge of inadequately treated sewerage	Treatments	Treatment Plant overload	4	4	1	4	4	3	3.35	D	M	Asset management plan for population growth – control tradewaste with Bylaw	Consider additional treatment processes	
			Mechanical / electrical equipment failure	1	1	2	2	2	1	1.5	B	M	Standby plant 24 hour maintenance crew response		
			Power supply failure	1	1	2	1	1	1	1.15	C	L	Standby genset		
	Discharge to air / water fails to meet consent standards		Earthquake damage	3	3	3	6	3	3	3.6	F	H	Lifelines response		
	Floor – larger than 5 year return		1	1	3	2	2	2	1.85	D	H	Lifelines response			
	Consent quality conditions not met		4	4	3	4	4	1	3.35	B	H	Consent review			
Embrace innovation and	Tradewaste quality and	Treatment plants	Treatment plant	4	4	1	4	4	3	3.35	D	M	Asset management plan – plan for industrial load		

Strategic Outcome	Level of Service Failure Indicators	Asset Sub Group	Caused by	Consequences							Weighted Averaged Consequence Score	Likelihood	Risk Severity	Control	
				Legal Compliance (0.20)	Corporate Image and Reputation (0.10)	Service Delivery – Customer Impact (0.15)	ICC Financial Impact (0.20)	Financial – Community (0.15)	Health and Safety (0.20)	Current Practice				Recommended Actions	
change	quantity fail to meet tradewaste consent limits	Pipe network	overloaded												
			Pipe network overload due to tradewaste	3	3	3	3	2	1	2.5	D	L	Control tradewaste discharge with Bylaw – require quality improvement Tradewaste Bylaw – require volume reduction	Plan for industrial volumes	

Note: risk schedules will be updated following implementation of corporate framework.

6.2.4 Summary of Key Risk Issues

- Pipe blockage or collapse causing backup and sewage overflow
- Pump station failure causing backup and sewage overflow
- Pipe network overload due to tradewaste
- Treatment plant mechanical and electrical failure
- Discharge non-compliant with quality requirements
- Flooding greater than five year return, causing sewer overload
- Earthquake causing network damage

6.2.5 Possible Approaches to Risk Mitigation

- **Pipe blockage or collapse**
 - Maintain response to clear blockage / repair pipes
 - CCTV inspection and condition rating to feed into renewal programme
- **Pipe network overload**
 - Flow monitoring to improve understanding of system condition and performance, feeding into renewal priority
 - Flow metering of large tradewaste discharges to understand impact on sewerage network
- **Treatment plant / pump station mechanical and electrical failure**
 - Schedule maintenance activities to ensure optimum performance and feed into renewal programme
 - Standby gensets or sucker trucks available during failure
- **Flooding greater than five year return**
 - Emergency lifelines response
 - Maintain attendance at pump station to return to duty
 - Maintenance response to sewage spillages
- **Earthquake**
 - Emergency lifelines response
 - Maintenance attendance to return pump station / treatment plants to duty
 - Maintenance response to network issues

6.3 RESILIENCE

The working definition of resilience to Invercargill City Council is the ability of the organisation to survive a crisis and thrive in a world of uncertainty. Resilience includes both planned risk management (Section 6.2) and adaptive capacity. In this context resilience refers to our capacity to adapt, rather than preparedness or recovery, which is the capacity of people, the community and systems to adapt in the face of unpredictable change – the ‘unknown unknowns’.

100 Resilient Cities* has four dimensions and three drivers within each:

- **Health and Well-being**

- Meet basic needs
- Support livelihoods and employment
- Ensure public health services

➤ ***Economy and Society***

- Foster economic prosperity
- Ensures social stability, security and justice
- Promote cohesive and engaged communities

➤ ***Infrastructure and Environment***

- Provide reliable communication and mobility
- Ensure continuity of critical services
- Provide and enhance natural and man-made assets

➤ ***Leadership and Strategy***

- Promote leadership and effective management
- Empower a broad range of stakeholders
- Foster long-term and integrated planning

* <http://www.100resilientcities.org/resilience>

6.3.1 Business Continuity and Emergency Response Arrangements

Emergency Management Southland (EMS) is a shared service between Invercargill City Council, Southland District Council, Environment Southland and Gore District Council. It focuses on ensuring communities are prepared for emergencies and that they are able to respond to and recover from these when they do happen. Specific actions include public education and ensuring a pool of trained personnel. Having this combined organisation results in streamlined decision making, faster response times and cost savings.

Catastrophic events such as extreme weather events, earthquakes, tsunamis, etc. are likely to damage the sewerage infrastructure and compromise its ability to continue to provide the service for which it is designed. Damage to other infrastructural services, particularly power and roading, can compromise the recovery strategies. Some of the strategies in the risk mitigation section will assist in the recovery of the service (e.g. availability of the 24 hour response crews and standby gensets at pump stations), but resilience includes the ability of the community to continue to function while services return to normal.

It is unlikely in these events that the sewerage activity would be able to rely on its own resources, and the assistance of the wider community may be required. It is likely the resources will be rationed, and the community may decide that recovery in other areas should take precedence over the sewerage activity. The protection of human health and safety will be of paramount importance.

6.3.2 Current and Desired Resilience Assessment

The need to build a resilient community is learning from events such as the earthquakes in Christchurch, Kaikoura and Wellington, and recent major storm events in New Zealand and across the world. Invercargill City Council is seeking to make the City and its infrastructure more resilient as part of the review of risk management being undertaken.

6.3.3 Summary of Resilience Issues and Challenges

- Recovery of the sewerage activity may require resources from other areas of the community
- Risk mitigation strategies will be a start to recovery but may not be sufficient
- Community health and safety is of prime importance
- Resilience requires the community to work in unity

7. Managing Our Activities

7.1 RESPONDING TO THE ISSUES AND CHALLENGES

Table 7.1 Managing Issues and Challenges

Topic	Issue or Challenge	Potential Response
Population Growth	Growth greater than forecast – demand for new development	<ul style="list-style-type: none"> - Extend sewerage to new greenfields development
New Technology	Opportunity for improved performance at reduced cost	<ul style="list-style-type: none"> - Willing to adapt and change in procurement of services, and use of innovation - Research and assess new products and methodologies - Monitor developments and respond quickly where possible
Levels of Service	Environmental standards – compliance with resource consent conditions	<ul style="list-style-type: none"> - Maintenance and renewal programme to fix network leakages so stormwater discharge consents are not compromised - Maintenance, operation and renewal programmes to ensure optimum performance of treatment plants - Monitor treatment plant performance to identify emerging risks - Monitor large tradewaste discharges to ensure tradewaste consent are compliant
	Reliability	<ul style="list-style-type: none"> - Maintenance and renewal programmes to ensure reliability - Improve knowledge of asset condition and performance to lead decision making for renewal programmes
	System adequacy	<ul style="list-style-type: none"> - Review network design standards to ensure adequate capacity
	Service response times	<ul style="list-style-type: none"> - Monitor contractor performance to ensure time frames are achieved
	Quality	<ul style="list-style-type: none"> - Monitor contractor performance to ensure quality standards are achieved
	Health and safety	<ul style="list-style-type: none"> - Check quality of services and products when purchased - Audit sewerage features to ensure safety, or restrict public access - Review contractors and employees health and safety plan, and ensure they are complied with

Resilience	No documented contingency plans	- Develop contingency plans on Council wide basis
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The Problem (Why)

Invercargill has good quality sewerage systems which protect its residents from health issues and the receiving environments of its discharges from adverse effects due to poorly treated wastewater discharges.

The pipe network and pump stations are aging and investment in maintenance and renewal programmes are required if they are to continue to operate effectively and for contamination of stormwater to be reduced.

The treatment plants currently operate within the conditions of their resource consents, but continued investment in operations, maintenance and renewal programmes are required to ensure this level of performance continues.

The Benefits (What)

Investment in network maintenance and renewals will reduce contamination of stormwater, and therefore help to meet the requirements of the stormwater discharge consent, and to improve the quality of natural waterways adjacent to the City.

Continued investment in treatment systems will ensure that they continue to operate within the requirements of the resource consent, particularly in regard to discharges to water.

These investments contribute to social wellbeing, and the economic growth and productivity of the City.

The Strategic Responses (How)

Strategies would include:

- Adequate maintenance and renewal of infrastructure
- Identification and remedy of cross contamination of stormwater

7.1.1 Alternative Investment Approaches

Operational expenditure including maintenance and renewal activities are funded by rates. Major capital expenditure for growth or improved level of service may be funded by loans, generally over a 20 year period. Capital servicing charges are recovered through rates.

As part of subdivisional development, new sewerage assets are funded by the developer and built to Council's "Code of Land Development" standards, and are taken over by Council at no cost.

Alternative investments are considered as a standard part of procurement of services and products, to ensure that the activity's objectives are met at the lowest cost. For new capital development, alternatives are routinely considered to ensure effective and economic life time performance.

7.1.2 Do-Minimum Programmes

A key assumption of this Asset Management Plan is that maintenance and renewal programmes will ensure that the activity continues to meet the level of service targets. The work programmes are designed to meet the targets at the least possible cost, and to ensure that asset life is extended to the fullest extent possible.

7.1.3 Programmes Evaluation

The areas which are considered when evaluating programmes:

- Meets sound asset management principles
- Best value for money
- Meets demands
- Delivers customer Levels of Service
- Is integrated with the requirements of other infrastructural services
- Complies with Regional Council Requirements and consent conditions
- Is delivered in a timely fashion
- Is affordable within the life cycle budgets of this Plan

7.2 OPERATIONS AND MAINTENANCE

7.2.1 Operation / Maintenance Strategy

The sewerage network is operated and maintained to ensure the efficient utilisation of the assets and to achieve the stipulated levels of service. Operational strategies include the efficient control and monitoring of mechanical and electrical plant, and the pipe network to ensure continuity and quality of service. Maintenance strategies aim to ensure efficient operation over the useful service life of assets, to ensure target standards are met, and to prevent premature asset failure or deterioration. Operation and maintenance strategies are detailed in Appendix 14.06.

7.2.2 Operation / Maintenance Standards and Specifications

The following are the major documents specifying the standards of service provisions for the sewerage asset. Included as part of these documents are a wide range of New Zealand and international standards and code of practice which regulate aspects of the activity, and which will be updated on a regular basis.

Sewerage assets will be operated and maintained in compliance with:

- Long Term Plan for Invercargill
- This Asset Management Plan
- Contract 807 - Piped Networks Utility Maintenance 2017
- Contract 803 - Electrical and Mechanical Utility Maintenance 2019
- Invercargill City District Plan 2005
- Resource Management Act 1991
- The National Policy Statement for Freshwater Management
- Regional Water Plan for Southland
- Resource consents
- Local Government Act 2002
- Construction Act 1959
- Building Act 2004
- Health and Safety in Employment Act 1991

- Invercargill City Council Code of Land Development
- Invercargill City Council Specification for Laying Stormwater and Foul Sewers
- Invercargill City Council Standard Conditions for Excavation and Reinstatement of Trenches

7.2.3 Operation / Maintenance Options and Alternatives

The sewerage activity is operated and maintained with the goal of minimising service disruptions to ratepayers and ensuring the maximum protection of public and environmental health. Alternative maintenance options are routinely considered and will be adopted if they are more cost effective, and the target service levels are not compromised.

Alternative maintenance options include:

➤ ***Reduction of Planned Maintenance Activities***

Within the pipe network, most maintenance is reactive to reported faults or blockages, with planned maintenance activities including checking of overflow structures, cleaning syphons and air valves, and other assets which have a higher incidence of blockage.

Within the new pump stations and treatment plants, operators and maintenance contractors routinely inspect, clean, adjust and monitor items of plant to ensure that they continue to operate at optimum performance levels, and that significant maintenance issues are identified early, to ensure appropriate maintenance is undertaken and service life is maximised.

While reduced maintenance activities may initially reduce cost, it is likely that levels of service will be compromised, and that service lives of mechanical and electrical plant would be reduced. These possibilities need to be considered in any decision to reduce maintenance actively.

➤ ***Data Collection Programmes***

Collection of data on condition, performance, and remaining service life of assets is necessary for the optimum performance and renewal of assets, but can be expensive. These programmes need to be carefully considered to ensure they are cost effective and consistent with business needs.

➤ ***System Control and Monitoring***

Electronic systems can provide continuous control and surveillance of mechanical plant, and can effectively warn of plant failure requiring operator intervention, thus reducing the need for scheduled attendance. The sewerage activity incorporates sophisticated telemetry systems that can improve response times to maintenance issues. For the treatment plants, these have been upgraded over the last two years, and for pumping stations, upgraded systems are now in progress and expected to be completed by July 2021.

7.3 ASSET RENEWAL / REPLACEMENT

7.3.1 Renewal Strategy

This renewal programme is intended to maintain the overall standard of the sewerage system at a level which reflects its age profile by providing for the rehabilitation or replacement of individual assets as they reach the end of their useful life. It must be funded adequately to maintain current levels of service and the overall quality of the network. The level of expenditure on cyclic asset renewal will vary from year to year, reflecting the remaining life profile of the assets within the sewerage network. Life cycle management strategies are included in Appendix 14.06.

Major renewal projects are subject to competitive tendering, using 'lowest cost conforming' or 'weighted attributes' assessment procedures in accordance with the New Zealand Transport Agency Competitive Pricing Procedures Manual.

Failure to maintain an adequate cyclic renewal programme will be reflected in a decline in the overall standard of the system of assets.

The overall decline in service standards is approximately measured in financial terms by the depreciation rate, and Council intends, over the next five years, to increase renewal expenditure closer to the rate of depreciation. Service lives of assets are continually being reviewed, and increases or decreases in predicted asset service life will be reflected in the depreciation rate. A shortfall in renewal expenditure will be reflected in additional depreciation of the network. Asset revaluations are programmed at three yearly intervals, and take into account inflationary influences on new plant or construction costs and any changes that have been made to predicted lives of assets. The updated valuation will feed into the annual depreciation allocation, and renewal expenditure will be adjusted to match.

➤ ***Pump Stations and Treatment Plants***

The predicted lives of components of pump stations and treatment plants are listed below. Renewal budgets provide for renewal of individual assets at the end of their predicted life. Asset lives are reviewed at three yearly intervals, depending on assessed condition and performance of the asset, and renewal budgets adjusted accordingly.

- Building and Structure (60-80 years)
- Pipe and Fittings (30-60 years)
- Mechanical Plant (5-40 years)
- Electrical Motors and Switchgear (20 years)
- Electronic Control and Telemetry Systems (10-15 years)

Detailed asset data, including age and programmed renewal times, are included in Appendix 14.05 for treatment plants and Appendix 14.03 for pump stations.

➤ ***Pipe Network***

The predicted lives of pipes of various materials are listed below, and predicted renewal decade, based on assets life, is summarised in Figure 7.1:

- Earthenware Pipes (100 years)
- Concrete Pipes (100 years)
- uPVC Pipes (85 years)
- Asbestos Cement Pipes (65 years)

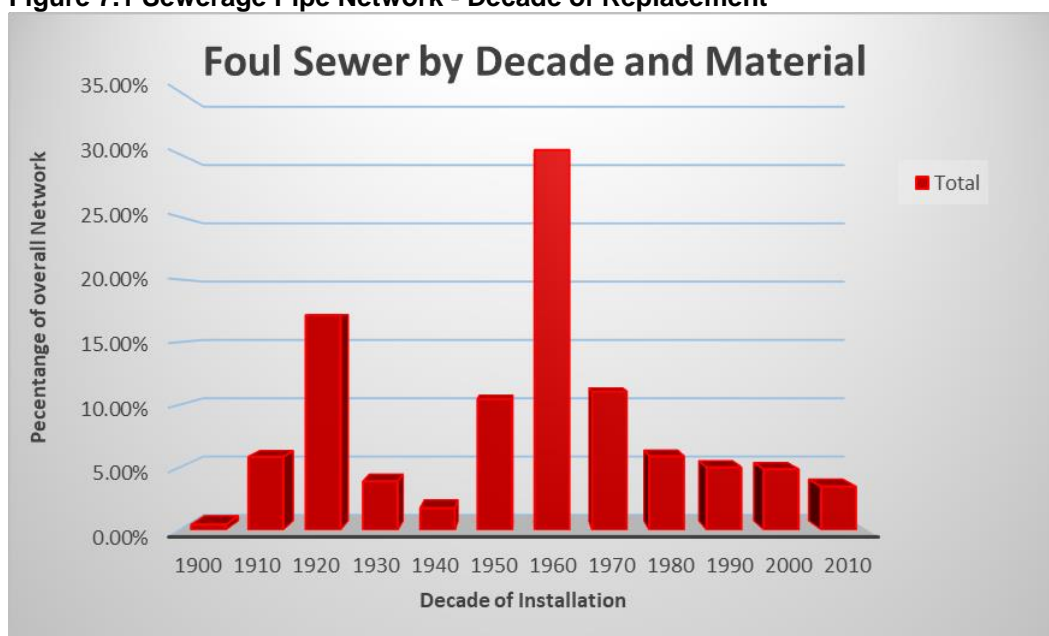
Detailed pipe age and material profiles are contained in Appendix 14.02.

Individual assets are assessed as they come near the predicted service life, and depending on conditions, may be replaced earlier or later than the assigned life.

Further work on determination of predicted service life is planned as part of the Improvement Plan (Section 10) including CCTV inspection and analysis of maintenance records. It is possible that predicted service lives listed above will be adjusted, and this would increase or decrease the depreciation rate for pipe assets, and may lead to an adjustment in renewal expenditure.

Renewal budgets for pipe assets will be increased over the next five years to match the depreciation rate, and are then intended to continue indefinitely at this rate. During the 2020's the rate of renewal will fall behind the predicted required replacement date as shown in the bar chart, and this gap will be reduced in subsequent decades. As asset lives are further refined there may be a need to increase or decrease the renewal budgets.

Figure 7.1 Sewerage Pipe Network - Decade of Replacement



7.3.2 Renewal Criteria / Intervention Standards

The general renewal strategy is to rehabilitate or replace assets when justified by:

➤ **Asset Performance**

An asset is renewed when it fails to meet the required level of service. Non-performing assets are identified by the monitoring of asset reliability, capacity and efficiency during planned maintenance inspections and operational activity. Indicators of non-performing assets include:

- Repeated asset failure
- Repeated pipe blockages or overflows
- Ineffective and / or uneconomic operations
- Inefficient energy consumption

➤ **Economics**

An asset is renewed when it can no longer be economically repaired (i.e. the annual cost of repairs exceeds the annualised cost of its renewal). Council will actively research the effectiveness of new technology which may improve the overall performance of the assets.

➤ **Risk**

An asset is renewed when the risk of failure has increased to the point that the environmental, public health, financial and social impacts are no longer acceptable to the community.

➤ **Criticality**

Assets identified within the major and extreme criticality categories in Section 5.2 carried an increased risk of impacts on the community. These assets will be replaced before failure is imminent.

Planned and reactive replacement works are prioritised in accordance with the following priority ranking table (Table 7.2) and then programmed or, in urgent cases, undertaken immediately.

A more detailed renewal strategy is included in Appendix 14.06.

Table 7.2 Priority Ranking for Planned and Reactive Replacement

Priority 1 (High)	<ul style="list-style-type: none"> ➤ Asset failure has occurred and renewal is the most cost-effective treatment. ➤ Asset failure is imminent and failure is likely to have major impact on the environment, public health or property. ➤ Asset performance is non-compliance with resource consent requirements.
Priority 2	<ul style="list-style-type: none"> ➤ Asset failure is imminent, but failure is likely to have only a minor impact on the environment, public health or property. ➤ Asset failure is imminent and proactive renovation is justified economically. ➤ Associated work scheduled for the current financial year. ➤ Asset renewal is justified on the basis of minimal life cycle costs and deferment would result in significant additional costs.
Priority 3 (Low)	<ul style="list-style-type: none"> ➤ Asset failure is imminent but failure is likely to have a negligible impact on the environment, public health or property. ➤ Asset renewal is justified on the basis of minimal life cycle costs but deferment would result in minimal additional costs.

The renewal strategy will be reviewed at least annually, and any deferred works reprioritised alongside new renewal projects. Indirect costs such as disruptions to traffic or business, temporary denial of access, or nuisance are currently not considered in the evaluation of renewal options.

The standards and specifications for renewal work are generally the same as listed in Section 7.2.2.

7.3.3 Renewal Options and Alternatives

Pump Stations and Treatment Plants

Mechanical and Electrical renewals for pump stations and treatment plants are scheduled over the 30 year Asset Management Plan period, based on predicted service life (refer to Appendix 14.05 and 14.03). Renewal requirements are assessed annually, and scheduled renewals can be brought forward, or extended based on criteria set out in Section 7.3.2. Alternative renewal strategies are:

- *Replace at failure* – Mechanical and electrical equipment would continue to be maintained until ultimate failure and then replaced. Possible consequences are poor performance as assets require more frequent and urgent maintenance, additional costs of maintenance, difficulty in obtaining parts, and decreased reliability.
- *Replace at predicted service life* – Asset would be maintained until they reach their predicted service life and then replaced irrespective of performance. Some assets may incur significant maintenance costs, and others would be replaced while still in very good condition.

The recommended renewal strategy gives a better assurance of serviceability, and is likely to be the most economic option.

Pipe Network

Pipes are assigned service lives depending on pipe material. Individual pipes are assessed as they come near renewal age, depending on the criteria set out in Section 7.3.2. This will provide a budget to renew pipes at the appropriate rate of deterioration of asset condition. The renewal programme will replace pipes to the current design standard, as detailed in Appendix 14.01. The budget to renew pipes is based on the upgrade size of the pipe.

7.4 CAPITAL DEVELOPMENT PLAN

The asset development plan provides for extensions to the sewerage system or increases in capacity to provide for growth in the City, or to meet higher service standard targets.

Assets are acquired as a result of:

- Taking over new reticulation constructed as part of sub-divisional development (constructed at the developer's expense)
- Extensions constructed by Council to service new areas
- Asset upgrading constructed by Council to provide additional system capacity to overcome inadequacies or provide for growth (e.g. larger drains or pumps)

Over the life of this Asset Management Plan, the following development priority have been identified:

➤ ***Residential Development***

Due to slow population growth anticipated for Invercargill, there is a low demand for the extension of sewerage services to new areas over the life of this Asset Management Plan. However, the District Plan does identify

potential residential development areas to the north of the urban area being Retreat Road, Rockdale Road, Tramway Road area and in Otatara. It is anticipated that any new sewerage infrastructure, or required upgrading within the existing infrastructure as a result of new residential development, will be funded by the developers. Council will take over and manage such assets as part of the sewerage infrastructure when they have been developed in accordance with the Invercargill Code of Land Development and conditions of subdivision consents. Council staff will have input into and approve the design of infrastructure built for new subdivisions, and have checking and approval systems in place to ensure infrastructure is completed in accordance with the Code of Land Development prior to its acceptance as sewerage assets.

7.4.1 Capital Development Selection Criteria

The sewerage network will be developed during the life of the Plan to meet community expectations, technical and environmental standards, and community growth projections.

Additional new development projects will be identified on the basis of:

- *Growth* - Where development is needed to meet projected increased demand
- *Regulatory* - Development of systems, or to reduce contamination of stormwater with sewerage, may be required to meet conditions of stormwater discharge consents, or the quality requirements of the Regional Water Plan for Southland
- *Operational Efficiency* - New projects will be considered when annual costs are reduced by improving efficiencies

The selection, prioritising and programming of sewerage asset development projects will take into account:

- Council preference
- Risk analysis
- Cost and benefits
- Affordability
- Ranking and co-ordination with other projects

For new development projects, Council will consider all available options, including new technologies and renovation techniques, life cycle costs and replacement of existing assets to achieve the most cost effective options.

7.4.2 Capital Development Options and Alternatives

The only forecast Capital Development requirements over the life of this Asset Management Plan are for wastewater treatment plant upgrades which are likely to be required as a condition of the Clifton Waste Water Treatment Plant consent in 2029. It is expected that an improvement to discharge quality will be required as a consequence of the Southland Water and Land Plan, and is likely to require nutrient removal from the discharge. Because limits for discharges have not yet been set, required quality cannot be determined, and a tentative budget of \$10,000,000 (\$12,700,000 with inflation) is proposed. It is also possible that discharge consent negotiation may result in a requirement to discharge to land. Table 7.3 presents a range of options that have been considered by Council, with the preferred option highlighted.

The Bluff Wastewater Treatment Plant discharge consent expires in 2025. Because effluent quality is high, and effects on the receiving water negligible, Council expects that the consent will be renewed without a requirement to upgrade treatment standards. However, as with the Clifton discharge consent, the required treatment standard will be negotiated as part of consent renewal, and if treatment upgrade or discharge to land is required, it is likely that the most economic result is for Council not to renew the Bluff discharge consent, and to pump effluent to the larger Clifton Treatment Plant. Options considered by Council are summarised in Table 7.3.

Table 7.3 Sewerage - Discharge Consent Renewals

Issue and Consequence	Option	Implication	Cost
Wastewater Treatment Plant Discharge Consents require renewal in 2025 for Bluff, and 2029 for Clifton.	Negotiate new consents for discharge to Coastal Marine Area.	Bluff: Impacts on receiving environment are low. Quality improvement may not be required. Clifton: Nutrient removal likely to be required to reduce load on estuary.	Bluff: \$200,000 for consent renewal. Invercargill: \$10,000,000 plus for nutrient removal.
	Remove discharges from Coastal Marine Area. Pump Bluff effluent to Clifton (2025) and discharge Clifton effluent to land (2029).	Bluff: Discharge consent not required. Receiving water improvement at Bluff, and additional effects at Clifton would both be minor. Clifton: Effects on estuary would reduce, and may be transferred to catchment in which land disposal area is located. Suitable disposal site has not been identified.	Bluff: \$3,100,000 capital plus \$164,000 per annum operational. Clifton: \$28,000,000 capital plus \$3,100,000 per annum operational.
	Do nothing.	Failure to renew consents would result in regulatory action by Environment Southland, and directive to fix.	Unknown cost to defend legal action, and for fines imposed by courts. Court imposed directives to upgrade may also apply.

7.5 DISPOSAL PLAN

7.5.1 Forecast Future Disposal of Assets

Because the sewerage asset is intended to operate in perpetuity to provide a continuing sewerage drainage service to the developed areas of the City, it is intended that individual assets will only be disposed of at the end of their service life, at which time they will be replaced with new assets, or become obsolete as part of new development projects. In general, where assets are in the same location, the old asset will be removed as part of the renewal project.

7.5.2 Forecast of Income / Expenditure from Asset Disposal

Because assets will usually be at the end of useful life at disposal, they are expected to have zero value. Specific funding is therefore not allocated to disposal of assets, but where costs are incurred in their removal, these will be included in development and renewal project costs.

7.6 RECOMMENDED PROGRAMME

The recommended programme is designed to ensure that the activity is operated effectively and efficiently to ensure that levels of service are achieved over the 30 years of this Asset Management Plan life.

7.6.1 Evaluation of Options / Alternative Programmes

The evaluation of a range of options is standard practice within the design and procurement phases of projects. For example, a range of pump types and brands may be considered for a pump renewal project, with performance and life cycle costs taken into account.

7.6.2 Recommended Operation / Maintenance Programmes

The recommended programme is to continue current maintenance and operational activities for the pipe network, pump stations and treatment plants. The procedures include attendance to reported faults at the pump stations and pipe network, and to remedy these.

Operational and maintenance programmes for pump stations and treatment plants include regular inspections to ensure operational efficiency and maintenance of electro mechanical plant to ensure optimal life time performance. Operational programmes include annual inspections of all plant items to optimise maintenance requirements, and to identify renewal requirements.

7.6.3 Recommended Renewal Programmes

➤ *Pipe Networks*

The proposed renewal programme is to renew pipes at the end of their expected lives. This would provide for pipes to be replaced at the rate of condition deterioration, and so, overall, would maintain the condition profile of the network. This programme is smoothed over a 5-7 year period to minimise yearly peaks and allow for a consistent renewal programme.

➤ *Pump Stations and Treatment Plants*

The detailed recommended programme for mechanical and electrical equipment is detailed in Appendix 14.05 for treatment plants and Appendix 14.03 for pump stations.

The recommended programme provides for replacement at end of optimal service life as determined by maintenance and operational programmes.

7.6.4 Recommended Capital Development Programme

The only capital development project recommended in this Asset Management Plan is the Clifton Waste Water Treatment Plant Service Level Upgrade proposed in 2029.

It is anticipated that new assets may be added to the activity as a result of extensions to the network which will be funded by developers.

7.7 HOW THE ACTIVITY WILL BE RESOURCED

As noted above Council does acknowledge Central Government intent to reform delivery of the 3 waters which sewerage, and for the purpose of this plan it has been assumed that Council will continue to manage and operate the sewerage activity.

7.7.1 Internal Resourcing

The activity is resourced from the Council Asset Team, Engineering Services and the 3 Waters Operational Team.

The Asset team provides for programming activities, budget supervision, programme and performance monitoring, asset management, bylaws, advice for planning, resource and subdivisional activity, negotiation of resource consents for the activity, and council reporting.

Engineering Services is Council's in-house consulting team, providing engineering advice for maintenance and construction as the role of contract engineer and engineers representative, and direct liaison with the contractor in the delivery of contracts. Where needed in specialist areas, Engineering Services will subcontract these resources 'on an as and when needed basis', such as for pump station design or structures associated with the network.

The 3 Waters Operational Team provides Council's in-house management and operation of the three waters activities. They provide laboratory services to monitor treatment plant processes as required by the treatment plant discharge consents, and operators to manage the wastewater treatment plants and sewage pump stations.

7.7.2 Procurement Strategy

Council procures its physical works via the open tender market.

The maintenance contracts are:

➤ ***Mechanical and Electrical Maintenance***

This contract provides for the maintenance of the mechanical and electrical plant across the three water activities for the pump stations and treatment plants.

➤ ***Pipe Network Maintenance***

This contract provides for the operational and maintenance of pipe networks across the three waters activities.

Renewal contracts for pipe network and pumping stations are typically tendered on a project basis, in accordance with the Financial Delegations Manual.

8. Financial Management

8.1 OVERVIEW

The Local Government Act 2002 requires local authorities to manage their finances “*prudently and in a manner that promotes the current and future interests of the community*”. This implies compliance with Generally Accepted Accounting Practice (GAAP). Of particular relevance is International Public Sector Accounting Standard (IPSAS17) Property, Plant and Equipment.

In determining how activities will be funded local authorities are required to take the following into consideration:

- The contribution to the achievement of Community Outcomes (strategic alignment)
- Beneficiaries of each activity (beneficiary / user pays principles)
- The period over which benefits from the activity will occur (intergenerational equity issues)
- The costs and benefits of funding the activity compared to other activities (cost / benefit, prioritisation principles)
- The impact of funding the activity on the wellbeing of the community (ability to pay principles)

Asset Management Plans provide the basis for meeting these requirements for infrastructure based activities.

8.2 FINANCIAL SUMMARY – WHAT THE ACTIVITY COSTS

The following graphs show the forecast in categories over the first 10 years of the Plan, and summarised in five year blocks over the 30 years of the Plan.

Expenditure categories are identified as follows:

- *Operational* - Rates, insurance, contract data management system costs, investigations and monitoring, daily attendance to plant operation.
- *Maintenance* - Recurrent expenditure (periodically or regularly required) as part of the anticipated schedule of works required to keep assets operating, e.g. maintenance of mechanical and electrical plant, clearance of blockages or repair of leaking pipes.
- *Capital Development* - Expenditure, which creates a new asset to meet additional service level requirements or which improves an existing asset to provide a higher level of service.
- *Capital Renewals / Rehabilitation* - Expenditure on an existing asset which restores, rehabilitates, replaces existing asset to its original capacity, e.g. replacing parts of the pipe network or pump station / treatment plant machinery at the end of economic life.
- *Management* - Asset Management Planning, Contract Management, Corporate Overheads and Financing.

Figure 8.1 Operating Expenditure (10 years)

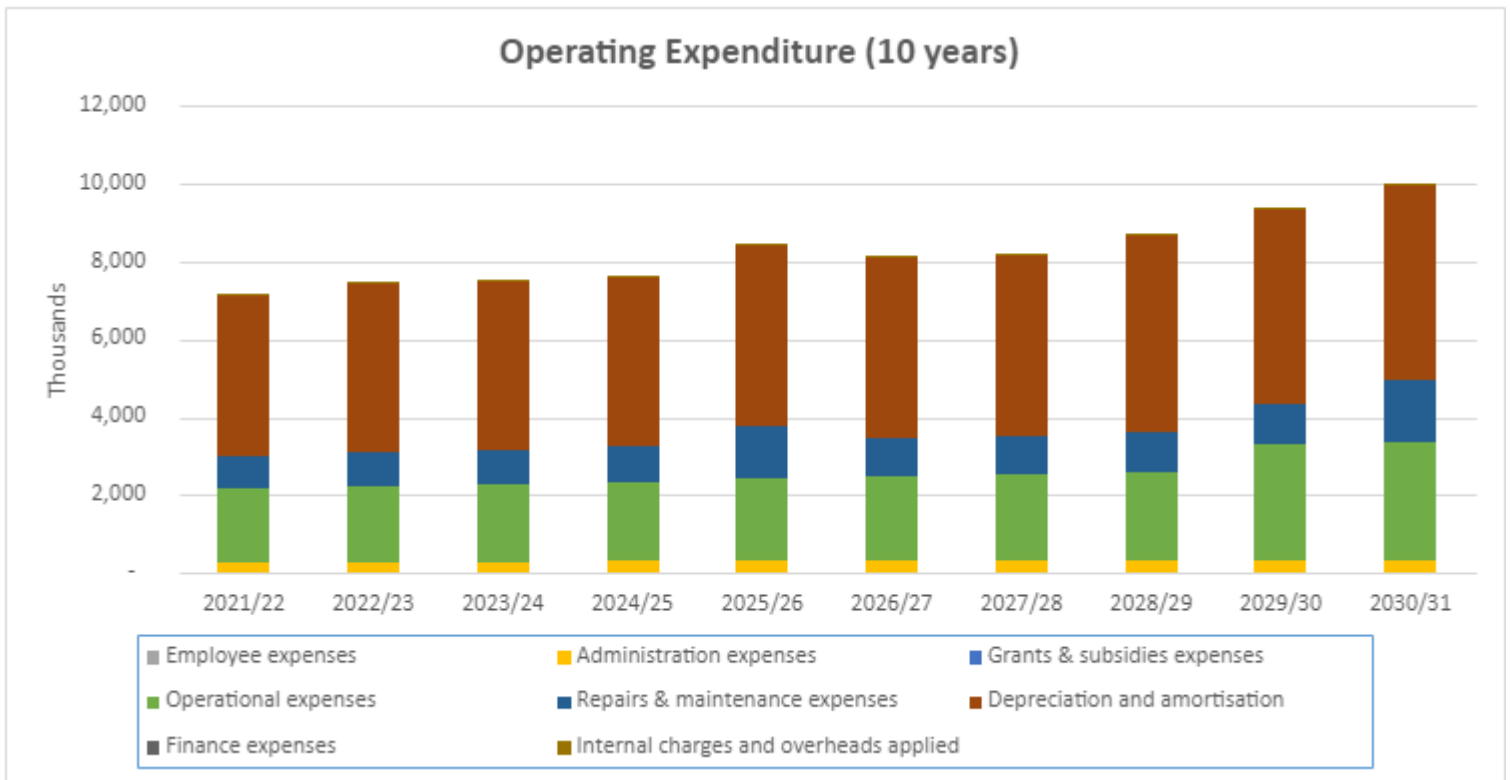


Figure 8.2 Capital Expenditure (10 years)

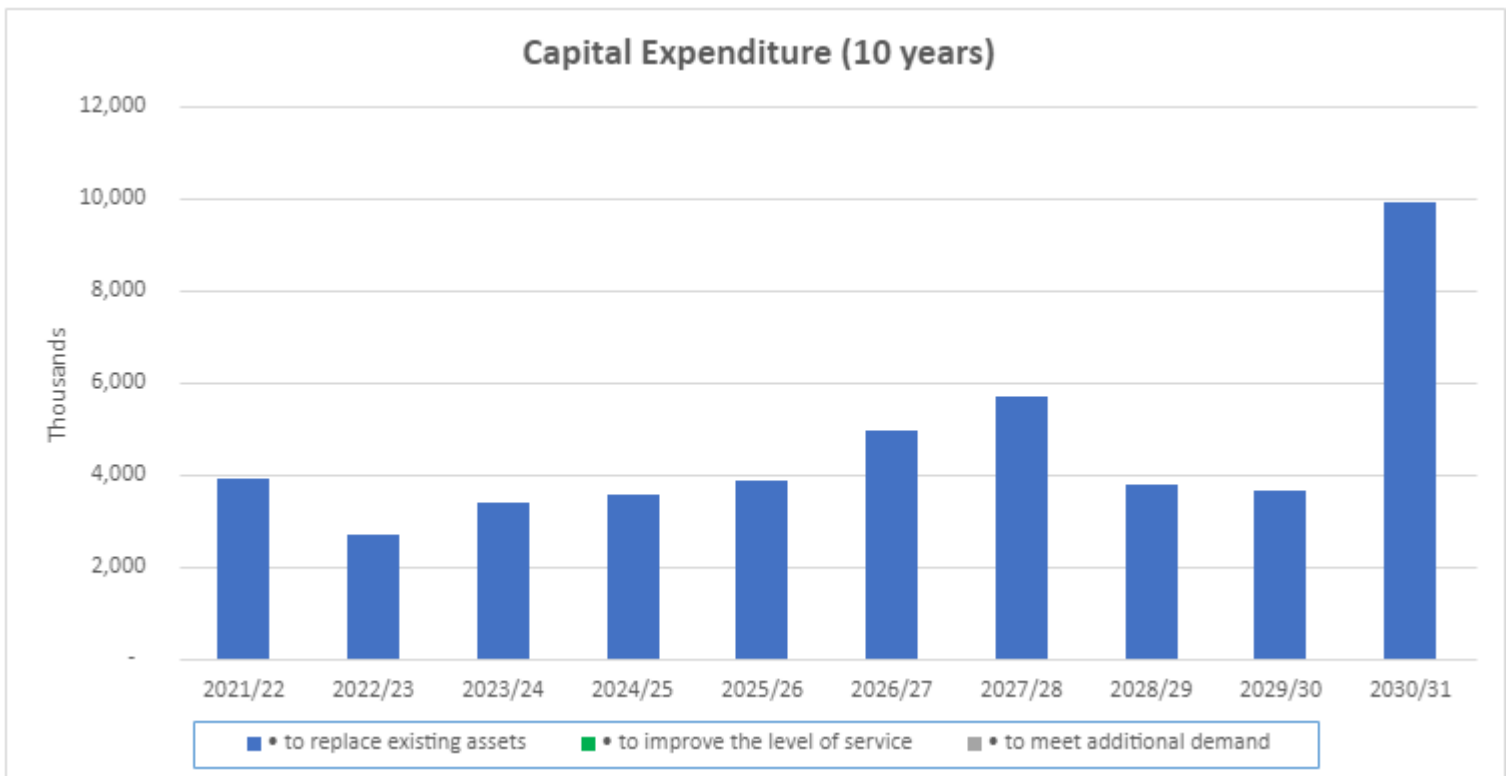


Figure 8.3 Operating Expenditure (30 years)

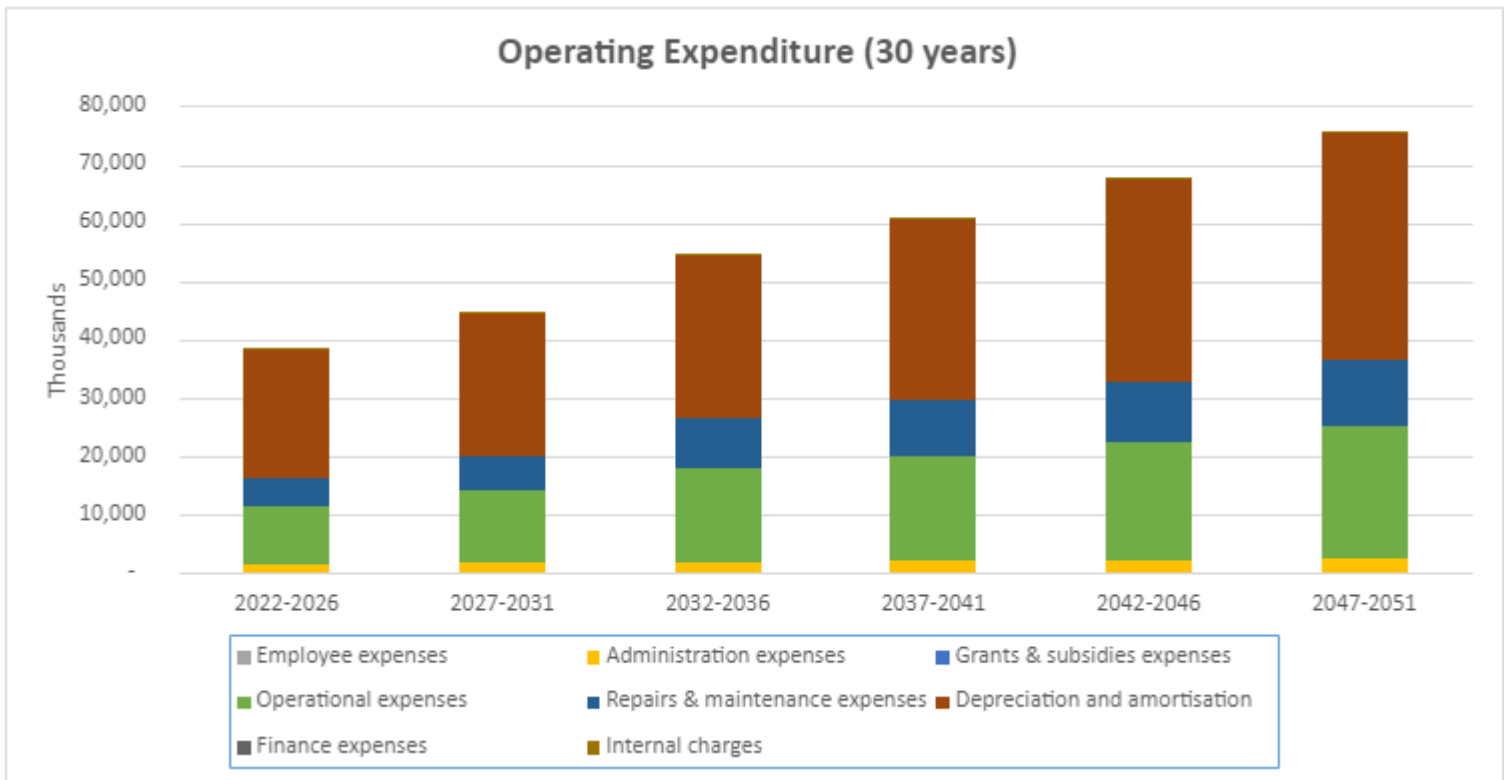
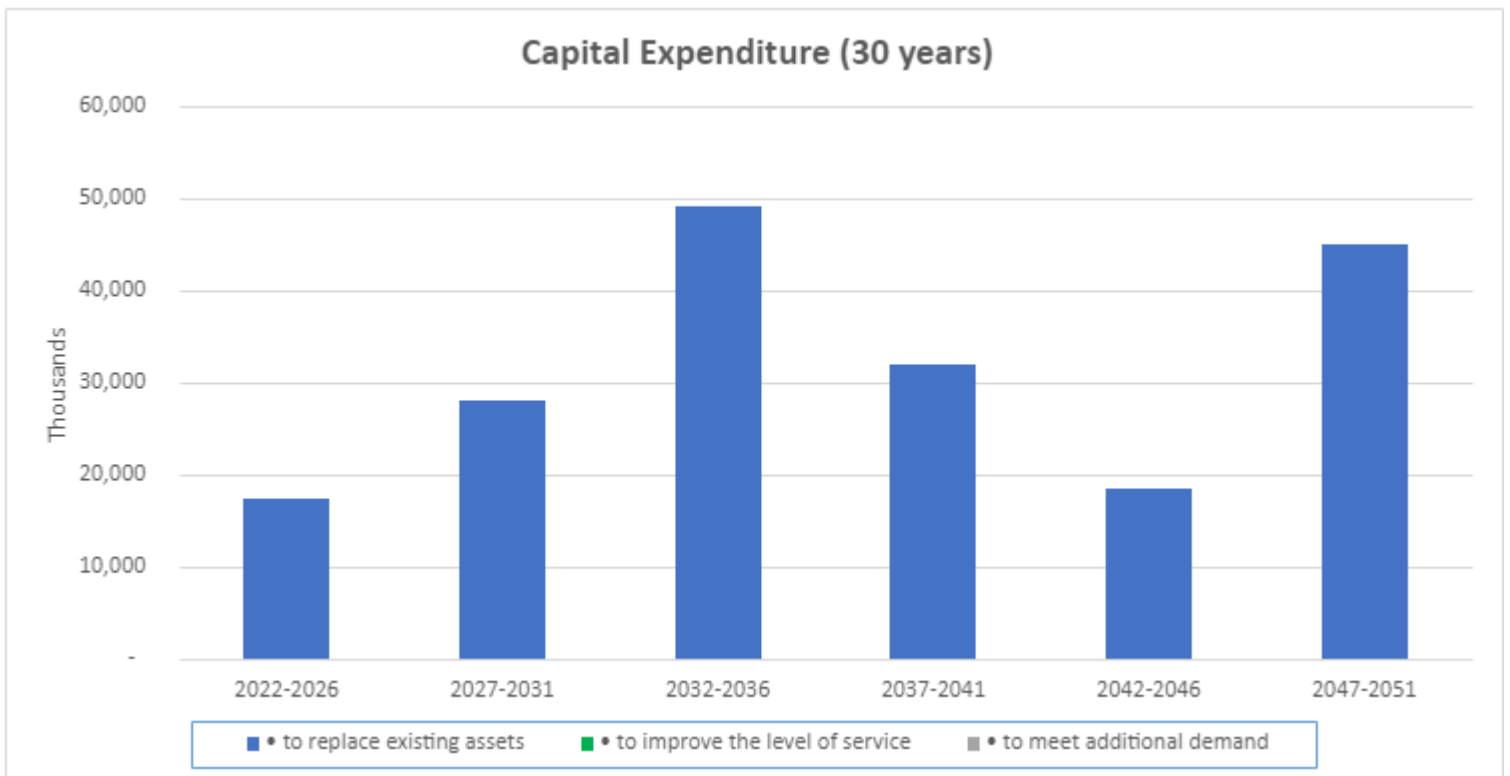


Figure 8.4 Capital Expenditure (30 years)



8.2.1 Council Funded Programmes

The following tables show the 10 year and 30 year financial summary in spreadsheet form. Table 8.3 and Figure 8.5 show the capital programme based on the asset management plan programme compared to the allocated funding as determined by Council. This results in some years with less funding allocated than required. This has an implication on the asset management programme proposed, as some infrastructure will need to be “sweated” to some degree, however, this is only over an approximate 5 year period before funding is reallocated. Over the 10 year period of the AMP this results in approximately \$10M of underfunding, however over the 30 year period of the infrastructure strategy there is no net under funding.

All cost below (table 8.1, 8.2 and 8.3) include inflation factor.

Table 8.1 Sewerage - 10 Year Plan

	2020/21 Annual Plan (\$000)	2020/21 Forecast (\$000)	2021/22 LTP (\$000)	2022/23 LTP (\$000)	2023/24 LTP (\$000)	2024/25 LTP (\$000)	2025/26 LTP (\$000)	2026/27 LTP (\$000)	2027/28 LTP (\$000)	2028/29 LTP (\$000)	2029/30 LTP (\$000)	2030/31 LTP (\$000)
OPERATING												
Rates revenue	6,303	6,303	7,075	7,381	7,701	8,036	8,387	8,753	9,053	9,364	9,687	10,021
Subsidies and grants (Capital)	-	-	750	-	-	-	-	-	-	-	-	-
Subsidies and grants (Operational)	-	-	570	-	-	-	-	-	-	-	-	-
Direct charges revenue	707	707	742	772	803	835	868	903	930	958	987	1,017
Rental revenue	-	70	210	216	221	227	233	239	245	252	258	265
Finance revenue	-	-	-	-	-	-	-	-	-	-	-	-
Dividends	-	-	-	-	-	-	-	-	-	-	-	-
Fines	-	-	-	-	-	-	-	-	-	-	-	-
Other revenue	-	-	-	-	-	-	-	-	-	-	-	-
Internal charges and overheads recovered	-	-	-	-	-	-	-	-	-	-	-	-
Total revenue	7,010	7,080	9,347	8,369	8,725	9,098	9,488	9,895	10,228	10,574	10,932	11,303
Employee expenses	13	13	13	13	14	14	14	15	15	16	16	16
Administration expenses	160	261	261	269	277	282	289	296	305	312	320	330
Grants & subsidies expenses	-	-	-	-	-	-	-	-	-	-	-	-
Operational expenses	2,059	1,929	1,905	1,962	2,010	2,059	2,113	2,166	2,223	2,283	2,961	3,036
Repairs & maintenance expenses	787	1,242	832	876	879	921	1,356	968	970	1,020	1,023	1,568
Depreciation and amortisation	4,106	4,106	4,106	4,312	4,312	4,312	4,662	4,662	4,662	5,030	5,030	5,030
Finance expenses	105	-	-	-	-	-	-	-	-	-	-	-
Internal charges and overheads applied	373	24	24	25	25	26	26	28	28	29	30	30
Total expenses	7,603	7,575	7,141	7,457	7,517	7,614	8,460	8,135	8,203	8,690	9,380	10,010
OPERATING SURPLUS / (DEFICIT)	(593)	(495)	2,206	912	1,208	1,484	1,028	1,760	2,025	1,884	1,552	1,293
CAPITAL EXPENDITURE												
• to meet additional demand	-	-	-	-	-	-	-	-	-	-	-	-
• to improve the level of service	-	-	-	-	-	-	-	-	-	-	-	-
• to replace existing assets	-	7,215	3,925	2,708	3,418	3,593	3,871	4,960	5,693	3,777	3,670	9,928
TOTAL CAPITAL EXPENDITURE	-	7,215	3,925	2,708	3,418	3,593	3,871	4,960	5,693	3,777	3,670	9,928
Gross proceeds from sale of assets	-	-	-	-	-	-	-	-	-	-	-	-

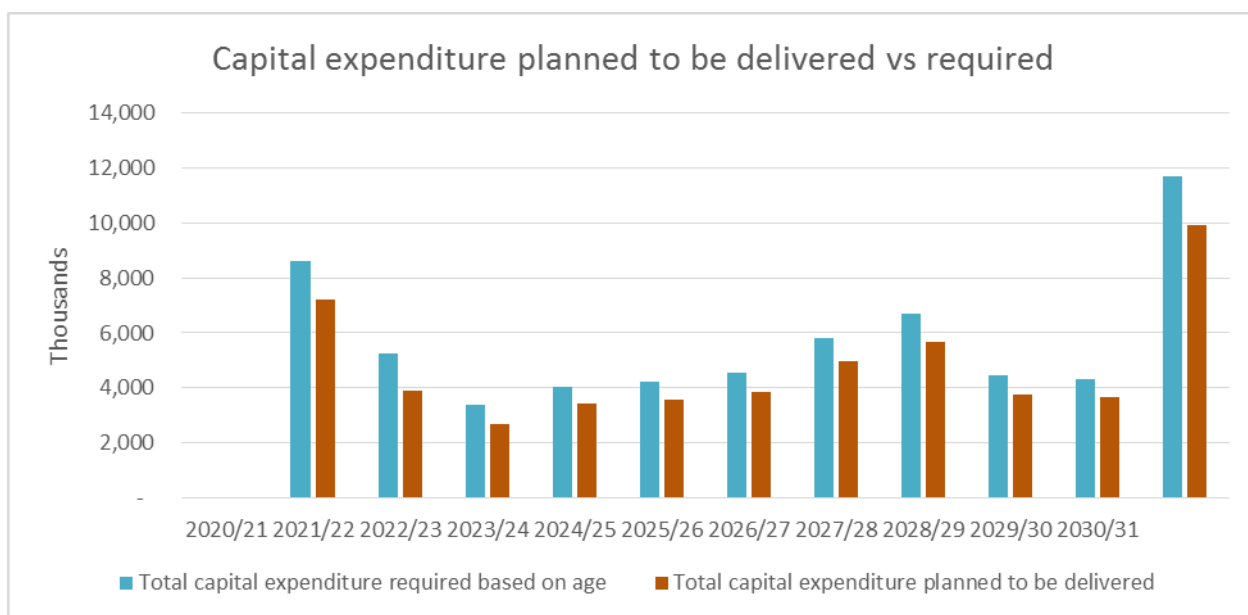
Table 8.2 Sewerage - 30 Year Plan

	2022-2026	2027-2031	2032-2036	2037-2041	2042-2046	2047-2051
	LTP	LTP	LTP	LTP	LTP	LTP
	(\$000)	(\$000)	(\$000)	(\$000)	(\$000)	(\$000)
OPERATING						
Rates revenue	38,580	46,878	53,266	63,624	75,996	90,775
Subsidies and grants (Capital)	750	-	-	-	-	-
Subsidies and grants (Operational)	570	-	-	-	-	-
Direct charges revenue	4,020	4,795	5,558	6,444	7,471	8,661
Rental revenue	1,107	1,259	1,416	1,578	1,760	1,962
Finance revenue	-	-	-	-	-	-
Dividends	-	-	-	-	-	-
Fines	-	-	-	-	-	-
Other revenue	-	-	-	-	-	-
Internal charges	-	-	-	-	-	-
Total revenue	45,027	52,932	60,240	71,646	85,227	101,398
Employee expenses	68	78	88	98	109	121
Administration expenses	1,378	1,563	1,758	1,962	2,186	2,439
Grants & subsidies expenses	-	-	-	-	-	-
Operational expenses	10,049	12,669	16,208	18,074	20,151	22,469
Repairs & maintenance expenses	4,864	5,549	8,374	9,334	10,406	11,606
Depreciation and amortisation	21,704	24,414	27,951	31,041	34,446	38,743
Finance expenses	-	-	-	-	-	-
Internal charges	126	145	162	180	202	224
Total expenses	38,189	44,418	54,541	60,689	67,500	75,602
OPERATING SURPLUS / (DEFICIT)	6,838	8,514	5,699	10,957	17,727	25,796
CAPITAL EXPENDITURE						
• to meet additional demand	-	-	-	-	-	-
• to improve the level of service	-	-	-	-	-	-
• to replace existing assets	17,515	28,028	49,280	32,105	18,463	45,022
TOTAL CAPITAL EXPENDITURE	17,515	28,028	49,280	32,105	18,463	45,022
Gross proceeds from sale of assets	-	-	-	-	-	-

Table 8.3 Sewerage – Capital Expenditure Planned vs Required

	2020/21 Annual Plan (\$000)	2020/21 Forecast (\$000)	2021/22 LTP (\$000)	2022/23 LTP (\$000)	2023/24 LTP (\$000)	2024/25 LTP (\$000)	2025/26 LTP (\$000)	2026/27 LTP (\$000)	2027/28 LTP (\$000)	2028/29 LTP (\$000)	2029/30 LTP (\$000)	2030/31 LTP (\$000)
<u>Capital expenditure required based on age</u>												
• to meet additional demand	-	-	-	-	-	-	-	-	-	-	-	-
• to improve the level of service	-	-	-	-	-	-	-	-	-	-	-	-
• to replace existing assets	8,593	5,234	3,384	4,022	4,227	4,554	5,836	6,698	4,443	4,317	11,680	
Total capital expenditure required based on age	8,593	5,234	3,384	4,022	4,227	4,554	5,836	6,698	4,443	4,317	11,680	
<u>Capital expenditure planned to be delivered</u>												
• to meet additional demand	-	-	-	-	-	-	-	-	-	-	-	-
• to improve the level of service	-	-	-	-	-	-	-	-	-	-	-	-
• to replace existing assets	7,215	3,925	2,708	3,418	3,593	3,871	4,960	5,693	3,777	3,670	9,928	
Total capital expenditure planned to be delivered	7,215	3,925	2,708	3,418	3,593	3,871	4,960	5,693	3,777	3,670	9,928	

Figure 8.5 Capital Expenditure – Planned vs Required



FINANCIAL IMPLICATIONS

8.2.2 NZTA Assisted Programmes

Not applicable to the sewerage activity.

8.2.3 Programme Implications

Council will approve budgets in January 2021.

8.3 FINANCIAL POLICIES

The Local Government Act 2002 requires Council to manage its finances prudently and in a manner which promotes the current and future needs of the community. Council must ensure that each year's projected operating revenues are set at a level sufficient to meet the year's projected operating expenses.

The Revenue and Financing Policy states Council's policy on the funding of its operating and capital expenditure, and the sources of those funds.

Council for each activity must give consideration to who benefits from the activity and the appropriate level of private versus public benefit when funding the activity. Public benefit is gained from having access to activities provided by Council. Private benefit is gained from receiving goods or services provided by Council, i.e. a building consent for work carried out by private residents.

8.4 HOW WE PAY FOR THE ACTIVITY

The finance Strategy provides the detail of the funding for the sewerage activity.

8.5 ASSET VALUATION FORECASTS

Council sewerage assets were revalued as at 30 June 2019 in accordance with the Financial Reporting Standard PBE IPSAS 17 and the New Zealand Infrastructure Valuation Guidelines.

The pipe network was valued by Council staff and audited by AECOM NZ Limited. Treatment Plants and Pump Stations were valued by AECOM NZ Limited and reviewed by Council staff.

The unit costs applied to the pipe network assets were derived from Council analysis of previous contracts with comparison to those experienced in other Councils, plus comparison to those stated in the New Zealand Infrastructure Valuation Guidelines. Asset lives are generally those stated in the valuation guidelines with some modification by Council Asset Management staff.

Depreciation is calculated on all costs, except land, to allocate their costs (less residual value) over their expected economic life. Details of the basis and rates of various categories of asset are as follows:

- Pipe Network 1%-2% Straight Line
- Mechanical and Electrical Plant - 6.67% Straight Line
- Buildings - 1%-2% Straight Line

The valuation is as follows:

- *Pipe and fittings* (file reference A3183132)
- *Treatment Plants and Pump Station* (file reference A3259863)

Table 8.3 Asset Valuation

Asset Group	Optimised Replacement Cost	Optimised Depreciation Replacement Cost	Annual Depreciation
Pipe Fittings (manholes, cleaning eyes, etc.)	\$24,412,896	\$10,432,808	\$252,679
Pipes	\$225,836,444	\$82,887,003	\$2,500,446
Pumping Stations – 31	\$10,179,392	\$4,331,500	\$261,031
Treatment Plants – 3	\$50,389,234	\$26,818,590	\$1,063,055
Total	\$310,817,966	\$124,469,901	\$4,077,211

8.5.1 30-year Valuation and Depreciation Forecast uninflated

Figure 8.6 Depreciation vs Capital Renewals Over 10 Years

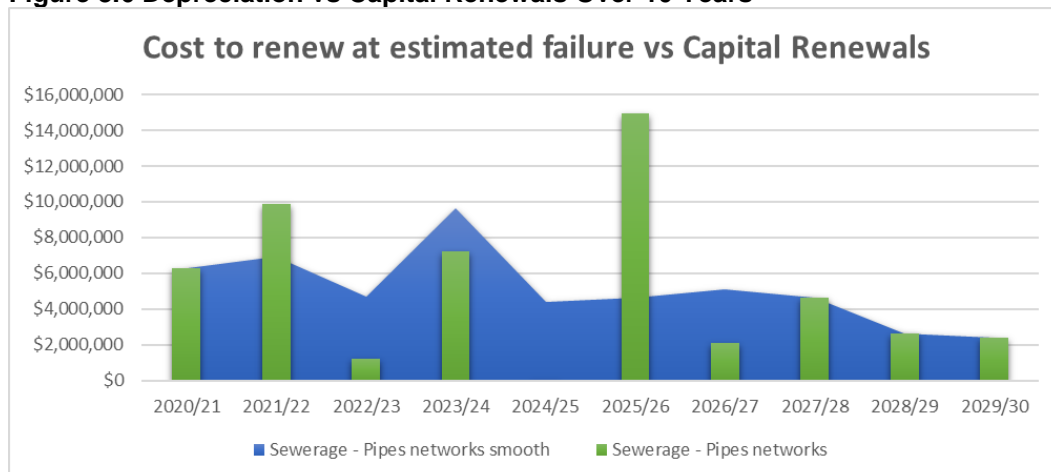
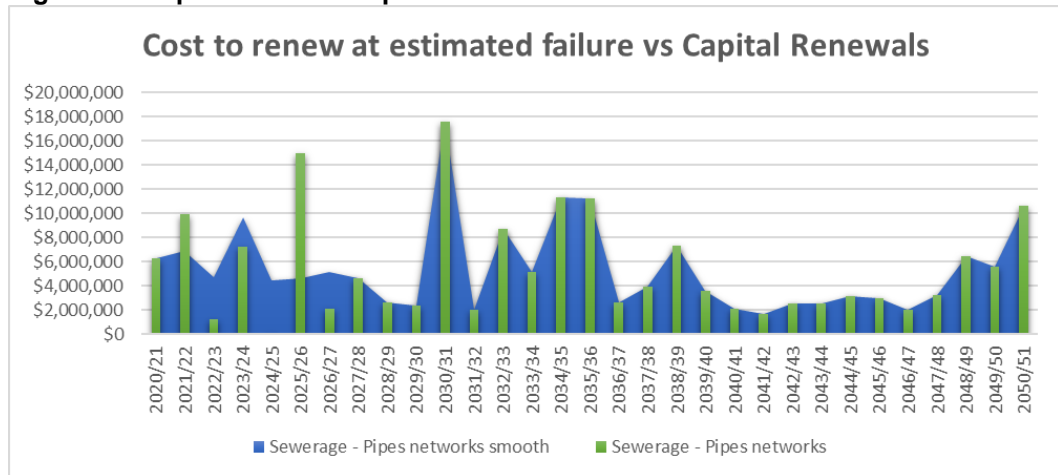


Figure 8.7 Depreciation vs Capital Renewals Over 30 Years



8.6 CONFIDENCE LEVELS IN PROGRAMMES

The confidence in the programmes in this Asset Management Plan has been assessed in terms of the data on which the programmes are based and in terms of the programmes themselves.

Confidence Grade	General Meaning
A	Highly Reliable Data based on sound records, procedures, investigations and analysis which is properly documented and recognised as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%.
B	Reliable Data based on sound records, procedures, investigations and analysis which is properly documented but has minor shortcomings, for example the data is old, some documentation is missing and reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%.
C	Uncertain Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolation from a limited sample for which grade A & B data is available. Dataset is substantially complete but up to 50% is extrapolated data and accurately estimated ± 30%.
D	Very Uncertain Data is based on unconfirmed verbal reports and/or cursory inspection and analysis. Dataset may not be fully complete and most data is estimated or extrapolated. Accurately ± 40%.

The assessment of confidence levels is based on the following assumptions:

Growth

- Population change will follow the Statistics New Zealand population projection
- There will be no significant change in per capita sewerage generation
- The majority of infrastructure required to service new developments will be funded by developers

Levels of Service

- There will be no significant changes in levels of service.
- No upgrading of existing infrastructure will be required as a result of urban development, provided the anticipated development is evenly spread across the urban area. If development of new dwellings is concentrated in part of the urban area, or one of the areas identified for growth of the urban area, some upgrading of existing infrastructure is likely to be required.
- Future condition assessments will not indicate additional remedial / replacement works to those scheduled in work programmes.
- Remedial work required as a result of the Stormwater Discharge consent to fix sewage discharges to stormwater will be accommodated within maintenance or renewal programmes.

Natural Disasters

No provisions has been made in programmes for the cost of repairing damage or other additional costs consequent upon a natural disaster such as a major flood or substantial earthquake. It is anticipated that costs associated with these disasters will be covered by Council's participation in the LAPP scheme (Local Authority Protection Programme Disaster Fund) and insurance of assets excluded from coverage by the LAPP scheme.

Assessment of Confidence in Key Inputs to Programmes

Table 8.4 Confidence Assessment Grades for Pipe Network and Pump Stations

Programme	Grade	Programme	Grade
Pipe Networks		Pump Stations	
Unit Replacement Cost	B+	Structural Condition	A
Condition / Remaining Life	B-	Pump Description	A
Diameter	A	➤ Date Installation	A
Material	A	➤ Performance	A
Age	A	➤ Condition / Remaining Life	B
Length	A	➤ Replacement Cost	B+
Infiltration Rates	C	Switchboard / Telemetry	
		➤ Condition	A
		➤ Date Installation	A
		➤ Performance	A
		➤ Replacement Cost	B+
Treatment Plants			
Structural Conditions	A		
Plant (Mechanical and Electrical)			
➤ Description	A		
➤ Date Installation	A		
➤ Performance	A		
➤ Condition / Remaining Life	B		
➤ Replacement Cost	B+		

Confidence in asset attributes are rated as very reliable (A grade).

For pipe network attributes, confidence is based on comprehensive construction records maintained through the life of the network. When work is done on individual assets, information is checked for accuracy and corrected when found to be inaccurate. A small number of records require correction in any year, representing a high level of confidence in the data.

For mechanical and electrical plant (pump stations and treatment plants) inspections are scheduled annually to determine maintenance requirements and to update condition and performance ratings, providing a high level of confidence in the data.

Assessment of Confidence in Financial Programmes

Table 8.5 Confidence in Financial Programmes Grades

Parameter	Confidence Grade
Management Costs	A
Asset Management	A-
Treatment Plants – Maintenance Costs	B
Replacement Costs	B
Pump Stations – Maintenance Costs	B
Replacement Costs	B
Pipe Network – Maintenance Costs	B-
Replacement Costs	B-
Depreciation	B-
Capital Costs – Asset Renewals	B
Asset Development	B
Overall Confidence in Financial Programme	B

8.7 RELIABILITY OF FINANCIAL FORECASTS

A full sensitivity analysis has not been completed and this will be an item in the improvement plan. Assumptions that will affect the activity are identified below.

8.7.1 Maintenance and Renewal Forecasts

- Population
- Household growth
- Aging population

The activity relies predominately on rates with 89% of revenue coming from rates on residential and commercial properties connected to the sewerage network. Significant variance in the population related assumptions may affect the community's ability to pay, or require significant development expenditure.

Local Economy

The activity draws 11% of revenue from a small number of primary industries producing large volumes of tradewaste. Variance in the composition and size of these industries may reduce the revenue from tradewaste producers, or, if these

industries were to increase in size, require upgrading of treatment plant capacity, or of the pipe network servicing the industries.

8.7.2 Development Forecasts

➤ **Resource Consents**

Invercargill City Council was issued a new consent for stormwater discharges in September 2017. The consent conditions require investigations to identify and rectify sewerage contamination, and if the sewerage network is found to be a source of contamination, additional operational expenditure could result.

Wastewater treatment plant consents will require renewal in 2025 for Bluff Treatment Plant, and 2029 for the Clifton plant. The National Policy Statement for Freshwater Management and the Southland Water and Land Plan may require for treatment plant upgrades, these have not yet been determined, and depending on the upgrade required, additional operational and capital expenditure and may result.

This Plan assumes that a treatment upgrade will not be required for the Bluff Treatment Plant in 2025, but that the Clifton Treatment Plant will require additional processes for nutrient reduction when the consent comes due for renewal in 2029.

➤ **Natural Disasters**

Significant flood events or earthquakes are expected to require significant operational expenditure for clean-up, and to assist the community to return to normal functionality.

➤ **Climate change**

Climate change will have a minimal effect on the sewerage activity over the short to medium term. Effects will include the possibility of increased infiltration into the network, additional pumping and treatment processing. The cost short term will be covered in the current operational budget.

8.7.3 Maintenance and Renewal

➤ **Resource Consents**

The new Stormwater Discharge Consent monitoring requirement may identify a need for additional projects to be included in renewal programmes. It is assumed that these projects can be prioritised within the planned renewal budgets, but the extent of this work requirement has not yet been determined.

The Bluff Wastewater Treatment plant effluent discharge consent is due for renewal in 2025 and it is expected that new consent will not require any major capital funding. The budgets have allowed for consent application and associated cost but no capital work has been identified at this stage due to the unknown conditions that may or may not apply.

The Clifton Wastewater treatment Plant consent is due in 2029 that may require further treatment upgrade but at this stage it is unknown what

these requirements will be. The budgets have allowed for consent application and associated cost but no capital work has been identified at this stage due to the unknown conditions that may or may not apply.

➤ ***Useful Life of Significant Assets / Depreciation***

If the useful life of assets varies significantly from the assumptions of Section 7.3.1, renewal programmes will require adjustment, potentially with significant positive or negative effects on budgets, and in the annual depreciation costs.

➤ ***Asset Valuations***

Asset valuations are based on contract prices for renewal projects, and variation of prices will lead to variation in renewal budgets.

8.7.4 Development Forecasts

Apart from the Bluff Treatment Plant (2025) consent conditions and the Clifton Treatment Plant upgrade proposed in 2029, as a predicted result of discharge consent renewal, no development plans are included in this Asset Management Plan.

If population increases at a greater rate than assumed, or new industry is established in the City, development programmes will need to be considered.

8.8 SUMMARY OF PROGRAMME ASSUMPTIONS

The sewerage activity is particularly susceptible to the following assumptions:

➤ ***Resource Consents***

A new stormwater resource consent may require remedial work on the sewerage network found to be contaminating stormwater.

The Bluff, Invercargill and Omaui discharge consents are unknown as what additional requirement will be placed on renewing these existing consents

➤ ***Useful Life of Significant Assets / Asset Valuation***

Asset renewals accounts for over 60% of the activity budget. Changes in useful life and valuation of assets will significantly affect the overall budget.

➤ ***Natural Disasters***

Floods or earthquakes have the potential to cause significant damage to sewerage infrastructure.

➤ ***Climate change***

Climate change may have some effect on the activity budget.

9. Delivering and Monitoring the Programme

9.1 PROGRAMME GOVERNANCE AND REPORTING

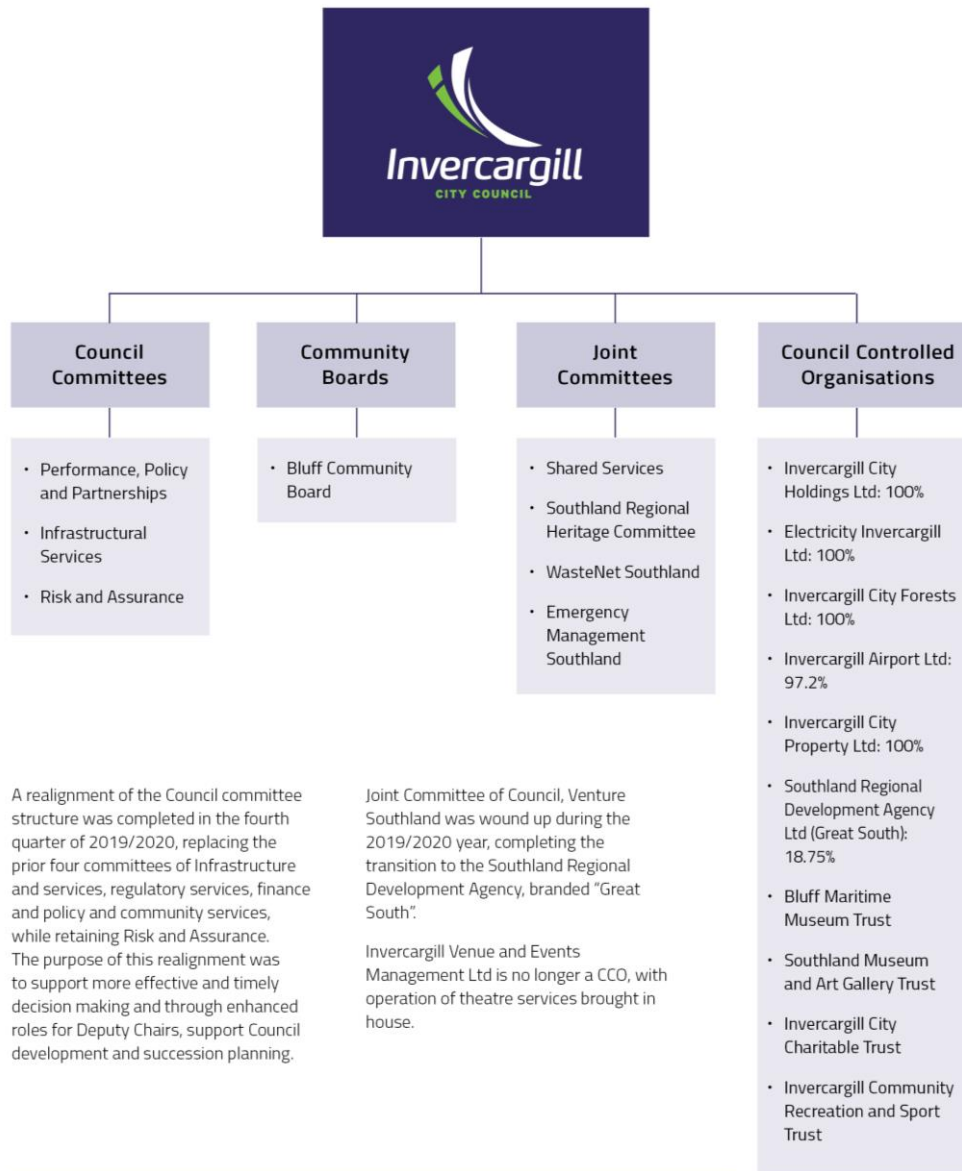
Council operates on a monthly cycle with committees meeting before a full Council meeting. These committees accept and receive reports from their relevant Group, and Management Staff are at these meetings to answer any questions that arise.

This reporting process ensures accountability to Councillors and allows for transparency to the public.

The Bluff Community Board is established as a committee who reports to Council on behalf of the Bluff area and deals with any issues relating to their area. Council provides direction to this committee and has a representative sitting on this Board.

Figure 9.1 Programme Governance and Reporting

Council Structure

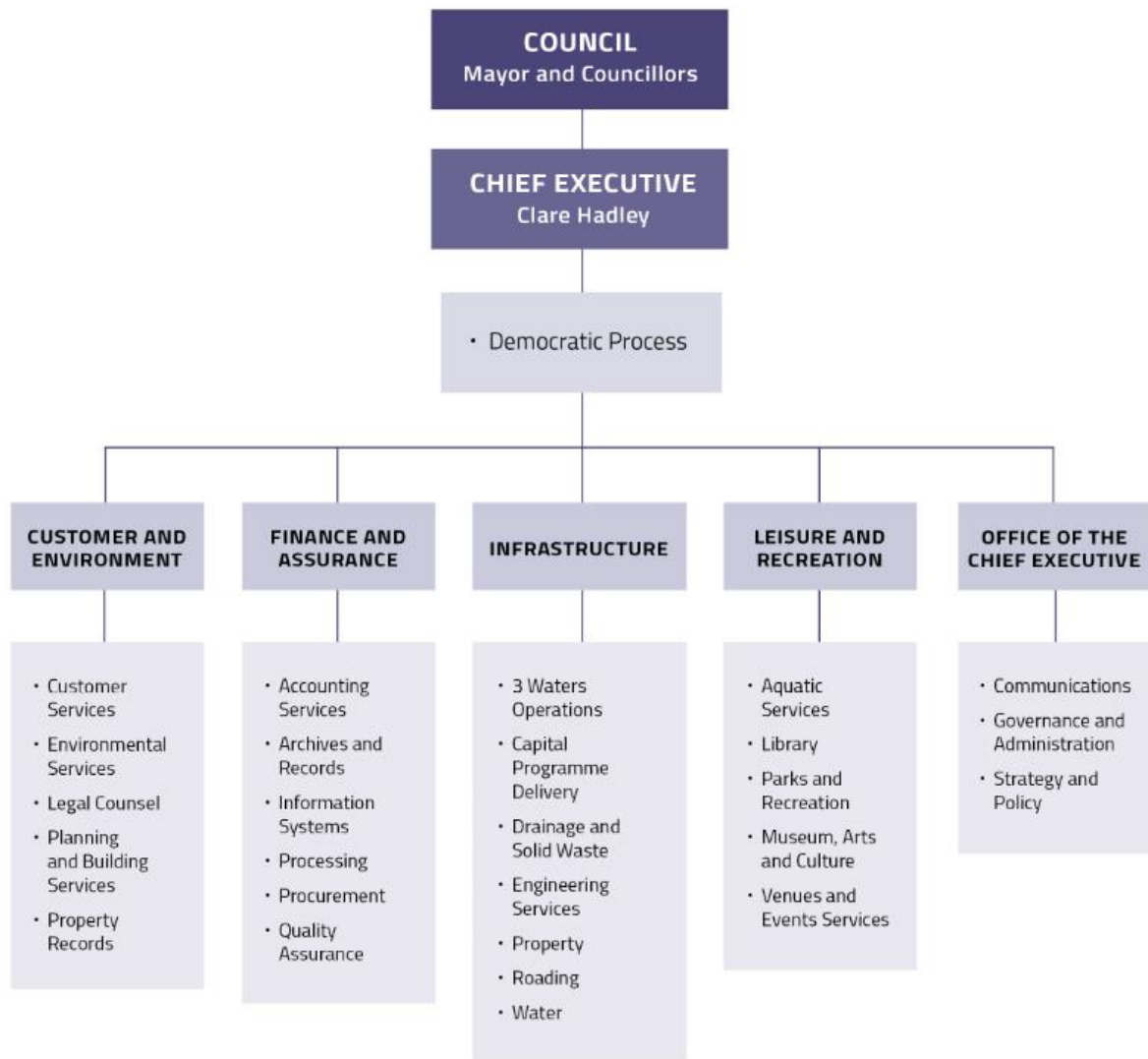


Councillors are elected on a triennial basis through local government elections with the community voting for 12 Councillors and a Mayor. The Chief Executive role is reviewed every five years. In addition to this, Council undertakes a Representation Review every six years to ensure that the community is aware and accepting of the current Council structure.

Council develops their Long Term Plan every three years in line with their obligations under the Local Government Act 2002. Every year following this, Council will adopt an Annual Plan which will make any amendments to the existing Long Term Plan and allows for members of the community to submit on this process.

Further, Council will provide an Annual Report, which is a full year financial snapshot of Council's activities for that financial year. This is also compared to the financial projections in Council's Long Term Plan.

Management Structure



9.2 STAKEHOLDER ENGAGEMENT AND COMMUNICATIONS

Council currently utilises a myriad of methods to engage in consultation with members of the community. The Local Government Act 2002 states specific methods of consultation to be utilised by Council for certain processes, Council adds to this through innovative and community-tailored engagement techniques.

9.3 BUSINESS PROCESSES

The management structure of the Invercargill City Council is as follows:

Figure 9.2 Management Structure of Invercargill City Council

Council staff operates under a Delegations Register (Appendix 1.10) that is adopted by Council; this Register lists every department with specific delegations that are required under legislation or Council policies so that staff members are able to carry out their specific job requirements.

9.4 INFORMATION SYSTEMS AND DATA

Geographical Information Systems (GIS)

Provides mapping and spatial analysis tools for Council to graphically determine and understand where Council facilities or assets are located. This includes geocoding our data, putting it on a map, and symbolizing it in ways that can help visualize and understand the data. The software displays how places are related which helps make more informed decisions about the best locations and paths for infrastructure and planning. Utilising these attributes we can use the software to help make predictions and better understand our environment.

Infor Pathway

Delivers a comprehensive offering of fully integrated functionality for managing council related business processes including:

- *Customer Service and People Management* - central name / address register and customer request management.
- *Land and Property Management* - administration tools to assist with land and property management.
- *Revenue Management* - capabilities such as rates accounting, property valuations, debtors and water billing.
- *Regulatory Management* - a comprehensive range of workflow-driven modules to ensure that local and national regulatory legislation for consents processing, parking and animals, and health and liquor licensing are complied with.
- *Internet-enabled customer self-service* - ePathway enables Council customers to conduct local government e-commerce online.

Infor Public Sector (IPS)

IPS is a centralised Asset Management Information System (AMIS) that allows for the effective management of infrastructure assets. IPS provides tools to improve asset efficiency, conduct planned and unplanned maintenance, manage work costs, provide asset inspection scheduling, and assists in optimising assets life cycles. Asset needs analysis in IPS can be used to determine and recommend which maintenance and renewal programmes are likely to be needed, to assist with long term maintenance and budgeting plans.

Objective

Delivers an Electronic Document and Records Management (EDRMS) service across all of Council providing information management processes and business process automation with robust security, version control and audit management

to ensure Council complies with recordkeeping standards; this reduces the risk associated with managing information in multiple locations.

SCADA / InTouch

SCADA (supervisory control and data acquisition) is a control system installed at the Clifton Wastewater Treatment Plant and the City Control Room. It includes electronic devices networked to a computer to allow remote control and record keeping of all actions, faults and alarms.

InTouch is the computer programme which allows human interfacing with SCADA to facilitate the exercising of control and access of data (a form of human / machine interface referred to as HMI).

Telemetry

Telemetry is the communication system that allows communication between the Clifton Wastewater Treatment Plant and City Control Room to all remote sites including the Bluff Wastewater Treatment Plant and pump stations. Communication technology currently in service is a combination of several direct point to point radio links and micro wave / fibre optic network links. The telemetry system reports alarms from remote sites to the Treatment Plant SCADA system which can then be actioned by operators, or by Council's 24 hour Water Control Centre.

9.5 PROGRAMME PERFORMANCE MONITORING AND REVIEW

9.5.1 Monitoring Approach

Council operates on a monthly cycle with meetings for the committees of Council that look into each group at Council and are provided with extensive monitoring and reporting of levels of services for activities and assets that come out of that group, alongside monthly financial accounts for each group. The Committee will question these reports with managers present to answer any questions that arise from the reports.

The information for these reports is entered into various software systems as detailed in Section 9.4. This monitors the performance (which is both fiscal and service based) against targets and budgets from Council's Long Term Plan. Targets can be key performance indicators, internally driven targets or provided from a Ministry that oversee that area, e.g. Department of Internal Affairs.

9.5.2 Frequency of Review

Every financial year Council prepares an Annual Report that is the key document in ensuring the expenditure for the year was efficient and is pertinent in ensuring accountability to the community and ratepayers.

The Annual Report does not just show the current financial status, but also shows the levels of service for all Council activities and assets measured against the yearly targets set in the Long Term Plan. As noted in Section 9.1, these are measured and reported six weekly in the Council meetings. The Annual Report is a holistic overview of their performance.

10. Continuous Improvement

10.1 CURRENT ACTIVITY MANAGEMENT PRACTICE

The Asset Management Improvement Plan is set over a three year period from July 2020 to June 2023 and is designed to produce an ongoing improvement to Asset Management processes. Current practice and areas for improvement are tabulated below.

Table 10.1 Current Asset Management Practices and Improvement Programme

	Current Practice	Areas for Improvement	Timeframe	Budget	Responsibility
Knowledge of Assets / Data Management	Pipe Network	Continue to update records	Ongoing	Within existing budgets	Engineering Services
	<ul style="list-style-type: none"> ➤ Data – knowledge of pipe age, materials, sizes and location is very good ➤ Condition – knowledge of pipe condition from 6.48% of asset record on CCTV and graded in accordance with pipe inspection manual 	Continue pipe inspection programme to improve knowledge of asset condition	Ongoing	\$50,000 p.a.	Engineering Services
	Electro Mechanical Plant	Current practice adequate	Ongoing	\$20,000 p.a.	Drainage Operations Group – Maintenance Contractor
	Structures (buildings, manholes, etc.) <ul style="list-style-type: none"> ➤ Buildings and manholes maintained and assessed regularly – upgrading needs assessed for Asset Management Plan 	Current practice adequate	Ongoing	Within existing budgets	Drainage Manager
Valuation, Depreciation and Effective Lives	<ul style="list-style-type: none"> ➤ Valuation guidelines 	Reassess effective lives of pipe network based on improved condition assessment	Ongoing	Within existing budgets	Engineering Services
Asset Costing	<ul style="list-style-type: none"> ➤ Replacement costs based on continuing records of renewal contracts 	Current practice adequate	Ongoing	Within existing budgets	Engineering Services
Asset Renewal and New Works Strategy	<ul style="list-style-type: none"> ➤ Forward 30 year plan based on age and condition ➤ Annual Plans consider: <ul style="list-style-type: none"> ▪ Condition ▪ Age ▪ Capacity ▪ Co-ordination with other asset upgrades / renewals 	Improve asset condition assessment to better identify renewal needs	Ongoing	Within existing budgets	Engineering Services Drainage Manager
Service Level Specification and Measurement	<ul style="list-style-type: none"> ➤ Meeting most performance measures ➤ Customer focussed service levels only recently 	Continue to measure and assess performance against service levels	Ongoing	Within existing budgets	Drainage Manager

	Current Practice	Areas for Improvement	Timeframe	Budget	Responsibility
	measured ➤ Surveys used to assess customer needs				
Review, Audit and Continuous Improvement	➤ Annual financial audit ➤ Annual service level audit ➤ Peer review of Asset Management Plans	Current practice adequate	Ongoing	Within existing budgets	ICC Finance Group Manager
Operations and Maintenance Strategy	➤ Contract in place for major maintenance and operational items ➤ Quality contract management procedures in place	Current practice adequate	Ongoing	Within existing budgets	Drainage Operations Group
Consent Compliance	➤ Discharge consents for three treatment plants fully compliant	Monitor and implement identified improvements	Ongoing	Within existing budgets	Drainage Manager
Risk Plans	➤ Lifelines Project identifies risk and response strategies for major events ➤ Asset Management Plan identifies asset failure risk and response strategies	Current practice adequate	Ongoing	Within existing budgets	Drainage Manager
		Improve risk management strategies to align with AS/NZS ISO 13000 Identify high value risk assets	Ongoing	Within existing budgets	Drainage Manager
Sustainability	➤ Develop strategy		Ongoing	Within existing budgets	Infrastructure Group
Resilience	➤ Develop strategy	Community dialogue	Ongoing	Within existing budgets	Infrastructure Group
Sensitivity		Develop sensitivity analysis	Ongoing	Within existing budgets	Drainage Manager

Table 10.2 Improvements from 2017 Asset Management Plan

	Current Practice	Areas for Improvement	Progress Towards Achievement
Knowledge of Assets / Data Management	<p>Pipe Network</p> <ul style="list-style-type: none"> ➤ Data – knowledge of pipe age, materials, sizes and location is very good. ➤ Condition – knowledge of pipe condition from 10% of asset record on CCTV and graded in accordance with pipe inspection manual. <p>Electro Mechanical Plant</p> <ul style="list-style-type: none"> ➤ Condition regular maintained and inspected. ➤ Condition assessed annually ➤ Rated 3 yearly <p>Structures (Buildings, Manholes, etc)</p> <ul style="list-style-type: none"> ➤ Buildings and manholes maintained and assessed regularly – upgrading needs assessed for Asset Management Plan. 	<p>Current knowledge adequate</p> <p>Continue pipe inspection programme to improve knowledge of asset condition.</p> <p>Current practice adequate.</p> <p>Current practice adequate.</p>	<p>Data has been transferred migrated to Infor IPS</p> <p>Improved data fed into 2020 Asset Management Plan.</p> <p>Data migrated to Infor IPS.</p> <p>Improved Treatment Plant and Pump Station Asset Data and Condition Ratings fed into 2020 Asset Management Plan.</p> <p>Annual programme to inspect manholes and upgrade where required.</p>
Valuation, Depreciation and Effective Lives	<ul style="list-style-type: none"> ➤ Valuation guidelines. 	<p>Reassess effective lives of pipe network based on improved condition assessment.</p>	<p>Records updated.</p>
Asset Costing	<ul style="list-style-type: none"> ➤ Replacement costs based on continuing records of renewal contracts. 	<p>Current practice adequate.</p>	<p>Replacement costs updated based on recent contract costs.</p>
Asset Renewal and New Works Strategy	<ul style="list-style-type: none"> ➤ Forward 30 year plan based on age and condition. ➤ Annual Plans consider: <ul style="list-style-type: none"> ▪ Condition ▪ Age ▪ Capacity ▪ Co-ordination with other asset upgrades / renewals 	<p>Improve asset condition assessment to better identify renewal needs.</p>	<p>Asset condition continues to be assessed to improve renewal needs forecasting.</p>

	Current Practice	Areas for Improvement	Progress Towards Achievement
Service Level Specification and Measurement	<ul style="list-style-type: none"> ➤ Meeting most performance measures. ➤ Customer focussed service levels only recently measured. ➤ Surveys used to assess customer needs. 	Continue to measure and assess performance against service levels.	New and previous service levels were monitored and documented in Opal 3. Most targets met.
Review, Audit and Continuous Improvement	<ul style="list-style-type: none"> ➤ Annual financial audit. ➤ Annual service level audit. ➤ Peer review of Asset Management Plans. 	Current practice adequate.	Audits completed.
Operations and Maintenance Strategy	<ul style="list-style-type: none"> ➤ Negotiated contract in place for major maintenance and operational items (to terminate in November 2011). ➤ Quality contract management procedures in place. 	Competitively tendered maintenance contract planned to commence November 2011. Some operational and maintenance items in house.	New contract in place.
Consent Compliance	<ul style="list-style-type: none"> ➤ Discharge consents for three treatment plants fully compliant. 	Current practice adequate.	Continued compliance achieved.
Risk Plans	<ul style="list-style-type: none"> ➤ Lifelines Project identifies risk and response strategies for major events. ➤ Asset Management Plan identifies asset failure risk and response strategies. 	Current practice adequate. Improve risk management strategies. Identify high value risk assets.	Further work required.

10.2 IMPROVEMENT PROGRAMME

Areas for improvement of Asset Management system are identified in Section 10.1, and will be addressed by the following programmes:

➤ ***Pipe Asset Condition Assessment***

Part of the network has been inspected by CCTV and graded in accordance with the New Zealand Pipe Inspection Manual. This inspection programme will continue, and along with maintenance records, will be used to determine effective lives of pipe assets, and renewal programmes.

➤ ***Operational and Maintenance Strategies***

Along with the maintenance contractors Downer and Wallace Murray Limited, Council continues to review operational and maintenance strategies to ensure that the delivery of sewerage service continues to improve.

➤ ***Risk Management***

Asset risks have been tabulated in Section 7 of this Plan, and response strategies identified. Further work is intended to identify risks, particularly those associated with deteriorating asset condition and serviceability, and to improve response strategies.

10.3 IMPROVEMENTS FROM PREVIOUS ASSET MANAGEMENT PLAN

10.3.1 Pipe Asset Condition Assessment

Progress has been made in condition assessment of pipe assets, and further work is intended.

10.4 MONITORING AND REVIEW

The improvement plan will be assessed annually by reporting on progress towards the goals listed in Section 10.2.

11. Glossary

The following terms and acronyms (in brackets) are used in this Asset Management Plan.

Activity	An activity is the work undertaken on an asset or group of assets to achieve a desired outcome.
Advanced Asset Management	Asset management which employs predictive modelling, risk management and optimised renewal decision-making techniques to establish asset life cycle treatment options and related long term cashflow predictions. (See Basic Asset Management).
Annual Plan	The Annual Plan provides a statement of the direction of Council and ensures consistency and co-ordination in both making policies and decisions concerning the use of Council resources. It is a reference document for monitoring and measuring performance for the community as well as the Council itself.
Asset	A physical component of a facility that has value, enables services to be provided and has an economic life of greater than 12 months.
Asset Management (AM)	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.
Asset Management System (AMS)	A system (usually computerised) for collecting, analysing and reporting data on the utilisation, performance, life cycle management and funding of existing assets.
Asset Management Plan	A plan developed for the management of one or more infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost effective manner to provide a specified level of service. A significant component of the plan is a long term cashflow projection for the activities.
Asset Management Strategy	A strategy for asset management covering, the development and implementation of plans and programmes for asset creation, operation, maintenance, renewal, disposal and performance monitoring to ensure that the desired levels of service and other operational objectives are achieved at optimum cost.
Asset Register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each.
Basic Asset Management	Asset management which relies primarily on the use of an asset register, maintenance management systems, job / resource management, inventory control, condition assessment and defined levels of service, in order to establish alternative treatment options and long term cashflow

	predictions. Priorities are usually established on the basis of financial return gained by carrying out the work (rather than risk analysis and optimised renewal decision making).
Benefit Cost Ratio (B/C)	The sum of the present values of all benefits (including residual value, if any) over a specified period, or the life cycle of the asset or facility, divided by the sum of the present value of all costs.
Business Plan	A plan produced by an organisation (or business units within it) which translate the objectives contained in an Annual Plan into detailed work plans for a particular, or range of, business activities. Activities may include marketing, development, operations, management, personnel, technology and financial planning.
Capital Expenditure (CAPEX)	Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of an asset.
Condition Monitoring	Continuous or periodic inspection, assessment, measurement and interpretation of resulting data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action.
Critical Assets	Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation. Critical assets have a lower threshold for action than non-critical assets.
Current Replacement Cost	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset.
Deferred Maintenance	The shortfall in rehabilitation work required to maintain the service potential of an asset.
Demand Management	The active intervention in the market to influence demand for services and assets with forecast consequences, usually to avoid or defer CAPEX expenditure. Demand management is based on the notion that as needs are satisfied, expectations rise automatically and almost every action taken to satisfy demand will stimulate further demand.
Depreciated Replacement Cost (DRC)	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
Depreciation	The wearing out, consumption or other loss of value of an asset whether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for by the allocation of the historical cost (or revalued amount) of the asset less its residual value over its useful life.
Disposal	Activities necessary to dispose of decommissioned assets.
Economic life	The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of

	service. The economic life is at the maximum when equal to the physical life, however obsolescence will often ensure that the economic life is less than the physical life.
Enforcement Order	An order made under section 319 of the Resource Management Act 1991 for any of the purposes set out in section 314 of that Act; and includes an interim enforcement order made under section 320 of that Act.
Facility	A complex comprising many assets (e.g. hospital, water treatment plant or recreation complex) which represents a single management unit for financial, operational, maintenance or other purposes.
Flooding Event	An overflow of stormwater from a territorial authority's stormwater system that enters a habitable floor.
Geographic Information System (GIS)	Software that provides a means of spatially viewing, searching, manipulating, and analysing an electronic database.
Habitable Floor	A floor of a building (includes a basement) but does not include ancillary structures such as stand-alone garden sheds or garages
Infrastructure Assets	Stationary systems forming a network and 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.
Life	A measure of the anticipated life of an asset or component; such as time, number of cycles, distance intervals etc.
Level of service	The defined service quality for a particular activity (i.e. stormwater) or service area (i.e. stormwater disposal) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.
Life Cycle	Life cycle has two meanings: <ul style="list-style-type: none"> ➤ The cycle of activities that an asset (or facility) goes through while it retains an identity as a particular asset, i.e. from planning and designs to decommissioning or disposal. ➤ The period of time between a selected date and the last year over which the criteria (e.g. costs) relating to a decision or alternative under study will be assessed.
Life Cycle Cost	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation, and disposal costs.
Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal.
Maintenance Plan	Collated information, policies and procedures for the optimum maintenance of an asset, or group of assets.

Maintenance Standards	The standards set for the maintenance service, usually contained in preventive maintenance schedules, operation and maintenance manuals, codes of practice, estimating criteria, statutory regulations and mandatory requirements, in accordance with maintenance quality objectives.
Objective	An objective is a general statement of intention relating to a specific output or activity. They are generally longer term aims and are not necessarily outcomes that managers can control.
Operation	The active process of utilising an asset that will consume resources such as manpower, energy, chemicals and materials. Operation costs are part of the life cycle costs of an asset.
Optimised Renewal Decision Making (ORDM)	An optimisation process for considering and prioritising all options to rectify performance failures of assets. The process encompasses NPV analysis and risk assessment.
Performance Measure	A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction.
Performance Monitoring	Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.
Pipeline Asset Management System (PAMS)	The computerised utilities asset management software system (Hansen IMS) supplied by MITS-Hansen under a bulk supply agreement with ALGENZ for use by New Zealand local authority asset managers.
Planned Maintenance	Planned maintenance activities fall into three categories: <ul style="list-style-type: none"> (a) Periodic - necessary to ensure the reliability or sustain the design life of an asset. (b) Predictive - condition monitoring activities used to predict failure. (c) Preventive - maintenance that can be initiated without routine or continuous checking (e.g. using information contained in maintenance manuals or manufacturers' recommendations) and is not condition-based.
Rehabilitation	Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally involves repairing the asset using available techniques and standards to deliver its original level of service (i.e. heavy patching of roads, slip-lining of stormwater mains, etc.) without resorting to significant upgrading or replacement.
Renewal	Works to upgrade, refurbish, rehabilitate or replace existing facilities with facilities of equivalent capacity or performance capability.

Renewal Accounting	A method of infrastructure asset accounting which recognises that infrastructure assets are maintained at an agreed service level through regular planned maintenance, rehabilitation and renewal programmes contained in an Asset Management Plan. The system as a whole is maintained in perpetuity and therefore does not need to be depreciated. The relevant rehabilitation and renewal costs are treated as operational rather than capital expenditure and any loss in service potential is recognised as deferred maintenance.
Repair	Action to restore an item to its previous condition after failure or damage.
Replacement	The complete replacement of an asset that has reached the end of its life, so as to provide a similar or agreed alternative, level of service.
Resilience	The ability of the organisation to service a crisis, and thrive in a world of uncertainty.
Risk Management	The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.
Routine Maintenance	Day to day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventative maintenance.
Service Potential	The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset.
Sustainability	The ability of the activity to continue to function at the desired Levels of Service.
Stormwater System	The pipes and infrastructure (excluding roads) that collect and manage rainwater run-off from the point of connection to the point of discharge.
Strategic Plan	Strategic planning involves making decisions about 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.
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.
Upgrading	The replacement of an asset or addition / replacement of an asset component that materially improves the original service potential of the asset.
Valuation	Estimated asset value which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels or market value for life cycle costing.

12. Appendices

The Appendices for all of Council's Asset Management Plans are kept separate. The list below highlights the appendices that relate to this Asset Management Plan and where to find them in the Corporate Appendices Register.

Number	Type	Title
14.01	Sewerage	Sewerage System Maps – Major Pipes, Rising Mains and Pump Stations, and Reticulation, and FS Overflow Locations
14.02	Sewerage	Pipe Schedule – Diameter and Material, and, Decade and Material
14.03	Sewerage	Pump Station Register
14.04	Sewerage	Wastewater Treatment Plant Discharge Consents
14.05	Sewerage	Wastewater Treatment Plant Maintenance and Renewals Schedule
14.06	Sewerage	Lifecycle Management Strategies
14.07	Sewerage	Asset Inspection Grading Standards
14.08	Sewerage	Defining Asset Criticality for Water Services