Long Term Plan 2021-31

Activity Plan

Wastewater collection treatment and disposal

Adopted 21 and 23 June 2021

Christchurch City Council

Approvals

Role	Position	Name	For Draft LTP	
			Signature	Date of sign-off
General Manager	GM City Services (acting)	Carolyn Gallagher		04/02/2021
Finance Business Partner	Finance Business Partner	Peter Langbein		12/02/2021
Activity Manager	Head of Three Waters & Waste	Helen Beaumont		02/02/2021

Authors and Advisors to this Activity Plan

Group	Business Unit	Position	Name
City Services	3 Waters	Team Leader Asset Management	Mark Johnson
City Services	3 Waters	Asset Engineer - Planning	Michael Galambos

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1. What does this activity deliver?

We're investing in Christchurch's future

This document outlines the wastewater infrastructure and services we propose to invest in over the next 10 years to safeguard public health and protect the environment. It is based on the recommendations documented within the council's wastewater asset management plan. This includes a summary of the investment required to meet future demand, prevent further deterioration of network infrastructure and maintain current levels of service. It gives Christchurch residents the opportunity to join the conversation by telling us what matters to them.

What we provide

Every day Christchurch City Council (Council) delivers safe drinking water to homes and businesses. Some of this water is used outside (watering your garden), but most is used inside your house; in the bathroom, kitchen or laundry. Once used, this water leaves your home as wastewater (also known as sewage), through your plumbing and into the public wastewater network. Council's wastewater network carries a combination of residential and business waste.

Wastewater contains 99% water and about 1% human and other waste. Because the waste component contains bacteria and viruses that could be harmful to human health, it's important it is kept separate from the drinking water network. Furthermore nutrients from the waste component can overload receiving ecosystems if discharged untreated. The wastewater network collects all wastewater from connected properties for treatment at one of Council's treatment plants, before discharge to sea or land irrigation.

The Council collects wastewater from approximately 160,000 customers in Christchurch, Lyttelton, Diamond Harbour, Governors Bay, Akaroa, Duvauchelle, Tikao Bay and Wainui. It treats this wastewater at eight treatment plants and disposes the treated wastewater into the sea and to land irrigation schemes. The key assets Council manage in relation to wastewater collection, treatment and disposal include:

Reticulation

1,622 km gravity wastewater mains

253 km pressure wastewater mains

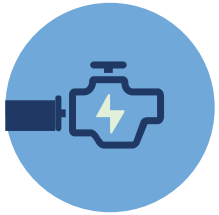
61 km vacuum wastewater mains

1,000 km wastewater laterals

27,666 manholes

9,405 local pressure sewer system tanks

4,353 vacuum sewer system chambers



Pumping (collection)

150 pump stations

84 lift stations

3 vacuum stations

248 pump station control systems

34 odour control sites

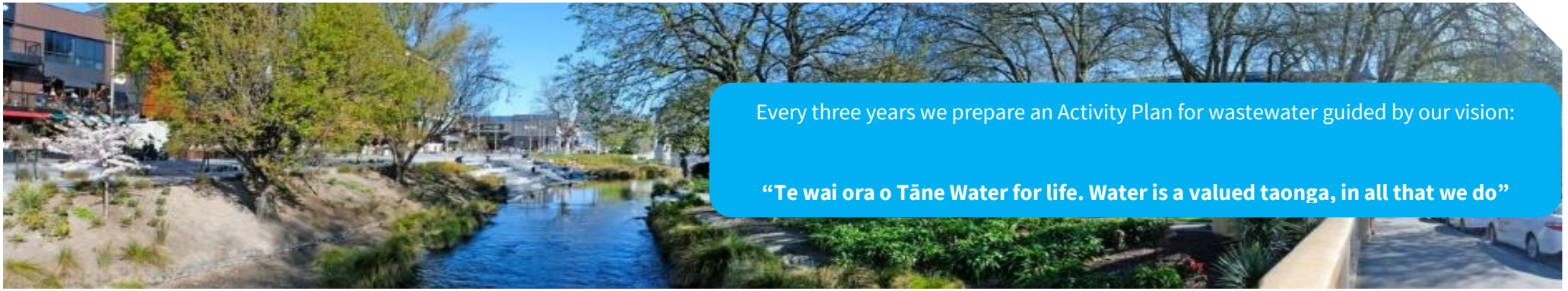
Treatment & Disposal

8 wastewater treatment plants

1 outfall pump station

6 ocean / harbour outfalls

2 land irrigation schemes



Every three years we prepare an Activity Plan for wastewater guided by our vision:

"Te wai ora o Tāne Water for life. Water is a valued taonga, in all that we do"

Achieving the vision will mean that water resources and taonga are managed in an integrated way to provide people, communities and future generations with access to safe and sufficient water resources, maintain the integrity of freshwater ecosystems and manage hazards from flooding and sea level rise.

The key wastewater activities that Council undertakes include:

Wastewater monitoring and control

Monitoring and control of wastewater flow and quality, including the social, cultural, environmental, economic and technological impacts of wastewater operations.

Inflow and infiltration control

Inflow refers to stormwater entering the wastewater network. Excess stormwater can overload the system and result in untreated wastewater entering the environment. Infiltration describes the entry of groundwater into the network, through damaged pipes, which can also contribute to wastewater entering the environment. The Council aims to reduce inflow and infiltration so that our wastewater systems are not overloaded and to reduce wastewater overflows to the environment. Current estimations show the proportion of Inflow and Infiltration to be 30% of the total annual flow to the Christchurch wastewater treatment plant. During storm events inflow and infiltration can more than triple instantaneous flows.

Wastewater overflow management

Overflows occur when wastewater enters public or private property, waterways and the sea. They occur when the wastewater, inflow and infiltration volumes are greater than pipes can carry, typically during heavy rainfall events, or when wastewater pipes become blocked. To reduce overflows, the Council cleans wastewater pipes that are prone to blocking and repairs or replaces leaky wastewater pipes through its renewal programme.

Wastewater treatment

Wastewater is transported along the network to a wastewater treatment plant where it is treated, before being discharged to the land or sea. The Council is responsible for planning, constructing, operating and maintaining a cost-effective and resilient wastewater collection, treatment and disposal system.

Treatment by-product management

Wastewater treatment practices create various by-products, such as sludge and gases that either need to be disposed of, re-used or destroyed. A key Council wastewater activity is the efficient treatment, disposal and/or recycling of wastewater treatment by-products.

Laboratory services

Laboratory services monitor and analyse treatment processes and products to demonstrate compliance with consent discharge conditions.

2. Community Outcomes – why do we deliver this activity?

	Community Outcomes	Describe in 2-3 sentences how the activity effects the Community Outcome.
Primary Outcome 1	Safe and healthy communities	Protecting public health by limiting exposure to human waste in accordance with: • Health Act 1956 • Hazardous Substances and New Organisms Act 1996 • Resource Management Act 1991 • Health and Safety at Work Act 2015 • Water Supply, Wastewater and Stormwater Bylaw 2014 • Trade Waste Bylaw 2015
Primary Outcome 2	Healthy water bodies	Reducing wastewater overflows to waterways
Secondary Outcome 1	Modern and robust city infrastructure and facilities network	We strive for a resilient public drinking water supply network, to support a healthy community, healthy environment and prosperous economy by: • Minimising damage from natural disasters by setting minimum requirements for new infrastructure. • Gathering an evidence base to support asset lifecycle decision making. • Performing lifecycle management to minimise whole of life costs. • Minimising service disruptions. • Setting requirements for network condition and performance.
Secondary Outcome 2	Sustainable use of resources and minimising waste	Limiting resource use and encouraging by-product re-use
Secondary Outcome 3	Great place for people, business and investment	• We strive to manage costs and intergenerational debt by: • Controlling costs to minimise rates increases • Maintaining networks to prevent future generations inheriting a network in need of significant expenditure.

The information below summarises how the wastewater collection, treatment and disposal activities contribute to Council's community outcomes.

PRIMARY OUTCOME - SAFE AND HEALTHY COMMUNITIES

We manage wastewater treatment and disposal to protect human health by:

- Limiting exposure to human waste in accordance with legislation and regulations

PRIMARY OUTCOME - HEALTHY WATER BODIES

We sustainably manage the environmental impacts of wastewater services by:

- Reducing wastewater overflows to waterways

SECONDARY OUTCOME - SUSTAINABLE USE OF RESOURCES AND MINIMISING WASTE

We manage the wastewater network in a way that promotes sustainable use of resources, energy efficiency and resilience by:

- Encouraging the re-use of by-products generated through the wastewater treatment process, such as the use of methane in energy production and dried sludge for land remediation

SECONDARY OUTCOME - MODERN AND ROBUST CITY INFRASTRUCTURE AND FACILITIES

We strive for an efficient, sustainable and resilient wastewater network to support a healthy community, environment and prosperous economy by:

- Setting minimum requirements for network condition and performance

SECONDARY OUTCOME - GREAT PLACE FOR PEOPLE, BUSINESS AND INVESTMENT

We control costs to minimise rates increases:

- Controlling costs to minimise rates increases
- Maintaining networks to prevent future generations inheriting a network in need of significant expenditure

3. Strategic Priorities – how does this activity support progress on our priorities?

Strategic Priorities	Activity Responses
Enabling active and connected communities to own their future	Active citizenship supported and promoted via • support to water management zone committee activities and projects • community working parties for major wastewater projects (e.g. Duvauchelle wastewater working party) • annual residents surveys, including obtaining views on wastewater services
Meeting the challenge of climate change through every means available	Supporting climate change leadership by: • tracking energy use and greenhouse gas emissions associated with wastewater services through the resource efficiency and greenhouse gas emissions dashboard • biogas production and generation of energy from biogas at the Bromley wastewater treatment plant • considering carbon as part of project lifecycle costs for major wastewater projects
Ensuring a high quality drinking water supply that is safe and sustainable	Efficient, effective and resilient wastewater services support high quality drinking water that is safe and sustainable by: • reducing the risk of contaminating source water by reducing wastewater overflows and renewing leaky wastewater pipes
Ensuring healthy water bodies	Efficient, effective and resilient wastewater services healthy water bodies by: • reducing wastewater overflows
Accelerating the momentum the city needs	Efficient and resilient wastewater services support a healthy economy by: • providing reliable and resilient wastewater services
Ensuring rates are affordable and sustainable	• reducing expenditure on wastewater services

Our wastewater initiatives over the next ten years will also contribute to Council's strategic priorities by:

Enabling active and connected communities to own their future

- Supporting water zone committee activities
- Increasing customer engagement and consultation through community working parties for major wastewater projects e.g. Duvauchelle wastewater treatment plant

Meeting the challenge of climate change through every means available

- Tracking energy use and greenhouse gas emissions from Council wastewater activities
- Generating electricity from biogas at the Christchurch wastewater treatment plant
- Considering carbon emissions in large wastewater projects

Ensuring a high quality drinking water supply that is safe and sustainable

- Reducing the risk of contaminating drinking water by reducing wastewater overflows and renewing leaky wastewater pipes

Ensuring healthy water bodies

- Reducing dry and wet weather overflows that can pollute waterways

Accelerating the momentum the city needs

- Providing reliable and resilient wastewater services

Ensuring rates are affordable and sustainable

- Reducing expenditure on wastewater services

4. Increasing Resilience

Council monitors and manages a number of risks in relation to wastewater and undertakes improvements to improve resilience to man-made and natural hazards.

Natural Disasters

Earthquakes: Earthquakes can cause damage to wastewater networks and wastewater treatment plants. New infrastructure is designed to be resilient to earthquakes. In areas with a high risk of liquefaction changes from traditional gravity sewers to local pressure sewer systems or vacuum sewer systems provide a more resilient network.

Tsunamis: A tsunami could cause damage to low lying wastewater assets near the coast (e.g. wastewater treatment plants, pipes and pump stations).

Climate Change

Sea Level Rise: Sea level rise and coastal erosion may make it difficult to service some properties in the future. Increased levels of salt water in the groundwater may also damage assets in coastal areas. Increased groundwater levels will increase infiltration.

Council modelling suggests that sea level rise could impact 12 percent of wastewater pipe renewals by 2065 and a further eight percent by 2120.

Higher Temperatures: Higher temperatures could create a change in bacterial conditions and could lead to increased odour and corrosion. It could also result in improved nitrogen removal at wastewater treatment plants.

Increased Rainfall: Increased high intensity rainfall may lead to an increased risk of flooding and wet weather overflows. Wet weather overflows occur

when an increased rainfall event leads to stormwater entering the wastewater network. This can result in wastewater overflowing into rivers, streams, or the ocean.

Wastewater overflows are a public health risk and can cause damage to natural heritage, cultural heritage or disruption to the city and the economy. Flooded areas also need to be pumped out and cleaned, which causes reduced or impaired service and increased costs to Council.

Public Health: Wastewater is a risk to public health if it is not managed safely. The Council's Wastewater Network Improvement Programme aims to reduce overflows, mitigating the impact on population and environmental health. The Wastewater Renewal Programme will further reduce the likelihood of untreated wastewater entering the environment by replacing assets with the highest impact (should a failure occur) and the assets most likely to fail.

Societal Changes

Environmental Standards: Stricter consent conditions or standards may be imposed on overflows or treated wastewater discharges in the future.

Social Inequity: The cost of wastewater management is currently paid by home-owners through general rates. Council is considering charging for water and wastewater based on water usage. This means those who use less water will pay less. Desires to eliminate or limit rate rises in the short term will result in an increased financial burden on future generations due to deterioration in wastewater networks.

Business as Usual

Aging Pipe Networks: Historic underinvestment, aging pipes and the legacy of earthquake damage means that our wastewater network is deteriorating with a corresponding increase in the risk of failure. With more very poor condition pipes, inflow and infiltration will increase resulting in more overflows and increased pumping and treatment costs. Based on funding available we expect the proportion of very poor condition pipes to increase to 27% by 2039 before beginning to decrease to 19% in 2051

5. Specify Levels of Service

Council's Levels of Service (LoS) measures enable us to monitor and report against our outcomes and service performance. To support the Activity Plan for wastewater we have produced a set of quantitative outcomes and outputs to track the contribution of wastewater over time. In this Long Term Plan the LoS are grouped under each of the community outcomes to clearly demonstrate the linkage between what we do, why we do it and to measure progress towards the overall vision for wastewater in Christchurch.

The following pages provide an overview of the LoS for each community outcome. These are the community facing LoS and will be published in our Statement of Service Provision. Council also has a number of management LoS that are internal measures used to assess service delivery.

Safe and Healthy Communities

LoS: Public health is protected from Council wastewater services

- Number of dry weather overflows from wastewater systems

LoS: Council operates wastewater services in a responsive manner

- Median time (in hours) from notification to attendance of overflows resulting from network faults
- Median time (in hours) from notification to resolution of overflows resulting from network faults

Modern and Robust City Infrastructure and Facilities Network

LoS: Council operates wastewater services in a reliable manner

- The proportion of residents satisfied with the reliability and responsiveness of wastewater services
- The total number of complaints received by Council per 1000 properties
- Percentage of total wastewater gravity network pipework length at condition grade 5 (very poor)

LoS: Council operates wastewater services in a responsive manner

- Median time (in hours) from notification to arrival on-site for urgent faults on rural wastewater networks
- Median time (in hours) from notification to arrival on-site for urgent faults on urban wastewater networks
- Median time (in hours) from notification to arrival on-site for non-urgent faults on rural wastewater networks
- Median time (in hours) from notification to arrival on-site for non-urgent faults on urban wastewater networks

Healthy Water Bodies

LoS: Council has high wastewater discharge quality

- Number of abatement notices, infringement notices, enforcement orders and convictions Regarding Council resource consents.

Sustainable Use of Resources and Minimising Waste

LoS: Council wastewater networks and operations are sustainable

Community outcome: Safe and Healthy Communities

Level of service: Council operates wastewater services in a responsive manner

A key level of service (LoS) for the wastewater activity is that Council responds to issues and customer complaints regarding wastewater overflows in a timely manner to achieve the outcome of safe and healthy communities.

The image opposite shows groundwater entering the wastewater network through cracked pipes. This extra water can cause the capacity of the network to be overwhelmed in heavy rain.

The public can also help to avoid wastewater overflows by making sure they only connect wastewater plumbing to a gully trap.

It is also recommended that people do not have contact with ocean and waterways for two days following a heavy rainfall event, to protect them from wastewater overflows and other stormwater contaminants.

Groundwater entering through cracked pipes

Outputs

LoS Performance Measures	Current Performance	Benchmark	Performance Targets			
			Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31
11.0.1.5 – Median time (in hours) from notification to attendance of overflows resulting from network faults	2019/20 = 0.55 hours	2018/19 = 0.55 hours (Water NZ National Performance Review median results)	≤ 1 hour			
11.0.1.6 – Median time (in hours) from notification to resolution of overflows resulting from network faults	2019/20 = 7.75 hours	2018/19 = 2.8 hours (Water NZ National Performance Review median results)	≤ 24 hours			

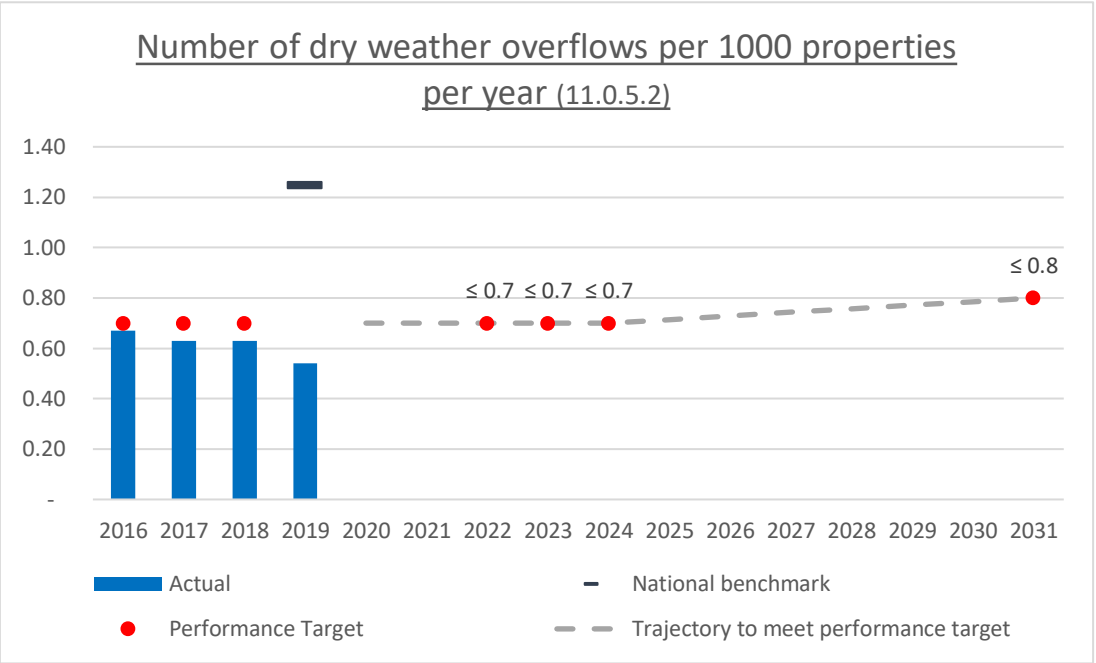
Community outcome: Safe and Healthy Communities

Level of service: Public health is protected from Council wastewater services

A key level of service for the wastewater activity is that it protects public health to achieve the outcome of safe and healthy communities. A dry weather overflow occurs when there is a blockage in the system, causing wastewater to enter streams, rivers, the sea, roads, or private property.

Wastewater contains human waste, food scraps and debris, so dry weather overflows can have an impact on river quality and cause a risk to public health. Dry weather overflows typically occur in small pipes, and are more frequent than wet weather overflows, however typically these have a smaller impact.

The graph opposite shows the number of dry weather overflows that have occurred per 1,000 properties connected to the network since the 2016 financial year, illustrating a steady decrease in dry weather overflows over the period. If this trend continues, Council will be below the target of less than 0.70 overflows per 1,000 properties for the financial years 2021/22 to 2023/24.



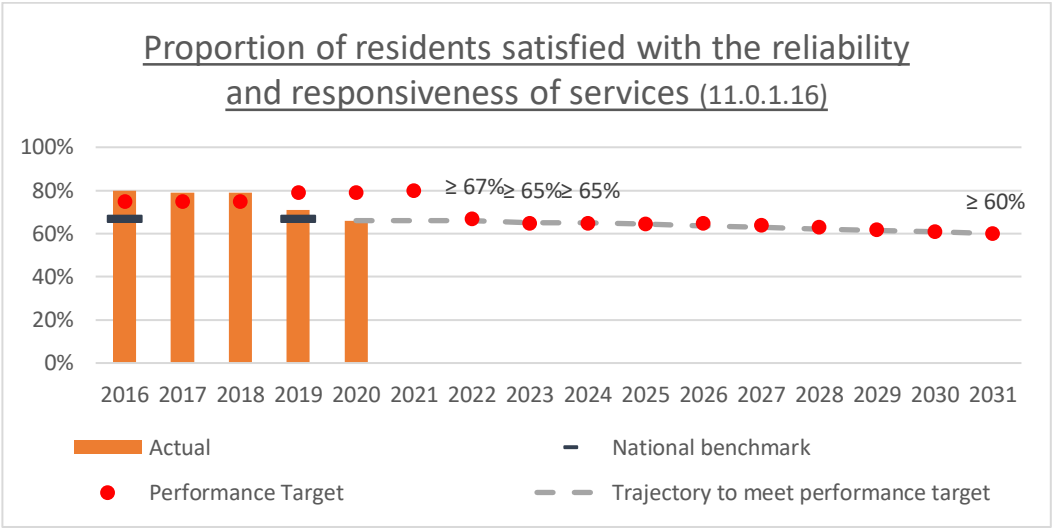
Outputs

Performance Measures	Current Performance	Benchmark	Performance Targets			
			Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31
11.0.5.2 – Number of dry weather overflows from wastewater systems per 1,000 connected properties per year	2019/20 = 0.6	2018/19 = 0.99 (Water NZ National Performance Review median results)	≤ 0.7	≤ 0.7	≤ 0.7	≤ 0.8

Level of service: Council operates wastewater services in a reliable

A key level of service for the wastewater activity is that it operates Council operates wastewater services in a reliable manner. This contributes to the community outcome of modern and robust city infrastructure and facilities network.

Wastewater reliability is measured through resident satisfaction and the number of complaints received through the call centre. The graph opposite shows the proportion of residents satisfied with the reliability and responsiveness of services, demonstrating a decline since the SCIRT rebuild.



Community outcome: Modern and Robust City Infrastructure and Facilities Network

Outputs

LoS Performance Measures	Current Performance	Benchmark	Performance Targets			
			Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31
11.0.1.16 – Proportion of residents satisfied with the reliability and responsiveness of wastewater services	2019/20 = 66%	Dunedin 67%	≥ 67%	≥ 65%	≥ 65%	≥ 60%
11.0.1.10 – Number of complaints received by Council relating to: - Wastewater odour - Wastewater faults - Wastewater blockages - Council's response to any of these issues	2019/20 = 7.47	2018/19 = 10.81 (Water NZ National Performance Review median results for all complaint types)	≤ 10.7	≤ 10.7	≤ 10.7	≤ 10.7
11.0.1.18 – Percentage of total wastewater gravity network pipework length at condition grade 5 (very poor)	Changed Metric, past performance is not comparable.	No comparable benchmarks found.	≤ 13%	≤ 15%	≤ 17%	≤ 26%

Community outcome: Modern and Robust City Infrastructure and Facilities Network

Wastewater Pipe Damage

Level of service: Council operates wastewater services in a responsive manner

A key level of service for the wastewater activity is that it operates wastewater services in a responsive manner. Responsiveness is measured through the time taken both to arrive on site following the notification of an issue, and by the time taken to resolve the issue. This contributes to the community outcome of modern and robust city infrastructure and facilities network.

The image opposite shows a contractor on site, resolving a damaged wastewater pipe following the Christchurch earthquake in February 2011.

Outputs

Performance Measures	Current Performance	Benchmark	Performance Targets			
			Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31
11.0.1.1 – Median time (in hours) from notification to arrival on-site for urgent faults on rural wastewater networks	2019/20 = 0.82 hours	2018/19 = 0.50 hours (Water NZ National Performance Review median results for all fault types)	≤ 2 hours			
11.0.1.2 – Median time (in hours) from notification to arrival on-site for urgent faults on urban wastewater networks	2019/20 = 0.47 hours	2018/19 = 0.50 hours (Water NZ National Performance Review median results for all fault types)	≤ 1 hours			
11.0.6.3 – Median time (in hours) from notification to arrival on-site for non-urgent faults on rural wastewater networks	2019/20 = 59.12 hours	2018/19 = 0.50 hours (Water NZ National Performance Review median results for all fault types)	≤ 120 hours			
11.0.6.2 – Median time (in hours) from notification to arrival on-site for non-urgent faults on urban wastewater networks	2019/20 = 37.95 hours	2018/19 = 0.50 hours (Water NZ National Performance Review median results for all fault types)	≤ 120 hours			

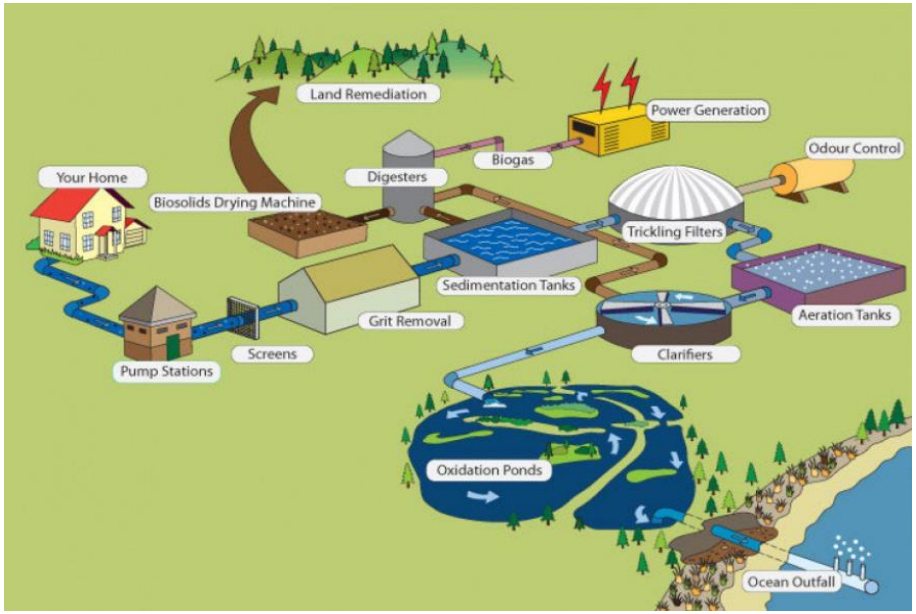
Community outcome: Healthy Waterways

Level of service: Council has high wastewater discharge quality

A key level of service for the wastewater activity is that Council have a high wastewater discharge quality. Wastewater discharge quality is an important aspect of maintaining healthy waterways and protecting the natural environment.

The image opposite shows the wastewater treatment process from a residential house through to the sea via an outfall. Samples of this treated wastewater discharged via the outfall are taken and analysed for a range of contaminants. These results are provided to Environment Canterbury to comply with resource consent monitoring requirements on a quarterly basis.

Wastewater Treatment Process



Outputs

Performance Measures	Current Performance	Benchmark	Performance Targets			
			Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31
11.1.2.0 – Number of abatement notices, infringement notices, enforcement orders and convictions regarding Council resource consents related to discharges from wastewater systems per year	2019/20 = 0	Average from Water NZ National Performance Review. 2015/16: 0.19	0			

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
Council operates wastewater services in a reliable manner										
11.0.1.16	C	Proportion of residents satisfied with the reliability and responsiveness of wastewater services	2019/20: 66% 2018/19: 71%	Dunedin 67%	≥ 67%	≥ 65%	≥ 65%	≥ 60%	Resident satisfaction surveys	Modern and robust city infrastructure and community facilities
11.0.1.15	M	Annual number of properties affected by wastewater blowbacks due to maintenance work carried out by the Council or its contractors	2019/20: 31 2018/19: 21 2017/18: 41 2016/17: 23 2015/16: 23	Blowbacks can occur in Christchurch wastewater network due to flat grades and remaining earthquake damage. No performance data found for blowbacks at other NZ Councils or wastewater service suppliers.	< 35	< 35	< 35	< 35	Count of total number of blowbacks due to maintenance work carried out by the Council or its contractors reported to the Council call centre in a financial year. Reported in monthly contract reports from the Contractor.	Modern and robust city infrastructure and community facilities
11.0.1.10	C	Total number of complaints per 1000 properties received by Council per year about: a) Wastewater odour b) Wastewater system faults c) Wastewater system blockages d) Council's response to any of these issues	2019/20: 7.47 2018/19: 5.19 2017/18: 3.25 2016/17: 6.25 2015/16: 7.24	Medians from Water NZ National Performance Review 2018/19: 10.81 2015/16: 6	≤ 10.7	≤ 10.7	≤ 10.7	≤ 10.7	Total number of complaints received through Council's call centre about odour, system faults, blockages or responses to complaints multiplied by 1000/number of connections. Department of Internal Affairs, Wastewater Non-Financial Performance Measure 4.	Modern and robust city infrastructure and community facilities

[1] C/M – Community or Management level of service (LOS)
Community LOS - Previously known as LTP LOS. These are LOS that are community facing and will be published in our Statement of Service Provision.
Management LOS - Previously known as Non-LTP LOS. These are LOS that are measured in the organisation to ensure service delivery.

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
11.0.1.8	M	Number of wastewater odour complaints per 1,000 properties connected to the wastewater network per year	2019/20: 0.41 2018/19: 0.36 2017/18: 0.36 2016/17: 0.39 2015/16: 0.52	None found.	≤ 0.6	≤ 0.6	≤ 0.6	≤ 0.6	The number of complaints about Council's wastewater network received through the call centre, expressed per 1,000 properties connected to the Council's wastewater system Department of Internal Affairs, wastewater non-financial performance measure 4a	Modern and robust city infrastructure and community facilities
11.0.1.7	M	Number of wastewater system blockage complaints per 1,000 properties connected to the wastewater network per year	2019/20: 1.88 2018/19: 4.17 2017/18: 2.43 2016/17: 5.17 2015/16: 6.19	None found.	≤ 6	≤ 6	≤ 6	≤ 7	The number of complaints about Council's wastewater system blockages received through the call centre, expressed per 1,000 properties connected to the Council's wastewater system Department of Internal Affairs, wastewater non-financial performance measure 4c	Modern and robust city infrastructure and community facilities
11.0.1.9	M	Number of wastewater system fault complaints per 1,000 properties connected to the wastewater network per year	2019/20: 3.30 2018/19: 0.56 2017/18: 0.46 2016/17: 0.69 2015/16: 0.53	None found.	≤ 4.0	≤ 4.0	≤ 4.0	≤ 4.0	The number of complaints about Council's wastewater network received through the call centre, expressed per 1,000 properties connected to the Council's wastewater system. Department of Internal Affairs, wastewater non-financial performance measure 4b	Modern and robust city infrastructure and community facilities
11.0.1.18	C	Percentage of total wastewater gravity network pipework length at condition grade 5 (very poor)	2019/20: 9.3% 2018/19: 9.4% Change in measurement	No comparable benchmarks found.	≤ 13%	≤ 15%	≤ 17%	≤ 26%	Lengths of pipe at condition grade 5 divided by total wastewater pipe length expressed as a percentage. Condition deterioration since inspection to be	Modern and robust city infrastructure and community facilities

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
			method for 2021/22. Not measured prior to 2018.						included when assigning a condition grade to a pipe. Reported from Council asset management systems.	
11.0.1.19	M	Percentage of wastewater mains with high or very high consequences of failure inspected as scheduled in their lifespan.	Changed Metric. Past performance not comparable to new measurement methodology.	None found.	≥ 70%	≥ 75%	≥ 80%	≥ 80%	Considering only pipes scheduled for inspection in the CCTV inspection programme: Length of pipe inspected divided by total length of pipe. Reported from Council Asset Management Systems.	Modern and robust city infrastructure and facilities network
Council has high wastewater discharge quality										
11.1.2.0	C	Number of abatement notices, infringement notices, enforcement orders and convictions regarding Council resource consents related to discharges from wastewater systems per year	2019/20: 0 2019/20: 0 2018/19: 0 2017/18: 0 2016/17: 0 2015/16: 0	Average from Water NZ National Performance Review. 2015/16: 0.19	0	0	0	0	Resource consent compliance reports to ECan. Department of Internal Affairs, wastewater non-financial performance measure 2.	Healthy water bodies
11.1.2.1	M	Number of abatement notices regarding Council resource consents related to discharges from wastewater systems per year	2019/20: 0 2018/19: 0 2017/18: 0 2016/17: 0 2015/16: 0	Average from Water NZ National Performance Review. 2015/16: 0.15	0	0	0	0	Resource consent compliance reports to ECan. Department of Internal Affairs, wastewater non-financial performance measure 2a	Healthy water bodies

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
11.1.2.2	M	Number of convictions regarding Council resource consents related to discharges from the wastewater systems per year	2019/20: 0 2018/19: 0 2017/18: 0 2016/17: 0 2015/16: 0	Average from Water NZ National Performance Review. 2015/16: 0	0	0	0	0	Resource consent compliance reports to ECan.. Department of Internal Affairs, wastewater non-financial performance measure 2d	Healthy water bodies
11.1.2.3	M	Number of enforcement orders regarding Council resource consents related to discharges from wastewater systems per year	2019/20: 0 2018/19: 0 2017/18: 0 2016/17: 0 2015/16: 0	Average from Water NZ National Performance Review. 2015/16: 0	0	0	0	0	Resource consent compliance reports to ECan. Department of Internal Affairs, wastewater non-financial performance measure 2c	Healthy water bodies
11.1.2.4	M	Number of infringement notices regarding Council resource consents related to discharges from wastewater systems per year	2019/20: 0 2018/19: 0 2017/18: 0 2016/17: 0 2015/16: 0	Average from Water NZ National Performance Review. 2015/16: 0.04	0	0	0	0	Resource consent compliance reports to ECan. Department of Internal Affairs, wastewater non-financial performance measure 2b	Healthy water bodies
11.1.4	M	Proportion of externally reported sampling and testing completed by an IANZ accredited laboratory:	2019/20: 100% 2018/19: 100% 2017/18: 100% 2016/17: 100% 2015/16: 100%	Watercare Laboratory is IANZ accredited. Wellington Water uses IANZ accredited laboratories.	100%	100%	100%	100%	Number of samples tested by an IANZ accredited lab divided by total number of samples tested expressed as a percentage.	Modern and robust city infrastructure and community facilities
Council operates wastewater services in a responsive manner										
11.0.1.1	C	Median time (in hours) from notification to arrival on-site for urgent faults on rural wastewater networks	2019/20: 0.82 2018/19: 0.72	Median from Water NZ National Performance Review (combined urban and rural attendance times)	≤ 2	≤ 2	≤ 2	≤ 2	The median attendance time measured from the time that the Council receives notification of the	Modern and robust city infrastructure and

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
				2018/19: 0.50 2015/16: 0.92					fault to the time that service personnel confirm resolution of the fault. Reported in monthly contract reports from the Contractor. Department of Internal Affairs, wastewater non-financial performance measure 3a	community facilities
11.0.1.2	C	Median time (in hours) from notification to arrival on-site for urgent faults on urban wastewater networks	2019/20: 0.47 2018/19: 0.48	Median Results from Water NZ National Performance Review (combined urban and rural response times) 2018/19: 0.50 2015/16: 0.92	≤ 1	≤ 1	≤ 1	≤ 1	The median attendance time measured from the time that the Council receives notification of the fault to the time that service personnel confirm resolution of the fault. Reported in monthly contract reports from the Contractor. Department of Internal Affairs, wastewater non-financial performance measure 3a	Modern and robust city infrastructure and facilities network
11.0.6.3	C	Median time (in hours) from notification to arrival on-site for non-urgent faults on rural wastewater networks	2019/20: 59.12 2018/19: 2.28 Not measured prior to 2018.	Median from Water NZ National Performance Review (combined urban and rural attendance times) 2018/19: 0.50 2015/16: 0.92	≤ 120	≤ 120	≤ 120	≤ 120	The median attendance time measured from the time that the Council receives notification of the fault to the time that service personnel confirm resolution of the fault. Reported in monthly contract reports from the Contractor. Department of Internal Affairs, wastewater non-financial performance measure 3a	Modern and robust city infrastructure and community facilities
11.0.6.2	C	Median time (in hours) from notification to arrival	2019/20: 37.95	Median Results from Water NZ National Performance	≤ 120	≤ 120	≤ 120	≤ 120	The median attendance time measured from the time that the	Modern and robust city

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
		on-site for non-urgent faults on urban wastewater networks	2018/19: 2.28 Not measured prior to 2018	Review (combined urban and rural response times) 2018/19: 0.50 2015/16: 0.92					Council receives notification of the fault to the time that service personnel confirm resolution of the fault. Reported in monthly contract reports from the Contractor. Department of Internal Affairs, wastewater non-financial performance measure 3a	infrastructure and community facilities
11.0.1.5	C	Median time (in hours) from notification to attendance of overflows resulting from network faults	2019/20: 0.52 2018/19: 0.55	Median Results from Water NZ National Performance Review. 2018/19: 0.55 2015/16: 0.92	≤ 1	≤ 1	≤ 1	≤ 1	The median response time measured from the time that the Council receives notification of the overflow to the time that service personnel reach the site. Reported in monthly contract reports from the Contractor. Department of Internal Affairs, wastewater non-financial performance measure 3a	Safe and healthy communities
11.0.1.6	C	Median time (in hours) from notification to resolution of overflows resulting from network faults	2019/20: 7.75 2018/19: 2.41	Water NZ National Performance Review 2018/19: 2.8 2015/16: 3.0	≤ 24	≤ 24	≤ 24	≤ 24	The median resolution time measured from the time that the Council receives notification of the overflow to the time that service personnel confirm resolution of the overflow. Reported in monthly contract reports from the Contractor. Department of Internal Affairs, wastewater non-financial performance measure 3b	Safe and healthy communities

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
11.0.6.4	M	Number of complaints regarding Council's response to issues with the Council wastewater system per 1,000 properties connected to the wastewater network per year	2019/20: 1.88 2018/19: 0.10 Not measured prior to 2018.	None found.	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	The number of complaints about Council's wastewater system blockages received through the call centre, expressed per 1,000 properties connected to the Council's wastewater system Department of Internal Affairs, wastewater non-financial performance measure 4d	Safe and healthy communities
Public health is protected from Council wastewater services										
11.0.5.2	C	Number of dry weather overflows from wastewater systems per 1,000 connected properties per year	2019/20: 0.60 2018/19: 0.54 2017/18: 0.63 2016/17: 0.63 2015/16: 0.67	Median from Water NZ National Performance Review. 2018/19: 0.99 2015/16: 1.56	≤ 0.7	≤ 0.7	≤ 0.7	≤ 0.8	Number of dry weather overflows per 1,000 properties connected to the wastewater network. Reported in resource consent compliance reports to ECan. Department of Internal Affairs, wastewater non- financial performance measure 1	Safe and healthy communities
Council wastewater networks and operations are sustainable										
11.1.5.1	M	Power consumption - kWh of electricity per cubic metre wastewater treated at the Christchurch wastewater treatment plant	2019/20: 0.23 2018/19: 0.22 2017/18: 0.20 2016/17: 0.20 2015/16: 0.20	None found	≤ 0.24	≤ 0.24	≤ 0.24	≤ 0.24	Total power consumption for the year to date divided by the volume of wastewater treated for the year to date.	Sustainable use of resources and minimising waste

LOS number	C/M[1]	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Community Outcome
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31		
11.1.5.2	M	Power consumption - kWh of electricity per kilogram of chemical oxygen demand (COD) removed at the Christchurch wastewater treatment plant	2019/20: 0.35 2018/19: 0.36 2017/18: 0.33 2016/17: 0.29 2015/16: 0.31	None found	≤ 0.40	≤ 0.40	≤ 0.40	≤ 0.40	Total power consumption for the year to date divided by the mass of chemical oxygen demand removed in the year to date.	Sustainable use of resources and minimising waste
11.1.3.1	M	Proportion of biosolids diverted from landfill (beneficially reused)	2019/20: 100% 2018/19: 96.1% 2017/18: 97.9% 2016/17: 95.6% 2015/16: 95.7%	None found.	≥ 95%	≥ 95%	≥ 95%	≥ 95%	Mass of biosolids sent for beneficial reuse divided by total mass of biosolids produced expressed as a percentage.	Sustainable use of resources and minimising waste
11.1.6	M	Proportion of electricity used at the Christchurch wastewater treatment plant that is self-generated from treatment by-products	2019/20: 60.7% 2018/19: 74% 2017/18: 67% 2016/17: 73% 2015/16: 88.9%	Watercare: 26.7%	≥ 65%	≥ 65%	≥ 65%	≥ 65%	kWh of electricity used that is self-generated divided by the total power use in kWh expressed as a percentage.	Sustainable use of resources and minimising waste
11.1.10	M	10 year rolling historic ratio of renewals to depreciation	New Metric 2019/20: 31.0% 2018/19: 24.2%	100%: Institute of Public Works Engineering Australasia (IPWEA) Asset management financial indicator	≥ 35%	≥ 39%	≥ 45%	≥ 50%	Historic 10yr average renewals expenditure / Historic 10yr average depreciation	Great place for people, business and investment
11.1.11	M	Increase Wastewater Asset Management Maturity towards agreed, appropriate level.	New Metric 2020: 81 2018: 76 2016: 72	NZ Treasury Investor Confidence Rating (ICR) Asset Management Maturity Assessment (AMMA) Tool	≥ 81	≥ 81	≥ 81	≥ 90	Conduct assessment on alternate years Asset Management Maturity assessment (AMMA) to be conducted every two years by an external assessor until appropriate level of maturity target is achieved.	Modern and robust city infrastructure and facilities network

6. Does this Activity Plan need to change as a result of a Service Delivery Review (S17A)?

A Section 17A Service Delivery Review (S17A) is a legal requirement under the Local Government Act and determines whether the existing means for delivering a service remains the most efficient, effective and appropriate approach. The legislation requires that a S17A Service Delivery Review should periodically assess:

"The cost-effectiveness of current arrangements for meeting the needs of communities within its district or region for good quality local infrastructure, local public services, and performance of regulatory functions".

A review of water supply activities was initiated in July 2109 for two key reasons:

- the expiry of the existing 3 waters maintenance contracts and a desire to go out to market for these services
- to enable Council to be prepared for the outcomes of the Department of Internal Affairs' 3 Waters review

The section 17A review was completed in June 2020 and presented to Council in August 2020. The review confirmed that there were underlying challenges with the status quo. Central Government's water reform programme gained significant momentum in mid-2020 and Council agreed to sign a non-binding Memorandum of Understanding with the Crown at the same extra ordinary Council meeting in August 2020 regarding water reform. Due to the increasing pace of water reform, the status quo was the recommended way forward for the section 17A review. The reform is going to lead to significant changes to water service delivery across the country and adding in further structural change during the reform process was not seen to add value to Christchurch.

The Government has announced a new national water regulator and is reviewing how to improve the supply arrangements of drinking water, wastewater and stormwater, including financing provisions and decision-making capability. Any changes implemented at a national level will have an impact on Council's service delivery.

Given the uncertainty in terms of the outcomes and timing water reform, it is difficult to predict the impacts on the water supply activity service delivery structure. The AMP is prepared on a "business as usual" assumption. Potential outcomes include:

- Regional or larger asset owning 2 waters entity
- Regional, top of the South Island or full South Island entity that includes storm water and waterways

7. What levels of service changed from the LTP 2018-28 and why?

A number of level of service performance measures have been modified or added from the previous LTP as summarised below.

LOS number	C/N	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Rationale for Addition	Options for consultation and engagement
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31			
Additions											
11.0.1.10	C	Total number of complaints received by Council about: a) Wastewater odour b) Wastewater system faults c) Wastewater system blockages d) Council's response to any of these issues.	2019/20: 7.47 2018/19: 5.19 2017/18: 3.25 2016/17: 6.25 2015/16: 7.24	Medians from WaterNZ National Performance Review 2018/19: 10.81 2015/16: 6	≤ 10.7	≤ 10.7	≤ 10.7	≤ 10.7	Total number of complaints received through Council's call centre about odour, system faults, blockages or responses to complaints multiplied by 1000/number of connections. Department of Internal Affairs, Wastewater Non-Financial Performance Measure 4.	This is a combination of 4 individual performance measures. We propose to change the four existing performance measures from community to management Levels of Service for internal reporting but only report the overall complaint number externally. Combining the four minimises the number of community performance measures and aligns us with other councils as well as aligning to national benchmarking.	None required
11.1.10	M	10yr rolling historic ratio of renewals to depreciation.	2019/20: 31.0% 2018/19: 24.2%	100%: Institute of Public Works Engineering Australasia (IPWEA) Asset management financial indicator	≥ 35%	≥ 39%	≥ 45%	≥ 50%	Historic 10yr average renewals expenditure / Historic 10yr average depreciation.	This performance measure provides transparency to stakeholders as regarding the level of CAPEX funding against requirements. New metric to show adequacy of renewals funding. This is a standard IPWEA benchmarking measure.	Management Level of service - None required

LOS number	C/N	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Rationale for Addition	Options for consultation and engagement
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31			
11.1.11	M	Increase Wastewater Asset Management Maturity towards agreed, appropriate level.	2020: 81 2018: 76 2016: 72	NZ Treasury Investor Confidence Rating (ICR) Asset Management Maturity Assessment (AMMA) Tool	≥ 81	≥ 81	≥ 81	≥ 90	Asset Management Maturity assessment (AMMA) to be conducted every two years by an external assessor until appropriate level of maturity target is achieved.	This performance measure provides assurance to stakeholders that Council is working to improve and/or maintain best practice in asset management processes. Amendment to proposed target from draft LTP (≥ 82%/≥ 82%/≥ 84%/≥ 92%) to ≥ 81%/≥ 81%/≥ 81%/≥ 90% across the 10-year period, in the final LTP. The draft LTP does not include or provide funding and resourcing of asset management maturity improvement projects. Lack of funding and resourcing these projects means there will be no improvement in year 1. Year 2 onwards, improvements are possible if the annual plan process provides funding and resourcing, otherwise there will be no improvement until next LTP.	Management Level of service - None required
11.1.2.0	C	Number of abatement notices, infringement notices, enforcement orders and convictions	2019/20: 0 2019/20: 0 2018/19: 0 2017/18: 0 2016/17: 0 2015/16: 0	Average from Water NZ National Performance Review. 2015/16: 0.19	0	0	0	0	Resource consent compliance reports to ECan. Department of Internal Affairs, wastewater non-financial	Reclassification to meet Audit and Governance expectations. Combining 4 existing DIA measures into 1 single measure	None required

LOS number	C/N	Performance Measures Levels of Service (LOS)	Historic Performance Trends	Benchmarks	Future Performance Targets				Method of Measurement	Rationale for Addition	Options for consultation and engagement
					Year 1 2021/22	Year 2 2022/23	Year 3 2023/24	Year 10 2030/31			
		regarding Council resource consents related to discharges from wastewater systems per year							performance measure 2.		

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
Modifications							
11.0.1.7	Number of wastewater system blockage complaints per 1,000 properties connected to the wastewater network per year	No change.	2019/20: 1.88 2018/19: 4.17 2017/18: 2.43 2016/17: 5.17 2015/16: 6.19	Year 1: ≤ 10 Year 2: ≤ 10 Year 3: ≤ 10 Year 10: ≤ 8	Year 1: ≤ 6 Year 2: ≤ 6 Year 3: ≤ 6 Year 10: ≤ 7	Past performance has been significantly below the target. Suggest tightening the target with a slight increase in year 10 to allow for the deferred renewals predicted to occur. We propose changing this from a community to a management level of service. External reporting will replace this and three other levels of service with a single level of service for total complaint numbers. (See 11.0.1.10) This change would align Council with other councils and national benchmarking.	Target moved in line with historic performance levels. Consultation not required.
11.0.1.8	Number of wastewater odour complaints per 1,000 properties connected to the wastewater network per year	No change.	2019/20: 0.41 2018/19: 0.36 2017/18: 0.36 2016/17: 0.39 2015/16: 0.52	Year 1: ≤ 0.6 Year 2: ≤ 0.6 Year 3: ≤ 0.6 Year 10: ≤ 0.6	No change.	We propose changing this from a community to a management level of service. External reporting will replace this and three other levels of service with a single level of service for total complaint numbers. (See 11.0.1.10) This change would align Council with other councils and national benchmarking.	None required

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
11.0.1.9	Number of wastewater system fault complaints per 1,000 properties connected to the wastewater network per year	No change.	2019/20: 3.30 2018/19: 0.56 2017/18: 0.46 2016/17: 0.69 2015/16: 0.53	Year 1: ≤ 0.6 Year 2: ≤ 0.6 Year 3: ≤ 0.6 Year 10: ≤ 0.6	Year 1: ≤ 4.0 Year 2: ≤ 4.0 Year 3: ≤ 4.0 Year 10: ≤ 4.0	We propose changing this from a community to a management level of service. External reporting will replace this and three other levels of service with a single level of service for total complaint numbers. (See 11.0.1.10) This change would align Council with other councils and national benchmarking. Targets increased in line with the past performance and anticipated increases in faults.	None required
11.0.6.4	Number of complaints regarding Council's response to issues with the Council wastewater system per 1,000 properties connected to the wastewater network per year	No change.	2019/20: 1.88 2018/19: 0.10	Year 1: ≤ 0.1 Year 2: ≤ 0.1 Year 3: ≤ 0.1 Year 10: ≤ 0.1	No change.	We propose changing this from a community to a management level of service. External reporting will replace this and three other levels of service with a single level of service for total complaint numbers. (See 11.0.1.10) This change would align Council with other councils and national benchmarking.	None required
11.0.1.15	Annual number of properties affected by wastewater blowbacks due to maintenance work carried out by the Council or its contractors	No change.	2019/20: 31 2018/19: 21 2017/18: 41 2016/17: 23 2015/16: 23	Year 1: < 24 Year 2: < 23 Year 3: < 21 Year 10: < 12	Year 1: ≤ 35 Year 2: ≤ 35 Year 3: ≤ 35 Year 10: ≤ 35	Looking at the 2017/18 result of 41 and the 2019/20 result of 31 the targets may be overly tight. Targets in the 2018 LTP were ≤ 35 and we suggest returning to that target, especially as the CAPEX cap is likely to mean renewals remediating blowback causes are limited.	Management Level of service - None required
11.0.1.16	Proportion of residents satisfied with the reliability and responsiveness of wastewater services	No Change.	2019/20: 66% 2018/19: 71%	Year 1: ≥ 79% Year 2: ≥ 79% Year 3: ≥ 80%	Year 1: ≥ 67% Year 2: ≥ 65% Year 3: ≥ 65%	Based on past performance and the fact that the network faults and overflows are anticipated to increase as network condition deteriorates, targets are reduced to an achievable level.	Target moved in line with historic performance levels. Consultation not required.

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
				Year 10: ≥ 85%	Year 10: ≥ 60%		
11.0.1.18	Percentage of total wastewater gravity network pipework length at condition grade 5 (very poor)	No Change.	2019/20: 9.3% 2018/19: 9.4% Change in measurement method for 2021/22. Not measured prior to 2018.	Year 1: ≤ 13% Year 2: ≤ 13% Year 3: ≤ 13% Year 10: ≤ 13%	Year 1: ≤ 13% Year 2: ≤ 15% Year 3: ≤ 17% Year 10: ≤ 26%	Targets in and benchmarks from the previous LTP were based on a modified version of the NZPIM condition grading methodology. Changing to the AAIF condition assessment methodology means the targets should also change to reflect the new methodology. The current 9.4% condition 5 pipes is equivalent to 4.5% under the AAIF methodology. Many inspections informing the condition grades are approaching 10 or more years old and may not represent the current state of the pipe. New targets take estimated deterioration occurring since inspection into account with the method of measurement changed to include this deterioration.	None required
11.0.1.19	Percentage of wastewater gravity pipework identified as condition grade 5 through physical inspection rather than theoretical modelling.	Percentage of wastewater mains with high or very high consequences of failure inspected as scheduled in their lifespan.	Changed Metric. Past performance not comparable to new measurement methodology.	Year 1: ≥ 95% Year 2: ≥ 95% Year 3: ≥ 95% Year 10: ≥ 95%	Year 1: ≥ 70% Year 2: ≥ 75% Year 3: ≥ 80% Year 10: ≥ 80%	With the AAIF processes, we now have a risk/consequence of failure rating for all mains. The CCTV schedule takes this into account with planned/proactive inspections only planned for high consequence of failure pipes with the low consequence of failure pipes being run to failure and CCTV done reactively to identify factors causing issues. The proposed wording change reflects this. High consequence of failure pipes includes large diameter pipes that are difficult to inspect plus there is an existing backlog of inspections so the proposed targets start off low and increase to a value that allows for not all pipes able to be inspected.	Management Level of service - None required

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
11.0.5.2	Number of dry weather overflows from wastewater systems per 1,000 connected properties per year	No Change	2019/20: 0.60 2018/19: 0.54 2017/18: 0.63 2016/17: 0.63 2015/16: 0.67	Year 1: ≤ 0.7 Year 2: ≤ 0.7 Year 3: ≤ 0.7 Year 10: ≤ 0.6	Year 1: ≤ 0.7 Year 2: ≤ 0.7 Year 3: ≤ 0.7 Year 10: ≤ 0.8	We propose increasing the year 10 value to allow for increased blockages resulting from deferred renewal works.	None required
11.1.5.1	Power consumption - kWh of electricity per cubic metre wastewater treated at the Christchurch WWTP	No Change	2019/20: 0.23 2018/19: 0.22 2017/18: 0.20 2016/17: 0.20 2015/16: 0.20	Year 1: ≤ 0.20 Year 2: ≤ 0.20 Year 3: ≤ 0.20 Year 10: ≤ 0.20	Year 1: ≤ 0.24 Year 2: ≤ 0.24 Year 3: ≤ 0.24 Year 10: ≤ 0.24	Reductions in commercial and industrial activities, water conservation efforts and renewals reducing inflow and infiltration are reducing flows to the Christchurch WWTP (CWTP). Over the same period, increasing treatment processes and buildings increase the CWTP electrical usage. CWTP has a high baseline electrical usage, which is now spread over less flow increasing the electricity consumption per cubic meter. Based on recent performance, the above target of <0.275kWh/m3 is proposed as it more accurately reflects the present conditions as well as ensures a continued focus on energy efficiency. Amendment to proposed target from draft LTP (≤ 0.275) to ≤ 0.24 across the 10-year period, in the final LTP. Historically power consumption targets for the Christchurch wastewater treatment plant (WWTP) were based on a comparison to the Lower Hutt WWTP and trends since the last LTP. A recent analysis of the Christchurch WWTP power use suggests that targets based on comparisons and trends may be incorrect and better data is available.	Management Level of service - None required

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
						A number of factors are changing the wastewater composition received at the Christchurch WWTP. These include: • An increase in groundwater and storm water infiltration into the wastewater network through earthquake damaged and aging pipe networks. • A decrease in wet industry in Christchurch reducing the quantity of trade waste discharged to the wastewater network. • Changes in awareness and attitude to the environment result in composting instead of waste disposal (insinkerator) use. Changes in wastewater composition mean the wastewater is more dilute, i.e. that for every kg COD received at the WWTP there is much more water than pre-quake or at other comparable WWTPs. Pumping and processing this additional water increases power consumption. In addition to the changes in wastewater composition, WWTP changes also affect power consumption. Since initially setting the performance target in 2009, WWTP changes include: • Construction of two thermophilic (high temperature) digesters, which consume additional power to operate. • Construction of a new sludge dryer, which consumes additional power to operate.	

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
						• Construction of the biosolids energy centre, which consumes additional power to operate. • Aging and wear and tear of mechanical assets, decreasing their efficiency so more power is required to complete the same outcome. Performance measure 11.1.5.1 is the power consumption per cubic meter (m3) wastewater received at the WWTP. Dilute wastewater has less contaminants to remove per m3 reducing power consumption while the new assets and decreased efficiency increase power consumption. WWTP process engineers predict ≤ 0.24kWh/m3 as an achievable target given the wastewater composition and WWTP changes. Performance measure 11.1.5.2 is the power consumption per kg of chemical oxygen demand (COD) removed from the wastewater. Dilute wastewater has less COD per m3 so to treat 1 kg of COD requires pumping and treatment of larger volumes increasing the power consumption. Additional WWTP assets and efficiency decreases exacerbate this power consumption increase. WWTP process engineers predict a 20% increase in power consumption to 0.396kWh/kg COD. For this power consumption, we propose a target of ≤ 0.40kWh/kg COD to ensure it is achievable. Works during the 2021 LTP are unlikely to give increases in wastewater concentration or WWTP efficiency so new targets for both performance measures will not decrease over the ten years.	

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
11.1.5.2	Power consumption - kWh of electricity per kilogram of chemical oxygen demand (COD) removed at the Christchurch WWTP	No change	2019/20: 0.35 2018/19: 0.36 2017/18: 0.33 2016/17: 0.29 2015/16: 0.31	Year 1: ≤ 0.33 Year 2: ≤ 0.33 Year 3: ≤ 0.33 Year 10: ≤ 0.33	Year 1: ≤ 0.40 Year 2: ≤ 0.40 Year 3: ≤ 0.40 Year 10: ≤ 0.40	Reductions in commercial and industrial activities and increased pre-treatment of industrial discharges are reducing COD loads to the Christchurch WWTP (CWTP). Over the same period, increasing treatment processes and buildings increase the CWTP electrical usage. CWTP has a high baseline electrical usage, which is now spread over less COD increasing the electricity consumption per kg COD. Exasperating this are the algal blooms in the oxidation ponds that increase the COD in the discharge thus reducing the measured COD removal by the treatment plant. Based on recent performance, the above target of <0.38kWh/kg/COD is proposed as it more accurately reflects the present conditions and noted trends as well as ensures a continued focus on energy efficiency. Amendment to proposed target from draft LTP (≤ 0.38) to ≤ 0.40 across the 10-year period, in the final LTP. Historically power consumption targets for the Christchurch wastewater treatment plant (WWTP) were based on a comparison to the Lower Hutt WWTP and trends since the last LTP. A recent analysis of the Christchurch WWTP power use suggests that targets based on comparisons and trends may be incorrect and better data is available. A number of factors are changing the wastewater composition received at the Christchurch WWTP. These include: • An increase in groundwater and storm water infiltration into the wastewater	Management Level of service - None required

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
						network through earthquake damaged and aging pipe networks. • A decrease in wet industry in Christchurch reducing the quantity of trade waste discharged to the wastewater network. • Changes in awareness and attitude to the environment result in composting instead of waste disposal (insinkerator) use. Changes in wastewater composition mean the wastewater is more dilute, i.e. that for every kg COD received at the WWTP there is much more water than pre-quake or at other comparable WWTPs. Pumping and processing this additional water increases power consumption. In addition to the changes in wastewater composition, WWTP changes also affect power consumption. Since initially setting the performance target in 2009, WWTP changes include: • Construction of two thermophilic (high temperature) digesters, which consume additional power to operate. • Construction of a new sludge dryer, which consumes additional power to operate. • Construction of the biosolids energy centre, which consumes additional power to operate. • Aging and wear and tear of mechanical assets, decreasing their efficiency so more power is required to complete the same outcome.	

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
						Performance measure 11.1.5.1 is the power consumption per cubic meter (m3) wastewater received at the WWTP. Dilute wastewater has less contaminants to remove per m3 reducing power consumption while the new assets and decreased efficiency increase power consumption. WWTP process engineers predict ≤ 0.24kWh/m3 as an achievable target given the wastewater composition and WWTP changes. Performance measure 11.1.5.2 is the power consumption per kg of chemical oxygen demand (COD) removed from the wastewater. Dilute wastewater has less COD per m3 so to treat 1 kg of COD requires pumping and treatment of larger volumes increasing the power consumption. Additional WWTP assets and efficiency decreases exacerbate this power consumption increase. WWTP process engineers predict a 20% increase in power consumption to 0.396kWh/kg COD. For this power consumption, we propose a target of ≤ 0.40kWh/kg COD to ensure it is achievable. Works during the 2021 LTP are unlikely to give increases in wastewater concentration or WWTP efficiency so new targets for both performance measures will not decrease over the ten years.	
11.1.6	Proportion of electricity used at the Christchurch WWTP that is self-generated from treatment by-products	No Change	2019/20: 60.7% 2018/19: 74% 2017/18: 67% 2016/17: 73% 2015/16: 88.9%	Year 1: ≥ 97% Year 2: ≥ 97% Year 3: ≥ 97%	Year 1: ≥ 65% Year 2: ≥ 65% Year 3: ≥ 65%	Addition of the thermophilic sludge digestion process stage has reduced the quality of the biogas from 63% methane to only 58% methane. Co-generation engines (installed 1996 and 2007) are beyond their theoretical asset lives and only operable at ~60% and 70% of capacity.	Management Level of service - None required

LOS number	Old Wording	New Wording	Historic Performance Trends	Old Targets	New Targets	Rationale for Changes	Options for consultation and engagement
				Year 10: ≥ 97%	Year 10: ≥ 65%	Engine breakdown has recently been an issue with engines inoperable for lengthy periods awaiting parts. The 2018 LTP included engine replacement and installation of gas storage. Preliminary planning for replacement identified undersized pipework preventing maximum utilisation of biogas. A "Master Biogas Plan" is underway to identify all works required to maximise biogas utilisation and plan the required works. Installation of a solar array is identified to assist in Council's goal to become carbon neutral by 2030. A (very) draft proposal has been submitted by Council for Central Government's Covid-19 recovery shovel ready projects. The outcome of this application will potentially significantly impact this KPI. To reflect the current difficulties (co-generation unreliability) and opportunities (large solar array), it is proposed that the above targets are set, but which also ensures a continued focus on energy efficiency.	

8. How will the assets be managed to deliver the services?

Council staff undertake ongoing planning work to determine what is required by the community now and in the future, what the options are, how works should be prioritised and the best way to deliver them. An Infrastructure Strategy is also developed every three years to identify the significant infrastructure issues across all Council assets over the next thirty years. The significant infrastructure issues identified over the next thirty years are:

Managing assets through a global recession

Managing operational expenditure requirements

Managing and meeting the expectations of a growing and changing population

Adapting to and mitigating climate change

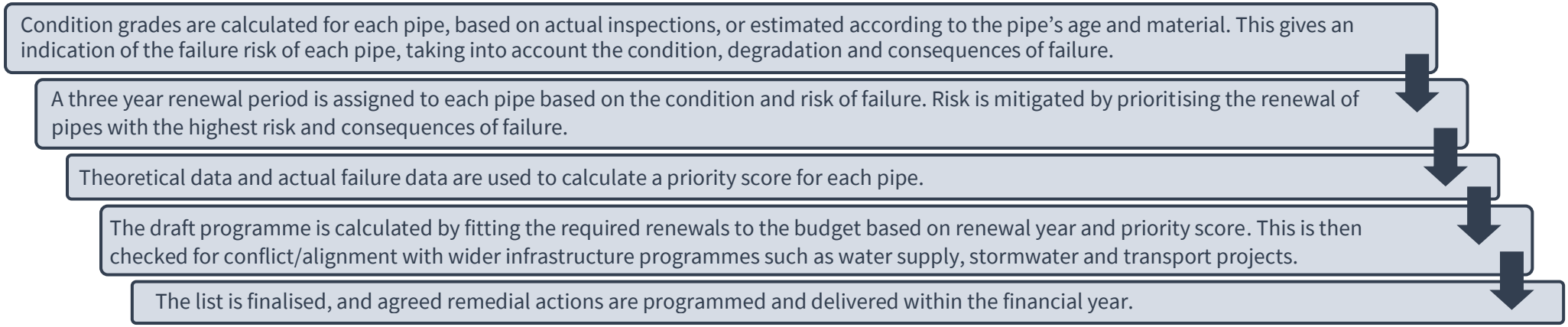
Protecting our environment through reducing greenhouse gas emissions

Managing the risks posed by a rapidly changing regulatory and commercial environment

One important shift from the 2018-48 Infrastructure Strategy is that earthquake recovery and regeneration is no longer a stand-alone significant issue. Earthquake recovery and regeneration continues to provide important context for infrastructure issues, investment planning and decision making. Although much of the rebuild is now complete, some of the issues the Council faces are in part a consequence of the earthquake's legacy.

How repair or renewal works are identified and prioritised?

Horizontal infrastructure refers to the network of pipes (typically below ground), and accounts for 85% of the value of Council's wastewater assets. Piped assets have a finite life. As pipes are buried underground, routine inspection and planned maintenance are costly and impracticable. Proactive inspections are carried out only on the pipes where failure would potentially have high or very high consequences on the network, community and environment. Reactive maintenance is carried out when issues are identified on the network, generally through service requests logged by the public. The process for repair or renewal of horizontal infrastructure is outlined below, and is explained in more detail in chapters 7 and 8 of the Asset Management Plan.



Wastewater assets are classified as either horizontal or vertical infrastructure. As stated above, horizontal infrastructure refers to the network of pipes and fittings (typically below ground), whereas vertical infrastructure refers to the pump stations and treatment plants (typically above ground). The key issues related to the management of both horizontal and vertical wastewater infrastructure are summarised below. This section also includes an overview of the measures we are taking to respond to these issues.

HORIZONTAL INFRASTRUCTURE - Reticulation Network

Renewals: Approximately 29% of below ground assets were repaired or replaced as part of the earthquake rebuild, at a cost of $1.35billion. There is still some earthquake damage to the network that requires additional investment and a large number of pipes that were installed in the original network construction or post-war growth periods are due for replacement.

Planned Expenditure: To bring the condition of the network up to standard, significant investment in renewals is required. Currently proposed investment to replace poor condition pipes while managing rates increases is predicted to deteriorate the network further from 13% worst condition by length to 25% by 2031 peaking at 27% in 2038 before beginning to improve.

Deferral of Renewals: Deferral of renewal projects will increase service interruptions and reduce the opportunities for cost savings. Proactive maintenance to clean pipes with operational issues will be required to prevent blockages and overflows. Groundwater and stormwater will continue to enter damaged pipes, resulting in reduced capacity, increased overflows, and there is a higher risk of catastrophic pipe failure. Risks will be minimised by prioritising renewal/replacement of pipes with the highest risk of failure.

New Infrastructure Growth: Council is responsible for completing the wastewater infrastructure between new developments and the treatment plants, which requires consultation and collaboration with developers. Growth areas in the west and northwest will create additional demand on infrastructure that may not have capacity, increasing the need for significant growth projects. Optimisation targets growth projects to coincide with renewal projects where possible.

VERTICAL INFRASTRUCTURE - Pump Stations and Treatment Plants

Renewals: 84 pumping stations were created, repaired or replaced as part of the earthquake rebuild, at a cost of $308million. There is a significant backlog of renewals that remains. Renewals at pump stations and treatment plants are required to continue the collection, treatment and disposal or wastewater and fall into four main areas:

- Health and safety projects
- End of life renewals
- Obsolescence projects
- Regulatory requirements

Health and Safety Requirements: Due to increasing health and safety requirements Council need to replace or upgrade assets that no longer comply and mitigate any sites containing asbestos. Guards for rotating equipment are also undergoing assessment and it is expected that investment will be required to bring these up to standard.

Technical Obsolescence: Technical obsolescence is where a product is no longer produced or supported. This issue affects our electrical and control systems. Projects for obsolescence can be costly as significant upgrades are often required due to incompatibility between new and existing assets.

Historical Underinvestment: Underfunding has also occurred in vertical infrastructure assets. Significant renewal projects are required, meaning there is an increased risk of service interruptions.

Regulatory Requirements: Meeting regulatory requirements is driving renewal and upgrade of instrumentation, especially at treatment plants. Existing testing and monitoring equipment is possibly not sufficiently accurate to meet new, more stringent, monitoring requirements in treatment plant resource consents, driving the renewal and upgrade of existing assets.

9. What financial resources are needed?

WW Collection, Treatment & Disposal 000's	Annual Plan 2020/21	LTP 2021/22	LTP 2022/23	LTP 2023/24	LTP 2024/25	LTP 2025/26	LTP 2026/27	LTP 2027/28	LTP 2028/29	LTP 2029/30	LTP 2030/31
Activity Costs before Overheads by Service											
Wastewater Collection	12,387	15,235	13,356	14,023	14,699	14,836	15,484	16,078	16,577	17,171	17,793
Treat & Dispose of Wastewater	9,114	8,803	8,901	9,101	9,347	9,585	9,834	10,085	10,349	10,629	10,908
Laboratory Services	2,054	1,901	1,902	1,885	1,918	1,963	2,015	2,064	2,109	2,161	2,212
	23,555	25,939	24,158	25,009	25,963	26,384	27,333	28,227	29,036	29,961	30,913
Activity Costs by Cost type											
Direct Operating Costs	4,133	3,983	4,088	4,199	4,318	4,445	4,575	4,714	4,867	5,025	5,182
Direct Maintenance Costs	8,915	10,311	9,606	10,160	10,749	10,771	11,281	11,756	12,136	12,596	13,083
Staff and Contract Personnel Costs	10,448	11,584	10,403	10,586	10,831	11,101	11,408	11,686	11,961	12,267	12,571
Other Activity Costs	60	61	63	64	66	67	69	70	72	74	76
	23,555	25,939	24,158	25,009	25,963	26,384	27,333	28,227	29,036	29,961	30,913
Activity Costs before Overheads	**23,555**	**25,939**	**24,158**	**25,009**	**25,963**	**26,384**	**27,333**	**28,227**	**29,036**	**29,961**	**30,913**
Overheads, Indirect and Other Costs	18,920	19,893	20,924	21,669	22,182	23,072	23,342	24,067	25,045	25,404	26,101
Depreciation	65,768	67,809	70,294	72,386	75,340	76,987	79,164	83,026	86,889	90,329	92,949
Debt Servicing and Interest	5,752	5,626	6,245	6,935	8,277	9,341	10,971	12,240	13,429	13,970	14,492
Total Activity Cost	**113,995**	**119,267**	**121,621**	**125,999**	**131,762**	**135,784**	**140,810**	**147,559**	**154,398**	**159,664**	**164,455**
Funded By:											
Fees and Charges	4,828	5,889	6,013	6,145	6,287	6,438	6,592	6,757	6,939	7,127	7,312
Grants and Subsidies	-	1,100	-	-	-	-	-	-	-	-	-
Cost Recoveries	676	690	705	720	737	755	773	792	813	835	857
Other Revenues	-	-	-	-	-	-	-	-	-	-	-
Total Operational Revenue	**5,504**	**7,680**	**6,718**	**6,866**	**7,023**	**7,192**	**7,365**	**7,549**	**7,753**	**7,962**	**8,169**
Net Cost of Service	**108,492**	**111,588**	**114,904**	**119,133**	**124,739**	**128,592**	**133,445**	**140,011**	**146,646**	**151,702**	**156,286**
Funding Percentages:											
Rates	95.2%	93.6%	94.5%	94.6%	94.7%	94.7%	94.8%	94.9%	95.0%	95.0%	95.0%
Fees and Charges	4.2%	4.9%	4.9%	4.9%	4.8%	4.7%	4.7%	4.6%	4.5%	4.5%	4.4%
Grants and Subsidies	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cost Recoveries	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%	0.5%	0.5%	0.5%	0.5%
Capital Expenditure											
Replace Existing Assets	40,373	43,861	31,072	49,890	59,906	63,938	74,745	71,229	76,130	66,565	61,406
Improve the Level of Service	13,953	10,965	35,066	19,866	22,473	27,383	26,669	15,208	2,445	2,445	7,891
Meet Additional Demand	1,429	1,927	2,973	2,727	1,632	2,127	2,300	4,409	3,249	3,527	3,874
Total Activity Capital	**55,755**	**56,753**	**69,111**	**72,484**	**84,012**	**93,447**	**103,713**	**90,846**	**81,823**	**72,537**	**73,171**

Funding Consideration

Local Government Act 2002 Section 101 Funding Consideration. The following tables are based on the financials from the previous page.

Funding Policy

Funding Principles

User-Pays	Exacerbator-Pays	Inter-Generational Equity	Separate Funding?
High	**Low**	**Low**	**High**

The table above shows how Council has considered funding in relation to the Activity, using a simple high / medium / low scale:

- User-pays – the degree to which the Activity can be attributed to individuals or identifiable groups rather than the community as a whole;
- Exacerbator-pays – the degree to which the Activity is required as a result of the action (or inaction) of individuals or identifiable groups;
- Inter-generational equity – the degree to which benefits can be attributed to future periods; and
- Separate funding – the degree to which the costs and benefits justify separate funding for the Activity.

Where an Activity is paid for through a number of funding mechanisms, Council's practice is to meet its operating costs in the first instance from fees & charges and grants & subsidies (subject to the considerations outlined above). If the Activity requires further operational funding, this remainder is funded through rates.

This capital programme will be funded in accordance with the following principles:

Investment type	**Initial funding**	**Serviced and/or repaid by:**
• Renewal / replacement	• Rates and debt	• Rates
• Service Improvement and other assets	• Debt	• Rates
• Growth	• Debt and Development Contributions	• Rates and Development Contributions

Operating Cost Funding Policy

This table below shows Council's broad funding target for the Activity (i.e. how much is paid for by individuals / groups, and how much by the community as a whole), and the associated funding mechanism used (i.e. general rates, targeted rates, user charges, etc.). As the precise balance between individual / group and community funding may vary in practice (particularly for volumetric fees and charges), the funding target for each of the below tables is expressed in broad terms rather than specific percentages:

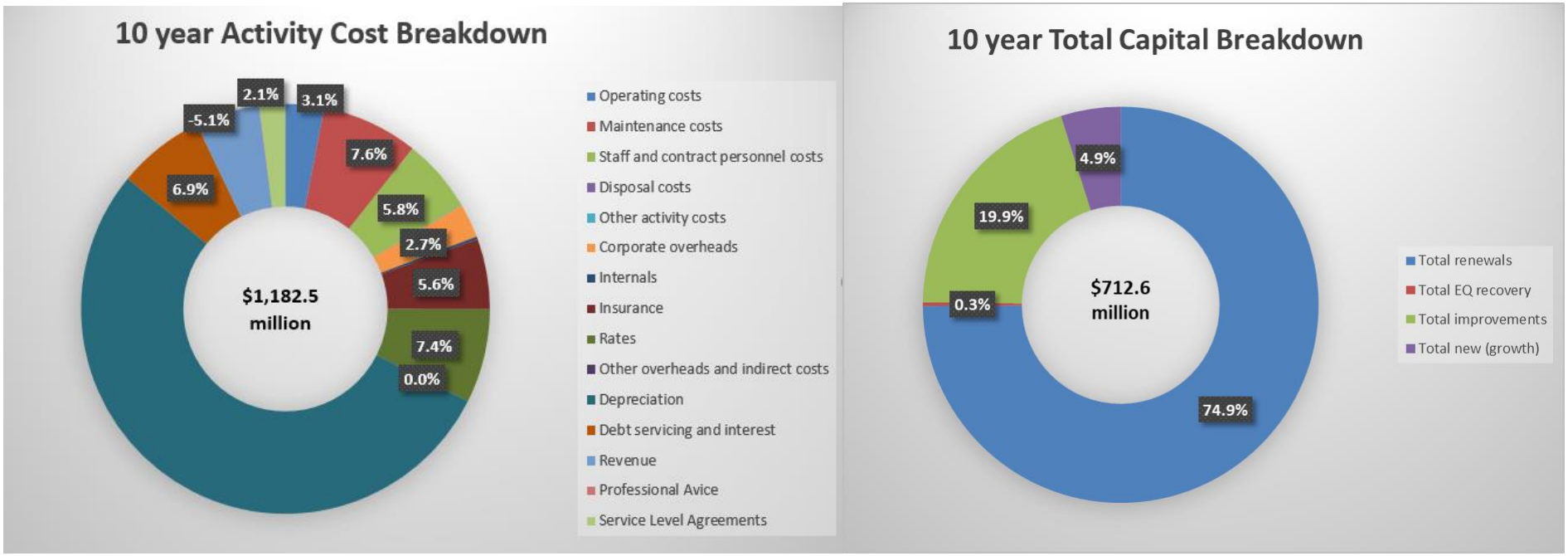
- Low = this source provides 0%-25% of the funding for this Activity;
- Medium = this source provides 25%-75% of the funding for this Activity; and
- High = this source provides 75%-100% of the funding for this Activity.

Funding Target		**Funding mechanism**	
Individual / Group	Community	Individual / Group	Community
High	**Low**	• **Targeted Rate (High)** • **Fees & Charges (Low)**	• **Grants & Other (Low)**

Capital Cost Funding Policy for this Activity

Rates	Borrowing	DC s	Grants and Other
High	**Low**	**Low**	**Low**

The charts below illustrate the proposed spending over the next ten years. The chart on the left shows significant a breakdown of activity costs and the chart on the right provides a breakdown of capital funding. The budgets shown in the section below are un-inflated.



The projected total cost of providing the necessary core services covered by this activity, including operations, maintenance, renewal, upgrade and earthquake recovery over the 10 years of the Long Term Plan (LTP) from Financial Year 21/22 to Financial Year 2031/32 (FY22 – FY32) is $2,296million. The historic expenditure for the 10 year period FY2011 to FY2020 was $1,858 million.

The significant projected increase is primarily due addressing a backlog of deferred renewals and to stop further deterioration of the network.

The funding allocated to providing the necessary core services covered by this Activity plan over the 10 years of the LTP is $1895 million. This is 82% of the cost (as outlined above) to provide optimised asset management at the lowest lifecycle cost.

The allocated funding leaves an annual average shortfall of $401 million over the 10 years of the LTP (all values exclude inflation).

A snapshot of key financial indicators is shown below, including the historic ten year average and how this compares with the next LTP period.

	Historic	Recommended	Proposed	Change	Explanation
Asset Renewal funding ratios	2011-20 29%	10yr 100% 5yr 100% 3yr 100%	10yr 68.8% 5yr 75.5% 3yr 75.5%	↓	Shows what percentage of total recommended renewal cost will be funded.
Rate of annual asset renewal (FY22-24)		2.74%	0.67%	↓	How much of the asset stock will be renewed / replaced each year.
Rate of annual asset creation (FY22-24)		0.67%	0.31%	↓	This is an indicator of how much is been added to the asset stock each year.

Valuation Data

Annual Depreciation Expense (AD)

2020	**$65.4 million**	**+ 27%**
2017	$48.7 million	+ 11%
2015	$43.3 million	+ 9%

Replacement Cost (ORC)

2020	**$5,104 million**	**+ 30%**
2017	$3,594 million	+ 4%
2015	$3,440 million	

Annual Rate of Asset Consumption

2020	**1.28%**
2017	1.36%
2015	1.34%

10. How much capital expenditure will be spent, on what category of asset, and what are the key capital projects for this activity?

Activity	Driver	ID	Project Name	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
Wastewater Collection, Treatment & Disposal														
	Asset Renewal		**($000)**											
		35	Programme - WW Reticulation Renewals		1,861	30,054	34,895	35,768	36,699	37,689	38,744	39,867	40,944	296,521
		37	LW Laboratory Renewals	109	108	102	268	275	282	290	105	98	98	1,735
		63	Programme - WW Pumping & Storage Instumentation Control & Automation Renewals (ICA)					396	513	572	588	551	549	3,169
		899	WW Step Screen Renewal	960	215									1,175
		1006	Programme - WW Infrastructure Rebuild of the Wastewater Treatment Plant - Budget Only (Capex)		148									148
		2304	WW Trickling Filter Media Renewal				107	874	6,346	5,798		123	708	13,956
		2318	CWTP WW Health and Safety Renewals		110	50	47	50	64	72	74	69	68	604
		2343	CWTP Roading Renewals		117		122		124					363
		2350	Programme - WW Reticulation Structure Renewals				339	354	457	510	525	492	490	3,167
		2375	WW Pump Station Equipment Reactive Renewals (MEICA)	180	184	189	285	297	384	429	441	412	412	3,213
		2717	CWTP Earthquake Repair Occupied Buildings	1,665	335									2,000
		17865	WW Reactive Lateral Renewals	1,982	1,697	457	71	74	71	80	79	74	73	4,658
		17875	WW Cranford Street Pump Station Renewal (PS58)		100	1,056								1,156
		17876	WW Locarno Street Pump Station Renewal (PS20)				107	598	6,747	7,066	12,032	2,445		28,995
		17881	WW Treatment Plant Asset Reactive Renewals	136	149	143	339	354	457	510	525	492	490	3,595
		30219	CWTP Earthquake Channels Restoration	36										36
		37153	CWTP Refurbish Amenities & Mezzanine Roof	612	2									614
		37155	CWTP Digester Roof Renewal (5&6)		102	943	966	1,530						3,541
		37835	Programme - WW Lateral Renewals				170	140	143					453
		37839	Programme - WW Treatment Plant Instrumentation, Control & Automation Renewals (ICA)					2,055	2,605	2,927	1,668	2,039	2,016	13,310
		41872	Programme - WW Control Software Renewals (SCADA)					64	82	92	94	88	88	508
		41873	Programme - WW Modelling		166	183	171	178	230	257	265	248	247	1,945
		41875	Programme - WW Pump & Storage Electrical Renewals					238	307	343	353	330	329	1,900
		41876	Programme - WW Pump & Storage Mechanical Renewals					227	292	327	336	314	314	1,810
		41878	Programme - WW Local Pressure Sewer Systems Reactive Renewals				905	2,461	1,134	1,430	1,663	1,762	1,984	11,339
		41879	Programme - WW Health & Safety Renewals				94	99	128	143	147	137	137	885
		41880	Programme - WW Infrastructure Renewals Wastewater Reticulation Affiliated with Roading Works		181	1,524	1,424	1,487	1,921	2,143	2,204	2,063	2,942	15,889
		44410	WW Mains Renewal Tuam St Reticulation Renewal (Brick Barrel) (Livingstone to Mathesons)	1,466										1,466

Activity	Driver	ID	Project Name	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
		47123	CWTP Biogas Storage Upgrade	1,404	6,138									7,542
		47211	CWTP Motor Load Centre Renewal (MLCG)	641	15									656
		48900	WW Pump & Storage Equipment Renewals 2021 (MEICA)	587										587
		48906	WW Health & Safety Renewals	94	96	99								289
		48919	CWTP Wastewater Network Fibre Ring Renewal	253	6									259
		49712	CWTP Wastewater Hardware & Software Renewal (PLC4 Removal)	149	3									152
		49713	CWTP Wastewater Digesters 1-6 Controls Renewal	579	13									592
		49714	CWTP Wastewater Control Renewal (PLC17)	325	7									332
		50436	WW Local Pressure Sewer Systems Reactive Renewals	37	40	38								115
		50873	CWTP Wastewater Ponds Midge Control	213	122	159	149	156	201	225	231	216	215	1,887
		55245	WW Ferry Road Masterplan Business Area Mains Renewal	98	2									100
		56163	WW Riccarton Mains Renewal (Hansons Lane to Euston Street)	1,066										1,066
		56164	WW Trafalgar, Dover, Cornwall, Lindsay, Caledonian & Ranfurly Mains Renewal	1,470										1,470
		56165	WW Upper Totara, Puriri, Balgay, Milnebank, Karamu, Field, Wharenui, Weka, Tui, Leinster & Bristol Mains Renewal	5,047	1,707									6,754
		56167	WW Philomel, Inverell, Pegasus, Endeavour, Royalist, Effingham, Monowai & Nile Mains Renewal	978										978
		56175	WW Nalder, Ruru, McLean, Wyon, Rudds, Griffiths, Digby, Rasen & Tilford Mains Renewal	1,372										1,372
		56176	WW Sails, Langdons, Hoani, Wilmot, Cone, Perry, Gambia, Frank, Sturrocks & Grassmere Mains Renewal	2,485										2,485
		56177	WW Ascot, Randwick, Flemington, Beach & Bower Mains Renewal		3,299	2,198								5,497
		56180	WW Tome, Rutlan, Scotsto, Norfol, Benne, May, Tavendal, Chapte, Lingar, Mathia, Paparo & Claremo Mains Renewal	4,355	2,813									7,168
		56181	WW W Edmonds, Randolph, Marcroft, Manning, Wildberry, Hopkins, Ferry & Okeover Mains Renewal	3,727	2,595									6,322
		56182	WW Edinburgh, Hinemoa, Nairn, Neville, Lyttelton, Torrens, Dundee, Somers & Hillier Mains Renewal	3,874	2,648									6,522
		56183	WW Allard, Edward, Geraldine & Cleveland Mains Renewal	2,334	1,220									3,554
		56307	WW Update Model Base Data	104	2									106
		56684	WW Reactive Mains Renewals & Capex Repairs	489										489
		57129	Programme - WW Reactive Reticulation Renewals		1,104	1,753	1,794	1,911	2,529	2,982	3,071	2,874	2,867	20,885

Activity	Driver	ID	Project Name	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
		59076	CWTP Wastewater Treatment Plant Building Three Renewal			210	1,933	3,302	2,258					7,703
		60080	Programme - WW Banks Peninsula Pumping & Storage Electrical Renewals					85	110	123	126	118	117	679
		60081	Programme - WW Banks Peninsula Pumping & Storage Instrumentation, Control and Automation Renewals (ICA)					99	128	143	147	137	137	791
		60084	Programme - WW Banks Peninsula Pumping & Storage Mechanical Renewals					70	91	81	83	79	78	482
		60085	Programme - WW Banks Peninsula Treatment Plant Civils & Buildings										110	110
		60086	Programme - WW Banks Peninsula Treatment Plant Instrumentation, Control and Automation Renewals (ICA)										8	8
		60087	Programme - WW Banks Peninsula Treatment Plant Electricals Renewals							356	13			369
		60088	Programme - WW Banks Peninsula Treatment Plant Mechanical Renewals					11	8	95				114
		60168	Wastewater Manholes & Structure Interventions 2022 to 2024		278	547	561							1,386
		60172	WW Lock Replacement Project		205	419	429							1,053
		60173	WW Pages Road Pump Station Pump Renewals (PS0001)		102	1,048	1,611	440						3,201
		60174	WW PS0015 Alport Pump Station Pump Renewals	290	102	524	966	120						2,002
		60175	WW Pump & Storage MEICA Renewals for FY2023		1,152	10								1,162
		60176	WW Pump & Storage MEICA Renewals for FY2024		10	1,151	10							1,171
		60177	WW Harrison Street Pump Station Renewal (PS0006)		205	838	215							1,258
		60178	WW Stapletons Road Pump Station Renewal (PS0007)				215	880	226					1,321
		60179	WW Chelsea Street Pump Station Renewal (PS0009)						226	928	238			1,392
		60180	WW Smith Street Pump Station Renewal (PS0012)								238	981	252	1,471
		60181	WW Tilford Street Pump Station Renewal (PS0013)										252	252
		60186	WW McCormacks Bay Road Pump Station Renewal (00057)		102	733	1,288							2,123
		60187	WW Pump & Storage MEICA Renewals for FY2025			10	1,005							1,015
		60299	WW Buildings Asbestos Removal		102	147	150	154	158	162	167	172	176	1,388
		60300	Landfill Gas Control & Electrical Renewal			210	429							639
		60301	CWTP Landfill Gas Compressor Renewal				537	550						1,087
		60304	WW Taylors Mistake Road Pump Station Renewals (PS70 & 71)		41	629	451							1,121
		60306	CWTP Wastewater Oxidation Pond Health & Safety		61	566								627

Activity	Driver	ID	Project Name	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
		60307	CWTP Wastewater Trickling Filter Flow Meter Renewal			52	483							535
		60308	CWTP Wastewater Inlet Flow Monitoring			26	242							268
		60309	CWTP Wastewater Clarifier Mechanical Renewals				1,288	1,321						2,609
		60310	CWTP Wastewater Digester 1-4 Roof Renewal							2,319	2,384	2,453		7,156
		60313	CWTP Wastewater Secondary Contact Tanks Renewal Pipework			105	859	1,761	790					3,515
		60314	CWTP Wastewater Influent Structure Renewal (upstream of screens)								4,769	4,907	5,039	14,715
		60315	CWTP Wastewater Sludge Screen				161	1,486	1,694					3,341
		60316	CWTP Wastewater Pump Station A & B Pump Renewal								1,490	1,533		3,023
		60317	CWTP Wastewater Odour Control Renewal & Enhancements						1,129	1,160	1,192			3,481
		60318	CWTP Wastewater Uniflare Renewals			157	1,450							1,607
		60319	CWTP Wastewater Trade Waste Reception Facility Improvements			42	387							429
		60320	CWTP Wastewater Ocean Outfall Diffuser Renewal					1,101	1,129	1,160	1,192	1,227		5,809
		60321	CWTP Wastewater Toe Drain Reprofiling			105	1,074	1,101	1,016					3,296
		60322	CWTP Wastewater Sludge Dryer 1 & 2 Renewal				215	1,101	1,355					2,671
		60323	CWTP Wastewater Solids Contact Tanks Air Distribution Pipe Renewal					275	1,976					2,251
		60324	CWTP Wastewater Trickling Filter Mechanical Renewal			42	387							429
		60385	WW Mains Renewal - Multi-Use Arena - Barbadoes, Madras, Lichfield, Poplar, Hereford and Cashel		545	3,374	863							4,782
		61836	Programme - WW Treatment Plant Electrical Renewals					495	732	816	945	265	265	3,518
		62349	WW Akaroa Inflow and Infiltration Renewals	2,941										2,941
		62351	WW Duvauchelle Inflow and Infiltration Renewals	1,780										1,780
		62640	WW Mairehau High School Mains Renewal	11	35									46
		63627	WW High & Lichfield Mains Renewal	12	468									480
		64993	Landfill Gas Pumping & Storage Reactive Renewals		221	102	94	99	128	143	147	137	137	1,208
		65016	WW Banks Peninsula Treatment Plant Equipment Renewals 2023 (MEICA)		82	184	5							271
		65017	WW Banks Peninsula Treatment Plant Reactive Renewals		106	76	71	75	96	107	110	103	103	847
		65019	CWTP Waste Water Equipment Renewals 2022 (EICA)		1,219	20								1,239
		65020	CWTP Waste Water Equipment Renewals 2023 (EICA)		10	1,772	30							1,812
		65021	CWTP Waste Water Equipment Renewals 2024 (EICA)		10	10	1,453							1,473

Activity	Driver	ID	Project Name	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
		65031	Wastewater Reactive Structural Operational Defects Interventions		357									357
		65107	WW Banks Peninsula Pumping & Storage Reactive Renewals		180	102	94	99	128	143	147	137	137	1,167
		65108	WW Banks Peninsula Pumping & Storage Equipment Renewals 2023 (MEICA)		396									396
		65109	WW Banks Peninsula Pumping & Storage Equipment Renewals 2024 (MEICA)			337								337
		65110	WW Banks Peninsula Pumping & Storage Equipment Renewals 2025 (MEICA)				440							440
		65128	WW Stanley Pl Mains Renewals	30	846	94								970
		65129	WW Bradford, Norwood, Hunter, Malcolm, Young, Woodbridge, Penrith, Cardiff et al Mains Renewals	99	2,750	306								3,155
		65133	WW Picton, Nelson, Elizabeth, Lyndon, Mandeville, Kipax, Kyle, Peverel, Burdale, Seto Mains Renewals	268	7,685	840								8,793
		65134	WW Gloucester, Worcester, Hereford, Trent, Nursery, Dearsley & Raglan Mains Renewals	178	4,964	553								5,695
		65136	WW Mains Renewals Projects to Support Transport 2023		1,628									1,628
	Growth													
		60	Programme - WW New Mains			185	583	1,724	1,769	1,817	1,788	1,840	1,890	11,596
		61	Programme - WW New Pump Stations for Growth								894	920	945	2,759
		94	WW Subdivisions Additional Infrastructure	105	267	353	393	402	413	424	566	583	598	4,104
		17873	WW Dufek Crescent Pump Station Renewal (PS65)		527	471								998
		42193	WW Halswell Pump Station (Stage 2) (PS60)	1,300										1,300
		43216	WW Tyrone Street Pump Station Capacity Renewal (Stage 2) (PS62)						118	2,168				2,286
		43219	WW Belfast Northern Wastewater Pump Station (Stage 1)									184	441	625
		53889	WW Copper Ridge Private Development Agreement (PDA)		334	76								410
		57643	WW Hayton Road Main Renewal	522	1,845	1,641	657							4,665
	Meeting Current Levels of Service													
		596	WW Akaroa Reclaimed Water Treatment & Reuse Scheme	4,236	2,087	4,887	13,602	18,736	15,511	7,333				66,392
		1376	Programme - WW New Reticulation Odour Control		85	192	450	694	897	1,001	1,029	963	961	6,272
		2214	WW Duvauchelle Treatment and Disposal Renewal	1,007	2,472	1,571	2,684	2,751	2,823					13,308
		2435	Programme - WW Wetwell Safety Improvements			24								24
		30172	WW Riccarton Interceptor (Upper Riccarton)	2,175	3,008	453								5,636
		30173	WW Avonhead Road Main Renewal		1,225	1	11	2,751	623					4,611
		42153	WW Eastern Terrace Wastewater Main Renewal	54	818									872
		42154	WW Somerfield Pump Station & Pressure Main	118	3,263	4,283								7,664

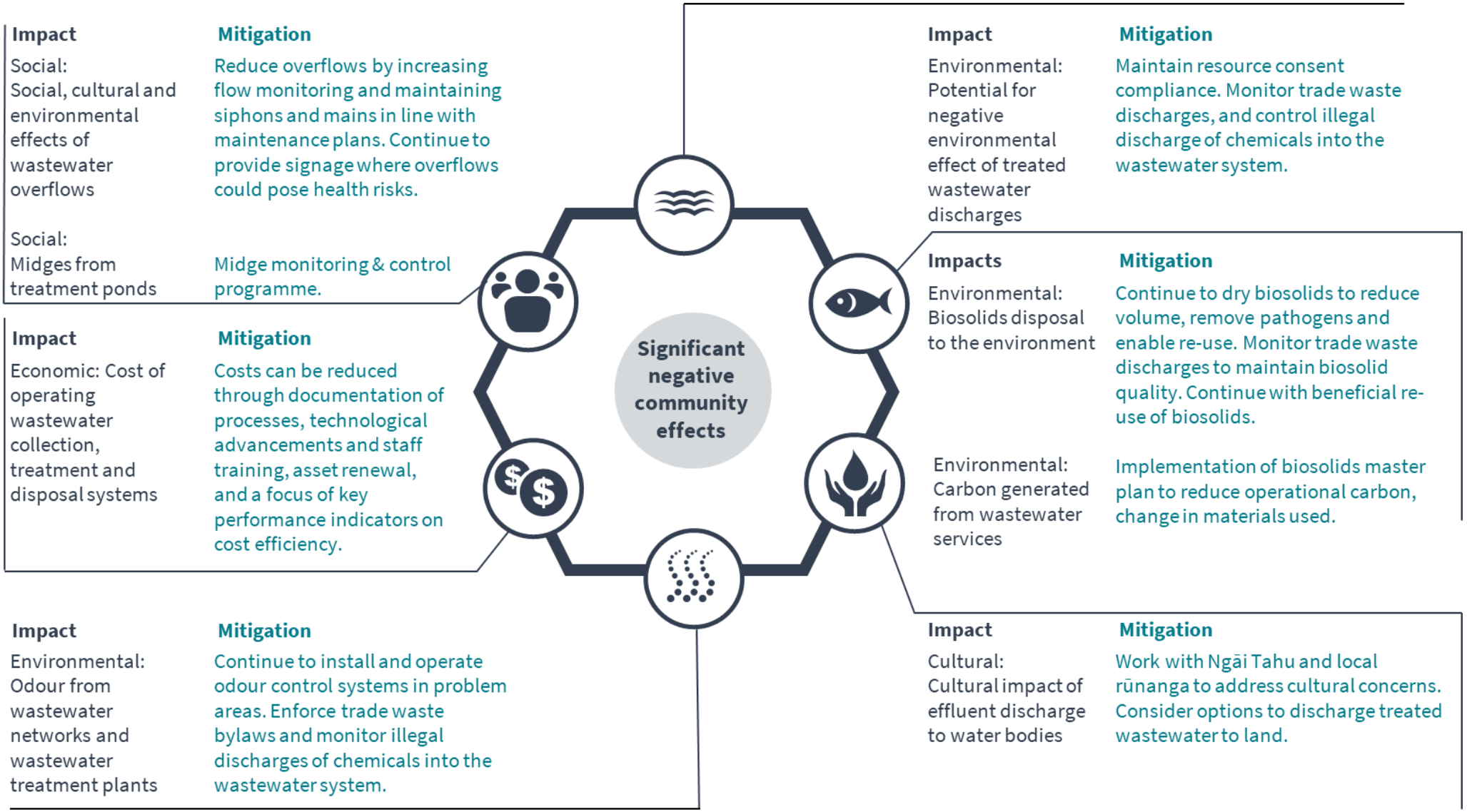
Activity	Driver	ID	Project Name	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	Total
		42155	Programme - WW Overflow Reduction								358	491	3,780	4,629
		43214	WW Treatment Plant Channel Improvements										252	252
		43335	Wastewater Reticulation Improvements Programme				443							443
		43946	WW Tilford Street Pump Station & Pressure Main Capacity Renewal (PS13)	613	414									1,027
		43947	WW Opawa Road Pump Station Capacity Renewal (PS44)		31	105								136
		47124	CWTP Biogas Engine Upgrade (Generator 1)					330	5,646	5,798				11,774
		48083	WW St Asaph St Odour Treatment	1,488										1,488
		57641	WW Land purchase for Wastewater Assets								119	123	126	368
		57642	WW Southern Relief Easement	140										140
		58434	WW Smart Overflow Reduction	105	107	183	188	193	198	162				1,136
		60161	WW Wigram Pump Station & Discharge Odour Treatment (PS0105 and PM0105)	454	10									464
		60311	CWTP Wastewater Critical Mechanical Spares		256	262	268	275	282	290	298			1,931
		60312	CWTP Wastewater Critical Electrical & Control Spares for Increased Resilience		205	210	215	220	226	232	238			1,546
		65041	WW Halswell, O'Halloran and Upgradient Catchment Pump Stations Odour Treatment (60,61,23,81,73,69)		394	356								750
		65068	WW Sparks, Awatea, Longhurst and Upgradient Catchment Pump Stations Odour Treatment (104, 123, 115)		394	356								750
	New Service													
		885	WW Reuse (C3 & C4 Water)									491	1,890	2,381
		20714	WW New Schemes										504	504
		60260	CWTP Sludge Holding Tank (to stop requirement for 24/7 manned operation)		102	2,252	2,416	550						5,320
		60303	WW Pressure Sewer System Monitoring & Control Relocation (SCADA)				107	220	113					440
		60305	WW Pump Station Flow Meters at all Stations		98	335	344	387						1,164
Wastewater Collection, Treatment & Disposal Total				**56,753**	**69,109**	**72,485**	**84,010**	**93,444**	**103,713**	**90,846**	**81,823**	**72,538**	**73,169**	**797,890**

11. Does this activity have any significant negative effects on social, economic, environmental or cultural wellbeing, now or in the future?

Negative Effect	Mitigation
Social	
1. Social, cultural and environmental effects of wastewater overflows	Maintain resource consent compliance. Reduce overflows through projects identified in the city-wide wastewater optimisation project. Fully calibrate wastewater network models through using recent flow monitoring data. Increase flow monitoring on wastewater pump stations and trunk sewers. Continue to implement processes for erecting signage and public notification where overflows could result in health risks. Provide on-site attenuation where required in capacity constraint areas. Clean and maintain siphons and wastewater mains in accordance with maintenance plan. Use flood modelling scenarios to identify areas at risk of inundation and undertake projects to reduce risk of flood water getting into the wastewater network.
2. Social effects as a result of Midges from treatment ponds	Midge control programme:- • Jet boat and midge dredge on the ponds every fortnight during breeding season • Midge traps deployed and weekly monitoring programme
Economic	
3. Cost of operating wastewater collection, treatment and disposal systems	Follow documented procedures and industry best practice for cost minimisation. Follow technological developments and implement cost saving initiatives on a continuous improvement basis. Focus process key performance indicators on cost efficiency. Ensure staff are kept updated with technological and operational best practice through attendance at conferences and participation in specialist industry working groups.
Environmental	
4. Odour from wastewater networks and wastewater treatment plants	Odour control systems installed in problem areas. Operate odour control systems in accordance with procedures including regular maintenance to remove build-ups of odour causing compounds. Robust work planning at wastewater treatment plants to avoid odour events. Good design of wastewater networks to prevent creation of anaerobic conditions / adequate ventilation. Enforce trade waste bylaws. Monitor and control illegal discharge of chemicals and toxins to the wastewater system.

Negative Effect	Mitigation
5. Potential for negative environmental effect of treated wastewater discharges	Maintain resource consent compliance. Operate and maintain treatment plant and disposal services according to best practice. Monitor trade waste discharges to ensure unacceptable pollutants are not released to the WWTP. Monitor and control illegal discharge of chemicals and toxins to the wastewater system to avoid process failure.
6. Biosolids disposal to the environment	Continue to dry biosolids to reduce volume, kill pathogens and enable reuse. Monitor trade waste discharges to ensure potential pollutants are not released to the wastewater treatment plants and carried over into the biosolids, maintaining quality of biosolids. Continue with beneficial reuse of biosolids. Implementation of biosolids master plan to reduce operational carbon
7. Carbon generated from wastewater services	Implementation of biosolids master plan to reduce operational carbon
Cultural	
8. Cultural impact of effluent discharge to water bodies	Work collaboratively with Ngāi Tahu and local rūnanga to find cost effective solutions that address cultural concerns. Consider options to discharge treated wastewater from Akaroa and Duvauchelle to land instead of Akaroa Harbour. Implement the project to divert wastewater from Lyttelton, Governors Bay and Diamond Harbour to the Christchurch Wastewater Treatment Plant, instead of Lyttelton Harbour.

The following diagram outlines the potential negative effects of wastewater collection, treatment and disposal activities on the community and how these impacts can be minimised or mitigated.



12. What risks are identified and what controls and mitigations are planned?

Council's Risk Policy and assessment framework outlines its approach to managing risk. The framework provides a way to consistently identify, record and assess risks, and prioritise those that need to be mitigated.

Risk management is inherent in all of Council's wastewater activity processes. Significant risk management strategies for this activity include:

- **Management escalation and review:** The Wastewater Unit holds a monthly management meeting to review progress on operational activities.
- **Asset design:** For Council delivered projects, all elements are designed and delivered in accordance with Council's Infrastructure Design Standards and Construction Standard Specification. These two documents set in place the expectations of fit-for-purpose design and construction practises.
- **Delivery:** During construction, quality assurance processes are in place to confirm that the works are undertaken in accordance with expectations and guidelines.
- It is recommended that the risk tables in Section 5 of the AMP are viewed in conjunction with this Activity Management Plan to understand the challenges that face the water supply activity, the mitigation measures, and the residual risk levels.

In various briefing presentations to the Councillors, the following high level risks were outlined as being key to the activity. There are a number of more specific risks that affect the activity, but they are not presented in this document due to the number of risks and quantity of detail.

Risk Title There is a risk that/of:	Caused By:	Resulting In:	Controls and Mitigations
There is a risk while managing the wastewater infrastructure to provide wastewater collection and treatment services, that Council pollutes the environment causing environmental damage.	• Operations and/or Maintenance failures in wastewater treatment processes • Failure to maintain network capacity • Treatment plant not properly maintained and/or operated • Lack of staff/contractor capability and/or capacity, or negligence • Vandalism, theft and deliberate damage • Insufficient trained and experienced staff (Council and Citycare) • Wastewater entering the environment from broken or leaking pipes, septic tanks or wastewater overflows	• Water borne disease outbreak or unacceptable public health issues • Breach of consent and prosecution by regulator • Costly clean-up and/or legal issues • Reduction in ecosystem health. (Low water quality resulting in poor ecological and cultural health of waterways) • Offensive or objectionable odour • Increasing dissatisfaction from community and increased number of complaints to Council • Loss of amenity value • Reputational damage • Negative economic impact • Failure to provide waste water collection in a safe and efficient manner to meet ratepayer expectations and/or Levels of Service (LoS) • Unbudgeted reactive expenditure	• Providing sufficient funding in the Long Term Plan for operational, maintenance and capital costs • Programmed CCTV inspections of high consequence of failure pipes • Qualified and experienced Maintenance staff to operate and maintain the wastewater treatment plants to documented procedures and contractor plans • Regular maintenance • Appropriately resourced 3 waters business unit • Increased communications and engagement with community, ECan and local iwi

Risk Title There is a risk that/of:	Caused By:	Resulting In:	Controls and Mitigations
		• Excess contaminant loading on stormwater treatment facilities and waterways as a result of overflows	• Microbial and chemical contamination monitoring, risk assessment and reactive processes • Monitoring of Inflow/Infiltration • Installing all fuel tanks above ground within adequate containment structures to capture leaks • Appropriate decommissioning of retired infrastructure • Clean up, disinfection and communication plans • Monitoring and mapping high odour (H2S)risk areas to inform planning of future Odour treatment facilities • Succession plans for all critical and specialist roles requiring specific knowledge, especially where scarcity in the market exists • Maintaining up to date Asset Management Plans with renewal programmes based on the best available data ensuring prioritisation to the most critical assets
There is a risk that Councils wastewater services do not comply with its ECan resource consents or the Health Act.	• Operations and/or Maintenance failures in wastewater treatment processes • Treatment plant not properly maintained and/or operated due to insufficient maintenance and renewals budget • Lack of staff/contractor capability and/or capacity, or negligence	• Breach of consent and abatement notice by regulator • Breach of consent and infringement notice by regulator • Breach of consent and infringement notice by regulator • Breach of consent and prosecution by regulator • Costly legal issues and unplanned expenditure • Reputational damage	• Monitor and record resource consent parameters • Flow and load models maintained for each plant and compared regularly against actual flows and loads to determine need for upgrades or process changes • Open and honest communications with stakeholders; community, local iwi and the regulator (ECAN)

Risk Title There is a risk that/of:	Caused By:	Resulting In:	Controls and Mitigations
			• Maintain appropriate Trade Waste Bylaws to reduce likelihood of overloading the treatment plants. • Providing sufficient funding in the Long Term Plan for operational, maintenance and capital costs

As discussed above, the AMPs list a number of activity specific risks. Robust risk identification processes identify activity specific risks, causes and consequences from the ProMapp risk register, and then expanding on this with the risks and challenges that face the business. All risks are included in the Asset Management Plan (AMP) Section 5.3.2 - Activity Specific Risks and relate to risks such as:

1. Major/critical infrastructure failure;
2. Outdated or inadequate hydraulic models to effectively inform planning decisions;
3. Climate change effects on infrastructure;
4. Impacts on economic development ;
5. Insufficient investment of CAPEX and OPEX; and
6. Inability to meet Councils Carbon Neutrality goals - The Government has recognised the pressing need for long-term greenhouse gas emissions reductions, setting national targets in 2019 which CCC have in turn adopted.
   These are:

   - Net zero gas emissions by 2045
   - 50% reduction from 2016/17 baseline levels by 2030 (excluding methane)
   - 25% minimum reduction in methane by 2030 and 50% reduction by 2045

This activity plan includes funding of the biogas master plan which is aimed at reducing the operational carbon generated by the Christchurch wastewater treatment plant. The master plan comprises of 3 stages which specifically targets greenhouse gas emission reductions to support climate change. Stages 1&2 address health and safety and biogas storage issues that we deliver some marginal carbon savings before the later improvements to co-generation engines FY27/28 deliver the full benefits of the biosolids master plan.