

Dunedin City Council

Draft Infrastructure Strategy
2025-2055

INTRODUCTION

This document sets out the Dunedin City Council's (DCC) strategy for managing its three waters and transport infrastructure for the next 30 years. It has been prepared in accordance with the requirements of section 101B of the Local Government Act 2002.

The purpose of the infrastructure strategy is to:

- identify the significant infrastructure challenges facing Dunedin and the DCC
- identify how the DCC will manage or influence these challenges and their implications
- set out the most likely scenario for managing Dunedin's infrastructure to 2055.

As part of the Council's long-term plan, the infrastructure strategy lays out the challenges of maintaining our assets, accommodating growth and changing demand, managing our environmental impact, supporting improved public health and safety outcomes and confronting long-term issues like climate change. The long-term plan forecasts the resources needed for ongoing infrastructure renewal and replacement, and includes funding for projects providing solutions to our challenges for the first 9 years up to 2034, with 30-year budgets signalled in the infrastructure strategy. The Council's financial strategy sets the parameters for funding and financial impacts on ratepayers.

Over the coming 30 years, the DCC will face similar infrastructure challenges across both three waters and transport infrastructure systems: Dunedin is growing, and demand on three waters and transport infrastructure is growing with it; the DCC's three waters and transport infrastructure is ageing and is vulnerable to natural hazards; regulators and the wider community expect improvements in public health, safety and environmental outcomes; and three waters and transport activities need to support work towards achieving Dunedin's Zero Carbon 2030 target.

The infrastructure strategy is presented in two parts:

- **Part 1: Three waters** – this covers the infrastructure related to the DCC's water supply, stormwater, and sewerage and sewage activities
- **Part 2: Transport** – this covers the infrastructure related to the DCC's roading and footpaths activities.

Although subject to similar infrastructure challenges, the three waters and transport activities currently operate within broader contexts with distinct features:

- **Three waters:** Local government three waters activities are the focus of a nationwide reform programme known as 'Local Water Done Well.' Changes to the way local government three waters services are delivered and regulated are anticipated during the early years of this infrastructure strategy. The Government's key principles for Local Water Done Well are:
 - *Introducing greater central government oversight, economic and quality regulation*
 - *Fit-for-purpose service delivery models and financing tools*
 - *Setting rules for water services and infrastructure investment*
 - *Ensuring water services are financially sustainable.*
- **Transport:** asset management planning and funding local government transport activities is undertaken in conjunction with the New Zealand Transport Agency / Waka Kotahi, with overarching direction provided by the Government Policy Statement. Priorities identified in

the 2024 Government Policy Statement on Land Transport are safety and economic productivity.

The two-part approach of this infrastructure strategy enables us to clearly reflect the influence of these distinct contexts for infrastructure management over the coming years.

The strategy set out in this document aims to ensure the DCC delivers infrastructure services to Dunedin's communities in a cost effective, sustainable, and coordinated manner, consistent with its vision, strategic framework, and long-term objectives. The DCC needs to make smart, affordable investments in three waters and transport infrastructure renewals, upgrades and extensions over the next 30 years to respond to challenges and maintain the levels of service enjoyed by residents and visitors in one of the world's great small cities.

Dunedin City Council

Draft Infrastructure Strategy
2025-2055 – Part 1: Three Waters

PART 1: THREE WATERS - EXECUTIVE SUMMARY

Part 1 of this Infrastructure Strategy sets out the DCC's strategy for managing three waters infrastructure for the next 30 years. It covers drinking water, wastewater and stormwater infrastructure assets operated by the DCC.

The purpose of this part of the Infrastructure Strategy is to:

- Identify the significant three waters infrastructure challenges facing the DCC
- identify how the DCC will manage or influence these challenges and their implications for three waters services
- set out the most likely scenario for managing the city's three waters infrastructure to 2055.

Projects identified in the first nine years of the strategy are funded as part of Dunedin's 9 year plan 2025-34.

Dunedin's 9 year plan 2025-34 provides for approximately \$1,015 million of capital spend over the period to 2033/34 for three waters infrastructure. Infrastructure budgets are increased from previous 10-year plans, and from the previous 2021-51 Infrastructure Strategy, as more funding is required for asset renewal and replacement to ensure networks continue to meet service performance levels and to accommodate urban growth and resilience needs. The proposed budget for three waters capital investment is consistent with DCC's Financial Strategy and aims to maintain affordability for ratepayers as far as possible while endeavouring to meet the needs of the community. The Financial Strategy should be read alongside this Infrastructure Strategy.

This strategy outlines the DCC's approach to management and funding of three waters infrastructure and addresses significant issues driving the three waters Infrastructure Strategy as required under section 101B of the Local Government Act 2002). Significant issues include:

- regulatory and legislative change
- replacing and renewing ageing infrastructure
- responding to changes in demand for infrastructure
- public health and environmental outcomes
- resilience to natural hazards
- planned changes to levels of service
- Council's Zero Carbon 2030 city target and DCC's organisational emissions reduction targets

The DCC is actively working to address these challenges. This strategy outlines the path forward, framed by key themes and drivers that reflect the DCC's goals and the impact of the challenges on our planning and service delivery. Our planning environment has evolved, supported by our partnership with mana whenua. Dunedin's Future Development Strategy 2024-2054 guides our responses to growth and changes in demand for service. Zero Carbon 2030 policy and planning, along with three waters system planning, have advanced baseline planning information. Our investment priorities are informed by long-term adaptive planning pathways, sharpening our approach to resilience and adapting to changing drivers for infrastructure.

1 THREE WATERS - OVERVIEW

This section describes the planning context for Part 1 of the infrastructure strategy and provides a snapshot of the three waters services we provide.

1.1 What is an Infrastructure Strategy?

The 30-year infrastructure strategy is a core component of the DCC's future planning and strategic framework. Ensuring reliable and quality drinking water, wastewater and stormwater services is essential to Dunedin's vision of being one of the world's great small cities.

As part of the DCC's long-term plan, the infrastructure strategy lays out the challenges of maintaining our assets, accommodating growth and changing demand, managing our environmental impact, and confronting long-term issues like climate change. Our long-term plan forecasts the resources needed for ongoing infrastructure renewal and replacement, and includes funding for projects providing solutions to our challenges for the first 9 years up to 2033/34, with longer 30-year budgets signalled in the infrastructure strategy. The DCC's financial strategy sets the parameters for funding and financial impacts on ratepayers.

1.2 Our approach to the 2025-2055 Infrastructure Strategy

We aim to deliver three waters services to our communities in a cost effective, sustainable, and coordinated manner, consistent with our vision, strategic framework, and long-term objectives.

As a provider of three waters services, the DCC operates within a diverse range of drivers, navigating central and local government policy and regulations, as well as the DCC's own strategic goals and community expectations regarding services and affordability. This can lead to conflicting priorities in planning and funding. Examples of these drivers include regulatory compliance, maintaining services levels, continuing renewal of ageing infrastructure, and the ability to respond to the growth and urban development obligations contained in the Second Generation District Plan (2GP) and Future Development Strategy 2024 – 2054 (FDS). Decision-making ultimately requires the DCC to balance financial sustainability and affordability, prioritising a long-term programme that continues to improve infrastructure performance and asset management, while accommodating growth and development.

Structure of this document

Section 1: Three Waters Overview - The planning and regulatory context for the three waters part of the Infrastructure Strategy and outline of our infrastructure

Section 2: Our Challenges - The significant three waters challenges faced by the DCC and where we want to be positioned as we respond to these issues and opportunities

Section 3: Our Performance - How are we doing, the current state of three waters service provision, asset condition and performance

Section 4: Our Plan - How we are going to get to where we want to be, the preferred scenarios for managing three waters challenges and opportunities.

Section 5: Delivering on Our Plan - How we will deliver on our plan, providing an overview of highest three waters priorities and proposed expenditure over the term of the strategy.

1.3 Three waters planning and regulatory environment

Three waters activities are undertaken within a complex system of legislative and regulatory requirements (Table 1).

Table 1: Key legislative, regulatory and planning framework drivers impacting three waters infrastructure and services

Key legislation	Key policies, plans and standards
<ul style="list-style-type: none">• Local Government Act 2002• Resource Management Act 1991• Water Services Act 2021• Local Government (Water Services Preliminary Arrangements) Act 2024• <i>Local Government Water Services Bill (introduced Dec 2024)</i>• Health and Safety at Work Act 2015• Building Act 2004• Civil Defence Emergency Management Act 2002	<ul style="list-style-type: none">• National Policy Statement for Freshwater Management 2020• National Policy Statement for Urban Development 2020• Otago Regional Council's Regional Policy Statements and Regional Plans for Water, Air and Coast, in accordance with the conditions of relevant resource consents.• NZS 4404: Land Development and Subdivision Infrastructure• Water Services (Drinking Water Standards for New Zealand) Regulations 2022 (drinking water standards), and Drinking Water Quality Assurance Rules 2022 (DWQAR)• Building Regulations 1992 (Schedule 1): The New Zealand Building Code• Building (Dam Safety) Regulations 2022• NZ Fire Service Firefighting Water Supplies Code of Practice (SNZ PAS 4509:2008)• Kāi Tahu ki Otago Natural Resource Management Plan 2005.

The legislative and regulatory systems for three waters activities continue to undergo substantial change. Key areas of legislative and regulatory changes are anticipated to present challenges and opportunities for DCC three waters activities in the early years of this Infrastructure Strategy include three waters regulatory and Local Water Done Well (LWDW) service delivery changes, and resource management system reforms. We will continue to monitor the changing landscape and respond proactively to ensure our services remain effective and sustainable.

1.3.1 Strategic Context

The DCC's own strategic planning framework provides the context for three waters infrastructure management. Anchored in the four wellbeings, the City's community outcomes and the vision of making Dunedin one of the world's great small cities, it guides three waters activities and our responses to the challenges we face. The DCC strategic framework is described in Section 2 of Dunedin's 9 year plan 2025-34. Table 2 outlines the elements of the framework that directly inform the Infrastructure Strategy.

Table 2: DCC strategy and policy priorities informing the Infrastructure Strategy (Part 1: Three Waters)

Strategy	Strategic priorities guiding the development of the infrastructure strategy
3 Waters Strategic Direction Statement 2010-2060*	<ol style="list-style-type: none"> 1. meeting the water needs of the city for the next 50 years from existing water sources 2. adapting to a variety of scenarios for climate change and fluctuations in population 3. reducing our reliance on non-renewable energy sources and oil-based products 4. improving the quality of our discharges to minimise impact on the natural environment 5. ensuring that as a minimum, key levels of service are maintained 6. limiting cost increases to current affordability where practical 7. adopting an integrated approach to management of the 3 Waters and embracing the concept of Kaitiakitaka (guardianship and protection).
Te Taki Haruru 2023 Te Taki Haruru Implementation plan 2024	Te Taki Haruru (DCC's Māori Strategic Framework) guides the DCC in partnering with mana whenua and fulfilling its obligations under the Treaty of Waitangi. This expands the integrated approach to management and concept of Kaitiakitaka (guardianship and protection) to align with Tikaka (customary values and practices); and the principles Te Taki Haruru.
Future Development Strategy for Dunedin 2024-2054 required by National Policy Statement for Urban Development (NPS-UD) 2020, (jointly prepared with the Otago Regional Council (ORC) and in partnership with mana whenua, with input from Kāinga Ora and Waka Kotahi)	Strategic priorities for urban growth and development over the next 30 years, setting out a high-level vision for how Ōtepoti Dunedin will: <ul style="list-style-type: none"> • achieve well-functioning urban environments in its current and future urban areas • provide at least sufficient development capacity for housing and business land needs to meet expected demand over the next 30 years • help to integrate planning decisions under the RMA with infrastructure planning and funding decisions.
DCC Zero Carbon Policy 2022 DCC Zero Carbon Plan 2030 (2023) DCC's Emissions Management and Reduction Plan 2023/24-2030/31	Zero Carbon city and DCC emissions reduction priorities <ul style="list-style-type: none"> • Supporting compact urban form by removing 3 Waters network constraints on 2GP enabled densification • Minimising greenhouse gas emission from wastewater treatment • Replacing fossil fuel with other energy sources and increasing energy efficiency • Exploring options for renewable energy generation associated with 3 Waters assets
Te Ao Tūroa – The Natural World: Dunedin's Environment Strategy 2016 -2026	Te Ao Tūroa aims to set the direction for a future safe from climate change impacts; improve and maintain the health of Dunedin's natural environment; and give Dunedin people every opportunity to feel connected to and look after the environment. Strategic goals are: <ol style="list-style-type: none"> 1. Dunedin is resilient and carbon zero 2. Dunedin has a healthy environment 3. Dunedin people care for the natural world.

*There are also specific priorities outside the 3 Waters Strategic Direction Statement (SDS). The additional priorities reflect responses to changes and events occurring after the development of the SDS, including:

- A significant increase in forecast growth for the city. The SDS forecasted an 11% population growth over its 50-year horizon, translating to approximately 135,900 by 2060. Recent population estimates for 2024 indicate we are already very close to this 50-year forecast, with Stats NZ estimating our 2024 population at around 135,700.
- Changes to urban development priorities due to increasing population forecasts, the review of the District Plan, the subsequent adoption of the 2GP, and the adoption of the Future Development Strategy.
- Responding to flooding in South Dunedin.
- The Council's declaration of a climate emergency in 2019.
- Ongoing challenges with maintaining and renewing an ageing asset base in challenging economic times.

1.3.2 System planning and Dynamic Adaptive Planning Pathways

The DCC has recently completed a three waters strategic planning project to inform its 30-year Infrastructure Strategy. The Integrated System Planning (system planning) programme outlines a 50-year strategic plan, identifying future investments needed to maintain and adapt three waters services to current and future standards while keeping them affordable for the community.

The programme uses a Dynamic Adaptive Planning Pathways (DAPP) approach to map out a 'core pathway' for future investments. DAPP, originally developed for climate adaptation, is now widely used in infrastructure planning to manage future uncertainties by identifying multiple options and the signals that might necessitate a shift to a different option. Dunedin City Council (DCC) is one of New Zealand's early adopters of this method for three waters planning.

Only projects on the 'core pathway' identified through system planning are included in the 30-year programme in section 4 'Our Plan'. This programme is supported by monitoring key variables such as population forecasts, sea level rise, legislative changes, and asset performance. This monitoring helps determine when and how the programme needs to adapt to meet current and future challenges. Unexpected changes in these variables may lead to adjustments in the timing or selection of projects, which will be reflected in future Annual and Long Term Plans.

1.3.3 Community Outcomes

Investing in Dunedin's infrastructure supports the city's community outcomes and the vision of making Dunedin one of the world's great small cities. The three waters aspects of the infrastructure strategy directly contribute to the city's following community outcomes:

- A healthy city with reliable and quality water, wastewater and stormwater systems
- A sustainable city with healthy and treasured natural environments
- A successful city with a diverse, innovative and productive economy

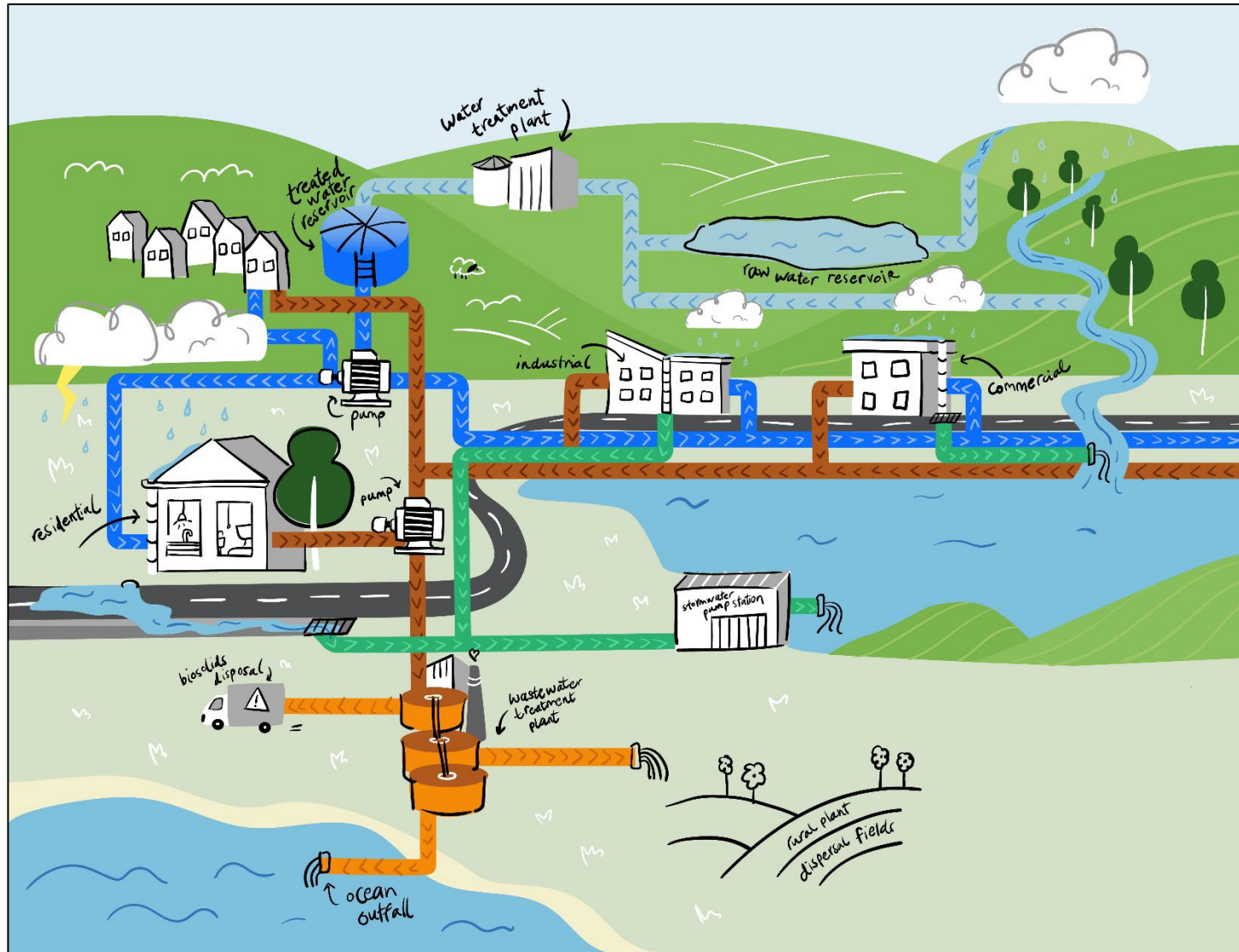
Table 3 highlights some of the projects that play a role in achieving these community outcomes.

Table 3: Infrastructure Project Links to Community Outcomes

	Community outcome		
	A healthy city with reliable and quality water, wastewater and stormwater systems	A sustainable city with healthy and treasured natural environments	A successful city with a diverse, innovative and productive economy
Infrastructure projects contributing to the community outcomes	<p>Upgrading and replacing ageing assets at water treatment plants will ensure compliance with drinking water standards to supply safe water in sufficient quantity to serviced communities.</p> <p>Port Chalmers and Mosgiel water supply improvements will boost year-round reliability of drinking water for residents and businesses.</p> <p>Targeted renewals of 3 Waters networks will provide a range of improvements in the water system such as supply aesthetics, improved fire flows and reduced supply interruptions. Inflow and infiltration to the wastewater network will decrease, reducing wastewater overflows.</p> <p>Upgrades and replacing ageing assets at Metropolitan wastewater treatment plants will improve treatment reliability and wet weather flow management.</p> <p>Rural wastewater scheme upgrades will ensure compliance with regulatory standards and reduce flooding risks.</p> <p>Development and implementation of a long-term Biosolids Strategy will provide sustainable, lower carbon solutions for beneficial reuse of Dunedin's waste sludges.</p> <p>The South Dunedin Flood Alleviation and Mosgiel Stormwater Network Improvement projects will reduce the risk of flooding by improving stormwater management in these areas.</p>	<p>An ongoing programme of projects is underway to increase the resilience of Dunedin's metro water supply for now and into the future.</p> <p>The system planning programme has developed long-term adaptive pathways to identify where and when to invest in 3 Waters infrastructure to meet the City's current and future needs.</p>	<p>Investing in increased capacity in 3 Waters systems to enable growth in the city.</p> <p>Maintaining the level of asset renewals within 3 Waters will continue to support local and regional infrastructure providers.</p>

1.4 Our Infrastructure

We own and manage \$3.956B of three waters infrastructure (based on replacement values used for the replacement value as at 30 June 2024), including pipes, pumps, and treatment plants.



Water Supply

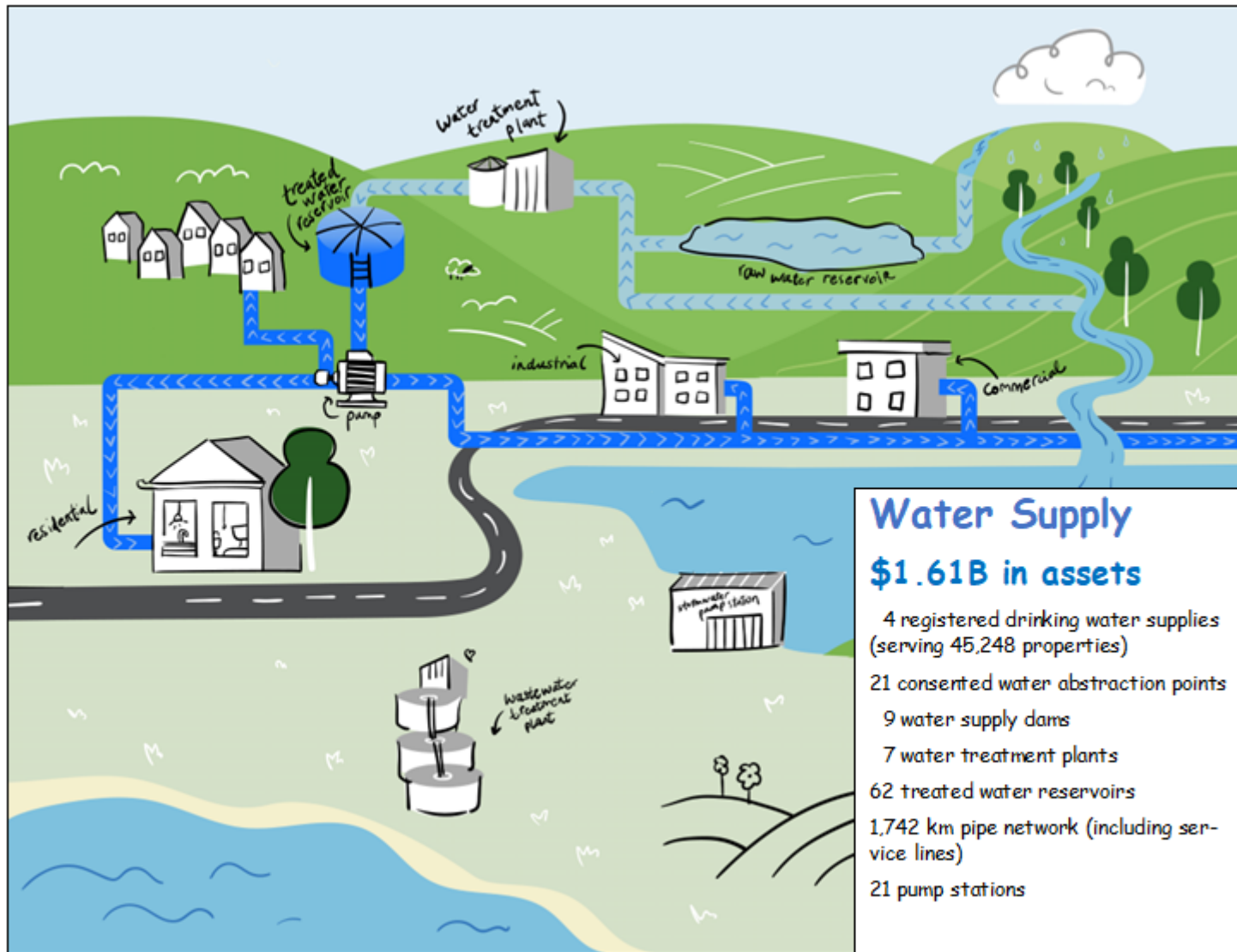
Our water supply infrastructure collects, conveys and treats raw water, then distributes treated water to ensure the provision of safe and reliable drinking water. This supports the health, safety and well-being of residents, as well as economic activities in our community.

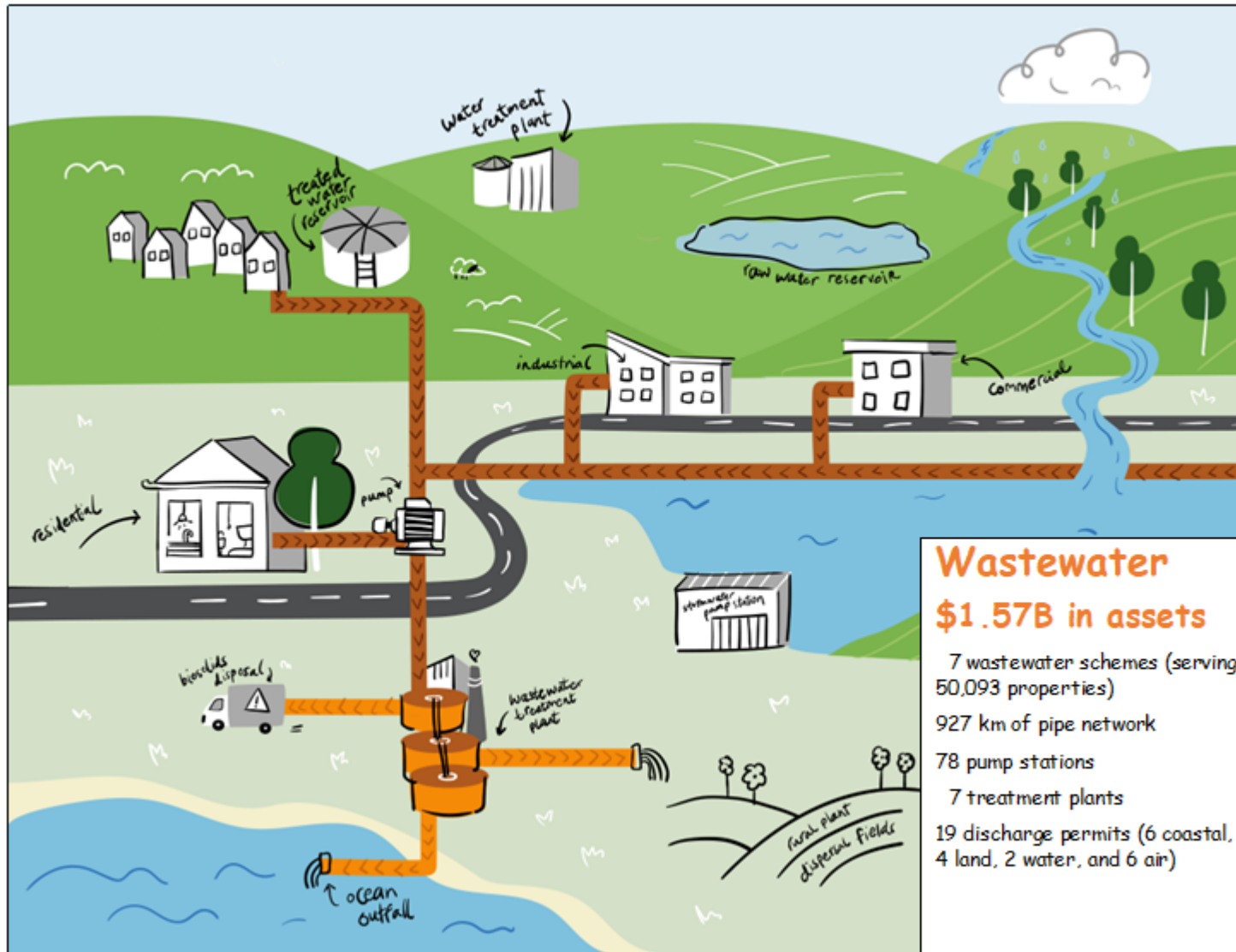
Wastewater

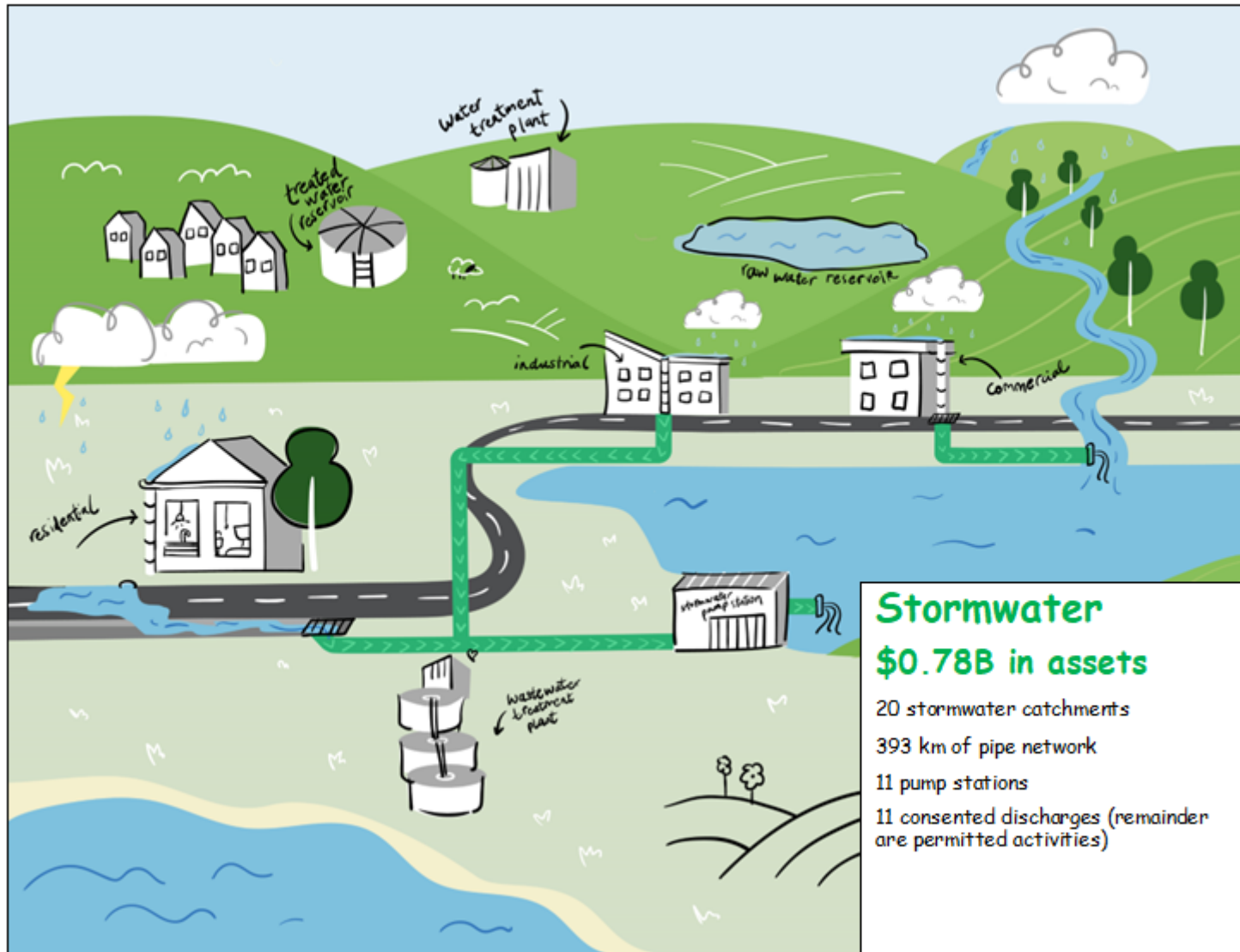
Our wastewater infrastructure protects public health and the environment by collecting and conveying wastewater from homes and businesses, treating it to a high standard before discharging it to the environment.

Stormwater

Our stormwater infrastructure protects public health and the environment by piping rainwater away from homes, properties and roadways to prevent flooding and minimise waterway pollution.







2 OUR CHALLENGES - THE ISSUES FACING THREE WATERS INFRASTRUCTURE IN DUNEDIN

This section outlines the challenges and opportunities the DCC faces in three waters strategic long-term infrastructure management.

Content is organised by a set of key drivers based on what the DCC plans to achieve within an infrastructure strategy and their alignment with the challenges and issues we face in our delivery of services.

Table 4: Key drivers and challenges

Drivers	Challenges:
Looking after our people and place	Maintaining or improving public health outcomes Maintaining or improving environmental outcomes Ensuring infrastructure is safe for staff and contractors to operate and maintain
Looking after what we have (things)	Replacing and renewing our ageing three waters infrastructure Maintaining levels of service
Meeting our changing needs	Responding to changes in growth and demand
Improving our resilience	Providing for infrastructure resilience in the face of a changing climate
Delivering on our city and DCC emissions reduction targets	Reducing our emissions and supporting urban intensification to reduce City emissions
Living within our means	Financial prudence and affordability

2.1 Looking after our people and place

Drinking water, wastewater and stormwater infrastructure services contribute to public health and environmental outcomes. The DCC must ensure it supplies safe drinking water and manages the environmental effects of water abstraction and discharges from its wastewater and stormwater systems appropriately. Three waters systems also impact the environment through greenhouse gas emissions from wastewater treatment processes and energy use. Urban form, which is influenced by the availability of three waters services, is also a key contributor to Dunedin's long-term emissions.

Improvements to our three waters assets are required to keep pace with increasing public health and environmental expectations. Investment is required to maintain current and future service levels, including enhanced protection of drinking water sources, improved water management practices, and new standards for drinking water, wastewater and stormwater services.

The three waters system planning programme will guide capital investment and support the continued provision of safe drinking water to serviced communities and improved environmental outcomes. Objectives developed with the ORC and our mana whenua partners during the project include:

- Regeneration – protecting and enhancing the natural environment, aligning with Tikaka and Kawa, contributing to carbon zero targets,
- Resilience – adapting to climate change, robust, recoverable and flexible response to incidents and natural disasters
- Efficiency – minimising wastage, reducing cost impacts to customers, and providing services in the right place at the right time to support growth.

Under section 125 of the Local Government Act 2002, as modified by the Water Services Act 2021, DCC must assess access to drinking water, wastewater and other sanitary services in Dunedin every three years. This assessment evaluates the adequacy of services from a public health and environmental perspective. A DCC servicing assessment is currently in progress.

2.1.1 Public Health and Environmental Outcomes

The DCC needs to continue maintaining and improving its drinking water supply systems to ensure compliance with drinking water legislative and regulatory requirements and to protect public health. The Water Services Act 2021 sets out the duties of drinking water suppliers. These include a duty to supply safe drinking water, to comply with drinking water standards, and to provide a sufficient quantity of drinking water. The DCC must also comply with the Drinking Water Quality Assurance Rules 2022 (DWQAR):

- The drinking water standards set maximum acceptable values for substances, organisms, contaminants or residues that may be present in drinking water.
- The DWQAR includes monitoring and assurance rules:
 - Monitoring rules must be complied with to demonstrate compliance with the drinking water standards.
 - Assurance rules cover activities that water suppliers need to undertake to manage risks to drinking water safety.

The DCC must also have drinking water safety plans for all drinking water supplies to identify risks to drinking water safety and how they will be managed - from the raw water catchment to the treatment plant and within the distribution network and operate in accordance with those plans. These plans need to be regularly updated and submitted to Taumata Arowai.

Accountability for environmental outcomes is managed within a national and regional planning framework supported by resource consents for three waters activities that impact the environment and people. Objectives, policies and rules set in national policy statements, national environmental standards, the Otago Regional Policy Statement and regional plans manage activities such as discharges to water, air and land, and the taking, damming and diversion of freshwater. These objectives, policies and rules are often put into action through conditions of resource consents.

The provisions of these policies, plans and standards will impact future consenting of discharges from the DCC's wastewater treatment and water treatment plants. Requirements will also impact future consenting of new and existing water takes. Anticipated impacts on DCC water supply activities include tighter controls on the DCC's ability to take water from the environment for drinking water supply purposes and a related emphasis on implementation of water efficiency and demand management measures in drinking water supply systems. Current water take consents do not expire until 2038-41. These changes will require major decisions regarding where and how raw water is sourced if surface water takes are reduced, how and where it is stored and used most efficiently.

The DCC holds resource consents to discharge treated wastewater to the environment for each of Dunedin's seven wastewater treatment plants, except for Mosgiel where treated wastewater is transferred to the Green Island wastewater treatment plant for further treatment before discharge to the ocean. Most resource consents the DCC holds to discharge wastewater are due to expire within the next 10 years. Projects are in progress to investigate practicable options to inform applications for new consents and to address anticipated new standards. Substantial changes to current wastewater management arrangements in Waikouaiti/Karitane, Warrington and Middlemarch are planned to better align with national and regional policy direction and Mana Whenua values, and to increase resilience to climate change impacts. This work relates to renewal of ageing infrastructure and improving outcomes in environmentally and culturally significant and sensitive areas. Wastewater infrastructure on the Northern Coast (eg. Waikouaiti/Karitane and Warrington) is also vulnerable to sea level rise. In addition, work is underway to reduce the volume of solid waste produced by the wastewater treatment process requiring disposal to landfill. These projects are described in section 4 'Our Plan'.

The DCC currently has five constructed wastewater network overflows authorised by resource consents. These overflows are designed to manage the public health risk in heavy rainfall events by allowing discharge of diluted wastewater to waterways at specific points in the network, rather than in an uncontrolled manner at low points in the network (including into private property). The consented overflows are signposted to alert the public to the potential risk of exposure to diluted wastewater in the event of heavy rainfall. As wastewater assets are renewed and upgraded, these overflows will activate less often with smaller discharges. The current overflow consents expire within 8 -18 years time. It is anticipated the quantity and quality of wastewater discharges will be subject to stricter requirements under future planning rules.

The DCC holds resource consents to discharge stormwater to the coastal marine area that expire in 2048. Key stormwater discharges are subject to environmental monitoring as part of consent requirements. Stormwater system planning has included a review of historical monitoring data, a broader environmental monitoring programme including the monitoring of freshwater bodies and updates and improvements to computer-based hydraulic models. Data from this and ongoing monitoring will be used to prioritise catchments for targeted improvement works to address stormwater quality and quantity issues. Where practicable, green

infrastructure approaches will be favoured. Under the current Regional Plan: Water, most of Dunedin's stormwater discharges to freshwater are permitted, subject to certain provisions. It is anticipated the quantity and quality of stormwater discharges will be subject to stricter requirements under future ORC planning rules, including requirements for discharges that are currently permitted to require resource consents.

A significant amount of the city is serviced for stormwater drainage by privately owned and maintained watercourses, open channels, pipes and streams. Where these private watercourses have been piped, many of the pipes are 100+ years old and in poor condition. As rainfall intensities increase this private infrastructure can sometimes no longer cope resulting in property damage, flooding, sinkholes and landslips. Developing solutions to complex watercourse problems is often beyond the means of most landowners. The Government has indicated that the Local Government Water Services Bill (expected Dec 2024) will provide new tools and clarification of roles and responsibilities to support stormwater management, including the management of overland flow paths and urban watercourses.

2.2 Looking after our assets - replacing and renewing Dunedin's ageing infrastructure

As one of the country's earliest metropolitan centres, some of Dunedin's three waters assets are more than 150 years old and still operate as essential pieces of the network today. As Dunedin has grown, so have three waters networks, resulting in widely distributed networks with a broad range of pipe materials, diameters and construction methods.

Some three waters assets require replacement based on their age and condition and the likelihood they will not be able to maintain service levels in the future. An example is old, earthenware pipes in our wastewater network that become cracked over time letting in groundwater and causing wastewater overflows, failing levels of service and not responding to climate change or weather events. Without continued spending on renewal of these assets they and their performance will deteriorate further.

The DCC is increasing spending on renewals over time. In some circumstances, 'like-for-like' renewals may no longer be enough to meet the needs and expectations of the community and regulators. This means it is likely the proportion of new capital against renewals funding will increase to allow for upgrades that provide capacity for growth and resilience to climate change impacts.

The DCC will manage the renewal and replacement of ageing infrastructure by planning to renew assets as they reach the end of their useful lives or are shown to be in poor condition; with an aim to increase the level of renewal delivery year on year. Where feasible pipes will be rehabilitated rather than completely renewed, using techniques such as re-lining. These techniques offer faster, less disruptive works and provide an environmentally acceptable and highly durable solution where appropriate and feasible. This extends the useful life of existing assets at a lower overall cost to ratepayers. Wastewater, stormwater, and water supply pipe networks can be rehabilitated using this approach. However, there may be areas where such methods are not feasible or won't deliver the desired project outcomes, such as increasing pipe capacity to support growth.

Renewals and rehabilitation are targeted in areas with the highest risk of failure and where possible are programmed to enable efficiencies between three waters and projects being undertaken by other areas within the DCC (e.g. road rehabilitation).

Assets reaching the end of their theoretical life don't always require replacement. Performance or condition may indicate that the asset can continue running beyond its theoretical life within acceptable levels of risk, especially for non-critical assets like the water tobies connecting each property to the water supply.

The DCC's planning focuses on assessments of asset condition, criticality, and risk, as well as planning and delivery opportunities to provide lasting value for residents, businesses and the environment through long-term asset solutions. Asset management planning is most efficient and effective when considering all options holistically, including renewals and upgrades. This approach can identify opportunities for systemic improvements, extending network life while maintaining service levels, and in some cases, achieving improved levels of service that add value to the community and the environment.

The DCC three waters reticulation, plant and civil assets, valued at \$3.956 billion and a current depreciated replacement value of \$1.577 billion as at the 30 June 2024 Annual Report. This plan's renewals spending significantly increases from previous 10-Year Plans due to the ageing asset base, which requires more renewals requirements and poses a risk of not meeting stated service levels as assets deteriorate. Higher capital expenditure budgets allow for a greater rate of renewals. To support this increased programme, the DCC has implemented new delivery models and established longer term contracts with contractors and service providers. Section 4 'Our Plan' provides more details on how we will deliver a capital expenditure programme to replace and renew ageing infrastructure.

2.3 Providing for infrastructure resilience

Flooding, drought, catchment fire, landslides, rising groundwater and ground movement and liquefaction in the event of an earthquake are the natural hazards posing the most significant risks to Dunedin's three waters infrastructure. It is anticipated that many of these risks will increase over time as a result of climate change.

The DCC is working to improve its understanding of natural hazards and for the resilience of its infrastructure into the future. Natural hazards pose a lesser risk when infrastructure is resilient.

We will manage the challenges posed by natural hazards by ensuring investment in renewals and new capital specifically considers reducing the risk arising from natural hazards, increasing resilience and where possible will consider adaptive planning.

2.3.1 Flooding and landslide

Some parts of Dunedin are susceptible to flooding and landslides during heavy rainfall. These events damages homes, businesses and infrastructure. More extreme rainfall events and storm surges may lead to larger and more frequent slips that can damage three waters infrastructure. As weather events become more frequent and severe the ability of infrastructure and the community's ability to recover will be put under increasing pressure.

Flood risks are due to several factors including :

- Rainfall events exceeding design tolerances
- Limited capacity in parts of the wastewater network as a result of inflow of rainwater and groundwater infiltration from ageing and cracked pipes and direct stormwater connections into the wastewater network
- Low-lying areas where the groundwater is close to the surface so rainwater cannot drain
- Catch pits can become blocked and creating a flooding hazard
- Roading infrastructure at low elevations can cause roads to be flooded or cut off

- Sea level rise, more extreme rainfall events and storm surges increasing the frequency of flood events in the future
- Manhole surcharging can create a safety hazard in flood events when manhole covers become dislodged.

Work to reduce inflow and infiltration into the wastewater system by replacing ageing pipe infrastructure is critical to building network resilience and reducing flood risk and potential threats to public health in flood events. Inflow occurs when stormwater enters the wastewater network through direct connections like manhole covers, while infiltration refers to groundwater seeping in through cracks or joints in the pipes. Excessive inflow and infiltration can overwhelm the wastewater system, especially during heavy rainfall, leading to overflows and increased treatment costs. Sealing manholes, prevents stormwater from entering the wastewater network, reducing the risk of overflow events.

2.3.2 Drought

Prolonged periods of drought pose a risk to Dunedin's water supply. Water demand increases during these periods while drier water catchments yield less water and are more prone to large-scale fires. Catchment fires can result in highly turbid water that is more expensive to treat or is unable to be treated by existing treatment processes. Higher mean temperatures increase the risk of algal blooms within raw water reservoirs, which may require expensive treatment. In addition, odour issues at wastewater treatment sites and within the wastewater network are more likely at higher temperatures. Lower water yield in periods of drought impacts raw water reservoir levels. Water use restrictions are used to balance supply and demand on the network and were put in place in Port Chalmers, Outram, Waikouaiti and Karitane during the summers of 2023 and 2024.

2.3.3 Earthquake

Seismic activity can cause widespread damage to infrastructure. Destruction of critical built infrastructure such as dams, treated water reservoirs (dams), treatment plants and displacement of piped infrastructure can render three waters systems inoperable and unable to deliver clean drinking water or to transport and treat wastewater safely. Liquefaction can cause more damage to underground pipes than ground movement and is a significant contributor to pipe failure in earthquakes. Dunedin has several areas with moderate to high likelihood of liquefaction in an earthquake.

Seismic activity could also cause isolation across the transport network if certain areas are cut off due to rubble, slips, liquefaction or land displacement. Dunedin is vulnerable to isolation given the limited number of routes in or out of the city. Dunedin is predominately serviced by a motorway inwards from the north and a motorway inwards from the south with the alternative route from the north on Mt Cargill Road. Dunedin's Akatore fault has potential to disrupt the network to the south of the City. Disruption of transport links would likely slow the rate at which three waters services can be restored, as suppliers and materials will either not be able to reach Dunedin, or will have to follow alternative routes (e.g. shipping).

2.3.4 Climate change

The effects of climate change are more becoming more evident and more frequently experienced. Climate change impacts include more extreme rainfall events, causing increased frequency and severity of flooding, while experiencing less rainfall overall can impact on water supply. Dry periods increase water demand, the risk of drought and catchment fire (which impacts on drinking water quality). Rising sea levels pose risks for infrastructure located at or near sea level. Managing risks and building resilience within our three waters infrastructure to protect both our assets and the assets and wellbeing of the community is a priority, as is

ensuring three waters systems play their part in reducing greenhouse gas emissions to support efforts to reduce the severity of climate change (see 2.5 below). As weather events become more frequent and severe, the ability of infrastructure and communities to recover will be put under increasing pressure. The DCC's Climate-related significant forecasting assumptions for the 2025-34 9 Year Plan have informed the development of three waters asset management plan and the infrastructure strategy.

Dunedin has significant low-lying areas that are within 0.5m of the current spring high tide mark (estimated at 2,684 Dunedin homes, 116 business and 35km of roads -Source: Parliamentary Commissioner for the Environment (2015) Rising Seas).

Older people and vulnerable populations find it more challenging to manage the impacts of natural hazards. South Dunedin has an increasingly ageing population and one of the highest deprivation index demographics in the country.

Rising groundwater as a result of sea level rise in low-lying areas is a significant risk facing Dunedin from climate change. High groundwater can cause problems such as increased frequency of flooding, boggy ground and surface ponding, damage to infrastructure and buildings, and a risk of liquefaction in earthquakes along with associated social wellbeing issues. This is a factor in flooding in South Dunedin. The DCC 3 Waters Group is working with the South Dunedin Future (SDF) programme in assessing and selecting adaptation pathways for South Dunedin.

2.4 Meeting our changing needs - responding to changes in demand for infrastructure

The DCC is preparing for growth through three waters asset capacity assessments and targeted capital works. Factors such as population growth, economic growth, housing development rates and locations will impact infrastructure demand. Effective asset management involves investments that address both service levels and future capacity while simplifying complex networks to reduce future repair and maintenance costs.

The DCC's 2025-2034 9 year plan significant forecasting assumptions for economic growth, demographic change and housing requirements have informed the development of our 30-year infrastructure strategy.

Dunedin's population is expected to grow over the next 10-20 years. The DCC adopted a high-medium growth scenario for Dunedin's 9 year plan 2025-34, assuming high growth from 2025-34 and medium growth from 2035-55.

Dunedin faces several issues within its three waters networks, including:

- Water availability in summer in some parts of the city due to high demand and drought, resulting in use restrictions;
- Ageing infrastructure causing leaks and overflows;
- Network capacity issues, leading to stormwater flooding in heavy rainfall events.

Significant work is needed to address these constraints and support future development. Projects to upgrade infrastructure are included in the 2025-34 plan, such as replacing and upgrading water, wastewater and stormwater pipelines, and improving pumping stations and treatment plants.

2.4.1 Impact of the National Policy Statement on Urban Development and Dunedin Future Development Strategy

The strategic priorities for urban growth and development over the next 30 years are given in the Dunedin Future Development Strategy 2024 – 2054 (FDS). The strategy was adopted in April 2024. The FDS informs Dunedin's 9 year plan 2025-34 and the ORC Long Term Plan 2024-2034 regarding Dunedin's future growth.

The FDS guides future changes to RMA planning documents (such as Dunedin's District Plan – the 2GP) and other planning decisions that affect the urban environment. It also influences infrastructure planning and funding decisions made by the DCC and ORC in their long term plans and infrastructure strategies, and the Regional Land Transport Plan. It includes policy guidance to help prioritise and plan investment in infrastructure. The FDS identifies three waters upgrades required to service existing development capacity, proposed future urban development areas, and outlying townships and settlements, based on these priorities. They include upgrades that reflect the aspirations and intent of iwi and outlying communities (although the timeframes to deliver these may be longer term). It also includes a clear statement of iwi and hapū values and aspiration for urban development.

Upgrades of infrastructure are required to service development that is provided for under existing District Plan rules.

- Consistent with the priority approach outlined in NPS -UD 2020 Policy 1 (Section 5), we are prioritising these upgrades to maintain or restore minimum levels of service and performance and provide for the development capacity that is enabled by current 2GP rules, considering also the pace and timing of growth.
- Dunedin is also required, at all times, to provide at least sufficient development capacity to meet expected demand for housing and for business land over the short, medium and long term under NPS-UD (Policy 2).

The FDS includes details of the current constraints on growth in the three waters network, and the upgrades required to address these constraints and support a well-functioning urban environment are documented as well as guidance on prioritising upgrades.

The costs to address the constraints in our network are significant, and all problems cannot be addressed immediately. We are prioritising upgrades required to service development that is provided for under existing plan rules and to maintain or restore minimum levels of service and performance.

Works to support expected growth are included in Dunedin's 9 year plan 2025-34 and will be provided in years 1 to 9. This includes significant replacement of and upgrades to water, wastewater and stormwater pipes, new and upgraded pumping stations, and upgrades to the city's wastewater and water treatment plants.

Further information about three waters upgrades to support the FDS can be found in sections 6.3.1.3 - 6.3.1.7 of the FDS document which is available on the DCC website: <https://www.dunedin.govt.nz/Future-Development-Strategy-2024-54.pdf>.

2.4.2 Planned increases or decreases in levels of service

Levels of service describe the standards for management and maintenance of the water supply, wastewater and stormwater systems and are a requirement of the Local Government Act 2002. The DCC sets levels of service in consultation with its community as part of the long-term plan process. This provides transparency and confidence for the public and other stakeholders that the system can support lifestyle and business needs and is well managed. They consist of a service statement, measure, and target.

No changes are proposed to the DCC's three waters levels of service in the 9 year plan 2025-34. The levels of service for three waters are based on the mandatory non-financial performance measures introduced by the Department of Internal Affairs in 2013 (as updated in 2024 to reflect changes in the drinking water regulatory system). New drinking water standards and drinking water quality assurance rules are already in place and administered within existing service levels.

Core service levels for three waters activities are: providing safe drinking water; reliability of supply; the adequate performance of networks; and the impacts of three waters discharges and overflows on the environment. These are measured by customer and technical performance measures.

There is limited funding in Dunedin's 9 year plan 2025-34 for upgrades arising from any changes to regulatory standards. Future, unanticipated three waters reform could result in enhanced standards for the quality, quantity and management of drinking water, or require improvements in wastewater or stormwater management. We do not anticipate significant regulatory changes that would required enhanced standards at this time.

2.4.3 Building resilience to natural hazards

DCC has improved its understanding of natural hazards to assist in developing options for resilient infrastructure into the future. The DCC is working in partnership with other agencies such as GNS Science and ORC to further enhance our understanding of natural hazards including groundwater and impacts of sea level rise, particularly in South Dunedin.

The South Dunedin Future (SDF) programme began in 2021 as a response to issues in South Dunedin in partnership with the ORC. The programme involves long-term planning to adapt to the effects of climate change. Aligned with this, the DCC, through its system planning programme has been improving monitoring of flows in stormwater and wastewater networks and improving the accuracy of computer hydraulic models of wastewater and stormwater networks, as well as investigating improvements to stormwater pump stations. The DCC 3 Waters Group will integrate with the SDF programme in assessing and selecting adaptation pathways for South Dunedin and will be responsible for implementing those adaptation options involving three waters infrastructure.

System planning is contributing to building resilience to natural hazards. The programme takes an adaptive approach to investment, planning for natural hazards and ensuring resilient solutions are implemented. System planning outputs have been used to inform the 2025-34 9 year plan, and early work is planned to increase resilience to some water supplies and target metropolitan wastewater treatment plant wet weather flow management in the 2025 -2034 capital programme.

The DCC is an active participant in the Alpine fault quake resilience (AF8) programme. This is a scenario-based planning project, managed by the Ministry of Civil Defence and Emergency Management, with the intention of preparing plans to respond to a major earthquake on the Alpine Fault.

2.5 Delivering on our city and DCC emission reduction targets

In June 2019, the Council declared a climate emergency and adopted the 'Zero Carbon 2030' target, which seeks, at a city level, to reach net zero greenhouse gas emissions by 2030 (excluding biogenic methane), and reduce biogenic methane emissions in line with Government targets.

Net zero' means greenhouse gases that we emit into the atmosphere (excluding biogenic methane) are in balance with the amount of carbon dioxide absorbed by forests. Biogenic methane is methane produced and released from living organisms like plants and animals. The city's biogenic methane reduction targets are the same as the central government targets as follows:

- 10% reduction from 2017 levels by 2030.
- 24-47% reduction from 2017 levels by 2050.

Council also adopted targets for its own organisation's activities gross emissions, as follows:

- By 2026/27, a 30% reduction in annual emissions from the 2018/19 baseline of 84,216 tCO₂e.
- By 2030/31, a 42% reduction in annual emissions from the 2018/19 baseline of 84,216 tCO₂e.

Council's Zero Carbon Policy adopted in 2022 mandates that the DCC's activities minimise emissions to help achieve both the city and Council emissions reduction targets. Our Zero Carbon Plan 2030, adopted in 2023, set out the pathway to Zero Carbon 2030 and identifies the city-wide outcomes, changes and the DCC's actions required to bring about those changes. The Plan focuses on reducing gross emissions where possible, rather than relying on sequestration alone. This aligns with the Zero Carbon Policy, best practice for developed countries, and with what scientists suggest is necessary to avoid the worst impacts of climate change.

2.5.1 Why Dunedin's infrastructure is important for Zero Carbon targets

Reducing emissions associated with infrastructure is necessary to achieve global climate goals. Infrastructure is associated with an estimated 79% of total greenhouse gas emissions worldwide. Most of these emissions are from energy, buildings, and transport, while water, waste management, and digital communications also contribute. Emissions occur at all stages of the infrastructure lifecycle, including from construction materials, transport of materials and workers, operation of the asset, and use of equipment for maintenance and decommissioning. The long life of infrastructure assets and the high costs of replacing or changing them can mean decisions made today result in emissions for years to come, and existing infrastructure and urban form can lock in long term behaviour and emission impacts for generations.

Three waters infrastructure impacts city-wide emissions in several ways. A significant impact is the availability of servicing in various parts of the city. This shapes urban form, which in turn impacts transport sector emissions.

Urban intensification (particularly around the CBD, urban centres and along public transport routes) supports and promotes low emission transport systems. The DCC's overall urban form objective of a 'compact city with resilient townships' is intended to be achieved through consolidation and prioritising use of existing capacity within existing urban areas. Rules in the 2GP currently restrict development in some new medium density areas due to constraints in the three waters network, and the degree to which additional intensification is achievable is similarly limited in some locations by three waters network capacity.

Three waters infrastructure also directly generates emissions. An emissions baseline for existing plant and network operations has been established. Emissions sources are as follows:

- Biological processes from wastewater treatment were assessed as being responsible for approximately 0.8% of the city's emissions in 2021
- Some sludge generated in wastewater treatment processes is currently sent to landfill, contributing to solid waste emissions
- Diesel, chemicals and energy used in distribution, treatment and disposal processes associated with three waters networks all contribute to stationary energy sector emissions

- Construction and maintenance processes associated with the three waters network also contribute to the city's emissions profile.

Emissions have not always been a key consideration in the design of three waters plant and network infrastructure, meaning the existing plant and network configuration is not optimised to minimise emissions. The need to prioritise reactive operational expenditure, to address process challenges and compliance risks, hinders the significant investment needed to minimise emissions.

Biosolids management and disposal, as well as increases in treatment standards for water and wastewater, are likely to result in more intensive treatment processes and to drive increases in energy demand. It is currently unknown how much these requirements may hold up emissions reduction efforts, but this may be significant. However, system planning identified a range of opportunities to manage down emissions while also delivering on strategic goals.

2.5.2 The DCC's work to reduce emissions associated with 3W infrastructure

Since the 2021-31 10 year plan was adopted, significant work has been undertaken to identify and prioritise opportunities for emissions reduction associated with wastewater emissions. The DCC has also developed policy and processes to ensure that emissions reduction is supported and prioritised as part of business-as-usual.

The Zero Carbon Policy 2022 will assist with reduction of emissions associated with three waters infrastructure projects, including renewals. It sets out key principles that guide the DCC's emissions management and minimisation practices, including considering and minimising the city-wide emissions impact of a proposed asset/activity early in the project lifecycle, escalating the decision if a proposed activity/asset is identified as likely to increase city-wide emissions; preferring options that contribute most to city-wide emissions reduction targets, minimising whole-of-life emissions; minimising exposure to climate change risks; and clearly reporting emissions considerations in decision making. To give effect to the Zero Carbon Policy, the DCC is integrating emissions reduction considerations throughout its procurement and project management processes.

The Zero Carbon Plan 2030 (an emissions reduction plan for Dunedin) focuses on tools and initiatives proven to work in other cities or suggested through community engagement, because achieving the city's targets means taking action now. Reducing emissions associated with three waters activity is also a key focus of the DCC's Emissions Management and Reduction Plan 2023/24-2030/31 (EMRP). Many of the actions in both plans will reduce costs in the medium and longer term, but there will be upfront costs.

Both the Zero Carbon Plan 2030 and the EMRP—emphasise reducing emissions from energy use associated with three waters infrastructure, and reducing wastewater processing emissions. A key focus over the next decade will be beneficial re-use of biosolids, which are the main component of DCC three waters-related carbon emissions. A planned upgrade of Green Island WWTP will also help reduce emissions from wastewater treatment processes within the decade. On the water supply side, targeted interventions include process optimisation to reduce chemical use, followed by lower emissions intensity energy sources associated with water supply. Planned water efficiency projects will also have flow on benefits for emissions reduction goals.

In the Zero Carbon Plan, there is an additional focus on supporting a compact urban form for Dunedin. Ensuring three waters infrastructure constraints are resolved for zoned medium density areas close to public transport and centres will assist with this objective.

Continuing to improve data quality for three waters is also necessary to support efforts to reduce emissions.

2.6 Living within our means - Financial prudence and affordability

Establishing an infrastructure strategy and funding programmes of works that are financially prudent and affordable to ratepayers is one of the most challenging aspects of our planning work. This requires managing risk around what is and is not prioritised, what can be reasonably expected to be funded and delivered while remaining affordable to the community, and continuing to deliver a sustainable level of asset management over short and long term planning timelines.

2.6.1 Financial Strategy

The Infrastructure Strategy is closely linked to the Financial Strategy. The Financial Strategy considers affordability for ratepayers and the DCC as a whole. The DCC has attempted to balance the competing tensions of affordability, maintaining assets and investing for the future, while addressing the financial challenges of increasing costs, delivering large capital projects and increasing piped network renewals. The Financial Strategy provides strategic financial limits for rates and debt and discusses other funding sources. The budgets increase rates and debt requirements, but do not exceed the limits over the next ten years. This guides decision making on Dunedin's 9 year plan 2025-34 funding, establishes the funding envelope or 'means' that each DCC activity operates within and the funds available for capital expenditure programmes.

2.6.2 Debt

The use of debt allows the financial burden of new capital expenditure to be spread across a number of financial years, recognising that the expenditure is on intergenerational assets, i.e., the assets have a long life and generate benefits both now and to future generations.

Debt is also used to fund the portion of capital renewals that is not covered by funded depreciation. The gross debt limit for this 9 year plan is set as 250% of revenue. This means that our debt level will be responsive to change and will move in line with the level of our activities. This revised debt limit will allow flexibility to deliver the planned capital expenditure programme, while also having capacity to fund potential unplanned events.

This debt limit is considered financially prudent, as it sits within the lending limits set by the Local Government Funding Authority (LGFA). The LGFA equivalent metric is based on net debt, where net debt is defined as gross debt less liquid financial assets and investments.

2.6.3 Managing within our means

There is an acknowledged nationwide three waters infrastructure deficit in renewals expenditure and replacement of ageing infrastructure. For Dunedin, this deficit is currently estimated at \$1,003M.¹ The DCC has developed renewals budgets to proactively and progressively reduce and remove the deficit in Dunedin's three waters networks across the term of the infrastructure strategy.

¹ Please note that the renewal capital expenditure amount corresponds to the allocation within the Council's capital expenditure programme, rather than the allocation outlined in the Funding Impact Statement.

The planned renewals expenditure over the life of Dunedin's 9 year plan 2025-34 is \$519.514M¹, and approximately \$3.55¹ billion over the life of the 30 year plan.

DCC three waters assets have a gross replacement value of \$3.956 billion and a current depreciated replacement value of \$1.58 billion (as at the 30 June 2024 annual report). Depreciation represents the using-up or consumption of our assets over their lifespan, and is offset by the value of our capital renewals work to replace assets as they reach the end of their service lives. Funding of renewals is stepped up in order to reduce the infrastructure deficit over the longer term. The deficit is shared proportionately between Water Supply 32%, Wastewater 44%, and Stormwater 24%.

Renewals as a percentage of cumulative depreciation across Dunedin's 9 year plan 2025-34 are Water Supply 67%, Wastewater 80%, and Stormwater 40% indicating a high level of renewals expenditure planned for wastewater. This reflects the higher deficit and the direct risk to public health and the environment from failures in wastewater network pipelines and potential impacts on stormwater in extreme rainfall events. Projected three waters renewals expenditure aims to reduce the infrastructure deficit down to zero by the end of the 30-year horizon of the Infrastructure Strategy.

Where funding is not available in Dunedin's 9 year plan 2025-34, the DCC will aim to manage risks within available budgets. This will be achieved through an increased focus on the monitoring of critical three waters assets and responding proactively to changes in condition and performance to ensure continued service delivery.

Monitoring and maintenance of older and poor-performing assets will be increased to keep them in serviceable condition for longer, and renewal capital will be targeted toward assets at highest risk of failure. While this approach will reduce the amount of capital expenditure required in the short term, it will lead to increasing operational expenses as repairs are undertaken on assets that would otherwise have been replaced. Additionally, if this approach is retained longer term, asset failures will increasingly begin to impact on service levels. Amendments will be made to the capital programme in this plan over its lifetime as new requirements become known and quantifiable, and capital projects are scoped to address any new deficiencies arising.

This strategy addresses the renewals backlog and seeks to balance asset risk in a pragmatic and affordable way. The planned 30 years phased approach means that there will be a modest reduction in the total backlog (approximately 4%), over the life of the 9 year plan 2025-34. However, our focus in the first nine years will be to prioritise renewals at highest risk such as at our treatment plants. Beyond the 9 year period, a reprioritisation in capital expenditure will be required to address the remaining backlog by the end of the 30-year horizon of this strategy.

Whilst the risk that critical assets may fail during the 9 year period may be high, we believe that this risk is mitigated as we have significantly increased our provision for repairs and maintenance over the term of the 9 year plan. We will also increase focus on the monitoring of critical assets and respond proactively to changes in condition and performance to ensure continued service delivery. This allows our focus to remain on planning for the renewal of critical assets before a deterioration in their condition materially impacts on service levels and the environment. Forward planning will also ensure that the capital needed to fund the work (both debt and rates), and the contractors required to do the work, are in place.

3 OUR PERFORMANCE – HOW WE ARE DOING

Our service provision is generally strong, but there are significant areas needing improvement. Some assets are in poor condition, and in certain cases, we lack sufficient information about their status. Additionally, we face several performance challenges that must be addressed to ensure reliable and efficient services.

For instance, our water supply network, despite delivering high-quality drinking water, struggles with capacity issues due to ageing infrastructure, leading to water supply losses and difficulties in meeting demand during peak summer periods. Our wastewater systems, although functioning well in dry weather, perform poorly during wet weather, resulting in overflows and a large carbon footprint. Similarly, our stormwater systems often fail to meet capacity levels of service, with limited treatment and contaminant removal capabilities. These issues highlight the need for targeted interventions to enhance our infrastructure and service delivery, ensuring we meet both current and future demands effectively.

It is important to note that the funding allocated in Dunedin's 9 year plan 2025-34 does not aim to renew all assets before they fail. Such an approach would be neither economically feasible nor practical. Instead, renewals are prioritised based on asset criticality, and failure rates. Allowing non-critical assets to fail before replacement is an approach that can improve affordability while adequately managing risk. Funding over the 30-year infrastructure strategy period is calibrated to meet these renewals and address historically deferred renewals, ensuring the DCC can maintain service levels in the future.

3.1 Water supply

The DCC provides high-quality drinking water that complies with Water Services (Drinking Water Standards for New Zealand) Regulations. However, ageing infrastructure in some areas reduces network capacity and fails to meet current requirements, such as minimum flows for firefighting, particularly in cast iron mains where tuberculation reduces flows. Urban growth and development, as planned in the FDS and enabled under District Plan provisions, are constrained by network capacity in some areas. Dunedin's 9 year plan 2025-34 includes expenditure to address these constraints. Some smaller, rural plants require improvements to ensure resilience and reliable compliance with more rigorous regulatory standards. Most non-compliances with recently strengthened standards have been technical non-conformances, related to missed manual samples or outages in automated data collection systems. The DCC remains confident that the water supplied to consumers is safe to drink but recognises that further work required to consistently meet all compliance requirements.

3.1.1 Condition of Water Plant and Civil (Built) Assets

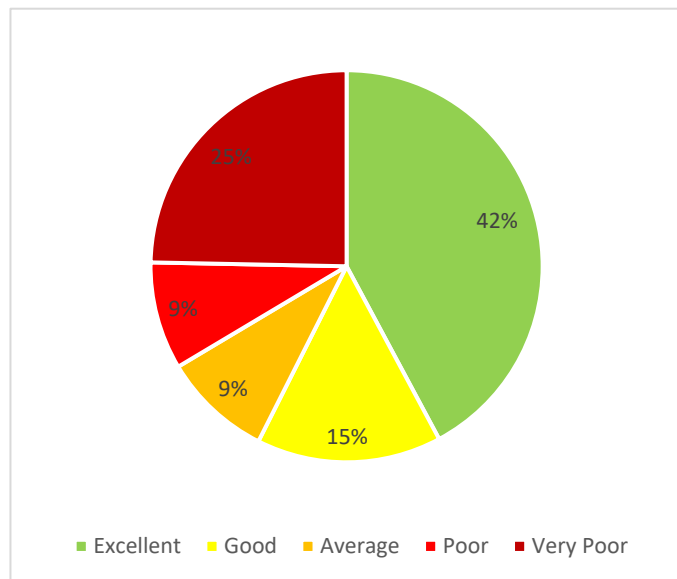


Figure 1: Age-based condition of water supply plant and civil assets

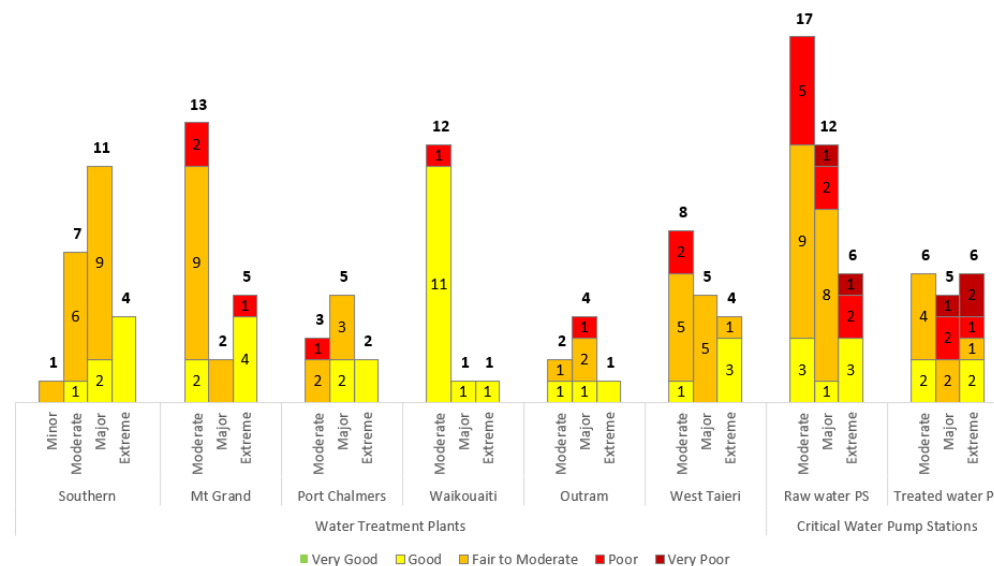


Figure 2: Assessed condition of critical water assets, grouped by criticality rating (Minor/Moderate/Major/Extreme) and site

The charts above show the condition of water supply plant and civil (built) assets. The chart on the left (Figure 1) shows the assumed condition of these assets based on how far through their useful lives they are. For example, if an asset is 85% or more through its expected useful life, it is considered to be in poor or very poor condition. Currently 34% of water supply plant and civil assets, (by replacement value, fall into this category).

The chart on the right (Figure 2) represents the condition assessed through direct observation, focusing on critical assets at critical sites only (critical assets being those assessed as being 'moderately critical' or above). The assessment indicates approximately 90% of these assets across the six water treatment sites are in fair to very good condition. Works are underway to replace the remaining 10% of critical assets in poor condition. Six highly critical raw water pump station assets are in poor or very poor condition, with half located at the Puddle Alley pump station, where works are programmed for 2025/26. Among treated water pump stations, several highly critical assets are in poor or very poor condition. Additionally, 75% of the critical pump station assets identified as being in poor condition have reached or exceeded their lifespan. Replacement works are either underway or planned, with budgets allocated for these projects in the 9 Year Plan 2025-34.

3.1.2 Condition of Water Network Assets

The average age of Dunedin's water pipelines is 49 years, with an average total expected useful life of around 80 years depending on the pipe material and diameter. Older pipes are more prone to leakage, loss of fire flow capacity, and aesthetic water quality issues, such as discolouration, sedimentation, and odour complaints due to higher chlorination levels needed to address biological build-ups, particularly in cast iron mains.

Water pipe conditions are assessed by removing small sections of pipe for inspection. CCTV filming is not commonly used because it requires taking the assets out of service. Data on material, age, condition, performance, location, capacity, criticality and remaining useful life is collected for three waters assets. DCC staff routinely inspect treatment plant assets to ensure proper maintenance, with specialist engineering advice used as needed. The following map (Figure 3) indicates the current state of water supply reticulation infrastructure.

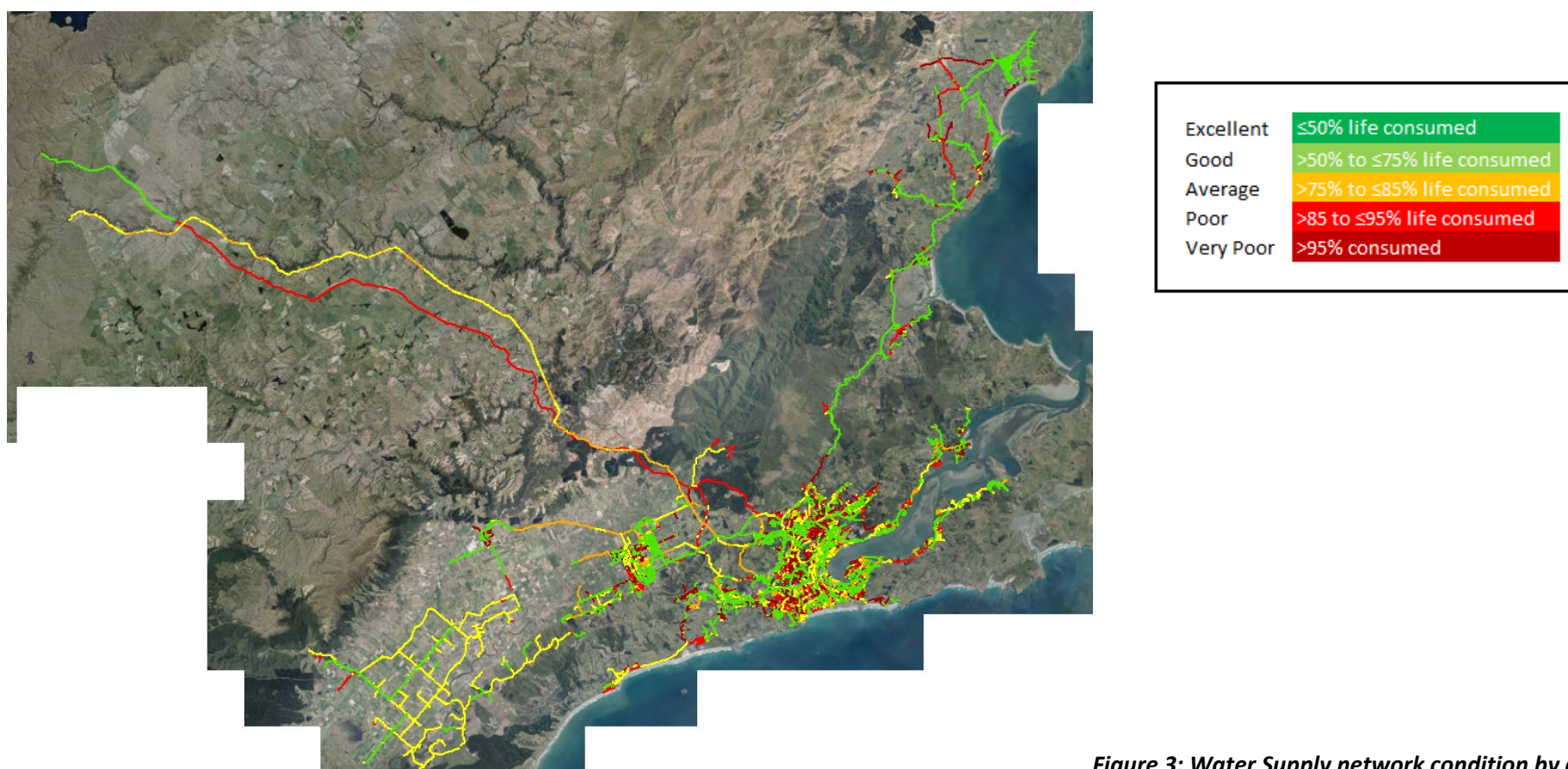


Figure 3: Water Supply network condition by age

Figure 3 shows water supply network (reticulation) assets by age. Red indicates our oldest water main assets which are beyond 85% of their expected lifespan. These are generally in the older parts of our city that received reticulated services first. 29% of our water mains are classified as being in poor to very poor condition. Much of our work programme focuses on renewing these older pipes to ensure continued reliable service. Work programmes prioritise assets in poorest condition, with renewal priority based on age and break history.

Figure 4 shows the number of water main breaks per month as a 12-month rolling average. The trend indicates an increase in breaks over time (as shown by the dotted line) which is expected where renewals have lagged behind depreciation over time.

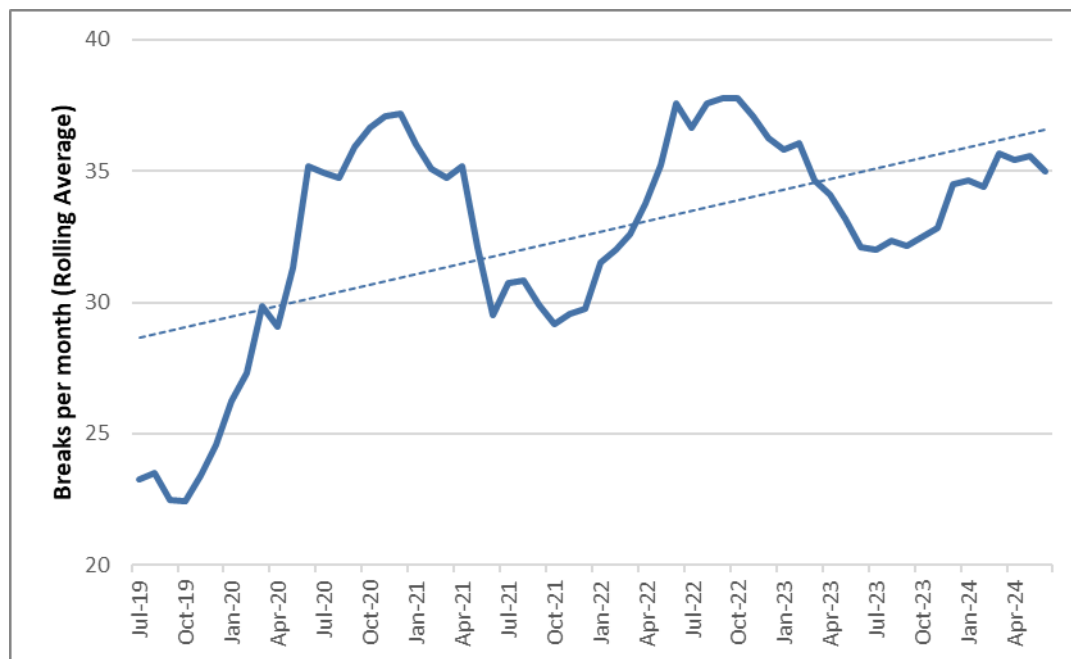


Figure 4: Number of water main breaks (12 month rolling average)

3.2 Wastewater

The performance of Dunedin's wastewater systems varies with age. Our wastewater systems generally operate as designed during dry weather, safely transporting, treating and discharging treated wastewater. However issues arise during wet weather, with severity increasing with rainfall. While most of the city's wastewater treatment plants are in reasonable condition, many mechanical and electrical components are reaching the end of their useful life, affecting operational performance and staff safety. Some plants face challenges meeting current consent conditions, resulting in non-compliance or abatement notices. Several areas of the wastewater network are in poor condition due to ageing pipes, leading to stormwater and groundwater infiltration. During heavy rainfall, this can cause wastewater overflows and insufficient treatment before discharge as treatment processes are overwhelmed. These issues constrain urban development in some parts of the city, with improvements needed to support development.

Wastewater treatment, including energy-intensive processes, biosolids production and biogenic methane, is the DCC's largest carbon emitter. Significant work, including developing a dedicated bioresources handling facility is planned (see section 4 'Our Plan').

Currently, CCTV inspections are completed in response to reported issues or when an asset is due for renewal. This approach skews the data toward assets in poor condition, making it an unreliable indicator of overall network condition. Network performance is a more reliable indicator.

With an average age 62 years, ageing wastewater pipes are causing varying issues for residents, particularly in older areas like Kaikorai Valley, North East Valley and South Dunedin. Renewals are underway in North East Valley and Kaikorai Valley. Renewals in South Dunedin have not commenced due to the complex interactions between groundwater, stormwater and wastewater. There is some evidence to suggest that South Dunedin's ageing wastewater infrastructure acts as a series of field drains, artificially lowering groundwater levels. The South Dunedin Futures project has examined these interactions and will guide renewals in both wastewater and stormwater networks to improve services without adversely impacting properties.

Inflow occurs when stormwater enters the wastewater network through direct connections like manhole covers, while infiltration refers to groundwater seeping in through cracks or joints in the pipes. Excessive inflow and infiltration can overwhelm the system during heavy rainfall, leading to overflows and increased treatment costs. Larger issues arise from inflow and infiltration of ground and surface water into older pipes, leading to surcharges, where network flows exceed capacity, creating pressure at access holes and flooding treatment plants.

Renewal programmes focus on reducing inflow and infiltration to minimise wet weather overflows and treatment plant washouts, which reduce treatment capacity and can lead to consent breaches. At pump stations, the aim is to increase reliability to maintain network performance, while renewals at treatment plant focus on compliance with resource consents and reducing health and safety risks.

3.2.1 Condition of Wastewater Plant and Civil (Built) Assets

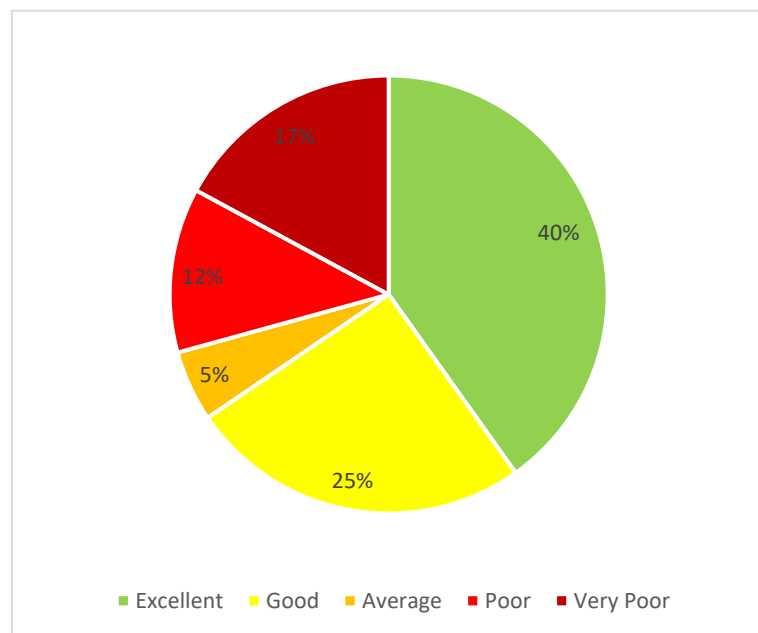


Figure 5: Age-based condition of wastewater plant and civil assets

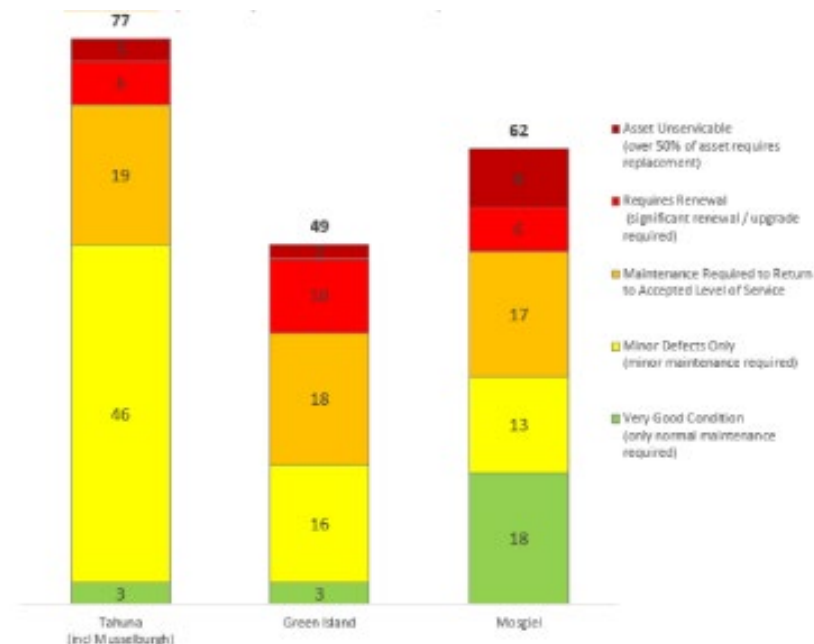


Figure 6: Assessed condition of metropolitan wastewater treatment plant assets, grouped by criticality rating (Minor/Moderate/Major/Extreme) and site

The charts above show the condition of wastewater plant and civil (built) assets. The chart on the left (Figure 5) shows the assumed condition of these assets based on age. Currently, 29% of wastewater plant and civil assets, by replacement value, are considered to be in poor or very poor condition due to their age.

The chart on the right (Figure 6) represents the condition of metropolitan treatment plant assets, as assessed through direct observation. The assessment indicates that approximately 82% of assets across the treatment sites are in fair to very good condition. Treatment assets at rural plants (not shown here) are generally in reasonable operating condition, with the exception of the Middlemarch WWTP which is programmed for upgrade in the short term, and Seacliff which has recently been refurbished. Wastewater pump station assets are routinely inspected as part of normal operations. The condition of pumps is assessed during programmed plant maintenance inspections, however formal condition grades are not assigned during this inspection. Works are underway or planned to replace assets in poor condition.

3.2.2 Condition of Wastewater Network Assets

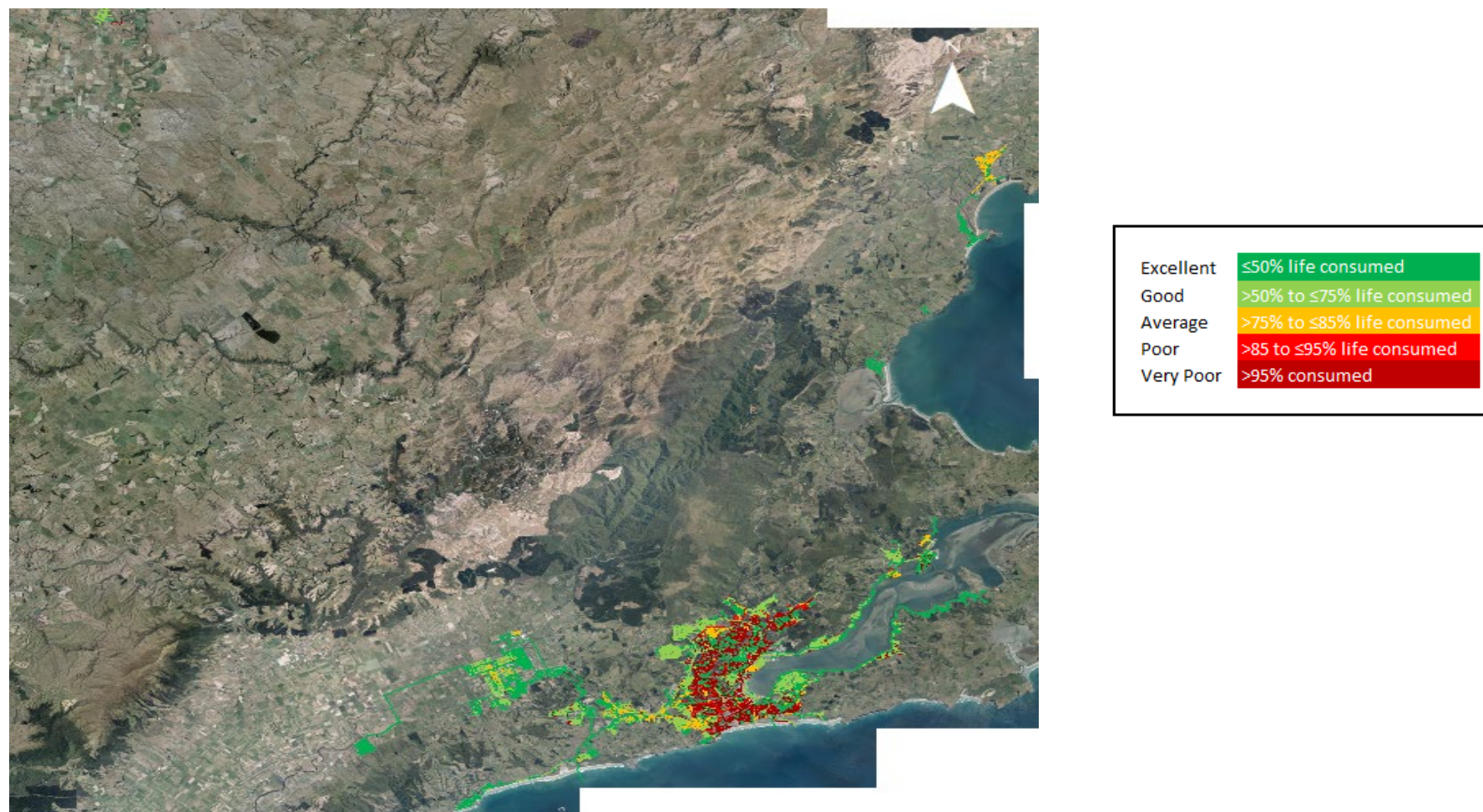


Figure 7 Wastewater network condition by age

Figure 7 above shows wastewater network (reticulation) assets by age. Assets marked in red are the oldest, having exceeded 85% of their expected lifespan. As with water, these older assets are typically located in the older parts of our city. 30% of our wastewater mains are classified as being in poor to very poor condition. Our work programme primarily targets the renewal of these ageing pipes to maintain reliable service. We prioritize assets in the poorest condition, with renewal decisions based on age and break history.

The figure below shows the number of blockages per month as a rolling 12-month average. The dotted line indicates a decreasing trend in monthly blockages and breaks, reflecting the DCC's efforts to reduce wastewater overflows by focusing on areas with older infrastructure susceptible to inflow and infiltration.

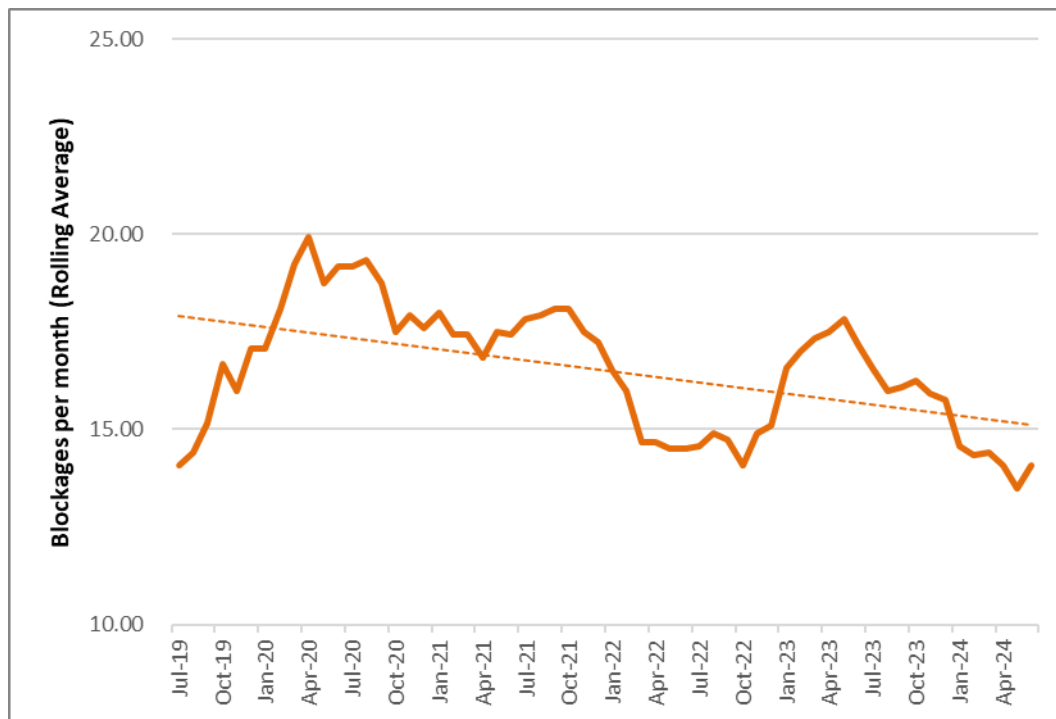


Figure 8: Number of wastewater blockages (12 month rolling average)

3.3 Stormwater

Stormwater services in the city are provided by the DCC, Otago Regional Council (ORC) and private landowners through open and piped watercourses and infrastructure. During heavy or prolonged rainfall, the drainage network in some areas underperforms, causing surface flooding and property damage. Peak stormwater flows are increasing due to climate change, which makes rainfall more intense and raising ground water levels in some areas.

Many areas experiencing capacity issues have seen significant change in use or density, or upstream development since the networks were first installed. Differing service levels design parameters for neighbouring borough councils prior to 1980s amalgamations also contribute to the issues. As a result, and acknowledging that development increases impervious surfaces and affects flow paths, the DCC now requires properties with significant development impacts on stormwater to undertake an assessment. This may require a stormwater management plan to ensure that post-development flows do not exceed pre-development levels. This approach allows for growth while ensuring it does not negatively affect the existing stormwater service level. Unreported development on private property, such as additional decking, paths, or sheds increases impervious surfaces and can cumulatively reduce the network's ability to meet service levels.

Issues also arise when private watercourses are not maintained or when private pipes are too small to safely convey flows. The integrated system plan includes an assessment of the quantity and criticality of private stormwater assets (e.g., watercourses) interacting with the DCC's network.

The average age of stormwater pipes owned by the DCC is 65 years. With little to no information on the nature of privately owned infrastructure it is impossible to determine how old these assets are, but they are likely to be similar, or older than surrounding structures.

The current provision of stormwater services is below target levels in some areas of the city. Climate change is intensifying rainfall, further exacerbating this issue, and in some areas, shallow groundwater limits soil storage capacity. These factors will make it more difficult to meet desired stormwater service levels in the future, requiring additional investment stormwater infrastructure to maintain existing service levels. To support this, DCC is focusing on renewing assets and initiating new projects to address current service level issues. Following previous floods, improvements are planned for the most heavily affected areas such as South Dunedin and Mosgiel. Work programmes to support planning are in place, such as the development of flood hazard assessment models for urban areas of Dunedin, new stormwater models for North East Valley and Kaikorai Valley, and improvement to the accuracy of stormwater hydraulic models in South Dunedin for planning and operational purposes.

Current service provision includes little infrastructure to improve stormwater quality before discharge or prevent contaminants from entering the stormwater system. Future regulatory changes are expected to require increased levels of stormwater treatment to protect receiving environments. Contaminants can enter stormwater from multiple sources including roadways and footpaths, roofs, and cross-connections. Most sources of contamination are outside the control of the DCC and will require treatment, but some sources, such as cross connections, can be identified and addressed either through capital works, or enforcement actions.

3.3.1 Condition of Stormwater Plant and Civil (Built) Assets

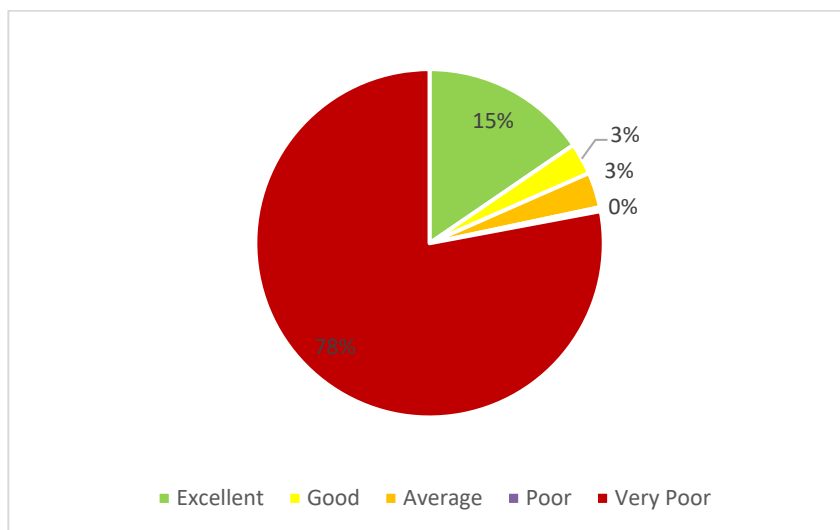


Figure 9: Age-based condition of stormwater plant and civil assets

Figure 9 shows the assumed condition of stormwater plant and civil (built) assets based on age. Currently, 78% of our stormwater assets, measured by replacement cost, are in very poor condition. Three-quarters of these assets by value are concentrated at the main Portobello Road pump station. Modifications and upgrades to this pump station will be considered as part of the South Dunedin flood alleviation programme, pending the outcomes of the South Dunedin Futures (SDF) project. A further 12% of the remaining assets in very poor condition are located at the Reid Avenue stormwater pump station, which is programmed for upgrade in the early years of the programme. Stormwater pump station assets are routinely inspected as part of normal operations. The condition of pumps is assessed during programmed plant maintenance inspections, however formal condition grades are not assigned during this inspection.

3.3.2 Condition of Stormwater Network Assets

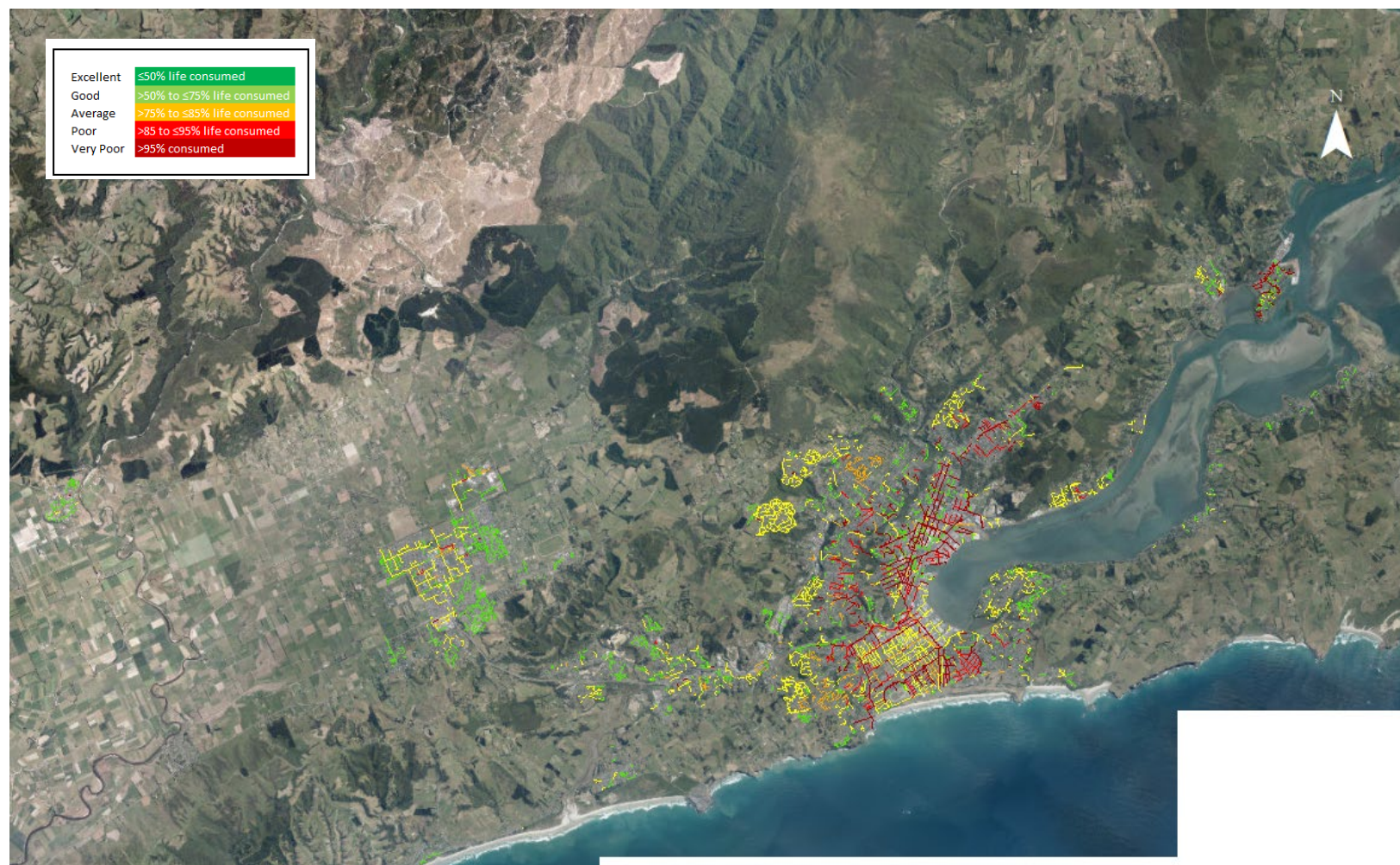


Figure 10: Stormwater network condition by age

Figure 10 shows stormwater network (reticulation) assets by age. Assets marked in red are the oldest, having exceeded 85% of their expected lifespan. As for water and wastewater, these older assets are typically located in the older parts of our city. 61% of our stormwater mains are classified as being in excellent to average condition (less than 85% through their lifespan). Our work programme primarily targets the renewal of these ageing pipes to maintain reliable service.

4 OUR PLAN – THE APPROACH TO DELIVERING OUR CAPITAL PROGRAMME

4.1 The plan to address Dunedin's three waters infrastructure challenges over the next 30 years

Significant work is required to enlarge and expand Dunedin's existing three waters infrastructure to meet the expected changes in population growth and housing demand. Renewals programmes and specific projects are also needed to address risks to health and safety, public health, levels of service and the environment, and to respond to new regulatory requirements.

The DCC will manage the response to changes in demand for infrastructure by planning and investing for a high growth scenario over 2025-34, and a medium growth scenario from 2035 to 2055. The 2025-34 capital programme is funded to investigate, design and construct new infrastructure required to service the housing capacity enabled by the 2GP and some of the desired growth signalled in the FDS. The delivery of new infrastructure to support this housing capacity will be undertaken within the first 10 years of the programme and will be prioritised based on demand in different areas. Areas with a lower demand for infrastructure and those future areas identified by the FDS as being required beyond the next 10 years will be delivered over a longer period.

In the short term, renewals are required at water treatment plants to ensure they continue to meet the Water Services (Drinking Water Standards for New Zealand) Regulations 2022. Work will also commence on improving the efficiency of our water use through initiatives such as demand and pressure management that will aim to reduce water losses. Major renewals within the wastewater network and treatment plants are needed to ensure discharges will remain compliant and to provide a safe working environment for operational and maintenance staff. As resource consents for discharge of wastewater expire, investigations into the capacity of infrastructure, a focus on environmental outcomes and working in partnership with Iwi will allow the best practicable options for new resource consents to be achieved. The DCC will invest in flood alleviation measures in South Dunedin and Mosgiel, increase water supply resilience for Mosgiel and Port Chalmers, carry out resilience focused upgrades at water treatment plants and pump stations and improve wet weather flow management of the wastewater networks.

In the medium term, water treatment plants will be upgraded as budgets allow to meet anticipated ongoing improvements in drinking water standards. Major renewals of water supply pipelines from Deep Stream and Deep Creek will also be undertaken to improve drinking water system resilience. Our system planning work has identified that new water sources will be required within the latter stages of this Infrastructure Strategy, as well as substantial raw water storage, to ensure that minimum flows in existing rivers can be maintained and Dunedin has sufficient water available in dry periods. There will be increased use of green infrastructure for managing stormwater, improving flood resilience and stormwater quality. This will benefit the health of freshwater and coastal waters and provides an opportunity to create more greenspaces for Dunedin residents to enjoy.

Within the timeframe of this Infrastructure Strategy, most DCC three waters-related buildings and structures will require significant upgrades or replacement to ensure service levels are maintained. Further changes to three waters infrastructure may also be required depending on demographic changes within the city to support proposed areas of future housing intensification and new business land identified in the FDS.

To support the Council's Zero Carbon 2030 target, projects will aim to minimise carbon emissions in the design, construction and operational phases. Integration of land use, infrastructure and transport system planning will be essential to achieving Zero Carbon goals.

The DCC will continue to invest in relationships with professional and local government bodies such as Water New Zealand, Local Government New Zealand, Taituarā (Society of Local Government Managers), Institute of Public Works Engineering Australasia, and central government to avoid duplication of effort and identify approaches used by other groups that can be applied in a local context.

Table 5: Responding to infrastructure challenges - principal options and implications

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
All 3 Waters	Responding to changes in growth and demand Dunedin is growing, and it is predicted to experience high population growth over the next 9 years to reach an estimated population of 146,100 by 2034. The Future Development Strategy 2024-54 has identified areas for growth and the investment needed in infrastructure to enable that growth. Dunedin's 2 nd Generation District Plan (2GP) documents existing approved areas of growth requiring network upgrades prior to development.	Prioritise 3 Waters network upgrades in support of the Future Development Strategy, completing works required to meet requirements of all 2GP and Variation 2 areas in the 10 years to 2034/35, OR	3 Waters infrastructure projects to support growth in zoned areas are completed within 10 years. Little funding left in years 1-10 for network renewals in areas without a growth driver. Levels of service in these areas will decrease as aging assets continue to deteriorate. More bursts and breaks, unplanned water shutdowns, and wastewater overflows will occur.	Growth projects have been completed, allowing a shift in focus to renewals in areas of low/no growth to renew aging network assets. More bursts and breaks, unplanned water shutdowns and wastewater overflows while renewals catch up to deteriorated assets.
		Target only high demand 2GP and Variation 2 areas for delivery in 2025-34, remaining 2GP and Variation 2 areas addressed over a longer period (Adopted)	Highest demand growth areas are prioritised and balanced against areas of ageing poor performing networks without a growth driver. Service levels are maintained.	Complete the remainder of 2GP and Variation 2 areas as required, balancing the programme with renewal of ageing network assets to ensure service levels are maintained.
	Replacing and renewing our ageing infrastructure Around 22%* of our assets have passed or are rapidly approaching their end of life based on age. These assets require replacement before their condition materially impacts on service levels and the environment.	Increase funding to plan for and deliver renewal of critical infrastructure and address the backlog of asset renewals within 30 years (Adopted), OR	Deliver specific critical asset renewals within years 1-10 (main interceptor sewer and Musselburgh wastewater pump station). Plan and programme critical asset renewals requiring further investigation (Deep Creek and Deep Stream raw water pipelines, large diameter pipelines). Increase funding for other renewals over the medium term to catch up on the backlog of asset renewals.	Renewal of Deep Creek and Deep Stream raw water pipelines, large diameter pipelines. Reduce the backlog of asset renewals to \$0 by year 30, and thereafter programme renewals to match long term average renewal budgets to forecast depreciation.

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
	* based on gross replacement cost as reported in the DCC Annual Report 2023-24	Maintain current rate of asset renewals in accordance with previous 10 Year Plan, continuing to operate the ageing and vulnerable Deep Creek and Deep Stream raw water pipelines, Musselburgh wastewater pump station, main interceptor sewer) and defer other renewals to reduce short term funding requirements.	Assets are renewed as they fail (i.e., undertaking reactive renewals only), with increasing likelihood of significant wastewater overflow from aging main interceptor sewer and Musselburgh pumpstation, risking public health and the health of the Otago harbour and St Clair/St Kilda/Tomahawk beaches. Increasing risk of failure of raw water pipelines, leading to long duration and very stringent water restriction measures. Increasingly frequent bursts and breaks, water shutdowns, and wastewater network overflows.	Continued reactive response to asset failure, leading to more frequent repairs and reduction in customer satisfaction as wastewater overflows and seepage, and water supply shutdowns become commonplace.
Water Supply	Providing for infrastructure resilience Climate change forecasts indicate longer periods of dry weather, with shorter more intense periods of rainfall between. This impacts on our ability to reliably take good quality water from our existing sources.	Investigate and develop new / alternative groundwater sources for Waikouaiti, Outram and Dunedin City water supplies (Adopted), Investigate and develop new raw and treated water storage locations (Adopted), OR	Work to investigate and develop new and alternative groundwater sources for Waikouaiti and Outram water supplies is expected to be completed by 2033. Work on alternative groundwater sources for the main Dunedin City supply (including Mosgiel and Port Chalmers) begins from 2032/33. Planning work to identify the required storage size and location of a new strategic raw water storage reservoir near Deep Creek and Deep Stream pipelines, to mitigate impacts of climate change. Planning work to identify the required storage size and locations of treated water storage within the network to minimise outages and disruption to customers, say during droughts or incident response following an emergency.	New Waikouaiti and Outram groundwater sources are in use, and the water supplies are more resilient as they are significantly less impacted by periods of drought and the risk of poor quality source water resulting from short sharp rain events in catchments. More water from existing river sources can be stored during periods of plentiful supply to buffer demand during peak season, leading to significantly fewer water restrictions for these supplies. Work continues on developing new groundwater sources for Dunedin City, with the sources expected to be fully operational by 2043. Develop 30-60 days of Strategic Storage - offline - at a remote location somewhere along the main raw water supply pipes. Construction of additional treated water reservoir storage.
		Continue to use current 'run of river' supplies only	Continue to use solely 'run of river' sources, which will be negatively impacted by	Continue to use solely 'run of river' sources, which will be negatively impacted by

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
			forecast increasing periods of drought and changing legislation and regional policies, risking the likelihood of future water shortages and severity of water restrictions.	forecast increasing periods of drought and changing legislation and regional policies, risking the likelihood of future water shortages and severity of water restrictions.
	Providing for infrastructure resilience Recent growth in the Mosgiel area has put the existing pumped water supply from the Mt Grand Water Treatment Plant under pressure, and the supply is increasingly prone to water restrictions during peak demand periods and potential water outages if failures occur and repairs cannot be made before reservoir reserves run dry.	Make improvements to the Mosgiel water supply to ensure current and future forecast demand can be met and is not significantly impacted by asset failure (Adopted), OR Continue to operate the ageing and undersized Mt Grand to Wingatui pipeline,	An alternative supply route is developed to improve resilience in the Mosgiel water supply during periods of high demand. Mosgiel water supply is reliable year-round, and development is not constrained by water supply.	An alternative supply route is developed to improve resilience in the Mosgiel water supply during periods of high demand. Mosgiel water supply is reliable year-round, and development is not constrained by water supply.
	Efficiency and affordability Sourcing raw water, treating it to drinking water standard and delivering it to our customers is expensive, and we want to ensure that as little as possible is lost through leaks. Significant water loss within Dunedin water supplies also occurs at the customer end, either through leakage on private properties or through water wastage. This is an avoidable use of raw water	Proactively invest in improving water network monitoring to support the prioritisation of areas experiencing the highest water loss (Adopted), Renew domestic water connections with smart, metered tobies (Adopted), OR Continue to replace and renew water network infrastructure prioritised based on age, assumed condition and breaks history.	Areas of highest water loss are prioritised for renewal, less water is lost to leakage, and capital upgrades to increase supply are delayed as demand is able to be met using existing assets. Residential water connections (tobies) are renewed with newer 'smart' technology, with the ability for Council and customers to monitor usage and identify and resolve leaks more quickly.	New capital works to source, treat and distribute drinking water can be delayed, downsized or avoided due to lower overall demand resulting from reductions in water losses. Water leakage is lower, and new capital works to source, treat and distribute drinking water can be delayed, downsized or avoided due to lower overall demand resulting from reductions in water losses.
			Renewal spend continues to be targeted at older assets with a history of break repairs, rather than targeting assets where water loss is occurring but not yet evident (leaking into stormwater and wastewater	New capital works are needed earlier to support current and future water demand, as increasing volumes of water is lost through unidentified leakage as networks

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
	from the natural environment and incurs unnecessary cost in treatment and distribution.	Continue to renew existing domestic water connections with standard non-metered tobies.	systems, or unreported seepage issues) Higher volumes of water are required to be sourced, treated and distributed to service normal customer use due to customer-side leaks, leading to increasing costs to deliver service levels.	age. New capital works are needed earlier to support current and future water demand, as increasing volumes of water is lost through unidentified leakage as networks age.
Wastewater	Looking after our people and place (Public Health and Environmental Outcomes)	Consolidate 3 WWTPs into a single WWTP to reduce ongoing cost and enhance plant efficiency (Adopted) OR	Renewing the three WWTP together at a centralised plant in the medium term addresses risk of inundation due to higher sea levels, reflects the values and aspirations of our mana whenua treaty partners and the long term vision of our consenting regulator, and creates operational efficiencies.	Consolidation of plant and operations contributing to operational efficiencies. Long term alignment with cultural and environmental vision and values of mana whenua and regulators.
		Renew 3 existing WWTPs in current locations, vulnerable to sea level rise and with high operational costs,	The Warrington and Waikouaiti WWTP are vulnerable to the impacts of climate change in their current locations, and the discharges near culturally and ecologically sensitive coastal environments are not supported in the longer term by our mana whenua treaty partners and consenting regulator. Maintaining three separate plants longer term is also relatively inefficient from a cost perspective. The Waikouaiti discharge consent expires in 2027, and the Warrington WWTP is currently in a consent renewals process.	The Warrington and Waikouaiti WWTP are vulnerable to the impacts of climate change in their current locations, and the discharges near culturally and ecologically sensitive coastal environments are not supported in the longer term by our mana whenua treaty partners and consenting regulator. Maintaining three separate plants longer term is also relatively inefficient from a cost perspective. The Waikouaiti discharge consent expires in 2027, and the Warrington WWTP is currently in a consent renewals process.
	Looking after our people and place (Public Health and Environmental Outcomes) Extension of services to areas not currently receiving 3 Waters service.	Plan for delivery of potential network extensions arising as a result of DCC's Servicing Assessment (currently in progress) (Adopted), OR,	Forward planning for network extensions can proceed in advance of next 10 Year Plan, as funding for the projects is in place.	Extension of services to areas of need identified in the Servicing Assessment

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
		Do not plan for potential network extensions in advance of next 10YP.	Network extensions arising from the Servicing Assessment are delayed as forward planning is not completed in advance of next 10 YP process. Public health and the health of receiving environments continue to be negatively impacted by failing private wastewater systems.	
	Delivering on our Zero Carbon goal Wastewater treatment, including energy-intensive processes, biosolids production and biogenic methane, is the DCC 3 Waters largest carbon emitter. Building a bioresources facility will allow us to repurpose biosolids, a byproduct of wastewater treatment, into beneficial resources, reducing reliance on landfill, and minimising environmental impacts.	Build bioresources facility capable of processing 10,000 tonnes of biosolids per year, to divert all biosolids from landfill by 2034, OR	From 2034 forward Dunedin's emissions from biosolids reduce and biosolids are repurposed into usable products. This reduces reliance on landfill and minimises environmental impacts, aligns with DCC's sustainability goals, enhances resource recovery, and supports circular economy principles. This investment also addresses regulatory requirements, public expectations for responsible waste management, reduction of long-term operational costs and compliance with environmental standards.	From 2034 forward Dunedin's emissions from biosolids reduce and biosolids are repurposed into usable products. This reduces reliance on landfill and minimises environmental impacts, aligns with DCC's sustainability goals, enhances resource recovery, and supports circular economy principles. This investment also addresses regulatory requirements, public expectations for responsible waste management, reduction of long-term operational costs and compliance with environmental standards.
		Build bioresources facility in two phases, with the first phase enabling processing 2,000 tonnes of biosolids per year by 2030, with further work completed to process an additional 8,000 tonnes per year by 2042. (Adopted), OR	As above, but biosolids continue to be transferred to landfill from 2030 to 2042, contributing to Dunedin's emissions.	Dunedin's emissions from biosolids are further reduced from 2042. Biosolids are repurposed into usable products from 2034, reducing reliance on landfill and minimising environmental impacts, aligning with DCC's sustainability goals, enhancing resource recovery, and supporting circular economy principles. This investment also addresses regulatory requirements and public expectations for responsible waste management, while reducing long-term operational costs and ensuring compliance with environmental standards.
		Continue using diesel powered incinerator to process biosolids and	Emissions from biosolids sludge to landfill, and from diesel powered incinerator	Emissions from biosolids sludge to landfill, and from diesel powered incinerator

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
	Efficiency and affordability Treating wastewater is expensive, and we want to ensure that this process is managed as efficiently as possible.	trucking excess sludge to landfill.	continue to contribute to Dunedin's emissions.	continue to contribute to Dunedin's emissions.
		Continue to operate older Mosgiel WWTP, risking non-compliances with WWTP discharge consent, OR	The Mosgiel WWTP is an older plant requiring extensive renewals to support continued regulatory compliance and meet health and safety requirements. The Mosgiel WWTP treats only to secondary treatment standard, sending partially treated wastewater to the Green Island WWTP for final UV treatment and discharge to the ocean. Operating both the Mosgiel and Green Island WWTPs is expensive, as we are required to maintain assets at both plants to a safe operable standard and support continued compliance with discharge consent requirements at Green Island WWTP. Consolidating treatment at the Green Island WWTP means the Mosgiel plant can be decommissioned, with the pump station remaining to transfer wastewater to Green Island WWTP for full treatment.	The Mosgiel WWTP is an older plant requiring extensive renewals to support continued regulatory compliance and meet health and safety requirements. The Mosgiel WWTP treats only to secondary treatment standard, sending partially treated wastewater to the GI WWTP for final UV treatment and discharge to the ocean. Operating both the Mosgiel and GI WWTPs is expensive, as we are required to maintain assets at both plants to a safe operable standard and support continued compliance with discharge consent requirements at Green Island WWTP. Consolidating treatment at the Green Island WWTP means the Mosgiel plant can be decommissioned, with the pump station remaining to transfer wastewater to GI WWTP for full treatment.
		Renew Mosgiel WWTP on existing site, continuing to pump secondary treated effluent to Green Island for tertiary (UV) treatment prior to disposal to ocean outfall, OR	Ongoing costs of upgrading and maintaining two wastewater treatment plants.	Ongoing costs of upgrading and maintaining two wastewater treatment plants.
		Upgrade Green Island WWTP to accommodate flows of untreated wastewater from Mosgiel. Decommission Mosgiel WWTP and pump untreated wastewater to GI for treatment and disposal (Adopted)	Upgrade Green Island WWTP to accommodate flows of untreated wastewater from Mosgiel. Decommission Mosgiel WWTP and pump untreated wastewater to GI.	Mosgiel flows treated at Green Island. Only one wastewater treatment plant and pump station to maintain and operate, resulting in cost efficiencies..

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
Stormwater	Providing for infrastructure resilience South Dunedin is highly vulnerable to climate change impacts such as rising sea levels, increased rainfall, and rising groundwater. Flooding in October 2024 and June 2015 highlighted deficits in stormwater systems in this area, with significant impact on residents in the lowest lying areas.	Invest in delivery of infrastructure upgrades that align with the outcomes of the South Dunedin Future programme to determine medium to longer term projects.	The outcomes of the SDF programme will inform delivery of flood alleviation projects from Year 6 onwards. No mitigation of flood risk in the short term.	Planning and delivery of long term projects identified in the final South Dunedin Futures Adaptation Plan.
		OR		
		as above, AND Plan for delivery of additional short to term 'no regrets' options to reduce flood risks more rapidly (Adopted) OR,	Short term improvements (years 1-5) are made to stormwater systems impacting on the South Dunedin area, alleviating some flooding impacts. The outcomes of the SDF programme will inform delivery of other flood alleviation projects within the 9 year time frame.	Planning and delivery of long term projects identified in the final South Dunedin Futures Adaptation Plan.
	Providing for infrastructure resilience Mosgiel experiences catchment-wide flooding in significant rainfall events. Deep flooding and property flooding are experienced in	Asset renewals only, as required. Taking a piecemeal approach as issues arise .		
		Complete no-regrets upgrades to Mosgiel's stormwater system, and plan for delivery of further options in future (Adopted) OR	Flood depth and frequency is reduced with no regrets options being implemented in the early years of the plan.	Upgrades completed in accordance with programmed approach.
		Continue to operate Mosgiel's SW system, completing renewals and	Flooding events continue in Mosgiel with increasing frequency and severity, with	Flooding events continue in Mosgiel with increasing frequency and severity, with

Activity	Issue	Principal Options	Risk and implications	
			Years 1-10	Years 11-30
	some areas. Mosgiel is a sensitive stormwater catchment; the area is the flood plain for the Taieri River and Silverstream and is underlaid by the extensive Taieri Aquifer which is responsive to river levels.	minor upgrades as required, and responding to flooding events as they occur.	repair costs and impacts on wellbeing borne by affected households.	repair costs and impacts on wellbeing borne by affected households.

4.2 Delivering on our Strategy

To address the significant challenges facing Dunedin's water supply, wastewater and stormwater activities, we have developed a comprehensive 30-year programme totalling \$4.752B. This ambitious plan includes a series of projects to enhance the delivery of three waters services, ensuring that Dunedin continues to thrive as one of the world's great small cities.

Our 30-year programme is strategically aligned with the goals of the Future Development Strategy (FDS), the 3 Waters Strategic Direction Statement and the Financial Strategy. We are committed to upholding the principles of Te Tiriti o Waitangi, ensuring that our initiatives respect and incorporate the values and rights of Māori communities.

Key focus areas of our programme include:

- Looking after our people and places, through projects that support public health and environmental outcomes
- Looking after what we have, by replacing and renewing our ageing infrastructure
- Meeting our changing needs, through projects that address changes in population, regulation and standards, and customer expectations
- Providing for infrastructure resilience, to ensure our assets can withstand and respond to extreme events
- Delivering on our city and DCC emissions reduction targets by reducing our own emissions, and supporting urban intensification to reduce City emissions
- Living within our means, making financially prudent choices that are affordable for our community.

4.3 Three Waters Projects

Table 6 describes key projects in our 30-year programme that support service delivery across all three waters activities. Tables 7, 8 and 9 describe specific projects supporting water supply, wastewater and stormwater activities.

Table 6: Key projects supporting service delivery across all three waters activities

DCC project name and description	Challenges to be addressed	Options considered	Expected timing	Year 1-10 estimated cost	Year 11-30 estimated cost
Growth capital programme (new capital supporting growth, renewals supporting growth) Provision for creation of infrastructure to support growth areas under the 2GP and variation 2 of that plan, in accordance with the DCC's adopted growth scenarios and to support our 'compact city with resilient townships' objective in the Future Development Strategy.	Responding to changing demand Delivering on our city and DCC emissions reduction targets Supporting urban intensification)	Target all 2GP and Variation 2 areas, OR Target high demand 2GP and variation 2 areas in 2025-34 for delivery, remaining 2GP and Variation 2 areas over a longer period (<i>selected option</i>)	Years 1-13	\$129M	\$51M
Supporting effective infrastructure decisions – AMIS and SCADA upgrades Renewal of asset management information systems (AMIS) and SCADA monitoring systems – both systems are critical in supporting informed, effective infrastructure decision-making. Significant business risk carried in both systems with outdated and unsupported software and hardware.	Replacing and renewing our ageing infrastructure Financial prudence and affordability	Do nothing, OR, Upgrade AMIS and SCADA systems to meet best practice modern requirements (<i>selected option</i>)	Years 1-9	\$3M	-

4.3.1 Water Supply Projects

Table 7: Projects supporting water supply service delivery

DCC project name and description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
Water efficiency – reduce network leakage and loss Reducing water leakage and loss is critical for Dunedin’s sustainable water management and ensuring the long-term reliability of supply systems. For Dunedin to achieve this, the sectorisation of Dunedin into manageable District Metered Areas (DMAs) will allow for easier monitoring to determine where the highest water losses are. Longer term, this will allow for the implementation of smart networks with real-time data collection providing immediate feedback on potential leaks and system pressure issues. Through this network upgrades such as replacing ageing infrastructure can be made very intentional, improving water efficiency through minimising leakage and loss.	Replacing and renewing our ageing infrastructure Maintaining or improving environmental outcomes Delivering on our city and DCC emissions reduction targets. Financial prudence and affordability	Continue to replace and renew water network infrastructure prioritised based on age, assumed condition and breaks history, OR, Proactively invest in improving monitoring to support the prioritisation of areas experiencing the highest water loss (ISP core pathway) (<i>selected option</i>)	Years 1-6	\$25M	-
Water efficiency – Smart networks and renewal of domestic water connection infrastructure Renew existing domestic water connection ‘tobies’ with the modern equivalent smart meters, that allow tracking of consumption volume and time of use, similar to that used by the electricity industry. Smart metering enables rapid detection and resolution of leaks on customer connections and reduces water network loss. Smart metering allows for (but does not require) a user-pays system to be implemented in future.	Responding to changing demand Replacing and renewing our ageing infrastructure Maintaining or improving environmental outcomes Delivering on our city and DCC emissions reduction targets. Financial prudence and affordability	Continue to renew existing domestic water connections with standard non-metered tobies, OR, Renew domestic water connections with smart, metered tobies, to allow rapid detection and resolution of leaks on customer connections and reducing network water loss (ISP core pathway) (<i>selected option</i>)	Years 6-30+	\$41M	\$80M

DCC project name and description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
<p>Water supply resilience – Investigate and develop new/alternative groundwater supplies to feed Waikouaiti, Outram and Dunedin City</p> <p>Groundwater sources provide better resilience in drought and climate change scenarios over surface water sources and are likely to be easier to consent in future. Long term modelling has identified a range of possible future shortfalls in source capacity from the existing run-of-river intakes which provide the bulk of the water supply to Dunedin City and Mosgiel. Diversification of water supply using new groundwater supply aids in addressing water catchment over-allocation, while improving system resilience by diversifying supply and increasing the potential for drought resilience.</p> <p>Investigation work into the feasibility of new bore location needs to be completed in advance of existing water take consent expirations (2036 – 2041). Changes to legislation and ORC’s Land and Water Regional Plan are likely to result in changes to abstraction limits during low flow conditions which will signal changes in supply sources prior to the 2036 reconsenting.</p>	<p>Providing for infrastructure resilience</p> <p>Responding to changing demand</p>	<p>Continue to use current ‘run of river’ supplies, which are likely to be negatively impacted by climate change and changes to legislation and regional policies, risking the likelihood of future water shortages,</p> <p>OR,</p> <p>Investigate and invest in new ground water sources (ISP core pathway) <i>(selected option)</i></p>	Years 5-18	\$21M	\$18M
<p>Water Supply Resilience – Deep Creek & Deep Stream Renewal</p> <p>Almost 80% of Dunedin’s water comes from the Deep Creek and Deep Stream supplies, which deliver water to the Mt Grand and Southern Water Treatment Plants (WTPs). The pipelines, measuring 64 km and 58 km respectively, are nearing the end of their expected lifespans and are vulnerable to asset failure.</p> <p>Work is underway to assess the condition of the pipes to better inform the timing of their renewal in relation to other critical infrastructure. Should the assessment show the pipes are in better condition than expected, the renewal may be deferred while other critical infrastructure is renewed. Conversely, if the pipes are found to be in poorer condition than expected, their renewal may be brought forward.</p>	<p>Replacing and renewing our ageing infrastructure</p> <p>Providing for infrastructure resilience</p>	<p>Continue to operate the ageing and vulnerable Deep Creek and Deep Stream pipelines</p> <p>OR,</p> <p>Renew critical water supply infrastructure <i>(selected option)</i></p>	Years 11-23	\$0	\$276M

DCC project name and description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
<p>Water supply resilience – Investigate and develop new raw and treated water storage locations</p> <p>Develop 30-60 days of Strategic Storage - offline - at a remote location somewhere along the main raw water supply pipes, e.g. in non-perennial stream/valley in Hindon area with minor diversion from DS and DC raw water pipes. Required storage size to reduce by ~10 days if existing raw water reservoir(s) were incorporated to the supply system.</p> <p>System resilience would also be improved by construction of additional treated water reservoir storage. A future study would identify and optimise service reservoir capacity to minimise outages and disruption to customers, say during droughts or incident response following an emergency (e.g. recently evident with network outages in West Harbour region, caused by land slips in the October 2024 rain event).</p>	<p>Providing for infrastructure resilience.</p> <p>Maintaining or improving environmental outcomes</p> <p>Maintaining or improving public health</p>	<p>Continue to use current 'run of river' supplies, which are likely to be negatively impacted by climate change and changes to legislation and regional policies, risking the likelihood of future water shortages,</p> <p>OR,</p> <p>Investigate and invest in new ground water sources and treated water storage (ISP core pathway) (<i>selected option</i>)</p>	Years 10-15	\$38M	\$203M
<p>Port Chalmers water supply upgrade</p> <p>Continuation of existing project to upgrade the water main connecting metropolitan Dunedin and Port Chalmers. Once completed, this upgraded connection will allow the DCC to decommission the Port Chalmers WTP, an expensive supply which operates seasonally to support periods of high demand.</p> <p>The decommissioning of the plant will make the Roseneath water pump station and the Cedar Farm and Rossville dams obsolete. Maintaining these dams incurs significant ongoing costs under Building (Dam Safety) Regulations 2022. No firm plans have been made regarding the future of the dams, other than that they will no longer be required for water supply purposes. Community views will be considered prior to any decision.</p>	<p>Financial prudence and affordability</p> <p>Maintaining or improving public health</p> <p>Delivering on our Carbon Zero commitment.</p>	<p>Continue to operate Port Chalmers WTP, upgrade and maintain two supply dams in accordance with dam safety regulations, incurring high ongoing capital and operational costs,</p> <p>OR,</p> <p>Upgrade connection from metropolitan supply, decommission plant and consider future of supply dams (<i>selected option</i>)</p>	Years 1-3	\$14M	-

DCC project name and description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
<p>Mosgiel water supply improvements</p> <p>The current pumped connection from the Mt Grand Water Treatment Plant (WTP) is constrained by pump capacity at Mt Grand. This supply is vulnerable due to the high and increasing demand from the growing Mosgiel area, and it was not designed to handle the current load. As a result, Mosgiel supply zones are increasingly prone to water restrictions during peak demand periods and potential water outages if failures occur and repairs cannot be made before reservoir reserves run dry.</p> <p>This project includes renewing the existing Wingatui to Mosgiel water main, constructing an alternative gravity- supply route to feed Mosgiel (Tunnel Trails route). This project will reduce our reliance on pumping, as the alternative supply will be gravity fed.</p>	<p>Replacing and renewing our ageing infrastructure.</p> <p>Providing for infrastructure resilience.</p> <p>Meeting our changing needs – responding to changes in demand</p> <p>Maintaining or improving public health.</p> <p>Delivering on our city and DCC emissions reduction targets.</p>	<p>Continue to operate the ageing and undersized Mt Grand to Wingatui pipeline,</p> <p>OR,</p> <p>Renew critical water supply infrastructure and invest in alternative (<i>selected option</i>)</p>	Years 1-9	\$15M	-

4.3.2 Wastewater Projects

Table 8: Projects supporting wastewater service delivery

DCC Project Name and Description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
Carbon reduction – bioresources facility Build a bioresources facility to repurpose biosolids, a byproduct of wastewater treatment, into beneficial resources, reducing reliance on landfill, and minimising environmental impacts. By transforming waste into usable products, such as compost or energy, the DCC aligns with its sustainability goals, enhances resource recovery, and supports circular economy principles. This investment also addresses regulatory requirements and public expectations for responsible waste management, while reducing long-term operational costs and ensuring compliance with environmental standards.	Maintaining or improving environmental outcomes Delivering on our Carbon Zero commitment Financial prudence and affordability	Continue using diesel powered incinerator to process biosolids and trucking excess sludge to landfill, OR Building a bioresources facility to repurposed biosolids into a reuseable, beneficial product (ISP core pathway) <i>(selected option)</i>	Years 1-5 (Phase 1) and Years 11-17 (Phase 2)	\$17M	\$45M
Main Interceptor Sewer (MIS) upgrade Renewal of approximately 4km of large diameter critical wastewater main carrying a large portion of the City's wastewater flows from hill suburbs, and the CBD to Musselburgh pump station. Increasing capacity where necessary to cater for growth.	Replacing and renewing our ageing infrastructure. Meeting our changing needs Maintaining or improving environmental outcomes Delivering on our Zero Carbon commitment	Continue to use existing ageing and undersized pipes to transport wastewater to terminal pump station, OR, Renew and upgrade critical wastewater infrastructure <i>(selected option)</i>	Years 4-10	\$26M	-
Musselburgh to Tahuna link Replacement of the terminal pump station and rising mains servicing around 65% of Dunedin City, with a tunnelled gravity pipeline and terminal lift station, supporting continued service delivery during construction and improving resilience in severe weather events, earthquake and power outage.	Replacing and renewing our ageing infrastructure. Maintaining or improving public health Maintaining or improving environmental outcomes Providing for infrastructure resilience	Continue to use existing ageing and seismically vulnerable terminal pump station and rising mains, risking wastewater overflows, OR, Renew critical wastewater infrastructure <i>(selected option)</i>	Years 2-6	\$49M	-

DCC Project Name and Description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
Rural Wastewater Schemes – Middlemarch Upgrade of the Middlemarch WWTP in advance of consent expiry in 2029, and upgrade of Middlemarch WW network to address network performance issues.	Replacing and renewing our ageing infrastructure. Maintaining or improving environmental outcomes	Continue to use existing ageing and undersized pipes to transport wastewater for treatment at ageing WWTP, risking wastewater overflows and non-compliances with WWTP discharge consent OR, Renew critical wastewater infrastructure (<i>selected option</i>)	Years 1-5	\$10M	-
Rural Wastewater Schemes – Northern WWTPs (Waikouaiti, Seacliff, Warrington) This project involves the construction of a new centralised wastewater treatment plant (WWTP) to manage flows from the Waikouaiti, Seacliff, and Warrington communities. The centralisation will allow for the decommissioning of the existing WWTP facilities in these areas. Upgrades to the Northern wastewater network will be required to redirect flows to the new treatment plant. Consolidating the three rural WWTPs into one centralised facility will reduce maintenance costs, enhance plant efficiency, and streamline operational processes.	Replacing and renewing our ageing infrastructure. Maintaining or improving environmental outcomes Financial prudence and affordability Providing for infrastructure resilience	Renew 3 existing WWTPs in current locations, vulnerable to sea level rise and with high operational costs, OR, Consolidate 3 WWTPs into a single WWTP to reduce ongoing cost and enhance plant efficiency (<i>selected option</i>)	Years 1-14	\$74M	\$28M
Service extension (wastewater) Projects to extend wastewater services to areas not currently serviced. Areas will be identified through the three waters Servicing Assessment and subsequent feasibility studies and options assessment.	Responding to changing demand	Do nothing, OR Extend services to areas of need identified in the servicing assessment and subsequent feasibility studies and options assessment as requiring servicing (<i>selected option</i>)	Years 4 – 12	\$31M	\$15M

DCC Project Name and Description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
<p>WW network resilience and efficiency – Wet weather flow management</p> <p>Project looking into wet weather flow management where the first step is an investigation concerning the most appropriate and cost-effective approach to managing problematic catchments in Dunedin. Two problematic catchments (overflows), Kaikorai Valley and Northeast Valley, have been identified. These are constraining any long-term growth in these areas and need to be addressed.</p> <p>Options include pipe upsizing, additional wastewater network storage, locating and addressing areas of high ingress and infiltration, removal of cross connections, connection of catchments to Green Island WWTP.</p>	<p>Providing for infrastructure resilience</p> <p>Responding to changing demand</p> <p>Maintaining or improving environmental outcomes</p>	<p>Do nothing and continue to overflow wastewater,</p> <p>OR,</p> <p>Invest in wet weather flow management projects (ISP core pathway) <i>(selected option)</i></p>	Years 4-9	\$61M	-
<p>WW network resilience and efficiency - Decommission Mosgiel WWTP and pump to Green Island WWTP</p> <p>Mosgiel WWTP is an ageing plant in need of significant upgrades to maintain operational efficiency and address health and safety concerns. Treated wastewater from the WWTP is pumped to Green Island WWTP for disposal. Pumping wastewater directly to Green Island WWTP from Mosgiel without a prior treatment would reduce ongoing maintenance and operating costs, and increase efficiency. Green Island WWTP will require upgrades to take the increased treatment volume: odour/sulphide treatment in the existing pipeline, allowance for balance tanks and wet weather flows, inlet and discharge modifications.</p>	<p>Providing for infrastructure resilience</p> <p>Replacing and renewing our ageing infrastructure</p> <p>Maintaining or improving environmental outcomes</p> <p>Delivering on our city and DCC emissions reduction targets</p> <p>Financial prudence and affordability</p>	<p>Continue to operate older WWTP, risking non-compliances with WWTP discharge consent,</p> <p>OR,</p> <p>Upgrade GIWWTP, redirect flows from Mosgiel WWTP, and decommission Mosgiel WWTP (ISP core pathway) <i>(selected option)</i></p>	Years 3-7	\$43M	-

4.3.3 Stormwater Projects

Table 9: Projects supporting stormwater service delivery

DCC Project Name and Description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
<p>South Dunedin flood alleviation</p> <p>South Dunedin is highly vulnerable to climate change impacts such as rising sea levels, increased rainfall, and rising groundwater. The South Dunedin Future (SDF) project is a collaborative effort between DCC and ORC, working closely with the South Dunedin community, mana whenua, and other stakeholders. The project aims to develop a balanced plan that addresses the needs of people, water, and space. A variety of adaptation strategies are being explored, including upgrades to three waters infrastructure and potential modifications to stormwater systems, including the city's largest pump station (Portobello Road) The South Dunedin Flood Alleviation budget provides for three short term 'no regrets' upgrade options to alleviate flood risks. A medium term project to reconfigure the stormwater system in South Dunedin is funded to start within the 9 year time frame and will be informed by the final adaptation plan, due in 2026.</p>	<p>Maintaining or improving public health</p> <p>Maintaining or improving environmental outcomes</p> <p>Providing for infrastructure resilience</p> <p>Replacing and renewing our ageing infrastructure.</p> <p>Financial prudence and affordability</p>	<p>Do nothing, and continue to experience disruptions to daily life and negative impacts on wellbeing from continued flooding events.</p> <p>OR,</p> <p>Invest in delivery of short term and smaller scale infrastructure upgrade options to reduce short term flood risk and</p> <p>invest in initial work on a medium term solution arising from the South Dunedin Future Adaptation Plan once it is completed.(selected option)</p>	Years 1-9	\$44M	-
<p>Mosgiel stormwater upgrades</p> <p>Comprehensive modelling has been completed to identify the most effective designs to reduce flood risk, optimised for cost and performance. The Dunedin's 9 year plan 2025-34 includes funding in the first two years for a 'no regrets' option based on this modelling. Further assessment and public engagement will determine the next steps for Mosgiel's stormwater system, considering community willingness to pay and desired service levels.</p>	<p>Providing for infrastructure resilience</p> <p>Maintaining or improving public health</p> <p>Maintaining or improving environmental outcomes</p> <p>Financial prudence and affordability</p>	<p>Do nothing, and continue to experience disruptions to daily life and negative impacts on wellbeing from continued flooding events.</p> <p>OR,</p> <p>Invest in upgrades to Mosgiel SW infrastructure to address flooding concerns (selected option)</p>	Years 1-2 and Years 5-6	\$9M	-

DCC Project Name and Description	Challenges to be addressed	Options considered	Expected timing	Years 1-10 estimated cost	Years 11-30 estimated cost
<p>Stormwater network resilience and efficiency – Smart networks for flood and water quality monitoring</p> <p>Investigation and monitoring programme aimed at the location and removal of wastewater cross-connections from the stormwater network and improvement of flood resilience.</p> <p>Using monitoring technologies such as flow meters, water quality sensors, and routine inspections, the DCC aims to locate and rectify these issues efficiently. The programme focuses on minimising pollution, enhancing infrastructure resilience, and ensuring compliance with water management goals, while reducing the long-term costs associated with wastewater overflows.</p>	<p>Providing for infrastructure resilience</p> <p>Maintaining or improving environmental outcomes</p> <p>Maintaining or improving public health</p>	<p>Do nothing,</p> <p>OR,</p> <p>Invest in smart networks for flood and water quality monitoring (ISP core pathway) <i>(selected option)</i></p>	Years 10-17	\$1M	\$7M
<p>Retrofit of proprietary devices for high traffic subcatchments</p> <p>Implementing stormwater treatment devices such as hydrodynamic separators, oil-water separators, and media filters in locations that generate high levels of stormwater contaminants. By integrating these treatment devices into the stormwater network, municipalities can significantly reduce the volume of contaminants entering rivers, lakes, and coastal waters, enhancing water quality, and supporting compliance with environmental regulations</p>	<p>Maintaining or improving environmental outcomes</p>	<p>Do nothing,</p> <p>OR,</p> <p>Retrofit of proprietary devices for high traffic subcatchments(ISP core pathway) <i>(selected option)</i></p>	Years 10-17	\$4M	\$26M

4.4 Key decisions

Table 10: Key DCC decisions or opportunities for public engagement affecting three waters activities:

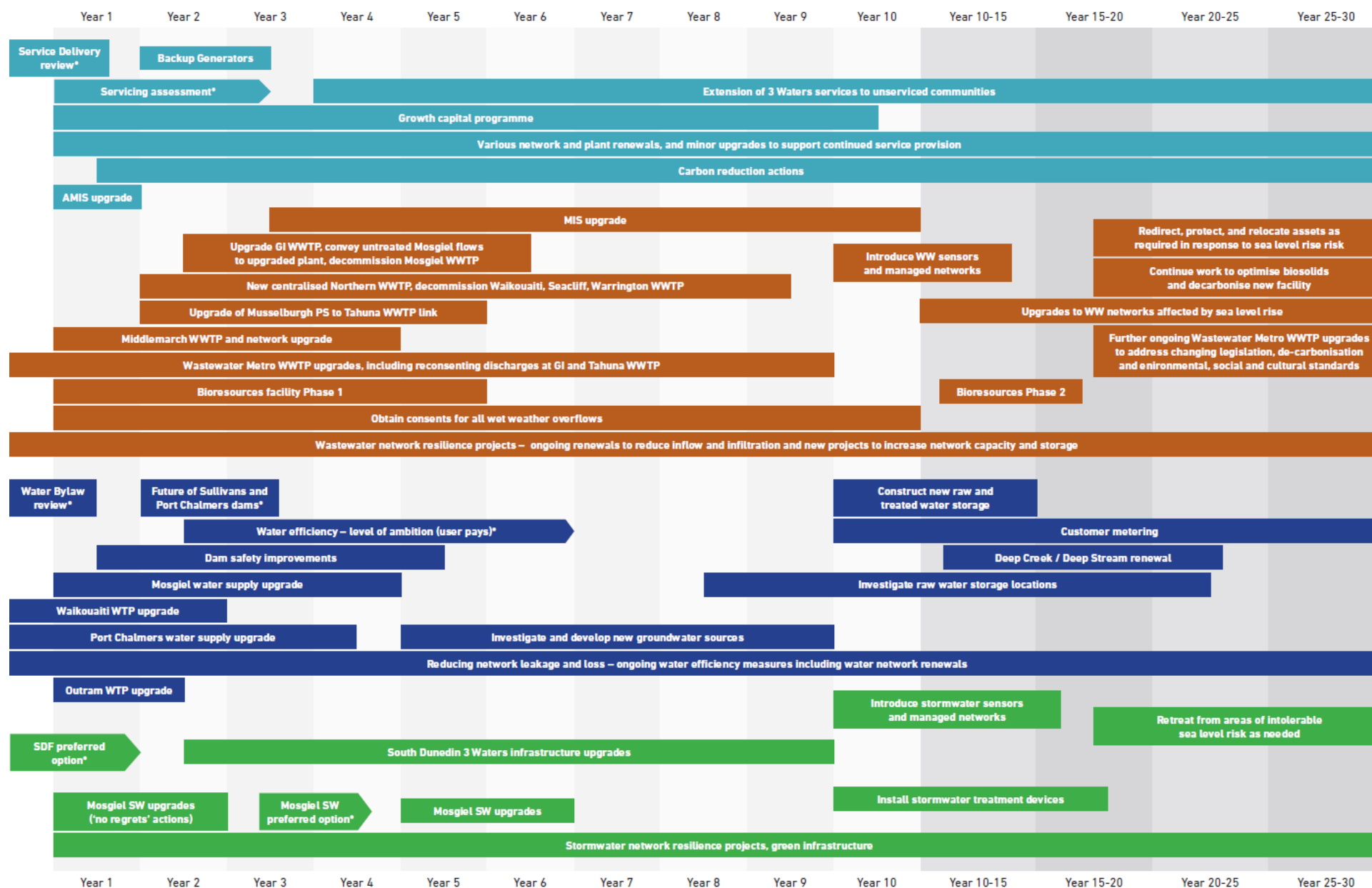
DCC decision or public engagement opportunity	Challenges to be addressed	Expected timing
<p><i>Servicing Assessment</i></p> <p>The LGA 2002 requires the DCC to have completed a servicing assessment (formerly the Water and Sanitary Services Assessment) by 1 July 2026. The assessment emphasises the identification of any adverse public health or environmental impacts arising from existing water and sanitary services available to communities in Dunedin, including accounting for future demand for services. For those communities where issues are identified, the assessment completed by 1 July 2026 will be followed by further detailed assessments of options for potential service extensions or upgrades needed to address the issues. Decisions on preferred options are likely to be informed by further consultation with impacted communities. Detailed options assessments and decisions on preferred options would take place between 2026 and 2028. Work on any proposed service extensions or upgrades would begin in 2028/29.</p>	<p>Maintaining or improving public health</p> <p>Maintaining or improving environmental outcomes</p>	2025-2028
<p><i>Local Water Done Well</i></p> <p>The DCC is working on a regional Local Water Done Well collaboration with other local authorities. Options for the format of local water service delivery will be presented to the Council in early 2025 and publicly consulted on alongside consultation on the Council's 9 year plan 2025-34 .</p>	<p>Financial prudence and affordability</p> <p>Local decision making</p>	June 2025
<p><i>Water Bylaw review</i></p> <p>The Water Bylaw is a regulatory tool that addresses key water services issues. It manages access to and use of public water supply infrastructure and services, protects the water supply network and ensures public health and safety. A draft updated Water Bylaw will be publicly consulted on in mid-2025.</p>	<p>Maintaining or improving public health</p> <p>Financial prudence and affordability</p>	June 2025
<p><i>South Dunedin Future - preferred pathway</i></p> <p>South Dunedin is particularly vulnerable to climate change impacts, including rising sea levels, increased rainfall, and rising groundwater. South Dunedin Future (SDF) is a joint programme between DCC and ORC, working closely with the South Dunedin community, mana whenua, and other stakeholders to develop a balanced plan that considers the needs of people, water, and space. A wide range of adaptation approaches are being considered, including changes to three waters infrastructure in the area. Ongoing public engagement will continue as the SDF Adaptation Plan is drafted, with the final plan expected to be delivered in 2026.</p>	<p>Providing for infrastructure resilience</p>	Ongoing public engagement, Adaptation Plan due 2026

DCC decision or public engagement opportunity	Challenges to be addressed	Expected timing
<p>Water efficiency – level of ambition</p> <p>The early years of Dunedin’s 9 year plan 2025-34 include significant expenditure aimed at improving water efficiency and reducing network leakage and loss. At present, domestic water connections in Dunedin are unmetered; each property is charged a fixed rate for water supply regardless of how much water they use. Without meters, water users often have no idea how much water they are using. Metering helps reduce household water use and the volume of wastewater needing treatment. It also defers the capital expenditure required for new water supplies and wastewater systems and reduces operating and maintenance costs. Metering raises awareness, encourages water-saving habits and installation of water-saving devices, and also allows for a user-pays system, which may be considered fairer.</p> <p>The DCC expects to begin a discussion with the community on domestic metering and user-pays charging around the next 10-Year Plan.</p>	<p>Financial prudence and affordability</p> <p>Responding to changes in demand</p> <p>Maintaining or improving environmental outcomes</p>	<p>10 Year Plan 2027/37</p>
<p>Future of Port Chalmers and Sullivans dams</p> <p>Work is underway to upgrade the water supply connection between metropolitan Dunedin and Port Chalmers. Once completed, this upgraded supply will allow the DCC to decommission the Port Chalmers WTP, an expensive supply which operates seasonally to support periods of high demand. The decommissioning of the plant will make the Cedar Farm and Rossville dams obsolete. Maintaining these dams incurs significant ongoing costs under Building (Dam Safety) Regulations, and the DCC is aiming to reduce the costs of these two dams, and a third unused water supply dam further north (Sullivan’s dam). Consultation with the West Harbour Community Board on costed options for the future of the three dams is expected in 2025/26.</p>	<p>Financial prudence and affordability</p> <p>Delivering on our city and DCC emissions reduction targets</p>	<p>2025/26</p>
<p>Mosgiel stormwater - preferred option</p> <p>Comprehensive modelling has been completed to identify the most effective designs to lower the total stormwater flood depth in Mosgiel, optimised for cost and performance. The Dunedin’s 9 year plan 2025-34 includes funding in the first two years for Reid Ave Pump station and network improvements based on this modelling. Further assessment and public engagement will be completed to determine the next steps for Mosgiel’s stormwater system following these upgrades. This will include consideration of community willingness to pay and desired service levels.</p> <p>Consultation with the Mosgiel-Taieri Community Board is expected in 2025/26.</p>	<p>Providing for infrastructure resilience</p>	<p>2025/26</p>

Significant projects and decisions over the next 30 years

Figure 11 shows the estimated timing of significant three waters capital expenditure projects and key decisions.

Figure 11: Estimated timeline of significant three waters capital projects and key decisions (* indicates DCC decision or opportunity for public feedback)



5 DELIVERING ON OUR PLAN

In developing the Infrastructure Strategy 2025-55, trade-offs have been made due to affordability pressures and market capacity. Renewals investment prioritises the most critical and high-risk areas. Our strategic system planning project has informed the prioritisation of the capital expenditure programme. Over the 30 years to 2055, most three waters-related buildings and structures will require replacement or significant upgrades to maintain service levels. Climate change impacts in South Dunedin and SDF adaptation planning will continue to shape the three waters capital expenditure programme in the medium to long term.

The first five years of Dunedin's 9 year plan 2025-34 prioritises areas of highest risk and activities most in need of investment, with a continued focus on pipework renewals and large-scale plant renewals, such as the renewal of the city's main central interceptor sewer and terminal wastewater pump station. New capital investment in the 10 years to 2039 aims to improve water supply resilience by investigating and developing new groundwater supplies, improving water use efficiency, and upgrading wastewater and stormwater networks. This includes improvements in wet weather flow management and projects to reduce carbon emissions from biosolids and create bioresources. Rationalisation of wastewater treatment plants in the north of the city and Mosgiel will reduce ongoing maintenance costs, enhance plant efficiency, and streamline operational processes.

Further improvements to the resilience of the water supply are programmed from 2034 onwards, including the construction of an additional raw water storage dam, and building new treated water reservoirs. The replacement of the Deep Creek and Deep Stream raw water pipelines (including replacing the Taieri River pipe bridge) is planned for the medium term, with condition assessment underway in early 2025 to inform timing. The replacement of these two pipelines is particularly significant as both carry significant risk in terms of the DCC's ability to supply water. Failure to address these assets in this timeframe would expose the assets to an increasing risk of failure, denying the city of its two primary water sources. Resilience to natural hazards and climate change will be supported by raising critical wastewater assets, sealing manholes against infiltration, and improving stormwater network resilience and efficiency with green infrastructure and catchment upgrades. Ongoing renewals and minor upgrades to larger treatment plants will continue over the medium term. Significant investment is required to support city growth, mainly within the networks. While most treatment plants can handle forecast population changes, some smaller plants will need upsizing.

Over the longer term, efforts will continue to reduce network water losses, reducing the volume of raw water required from sources and the volume of water requiring treatment. Additional protection for the Tahuna and Green Island WWTPs from sea level rise impacts will be required, as well as protection or relocation of other critical wastewater network assets such as pump stations in coastal hazard zones. These facilities will also need ongoing upgrades to align with changing legislation and standards. Stormwater systems will be upgraded over the longer term using a 'green infrastructure' approach, using place-based solutions such as daylighting streams (uncovering buried waterways) and retrofitting of treatment devices such as wetlands and detention ponds. These approaches support resilience in the face of a changing climate, providing more space for water as heavy rainfall events become more common.

We will continue to monitor key variables such as population forecasts, sea level rise, legislative changes, and asset performance to ensure the strategy adapts to meet current and future challenges. Our Dynamic Adaptive Planning Pathway (DAPP) approach will guide our investments, allowing us to adjust plans based on emerging signals and changing conditions, ensuring our infrastructure remains resilient and effective.

5.1 Three waters budget 2025-2034

Figure 12: Three waters capital expenditure by type 2025-34

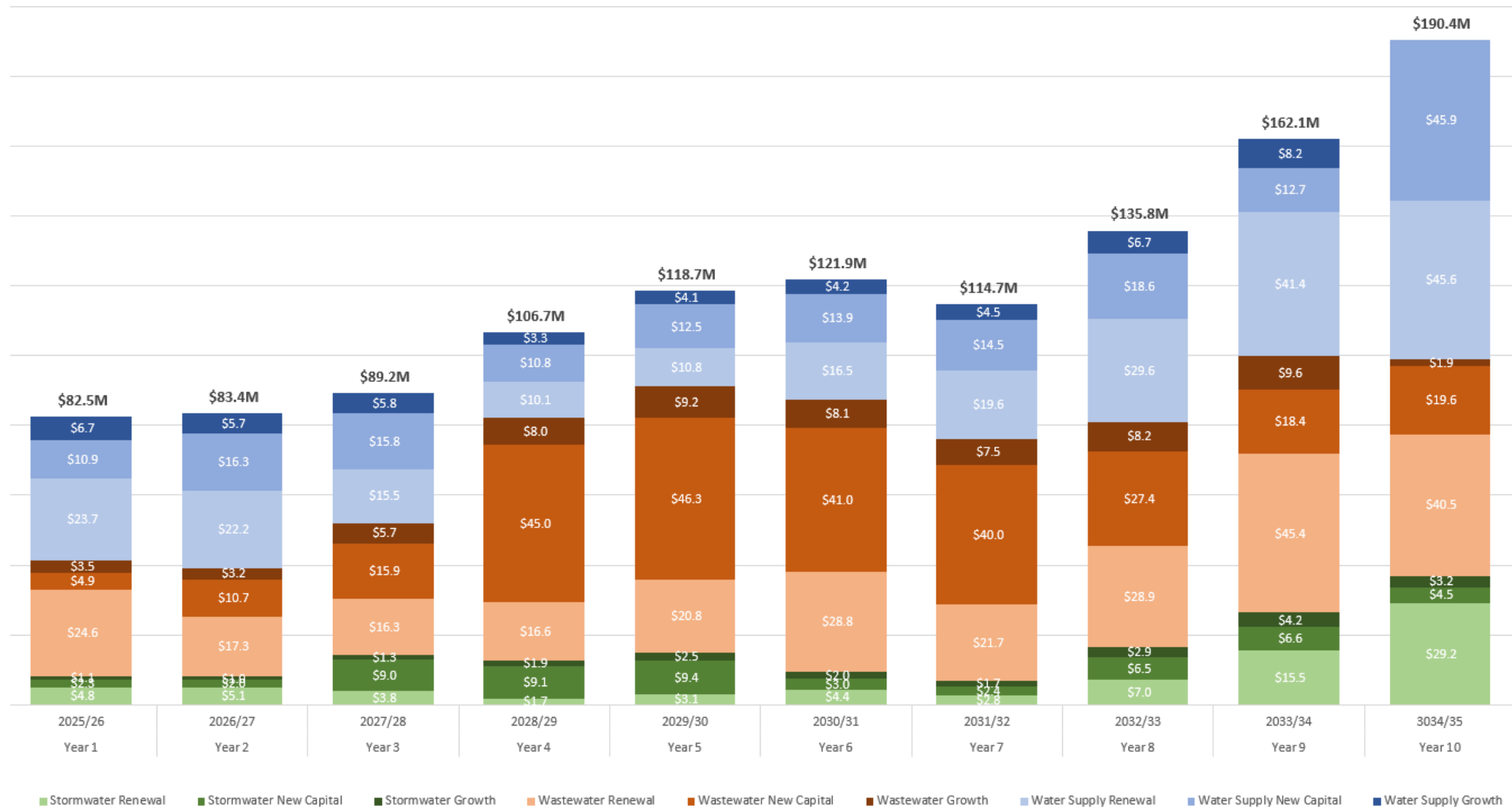


Table 11: Three waters capital and operating expenditure budget

\$ million	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	Total
Operating expenditure	66.7	70.0	72.9	77.1	86.0	91.7	96.7	101.7	107.6	109.7	880.0
Depreciation	62.4	63.0	66.3	70.0	74.1	78.7	82.8	86.8	90.8	92.7	767.6
Total operating expenditure	129.0	133.0	139.2	147.2	160.1	170.3	179.5	188.6	198.3	202.4	1,445.2
Renewals	53.1	44.6	35.6	28.5	34.6	49.6	44.1	65.5	102.4	115.3	573.2
Level of service	18.1	29.0	40.7	65.0	68.3	57.9	56.9	52.4	37.7	70.0	496.0
Growth	11.3	9.9	12.9	13.2	15.8	14.3	13.7	17.9	22.1	5.1	136.2
Total capital expenditure	82.5	83.4	89.2	106.7	118.7	121.9	114.7	135.8	162.1	190.4	1,205.4

5.2 Three waters 30 year budget

Figure 13: Projected three waters capital renewal and operating expenditure in 5 year bands for the 11 to 30 year period.

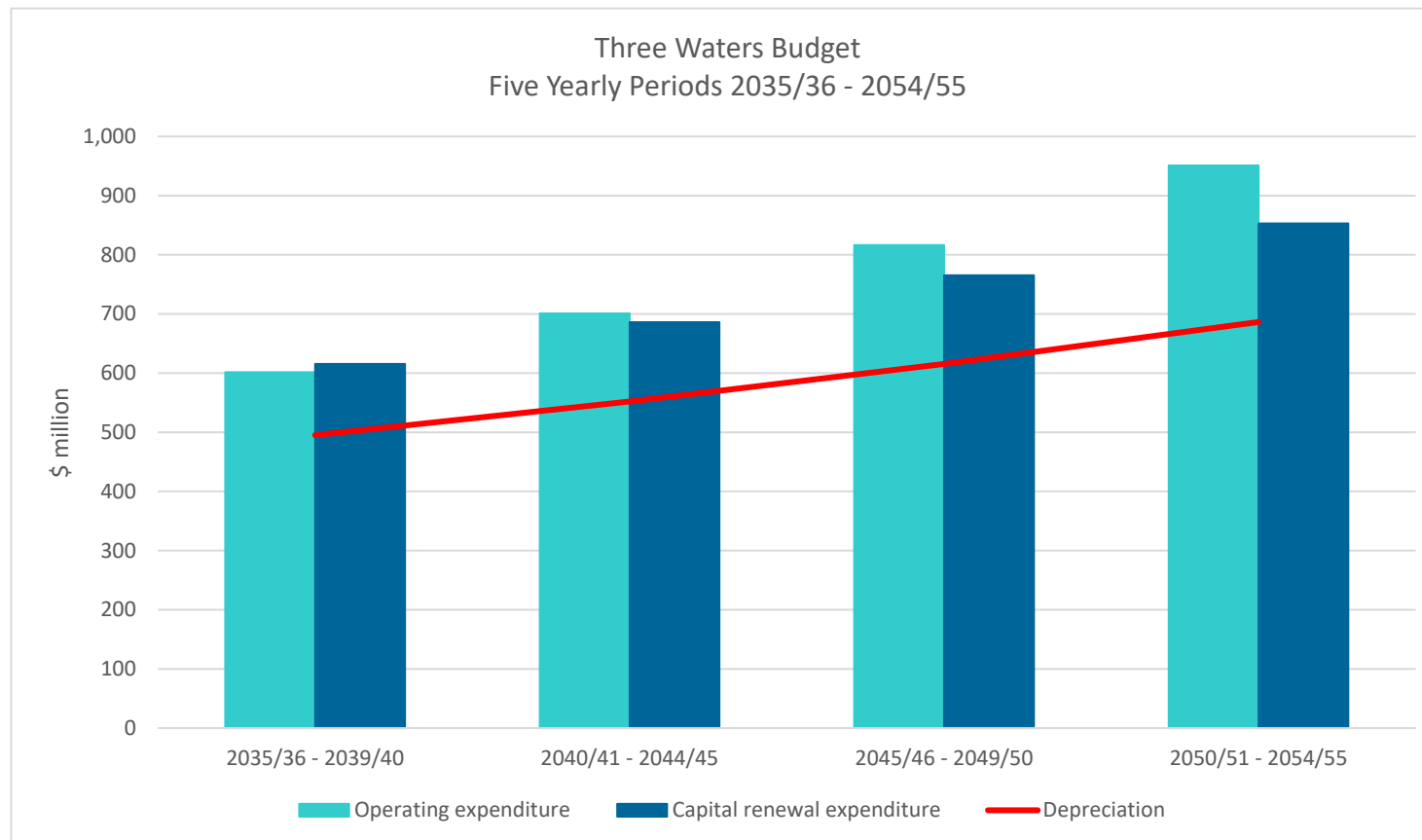


Table 12: Three waters capital renewal and operating expenditure budget, five year bands for the 11 to 30 year period

\$ million	2035/36-2039/40	2040/41-2044/45	2045/46-2049/50	2050/51-2054/55	Total
Depreciation	495.2	552.1	615.6	686.4	2,349.4
Operating expenditure	601.6	700.8	816.4	951.0	3,069.8
Capital renewal expenditure	615.40	686.0	765.2	853.1	2,919.7

Dunedin City Council

Draft Infrastructure Strategy
2025-2055 – Part 2: Transport

PART 2: TRANSPORT – EXECUTIVE SUMMARY

Part 2 of this Infrastructure Strategy sets out the Dunedin City Council's (DCC) strategy for managing transport infrastructure for the next 30 years.

The purpose of this part of the Infrastructure Strategy is to:

- Identify the significant infrastructure issues facing transport for the DCC for the next 30 years
- Identify how the DCC will manage or influence the issues identified and any subsequent implications.

Dunedin is the second largest city in the South Island with one of the largest territorial authorities in New Zealand. The transport asset base has a total replacement value of \$2.4 billion (2024) and assets depreciate by approximately \$31.4 million annually. The carriageway (transport corridor) makes up 56% of that asset base, drainage (catch pits, kerb and channel) makes up 18%, and footpaths and cycleways make up 10%. The remaining 16% of assets are street lights, bus shelters, rail, walls and seawalls.

Over the past few years investment in renewals has not kept pace with depreciation (which acts as an indicator for asset consumption).

Under-investing in renewals is not a sustainable approach for infrastructure which is required to success of our communities – environmentally, economically and socially. A poorly maintained transport network will result in increased unplanned failures disrupting essential services, commuters, freight movements and important links across communities and nationally.

Many of Dunedin's transport assets are ageing, with many nearing or exceeding the end of their useful economic lives. This document reflects an increase in capital expenditure to address the age and condition of the asset over the next three years.

The transport part of this Infrastructure Strategy mirrors the Asset Management Plan (AMP) which is provided to NZTA (Waka Kotahi) as a basis for co-funding. Both are about asset management and the investment required to meet community outcomes and expectations.

1.1 The DCC's strategic priorities for transport network infrastructure

The DCC is still guided by its Integrated Transport Strategy (ITS) of 2013. Until recently, the strategic principles between that document and the Government Policy Statement (GPS) were reasonably aligned. Under the new GPS (GPS 2024), the strategic principles are not aligned.

Local Government is reliant on co-funding from NZTA for the transport network. In order to obtain that co-funding its work has to align with the current GPS.

The challenge then lies in aligning with the recent GPS 2024 and the ITS. The two sets of strategic objectives are set side by side below for comparison:

Table 1: Legislative and planning framework impacting Transport

GPS 2024	ITS 2013
Value for Money	Travel Choices

Safety (through increased maintenance, fixing potholes and punitive measures such as fines)	Safety (through road interventions, reducing speeds, road safety education)
Economic Growth and Productivity	Freight and Resilience
Increasing maintenance and resilience	Centres (reinvigorating certain town centres)

Without an aligned approach to infrastructure management, a 30 year infrastructure strategy will constantly change as the GPS changes because of its intrinsic link to co-funding and the minimization of burden on the ratepayer.

The key strategic priorities for the transport part of this Infrastructure Strategy are drawn from commonalities and agreed Council Zero Carbon goals, the Future Development Strategy (FDS) and subsequent growth and the principles of good asset management.

- Maintaining and renewing existing assets
- Providing travel choices
- Supporting economic productivity
- Resilience - ensuring the ongoing resilience of Dunedin's transport system and key infrastructure
- Growth - planning for and responding to growth.

1.1.1 Safety

There has been a slight downward trend in deaths and serious injuries on the network over recent years, however crash numbers involving death or serious injury (DSI) has not reduced significantly. In fact, these numbers were the highest since 2019. Of particular concern is that vulnerable road users (VRU's) are over-represented in crash statistics, for example nearly a quarter (24%) of the DSI crashes involve pedestrians. Road factors are reported as being a causal factor in a significant number (10%) of crashes.

Infrastructure interventions to help address this were co-funded through the Low Cost Low Risk work programme. The interventions were typically intersection upgrades or roundabouts to improve intersection driver behaviors (to name but a few). The investment was driven on road classification (which assists in determining risk profile) and death and serious injury statistics. Low Cost Low Risk interventions such as these are no longer co-funded by NZTA, nor are they supported by the Government Policy Statement on Land Transport (GPS). Should interventions such as these be favored by the DCC, they will be at full cost to the ratepayer for at least the next three years.

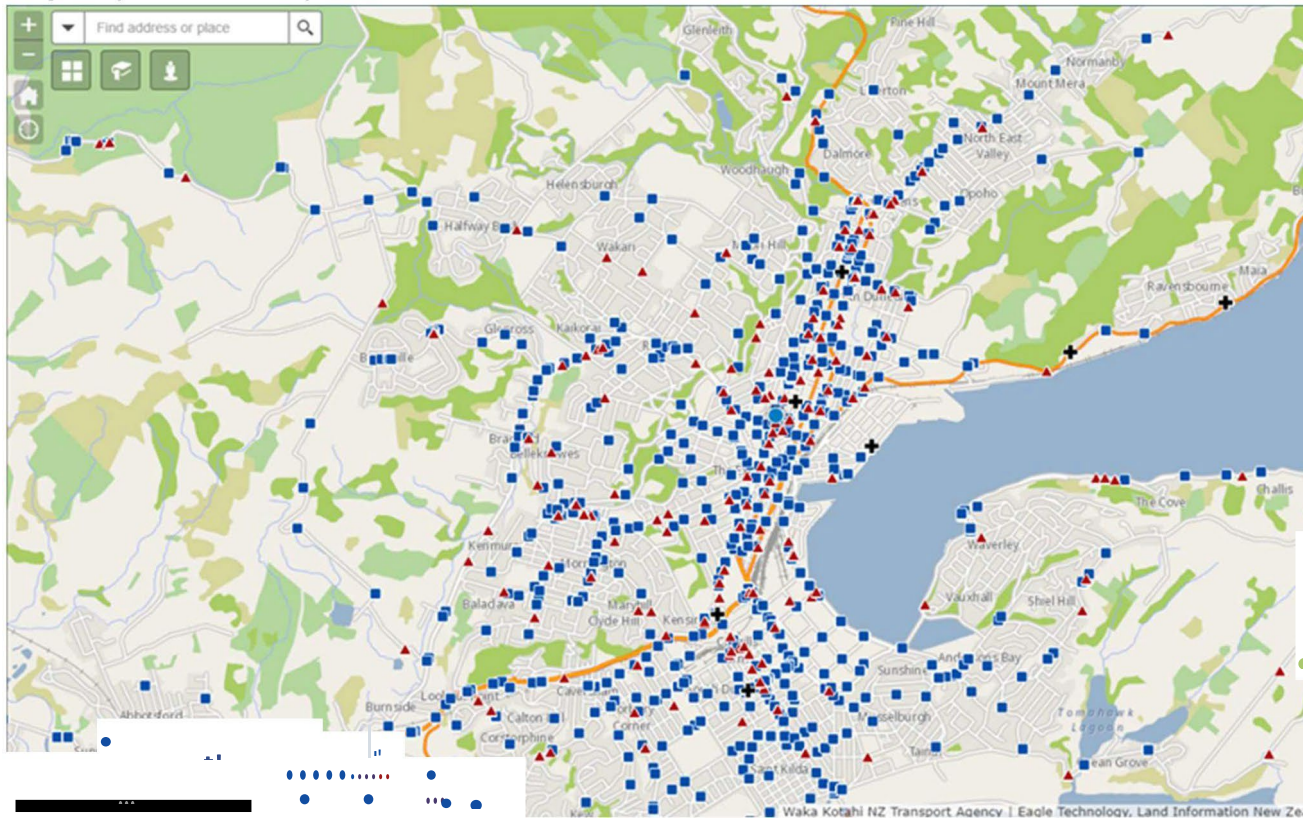


Figure 1: Map showing vulnerable fatal, serious and minor road user crashes for the period 2017-2021, orange - red being the most intensive crash areas (Source: NZTA, Safer Journeys Risk Assessment Waka Kotahi, MegaMaps RtZ Edition 2)

1.1.2 Resilience

There are ongoing responses to managing resilience in the transport corridor across the city, but significant investment is required. As weather events become more frequent consideration will need to be given to whether assumptions and designs for existing assets need to be reconsidered. As an example, should consideration be given to increasing the design assumptions behind road culverts? Do we need to increase their capacity to accommodate more frequent flooding events in the future?

Through Lifelines, agencies work together to plan alternative routes and develop strategies to respond to weather events and other natural disasters. However, these strategies largely focus on the existing asset, and its capability, not on what the asset should look like in the future.

Dunedin would need significant investment on its routes into and out of the city (both north and south) as it has limited redundancy from a linear infrastructure perspective (as road and rail largely follow one another into, and out of, the city in both directions). The limited alternative routes are constrained in their ability to take heavy vehicles

(and indeed, are themselves prone to flooding and slip risk). This is key to the supply of fast-moving imported consumer goods which predominantly come via road from the Port of Lyttleton.

There is limited investment in the 9 Year plan to address resilience issues, the investment through Crown Infrastructure Resilience Programme is primarily around areas such as the Peninsula and South Dunedin. The investment profile is small and is only committed for the 2024-2027 National Land Transport Plan (NLTP).

1.1.3 National Policy Statement for Urban Development

The Dunedin City District Plan controls what people can do on their land and how it can be developed to achieve sustainable management of natural and physical resources. This includes managing the use and development of natural and physical resources, in a way that enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety.

The National Policy Statement for Urban Development (NPS-UD) 2020 sets out the objectives and policies for planning for well-functioning urban environments under the Resource Management Act 1991. To support growth in the area, a transport assessment of the infrastructure needs for the identified growth areas has been completed. This has been translated into the Future Development Strategy FDS and informs a \$20M investment profile for the next ten years. Growth assumptions are reviewed regularly, and the investment profile for the following 20 years will be reassessed in 2034.

1.2 The current state of Dunedin's transport network infrastructure

Investment in renewals has been fiscally constrained over the past five years. Subsequently, there is a catch-up element to the renewal of the existing infrastructure. Design standards for infrastructure such as road culverts are generally to accommodate 1:20 year flood events.

The network for cycling and walking has developed over the past 20 years with separated shared paths from the city either side of the Peninsula and along the one-way pairs (SH1) that now provide an “off road” network. A gap still remains between Portobello School and Ōtākou in terms of a shared path (the continuation of the Peninsula Connection). There are no connections between the SH88 shared path and the cycleway on SH1 and no off road opportunities for cyclists/walkers from a network coming in from the south which is Dunedin’s largest commuting population.



Figure 2: Pineapple Rock on the Otago peninsula

1.3 Significant transport infrastructure opportunities, issues and options for Dunedin

1.3.1 Replacing and renewing Dunedin's ageing transport infrastructure

The DCC will increase renewals investment by 29% over the first two years of the 9 Year Plan and it plans to retain that momentum into the remainder of the 9 Year Plan and beyond. The renewals investment is based on asset lifespan and condition rating. This, of course, will rely on continued co-funding from NZTA. Without this investment, the condition of the network will continue to deteriorate with levels of service reductions, and future work will need more expensive interventions.

In the past the DCC has relied more on heavy maintenance to address asset failures versus an optimal programme of renewals which placed a heavy reliance on operating costs, rather than capital.

1.3.2 Responding to changing needs for transport infrastructure

The DCC is responding to the demand for increased travel options across the city. The DCC will continue to invest in infrastructure to support and enable all transport modes across the city where funding allows, and where co-investment is supported through alignment with the GPS. Cycle infrastructure in the CBD continues to be plagued by "gaps" joining up the network, and one of the challenges for the review of the walking and cycling network (Strategic Walking and Cycling review) is to address this.

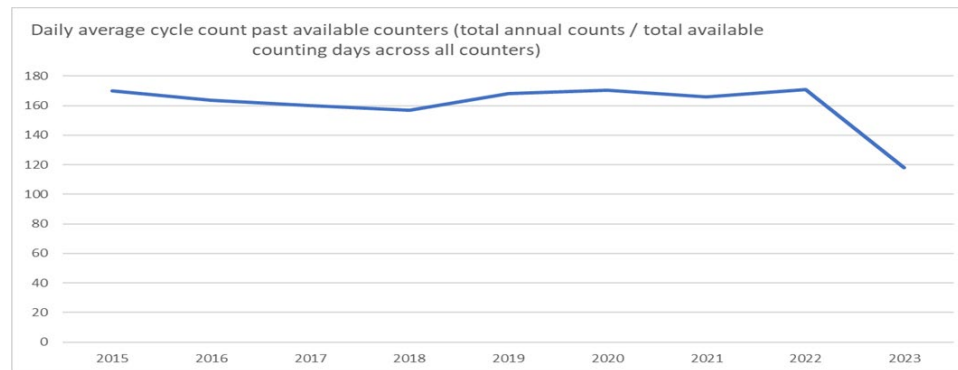
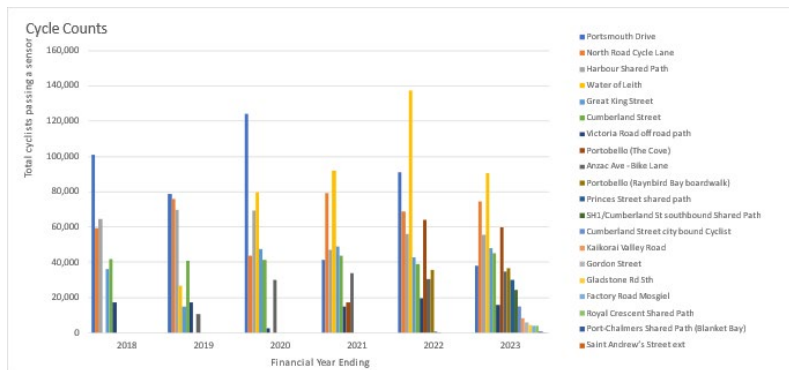


Figure 3: Cycle counts

In March 2019, the city established the central city bus hub and in 2020 there was the implementation of a cheaper and simpler fare and card system with the introduction of the Bee card. Both initiatives appear to have encouraged further uptake of public transport with bus patronage steadily increasing in the city.

Between July and September 2023, more than 850,000 passengers took the bus in Dunedin. This was a 31% rise in passenger numbers compared with the same period pre-Covid.

In comparison to last year, Dunedin recorded a 28% increase in public transport use in 2023.

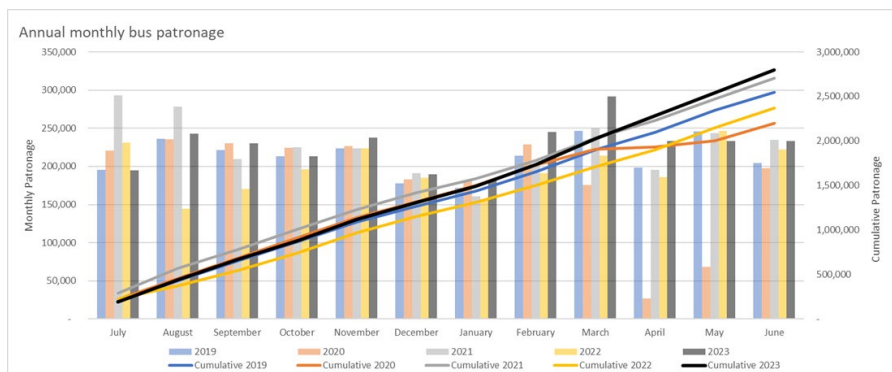


Figure 4: Annual bus patronage

The DCC works with Otago Regional Council (ORC) to provide shelter and facilities to support bus users and bus drivers. This is funded directly from ORC, and maintenance and upkeep of these facilities is managed under the maintenance contract. If changes to the bus services occur, the DCC works with ORC to change these facilities (if needed).

1.3.3 Public health and environmental outcomes

The provision of a safe and reliable transport network supports the use of active transport modes which directly affects public health through reduced road trauma and connected communities that are fit and healthy. It contributes to the DCC's Zero Carbon goals by providing transport choice across the network.

1.3.4 Resilience to natural hazards

Natural hazards pose a lesser risk when infrastructure networks are resilient. Flooding, drought, catchment fire, landslides, rising groundwater, and liquefaction in the event of an earthquake pose the most significant risks to Dunedin's infrastructure. The DCC is working to improve its understanding of natural hazards and to develop options for resilient infrastructure networks into the future, including route resilience.

Sea level rise, flooding, and storms are predicted to intensify over the next 30 years along with increased slips and erosion, increasing the risk to communities and transport networks. South Dunedin, the most densely populated part of the city, is particularly at risk of sea level rise and rising groundwater levels.

As weather events become more frequent and severe, the network's ability to recover is put under pressure particularly for communities on vulnerable routes with limited alternative access options. Such examples include:

- The coastal community of Aramoana (260 residents) is only accessible via one coastal road prone to coastal erosion and regular flooding during king tides
- Northern coastal roads from Seacliff through to Waikouaiti suffer from land instability (both road and rail) and slips are common
- Flood waters inundating the Taieri plains where there have been significant downpours in the Strath Taieri area
- Strath Taieri area (where alluvial fan flooding can occur)
- Port Otago at Port Chalmers - heavy freight and cruise ship passengers access the Port via State Highway 88. Blueskin Road is the only alternative route; however, it is frequently compromised during severe weather and not suitable for heavy vehicles.

All routes have been subject to unplanned road closure following significant weather events which have cut off communities and compromised freight routes.

Renewing ageing infrastructure in flood-prone and coastal erosion areas will reduce some risks arising from natural hazards; however, it will not solve it.

Alpine Fault Quake Resilience and Lifelines resilience projects will also help to improve the Transport networks' response to an event.

In 2024, the Lifelines vulnerability and interdependency study identified a range of strategic initiatives to create a more resilient infrastructure network, as follows:

- Continuing design and planning work to identify and prioritise responses to natural hazards in high-risk areas – this includes working with communities to identify plans for when to defend, accommodate, or retreat
- Better understanding routes that provide critical connections, the conditions of these, the pressures, and the level of investment needed to address impacts – this includes identifying priorities for network resilience
- Engaging in local planning processes to avoid infrastructure and development in areas at risk of natural hazards and climate change

- Seeking continuous improvement in network resilience through maintenance, renewals, and 'low cost/low risk' investments
- Improving operational responses to events to support quick recovery following disruption to the land transport system
- Shifting to more adaptable 'scenarios-based' planning
- Improving personal security for people using the region's transport system.

1.3.5 Planned increases or decreases in levels of service

The DCC sets levels of service in consultation with its community as part of the 9 Year Plan process. The standards at which the DCC delivers its management and maintenance of the network are a requirement of the Local Government Act 2002. They consist of a service statement, a measure, and a target. The result is transparency for the public and other stakeholders that the network can support lifestyle and business needs, and confidence in the DCC's management of the network.

As part of the 2024/34 9 Year Plan process the DCC reviewed its levels of service. The only change is that the parking levels of service focus on the use of parking in the city, rather than the more subjective approach of residents' satisfaction.

In our last 10 year plan, the DCC acknowledged that Dunedin's infrastructure networks including transport services, have been neglected in the past. Over many years there has been insufficient investment in their maintenance and renewals, and as a result, the DCC has found itself in catch up mode, where significant work is needed to ensure reliability of its basic infrastructure.

Since 2021, the DCC has increased its maintenance and renewals spend on these networks, not to increase levels of services, but to maintain existing levels of service. The Transport team will, within its available budget, continually look for ways to ensure maintenance of its levels of service, along with concentrating on delivering a safe network.

1.3.6 Urban Growth Agenda

The 2017-2023 Labour Government developed an Urban Growth Agenda that aimed to remove barriers to the supply of land and infrastructure and make room for cities to grow up and out. It has five interconnected focus areas:

- Infrastructure funding and financing
- Urban planning
- Spatial planning
- Transport pricing
- Legislative reform.

As a result of this Agenda, all councils were required to develop a Future Development Strategy (FDS). The FDS for transport has been developed and forms part of the 9 Year Plan. The growth areas identified have been assessed for the need for transport infrastructure to support the predicted growth. The type of infrastructure identified consists

of traffic signals, roundabouts, new and extended footpaths, and kerb build outs (to name but a few). This infrastructure helps support growth by enabling travel options, managing safety, and reducing congestion. However, in light of the GPS 2024, that infrastructure is unlikely to be currently co-funded by NZTA.

1.3.7 Government Policy Statement on Land Transport

The Government has four strategic priorities which GPS (2024) will deliver against:

- Economic Growth and Productivity
- Increased Maintenance and Resilience
- Safety
- Value for Money.

The Economic Growth and Productivity strategic priority is the overarching strategic priority for the direction of this GPS. Increased maintenance and resilience, safety and value for money are all equally weighted and important priorities that collectively support the delivery of a transport system that drives economic growth and productivity.

1.3.8 Zero Carbon 2030 target

In June 2019, DCC declared a climate emergency. The 'Zero Carbon 2030' target seeks to achieve city-wide net carbon neutrality (excluding biogenic methane) by 2030. The transport sector is Dunedin's most significant, and fastest growing, source of emissions. On-road transport generates 56% of transport sector emissions. Cars generate almost half of all on-road emissions. Many more trips are taken by car than by commercial vehicles (e.g. light trucks, SUVs), but petrol (used by most cars) is less carbon intensive than diesel (used by most commercial vehicles).

A further third of emissions is generated by trips taken in light commercial vehicles. Trips by heavy vehicles and buses make up the remainder.

Emissions from this sector are closely linked to urban form, which in turn is greatly influenced by the provision of transport and 3 Waters network infrastructure. Trends suggest that with increasing investment in infrastructure to improve the levels of service for active and public transport modes, there is a slow increase in uptake, and with increasing intensification of urban form, these trends are likely to continue.

Overall, intensification enabled by the 2GP, Dunedin's District Plan, is likely to continue to promote shorter commutes and greater use of public and active modes. However, enabling density in planning frameworks doesn't mean it will happen. Development needs to be attractive and there needs to be supporting services like water and transport networks.

The DCC is also taking account of Zero Carbon targets in its spatial planning for the city, including the need for density close to centres and public transport. The key themes in the Zero Carbon plan to support carbon neutral by 2030 from a transport perspective are:

- Developing convenient and attractive walking and cycling networks and public transport services.
- Boosting travel demand management to support use of active and public transport modes.
- Shifting freight to low emissions.

- Decarbonisation of the Heavy Vehicle fleet.

1.4 The plan to address Dunedin's network infrastructure issues over the next 30 years

In developing the Infrastructure Strategy for the DCC, the focus has shifted to renewal of the existing asset to align with GPS 2024 and subsequent NZTA co-funding. However, regardless of Government policy, asset management and renewals are a known need that is not subject to change as the Government changes. Consistent investment in renewals over the 30 year period will ensure two things, the first that it meets the expectations of the city in terms of provision of existing infrastructure, the second that it ensures the city is not faced with a bow wave of renewals capital in the future associated with deferring asset management driven renewal activities.

The overarching strategic premise of the Infrastructure Strategy is to address deferrals in a way that maintains existing service levels and minimises disruption. Sustainability for the contracting market is also another consideration, and costs have been prepared with market capacity in mind forecasting stepped increases to allow for growth to deliver a sustainable volume of renewals.

The Infrastructure Strategy therefore proposes sustained renewal investment.

The level of investment in transport renewals across the city aims to maintain existing levels of service. It focusses on replacing existing assets based on asset management principles of age and conditions. Overall, in the mid to long term, budgets are set with the aim of retaining an asset management driven approach to renewals based on age and condition.

Sea walls, retaining walls and drainage work programmes continue to be assessed considering changing weather patterns however, significant investment to mitigate the impact from sea level rise in the transport corridor is unlikely.

Long-term investment in the transport network will need to focus on resilience to natural hazards (e.g. St Clair sea wall) and consider efficiency and movement of freight and people on the transport corridor.

Continued investment in transport options (where co-funding allows) will need future consideration, as may alternative forms of public transport to support growth and the growing demand for end-to-end public transport journeys.

The DCC has included other projects in the Regional Land Transport Plan, and as the NLTP has been recently released, it is clear funding for walking, cycling and safety interventions (such as pedestrian crossings, kerb build outs) are not a priority of GPS 2024 and will not be co-funded at least for the next three years.

However, the community expects safety interventions in the transport corridor to support the liveability of their communities. These interventions are part of the 9 Year Plan but will need to be wholly DCC funded. These interventions do not align with GPS 2024. Recognizing the likelihood of the need to catch up on this investment, larger allowances have been made in year 5 of the 9 Year Plan for this activity.

Economic development is another area of focus for the Infrastructure Strategy. Ensuring our networks support supply chains that support and grow our economic activity will be important for the future.

Transport infrastructure connects Dunedin to other regions and countries through state highways, the South Island main trunk railway line, Port of Otago and Dunedin Airport. Ongoing investment in land transport (road and rail) is important to enable the export sector to maintain (if not grow) and reflects the importance of the freight task to gross domestic product.

Port of Otago is New Zealand's second only deep-water port and highest export port (in \$/commodity value). Southland export products such as meat and dairy are almost exclusively exported through Port of Otago (and is predominantly transported to Dunedin by rail).

Port of Otago will be moving part of their operation to Mosgiel and is in the process of establishing an inland Port (to the west end of Mosgiel). This inland Port will prove much needed capacity for the Port's operations. The DCC supports the citing of the inland Port and is working with developers to assess the impact on traffic volume from this location to Port of Otago. It is unlikely that the transport corridor around Mosgiel will see any significant increase in heavy vehicle movement for the first five years of the inland Port's operations there, or that there will be a reliance on rail transport from Mosgiel to the Port. The DCC will work with developers to establish what impact (if any) the operation has on the transport corridor and will include any recommendations for additional infrastructure in future RLTP's.

The forestry sector is growing in and around the Otago/Southland area, and approximately 100 log trucks traverse the highways and roads of Dunedin to Port of Otago every day to serve this market. The DCC is currently investigating whether this product could transfer to rail, via an inland port south of the Dunedin area (Clutha District). Mode choice for freight is largely a commercial choice so understanding what interventions local and central government can make in this industry is complex. DCC does however, recognize that Gordon Road (the main street through Mosgiel, and a state highway) plays home to many of these logging trucks passing through from their origin to their destination, and the impact this has on liveability, retail, and amenity.

A transport plan for Mosgiel is due to be completed in 2024-2027. The outcomes of this transport plan are to establish the next level of transport investment required for the Mosgiel area over the next ten years, identifying issues and opportunities in the transport network, and noting that the DCC is already working with other parties to support the citing of Port of Otago's inland port west of Mosgiel.

1.5 Why is our infrastructure important?

1.5.1 Purpose of the transport network

The role of the transport network is to provide safe access to move people and goods to destinations. To support that the DCC manages the following assets.

- 1,076km of sealed roads
- 681km of unsealed roads
- 983km of footpaths and cycleways
- 251 bridges
- 42km of seawalls
- Shelters 369 (please note these are owned by DCC, but their renewal and maintenance is 100% funded by ORC)
- 8,760 catch pits (chambers/mudtanks) (3% increase from 2021-2031 Long Term Plan)
- 5,780 culverts (pipes)
- Parking management system that ensures the community has access to businesses and services
- Streetlights.



Figure 5: Diagram of transport infrastructure

1.6 How does the DCC assess the condition of transport assets?

The Transport team uses a rolling programme of condition assessments and age profiles to inform renewals decisions. For co-funding from NZTA Waka Kotahi, an Asset Management Plan is required. The level of confidence in the knowledge of the DCC's transport assets is high.

All assets have a finite lifespan, but they differ in terms of their use. Many things influence how an asset performs against that lifespan. Exposure to environmental conditions, different material composition, use (both in weight and frequency) are but a few of the contributors to asset condition. Sometimes assets can be extended beyond their predicted lifespan, but other times those contributors to asset condition will create a situation where the asset needs to be replaced at end of life, or before.

Overall fiscal constraints in previous years have meant DCC has not met its asset management driven targets for renewals. Since 2021, the gap between asset management driven replacement and available funding has been 2021 (-15%), 2022 (-13%) and 2023 (-9%). As a result, renewals values have increased by 29% from the 2022/23 financial year.

Assets are not all installed or renewed at the same time, and, as such, the asset management driven spend on renewals is not linear. Equally, the contributors to asset condition (discussed above) can speed up asset management replacement needs and subsequently change the overall investment profile.

To manage asset needs and fiscal constraints, strategies have been employed to increase the assets' longevity. In some cases, however, these strategies only last so long. For example, the maximum number of seal layers you can add to a road is six, after that a full rehabilitation should take place. Failing to do that (and adding additional layers) will add to the crown of the road and exacerbate drainage issues. Six percent of the current network has six or more seal layers.

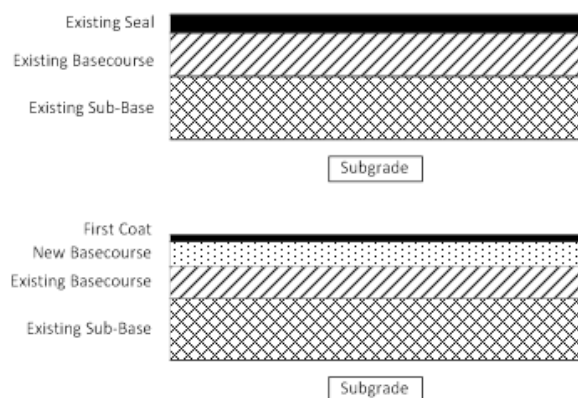





Figure 6: Seal layers

Deferral is a strategy to manage fiscal constraints associated with asset management. This approach is illustrated in our kerb and channel condition rating. A high percentage of this asset is rated poor or very poor in terms of condition so it will take a number of years to address the backlog in their asset renewal.




The higher costs across the construction sector post Covid have compounded the fiscal constraints with asset renewals. Footpath renewals (although flatlined from an asset replacement value) are opening up in cost differential in comparison to previous years (i.e. prices are higher), so renewals values reflect increased costs for this asset renewal.







1.6.1 Summary of transport assets

Asset condition

	Significant number of assets in poor condition
	Some assets in poor condition
	No or few assets in poor condition

Asset capacity

	Significant capacity issues currently experienced
	Capacity issues in some areas and/or capacity issues can be expected
	No or minor capacity issues and none are currently expected

Asset group and type	Number/Length	Value \$000	Asset condition	Asset capacity
Paved roads	1,076 km	\$619,131	 <p>Road pavements are in decline. Most of Dunedin's sealed pavements have a theoretical useful life ranging from 60-100 years. 50% of pavements are aged 60 years and over. Based on condition assessment road condition is in decline. Smooth travel exposure for urban roads has sat below target for the past 6 years and has slowly declined.</p> <p>Dunedin's roads have been built up over decades of overlaying surfaces with a new seal. The maximum number of seals should be 6 layers; 5.8% of the network currently has 6 or more seal layers with 16.9% facing a last seal.</p>	 <p>In capacity terms, the Dunedin urban network is experiencing congestion at certain parts of the day. Interventions such as the Harbor Arterial bypass and many of the Shaping Future Dunedin Transport projects, including some funded wholly by Waka Kotahi and ORC, are designed to enable mode shift to help reduce congestion around the new Dunedin hospital.</p>
Unsealed gravel roads	681km	\$16,202	 <p>Gravel roads are maintained in a good condition. Dust suppression application has changed meaning residents can co-pay for dust suppression or otta sealing. The latter causes less dust issues but does rely on resident co-funding. In the short term we may see an increase in the volume of dust on un-sealed roads.</p>	 <p>In capacity terms the Dunedin transport network is fit for purpose and can cope with traffic demands.</p>
Footpaths and Cycleways	2.14km ²	\$161,838	 <p>There are a high percentage of footpaths that have exceeded their life or are nearing the end of their economic life. Asphalt footpaths, that represent 85% of footpaths, have approximately 23% of the network at the end or nearing the end of their expected economic life. Concrete footpaths, that make up 6% of footpaths, have approximately 43% exceeding their expected economic life. Slurry seals, that represent 9% of footpaths, have 84% exceeding or nearing the end of their</p>	 <p>In capacity terms, Dunedin's footpaths are fit for purpose and can cope with pedestrian demands. There are no new footpath or footpath extensions planned unless they are funded as part of growth under the Future Development Strategy or through Development Contributions.</p>

Asset group and type	Number/Length	Value \$000	Asset condition	Asset capacity
			expected economic life. In the past 3 years 11% of the network has shown signs of deteriorating with a higher proportion moving to average condition from good to very good.	
Road drainage Surface Water Channels	1,140km	\$306,823	Surface Water Channel, particularly kerb and channel condition, is showing signs of decline. In 2022/23, 12% of the network was in poor to very poor condition and without increased investment this is expected to rise as more reach the end of their economic lives.	The surface water channel is fit for purpose in terms of water carrying capacity and generally only declines in terms of capacity if it is not maintained well. This asset provides a like for like capacity outcome when renewed at existing locations.
Signs, road markings, signals, outreaches, controllers and poles	23,559 (non-electronic signals) 52 sets of traffic signals 4,135 outreaches 14,242 controllers 19,379 poles (signs, signals and streetlights)	\$36,344	Signs, road markings and signals are maintained to a good condition.	General road signs have a limited impact on capacity. Traffic signals do have an impact on capacity and ongoing monitoring of those traffic signals can lead to interventions that can create more capacity (or less congestion) in the transport corridor. These interventions are normally managed by changing phasing and are not related to capital investment in the infrastructure itself.
Streetlights	14,027 streetlights	\$10,709	607 streetlights and bollards are using ageing high pressure sodium light fittings and need renewing to LED fittings. To standardize the asset across the city there is a small amount of heritage lights that need upgraded to the new LED lights. This will mean from a maintainability perspective managing street lights will be consistent across the city and from an operating perspective these lights can also join a central management system (this enables the street lights to be operated remotely).	The capacity of the streetlights themselves is good, and the ability to be able to “remote operate through the CMS system” streetlights means the transport network can respond to events where capacity through the system needs to be managed. All streetlights on the NZTA network were previously managed through the CMS system, these streetlights will be centralized into NZTA’s own CMS system in the future.

Asset group and type	Number/Length	Value \$000	Asset condition	Asset capacity
Bridges	251 bridges	\$292,461	Bridges are in largely good condition, noting DCC does not have a large number of timber bridges.	The capacity of these assets is fit for purpose, and none of the bridges across the network act as a limiter for overall network capacity (either in traffic volume or axle loading).
Drainage (Catchpits/ chambers, culverts, pipes)	9,016 catchpits / chambers 5,885 culverts 9,916 pipes	\$446,491	There are 12 culverts in poor to very poor condition. The condition of 32% of all culverts is unknown at this time. The expected age for mud-tanks is 80 years. 73% are aged between 70-79 years, thus nearing the end of their estimated lives. However, in terms of their structural condition (which is largely unknown), as long as catch pits are adequately maintained it would be expected they would live well beyond their estimated lives. 1,305 catch pits cannot be compliant with contract specifications of 150mm of freeboard from top of silt to bottom of outlet. These are our priority to renew.	Given changing weather patterns, emphasis has been placed on ensuring culverts and catch pits are maintained to a high standard. Capacity may become an issue in the face of significant adverse conditions.
Sea walls	101,045m ²	\$68,461	Isolated areas of the West Harbour and Peninsula back beaches are in poor to very poor condition and require remedial work in the short-term.	Isolated areas of the network are compromised during significant weather events and will require future investment.
Retaining walls	58,653m ²	\$66,816	Many of Dunedin's retaining walls were made many years ago and do not meet the current design requirements. Many provide resistance to surface erosion, rain, and weathering but are not able to retain saturated retained material. As such many may be at risk of failure during high rainfall vents and are routinely inspected and monitored for movement and condition.	Given changing weather patterns and the age of some retaining walls capacity may become an issue.
Minor structures (barriers, rails, seats, bollards, others)	282 barriers 2,725m of rails 401 seats 668 bollards	\$17,552	Minor structures are maintained regularly and are in good condition.	Good

1.7 How the infrastructure strategy contributes to Dunedin's community outcomes

Investing in Dunedin's transport infrastructure will contribute to achieving the city's community outcomes and the vision of making Dunedin one of the world's great small cities. This table shows how key projects link to Dunedin's community outcomes.

Table 2: Transport infrastructure projects contributing to community outcomes

Community outcome	Transport infrastructure projects contributing to the community outcomes
A supportive city with caring communities and a great quality of life.	<p>Renewing existing infrastructure across the city will contribute to the ability to move around productively and will provide transport choices to the community. The ongoing annual programme of renewals will maintain existing levels of service across the transport network, including pavement reseals.</p> <p>Ensuring assets are managed and replaced at end of life or use will ensure future generations are not burdened with the debt of deferred maintenance.</p> <p>Providing a parking management system that enables the community to find a park with ease will contribute to economic prosperity of the retail sector.</p> <p>The Shaping Future Dunedin Transport programme will deliver improvements in the central city and Mosgiel to reduce congestion and provide greater transport choice.</p> <p>Planning for and enabling growth (where it occurs) through the provision of infrastructure will enable people to move around the city, ensuring there are transport choices, and support for economic development.</p>
A connected city with a safe, accessible, and low-carbon transport system.	<p>The Tunnels Trail shared path will provide a walking and cycling route linking Dunedin to Mosgiel providing transport choice to the heavily populated areas to the south of the city.</p> <p>Consideration will be given to the remainder of the cycling and walking network (as part of the 9 Year plan) and how programs of work are funded in the future and how the gaps in that network are addressed, particularly getting into the CBD.</p> <p>The Shaping Future Dunedin Transport programme will improve transport choices connecting to the central city including upgrades to Princes and Street, St Andrew's Street and a cycleway on Albany Street to support people to move into, out of, and around central Dunedin.</p>

Community outcome	Transport infrastructure projects contributing to the community outcomes
A successful city with a diverse, innovative and productive economy,	<p>The Harbour Arterial bypass (as part of the Shaping Future Dunedin Transport (SFDT) programme) will support improvements to the freight network.</p> <p>Support for establishing an inland Port in Mosgiel will help grow the export market.</p> <p>Investigations into an inland Port south of Dunedin to support the export market for forestry will continue.</p>

1.8 Where are we now? Dunedin's transport infrastructure

Resilience in the transport network infrastructure is under increasing pressure as many assets are becoming more at risk from flooding, erosion and king tides. Generally, the network has sufficient capacity with congestion only experienced in short morning and afternoon commuter peaks.

In the main urban areas, a small number of key intersections have safety or capacity issues. Mosgiel has capacity and safety issues at the Gordon Road/Gladstone Road intersection, including the rail crossing and the intersection of Quarry Road and SH1, which can cause traffic to back up onto the southern motorway at peak times.

Portobello Road along the Otago Peninsula and State Highway 88 to Port Chalmers have good provision for cycling and walking between suburbs and into the city centre. In the case of Portobello Road, the road does not allow for safe access to the shared path or public transport on the harbour side of the road (in some areas). In some places, the width of the road makes it either very costly or impossible to provide safe crossing points to the harbour shared pathway or locate bus stops appropriately.

The intersection between North Road and Opoho Road has safety, capacity and resilience issues, and the intersection between Great King Street and State Highway 1 remains a safety concern. The bottleneck at the North Road and Opoho Road intersection remains a challenge as it is physically constrained.

Other parts of the network experience congestion for short periods at peak times, but traffic volumes ease quickly, and this is not considered a constraint on future urban development.

Heavy vehicle movements continue to put pressure on road pavements and deterioration of roading assets is being observed. This is particularly evident on roads from the south to the Port and the inner harbour.

Over the past few years investment in renewals has not kept pace with depreciation and if not addressed will begin to impact levels of service, growth opportunities and future economic development.

The detail below presents the deferral of renewals in the past.

Kerb and Channel (network percentage completed)

- 2021/2022 0.8% completed vs target of 1.25%
- 2022/2023 0.7% completed vs target of 1.25%

- 2023/2024 0.7% completed vs target of 1.25%

Resealing (network percentage completed)

- 2021/2022 4.4% completed vs target of 6%
- 2022/2023 6% completed vs target of 6%
- 2023/2024 5.1% completed vs target of 6%

Footpaths (network percentage completed)

- 2021/2022 2.8% completed vs target of 4%
- 2022/2023 3.4% completed vs target of 4%
- 2023/2024 3.3% completed vs target of 4%

Dunedin's transport network is made up of \$2.4 billion worth of assets (2024 replacement value). 50% of Dunedin's sealed pavements are aged 60 years or over (theoretical asset life ranges from 60 to 100 years).

Road surfaces in Dunedin have an age range of 9-25 years, and 6% of these surfaces are aged 20 years. 42% of these surfaces reach the end of their asset lifespan in years 10-20. The graphs below illustrate the age profile of various assets across the transport portfolio. These graphs indicate the complexity when planning from a budget perspective for asset renewal and illustrate how budget profiles for asset renewals are very rarely (if ever) linear.

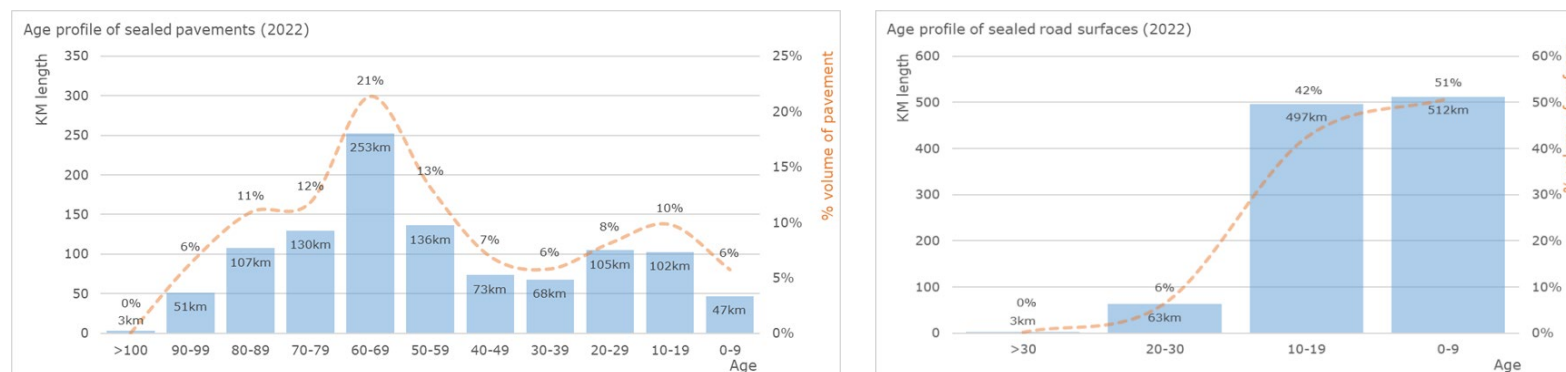


Figure 7: Age profile of sealed pavements and road surfaces

Dunedin's roads have been built up over many years overlaying surfaces with a new seal. This has resulted in the crown of the road being higher than the kerb height in areas and reducing the capacity of the road to hold water during heavy rain events, as well as introducing issues for mobility users. The maximum number of seals should be six layers and 6% of the network currently has six or more seal layers with 16.9% facing a last seal (illustrated below).

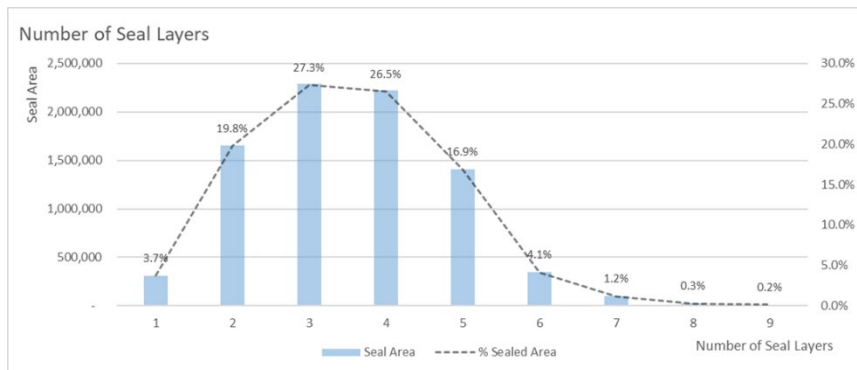


Figure 8: Number of seal layers

Stormwater assets (kerb and channel, culverts and catch pits) represent 18% of the total value of the asset portfolio. The expected age for kerb and channel is between 60 and 100 years and approximately 31% of the assets are over 60 years (note labelled surface water channels in graph below). Kerb and channel condition ratings show signs of decline with 12% of the network in poor to very poor condition.

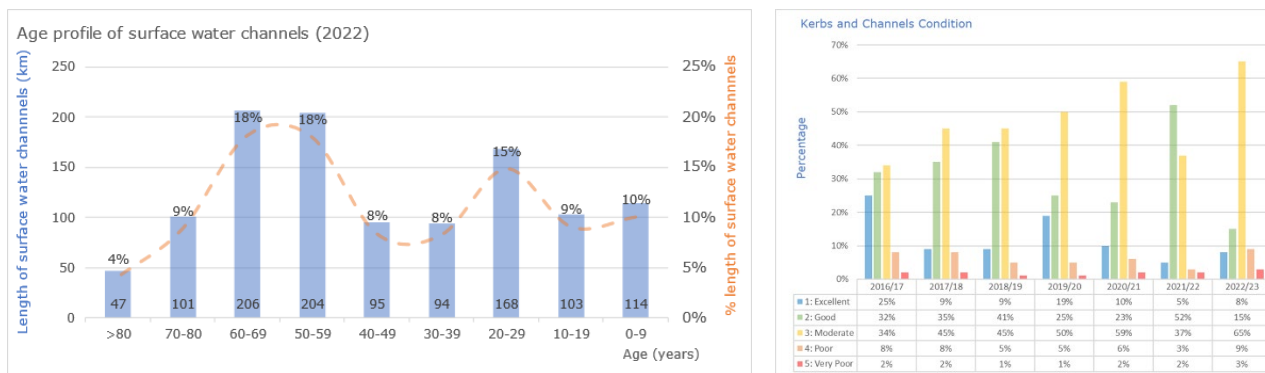


Figure 9: Age profile and condition of water channels and kerb & channels

Catch pits (mudtanks) have an expected life of 80 years. 72.6% of total catchpits are over 70 years old. Asset management of catchpits is normally through inspection, and they are graded according to their serviceability. Adequately maintained catchpits would be expected to live well beyond their expected (asset) life.

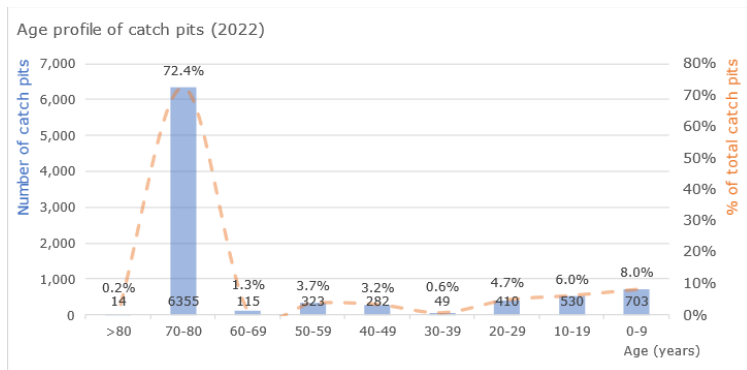


Figure 10: Age profile of catch pits

The asset life of a culvert is 80 years. 43% of these assets are over 70 years. Culverts are regularly inspected for condition and only a small number of culverts are rated in a poor condition. Culverts, however, are subject to influences outside of the asset more than most. Changes in weather patterns and surrounding vegetation can impact culvert performance significantly.

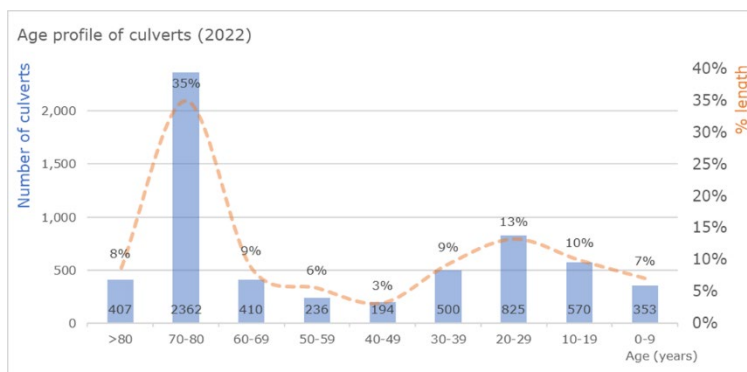


Figure 11: Age profile of culverts

Dunedin has 249 bridges, 728m² of retaining walls and 101,969m² of sea walls. Many of Dunedin's bridges are made of stone, wrought iron and steel with some early examples of reinforced concrete. Many other parts of New Zealand have a large component of timber bridges (which have shorter lifespans). In Dunedin, if bridges are suitably maintained there is no requirement for any major bridge replacements in the next ten years.

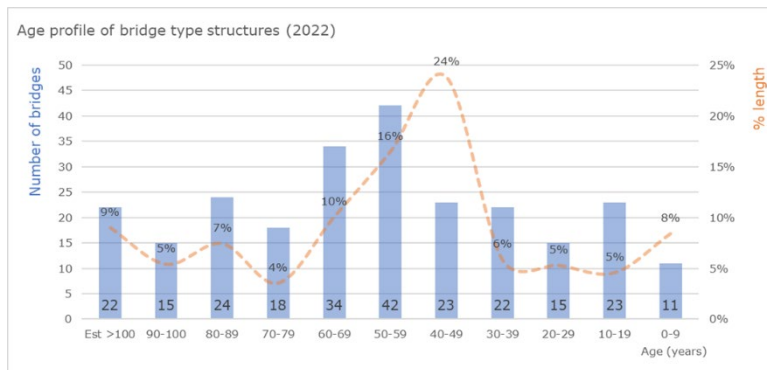


Figure 12: Age profile of bridge structures

Most of Dunedin's sea walls are made of stacked rock or stone. They have no estimated replacement date and are expected to last if they are fit for purpose (maintenance of these walls involves restacking the stone when required). The St Clair sea wall has design deficiencies so is regularly monitored and maintained and is currently structurally sound.

Most of Dunedin's retaining walls are masonry walls or concrete slope facings rather than structural retaining walls. A theoretical life of a retaining wall is 80 years, 79% of current retaining walls are past their asset life.

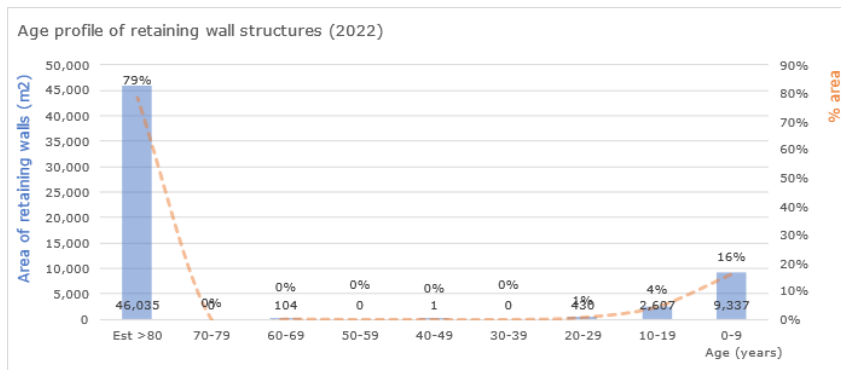


Figure 13: Age profile of retaining walls

Dunedin's 989kms of footpath are predominantly made of asphalt (85%), the remaining are concrete, metal and slurry. Asphalt has a life expediency of 25-30 years; slurry has 10 years and concrete has 60 years. 23% of the asphalt footpaths are near the end of their asset life. In terms of condition, a reasonably high proportion of footpaths are in poor to very poor condition. In the past three years, footpaths rated poor or very poor represented 18% of the total footpath asset.

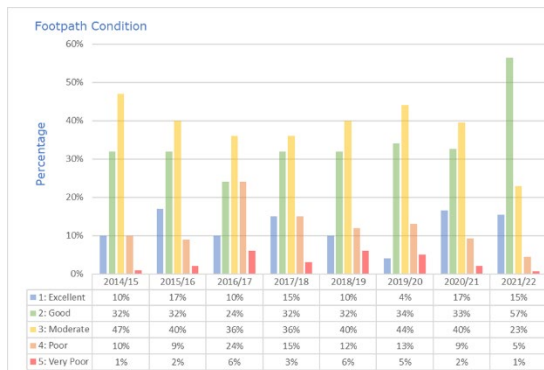
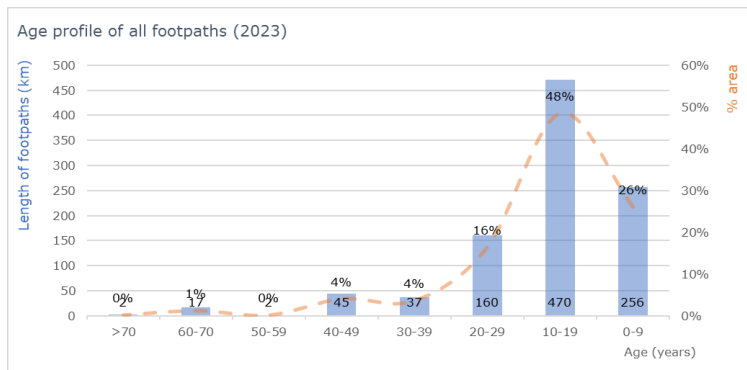


Figure 14: Age and condition profile of footpaths

The Smooth Travel Exposure survey (below) illustrates that the roughness of Dunedin's roads is increasing. In comparison to other local authorities, Dunedin performs poorly. Smooth Travel Exposure for urban roads has sat below the target measure for the past 11 years (a Department of Internal Affairs measure).

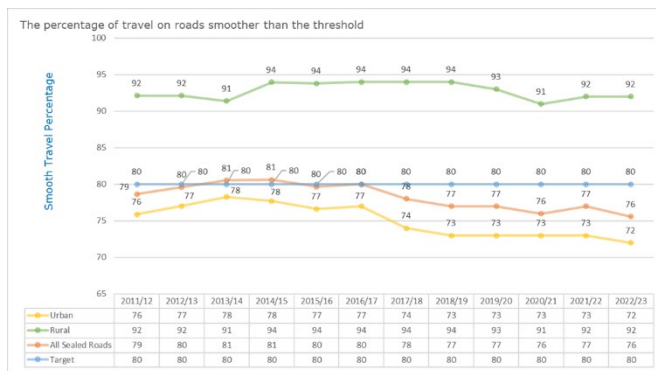


Figure 15: Percentage of travel on roads smoother than threshold

The graph below outlines renewal spend vs actual spend vs depreciation (in the past). Depreciation acts as an indicator for asset consumption, and it shows consistent and material under-investment in the past.

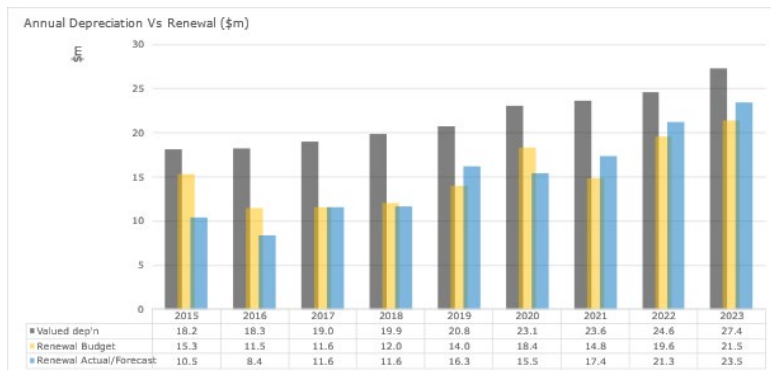


Figure 16: Depreciation vs renewals

Renewal quantities for the past six years are presented in the graphs below for reseals, footpaths and kerb and channel and show they have consistently been below asset management targets. This has led to a corresponding decline in asset condition and levels of service, and an increase in deferred renewals.

The 2024 Asset Management Plan and this Infrastructure Strategy propose sustained renewal investment. In 2024-27 this represents a 52% cost increase on the NZTA approved programme for 2021-24 and a 29% cost increase on the DCC's 2021-24 forecasted spend.

1.9 Managing Dunedin's transport infrastructure

Asset renewal across the city continues to evolve in terms of determining the impact changes in the climate have on the existing asset. Dunedin is not alone in developing the capability to determine where weather events are having an impact on asset condition. Asset renewal capability is robust, but the impact climate change has on those assumptions, is still evolving.

Dunedin's public transport (bus) network performs well in terms of patronage compared to New Zealand cities of a similar size, but there have been criticisms by bus users at times about the reliability, frequency, and travel times. Dunedin's cycling network still suffers from gaps linking the city, although longer separated cycleways (shared paths) have been reasonably well catered for in the past ten years.

Several factors are considered when managing Dunedin's transport infrastructure:

- Asset age, condition, and performance
- Changes to population and land use
- Changes to Government Policy Statement on Land Transport
- Climate change
- Maintenance to repair defects and preserve remaining asset life.

The Dunedin Integrated Transport Strategy 2013 is an overarching strategy covering the whole of Dunedin's transport system and is designed to enable the DCC to review its investment priorities and ensure they are relevant to the current and future needs of Dunedin. It identifies and outlines areas of focus developed from several transport challenges and issues that Dunedin faces. The strategy focuses on transport choice whilst maintaining the levels of service for transport corridor users. The corresponding Asset Management Plan determines a condition-based asset renewal programme that sets the level of investment required to maintain the existing transport infrastructure across Dunedin City.

1.10 Renewing and replacing assets

Transport asset risk management is undertaken using a rolling programme of condition assessments to inform renewals decisions.

Condition is the main indicator used to understand if and how transport assets are deteriorating. The DCC's asset management planning is increasingly focused on asset condition coupled with age profiles and risk assessments. From time to time however, fiscal constraints need to be considered in asset renewal strategies.

1.10.1 Principal options and implications of replacing and renewing ageing infrastructure.

The option that the DCC has decided to take is highlighted in green.

	1-10 years (2035)	10-30 years (2055)	30-50 years (2075)
Renewals delivery continues at current rates, with no plans to increase internal or external delivery capacity	Transport renewals continue to be prioritised in accordance with known asset condition and performance within existing budgets, however ageing assets mean risk to service levels increase.	The value of renewals required versus those undertaken will continue for 30 years, based on the increasing age of assets and inflation.	The value of renewals undertaken is expected to flatline in the long-term. The design and delivery of renewals will become more effective in maintaining service levels over the longer term, as internal and external capacity to deliver is increased.
Renewals delivery is increased over time as internal and external capacity to deliver is increased.	As above, however renewals delivery is increased in years 1-3 to reflect asset replacement (based on age and condition rating) needs. From years 3-10 renewals value will be gradually increased year by year.	The renewals programme will be more effective in reducing maintenance and operating expenditure and reducing the risk of deteriorating service levels. Non-critical issues, or those that affect a limited number of customers, can be addressed more quickly than they otherwise would.	As above, however, infrastructure risk profiles will be reduced as delivery of the renewals programme begins to outpace the rate at which asset age and condition deteriorate. Operations and maintenance costs can be reduced, and issues will become less prevalent.

1-10 years (2035)		10-30 years (2055)	30-50 years (2075)
Renewals delivery is accelerated in the early years of the plan, increased overall	As above, but with significant budget moved to years 1-2 to address priority renewals. Deferred or removed projects to be completed.	The renewals programme will be most effective in reducing maintenance and expenditure.	The value of renewals undertaken is expected to flatline at a much faster rate than in other options.

1.11 Responses to growth or decline in demand

Factors such as population growth, the rate and type of economic growth, the rate of growth in dwellings and where future housing developments occur will have an impact on the demand for infrastructure.

In terms of growth, the 2023 Housing Capacity report states that growth peaked at 1.4% for the year to June 2016 and then dropped to 0.5% for the year to June 2020 (mostly due to COVID restrictions). Recently, population growth is increasing again (between 2022-2023), with a 1.1% increase in 2023 from the previous year. Population is expected to grow at a relatively high rate between 2025 – 2034 before slowing between 2034-2055. However, there is a relatively slow rate of growth between 2024-2027 (short-term). This offers an opportunity to respond to the FDS post 2027, noting most of the FDS related transport infrastructure investments will not be co-funded in the short-term. The dwelling growth strategy is centred around intensification of existing urban areas. The following graph has been extrapolated from the growth and economic significant forecasting assumptions for the 9 year plan 2025-34 .

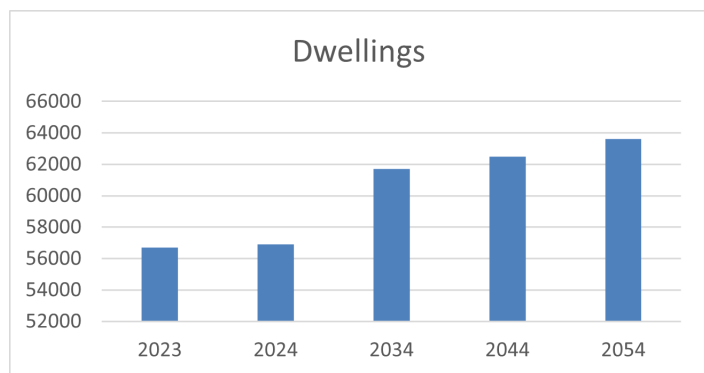


Figure 17: Dwelling growth

In 2023, primarily to inform the FDS, an update to the 2021 assessment was undertaken. The update considered recent changes to population growth and development trends, and updated the demand for dwellings, supply of development capacity, and the sufficiency of development capacity to meet demand. To respond to this, an infrastructure programme has been developed which indicates the transport requirements to accommodate areas of growth to support a safe, connected transport network providing transport choices. Congestion does need to be considered, and where possible infrastructure has been planned into areas where congestion (through additional

dwelling) might occur. DCC cannot provide for infrastructure for the State Highway to support that growth, however DCC will work with Waka Kotahi NZTA to develop any plans that require changes to the State Highway to accommodate growth.

Key constraint areas such as Mosgiel will be investigated further in 2025/2026 through transport modelling, and there is work underway to investigate freight movements in/and around the Mosgiel/Taieri area to support the inland Port on Dukes Road and to support economic development and carbon zero goals.

The changing composition and rate of growth in the economy may impact demand for network infrastructure. For example, the Port of Otago at Port Chalmers is New Zealand's fifth largest port (by commodity value) and a key link in New Zealand's international supply chain as a regional hub for the export of high value products including meat, dairy, timber, fish, horticulture, and other agriculturally based products.

1.11.1 Principal options and implications

1-10 years	10-30 years	30-50 years
<p>The focus for years 1 to 10 is on managing renewals of existing assets.</p> <p>Additional work through the Shaping Future Dunedin Transport programme will support network challenges around the new Dunedin Hospital build.</p> <p>Ongoing safety enhancements (at intersections and schools) will continue based on road status risk and deaths and serious injury data and are funded through the Low Cost Low Risk programme. In years 2 the Low Cost Low Risk programme will have completed the schools speed management rollout and will focus on intersections requiring infrastructure interventions for a better safety outcome.</p> <p>A strategic transport study will be undertaken for Mosgiel to identify issues and improvements within the network.</p>	<p>Transport upgrades, primarily to support new residential intensification and business land areas, within this period include transport corridor safety improvements, and pedestrian and cycling safety and accessibility improvements.</p> <p>There are also additional road safety improvements planned in this time period.</p> <p>Further development of the cycling network is planned.</p>	<p>Transport upgrades for this time period have not yet been confirmed.</p>

1.12 Public Health and environmental outcomes

The transport network provides important public health and safety benefits to the community and delivers transport choice helping contribute to zero carbon (environmental) outcomes. The ability to be able to move around easily across a variety of modes is linked to health, social and economic benefits. A goal of the Integrated Transport Strategy is to increase the percentage of people who walk, cycle, and take public transport to work from 16 percent to 40 percent by 2024. Committing to the goal of increasing transport choices will also contribute to the city's environmental commitments of being net carbon zero by 2030.

Death and serious injuries on the transport corridor contribute negatively to public health outcomes both socially and economically.

An analysis of crash statistics indicates factors which contribute to Dunedin's safety record are;

- Intersections
- Young drivers
- Older drivers
- Pedestrians and cyclists.

Dunedin also has a diverse network ranging from busy urban roads through to quiet rural roads. In some cases, the transition between urban and rural is very abrupt. The central city is also compact and needs to cater for a wide range of user groups, such as cyclists, pedestrians, cars and heavy freight vehicles.

State Highway 1 runs through the University of Otago, Otago Polytechnic and the CBD, State Highway 87 runs through the Mosgiel centre, and State Highway 88 runs through the Ravensbourne and Port Chalmers communities; they all carry a high number of heavy vehicles.

Heavy vehicles also service the CBD and industrial areas such as South Dunedin. This sometimes creates conflict with users of the transport corridor at peak times (whether for school or work). Revising the roading bylaw to determine the best times for heavy vehicle deliveries to these centres is a workstream the DCC's Transport team are undertaking in 2024/25.

Improving network safety is an issue to be addressed through specific safety improvement programmes (where it is cost effective to do so).

Safety interventions undertaken by the transport group include:

- Upgrading infrastructure around schools to calm traffic
- Upgrading pedestrian facilities
- Using fixed safety cameras at intersections and other high-risk areas (where funding is available)
- Implementing a prioritized programme of safety engineering projects.

1.12.1 Principal options and implications for responding to public health and environmental concerns

The option that the DCC has decided to take is highlighted in green

	10 years (2034)	10-30 years (2054)	30-50 years (2074)
Existing public health and environmental impacts are not prioritized.	Transport, limited network safety improvement packages are implemented, resulting in no decreases to the numbers of serious injury or death statistics on the Dunedin transport network.	No specific investment to decrease the number of serious injuries or deaths on the Dunedin transport network.	No specific investment to decrease the number of serious injuries or deaths on the Dunedin transport network.

	10 years (2034)	10-30 years (2054)	30-50 years (2074)
Improve public health and environmental outcomes by investing in public transport and transport corridor safety programs. Investment is increased over time	Transport investments, including expanded Road Safety and Travel Demand Management Programmes are focused on reducing deaths and serious injury in high risk transport corridor locations. Public Health outcomes are also achieved by continued investment in active transport modes such as walking and cycling.	Continued investment in road safety and active transport modes results in decreased road trauma on the transport network and a healthy connected community.	Continued investment in road safety and active transport modes results in decreased road trauma on the transport network and a healthy connected community.
Prioritise public health and environmental concerns over other considerations. Investment is prioritised in the earlier years of the plan	Reducing the number of deaths and serious injury is achieved by additional investment in transport corridor safety.	As above.	As above.

1.13 Resilience to natural hazards

1.13.1 Environmental impacts

Flooding, landslides, drought, catchment fire, rising groundwater, and the risk of liquefaction in the event of an earthquake pose the most significant risks to Dunedin's infrastructure. It is anticipated these risks will increase over time as a result of climate change. Resilience funding from central government has been made available in 2024, however this is specific to areas identified in the application (namely Andersons Bay and Portobello Road).

The biggest issue to Dunedin from an environmental, climate change and natural disaster perspective is its network to the north, south and west. As evidenced in the October 2024 flood event, it is not unusual for all routes to be severed into and out of the city.

1.13.2 Climate Change

Climate change impacts include more extreme rainfall events, causing increased frequency and severity of flood events. Rising groundwater as a result of sea level rise in low-lying areas is the one of the most significant risks facing Dunedin from climate change. High groundwater and increased rainfall can contribute to asset renewal acceleration, and recent examples on accelerated asset failure (water levels have reduced reseal longevity) from flood events, can be seen as a result of Cyclone Gabrielle.

1.13.3 Earthquakes

Seismic activity can cause widespread damage to network infrastructure. Destruction of critical built infrastructure can impact the transport network. Dunedin has several areas with moderate to high likelihood of liquefaction in an earthquake. Seismic activity could also cause isolation across the transport network if certain areas are cut off due to rubble, slips, liquefaction, or land displacement. frequently



Figure 18: Akatore fault MMI intensity classes

Estimated ground shaking expressed in MMI intensity classes for a magnitude 7 earthquake centres on the Akatore fault. Intensities of VII and VIII would be expected to be in coastal sectors of much of the Dunedin district and would be likely to generate liquefaction in susceptible locations.

1.13.4 Building resilience to natural hazards

The Peninsula Connection project is an example of building a more resilient asset by raising the road to allow for predicted sea level rise while widening the transport corridor (for safety purposes) and creating a shared path (for mode choice purposes). The remaining section of this corridor between Portobello and Ōtākou remains at risk from a resilience perspective, and the section of corridor at Fisheries Wharf before Ōtākou is frequently flooded in weather events and high tides.

As part of building resilience to natural hazards, DCC (as part of the Climate Adaptation work) will be investigating whether existing assets (such as road culverts) need to be reconsidered in terms of their design standards. Building culverts for 1:70 year events, and raising the transport corridor (where it is vulnerable to sea level rise) are expensive responses to adaptation. However, over the next three years consideration will need to be given to the existing infrastructure and its resilience to the increasing number of events and their increased severity.

Planning is underway to look at the resilience of the transport network in the case of a seismic event, specifically around the supply chain and getting goods to and from Dunedin. Planning is also underway for any Alpine Fault activity. In a seismic event involving the Alpine Fault, Dunedin may be the least affected so may have to become a recovery hub for the lower South Island.

The GPS 2024 response to resilience is in addressing the existing maintenance and renewals task. This is one of the GPS sites as “increased maintenance and resilience”. That resilience is achieved through increased expenditure on potholes, resealing and rehabilitation. Apart from the small amount of funding discussed earlier (\$1.5M over 2024-2027 NLTP) there is no co-funding for raising the height of the transport corridor or increasing the size of road culverts etc. A more strategic response to this will be considered as part of the climate adaptation strategy underway.

Central Government response to Cyclone Gabrielle and responding the communities at risk in terms of exposure to natural hazards will determine the strategic approach taken over the next ten years for the transport network.

1.13.5 Principal options and implications for building resilience to natural hazards

The option that the DCC has decided to take is highlighted in green

	10-years (2034)	10-30 years (2054)	30-50 years (2074)
Planned renewals and projects will reduce some risks arising from natural hazards.	Existing transport infrastructure is renewed like for like. Significant weather events will remain a problem for isolated areas of the network; largely in coastal, slip prone and low-lying areas.	Existing transport infrastructure renewed like-for-like. Significant weather events will remain a problem for isolated areas of the network; largely in coastal, slip prone and low-lying areas.	Existing transport infrastructure renewed like for like. Significant weather events will remain a problem for isolated areas of the network; largely in coastal, slip prone and low-lying areas.
Invest in new capital to specifically reduce the risk arising from natural hazards.	As above, however investment is made in specific new projects to minimise the risks from natural hazards. Undertake adaptive planning pathways - events are uncertain and so infrastructure planning will need to be agile and adapt to various scenarios.	New capital incorporated into renewals where a known hazard requires mitigation.	New capital incorporated into renewals where a known hazard requires mitigation.

1.14 Planned increase or decrease in levels of service

The priority service levels for the transport network are:

- Asset Management - the transport network is renewed in accordance with asset age and condition.
- Cost efficiency - The relative costs and efficiency of the network compared with other networks.

- Economic Productivity – The network supports ongoing economic productivity in the city including supporting economic productivity of the supply chain to and from other regions.

There are projects in the capital programme that aim to respond to levels of service across the city in light of the hospital rebuild and growth in the city, detailed below:

- Harbour arterial improvements - the harbour arterial route would run along Wharf St and Thomas Burns St to provide an alternative route bypassing the city centre, avoiding the new hospital during and after construction
- Park and Ride facilities at Mosgiel and Burnside - parking areas, where people can leave their car and catch a city-bound express bus service
- Central city parking management - implementation of a plan to improve the parking experience, wayfinding of parking, and a review of the pricing structure of parking, to encourage better parking options for the CBD which will contribute to economic development
- Bus priority measures and safety improvements - providing infrastructure to prioritise buses and safety improvements for pedestrians in and around the CBD
- The Tunnels Trail – cycleway connection between Mosgiel and Dunedin.

1.14.1 Principal options and implications for increasing or decreasing levels of service

The option that the DCC has decided to take is highlighted in green.

Option	10-years (2034)	10-30 years (2054)	30-50 years (2075)
Plan and invest to maintain service levels.	Focus on renewing network infrastructure to reduce the risk of declining service levels. Do not plan or invest for changes to service levels.	Maintain capacity to manage current risk, however no increases in service levels may undermine growth in future.	A demographically driven decline in population may mean costs directly linked to service level delivery are borne by fewer residents if growth does not occur.
Plan and invest to maintain and increase some strategic service levels.	Renew infrastructure to reduce the risk of declining service levels and to increase resilience, while also investing in improving strategic service levels.	Balance our ability to manage future demands with strategic investments aimed at encouraging sustainable growth through improved service levels.	If investing in infrastructure to attract more people to live and study in Dunedin results in higher than projected growth, this may improve ongoing affordability of service level increases. A long-term investment programme is built up from enhanced monitoring and investment can be phased to deliver maximum benefits and efficiencies.


Option	10-years (2034)	10-30 years (2054)	30-50 years (2075)
Plan and invest to increase some strategic service levels through enhanced projects.	Renew infrastructure to reduce the risk of declining service levels and to increase resilience, while investing strongly in significantly improving strategic service levels through new and enhanced projects. High likelihood this option is not deliverable.	If strong growth does not occur, a higher cost will be borne by existing residents. This may limit the ability to maintain and operate changes to service levels. The impact on rates of any changes in strategic service levels are currently not understood, and so best practicable options cannot be chosen. There is the risk that abortive work will be undertaken and additional spend needed to meet new standards.	If investing in infrastructure to attract more people to live and study in Dunedin results in higher than projected growth, this may improve ongoing affordability of service level increases.

There is only one change to existing service levels reflected in the parking metric below.

Level of service statement	ID #	Performance measure	Data source	Actual 2023-24	Target			
					Year 1 2025-26	Year 2 2026-27	Year 3 2027-28	Year 4 - 9 2028-34
The transport network facilitates efficient travel	LOS2434 #101	Percentage of residents satisfied with overall roading and maintenance	ROS	26%	≥60%	≥60%	≥60%	≥60%
The transport network facilitates active travel	LOS2434 #102	Percentage of residents satisfied with the suitability of the road network for cyclists throughout the city	ROS	30	≥30%	≥30%	≥30%	≥30%
	LOS2434 #103	Percentage of residents satisfied with condition of footpaths throughout the city	ROS	36	≥60%	≥60%	≥60%	≥60%

Level of service statement	ID #	Performance measure	Data source	Actual 2023-24	Target			
					Year 1 2025-26	Year 2 2026-27	Year 3 2027-28	Year 4 - 9 2028-34
	LOS2434 #104	Percentage of residents satisfied with the ease of pedestrian access throughout the city	ROS	54	≥65%	≥65%		≥65%
	LOS2434 #105	Percentage of residents satisfied with condition of the streetlights throughout the city	ROS	61	≥75%	≥75%		≥75%
The transport network facilitates accessibility	LOS2434 #106	Percentage of residents satisfied with parking availability in the central city	ROS	19	≥45%	≥45%		≥45%
The DCC provides kerb and channel within the level of service standard adopted by the Council Asset Management Plan	LOS2434 #107	Percentage of the kerb and channel network is rated as moderate to excellent condition	Road Assessment and Maintenance Management (RAMM)	88%	≥88%	≥89%	≥89%	≥90%
The DCC provides footpaths within the level of service standard adopted by the Council Asset Management Plan	LOS2434 #108	Percentage of the footpath network is rated as moderate to excellent condition	Road Assessment and Maintenance Management (RAMM)	92.7%	≥89%	≥90%	≥90%	≥90%
The DCC provides a functional streetlight network that provides for safe movement	LOS2434 #109	Percentage of streetlights monitored by the Central Management System (CMS) that will be operational during the hours of darkness	CMS system	99.10%	≥99%	≥99%	≥99%	≥99%

Level of service statement	ID #	Performance measure	Data source	Actual 2023-24	Target			
					Year 1 2025-26	Year 2 2026-27	Year 3 2027-28	Year 4 - 9 2028-34
The DCC's Parking management system provides on road parking capacity and turnover to enable access to businesses and services	LOS2434 #110	Percentage of metered city parking spaces vacant in the CBD retail core during business hours (0800-1800)	New system	New measure	Establish baseline	Reduce year on year	Reduce year on year	Reduce year on year
The DCC provides the transport network that facilitates safe travel	LOS2434 #111	The change from the previous financial year in the number of fatalities and serious injury crashes on the local road network expressed as number (Mandatory measure)	Waka Kotahi	Achieved (decrease of 11 from previous year)	Reduce year on year	Reduce year on year	Reduce year on year	Reduce year on year
The DCC provides the transport network that facilitates comfortable travel	LOS2434 #112	Average quality of ride on local sealed road network measured by smooth travel exposure (Mandatory measure)	Road Assessment and Maintenance Management (RAMM)	76%	≥76%	≥78%	≥78%	≥78%
The DCC provides a transport network, which facilitates sustainable maintenance	LOS2434 #113	Percentage of sealed road network that is resurfaced (Mandatory measure)	Internal data	6%	6%	6%	6%	6%
The DCC maintains the transport network efficiently	LOS2434 #114	Percentage of service requests relating to roads and footpaths to where the response is provided within	Internal data	85%	≥85%	≥86%	≥86%	≥87%

Level of service statement	ID #	Performance measure	Data source	Actual 2023-24	Target			
					Year 1 2025-26	Year 2 2026-27	Year 3 2027-28	Year 4 - 9 2028-34
		five working days (Mandatory measure)						
The DCC provides cycleways to support multimodal travel for the community	LOS2434 #115	Number of people using cycleways (average daily movements per counter) 	Cycle counters	118	Increase year on year	Increase year on year	Increase year on year	Increase year on year



Level of service statements and measures that will help monitor progress towards Council's zero carbon 2030 target

1.15 What we need to do - Dunedin's most likely transport infrastructure scenario and approach to delivering new capital and renewals

The Infrastructure Strategy is closely linked to the Financial Strategy. The Financial Strategy considers affordability for ratepayers and the DCC as a whole. The DCC has attempted to balance the competing tensions of affordability, maintaining assets and investing for the future, while addressing the financial challenges of increasing costs, delivering large capital projects and increasing network renewals. The Financial Strategy provides strategic financial limits for rates and debt and discusses other funding sources.

1.16 Major projects and decisions

The Future Development Strategy (FDS) capital is split separately to remaining capital for the purposes of this document.

	(\$million)								
	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	Total
1.0 - FDS - Mosgiel									
1.1 Strengthening of certain roads to support additional volume/weight									
1.2 Kerb build outs and crossing points to support additional traffic and pedestrians									
1.3 Traffic light installations from side roads onto busier roads (intersections)									
1.4 Roundabouts to manage traffic flows, minimising congestion									
1.5 Footpath extensions									
1.6 Raised crossing points to support walking and cycling									
1.7 Making some existing infrastructure capable for walking and cycling (ie bridges)									
SUBTOTAL	\$ 1,282	\$ 1,282	\$ 1,282	\$ 1,282	\$ 1,282	\$ 1,282	\$ 1,282	\$ 1,282	\$10,256
FDS - Abbotsford, Green Island, Corstorphine, Kaikorai Valley Road									
2.1 Connection from Fairfield into the Tunnels Trail									
2.2 Seal extensions									
2.3 Kerb build outs to manage intersection turning speed and sightlines									
2.4 Footpath extensions									
2.5 Connections to Kaikorai Valley road from the Tunnels Trail									

	(\$million)								
	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	Total
2.6 Strengthening of certain roads to support additional volume/weight									
2.7 Cycleway extensions									
2.8 Roundabouts to manage traffic flows, minimising congestion									
2.9 Traffic light installations from side roads onto busier roads (intersections)									
SUBTOTAL	\$ 231	\$ 231	\$ 231	\$ 231	\$ 231	\$ 231	\$ 231	\$ 231	\$ 1,848
3.0 FDS - Pine Hill, NEV, Wakari, Sawyers Bay, St Leonards									
3.1 Roundabouts to manage traffic flows, minimising congestion									
3.2 Footpath extensions									
SUBTOTAL	\$ 813	\$ 813	\$ 813	\$ 813	\$ 813	\$ 813	\$ 813	\$ 813	\$ 6,504
4.0 - FDS - Peninsula									
4.1 Footpath extensions									
4.2 Raised crossing points to support walking and cycling									
4.3 Intersection improvements									
SUBTOTAL	\$ 150	\$ 150	\$ 150	\$ 150	\$ 150	\$ 150	\$ 150	\$ 150	\$ 1,200
TOTAL	\$ 2,476	\$ 2,476	\$ 2,476	\$ 2,476	\$ 2,476	\$ 2,476	\$ 2,476	\$ 2,476	\$ 19,808

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected Timing	Carbon Neutrality
Tunnels Trail	Providing Transport choice for a large commuting population from the south into Dunedin city.	Cycleway between Mosgiel and Dunedin, through two disused rail tunnels. <i>(Currently not co-funded)</i>		In 2022 Council made the decision to increase the cycleway budget to \$11.4M to accelerate the Tunnels Trail. That was in a co-funded environment.	\$1M has been retained in the 9 year plan for this project	Year 9 (note that funding is considered as part of the Zero Carbon packages)	Significant impact
Parking Management (SFDT).	Parking availability and congestion around the new Dunedin Hospital build.	Parking technology, systems, processes, and policy to make parking in the city more efficient and support economic development of the CBD. <i>(Not applicable for co-funding)</i>		Council decision made in 2021.	\$1M	Within the next 10 years	Moderate impact
Mosgiel Park and Ride (SFDT)	Park and Ride Facility at Mosgiel.	Create a parking area for commuters to use before taking public transport between Mosgiel and Dunedin. <i>(Currently co-funded)</i>		Council decision made on Shaping Future Dunedin (SFDT) portfolio in 2021.	\$5M	Within the next 10 years.	Significant impact
Central City and Pedestrian Improvements (SFDT)	Responding to a need to create better transport choices for people to get around the city and congestion as a result of the New Dunedin hospital build.	Create better pedestrian and cycling connections around the city. <i>(Only approved co-funded project is Albany Street cycleway).</i>		Council decision made on SFDT portfolio.	\$3M	Within the next 10 years.	Moderate impact

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected Timing	Carbon Neutrality
Princes Street (SFDT)	Enable buses and walkers and cyclists access to the city through this main route.	Create bus priority measures along Princes Street (key route for commuters) and safer walking and cycling opportunities. <i>(Positive Benefit Cost Ratio and high likelihood of co-funding)</i>			\$7.034M	Within the next 10 years.	Moderate impact
Harbour Arterial Efficiency Improvements (SFDT)	Enable a vehicle bypass to avoid the area near the new Dunedin Hospital to avoid congestion.	Changes to Strathallan Street and various areas leading up to exit onto the State Highway (slightly north of the CBD). <i>(Currently co-funded)</i>			\$4.3M	Within the next 10 years.	Minimal impact
Capital renewal programme	Manage asset renewal based on condition and age to maintain levels of service across the city.	Footpath, bridge, road servicing and traffic light renewal (minor coastal costs have also been added in \$3M).		Council decision	\$377.736M	Within the next 10 years.	Minimal impact
Low Cost Low Risk Work Programme	Reducing incident rates for all users.	Minor safety and efficiency improvements for all users, such as crossing points, roundabouts and intersection enhancements. <i>(Currently not funded)</i>		Continuous programme	\$9M		
Peninsula Connection (Boardwalk)	Resilience, safety and mode choice on the Peninsula.	Build a boardwalk at Latham Bay.		Council decision	\$3.5M	Within the next 10 years.	Moderate impact

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected Timing	Carbon Neutrality
Peninsula Connection (Section 9B (Portobello to Weir Road), Section 13 (Tidewater Drive to Ellison Road) and Section 14 (Ellison Road to the Ōtākou Fisheries Wharf).	Resilience, safety and mode choice on the Peninsula.	Create a shared path and a resilient transport corridor.		Council decision	\$18.5M	Within the next 10 years.	Moderate impact

1.17 Approach to delivering the new capital and renewals

The DCC plans to maintain internal capacity and reduce external (consultant) capacity to deliver the capital programme

- Using existing staff to project manage new capital projects and reducing external consultant assistance
- Continuing to deliver the renewals programme internally including continuing to grow capability of internal delivery i.e. engineers' representative and engineers to the contract
- Continuing to seek opportunities to package works with other large organisations such as Waka Kotahi and ORC to enjoy economies of scale and minimise community impact.

5.2.1 Transport budget

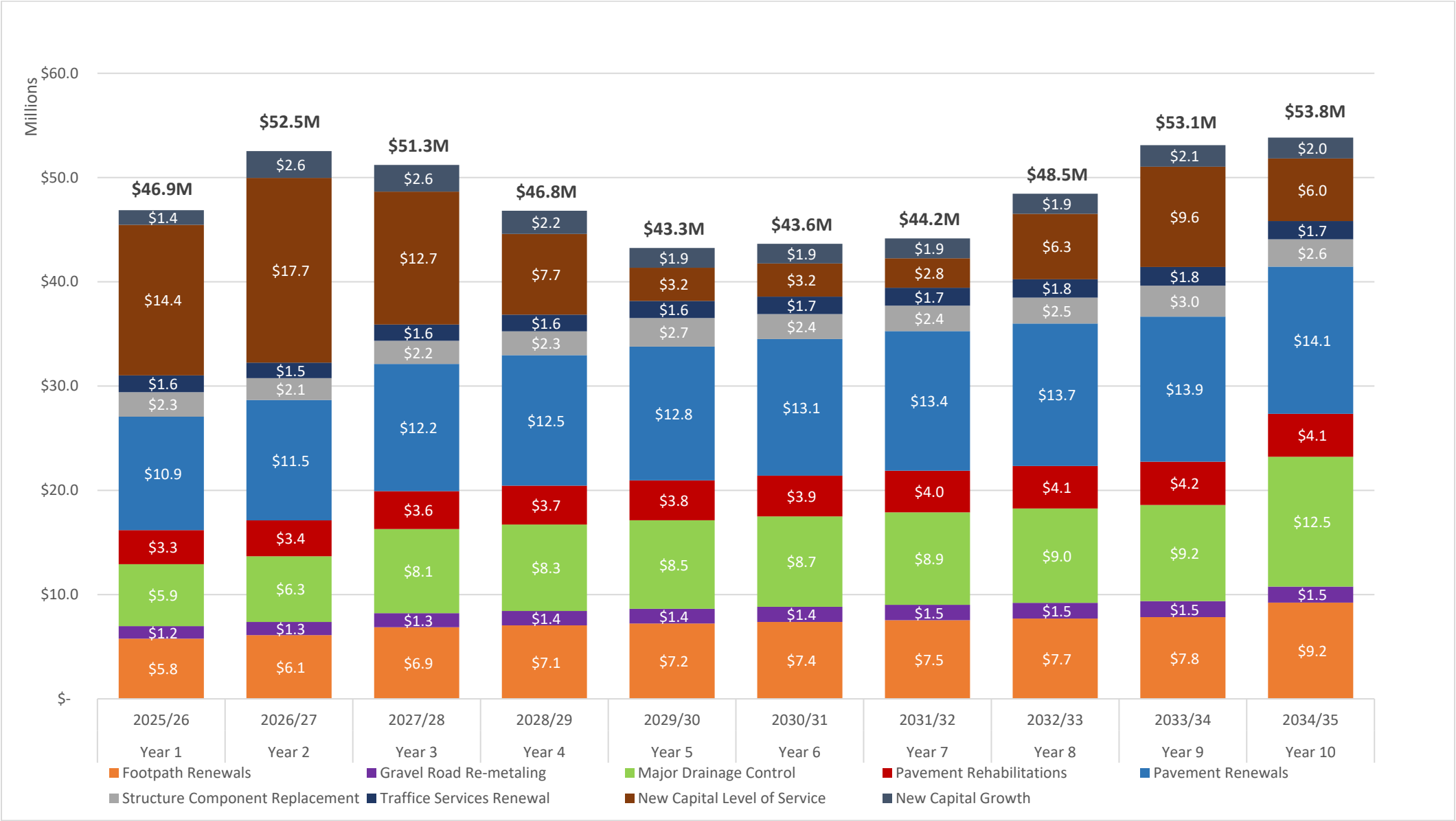


Figure 19: Transport capital expenditure by type 2025-2034

Table 3 Transport capital and operating expenditure budget

\$ million	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	Total
Operating expenditure	35.9	38.0	39.6	40.6	43.1	49.4	54.2	54.3	54.1	55.3	464.4
Depreciation	32.2	32.9	34.1	34.8	35.7	36.4	37.2	38.0	38.8	39.6	359.7
Total operating expenditure	68.1	70.9	73.6	75.4	78.8	85.8	91.5	92.3	92.9	94.9	824.1
Renewals	31.0	32.3	35.9	36.9	38.2	38.6	39.4	40.2	41.4	45.8	379.7
Level of service	14.4	17.7	12.8	7.7	3.2	3.2	2.8	6.3	9.6	6.0	83.7
Growth	1.4	2.6	2.6	2.2	1.9	1.9	1.9	1.9	2.1	2.0	20.4
Total capital expenditure	46.9	52.6	51.3	46.8	43.3	43.6	44.2	48.5	53.1	53.8	483.9

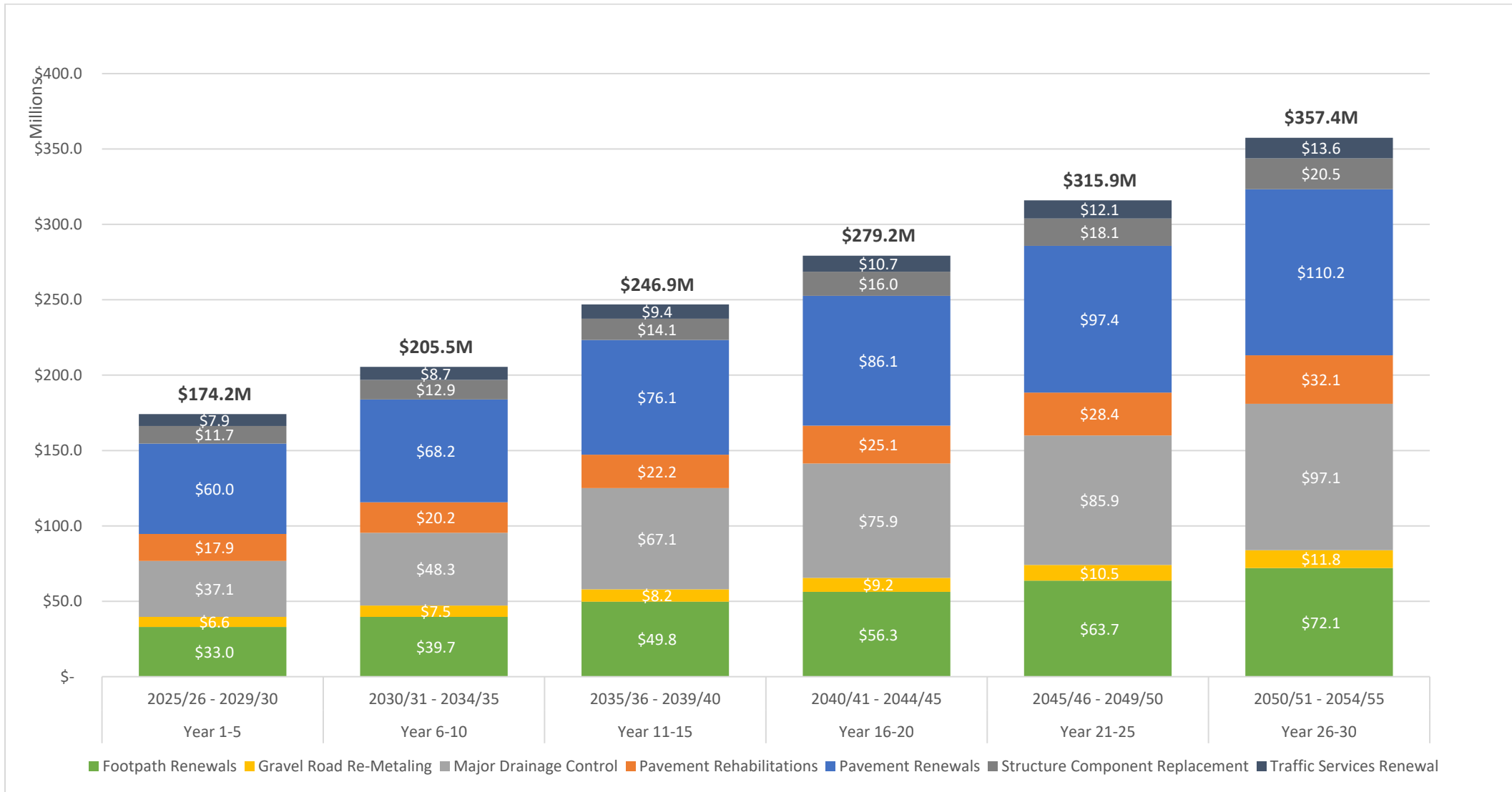


Figure 20: Projected Transport capital renewal expenditure by type in 5 year bands for the 1 to 30 year period

Roading and Footpaths Budget
Five Yearly Periods 2035/36 - 2054/55

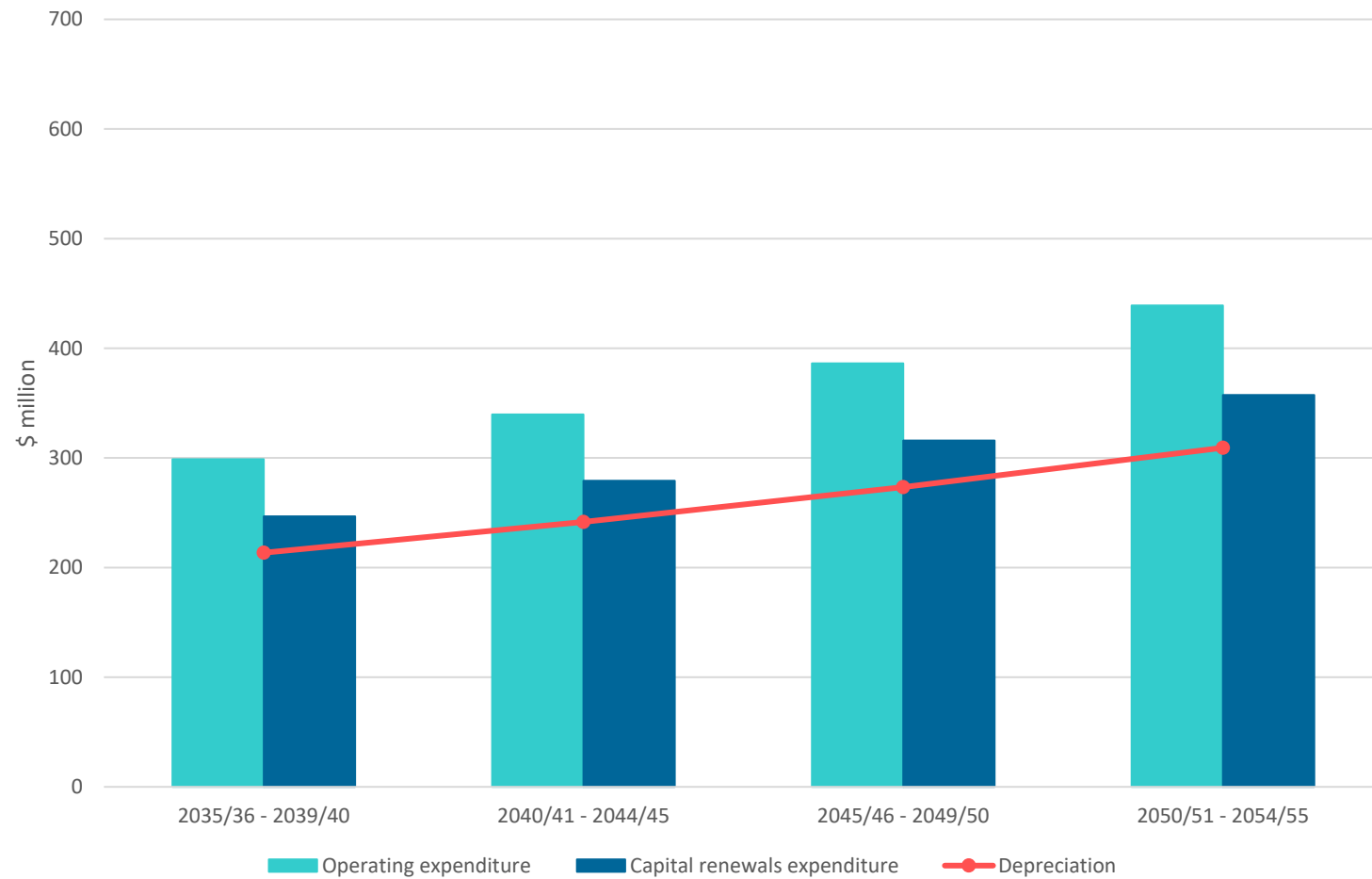


Table 4: Roading and Footpaths capital and operating expenditure budget, five year bands for the 11 to 30 year period

\$ million	2035/36 2039/40	2040/41 2044/45	2045/46 2049/50	2050/51 2054/55	Total
Depreciation	213.5	241.6	273.3	309.3	1,037.7
Operating expenditure	298.8	339.7	386.2	439.1	1,463.8
Capital renewals expenditure	246.8	279.2	315.9	357.4	1,199.3

1.18 The 30 year plan for transport infrastructure

The DCC's Transport team will remain focused on maintaining the transport corridor to the appropriate levels of service. Smaller safety interventions will continue as long as Low Cost Low Risk funding is maintained. No considerable scaled cycleway projects are considered in this infrastructure strategy (apart from the Tunnels Trail) due to a lack of co-funding. However, consideration may be given to delivering parts of the strategic walking and cycling network under a zero carbon package. Equally cycling and walking projects may be reconsidered should the co-funding landscape become more favourable.

Delivering the planned renewal and new capital programme is achievable within the capacity of existing external contractors.

Longer term investments will require further planning and investigation, taking into account climate goals, economic influences and the geo-political world situation. A focus towards a whole of network outcome (i.e. getting through Dunedin, through Mosgiel, to the Port of Otago) will need to be the priority for the next ten years whilst maintaining safety, considering resilience, and supporting economic development.