

Date: Tuesday 9 March 2021
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Venue: Council Chamber, Municipal Chambers, The Octagon, Dunedin

Council
OPEN ATTACHMENTS
UNDER SEPARATE COVER

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Appendix 1 - Significant negative effects

Group/activity	Significant and potential negative effects	Responses
Roading and footpaths group		
Transport No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	Air pollution – added emissions due to congestion. Water resource pollution – detritus from roads entering drainage systems and waterways. Land resource pollution from dust. Constricted traffic flow resulting in longer transport time. Limits on loading resulting in more trips to move tonnage. Road roughness affecting vehicle operating costs. Noise, vibration and/or pollution from road works. Pedestrian safety (accidents). Accessibility during road construction. Visual impacts on landscape. Effects on archaeological sites, heritage areas and/or areas of cultural significance.	Efforts are made to mitigate any negative effects through planning and consultation with the community. The Council ensures that contractors follow accepted environmental practices while undertaking construction and maintenance. Ongoing monitoring of the effects of operation is undertaken and action taken to remedy any issues arising.
Water supply group		
Water supply The collection, treatment and distribution of drinking water has potential negative effects on the local community. The 3 Waters Strategic Direction Statement and the system planning approach prioritises and plans the resolution of these issues and recognises that some issues can only be resolved pragmatically over longer periods of time.	Location of treatment plants close to residential properties could cause noise and/or odour issues.	Potential negative effects are managed as part of the day-to-day operation of the water supply activity. Preventative maintenance, emergency management and supply specific water safety plans are in place to limit disruption to wellbeing.
	Poor drinking water quality can cause sickness in the community and effect the ability to use water for domestic and trade purposes.	
	High water supply costs that may affect industries expanding/relocating to Dunedin or treatment upgrades costs being unviable for those ratepayers on low incomes	Efficiently manage and maintain the water supply services. System planning looks at long term strategic investment objectives and outcomes for the optimal cost/benefit ratio.
	Water take (e.g., taking water from a river for treatment) and discharges of wastewater from the drinking water treatment plants (e.g., backwash water used	Potential negative effects are managed as part of the day-to-day operation of the water supply activity. Activities are permitted and regulated by conditions of relevant resource consents, which

Group/activity	Significant and potential negative effects	Responses
	to clean membranes)	ensure potential adverse effects are managed at acceptable levels. Chlorine is removed (using a de-chlorination unit) from any discharges from the water treatment plants to control potential contamination from water production.
Sewerage and sewage group		
Wastewater The collection treatment and discharge of treated wastewater may have potential negative effects on the community. The 3 Waters Strategic Direction Statement and the system planning approach prioritises and plans the resolution of these issues and recognises that some issues can only be resolved pragmatically over longer periods of time.	Locations of treatment plants close to residential properties can give rise to issues with odour or noise.	Potential negative effects are managed as part of day-to-day operation of the treatment plants (including responding to customer complaints). Community liaison has been initiated in known areas of community concern, and complex odour and noise mitigation is programmed at treatment plants.
	High trade waste charges may affect industries expanding/relocating to Dunedin or treatment upgrade costs contributing to rating increases that are unviable for those ratepayers on low incomes.	System planning looks at long term strategic investment objectives and outcomes for the optimal cost/benefit ratio.
	Discharge from the wastewater system from treatment plants and overflows from the network can impact the local community. These discharges to the environment can be planned (e.g., the constant discharge of treated wastewater via an ocean outfall) or unplanned (e.g., a heavy rainfall event, blockage or broken pipe in the network causing an overflow). There is also the potential for wastewater to enter the stormwater system (e.g., in heavy rainfall events).	Potential negative effects are managed as part of day-to-day operation of the wastewater system. Activities are permitted and regulated by conditions of relevant resource consents, which ensure potential adverse effects are managed at acceptable levels. This includes monitoring of the effluent and sediment/coastal receiving waters and impact assessments. Renewal programmes for the treatment plants and wastewater network are intended to minimise the incidence of asset failures. System planning looks at long term strategic investment objectives and outcomes for the network, treatment plants and sludge treatment and disposal. Mana whenua are engaged as partners in system planning.

Group/activity	Significant and potential negative effects	Responses
Stormwater group		
<p>Stormwater</p> <p>The collection and disposal of stormwater may have potential negative effects on the interests of the community.</p> <p>The 3 Waters Strategy and implementation plan prioritises and plans the resolution of these issues and recognises that some issues can only be resolved pragmatically over longer periods of time.</p> <p>The Otago Regional Council is the controlling authority for the streams. A high proportion of the runoff is from erosion of land in rural catchments.</p>	<p>The local community can be affected by heavy rain events that result in flooding of properties and land.</p>	<p>Potential negative effects are managed as part of day-to-day operation and maintenance of the stormwater system (including planning for upcoming heavy rainfall events as part of the Civil Defence Response).</p> <p>Where flooding is due to the failure of stormwater pipes that are privately owned (watercourses), minor extensions to DCC's network are made to reduce flooding and other hazards such as sinkholes and landslips.</p> <p>Work is in progress to better understand secondary flow paths by reviewing, updating and calibrating Stormwater Catchment Models.</p>
	<p>Flooding can impact on property values and could lead to a potential loss of businesses if repeated flooding impacts their ability to operate and/or insure.</p>	<p>Potential negative effects are managed as part of day-to-day operation and maintenance of the stormwater system (including planning for upcoming heavy rainfall events as part of the Civil Defence Response).</p> <p>Modelling of stormwater system to identify mains that are at capacity and may constrain future development.</p>
	<p>Discharge of contaminated stormwater to waterways.</p>	<p>Activities are permitted and regulated by conditions of relevant resource consents, which ensure potential adverse effects are managed at acceptable levels.</p> <p>Water quality testing, and harbour sediment contaminant testing monitor contamination as part of resource consent requirements.</p> <p>Additional environmental monitoring project ongoing to sample critical stormwater outlets and assess environmental impacts as part of system planning.</p>
	<p>Discharge of stormwater into waterways or near areas of cultural significance.</p>	<p>Water quality testing, and harbour sediment contaminant testing monitor contamination. Mana whenua are</p>

Group/activity	Significant and potential negative effects	Responses
		engaged as partners in system planning.
Reserves and recreational facilities group		
Aquatic services No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	The potential exists for negative effects on the environmental interests of the community from the use of chlorine gas as a pool disinfectant, resulting in harm from a leakage in the gas storage or delivery system.	Emergency systems for early leak detection and emergency cylinder shut-downs to minimise adverse effects are in place. Alarms are wired directly to the Fire Service to ensure a quick response. The gas cylinders are stored in an area separate from the primary pool facilities.
	High energy consumption involved in the heating and operation of pools may impact environmental interests.	Energy use has been reduced with heat recovery projects. The 10 year plan includes a project to install a second heat recovery heat pump at Moana Pool (cutting 75% of our LPG use at the facility) and then installing either a wood pellet boiler or an air source heat pump (which would mean using no LPG at all). Energy efficiency has been a key consideration in the design of the new Mosgiel Pool to be built.
	The social wellbeing of individuals could be impacted by near-drowning, drowning incidents or perception of a danger of drowning.	This is managed by supervision of all pools by trained lifeguards.
Botanic Garden No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	Use of chemicals for pest plant, animal, and disease control.	This is managed through the compulsory adherence by the contractor to: Agrichemical Users Code of Practice – NZS 8409; Regional Plan – Air; and Fertiliser Use Code of Practice – (NZFMRA). The adherences to these standards are monitored by staff supervising the work.
	Biosecurity risk of exotic (and native) plants and captive birds escaping or causing or disease in local native flora and fauna.	This is managed by monitoring the health status of aviary birds and plants, staff who engage all measure necessary to ensure bird and plant health is maintained at optimum levels at all times. Holding structures for birds and

Group/activity	Significant and potential negative effects	Responses
		potential of weediness of plants are checked and monitored at all time with appropriate remedial work is carried out before any harm or loss occurs.
Parks and reserves No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	Conflict between provisions of recreation pursuits (e.g. mountain biking) vs. environmental protection.	This is managed through the adoption of appropriate, consulted policy (Tracks Policy) and Reserves Management Plans.
	Use of chemicals for pest plant, animal, and disease control.	This is managed through the compulsory adherence by the contractor to: Agrichemical Users Code of Practice – NZS 8409; Regional Plan – Air; and Fertiliser Use Code of Practice – (NZFMRA). Adherences to these standards is monitored by staff supervising the work.
Regulatory services group		
Building services No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	Because the Building Services unit is not able to control the incoming work load sometimes it is not able to issue consents within the statutory time frames.	A short fall in processing capacity can be compensated for by contracting other Building Consent Authorities to assist with the work.
Waste management group		
Waste and environmental solutions Waste collection and management services may have potential negative effects on the interests of the community.	Odour and noise for residents neighbouring the Green Island Landfill.	Council's current and proposed future approach for management is in accordance with resource consents for this activity.
	Recoverable resources which end up at the landfill are a loss of resource efficiency.	Programmes and communications promoting correct recycling practices are continually being developed and improved.
	Litter and illegal dumping negatively impact on the community from a visual, environmental and financial perspective and it can be difficult to identify offenders.	Council continues to engage and work collaboratively with affected parties in an effort to reduce the frequency of littering and illegal dumping events. A more coordinated approach is being taken across Council.

Group/activity	Significant and potential negative effects	Responses
	Methane emissions from waste disposed to landfill contribute to Dunedin's carbon emissions profile.	Council has developed a long term strategy to develop waste diversion and resource recovery infrastructure in order to significantly reduce waste disposed to landfill by 2030.
Community and planning group		
City development and resource consents No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	District Plan policies and rules, NES and regulation, their administration via permitted activity status and resource consent decisions can have negative effects on the interests of people within the community.	If these policies and rules and their administration is done effectively and appropriately, the effects should maximise the potential benefits to the community as a whole.
Community development and events No significant negative effects are currently identified, but examples of potential negative effects on the local community are included here.	The Events Team organises large events within the city. At times, these can cause some traffic congestion, in particular around Forsyth Barr Stadium and Octagon areas.	The Events Team is actively promoting ride-share, walking and other options for people to attend major events within the city. The Council works with the ORC and other providers to ensure there are buses from the Stadium to the city. More work is planned to explore further options to reduce traffic volumes in and around the Stadium and Octagon during major events.

There are no significant negative effects identified for the following groups/activities:

Group	Activity
Reserves and recreational facilities group	Cemeteries and crematorium
Property group	Commercial property Community housing Operational property
Libraries and museums group	Dunedin Chinese Garden Dunedin Public Art Gallery Dunedin Public Libraries Olveston Historic Home Toitū Otago Settlers Museum
Regulatory services group	Animal services Parking services Environmental health Alcohol licensing Parking operations
Economic development group	Business development Destination Dunedin Dunedin i-Site Visitor Centre
Governance and support services group	Business information services Civic and administration Corporate leadership Corporate policy Council communications and marketing Customer services agency Finance Fleet operations Human resources Investment account Waipori fund Warm Dunedin

Appendix 2 - Statements of variation

Statement of variation to the assessment of water and sanitary services

In 2007, the Council undertook an Assessment of Water and Sanitary Services of the provision of water-related and sanitary services within its district. The Assessment reviewed Council-operated water, wastewater and stormwater services, and assessed communities without such services having 25 or more persons in residence for more than 60 days per year. The resulting report, adopted in 2008, identified a number of issues and actions resulting from the assessment.

The Council has a statutory obligation under the Local Government Act 2002, Schedule 10, Part 1 (6a), to identify and explain significant variations between the Assessment of Water and Sanitary Services 2007/08 and the proposals set out in the Council's 10 year plan. The changes outlined below are a summary of changes since the Statement of Variation in the 10 year plan 2018-28.

3 Waters Assumptions

Forecast capital expenditure budgets for water supply, wastewater and stormwater systems are based on asset condition assessments, asset performance, asset life renewals and replacements and servicing of areas rezoned for development in the Second Generation District Plan (2GP). The work required for development area forecasts will be reassessed once proposed zoning changes from Variation 2 of the 2GP are agreed and incorporated.

3 Waters plans to invest in a higher growth scenario from 2019 – 2038, followed by a medium growth scenario from 2038 onwards. Current projections indicate the population will continue to grow sharply until 2038, reaching 142, 318.

3 Waters will consider a review of the existing Water and Sanitary Services Assessment as part of its strategic system planning during 2021 - 2024. Capital expenditure budgets will be reviewed to accommodate changes and required actions from this review.

3 Waters General

3 Waters is currently in Stage 1 of system planning for water and wastewater, and will commence stormwater in 2021. System planning assesses the 'entire system' from source to disposal, enabling optimal long-term strategic decision making. This could be on the number of treatment plants and treatment processes, storage options within the system, possible wet weather treatment options, water demand management, resilience and growth etc.

The 2008 Water and Sanitary Services Assessment (WSSA) makes reference to the need to 'better understand the composition, age and condition of the assets. Until it does, the accuracy of the future renewals forecasts is uncertain'. Recent work has been undertaken at the treatment plants to collect condition and performance data, the results of which informs the significant plant renewal programme. 3 Waters also plans to improve the condition assessment data programme through the programme of work to prepare for Water Reform.

The WSSA also highlights that 'a more robust method of determining the Capital Works Programme needs to be developed. Network modelling can be used to determine service levels and the capacity (or lack of) in the network'. As part of the system planning process the cost and benefit of differing levels of services can be assessed, and under the reform work programme 3 Waters has also started to improve asset management practices and processes such as criticality, risk frameworks and improving capital delivery processes.

Water Supply

The Drinking Water Standards New Zealand (DWSNZ) were revised in 2018 and further changes are anticipated in the short to medium term as a result of the Government's 3 Waters Reform. This will likely require additional new capital expenditure to ensure treatment plants and networks comply with tightened DWSNZ and legislation.

Projects aimed at increasing the resilience of Dunedin's water supply are ongoing. The refurbishment of the Ross Creek reservoir is currently complete and the upgrades of Waikouaiti water treatment plant is ongoing. There is a significant work programme under the 'water supply resilience' project in the 10-year plan, which aims to improve the resilience of the water supply in the event of severe drought, catchment fire, or major pipeline or treatment plant failure. Mosgiel is no longer supplied by bores, it is now supplied from the Mount Grand Water Treatment Plant.

Wastewater

Capital works are planned to renew critical plant assets at all the metropolitan wastewater treatment plants and assess the future of sludge treatment and disposal. System planning is underway to inform the large-scale strategic investment plan for the wastewater systems, including wet weather flow management, ability to treat to anticipated new standards and accommodate growth. Reviewing, updating and calibrating the hydraulic models is underway, along with assessing the key environmental impacts of wastewater discharges and overflows. Capital work is underway for the upgrade to Seacliff wastewater treatment plant. Planning has started for upgrades to the northern wastewater schemes of Middlemarch, Waikouaiti-Karitane and Warrington to ensure the treatment plants are able to meet effluent quality targets as existing discharge permits expire over the next 7 years.

Stormwater

Significant work is underway to review, update and calibrate priority stormwater hydraulic models and to assess the environmental impact of key discharges. Significant capital works are proposed as part of the South Dunedin flood alleviation project to reduce the risk of flooding in this community, by bringing affected assets up to currently accepted design standards. Capital works are proposed for Mosgiel during 2021-2028 to bring areas of the network and pump stations with capacity issues up to currently accepted design standards. High priority discrete watercourse projects are ongoing. It is anticipated that as part of 3 Waters reform, new stormwater standards and regulation will come into force which will likely result in additional capital expenditure being required.

Public toilets

The Council intends to maintain its approach of ensuring sufficient public toilet facilities. Included in the 10 year plan is a capital budget to provide more public toilets. In the first year it is intended to provide a Changing Places Bathroom in the central city, and from year 2 onward, a further two toilets each year. Residents will be given the opportunity to engage on this initiative and can provide feedback on preferred locations for the new toilets. Appropriate cleaning and maintenance through capital and operating budgets over the next 10 years is being provided, in accordance with its last Assessment of Water and Sanitary Services.

Cemeteries and crematoriums

The Council manages 19 cemeteries throughout the Dunedin area, although a number of cemeteries are closed to new burials (Andersons Bay Cemetery, East Taieri Cemetery, Northern Cemetery, Port Chalmers old cemetery, West Taieri and the Southern Cemetery).

Pandemic planning has been undertaken to ensure that the Dunedin City Council can manage its burial services during an

outbreak, and this planning is periodically reviewed.

A cemetery capacity analysis has been undertaken to identify potential sites suitable for an urupa within Council's existing cemeteries. Council will be engaging with iwi and hapū and through the Māori Participation Working Party to identify a location and design for a proposed urupā.

The Council intends to maintain its approach of ensuring sufficient and appropriately managed cemeteries and crematoria through its capital and operating budgets over the next 10 years, in accordance with its last Assessment of Water and Sanitary Services.

Statement of variation against adopted Waste Management and Minimisation Plans

The Dunedin City Council has a statutory obligation under the Local Government Act 2002, Schedule 10, Part 1, Clause 6 to identify and explain significant variations between its waste management and minimisation plans adopted under section 43 of the Waste Minimisation Act 2008 and the proposals set out in the Council's 10 year plan.

The Council had a statutory obligation under the Waste Minimisation Act 2008, Part 4 section 43, to review the Council's Resource Recovery and Waste Management Strategy (RRWMS), and develop a Waste Management and Minimisation Plan, (WMMP). The review requires a full waste assessment to be completed for the district. This review covers both Council and non-Council activities.

A waste assessment for the Dunedin City District was completed in 2018. Accordingly, the next review by DCC will be due six years in October 2024. Following public consultation an amended Waste Minimisation and Management Plan (WMMP2020) was adopted by Council on 25 May 2020.

There are no significant variations between the proposals outlined in the 10 year plan and the Council's Waste Minimisation and Management Plan.

Funding Impact Statement and Rating Information

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Dunedin City Council
Funding Impact Statement
for the Years Ended 30 June 2022 - 2031 (whole of council)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
	Annual Plan	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget	Draft Budget
	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
Sources of operating funding											
General rates, uniform annual general charges, rates penalties	93,883	104,079	108,796	112,187	119,500	127,307	135,515	143,473	151,903	158,542	164,932
Targeted rates	69,585	75,895	83,741	93,785	98,790	104,056	109,688	115,180	120,939	125,735	130,431
Subsidies and grants for operating purposes	11,329	11,664	11,927	12,171	12,521	12,880	13,250	13,632	14,025	14,443	14,859
Fees and charges	56,845	62,403	65,038	65,686	66,129	66,499	68,342	70,329	72,461	74,417	76,323
Interest and dividends from investments	9,816	8,619	8,391	8,260	8,144	8,129	8,201	8,307	8,417	8,490	8,566
Local authorities fuel tax, fines, infringement fees, and other receipts	3,163	3,003	3,239	3,276	3,317	3,353	3,389	3,427	3,466	3,507	3,548
Total operating funding (A)	244,621	265,663	281,132	295,365	308,401	322,224	338,385	354,348	371,211	385,134	398,659
Application of operating funding											
Payments to staff and suppliers	197,137	200,758	210,614	220,405	226,786	233,263	241,187	247,967	259,033	266,041	273,479
Finance costs	12,051	9,990	11,296	13,295	15,229	17,210	19,060	20,665	22,072	23,231	24,396
Other operating funding applications	-	-	-	-	-	-	-	-	-	-	-
Total application of operating funding (B)	209,188	210,748	221,910	233,700	242,015	250,473	260,247	268,632	281,105	289,272	297,875
Surplus/(deficit) of operating funding (A-B)	35,433	54,915	59,222	61,665	66,386	71,751	78,138	85,716	90,106	95,862	100,784
Sources of capital funding											
Subsidies and grants for capital expenditure	28,439	15,974	14,825	18,143	17,868	13,893	16,296	15,254	13,345	11,890	12,735
Development and financial contributions	832	572	572	572	572	572	572	572	572	572	572
Increase/(decrease) in debt	7,222	77,601	76,234	63,695	72,620	69,058	60,480	50,774	48,890	36,186	49,484
Gross proceeds from sale of assets	120	165	120	120	120	120	120	120	120	120	120
Lump sum contributions	-	-	-	-	-	-	-	-	-	-	-
Other dedicated capital funding	-	-	-	-	-	-	-	-	-	-	-
Total sources of capital funding (C)	36,613	94,312	91,751	82,530	91,180	83,643	77,468	66,720	62,927	48,768	62,911
Application of capital funding											
Capital expenditure											
- to meet additional demand	1,651	5,607	7,676	8,798	9,193	9,418	9,325	9,106	9,341	8,718	8,923
- to improve the level of service	28,122	68,250	56,882	49,741	58,531	68,270	55,784	48,553	44,705	30,871	40,739
- to replace existing assets	35,908	78,820	86,625	84,637	89,405	77,527	89,128	93,918	99,051	104,495	113,309
Increase/(decrease) in reserves	-	-	-	-	-	-	-	-	-	-	-
Increase/(decrease) of investments	6,365	(3,450)	(210)	1,020	438	179	1,369	859	(63)	546	723
Total application of capital funding (D)	72,046	149,227	150,973	144,195	157,566	155,394	155,606	152,436	153,033	144,630	163,695
Surplus/(deficit) of capital funding (C-D)	(35,433)	(54,915)	(59,222)	(61,665)	(66,386)	(71,751)	(78,138)	(85,716)	(90,106)	(95,862)	(100,784)
Funding balance ((A-B)+(C-D))	-	-	-	-	-	-	-	-	-	-	-

Rating Method

The rating method refers to the ways that the Council uses the rating system to allocate rates among groups of ratepayers, and how the liability for rates will be distributed within each group.

When considering the rating method, the Council takes into consideration the funding principles provided at the end of this section. It should be read in conjunction with the Revenue and Financing Policy and the Funding Principles.

At various points of this statement a level of rate or charge is specified. These are indicative figures included to give ratepayers an estimate of what their level of rates is likely to be. These figures are not the actual level of rates that will be assessed in the coming year, and the actual figure will not be known until the Council's rating information database is finalised, and the Council's 10 Year Plan 2021-31 is adopted.

Figures in this policy are GST inclusive.

The following rates are proposed to be set by the Council for the financial year commencing 1 July 2021 and ending 30 June 2022.

General Rate

The Council proposes to set a general rate based on the capital value of each rating unit in the district.

The general rate will be set on a differential basis based on land use (the categories are "residential", "lifestyle", "commercial", "farmland", "residential heritage bed and breakfasts" and "stadium: 10,000+ seat capacity").

The estimated rates (in cents per dollar of capital value) for the 2021/22 year are:

Table 1: General Rates

Categories	Estimated Rates, Cents in \$ per Capital Value	Factor	Revenue Sought \$	General Rate Share
Residential	0.3124	1.00	69,593,000	58.82%
Lifestyle	0.2969	0.95	5,819,000	4.92%
Commercial	0.7684	2.46	38,331,000	32.40%
Farmland	0.2499	0.80	4,427,000	3.74%
Residential Heritage Bed and Breakfasts	0.5463	1.75	24,000	0.02%
Stadium: 10,000+ Seat Capacity	0.0621	0.20	116,000	0.10%

The objective of the differential rate is to provide a mechanism to charge general rates to the six differential categories in a way that best achieves the 11 funding principles provided at the end of this section.

The Council uses the 'factor method' of setting the general rate differential. Under this method, a general rate factor is established which is simply the degree to which the rate (the cents in the dollar) on each category of property is higher or lower than residential property. In other words, the Council determines the degree to which the rate on a category of property is higher or lower than residential property.

The practical effect of the differential is that commercial properties pay more rates than would be expected under a "pure, undifferentiated" capital value (CV) system, and lifestyle, farmland and residential property owners pay less.

In December 2020, the Council reviewed the six general rate differential categories, specifically how the general rate is allocated across ratepayers. Due to the integrated nature of two targeted rates, Community Services and Tourism/Economic Development, these were also considered. The review also considered the rating of short term visitor accommodation. No changes to the general rate differentials were made because the status quo was felt to be appropriate.

Uniform Annual General Charge

The Council will not be using a Uniform Annual General Charge.

Targeted Rates

Community Services

The Council proposes to set a targeted rate for community services of \$102.00. This rate will be set on a differential basis based on land use (the categories are "residential, residential heritage bed and breakfasts, lifestyle and farmland" and "commercial and stadium: 10,000+ seat capacity"). The rate will be charged on the following basis:

Table 2: Targeted Rate – Community Services

Categories	Estimated Rate/Liability Calculated	Revenue Sought \$
Residential, Residential Heritage Bed and Breakfasts, Lifestyle and Farmland	\$102.00 per separately used or inhabited part of a rating unit	5,528,000
Commercial and Stadium: 10,000+ Seat Capacity	\$102.00 per rating unit	285,000

The community services targeted rate will be used to fund part of the Parks and Reserves activity and the Botanic Garden.

Kerbside Recycling Collection

The Council proposes to set a targeted rate for a kerbside recycling collection service. This rate will be set on a differential basis based on land use (the categories are "residential, residential heritage bed and breakfasts, lifestyle and farmland" and "commercial"). This rate applies to all separately used or inhabited parts of a rating unit or rating units that receive a kerbside recycling collection service. The estimated rate for the 2021/22 year is:

Table 3: Targeted Rate – Kerbside Recycling Collection

Liability Calculated	Estimated Rate/Liability Calculated	Revenue Sought \$
Residential, Residential Heritage Bed and Breakfasts, Lifestyle and Farmland	\$106.10 per separately used or inhabited part of a rating unit	5,320,000
Commercial	\$106.10 per rating unit	28,000

Drainage

The Council proposes to set a targeted rate for drainage. Drainage is a combined targeted rate for sewage disposal and stormwater. Sewage disposal makes up 83.9% of the drainage rate, and stormwater makes up 16.1%. This rate will be set on a differential basis based on the provision of service (with the categories being "connected" and "serviceable") and on land use (with the categories being "residential, residential heritage bed and breakfasts, lifestyle and farmland", "commercial, residential institutions, schools and stadium: 10,000+ seat capacity" and "churches"). The rate will be charged on the following basis:

Table 4: Targeted Rate – Drainage Categories

Categories	Liability Calculated	Revenue Sought \$
Residential, Residential Heritage Bed and Breakfasts, Lifestyle and Farmland	Per separately used or inhabited part of a rating unit	30,083,000
Commercial, Residential Institutions, Schools and Stadium: 10,000+ Seat Capacity	Per rating unit	1,793,000
Churches	Per rating unit	12,000

The estimated rates for the 2021/22 year are:

Table 5: Targeted Rate – Drainage Rates

Residential, Residential Heritage Bed and Breakfasts, Lifestyle and Farmland	Estimated Rates \$
Connected	625.00

Serviceable	312.50
Commercial, Residential Institutions, Schools and Stadium: 10,000+ Seat Capacity	Estimated Rates \$
Connected	625.00
Serviceable	312.50
Churches	Rate \$
Connected	102.25

Non-rateable land will not be liable for the stormwater component of the drainage targeted rate. Rates demands for the drainage targeted rate for non-rateable land will therefore be charged at 83.9%.

Rating units which are not connected to the scheme, and which are not serviceable, will not be liable for this rate.

Commercial Drainage – Capital Value

In addition, the Council proposes to set a capital value-based targeted rate for drainage on a differential basis based on land use (the categories are "commercial and residential institutions", "schools" and "stadium: 10,000+ seat capacity") and the provision of services (the categories being "connected" and "serviceable"). This rate shall not apply to properties in Karitane, Middlemarch, Seacliff, Waikouaiti and Warrington.

This rate shall not apply to churches.

The estimated rates for the 2021/22 year are:

Table 6: Targeted Rate – Commercial Drainage Rates

Categories	Rates, Cents in \$ per Capital Value		Revenue Sought \$	
	Connected	Serviceable	Connected	Serviceable
Commercial and Residential Institutions	0.2865	0.1433	14,889,000	273,000
Schools	0.2149	0.1075	737,000	6,000
Stadium: 10,000+ Seat Capacity	0.0233	N/A	44,000	N/A

Non-rateable land will not be liable for the stormwater component of the drainage targeted rate. Rates demands for the drainage targeted rate for non-rateable land will therefore be charged at 83.9%.

Water

The Council proposes to set a targeted rate for water supply per separately used or inhabited part of a rating unit on all property either connected, or for which connection is available, to receive an ordinary supply of water within the meaning of the Dunedin City bylaws, excepting properties in Karitane, Merton, Rocklands/Pukerangi, Seacliff, Waitati, Warrington, East Taieri, West Taieri and North Taieri. This rate will be set on a differential basis based on the availability of service (the categories are "connected" and "serviceable").

Rating units which are not connected to the scheme, and which are not serviceable, will not be liable for this rate.

The estimated rates for the 2021/22 year are:

Table 7: Targeted Rate – Water (Ordinary)

Categories	Estimated Rate/Liability Calculated	Revenue Sought \$
Connected	\$451.50 per separately used or inhabited part of a rating unit	21,002,000
Serviceable	\$225.75 per separately used or inhabited part of a rating unit	235,000

The Council proposes to set a targeted rate for water supply that is based on the volume of water made available to all separately used or inhabited parts of a rating unit in Karitane, Merton, Seacliff, Waitati, Warrington, East Taieri, West Taieri and North Taieri. This rate will be set on a differential basis based on the availability of service (the categories are "connected" and "serviceable").

The estimated rates for the 2021/22 year are:

Table 8: Targeted Rate – Water (Volume of Water)

Categories	Estimated Rate/Liability Calculated	Revenue Sought \$
Connected	\$451.50 per unit of water being one cubic metre (viz 1,000 litres) per day made available at a constant rate of flow during a full 24-hour period	1,371,000
Serviceable	\$225.75 per separately used or inhabited part of a rating unit (note this rate shall not apply to the availability of water in Merton, Karitane or Seacliff)	26,000

Fire Protection

The Council proposes to set a targeted rate for rating units that receive a water supply for the provision of a fire protection service. The rate will be set on a differential basis based on land use on certain categories of property ("commercial", "residential institutions" and "stadium: 10,000+ seat capacity").

This rate will be based on capital value. This rate shall not apply to churches.

The estimated rates for the 2021/22 year are:

Table 9: Targeted Rate – Fire Protection Capital Value

Categories	Estimated Rates, Cents in \$ per Capital Value	Revenue Sought \$
Commercial	0.0799	4,480,000
Residential Institutions	0.0599	307,000
Stadium: 10,000+ Seat Capacity	0.0094	18,000

The Council proposes to set a targeted rate for water supply for the provision of a fire protection service for each separately used or inhabited part of a rating unit within the "residential, residential heritage bed and breakfasts, lifestyle and farmland" categories that are not receiving an ordinary supply of water within the meaning of the Dunedin City bylaws.

The estimated rate for the 2021/22 year is:

Table 10: Targeted Rate – Fire Protection

Categories	Estimated Rate/Liability Calculated	Revenue Sought \$
Residential, Residential Heritage Bed and Breakfasts, Lifestyle and Farmland	\$135.45 per separately used or inhabited part of a rating unit	23,000

Water – Quantity of Water

The Council proposes to set a targeted rate for the quantity of water provided, reconnection fee and special reading fee, to any rating unit fitted with a water meter, being an extraordinary supply of water within the meaning of the Dunedin City bylaws, according to the following scale of charges:

Table 11: Targeted Rate – Quantity of Water

	Annual Meter Rental Charge \$
20mm nominal diameter	157.01
25mm nominal diameter	201.57
30mm nominal diameter	223.85

	Annual Meter Rental Charge \$
40mm nominal diameter	253.56
50mm nominal diameter	513.48
80mm nominal diameter	634.42
100mm nominal diameter	669.43
150mm nominal diameter	962.24
300mm nominal diameter	1,248.68
Hydrant Standpipe	621.69
Reconnection Fee	424.86
Special Reading Fee	59.47

	Backflow Prevention Charge \$
Backflow Preventer Test Fee	108.44
Rescheduled Backflow Preventer Test Fee	61.61
Backflow Programme – incomplete application fee (hourly rate)	43.54

	Water Charge \$
Merton, Hindon and individual farm supplied Bulk Water	0.11 per cubic metre
All other treated water per cubic metre	1.76 per cubic metre
Disconnection of Water Supply (AWSCI to excavate)	243.69
Disconnection of Water Supply (DCC contractor to excavate)	954.81

Where the supply of a quantity of water is subject to this Quantity of Water Targeted Rate, the rating unit will not be liable for any other targeted rate for the supply of the same water.

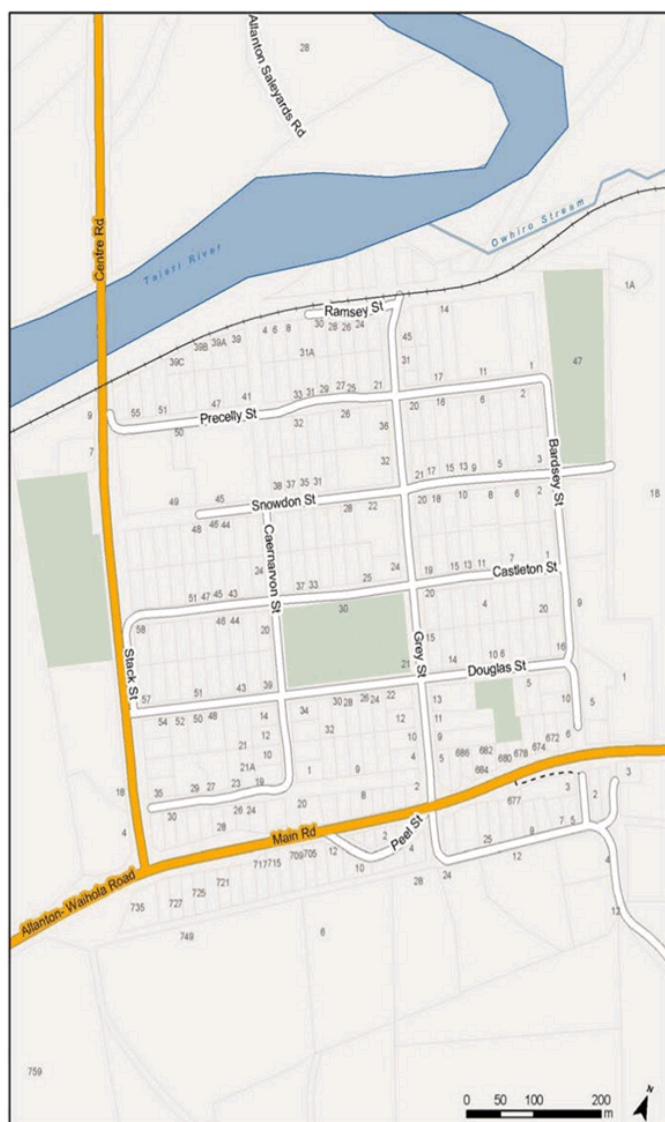
Allanton Drainage

The Council proposes to set a targeted rate for rating units within the Allanton area that are paying the capital contribution towards the Allanton Wastewater Collection System, as a targeted rate over 20 years. Liability for the rate is on the basis of the provision of service to each rating unit.

The estimated rate for the 2021/22 year is:

Liability Calculated	Estimated Rate	Revenue Sought \$
Per rating unit	\$411.00	22,000

The Allanton area is shown in the map below:



Blanket Bay Drainage

The Council proposes to set a targeted rate for rating units within the Blanket Bay area that are paying the capital contribution towards the Blanket Bay Drainage system, as a targeted rate over 20 years. Liability for the rate is on the basis of the provision of the service to each rating unit.

The estimated rate for the 2021/22 year is:

Liability Calculated	Estimated Rate	Revenue Sought \$
Per rating unit	\$636.00	1,000

The Blanket Bay area is shown in the map below:



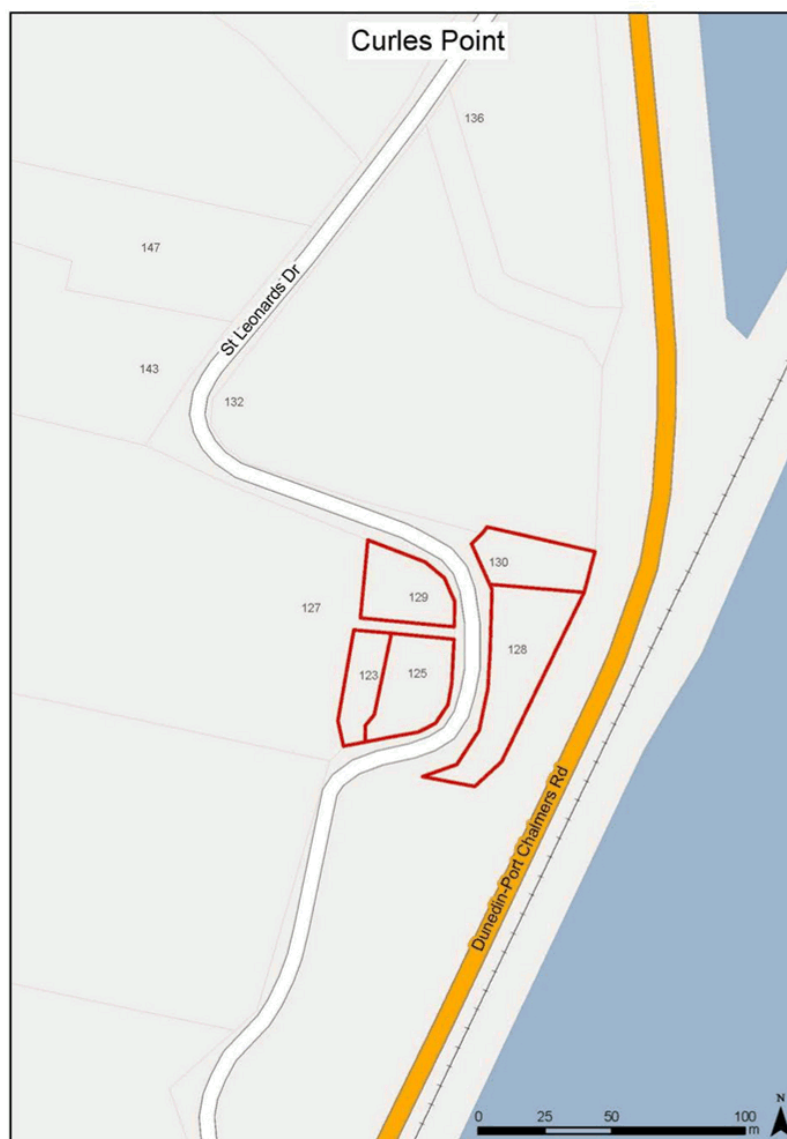
Curles Point Drainage

The Council proposes to set a targeted rate for rating units within the Curles Point area that are paying the capital contribution towards the Curles Point Drainage System, as a targeted rate over 20 years. Liability for the rate is on the basis of the provision of the service to each rating unit.

The estimated rate for the 2021/22 year is:

Liability Calculated	Estimated Rate	Revenue Sought \$
Per rating unit	\$749.00	1,000

The Curles Point area is shown in the map below:



Tourism/Economic Development

The Council proposes to set a capital value-based targeted rate for all commercial properties. The rate will be set on a differential basis based on land use (the categories are "commercial" and "stadium: 10,000+ seat capacity").

The estimated rate for the 2021/22 year will be charged on the following basis:

Table 12: Targeted Rate – Tourism/Economic Development

Categories	Estimated Rates, cents in \$ per Capital Value	Revenue Sought \$
Commercial	0.0116	573,000
Stadium: 10,000+ Seat Capacity	0.0013	2,000

The Tourism/Economic Development targeted rate will be used to fund part of the Economic Development budget.

Warm Dunedin Targeted Rate Scheme

The Council proposes to set a targeted rate for each rating unit in the Warm Dunedin Targeted Rate Scheme. The revenue sought from this targeted rate is \$590,000. The targeted rate scheme provides a way for homeowners to install insulation and/or clean heating. The targeted rate covers the cost and an annual interest rate. The interest rates have been and will be:

- Rates commencing 1 July 2013 and 1 July 2014 8%;
- Rates commencing 1 July 2015 and 1 July 2016 8.3%;
- Rates commencing 1 July 2017 7.8%;
- Rates commencing 1 July 2018 7.2%;
- Rates commencing 1 July 2019 6.8%.
- Rates commencing 1 July 2020 5.8%.
- Rates commencing 1 July 2021 – this rate will be confirmed when the 10 Year Plan 2021-31 is adopted.

Table 13: Targeted Rate – Warm Dunedin Targeted Rate Scheme

Liability Calculated	Revenue Sought \$
Per rating unit	590,000

Private Street Lighting

The Council proposes to set a targeted rate for street lighting in the private streets to which the Council supplies a private street lighting service. The targeted rate will be set on a differential basis based on land use (the categories are "residential", "lifestyle" and "commercial").

The estimated rate for the 2021/22 year will be charged on the following basis:

Table 14: Targeted Rate – Private Street Lighting

Categories	Liability Calculated	Estimated Rate \$	Revenue Sought \$
Residential and Lifestyle	For each separately used or inhabited part of a rating unit in a private street the sum calculated on the formula of \$149.40 per street light in a private street divided by the number of separately used or inhabited parts of a rating unit in the private street.	149.40 for each street light	31,000
Commercial	For each rating unit in a private street the sum calculated on the formula of \$149.40 per street light in a private street divided by the number of rating units in the private street.	149.40 for each street light	4,000

The private street addresses are as follows:

1-10	Achilles Avenue
1	Alton Avenue
2	Alton Avenue
2A	Alton Avenue
3	Alton Avenue
4	Alton Avenue
5	Alton Avenue
6	Alton Avenue
7	Alton Avenue
8	Alton Avenue
9	Alton Avenue
7	Angle Avenue
9	Angle Avenue
11	Angle Avenue
20	Angle Avenue
22	Angle Avenue
24	Angle Avenue
43	Arawa Street
47	Arawa Street
17	Awa Toru Drive
19	Awa Toru Drive
21	Awa Toru Drive
23	Awa Toru Drive
25	Awa Toru Drive
27	Awa Toru Drive
29	Awa Toru Drive
31	Awa Toru Drive
33	Awa Toru Drive
35	Awa Toru Drive
37	Awa Toru Drive
39	Awa Toru Drive
41	Awa Toru Drive
43	Awa Toru Drive
45	Awa Toru Drive
49	Awa Toru Drive
60A	Balmacewen Road

60B	Balmacewen Road
62	Balmacewen Road
64	Balmacewen Road
1	Balmoral Avenue
2	Balmoral Avenue
3	Balmoral Avenue
4	Balmoral Avenue
5	Balmoral Avenue
6	Balmoral Avenue
7	Balmoral Avenue
8	Balmoral Avenue
9	Balmoral Avenue
10	Balmoral Avenue
11	Balmoral Avenue
12	Balmoral Avenue
16	Balmoral Avenue
17	Balmoral Avenue
19	Barclay Street
211	Bay View Road
211A	Bay View Road
211B	Bay View Road
1	Beaufort Street
3	Beaufort Street
119	Belford Street
12	Bell Crescent
14	Bell Crescent
24	Bell Crescent
26	Bell Crescent
7	Bishop Verdon Close
9	Bishop Verdon Close
10	Bishop Verdon Close
11	Bishop Verdon Close
12	Bishop Verdon Close
8	Bonnington Street
8a	Bonnington Street
10	Bonnington Street

20K	Brighton Road
20J	Brighton Road
20H	Brighton Road
20G	Brighton Road
20F	Brighton Road
20E	Brighton Road
20D	Brighton Road
20C	Brighton Road
20B	Brighton Road
20A	Brighton Road
20	Brighton Road
34	Burgess Street
36	Burgess Street
38	Burgess Street
40	Burgess Street
42	Burgess Street
44	Burgess Street
46	Burgess Street
48	Burgess Street
50	Burgess Street
181	Burt Street
183	Burt Street
185	Burt Street
7	Bush Road, Mosgiel
80	Caldwell Street
82	Caldwell Street
1	Campbell Lane
4	Campbell Lane
5	Campbell Lane
6	Campbell Lane
7	Campbell Lane
8	Campbell Lane
9	Campbell Lane
10	Campbell Lane
11	Campbell Lane
12	Campbell Lane
13	Campbell Lane

14	Campbell Lane
15	Campbell Lane
30	Cardigan Street, North East Valley
32	Cardigan Street, North East Valley
34	Cardigan Street, North East Valley
36	Cardigan Street, North East Valley
22	Centennial Avenue, Fairfield
24	Centennial Avenue, Fairfield
26	Centennial Avenue, Fairfield
28	Centennial Avenue, Fairfield
150	Chapman Street
150A	Chapman Street
152	Chapman Street
12	Clearwater Street
14	Clearwater Street
16	Clearwater Street
18	Clearwater Street
20	Clearwater Street
22	Clearwater Street
24	Clearwater Street
26	Clearwater Street
28	Clearwater Street
30	Clearwater Street
32	Clearwater Street
34	Clearwater Street
36	Clearwater Street
22	Cole Street
11	Corstorphine Road
11A	Corstorphine Road
13	Corstorphine Road
15	Corstorphine Road
17	Corstorphine Road
21	Corstorphine Road
23	Corstorphine Road
25	Corstorphine Road
11	Craighall Crescent
15	Craighall Crescent

1	Dalkeith Road, Port Chalmers
2	Dalkeith Road, Port Chalmers
4	Dalkeith Road, Port Chalmers
6	Dalkeith Road, Port Chalmers
8	Dalkeith Road, Port Chalmers
10	Dalkeith Road, Port Chalmers
12	Dalkeith Road, Port Chalmers
21	Davies Street
22	Davies Street
1	Devon Place
2	Devon Place
3	Devon Place
4	Devon Place
5	Devon Place
6	Devon Place
7	Devon Place
9	Devon Place
10	Devon Place
11	Devon Place
12	Devon Place
13	Devon Place
14	Devon Place
15	Devon Place
16	Devon Place
17	Devon Place
18	Devon Place
19	Devon Place
20	Devon Place
139b	Doon Street
139a	Doon Street
139	Doon Street
141	Doon Street
143	Doon Street
145	Doon Street
149	Doon Street
151	Doon Street
5	Dorset Street

7	Dorset Street
10	Dorset Street
11	Dorset Street
12	Dorset Street
14	Dorset Street
16	Dorset Street
18	Dorset Street
20	Dorset Street
21	Dorset Street
17	Duckworth Street
19	Duckworth Street
21	Duckworth Street
35	Duckworth Street
37	Duckworth Street
39	Duckworth Street
39a	Duckworth Street
41	Duckworth Street
47	Duckworth Street
49	Duckworth Street
53	Duckworth Street
	Dunedin Airport
1 – 31	Eastbourne Street
2 – 31	Eastbourne Street
3 – 31	Eastbourne Street
4 – 31	Eastbourne Street
5 – 31	Eastbourne Street
6 – 31	Eastbourne Street
7 – 31	Eastbourne Street
8 – 31	Eastbourne Street
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23 – 31	Eastbourne Street
24 – 31	Eastbourne Street
25 – 31	Eastbourne Street
26 – 31	Eastbourne Street
27 – 31	Eastbourne Street
28 – 31	Eastbourne Street
29 – 31	Eastbourne Street
30 – 31	Eastbourne Street
31 – 31	Eastbourne Street
32 – 31	Eastbourne Street
33 – 31	Eastbourne Street
34 – 31	Eastbourne Street
35 – 31	Eastbourne Street
36 – 31	Eastbourne Street
37 – 31	Eastbourne Street
38 – 31	Eastbourne Street
39 – 31	Eastbourne Street
40 – 31	Eastbourne Street
41 – 31	Eastbourne Street
42 – 31	Eastbourne Street
43 – 31	Eastbourne Street
46 – 31	Eastbourne Street
47 – 31	Eastbourne Street
50 – 31	Eastbourne Street
51 – 31	Eastbourne Street
8	Echovale Avenue
10	Echovale Avenue
12	Echovale Avenue
2	Elbe Street
202	Elgin Road
204	Elgin Road

206	Elgin Road
208	Elgin Road
1	Eton Drive
4	Eton Drive
5	Eton Drive
6	Eton Drive
7	Eton Drive
8	Eton Drive
9	Eton Drive
10	Eton Drive
11	Eton Drive
12	Eton Drive
13	Eton Drive
14	Eton Drive
15	Eton Drive
16	Eton Drive
17	Eton Drive
18	Eton Drive
19	Eton Drive
20	Eton Drive
2	Everton Road
3	Everton Road
4	Everton Road
64	Every Street
66	Every Street
68	Every Street
70	Every Street
76	Every Street
7	Fern Road, Ravensbourne
9	Fern Road, Ravensbourne
11	Fern Road, Ravensbourne
13	Fern Road, Ravensbourne
15	Fern Road, Ravensbourne
17	Fern Road, Ravensbourne
19	Fern Road, Ravensbourne
21	Fern Road, Ravensbourne
19	Ferntree Drive

21	Ferntree Drive
23	Ferntree Drive
25	Ferntree Drive
45	Forfar Street
47	Forfar Street
47a	Forfar Street
49	Forfar Street
51	Forfar Street
53	Forfar Street
53a	Forfar Street
1 – 80	Formby Street
5 – 80	Formby Street
6 – 80	Formby Street
7 – 80	Formby Street
8 – 80	Formby Street
10 – 80	Formby Street
14 – 80	Formby Street
15 – 80	Formby Street
16 – 80	Formby Street
17 – 80	Formby Street
18 – 80	Formby Street
19 – 80	Formby Street
20 – 80	Formby Street
239	Fryatt Street
248	George Street
558	George Street
150A	Gladstone Road North
150B	Gladstone Road North
150C	Gladstone Road North
150D	Gladstone Road North
150E	Gladstone Road North
152B	Gladstone Road North
152C	Gladstone Road North
152D	Gladstone Road North
152E	Gladstone Road North
154A	Gladstone Road North
214	Gladstone Road North

216	Gladstone Road North
218	Gladstone Road North
220	Gladstone Road North
222	Gladstone Road North
224	Gladstone Road North
226	Gladstone Road North
228	Gladstone Road North
230	Gladstone Road North
232	Gladstone Road North
234	Gladstone Road North
39	Glenbrook Drive, Mosgiel
41	Glenbrook Drive, Mosgiel
45	Glenbrook Drive, Mosgiel
47	Glenbrook Drive, Mosgiel
49	Glenbrook Drive, Mosgiel
51	Glenbrook Drive, Mosgiel
57	Glenbrook Drive, Mosgiel
1	Glenfinnan Place
3	Glenfinnan Place
4	Glenfinnan Place
4A	Glenfinnan Place
5	Glenfinnan Place
6	Glenfinnan Place
7	Glenfinnan Place
8A	Glenfinnan Place
8B	Glenfinnan Place
9A	Glenfinnan Place
9B	Glenfinnan Place
10A	Glenfinnan Place
10B	Glenfinnan Place
1	Glengarry Court
2	Glengarry Court
3	Glengarry Court
4	Glengarry Court
5	Glengarry Court
6	Glengarry Court
7	Glengarry Court

8	Glengarry Court
9	Glengarry Court
10	Glengarry Court
11	Glengarry Court
12	Glengarry Court
13	Glengarry Court
14	Glengarry Court
15	Glengarry Court
16	Glengarry Court
17	Glengarry Court
18	Glengarry Court
19	Glengarry Court
20	Glengarry Court
21	Glengarry Court
22	Glengarry Court
23	Glengarry Court
24	Glengarry Court
48	Glenross Street
50	Glenross Street
54	Glenross Street
56	Glenross Street
58	Glenross Street
60	Glenross Street
110	Glenross Street
114	Glenross Street
116	Glenross Street
230	Gordon Road
229	Gordon Road
34	Grandview Crescent
10	Halsey Street
1	Hampton Grove
2	Hampton Grove
3	Hampton Grove
4	Hampton Grove
5	Hampton Grove
6	Hampton Grove
7	Hampton Grove

8	Hampton Grove
9	Hampton Grove
10	Hampton Grove
11	Hampton Grove
12	Hampton Grove
14	Hampton Grove
15	Hampton Grove
16	Hampton Grove
17	Hampton Grove, Mosgiel
18	Hampton Grove, Mosgiel
19	Hampton Grove, Mosgiel
20	Hampton Grove, Mosgiel
21	Hampton Grove, Mosgiel
22	Hampton Grove, Mosgiel
23	Hampton Grove, Mosgiel
24	Hampton Grove, Mosgiel
25	Hampton Grove, Mosgiel
26	Hampton Grove, Mosgiel
4	Harold Street
12	Harold Street
70a	Hazel Avenue
70	Hazel Avenue
72	Hazel Avenue
215a	Helensburgh Road
217a	Helensburgh Road
217b	Helensburgh Road
219	Helensburgh Road
219a	Helensburgh Road
219b	Helensburgh Road
221	Helensburgh Road
223	Helensburgh Road
49	Highcliff Road
49A	Highcliff Road
51	Highcliff Road
57	Highcliff Road
295	Highcliff Road
297	Highcliff Road

313	Highcliff Road
315a	Highcliff Road
315b	Highcliff Road
317	Highcliff Road
16	Highgate
18	Highgate
20	Highgate
34a	Highgate
34	Highgate
216	Highgate
218	Highgate
144A	Highgate
144B	Highgate
146	Highgate
146A	Highgate
148	Highgate
11	Irmo Street
12	Irmo Street
9	Kilgour Street
11	Kilgour Street
15	Kilgour Street
20	Kinvig Street
22	Kinvig Street
2	Koremata Street
4	Koremata Street
12	Koremata Street
3	Lawson Street
4	Leithton Close
6	Leithton Close
9	Leithton Close
10	Leithton Close
11	Leithton Close
14	Leithton Close
15	Leithton Close
18	Leithton Close
19	Leithton Close
21	Leithton Close

22	Leithton Close
23	Leithton Close
26	Leithton Close
27	Leithton Close
28	Leithton Close
29	Leithton Close
32	Leithton Close
33	Leithton Close
36	Leithton Close
5	Leven Street
2	Leyton Terrace
21-67	Lock Street
23a	London Street
25	London Street
1-25	London Street
2-25	London Street
3-25	London Street
8	Lynwood Avenue
10	Lynwood Avenue
12c	Lynwood Avenue
12b	Lynwood Avenue
12a	Lynwood Avenue
12	Lynwood Avenue
14	Lynwood Avenue
3	McAllister Lane, Mosgiel
5	McAllister Lane, Mosgiel
7	McAllister Lane, Mosgiel
9	McAllister Lane, Mosgiel
11	McAllister Lane, Mosgiel
13	McAllister Lane, Mosgiel
15	McAllister Lane, Mosgiel
17	McAllister Lane, Mosgiel
19	McAllister Lane, Mosgiel
210	Main South Road, Green Island
1	Mallard Place, Mosgiel
2	Mallard Place, Mosgiel
3	Mallard Place, Mosgiel

4	Mallard Place, Mosgiel
5	Mallard Place, Mosgiel
6	Mallard Place, Mosgiel
7	Mallard Place, Mosgiel
8	Mallard Place, Mosgiel
9	Mallard Place, Mosgiel
10	Mallard Place, Mosgiel
11	Mallard Place, Mosgiel
12	Mallard Place, Mosgiel
13	Mallard Place, Mosgiel
14	Mallard Place, Mosgiel
15	Mallard Place, Mosgiel
11	Malvern Street
15	Malvern Street
17a	Malvern Street
30	Marne Street
32	Marne Street
42	Marne Street
44	Marne Street
46	Marne Street
48	Marne Street
50	Marne Street
2	Meldrum Street
10	Meldrum Street
33	Melville Street
14	Middleton Road
16	Middleton Road
18	Middleton Road
20	Middleton Road
22	Middleton Road
24	Middleton Road
26	Middleton Road
28	Middleton Road
30	Middleton Road
37	Middleton Road
37a	Middleton Road
39	Middleton Road

43	Middleton Road
47a	Middleton Road
19	Montague Street
21	Montague Street
23	Montague Street
29	Moray Place
415	Moray Place
72	Newington Avenue
37	Norwood Street
41	Norwood Street
39	Pacific Street
1	Pembrey Street
2	Pembrey Street
3	Pembrey Street
4	Pembrey Street
5	Pembrey Street
6	Pembrey Street
7	Pembrey Street
8	Pembrey Street
10	Pembrey Street
11	Pembrey Street
264	Pine Hill Road
264a	Pine Hill Road
266B	Pine Hill Road
266A	Pine Hill Road
268A	Pine Hill Road
268B	Pine Hill Road
270	Pine Hill Road
272	Pine Hill Road
274	Pine Hill Road
278A	Pine Hill Road
278B	Pine Hill Road
390	Pine Hill Road
409	Pine Hill Road
411	Pine Hill Road
5	Pinfold Place, Mosgiel
6	Pinfold Place, Mosgiel

8	Pinfold Place, Mosgiel
9	Pinfold Place, Mosgiel
10	Pinfold Place, Mosgiel
11	Pinfold Place, Mosgiel
12	Pinfold Place, Mosgiel
13	Pinfold Place, Mosgiel
14	Pinfold Place, Mosgiel
15	Pinfold Place, Mosgiel
19	Queen Street
19A	Queen Street
223	Ravensbourne Road
87	Riselaw Road
89	Riselaw Road
89a	Riselaw Road
91	Riselaw Road
91a	Riselaw Road
93	Riselaw Road
93a	Riselaw Road
21	Rosebery Street
16	Selkirk Street
11	Shand Street, Green Island
14	Sheen Street
6	Silver Springs Boulevard, Mosgiel
8	Silver Springs Boulevard, Mosgiel
10	Silver Springs Boulevard, Mosgiel
12	Silver Springs Boulevard, Mosgiel
14	Silver Springs Boulevard, Mosgiel
16	Silver Springs Boulevard, Mosgiel
20	Silver Springs Boulevard, Mosgiel
22	Silver Springs Boulevard, Mosgiel
24	Silver Springs Boulevard, Mosgiel
26	Silver Springs Boulevard, Mosgiel
28	Silver Springs Boulevard, Mosgiel
1-27	St Albans Street
2-27	St Albans Street
3-27	St Albans Street
4-27	St Albans Street

5-27	St Albans Street
6-27	St Albans Street
7-27	St Albans Street
8-27	St Albans Street
9-27	St Albans Street
10-27	St Albans Street
11-27	St Albans Street
12-27	St Albans Street
13-27	St Albans Street
4	Stanley Square
5	Stanley Square
6	Stanley Square
7	Stanley Square
8	Stanley Square
9	Stanley Square
10	Stanley Square
11	Stanley Square
12	Stanley Square
365	Stuart Street
367	Stuart Street
367a	Stuart Street
55	Sunbury Street
57	Sunbury Street
59	Sunbury Street
59a	Sunbury Street
67	Tahuna Road
67A	Tahuna Road
67B	Tahuna Road
69	Tahuna Road
69A	Tahuna Road
69B	Tahuna Road
69C	Tahuna Road
1	Taupo Lane
2	Taupo Street
1	Thomas Square
2	Thomas Square
3	Thomas Square

4	Thomas Square
5	Thomas Square
6	Thomas Square
7	Thomas Square
8	Thomas Square
9	Thomas Square
4A	Totara Street, Ravensbourne
44	Turnbull Street
46	Turnbull Street
85A	Victoria Road
85B	Victoria Road
85C	Victoria Road
85D	Victoria Road
85G	Victoria Road
85H	Victoria Road
85I	Victoria Road
85J	Victoria Road
85K	Victoria Road
85L	Victoria Road
85M	Victoria Road
85N	Victoria Road
85O	Victoria Road
85P	Victoria Road
85Q	Victoria Road
85R	Victoria Road
146	Victoria Road
44	Waimea Avenue
46	Waimea Avenue
48	Waimea Avenue
50	Waimea Avenue
58/60	Waimea Avenue
62/64	Waimea Avenue
16	Warwick Street
18	Warwick Street
23	Warwick Street
1	Wenlock Square
2	Wenlock Square

3	Wenlock Square
4	Wenlock Square
5	Wenlock Square
6	Wenlock Square
7	Wenlock Square
8	Wenlock Square
9	Wenlock Square
10	Wenlock Square
11	Wenlock Square
12	Wenlock Square
14	Wenlock Square
15	Wenlock Square
17	Wenlock Square
18	Wenlock Square
19	Wenlock Square
20	Wenlock Square
21	Wenlock Square
19	Woodside Terrace
20	Woodside Terrace
22	Woodside Terrace
23	Woodside Terrace
24	Woodside Terrace
25	Woodside Terrace
25a	Woodside Terrace
26	Woodside Terrace
27	Woodside Terrace
29	Woodside Terrace

Differential Matters and Categories

Where councils assess rates on a differential basis, the definition of differential categories is limited to the list of matters specified in Schedule 2 of the Local Government (Rating) Act 2002. The Council is required to state which matters will be used for definition of the categories, and the category or categories of any differentials.

The differential categories are determined in accordance with the Council's land use codes and the provision or availability of services. The land use code for each property is available from the Council's Customer Services Agency and on the website (on a property by property basis) at www.dunedin.govt.nz/services/rates-information.

The Council's land use codes are based on the land use codes set under the Rating Valuation Rules 2008, which are set out below:

Land Use Code	Land Use Description	Differential Category
0	Multi-use: Vacant/Indeterminate	Commercial
1	Multi-use: Rural Industry	Farmland
2	Multi-use: Lifestyle	Lifestyle
3	Multi-use: Transport	Commercial
4	Multi-use: Community Services	Commercial
5	Multi-use: Recreational	Commercial
6	Multi-use: Utility Services	Commercial
7	Multi-use: Industrial	Commercial
8	Multi-use: Commercial	Commercial
9	Multi-use: Residential	Residential
10	Rural: Multi-use within Rural Industry	Farmland
11	Rural: Dairy	Farmland
12	Rural: Stock Finishing	Farmland
13	Rural: Arable Farming	Farmland
14	Rural: Store Livestock	Farmland
15	Rural: Market Gardens and Orchards	Farmland
16	Rural: Specialist Livestock	Farmland
17	Rural: Forestry	Farmland
18	Rural: Mineral Extraction	Commercial
19	Rural: Vacant	Farmland
20	Lifestyle: Multi-use within Lifestyle	Lifestyle
21	Lifestyle: Single Unit	Lifestyle
22	Lifestyle: Multi-unit	Lifestyle
29	Lifestyle: Vacant	Lifestyle
30	Transport: Multi-use within Transport	Commercial
31	Transport: Road Transport	Commercial
32	Transport: Parking	Commercial
33	Transport: Rail Transport	Commercial

Land Use Code	Land Use Description	Differential Category
34	Transport: Water Transport	Commercial
35	Transport: Air Transport	Commercial
39	Transport: Vacant	Commercial
40	Community Services: Multi-use within Community Services	Commercial
41	Community Services: Educational	Commercial
42	Community Services: Medical and Allied	Commercial
43	Community Services: Personal and Property Protection	Commercial
44	Community Services: Religious	Commercial
45	Community Services: Defence	Commercial
46	Community Services: Halls	Commercial
47	Community Services: Cemeteries and Crematoria	Commercial
49	Community Services: Vacant	Commercial
50	Recreational: Multi-use within Recreational	Commercial
51	Recreational: Entertainment	Commercial
52	Recreational: Active Indoor	Commercial
53	Recreational: Active Outdoor	Commercial
54	Recreational: Passive Indoor	Commercial
55	Recreational: Passive Outdoor	Commercial
59	Recreational: Vacant	Commercial
60	Utility Services: Multi-use within Utility Services	Commercial
61	Utility Services: Communications	Commercial
62	Utility Services: Electricity	Commercial
63	Utility Services: Gas	Commercial
64	Utility Services: Water Supply	Commercial
65	Utility Services: Sanitary	Commercial
66	Utility Services: Other	Commercial
67	Utility Services: Post Boxes	Commercial
69	Utility Services: Vacant	Commercial
70	Industrial: Multi-use within Industrial	Commercial
71	Industrial: Food, Drink and Tobacco	Commercial
72	Industrial: Textiles, Leather and Fur	Commercial
73	Industrial: Timber Products and Furniture	Commercial
74	Industrial: Building Materials Other than Timber	Commercial
75	Industrial: Engineering, Metalworking, Appliances and Machinery	Commercial
76	Industrial: Chemicals, Plastics, Rubber and Paper	Commercial

Land Use Code	Land Use Description	Differential Category
77	Industrial: Other Industries – including Storage	Commercial
78	Industrial: Depots, Yards	Commercial
79	Industrial: Vacant	Commercial
80	Commercial: Multi-use within Commercial	Commercial
81	Commercial: Retail	Commercial
82	Commercial: Services	Commercial
83	Commercial: Wholesale	Commercial
84	Commercial: Offices	Commercial
85	Commercial: Carparking	Commercial
89	Commercial: Vacant	Commercial
90	Residential: Multi-use within Residential	Residential
91	Residential: Single Unit excluding Bach/Crib	Residential
92	Residential: Multi-unit	Residential
93	Residential: Public Communal – Unlicensed	Commercial
94	Residential: Public Communal – Licensed	Commercial
95	Residential: Special Accommodation	Residential
96	Residential: Communal Residence Dependent on Other Use	Residential
97	Residential: Bach/Crib	Residential
98	Residential: Carparking	Residential
99	Residential: Vacant	Residential

In addition to the categories set out above, the Council has established categories for residential institutions, residential heritage bed and breakfasts, the stadium: 10,000+ seat capacity, churches, and schools.

1 Differentials Based on Land Use

The Council proposes to use this matter to:

- differentiate the General Rate
- differentiate the Community Services Rate
- differentiate the Kerbside Recycling Collection Rate
- differentiate the Private Street Lighting Rate
- differentiate the Tourism/Economic Development Rate
- differentiate the Fire Protection Rate.

The differential categories based on land use are:

Residential – includes all rating units used for residential purposes including single residential, multi-unit residential, multi-use residential, residential special accommodation, residential communal residence dependent on other use, residential bach/cribs, residential carparking and residential vacant land.

Lifestyle – includes all rating units with Council land use codes 2, 20, 21, 22 and 29.

Commercial – includes all rating units with land uses not otherwise categorised as Residential, Lifestyle, Farmland, Stadium: 10,000+ Seat Capacity or Residential Heritage Bed and Breakfasts.

Farmland – includes all rating units used solely or principally for agricultural or horticultural or pastoral purposes.

Residential Heritage Bed and Breakfasts – includes all rating units meeting the following description:

- 1 Bed and breakfast establishments; and
- 2 Classified as commercial for rating purposes due to the number of bedrooms (greater than 4); and
- 3 Either:
 - the majority of the establishment is at least 80 years old; or
 - the establishment has Heritage New Zealand Pouhere Taonga Registration; or
 - the establishment is a Dunedin City Council Protected Heritage Building, as identified in the District Plan; and
- 4 The bed and breakfast owner lives at the facility.

Stadium: 10,000+ Seat Capacity – this includes land at 130 Anzac Avenue, Dunedin, Assessment 4026695, Valuation reference 27190–01403.

2 Differentials Based on Land Use and Provision or Availability of Service

The Council proposes to use these matters to differentiate the drainage rate and commercial drainage rate.

The differential categories based on land use are:

Residential – includes all rating units used for residential purposes including single residential, multi-unit residential, multi-use residential, residential special accommodation, residential communal residence dependent on other use, residential bach/cribs, residential carparking and residential vacant land.

Lifestyle – includes all rating units with Council land use codes 2, 20, 21, 22 and 29.

Farmland – includes all rating units used solely or principally for agricultural or horticultural or pastoral purposes.

Commercial – includes all rating units with land uses not otherwise categorised as Residential, Lifestyle, Farmland, Stadium: 10,000+ Seat Capacity, Residential Heritage, Bed and Breakfasts, Residential Institutions, Churches or Schools.

Stadium: 10,000+ Seat Capacity – this includes land at 130 Anzac Avenue, Dunedin, Assessment 4026695, Valuation reference 27190–01403.

Residential Heritage Bed and Breakfasts – includes all rating units meeting the following description:

- 1 Bed and breakfast establishments; and
- 2 Classified as commercial for rating purposes due to the number of bedrooms (greater than 4); and
- 3 Either:
 - the majority of the establishment is at least 80 years old; or
 - the establishment has Heritage New Zealand Pouhere Taonga Registration; or
 - the establishment is a Dunedin City Council Protected Heritage Building, as identified in the District Plan; and
- 4 The bed and breakfast owner lives at the facility.

Residential Institutions – includes only rating units with Council land use codes 95 and 96.

Churches – includes all rating units used solely or principally as places of religious worship.

Schools – includes only rating units used for schools that do not operate for profit.

The differential categories based on provision or availability of service are:

Connected – any rating unit that is connected to a public sewerage drain.

Serviceable – any rating unit that is not connected to a public sewerage drain but is capable of being connected to the sewerage system (being a property situated within 30 metres of a public drain).

3 Differentials Based on Provision or Availability of Service

The Council proposes to use these matters to differentiate the water rates.

The differential categories based on provision or availability of service are:

Connected – any rating unit that is supplied by the water supply system

Serviceable – any rating unit that is not supplied but is capable of being supplied by the water supply system (being a rating unit situated within 100 metres of the nearest water supply).

Minimum Rates

Where the total amount of rates payable in respect of any rating unit is less than \$5.00, the rates payable in respect of the rating unit shall be such amount as the Council determines, but not exceeding \$5.00.

Low Value Rating Units

Rating units with a capital value of \$3,500 or less will only be charged the general rate.

Separately Used or Inhabited Part of a Rating Unit

A separately used or inhabited part of a rating unit includes any portion inhabited or used by the owner/a person other than the owner, and who has the right to use or inhabit that portion by virtue of a tenancy, lease, licence, or other agreement.

This definition includes separately used parts, whether or not actually occupied at any particular time, which are provided by the owner for rental (or other form of occupation) on an occasional or long term basis by someone other than the owner.

For the purpose of this definition, vacant land and vacant premises offered or intended for use or habitation by a person other than the owner and usually used as such are defined as 'used'.

For the avoidance of doubt, a rating unit that has a single use or occupation is treated as having one separately used or inhabited part.

Lump Sum Contributions

No lump sum contributions will be sought for any targeted rate.

Rating by Instalments

All rates to be collected by the Council will be payable by four instalments according to the following schedule.

The City is divided into four areas based on Valuation Roll Numbers, as set out below:

Table 15: Rating Areas

Area 1	Area 2	Area 3	Area 3 continued
Valuation Roll Numbers:			
26700	26990	26500	27550
26710	27000	26520	27560
26760	27050	26530	27600
26770	27060	26541	27610
26850	27070	26550	27760
26860	27080	26580	27770
26950	27150	26590	27780
26960	27350	26620	27790
26970	27360	26640	27811
26980	27370	26651	27821
27160	27380	26750	27822
27170	27500	26780	27823
27180	27510	27250	27831
27190	27520	27260	27841

Area 1	Area 2	Area 3	Area 3 continued
Valuation Roll Numbers:			
27200	27851	27270	27871
	27861	27280	27911
	27880	27450	27921
	27890	27460	27931
	27901	27470	27941
	28000		
	28010		
	28020		

Area 4 comprises ratepayers with multiple assessments who pay on a schedule.

Due Dates for Payments of Rates

All rates, with the exception of water rates which are charged based on water meter consumption, will be payable in four instalments, due on the dates shown below:

Table 16: Due Dates

Due Dates	Area 1	Areas 2 and 4	Area 3	To be provided in the adopted 10 Year Plan 2021-31
Instalment 1				
Instalment 2				
Instalment 3				
Instalment 4				

Water meter invoices are sent separately from other rates at intervals depending on the quantity of water consumed.

Example Rate Accounts

	Capital Value	2020/21 Rates	2021/22 Indicative Rates	Increase	Increase %
<i>Residential</i>					
Example	345,000	2,153	2,362	209	9.7%
Mode Value	385,000	2,267	2,487	220	9.7%
Median Value	420,000	2,368	2,597	229	9.7%
Average Value	464,400	2,494	2,735	241	9.7%
Example	530,000	2,682	2,940	258	9.6%
Example	600,000	2,882	3,159	277	9.6%
Example	750,000	3,311	3,627	316	9.5%
<i>Commercial</i>					
Example	245,000	3,261	3,536	275	8.4%
Median Value	495,000	5,892	6,401	509	8.6%
Example	1,150,000	12,789	13,911	1,122	8.8%
Average Value	1,605,000	17,579	19,127	1,548	8.8%
Example	2,345,000	25,371	27,610	2,239	8.8%
Example	5,500,000	58,589	63,781	5,192	8.9%
Example	10,800,000	114,392	124,539	10,147	8.9%
<i>Farmland (General and Community Services Rates only)</i>					
Median Value	550,000	1,358	1,476	118	8.7%
Average Value	1,265,000	2,994	3,263	269	9.0%
Example	1,430,000	3,372	3,676	304	9.0%
Example	2,060,000	4,813	5,250	437	9.1%
Example	4,230,000	9,778	10,672	894	9.1%
Example	7,250,000	16,688	18,219	1,531	9.2%
Example	10,300,000	23,666	25,842	2,175	9.2%
<i>Lifestyle (General and Community Service Rates only)</i>					
Example	510,000	1,485	1,616	131	8.8%
Median Value	725,000	2,069	2,254	185	8.9%
Average Value	746,000	2,127	2,317	190	8.9%
Example	930,000	2,626	2,863	237	9.0%
<i>Residential Heritage Bed and Breakfasts</i>					
Example	1,020,000	5,973	6,541	568	9.5%

Definitions

Mode – this is the most frequently occurring capital value.

Median – this capital value is the one in the middle of the list of individual capital values. Half of the values are above this amount, and half below.

Average – this is the capital value calculated if the whole value in each category was divided by the number of properties in each category.

Example – these properties provide additional example rate accounts.

Mix of Funding Mechanisms by Group Activity

The following funding mechanisms are applied to the Council's group activities. All mechanisms that have been used are in accordance with the Revenue and Financing Policy.

	General Rate	Community Services Rate	Kerbside Recycling Rate	City-wide Water Rates	City-wide Drainage Rates	Allanton Drainage Rate	Blanket Bay Drainage Rate	Curles Point Drainage Rate	Private Street Lighting Rate	Tourism/Economic Development Rate	Warm Dunedin Rate	Revenue ²	Loans Raised	Sale of Assets	Reduction in Loans and Advances	Dunedin City Holdings Limited Interest and Dividend	NZTA Income	Cash	Development Contributions
Reserves and recreational facilities																			
Community and planning																			
Ara Toi (libraries and museums)																			
Water supply																			
Waste management																			
Sewerage and sewage																			
Stormwater																			
Property																			
Regulatory services																			
Economic development																			
Roading and footpaths																			
Governance and support services																			

² Revenue includes fees and charges, subsidies, capital revenue, interest and dividends (other than Dunedin City Holdings Limited dividends). Revenue also includes water rates based on quantity of water and any lump sum payments for the Blanket Bay and Curles Point drainage system.

Funding Principles

The Dunedin City Council, in adopting the rating method, takes into consideration the following funding principles:

- 1 That, in so far as possible, the rating method should be simple, efficient and understandable.
- 2 People who benefit (including secondary beneficiaries) should contribute to costs.
- 3 Capital value is the primary method of determining the rating method. Capital value is based on market value and reflects the property valuation.
- 4 Property rates are a mechanism, which contains principles of public benefit taxation. Rates are not a user–pays mechanism.
- 5 The application of funding mechanisms should not distort markets.
- 6 The funding of activities and services should have regard to the interests of residents and ratepayers, including future ratepayers.
- 7 The funding of services and activities should not make these unaffordable.
- 8 People who pollute or damage the environment should bear the cost of redress.
- 9 To promote fairness and equity in rating, fixed charges may be used.
- 10 Where changes are contemplated to the rating method, transition arrangements may be used.
- 11 Specific rating areas may be considered on a case–by–case basis.

INFRASTRUCTURE STRATEGY | HE RAUTAKI HAKA

1. EXECUTIVE SUMMARY

This document sets out the Dunedin City Council's (DCC) strategy for managing drinking water, wastewater and stormwater (3 waters) and transport infrastructure for the next 50 years. The strategy covers infrastructure assets operated by the DCC.

The purpose of this strategy is to:

- identify the significant infrastructure issues facing the DCC for the next 50 years
- identify how the DCC will manage the issues identified and any implications
- set out the most likely scenario for managing the city's network infrastructure to 2071.

Projects identified in the first 10 years of the strategy are funded as part of the DCC's 10-year plan. The 10 year plan provides for approximately \$1.5 billion of capital spend over the 10 year period, and of this, approximately \$1 billion is for 3 waters and transport infrastructure. There is less certainty around the issues and options for the period 2031 to 2071 and projects identified beyond the first 10 years of the plan are currently unbudgeted.

1.1. Strategic priorities for network infrastructure

1.1.1. 3 Waters

The strategic priorities for the 3 waters network are:

- meeting the water needs of the city for the next 50 years from existing water sources
- adapting to a variety of future scenarios for climate change and fluctuations in population
- reducing our reliance on non-renewable energy sources and oil-based products
- improving the quality of our discharges to minimise impacts on the environment
- ensuring that, as a minimum, key service levels are maintained into the future
- limiting cost increases to current affordability where practical
- adopting an integrated approach to management of the 3 waters and embracing the concept of kaitiakitaka.

1.1.2. Transport

The strategic priorities for Dunedin's transport network are:

- improving Dunedin's road safety record
- providing safe, viable transport choices
- strengthening connections to, within and between Dunedin's centres
- supporting safe and efficient freight movement
- ensuring the ongoing resilience of Dunedin's transport system and key infrastructure.

1.2. The current state of Dunedin's network infrastructure

1.2.1. Water supply

Due to significant investment in the city's water supply assets over the past two decades, Dunedin City has high quality drinking water that complies with the Ministry of Health Drinking Water Standards. However, there are capacity issues in some areas of the network and some of the smaller, rural plants need work to improve reliability of treatment standards. In addition, as the infrastructure has been developed over a long period of time, some infrastructure does not meet today's requirements such as required fire flow pressures.

1.2.2. Wastewater

While the majority of the city's wastewater treatment plants are generally in good condition, there are many mechanical and electrical plant items that are reaching, or have reached, the end of their asset life. There are also some areas of the network and that are in poor condition due to the age of the pipes, resulting in stormwater and groundwater infiltrating the network, which can lead to wastewater overflows and 'wash-out' of the treatment plant process, particularly during heavy rainfall events and high tide. The condition and reliability of the rural wastewater systems vary across the five schemes.

1.2.3. Stormwater

The provision of stormwater services across the city includes the DCC, Otago Regional Council (ORC) and private watercourse (both open and piped) infrastructure. During heavy or prolonged rainfall, the drainage network no longer copes with flows in some areas, resulting in damage to

property. Flows have increased due to changing climate and rainfall intensities, but also from development of the surrounding land. Issues can arise when a private watercourse has not been maintained or when private pipes are no longer of a size to safely convey flows.

1.2.4. Transport

There has been limited increases in renewals investment in the Dunedin transport network over the past five years, however, the cost of delivering renewals has increased by approximately 50%. The network has deteriorated as a result. Footpaths are generally in poorer condition than the roads. The city suffers from high crash statistics, particularly between motor vehicles and vulnerable roads users (i.e. cyclists and pedestrians). 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. Gaps still exist in the cycling network across the city with approximately 50% of the strategic cycleway network currently implemented.

1.3. Significant infrastructure issues and options for Dunedin

1.3.1. Regulatory, legislative and service delivery changes

The New Zealand Government is undertaking a substantial change programme that is expected to impact Dunedin's infrastructure services in the coming years. This includes reform of three waters regulatory and service delivery arrangements, freshwater reforms, review of the resource management system, changes to the way we provide for and manage urban growth, and reform of government and industry procurement systems. In addition, the Government Policy Statement on land transport, which sets out the Government's strategic direction for the land transport system over the next 10 years, is issued every three years.

1.3.1.1. 3 waters regulatory and service delivery reform

The 3 waters industry is entering a period of significant change:

- there is a drive to improve the environmental performance of wastewater and stormwater systems
- drinking water regulation is changing
- a new water services regulator, Taumata Arowai, has been established
- the Government has proposed substantive reform of the 3 waters service delivery model, including the establishment of public, multi-regional water services entities, in response to affordability and capability challenges facing the sector.

More stringent regulation of 3 waters activities means that current levels of service will need to increase. Government funding for accelerating investment in 3 waters assets has already begun in connection with the Government's Three Waters Reform Programme.

1.3.1.2. Essential Freshwater Programme

The Government has also introduced changes to freshwater regulation through the Essential Freshwater Programme, which relate to the environmental regulation of stormwater and wastewater discharges and protection of drinking water sources.

The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) came into effect in September 2020. Regional councils are required to notify new or amended regional plans that give effect to the NPS-FM 2020 by 31 December 2024. These changes will have significant flow-on effects for 3 waters activities, through anticipated changes to permitted activities and more stringent requirements around discharges. Changes to engagement requirements are also expected which will promote tangata whenua involvement in freshwater management and decision making, and to ensure Māori freshwater values and the principals of Te Mana o te Wai are identified and provided for.

1.3.1.3. Resource management system review

In 2020, an independent panel appointed by the Minister for the Environment completed a comprehensive review of New Zealand's resource management system. The review's scope included looking at the Resource Management Act 1991 and its interfaces with the Local Government Act 2002, the Land Transport Management Act 2003, and the Climate Change Response Act 2002. The

review recommended that the current Resource Management Act be replaced with three new pieces of legislation; a Natural and Built Environments Act, a Strategic Planning Act and a Managed Retreat and Climate Change Adaptation Act. The panel's report is expected to be followed in 2021 by consultation to develop government policy and a framework to link together the key pieces of legislation.

1.3.1.4. Urban Growth Agenda

The Urban Growth Agenda is a Government work programme that aims 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; and legislative reform.

The National Policy Statement on Urban Development 2020 (NPS-UD 2020) came into effect on 20 August 2020. The NPS-UD contributes to the Urban Growth Agenda by addressing constraints in New Zealand's planning system to ensure it enables growth and supports well-functioning urban environments. The NPS-UD 2020 categorises Dunedin as a tier 2 urban environment, bringing into effect a range of provisions relating to the amount of development capacity required to be serviceable with infrastructure.

1.3.1.5. Government Policy Statement on land transport

The Government Policy Statement on land transport (GPS) sets the Government's priorities on land transport investment over the next 10-year period.

The strategic priorities for GPS 2021 are:

- Safety – developing a transport system where no-one is killed or seriously injured
- Better Travel Options – providing people with better transport options
- Improving freight connections
- Climate Change – developing a low carbon transport system that supports emission reductions.

Investment in the transport network is typically co-funded by Waka Kotahi New Zealand Transport Agency (Waka Kotahi). Co-funding levels in DCC transport investment are generally linked to the level of alignment with the GPS.

1.3.1.6. The DCC's response

The DCC is managing the regulatory and legislative issues for 3 waters by undertaking strategic planning for network and treatment assets and progressing a proactive and comprehensive transition work programme to prepare for 3 waters reform. These projects include:

- asset management and policy improvements
- asset ownership options
- strengthening regulation
- servicing growth
- contract and capital delivery improvements
- system planning.

1.3.2. Replacing and renewing Dunedin's ageing infrastructure

Some assets of the 3 waters and transport networks require replacement based on their age and the likelihood they will not be able to maintain service levels in the future. Issues include cracked earthenware sewers letting in groundwater and causing overflows, and the transport network becoming unsafe. Without continued spending on renewal of these assets they are likely to deteriorate further. The DCC will increase 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, particularly as the Government's 3 waters regulatory reform programme is implemented over the coming years.

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 in poor condition and to increase the level of renewal delivery year on year. There is also the ability to re-allocate funding from later years

through the Annual Plan process to accelerate renewals if increased delivery is achieved. Renewals are targeted in areas with the highest risk and where possible are programmed to enable efficiencies between 3 waters and transport projects.

1.3.3. Responding to changes in demand for infrastructure

The DCC growth projections indicate Dunedin's population will increase from 126,255 (2018 Census) to be 144,249 by 2068. This will have an impact on the city's infrastructure. 3 waters and transport are planning for growth through specific capacity assessments and targeted capital works to meet projected demand.

The DCC is seeing growing diversity of travel choice across Dunedin; public transport, walking and cycling continue to be increasingly attractive options for people to get around the city or to and from work. The DCC will continue to invest in infrastructure to support and enable all transport modes across the city.

The Dunedin City District Plan controls what people can do on their land and how it can be developed. The main goal of the District Plan is to sustainably manage the natural and physical resources of Dunedin to meet the needs of current and future generations and to provide for their social, economic and cultural wellbeing and for their health and safety.

Under the Resource Management Act 1991, the DCC is required to review the District Plan every 10 years. A full review of the first Plan started in 2012. This review produced the Proposed Second-Generation Dunedin City District Plan, known as the 2GP. The 2GP is an entirely new plan, with a new format, new zones, objectives and policies, and many rule changes. The DCC must provide infrastructure to service relevant areas within the 2GP. The DCC initiated variation 2 to the 2GP on 12 February 2019. The purpose of the change was to identify targeted actions to address the shortfall in housing capacity over the next 10 years, in order to meet the DCC's obligations under the National Policy Statement for Urban Development.

The DCC will manage the response to changes in demand for infrastructure by planning and investing for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onwards. The 2021-31 capital programme is funded to investigate, and design new infrastructure required for the 2GP and Variation 2. The delivery of new infrastructure for 2GP and Variation 2 will be undertaken within the first 10 years of the programme and will be prioritised on demand in different areas. Remaining lower demand areas for 2 GP and Variation 2 infrastructure will be delivered over a longer period.

The DCC will manage the response to changes in demand for infrastructure by planning and investing for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onwards. The 2021-31 capital programme is funded to deliver new infrastructure required for the 2GP and investigate and design infrastructure needed for Variation 2. The delivery of Variation 2 will be considered within the 2024-34 10 Year Plan.

1.3.4. Public health and environmental outcomes

The 3 waters and transport networks provide important public health benefits to the community and deliver services which can impact on the natural environment. The provision of drinking water, wastewater and stormwater services directly affect public health and environmental outcomes through providing safe drinking water and management of wastewater and stormwater discharges. The provision of a safe and reliable transport network that supports the use of active transport modes directly affects public health through reduced road trauma and connected communities that are fit and healthy.

The DCC will manage the response to public health and environmental outcomes by increasing investment over time through existing renewals programmes and planning for changes to regulation and legislation.

1.3.5. 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 it's

understanding of natural hazards and to develop options for resilient infrastructure networks into the future, including route resilience.

The DCC will manage this issue by ensuring investment in renewals and new capital specifically considers reducing the risk arising from natural hazards and where possible considers adaptive planning. Renewing aging infrastructure in flood prone and coastal erosion areas will reduce some risks arising from natural hazards. The DCC will continue to fund projects to improve the resilience of the water supply, wastewater, stormwater and transport network. Alpine Fault Quake Resilience and Lifelines resilience projects will also improve help resilience of the 3 waters and transport networks.

1.3.6. Planned increases or decreases in levels of service

The 3 waters industry is entering a period of significant change. The Government's reform programme is likely to require an increased level of service over time. Through strategic planning and improving asset management, the DCC will assess the costs and benefit of projects to meet new levels of service to ensure the best practicable options are implemented.

The transport levels of service for this 10 year plan demonstrate alignment with the GPS on Land Transport. Infrastructure investment to support active transport modes and public transport will continue to be invested in to improve levels of service in these areas. There are also opportunities to make amenity and service improvements in the central city through the Central City Plan projects to make the city more vibrant, support growth and to attract people to Dunedin.

The DCC will manage this issue by focusing on renewing infrastructure to reduce the risk of declining service levels and to increase resilience, while also investing in improving strategic service levels as planning and delivery capacity allows.

1.3.7. Zero Carbon 2030 target

In June 2019, the Council 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. 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.

Alignment of infrastructure provision with the Zero Carbon 2030 target will focus in the first instance on improving data quality, and amending internal policy and processes to ensure emissions reduction is central to strategic urban planning. In parallel, immediate capital investment in the transport network will be focused on projects that support mode choices.

1.4. The plan to address Dunedin's network infrastructure issues over the next 50 years

Dunedin is planning and investing for a medium-high growth scenario over 2021-28 and a medium growth scenario from 2029 onward. Because of this, significant work is required to enlarge and expand Dunedin's existing infrastructure. 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.

In the short term, major renewals are needed at water treatment plants to ensure they continue to meet the Ministry of Health Drinking Water Standards and 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 3 waters resource consents expire, investigations into the capacity of infrastructure, effects on the environment and working in partnership with Iwi will allow best practicable options for new resource consents to be achieved. The DCC will invest in flood alleviation in South Dunedin and Mosgiel, increase water supply resilience via the Port Chalmers and Water Supply projects and improve wet weather flow management on the wastewater networks.

In the medium term, water treatment plants will be upgraded as budgets allow to meet ongoing anticipated improvements in standards. Major renewals of water supply pipelines will also be undertaken to improve drinking water system resilience.

Large scale 3 waters projects are difficult to anticipate in the longer term due to a number of unknowns on how 3 waters reform and increased regulation will progress. However, within the timeframe of this Infrastructure Strategy, most 3 waters buildings and structures will require replacement or significant upgrades to ensure service levels are maintained. Some specific major projects are identified for post-2031 such as the Deep Creek/Deep Stream pipeline renewal and servicing the Variation 2 to the 2GP to enable growth. Further changes to the 3 waters networks may also be required depending on demographic changes within the city. Ongoing strategic planning within 3 waters will produce long-term strategic investment plans for the 2024-34 10-year plan.

The level of investment in transport renewals and maintenance across the city aims to maintain existing levels of service but does assume some transport mode shift associated with growth occurs to mitigate traffic congestion. In the short to medium term, improved planning and increased investment is required for assets such as sea walls, retaining walls and drainage assets in light of changing weather patterns. Overall, the mid to long-term, budgets are set with the aim of maintaining assets at their current condition. The nature and extent of capital programmes required over the longer term is more uncertain, however the impacts of climate change are likely to place pressure on the network's capacity to remain resilient in coastal, flood-prone, low-lying areas and will likely require some mitigation.

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 (Mosgiel heavy vehicle bypass and central city bypass) and an increased level of service in public transport for our city's main commuting populations.

To support the Council's Zero Carbon 2030 target, projects will aim to minimise carbon emissions both in the construction and operational phases. In addition, tight integration of land use, infrastructure and transport system planning will be essential, particularly in the implementation of the National Policy Statement – Urban Development and the development of a Future Development Strategy.

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

2. WHY OUR INFRASTRUCTURE IS IMPORTANT

This section covers the purposes of our various infrastructure networks and explains how they work.

2.1. Water supply

2.1.1. Purpose of the water supply network

The purpose of the water supply network is to protect public health by delivering adequate quantities of safe water to water users. Clean drinking water is essential for public health and for the safe and productive operation of many businesses. The DCC provides drinking water services to protect the health of its residents and visitors and to support economic activity.

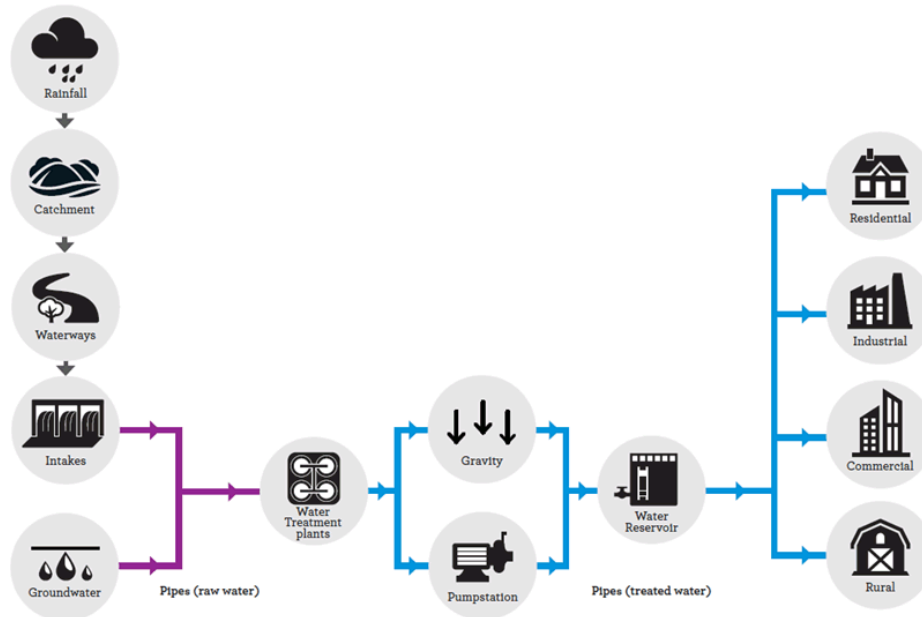
2.1.2. What's involved in supplying water?

The DCC manages the collection, supply, treatment and distribution of water to domestic and commercial residents in Dunedin. The below list covers the main aspects of the water supply system.

- Catchment: an area where water is collected by the natural landscape. The DCC holds 21,000ha of water catchment within its territory, and most of this land is in the protected Deep Stream and Deep Creek catchments.
- Untreated (raw) water: water that is collected from the catchments.
- Water supply: the main supply pipelines that carry raw water from the catchments to the

- raw water reservoirs or directly to the treatment plants.
- Treatment: raw water is treated at one of Dunedin's six water treatment plants.
- Distribution: the main pipelines between the treatment plants and the treated water reservoirs.
- Reticulation: pipelines that distribute water from the treated water reservoirs to the property boundary.

How our water supply infrastructure works



2.1.3. Water supply level of service measures

The water supply network provides the following levels of service:

- the water is safe to drink
- service calls are responded to promptly
- the water tastes and looks pleasant
- water is supplied at adequate pressure
- the water supply is reliable
- the Council is responsive to customer concerns
- water resources are used efficiently and sustainably.

2.2. Wastewater

2.2.1. Purpose of the wastewater network

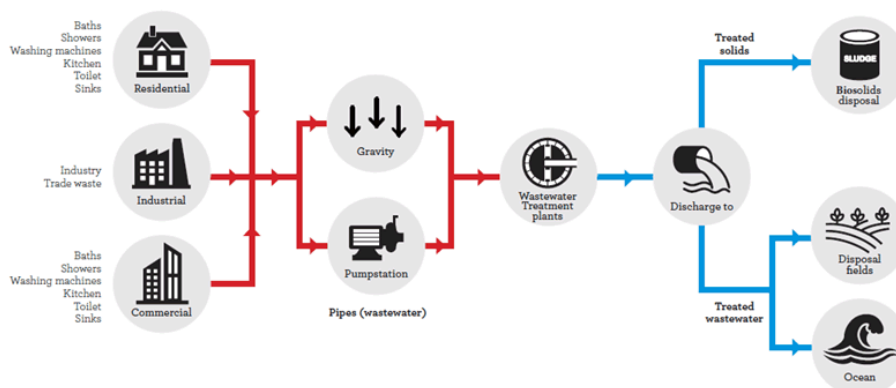
Wastewater is taken from commercial and domestic properties via pipes and pumps to one of seven waste water treatment plants in the district. The wastewater system aims to protect the health of the community by providing cost effective, reticulated wastewater services throughout the urban area, and to treat wastewater to a high standard before it is discharged into the environment.

2.2.2. What's involved in the wastewater network?

The DCC manages the collection, treatment and disposal of wastewater from residential and commercial customers across Dunedin. The below list covers the main aspects of the wastewater system.

- Reticulation: the network collects wastewater from domestic and commercial private lateral connections. The majority of the 918km of publicly owned wastewater reticulation system operates via gravity, with pipe size varying from 150mm to 1800mm in diameter.
- Pump stations: there are 79 wastewater pump stations throughout the reticulated network that pump wastewater from low points back into the gravity network. A critical pump station located at Musselburgh accounts for half of the wastewater pump station asset base (by value).
- Treatment: the DCC owns seven wastewater treatment plants. The population served by each plant varies from fewer than 100 for the smallest plant (Seacliff) to more than 83,000 for the largest plant (Tahuna). Treated wastewater is then returned into the environment.
- Biosolids: (or sludges) are the major by-product of the wastewater treatment process. They are the organic material that remains after sludge is treated. The vast majority of biosolids are generated by 3 waters wastewater treatment processes (with a small amount from the drinking water treatment process). Currently, Dunedin's biosolids are incinerated at the Tahuna wastewater treatment plant or disposed of at Green Island Landfill.

How wastewater infrastructure works



2.2.3. Wastewater level of service measures

The wastewater network provides the following levels of service:

- sewage is managed without adversely affecting the quality of the receiving environment
- service calls are responded to promptly
- the wastewater service is reliable, and the Council is responsive to customer concerns.

2.3. Stormwater

2.3.1. Purpose of the stormwater network

The stormwater network collects rainwater from the roofs of houses and buildings, footpaths and roads and diverts it to the ground, into waterways or the ocean. Effective management of stormwater is essential to prevent flooding of properties and businesses. Controls are necessary to ensure stormwater does not become excessively contaminated leading to pollution of watercourses, the harbour or the ocean. The DCC is not engaged in flood protection and control works except where it relates to stormwater or to protect assets such as roads.

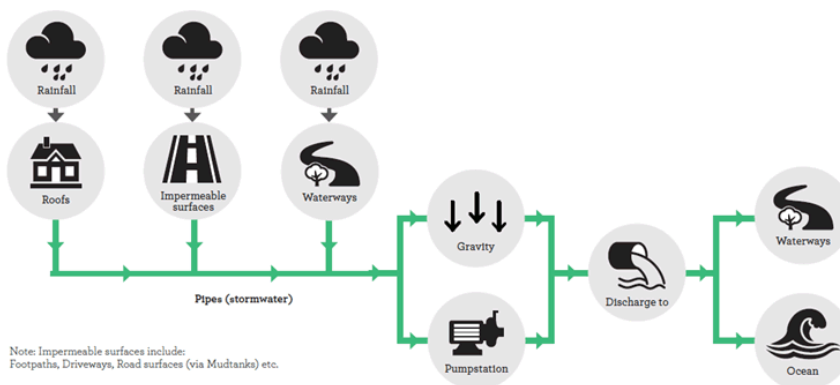
2.3.2. What's involved in the stormwater network?

The DCC provides reticulated stormwater services to the city and to most areas that also receive reticulated wastewater. When an area is developed, stormwater generally increases due to runoff from impermeable surfaces (e.g. roofs, roads, car parks, or compacted soil). It flows naturally from higher to lower ground, and ultimately discharges into natural watercourses such as wetlands, creeks, rivers or the sea. Land development results in the creation of both private and public stormwater systems. These networks exist co-operatively to collect and transfer stormwater to waterways, and in some cases the marine environment, efficiently minimising damage to downstream assets.

The below list covers the main aspects of the stormwater system.

- Reticulation: the reticulated network collects stormwater from domestic and commercial connections, mud tanks and some watercourses, and discharges stormwater into watercourses, streams and the sea. Most of the 378km of publicly owned stormwater reticulation system operates via gravity, with pipe size varying from 100mm to 2700mm in diameter.
- Pump stations: there are 11 stormwater pump stations throughout the reticulated network that pump stormwater from low points back into the gravity network or to discharge points. The most critical pump stations are in South Dunedin and Mosgiel.
- Overland flow paths: structures such as swales direct and convey stormwater overland into the stormwater system.

How stormwater infrastructure works



2.3.3. Stormwater level of service measures

The stormwater network will provide the following major levels of service:

- stormwater services perform adequately and reliably
- stormwater is managed without adversely affecting the quality of the receiving environment
- service calls are responded to promptly.

2.4. Transport

2.4.1. Purpose of the transport network

The role of a transport network is to provide access to move people and goods to destinations such as centres of employment, services, and amenities. Transport assets allow people choice about how they move around the city for either commuter or recreational purposes. Roding infrastructure also connects Dunedin to national and international road, rail, shipping and air transportation networks. Land transport investment promotes keeping people in employment, improves productivity, and supports economic growth and connected communities.

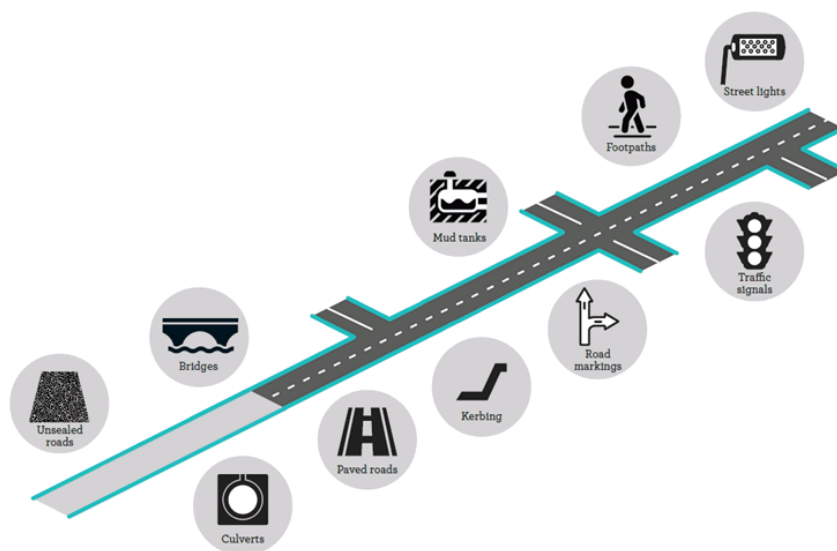
2.4.2. What's involved in the transport network?

The DCC manages a large network of transport infrastructure which includes roads (both sealed and unsealed) footpaths, cycle ways, streetlights, traffic signals, signs and road markings, retaining walls, bridges, culverts and seawalls.

The below list covers the main aspects of the transport network

- 1071km of sealed roads
- 695km of unsealed roads
- 968km of footpaths
- 261 bridges
- 42km of seawall
- 8478 mud tanks
- 5742 culverts.

Our transport network



2.4.3. Transport levels of service

The transport network provides the following levels of service:

- the transport network facilitates safe travel
- the transport network facilitates active travel
- the transport network facilitates comfortable travel
- the transport network facilitates accessibility
- the transport network facilitates efficient travel

- the transport network facilitates sustainable maintenance
- car parking is available and meets the needs of users
- the transport network provides choice in how people move around
- the transport network is maintained in a responsive manner
- The use of electric vehicles (EV's) is supported
- Minimising transport disruption during and after the construction of the new Dunedin Hospital rebuild will be supported through the Shaping Future Dunedin project.

3. HOW THE INFRASTRUCTURE STRATEGY CONTRIBUTES TO DUNEDIN'S COMMUNITY OUTCOMES

Investing in Dunedin's water and 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.

Community outcome	Infrastructure projects contributing to the community outcomes
A supportive city with caring communities and a great quality of life	<p>The central city upgrade will improve safety, support growth, support mode choice and contribute to a more vibrant and thriving central city environment for people to enjoy.</p> <p>The tertiary precinct upgrade will enhance safety and accessibility in this area while supporting growth and mode choice, creating a better quality of life through health benefits.</p> <p>The Dunedin urban cycle ways will improve road safety for cyclists and continue to close the gaps of the cycleway network across the city. Providing active modes of transport is directly linked to health outcomes.</p> <p>The minor safety improvements programme will support safety and accessibility, particularly around schools and known areas where safety and accessibility are known issues. This will lead to better safety outcomes.</p> <p>The series of major centres upgrades will increase amenity in our major town centres across the city outside of the Central Business District (CBD), which will provide support for retail.</p>
A healthy city with reliable and quality water, wastewater and stormwater systems	<p>Upgrades and replacing ageing assets at the water treatment plants will ensure compliance with drinking water standards to supply adequate safe water to the community.</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>Port Chalmers water supply improvements will boost year-round reliability of drinking water to residents of Port Chalmers.</p> <p>Targeted renewals of the 3 waters networks will have a range of improvements in the water system such as supply aesthetics, increased fire flows and reduced supply interruptions. Inflow and infiltration to the wastewater network will be reduced.</p> <p>Upgrades and replacing ageing assets at the Metropolitan wastewater treatment plants will improve treatment reliability and wet weather flow management. Interventions to reduce wet weather wastewater overflows in Kaikorai Valley and South Dunedin will prepare the DCC for anticipated new standards for wastewater treatment and discharges.</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 dealing with Dunedin's waste sludges.</p>

Community outcome	Infrastructure projects contributing to the community outcomes
A sustainable city with healthy and treasured natural environments	A series of projects are programmed to improve the resilience of Dunedin's metro water supply for now and into the future. Assessing the ability of 3 waters networks and treatment plants to ensure compliance with new environmental standards and developing best practicable options. The Peninsula connection improvements will increase resilience to high tides and weather events. The LED street lighting upgrade will reduce energy needs.
An active city with quality and accessible recreational spaces and opportunities	The Peninsula connection improvements will provide for walking and cycling along the Peninsula. Further development of Dunedin's urban cycle ways will encourage cycling uptake. The tertiary precinct upgrade will enhance the pedestrian and cycling environment in this area. The city to waterfront connection will improve accessibility and amenity in the waterfront area and contribute to a more vibrant and thriving city environment. The Shaping Future Dunedin Transport suite of works will improve how people move into, out of and around central Dunedin.
A successful city with a diverse, innovative and productive economy	Investing in increased capacity in 3 waters systems to enable growth in the city. Increasing and maintaining the level of asset renewals within 3 waters will support local and regional infrastructure providers. The central city upgrade will contribute to a more vibrant and thriving central city environment attracting more people to live, work, study and visit Dunedin. The central city upgrades aim to create retail prosperity in the CBD. The city to waterfront connection will improve accessibility and amenity in the waterfront area and contribute to a more vibrant and thriving city environment. The series of major centres upgrades will increase amenity and investment in our major town centres outside of the CBD. The tertiary precinct upgrade will improve the amenity and vibrancy of the streets around Dunedin's tertiary institutions and encourage and support active and public transport use.
A creative city with a rich and diverse arts and culture scene	The Art and Creativity in Infrastructure Policy will embed art and creativity into infrastructure projects.
A connected city with a safe, accessible and low-carbon transport system	The Peninsula connection improvements will improve safety, resilience and walking and cycling options. Further development of Dunedin's urban cycle ways will encourage cycling uptake and close the gaps in the Dunedin network for cycling. The city to waterfront connection will improve accessibility and amenity in the waterfront area and contribute to a more vibrant and thriving city environment. Ongoing annual programme of renewals will maintain existing levels of service across the transport network, including pavement reseals, pavement rehabilitations, seawalls, retaining walls, bridges, footpaths and kerb and channels. The minor safety improvements programme will improve safety and accessibility. The series of major centres upgrades will increase the level of service in our major town centres outside of the CBD.

4. WHERE ARE WE NOW? DUNEDIN'S WATER AND TRANSPORT INFRASTRUCTURE

This section covers the current condition and situation of the city's 3 waters and transport infrastructure. The DCC's assumptions on asset lives are attached as Appendix A.

4.1. 3 Waters

As one of the country's earliest metropolitan centres, Dunedin's 3 waters infrastructure pre-dates that of other centres. Some assets are older than 150 years and still operate as essential pieces of the network today. As Dunedin has grown, so have the 3 waters networks, resulting in widely distributed networks with a broad range of pipe materials, diameters and construction methods. As areas were connected to the different networks at different times, there can be wide variation in age, condition and capacity of assets in the same location. As a result of age, many assets need repair and/or replacement. We mainly deliver our operational services in house, but some specialist resources are outsourced such as specialist maintenance providers, consultant services, design services and capital delivery contractors across 3 waters. This strategy does not look to change the service delivery approach as there is little benefit while the 3 Waters reform programme is unfolding.

4.1.1. Water supply

Today, most of the water supply needed for the city comes from the Deep Stream and Deep Creek catchments. This is then treated at Dunedin's two major treatment plants - Mount Grand and Southern - before being distributed for public consumption. In addition, the DCC operates four smaller community water treatment plants: Waikouaiti, Outram, West Taieri and Port Chalmers. The Port Chalmers water treatment plant is only operated during periods of high demand, such as cruise ship season, to supplement the main metropolitan supply.

4.1.2. Wastewater

Dunedin's Main Interceptor Sewer was constructed between 1903 and 1908. This sewer, which has gradually increased in size, is still in use today, running from the Dunedin Railway Station to the Tahuna wastewater treatment plant. It takes wastewater from a large part of the Dunedin metropolitan area, the West Harbour catchment as far as Port Chalmers and the East Harbour as far as Portobello. The second largest wastewater system collates flows from the north-west and west of the city, Brighton and Waldronville and is treated at Green Island wastewater treatment plant. In addition, the DCC operates wastewater networks and treatment plants at Mosgiel, Middlemarch, Warrington, Seacliff and Waikouaiti/Karitane.

As time has progressed, and community expectations around wastewater discharges have changed, treatment plants have been consolidated and upgraded. The most recent major upgrade, completed in 2016, was to the Tahuna wastewater treatment plant, with minor upgrades underway at Seacliff wastewater treatment plant.

4.1.3. Stormwater

Stormwater infrastructure in Dunedin consists of public and privately owned open and piped watercourses, the DCC owned reticulated stormwater networks and Otago Regional Council owned or managed drainage schemes, streams and river systems. As Dunedin has grown, the stormwater network has grown with it.

Increases in the scale and frequency of rainfall events and growing public expectations about the quality of stormwater discharges to the environment are significant challenges to be met by all those who own or manage stormwater infrastructure.

Due to the complex nature of stormwater systems, addressing stormwater issues can be expensive, require specialist skills and a catchment-based approach with the coordination of many individual watercourse owners. The current requirement for private infrastructure owners to maintain their watercourses does not always result in the best overall outcomes for the city and may be better managed by one entity. However, the DCC's drainage rates do not currently make any allowance for maintaining infrastructure identified as privately owned.

4.2. Transport

Dunedin's transport network is relatively complex in comparison to most provincial centres. It is made up of a diverse range of assets and has an equally high mix of urban and rural roads within a varied topography. Footpaths are generally in poorer condition than the roads. Maintaining transport levels of service is supported by the funding arrangements with Waka Kotahi year on year.

Resilience in the road network is an ongoing issue as many roads across the city are at risk from flooding, erosion and king tides. 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. Certain routes across Dunedin are seeing congestion in short commuter peak travel windows.

In addition, the city suffers from the social cost of road trauma with reasonably high crash statistics across the city. Crash statistics are particularly high between motor vehicles and vulnerable road users such as pedestrians. Gaps exist in the strategic cycling network with approximately 50% of the network currently implemented across the city.

Maintenance services are outsourced via a 10 year maintenance agreement with Fulton Hogan. Other capital works and structure inspections are also outsourced to contractors

5. MANAGING DUNEDIN'S WATER AND TRANSPORT INFRASTRUCTURE

Today, Dunedin's water and transport infrastructure are worth ~~\$6.8~~\$4.1 billion (gross asset replacement cost).

5.1. 3 Waters

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

- asset age, condition and performance¹
- changing weather patterns (such as rainfall intensity and drought frequency)
- changes to population or land use
- changes to legislative and regulatory requirements, such as drinking water standards and national policy statements.

When infrastructure assets are not performing as required, or are unable to meet new standards, capital projects are scoped so deficiencies can be addressed. These projects are prioritised based on the criticality of the assets and the likely impact of any loss of service and programmed into 3 waters budgets. Strategic Planning is currently underway for water and wastewater, and will soon commence for stormwater, in the form of system planning. For wastewater it considers from the source (e.g. residential, commercial and industrial customers) to disposal (e.g. the ocean) and for drinking water it considers from the catchment (e.g. a river) to the customer's tap. Long-term optimal solutions can be developed by looking holistically at factors such as capacity, performance, growth, new standards, overflows, and storage.

Funding for infrastructure is categorised in two ways. Renewals funding is targeted at maintaining existing service levels, whereas new capital funding can both maintain existing service levels (where current assets can no longer achieve required outputs e.g. raw water quality changes require increased treatment to maintain standards) or be targeted at increasing levels of service in order to meet modern standards. These standards include new consent conditions for water take and discharge permits, changes to the drinking water standards, health and safety improvements, increasing capacity to meet additional demand and improvements to operational efficiency.

Both renewals funding and new capital funding are often used together on specific projects. The renewal of an undersized pipe will use renewal funding in the 'like for like' replacement portion of the works, while an incremental change in pipe diameter is considered 'new capital'.

¹ 3 waters level of service measures are set out in the 10-year plan.

5.2. Transport

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

- asset age, condition and performance
- changes to population and land use
- changes to GPS on land transport
- maintenance to repair defects and preserve remaining life.

Most of the transport network's maintenance, renewal and new capital programmes are subsidised by Waka Kotahi at a funding assistance rate of 53% - 51%. Every year a funding bid is submitted to Waka Kotahi for co-funding the transport network programmes. In recent years construction prices have increased significantly, creating financial pressures in delivering renewal and maintenance programmes with limited Waka Kotahi funding and corresponding DCC share.

This Infrastructure Strategy assumes that there will be constraints in Waka Kotahi funding (partly driven by the impact of the COVID-19 pandemic and current income shortfalls in petrol tax) along with changing priorities for Waka Kotahi funding. In the short term at least, renewals co-funding from Waka Kotahi will be limited to \$7 - \$8 million per annum, short of the \$10 - \$14 million per annum based on standard Waka Kotahi subsidy rates of 51% - 53%. Investing in the renewal of the network will continue, to ensure levels of service are maintained. It is anticipated that in the short term at least there will be an additional funding requirement from the DCC. This will be financed through a combination of debt and rates funding over the course of the 10 year plan.

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 road users. A corresponding asset management plan determines a condition-based asset maintenance and renewal programme that sets the level of investment required to maintain the existing transport infrastructure across Dunedin City.




5.3. Assessing the condition of Dunedin's network infrastructure

How does the DCC assess the condition of water supply assets?




Methods for assessing the condition of the DCC's 3 waters infrastructure vary by asset type but typically involve visual or physical inspection. Water pipes are more difficult to assess due to the continual flow of water through them. Instead, small sections of pipe must be taken out for inspection. The condition of treatment plants is routinely inspected by DCC staff to ensure assets are appropriately maintained. Specialist engineering advice is used as required. The DCC 3 Waters Group is currently undertaking a series of improvements to water treatment asset condition assessments.

5.3.1. Summary of water supply 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	Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
Metropolitan Water Systems including the Dunedin City (Mount Grand, Southern and Port Chalmers) and Mosgiel supplies					
Raw Water Supply	Bore pumps and intake structures	18	3,326	Intakes and pumps in active service are maintained in good condition.	Current risks in supply demand within the network are planned for remedial action within the short – medium term, while longer-term risks will be addressed as part of water system planning to inform the 2024-34 10 year plan. The recent refurbishment of the Ross Creek Reservoir is one of several projects aimed at increasing the security of raw water supply to the Dunedin metropolitan area. Existing capacity, while good, is susceptible to drought and the failure of critical assets. The ability to supply water in such events will be improved when the Ross Creek Reservoir is able to supply Mount Grand Water Treatment Plant via
	Raw water pipelines and pump stations	157km pipelines one pipe bridge two pump stations	232,528	The majority of the raw water pipelines are in good condition, however sections of the Deep Stream and Deep Creek pipelines upstream of the Taieri River pipe bridge	

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Asset group and type	Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
	and the Puddle Alley and Silverstream pump stations, pushing water from the Taieri bores and Silverstream respectively, up to the Southern Reservoir.			are in poor condition, with specific concerns relating to the joints between sections of pipe. Enabling supply from the Ross Creek Reservoir will make these pipelines less critical, enabling the renewal of the pipelines to be pushed out while various long-term options are considered. Repairs to the pipelines are made as required.	the building of a new supply pipeline.
Raw Water Reservoirs	Raw water storage for supply to treatment plants (dams), including Port Chalmers (Cedar Farm and Rossville), Mount Grand and Southern reservoirs as 'live' supplies, with Ross Creek and Sullivan's Dam not currently live supplies.	Six	21,454	Raw water reservoirs are managed in accordance with the Dam Safety Assurance Programme (DSAP) overseen by the consenting authority. All raw water reservoirs are in good condition, however ongoing work will be planned as required by the DSAP.	

Asset group and type	Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
Water Treatment	<p>Plant and equipment used to screen, filter, pH adjust, and disinfect water to meet the Drinking Water Standards New Zealand (DWSNZ), and plant and equipment used to monitor and control individual processes.</p>	Three plants (Mt Grand, Southern and Port Chalmers)	77,319	<p>Plant and equipment at the water treatment plants are maintained in good condition to ensure water produced meets drinking water standards.</p> <p>Recent condition assessments have produced a plan of renewals over the period of the plan to ensure the treatment plants can continue to supply drinking water which meets national standards.</p>	<p>Recent process capacity assessments showed most of the water treatment plants can cope with current and future demand. Where future demand risks have been identified, system planning will produce the best practicable option, which may include plant rationalisation.</p> <p>The Port Chalmers Treatment Plant runs seasonally (October to April), when peak demand from cruise ships is unable to be met by the Dunedin city supply alone. This is an expensive water supply arrangement.</p> <p>Rationalisation of this supply is planned on completion of feasibility studies, which is expected to result in water supply from Mount Grand Water Treatment Plant and a new supply pipeline.</p>
Treated Water Distribution	<p>Transport water from treatment plants around the network, with pump stations boosting water to areas of the network unable to be reached by gravity feed alone.</p> <p>Includes the 25km treated water pipeline connecting the northern water schemes of Waitati, Warrington and Seacliff to the Dunedin City water supply.</p>	989 km pipelines 18 pump stations 23,626 minor point assets (valves, hydrants and meters)	456,364	<p>As with some other 3 waters networks, areas of the network are in excellent condition while other areas are in poor or very poor condition, which affects flow and pressure to customers. Ongoing renewals are targeted at areas of very poor condition.</p> <p>Renewals of flow meters have been stepped up since 2010 but many are still outside their expected lives and are likely to be in poor condition for assets of this type.</p>	<p>Capacity in the treated water network is defined as being where the flow rate of water supplied by an individual fire hydrant within the network meets the requirements of the NZ Fire Service Code of Practice for Fire Fighting Water Supplies (Standards NZ reference NZ PAS 4509:2008).</p> <p>For the Dunedin City and Mosgiel water supplies, some of hydrants across the city are non-compliant with the standard. This generally relates to water mains installed before 1960, where the 100mm diameter pipes were appropriately</p>

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Asset group and type		Purpose and description	Number/ Length	Value \$000	Asset condition	Asset capacity
	Treated Water Reservoirs	Treated water storage within the network to meet peak demand and ensure supply in the event of network outages.	44	33,159	Regular maintenance means that most city reservoirs are in good condition. Some reservoirs will require replacement within 50 years and have been accounted for as part of the forecast renewals.	sized at the time of installation but are undersized for today's demand. In peak summer demand, some pipelines do not meet sufficient capacity and so these are targeted for replacement.
	Service connections	Service lines, tobies, manifolds and backflows preventers connecting private properties to the water network in a safe manner.	44,132	111,597	A significant proportion of service connections in the metropolitan area are older style 'toby' connections. These will be replaced with modern manifold connections when capital works are being undertaken in an area.	A programme of renewals and new capital works targeting these areas is underway, with targeted pipeline renewals as the next package of works, aimed at improving pressure management and fire flows.

Asset group and type	Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
Rural Water Supplies					
Waikouaiti/Karitane/Merton	Extract water from Waikouaiti River, treat to drinking water standards and pump or gravity feed to properties in the Waikouaiti urban water supply area, and the Karitane and Merton rural water supply areas.	one plant 96 km pipelines three pump stations 2,638 minor point assets (valves, hydrants and meters)	28,485	The Waikouaiti water treatment plant is in generally good condition though some assets with shorter lifespans (filter membranes) are nearing the end of their useful lives and in correspondingly average to poor condition. There is a scheme which will extend into the early years of the plan which renews these assets. Condition of water mains in Karitane is of concern with a high number of breaks per kilometre being an indicator of poor asset condition. This will be addressed through the current renewal work in this area.	There are identified capacity issues in the Waikouaiti and Karitane treated water networks. Recent capital works have been completed in Waikouaiti to address some of these issues; further works are programmed within the Karitane township and from the Waikouaiti Reservoir to the Waikouaiti township in the near future to improve capacity. There are still known capacity issues in the Edinburgh Street (Waikouaiti) area, which will not be completely alleviated by the recent and planned upgrade works. Further work will be programmed in year 7-10 of the strategy to improve capacity in this area. The Merton supply is a restricted rural scheme with enough capacity for the foreseeable future. Upgrades to the Waikouaiti Water Treatment Plant will improve taste and aesthetics.
Outram	Extract water using a bore pump located adjacent to the Taieri River, treat to meet drinking water standards, and gravity fed to properties within the Outram water supply zone.	One plant 17 km pipelines one pump station 961 minor point assets (valves, hydrants and meters)	6,359	Condition within the Outram network is generally good to excellent. Recent condition assessments of the treatment plant have produced a plan of renewals over the period of the plan to ensure the plant can continue to supply drinking water which meets national standards.	Recent capacity assessments have shown that work is needed to meet future demand within the treatment plant. The strategic investment plan for longer term upgrades are part of the water system planning.

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Asset group and type	Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
West Taieri Rural Scheme (Restricted)	Water extracted from the Waipori River, treated to meet drinking water standards, and pumped to Dunedin Airport and privately-owned tanks within the West Taieri water supply zone.	One plant 127 km pipelines five pump stations 392 minor point assets (valves, hydrants and meters)	8,921	The West Taieri water treatment plant is in generally good condition, although some shorter lifespan assets are nearing the end of their useful lives and are in correspondingly average to poor condition. The piped network is also generally in good condition with a relatively small number of breaks per kilometre.	There is sufficient capacity within the West Taieri Rural Scheme to meet demand for the foreseeable future.




5.4. How does the DCC assess the condition of wastewater assets?

Visual inspection methods, such as closed-circuit television (CCTV) filming, are used to assess the condition of wastewater pipes. The results from these CCTV inspections are used to determine if assets need to be repaired or replaced.




DCC staff undertake visual and physical inspections of the condition of treatment plants and pump stations to ensure assets are appropriately maintained. Specialist engineering advice is used as required. Data on material /unit type, age, condition, performance, location, capacity, criticality and remaining life is collected for 3 waters assets. Confidence in the condition information about the DCC's wastewater network and treatment assets ranges varies. The DCC 3 Waters Group is currently undertaking a series of improvements to wastewater treatment asset condition assessments.

5.4.1. Summary of wastewater 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		Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
Metropolitan Wastewater Systems	Tahuna catchment					
	Wastewater Network	Transport untreated wastewater from customers' point of discharge to Tahuna wastewater treatment plant.	618 km pipelines (including 4.5 km main interceptor sewer) 39 pump stations 14,176 network access points (manholes, lampholes etc.)	520,352	With a high proportion of early 20 th century pipework, much of the network feeding the Tahuna WASTEWATER TREATMENT PLANT is in poor condition. A large portion of the network is older earthenware pipe with more joints than modern equivalents. As they deteriorate, these joints allow considerable volumes of water to infiltrate into the network, exceeding network capacity during heavy rainfall events and resulting in wastewater overflows downstream. Pipeline renewals are focussed on areas of high inflow and infiltration.	High intensity rainfall events can lead to inflow and infiltration entering the network with wastewater systems becoming overwhelmed and overflowing, while at the treatment plants wash out can occur which severely disrupts treatment processes. Incapacities upstream in the Tahuna wastewater catchment overflow into stormwater catchments flowing into the South Dunedin area, further exacerbating flooding issues in the area. The performance and possible solutions to wet weather flow management will continue. by

Asset group and type	Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
					undertaking flow monitoring and incorporating the ground water model information. The best practicable solutions will be assessed for cost and their ability to deal with growth, resilience and carbon impacts.
Wastewater Treatment and discharge to ocean outfall	Treat wastewater to meet discharge consent conditions.	One treatment plant 1.1 km outfall pipe off Middle Beach	136,251	The upgrade of the Tahuna wastewater treatment plant means <u>most parts</u> of the plant <u>is-are</u> in good to excellent condition. Some sections or the original building will require some further remedial works in the short to medium term. The condition of the rising mains from the Musselburgh pump station to Tahuna wastewater treatment plant are poor, with investigations into options starting in 2020 to inform remedial action in the short-medium term.	The recent process capacity assessments have shown the Metropolitan treatment plants have capacity to treat to current environmental standards now and in the future, but small-scale renewals are needed to continue capacity as the assets age. As with most city plants, wet weather flows can overwhelm the system and solutions will be developed as part of the wastewater system planning.
Green Island catchment (excluding Mosgiel)					
Wastewater Network	Transport untreated wastewater from customers' point of discharge to Green Island wastewater treatment plants	121 km pipelines 26 pump stations 2,037 network access points (e.g. manholes lampholes.)	117,419	The Green Island network is generally in good condition given its age, <u>with however the plant does receive high wet weather flow volumes due to few</u> inflow and infiltration problems in the catchment.	Some treatment capacity is available within the Green Island network, however wet weather flows can overwhelm the system. Solutions will be developed as part of system planning.
Wastewater Treatment and	Treat wastewater to meet	one treatment plant	26,962	The Green Island wastewater treatment plant is in average condition given its age. Smaller scale	The recent process capacity assessments have shown the Metropolitan treatment plants have

Asset group and type		Purpose and description	Number/Length	Value \$000	Asset condition	Asset capacity
	discharge to ocean outfall.	discharge consent conditions.	850m outfall off coast at Waldronville		renewals and process changes are needed to continue to meet levels of service and implement short-term wet weather flow management operational processes.	capacity to treat to current environmental standards now and in the future, but small-scale renewals are needed to continue capacity as the assets age. As with most city plants, wet weather flows can overwhelm the system and solutions will be developed as part of the wastewater system planning project.
Mosgiel catchment (includes Allanton)						
	Wastewater Network	Transport untreated wastewater from customers' point of discharge to wastewater treatment plants	113km pipelines six pump stations 2,226 network access points (manholes, lampholes etc.)	87,354	Some areas of the Mosgiel wastewater network are in excellent condition, while other areas are in poor or very poor condition. While the overall network is a similar age to the Green Island network, the way in which the Mosgiel network was constructed means that it experiences significantly higher infiltration during rainfall events. During heavy rainfall events groundwater levels become elevated which increases the amount of groundwater infiltrating into the wastewater network.	There are significant incapacities in the network servicing the Mosgiel wastewater treatment plant catchment. High levels of inflow and infiltration result in wastewater overflows to roads, homes and properties during heavy rainfall events. Preliminary investigative work has shown that large-scale pipeline and pump station upgrades are needed to reduce the risk of flooding.
	Wastewater Treatment and transfer to Green Island	Treat wastewater to remove solids and organic matter, transfer to Green Island Wastewater for UV treatment	one treatment plant 20 km transfer line to Green Island	25,812	The Mosgiel wastewater treatment plant has some mechanical, electrical and civil plant items in poor condition resulting in increased operations and maintenance costs. Renewals will be stepped up to improve overall plant condition to maintain service while awaiting long term options from system planning.	While there is sufficient capacity within the Mosgiel wastewater treatment plant for dry weather flows, the pipeline that transfers effluent from the Mosgiel wastewater treatment plant for final treatment at the Green Island wastewater treatment plant is at capacity during heavy rainfall events, resulting in a bottleneck at the treatment plant. Investigative




Asset group and type		Purpose and description	Number/ Length	Value \$000	Asset condition	Asset capacity
		prior to discharge.				work is underway to determine the most appropriate solution long term.
Rural Wastewater Schemes	Waikouaiti (including Karitane), Seacliff, Warrington and Middlemarch catchments					
	Wastewater Network	Transport untreated wastewater from customers' point of discharge to wastewater treatment plants	43 km pipelines 10 pump stations	29,002	Rural wastewater network assets vary between 'very good' and 'poor' condition. The Karitane portion of the network is in very good condition having been installed as an entirely new network in 1983. Renewal of older assets is incorporated as part of forecast renewals as assets reach the end of their useful lives.	There is incapacity in the Waikouaiti/Karitane network which show up as minor wastewater overflows at the Karitane No. 1 pump station during heavy rainfall events. There are no known network capacity issues in Seacliff or Warrington. There are known capacity issues in Middlemarch due to inflow and infiltration issues evidenced by minor network overflows in wet weather, work is underway to understand the best 'whole of system' solution for the area.
	Wastewater Treatment and discharge to land	Treat wastewater to meet discharge consent conditions.	four treatment plants and associated disposal areas	4,297	The rural wastewater treatment plants are generally in good condition, with renewals planned over the next 10 years as discharge consents expire. Treatment options will be considered as renewals are planned, with Seacliff being the first of the northern wastewater treatment plants programmed for renewal.	There is enough capacity within the existing wastewater treatment plants for current and forecast flows in the short term. The plants will be upgraded over the next 10 years prior to their discharge consents expiring, with any forecast capacity changes accounted for as the upgrades are planned.

5.5. How does the DCC assess the condition of stormwater assets?




The condition of stormwater pipes is primarily assessed through CCTV filming. The results from CCTV inspections are used to determine whether assets need repair or replacement, and when this needs to happen. The condition of pump station assets is routinely inspected by DCC staff to ensure assets are appropriately maintained. Specialist engineering advice is used as required. Data on material /unit type, age, condition, performance, location, capacity, criticality and remaining life is collected for 3 waters assets. The DCC 3 Waters Group is currently planning to undertake a series of improvements to stormwater asset condition assessments.

5.5.1. Summary of stormwater 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

Area	Asset type	Purpose/description	Number/Length	Value \$000	Asset condition	Asset capacity
South Dunedin (includes the individual stormwater catchments of Orari Street, St Clair, Portsmouth Drive, and South Dunedin)	Pipe network	Transport stormwater water to pump stations or outlets	97km pipelines 2,454 network access points (manholes, lampholes etc.)	155,861	Condition of the pipe network in the wider South Dunedin stormwater catchment area varies widely based on the age, diameter and construction materials of individual pipes. Older large diameter pipes are generally in sound condition, due to the construction methods of the era.	In heavy rainfall events the stormwater network in South Dunedin can become overwhelmed, resulting in flooding of roads, homes and properties. This is exacerbated by areas of high ground water, particularly around high tide. Hydraulic modelling indicates the stormwater network is performing below the expected level of service. The DCC is working with the ORC and GNS Science to develop and incorporate groundwater into the hydraulic model for the area. Significant capital works are proposed to bring these assets up to currently accepted design standards.
	Pump stations	Pump stormwater during times of significant inflow	three pump stations	5,120	The majority of pump stations are in average condition with some requiring attention to wet wells, pipes and pumps.	Pump station capacity is generally good; issues relate to incapacity within the wider network.

Mosgiel, East Taieri and Outram	Pipes	Transport stormwater water to pump stations or outlets	57km pipelines 1,023 network access points (manholes, lampholes etc.)	66,442	Condition of the pipe network in the Mosgiel, East Taieri and Outram area varies widely based on the diameter and construction materials of individual pipes.	Mosgiel is a very sensitive stormwater catchment; the area is the flood plain for the Taieri River and Silverstream and is underlain by the extensive Taieri Aquifer which is responsive to river levels. The DCC stormwater network discharges into the Taieri River, Silverstream and other tributaries, and when those waterways are high stormwater discharge is impeded. Mosgiel frequently experiences catchment- wide nuisance flooding in small rainfall events. Deep flooding and property flooding are experienced in some areas. Capital works are proposed after modelling improvements have assessed the best practicable option to bring areas of the network with capacity issues up to currently accepted design standards.
	Pump stations	Pump stormwater during times of significant inflow	five pump stations	1,284	Many pump stations are in average condition with some requiring attention to wet wells, pipes and pumps.	Pump station capacity is generally fair; issues have tended to be with incapacity within the wider network. Capital works are planned to enhance pump station performance in conjunction with pipe improvements above.
Centre City (includes the individual catchments of Halsey Street, Mason Street, Kitchener Street and Ravensbourne Road) Outlying areas: Port Chalmers, Brighton/Waldroneville, Green Island, Waikouaiti/ Karitane and Warrington.	Pipes	Transport stormwater water to pump stations or outlets	233km 7,406 network access points (manholes, lampholes etc.)	265,152	Condition of the pipe network in the Centre City area varies widely based on the age, diameter and construction materials of individual pipes. Older large diameter pipes are mostly in sound condition, due to the construction methods of the era. Capital works are proposed via the Central City, Tertiary Precinct and general renewals projects.	Capacity issues exist in small discrete areas of the network. These issues will be addressed through focused capital works. The DCC is working with the ORC and GNS Science to develop and incorporate a groundwater model for the central city area. Northern area – there are limited networks installed in the townships of Waikouaiti, Karitane and Warrington. Both – stormwater system planning will be developed in the early years of this 10-year plan and will provide a basis for future investment




	Pump stations	Pump stations during times of significant inflow	three pump stations	1,541	Many pump stations are in good condition with some attention required on specific wet wells, pipes and pumps. The pump station renewals projects target these issues.	Pump station capacity is generally good.
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5.6. How does the DCC assess the condition of transport assets?




Assessing the condition of above ground infrastructure like roads, cycleways and footpaths is more straightforward than assessing the condition of pipes and other underground infrastructure. The transport team uses a rolling programme of condition assessments to inform its maintenance and renewals decisions which translates into the Asset Management plan which enables co-funding with Waka Kotahi. The level of confidence in the knowledge of the DCC's transport assets is high.







5.6.1. 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	1,071 km	824,880	 Road pavements are in decline. Most of Dunedin's sealed pavements have a theoretical useful life ranging from 60 – 100 years. 57% 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 11 years and has slowly declined.	 In capacity terms the Dunedin urban network is experiencing congestion at certain parts of the day. With the hospital re-build coming congestion will increase so intervention such as the Harbour Arterial bypass are required. In addition, offering Transport choices will be necessary to avoid congestion in the future.
Unsealed gravel roads	693km	28,284	 Gravel roads are maintained in a good condition; however, dust suppression methods have changed meaning potentially gravel roads will see higher volumes of dust.	 In capacity terms the Dunedin transport network is fit for purpose and can cope with traffic demands.
Footpaths & Cycleways	976 km	177,700	 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 76% 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 48% exceeding their expected economic life. Slurry seals, that represent 9% of footpaths, has 84% exceeding or nearing the end of their expected economic life. In the past 3 years 18% of the network have shown signs of deteriorating with a higher proportion moving to average condition from good to very good.	 In capacity terms Dunedin's footpaths are fit for purpose and can cope with pedestrian demands.

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Asset group and type	Number/Length	Value \$000	Asset condition	Asset capacity
Road drainage Kerbing		175,571	Kerb and channel condition are showing signs of decline. In 2019/20 6% of the network was in poor to very poor condition and without sustained investment this is expected to rise as more reach the end of their economic lives.	Good
Signs, road markings and signals	20,403 signs 79 signalled intersections	10,721	Signs, road markings and signals are maintained to a good condition.	Good
Street lights	13,656 streetlights, 5 base stations, 3,313 tele-cells	27,900	LED rollout will be complete by the middle of 2021	Good
Bridges and large culverts	243 bridges 61 large culverts	100,217	Bridges are in largely good condition.	Good
Culverts and mud-tanks	5,734 culverts 8,331 mud-tanks	72,127	Culverts have 5% in poor condition, 35% in average condition, 36% in good condition and 20% in very good condition. 4% are awaiting condition rating. The expected age for mud-tanks is 80 years. 74% 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 mud-tanks are adequately maintained it would be expected they would live well beyond their estimated lives.	Given changing weather patterns, emphasis has been placed on ensuring culverts and mud-tanks are maintained to a high standard. Capacity may become an issue in the face of significant adverse conditions.
Seawalls	41 km	35,480	Seawalls have 6% in very poor condition, 13% in poor condition, 23% in average condition, 39% in good condition and 19% in very good condition.	Isolated areas of the network are compromised during significant weather events and will require future investment.
Retaining walls	31 km	27,832	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 events 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		9,950	Minor structures are maintained regularly and are in good condition.	Good

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6. SIGNIFICANT INFRASTRUCTURE ISSUES AND OPPORTUNITIES FOR DUNEDIN

This section sets out the key infrastructure challenges and opportunities for Dunedin and the main options and implications for managing these over the next 50 years.

6.1. Regulatory, legislative and service delivery changes

The Government is undertaking a substantial change programme that is expected to impact Dunedin's infrastructure services in the coming years. This includes reform of 3 waters regulatory and service delivery arrangements, freshwater reforms, review of the resource management system and changes to the way we provide for and manage urban growth. In addition, the Government Policy Statement on land transport, which sets out the Government's strategic direction for the land transport system over the next 10 years, is issued every three years.

6.1.1. 3 Waters regulatory and service delivery reform

The Government's Inquiry into the Havelock North water supply contamination event of 2016 recommended a suite of changes to improve the safety of drinking water in New Zealand. Three key issues were identified – regulatory weakness, funding and financing challenges, and capability and capacity challenges.

In 2017, the Government established the Three Waters Review. The Review acknowledges multiple challenges facing 3 water services, including funding pressures, ageing infrastructure, rising environmental standards, climate change, seasonal pressure from tourism, and an industry-wide shortage of skilled and qualified people. From the outset, the Government made it clear that it would explore a variety of possible interventions to lift the performance of these services, including changes to both regulatory and service delivery arrangements.

The Government has begun implementing a package of 3 waters regulatory reforms designed to:

- improve national-level leadership, oversight, and support relating to the 3 waters through the creation of Taumata Arowai, the new, dedicated water services regulator
- significantly strengthen compliance monitoring and enforcement relating to drinking water regulation
- manage risks to drinking water safety and ensure sources of drinking water are protected
- improve the environmental performance and transparency of wastewater and stormwater networks.

In July 2020, the Government introduced the Water Services Bill to Parliament. The Bill, if passed, would implement system-wide reforms to the regulation of drinking water and source water, as well as introducing new national-level reporting and monitoring requirements for wastewater and stormwater. Parliament also passed legislation establishing Taumata Arowai as a new Crown entity.

Taumata Arowai is currently being built and will take up its regulatory responsibilities after Parliament passes the Water Services Bill. This is expected to occur in the second half of 2021. From that point, Taumata Arowai will oversee, administer and enforce the regulatory system for drinking water and perform national-level oversight and advisory functions relating to wastewater and stormwater. Regional councils will still regulate wastewater and stormwater discharges to the environment under the Resource Management Act 1991.

Further regulatory reforms may include the introduction of national environmental standards for wastewater discharges and overflows.

In addition to regulatory reforms, the Government has launched a suite of 3 waters service delivery reform proposals. The Government intends to transfer 3 waters service delivery functions from councils to new, public multi-regional water entities. Participation in the service delivery reform programme is voluntary, but the Government has made its preference for full participation by councils clear. In July 2020, the Government provided an indicative timeline for a three stage service delivery reform work programme, with each stage accompanied by a tranche of stimulus funding, and the DCC agreed to 'opt in' to the first stage in August 2020. Councils will be asked to make a second decision on participation in late-2021. All councils will be included in one of the new

proposed water services entities by default but will have the option to decide not to continue to participate. According to an updated reform timeline published in December 2020, the proposed water services entities would commence operation in about 2023.

Through voluntary participation in stage 1, the DCC received Tranche 1 stimulus funding totalling \$15.84 million in November 2020 to be spent by 31 March 2022. The purpose of the funding is to support the Government's reform objectives, stimulate economic recovery through job creation and increase and/or accelerate investment in 3 waters infrastructure.

Major decision: participation in Government 3 waters service delivery reform programme

The DCC agreed to 'opt in' to the first stage of the Government's 3 waters service delivery reform programme in August 2020.

In December 2020, the Government decided that participation in the service delivery reform programme would continue to be voluntary, and that councils would be asked to make a second decision on participation in late-2021. All councils will be included in one of the new water services entities by default but will have the option to decide not to continue to participate.

The Government will promote an amendment to the Local Government Act 2002 that, if passed, will enable councils to transfer ownership of 3 waters assets and services to new entities. The proposed amendment will also provide a fit-for-purpose consultation process that sets out how local government will engage with communities and iwi/Māori about the reform proposals and make decisions.

This decision is only for service delivery reform. Council is unable to opt out of the regulatory elements of 3 waters reform.

6.1.2. Essential Freshwater Programme

The Government has also introduced changes to freshwater regulation through the Essential Freshwater Programme. The Essential Freshwater Programme aims to:

- Stop further degradation of New Zealand's freshwater
- Start making immediate improvements so water quality improves within five years
- Reverse past damage to bring New Zealand's waterways and ecosystems to a healthy state within a generation.

There are overlaps between the Essential Freshwater Programme and the Three Waters Review, which relate to the environmental regulation of stormwater and wastewater discharges and protection of drinking water sources.

The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) came into effect in September 2020. The NPS-FM 2020 requires regional councils to manage freshwater in a way that gives effect to Te Mana o te Wai, a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment and the mauri of the water itself. Regional councils are required to notify new or amended regional plans that give effect to the NPS-FM by 31 December 2024.

The Essential Freshwater Programme has also included introduction of new National Environmental Standards for Freshwater and amendments to existing regulations for the measurement and reporting of water takes. Further regulatory changes proposed include amendments to the NES for Sources of Human Drinking Water, which would strengthen the ability of regional councils and territorial authorities to manage risks to drinking water posed by activities in drinking water catchments.

Overall, the changes made through the Essential Freshwater Programme will have significant flow-on effects for 3 waters activities, through anticipated changes to permitted activities and more

stringent requirements around discharges. Changes to engagement requirements are also expected in order to promote active tangata whenua involvement in freshwater management and decision making, and to ensure Māori freshwater values are identified and provided for.

6.1.3. Resource management system review

In 2020, an independent panel appointed by the Minister for the Environment completed a comprehensive review of New Zealand's resource management system. The review's scope included looking at the Resource Management Act 1991 and its interfaces with the Local Government Act 2002. The review recommended the current Resource Management Act be replaced with three new pieces of legislation: a Natural and Built Environments Act, a Strategic Planning Act and a Managed Retreat and Climate Change Adaptation Act. The panel's report is expected to be followed in 2021 by consultation to develop government policy and a framework to link together the key pieces of legislation.

6.1.4. Urban Growth Agenda

The Urban Growth Agenda is a Government work programme that aims 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; and legislative reform.

The National Policy Statement on Urban Development 2020 (NPS-UD 2020) came into effect on 20 August 2020. The NPS-UD contributes to the Urban Growth Agenda by addressing constraints in New Zealand's planning system to ensure it enables growth and supports well-functioning urban environments. The NPS-UD 2020 categorises Dunedin as a tier 2 urban environment, bringing into effect a range of provisions relating to the amount of development capacity required to be serviceable with infrastructure.

6.1.5. Government Policy Statement on Land Transport

The Government Policy Statement on land transport (GPS) sets the Government's priorities on land transport investment over the next 10-year period. It sets out how money is spent on activities such as public transport, state highway improvements, local roads and road safety. The GPS is reviewed and updated every three years. Changes to priorities in the GPS impact on the DCC's renewal and capital programmes.

The strategic priorities for GPS 2021 are:

- Safety – developing a transport system where no-one is killed or seriously injured
- Better Travel Options – providing people with better transport options
- Improving freight connections
- Climate Change – developing a low carbon transport system that supports emission reductions.

The Land Transport (Rail) Legislation Act 2020 (the Rail Act) came into force on 1 July 2020. The Rail Act amends the Land Transport Management Act 2003 (the LTMA) and the Land Transport Act 1998 to implement a new long-term planning and funding system for the heavy rail track network owned by KiwiRail.

The new framework brings the planning and funding of the rail network under the land transport planning and funding regime set by the LTMA. This will allow local authorities to have input into how the rail network influences the movement of freight and people in their areas.

6.1.6. Principal Options and Implications of responding to regulatory, legislative and service delivery changes: 3 waters

While a decision whether to transfer the DCC's 3 waters assets and service delivery functions to a new entity will not be made until late-2021, the DCC 3 Waters Group has initiated a series of projects that will assist with preparation for regulatory, legislative and service delivery changes. These projects focus on organisational impacts, which have potentially large financial implications for the DCC and so all options must be carefully considered. System planning is also key to preparing for reform.

Some projects have already commenced to better understand the capability and capacity of the water, wastewater and stormwater systems to meet current and future anticipated standards. This is complemented by projects to assess the impacts of wastewater and stormwater discharges on the receiving water environments and an assessment of the treatment plants to meet anticipated future treatment standards.

The 2021-31 capital programme does not fund any improvements needed to meet anticipated new regulatory standards in drinking water, wastewater or stormwater as these are not yet confirmed. However the current workplan will assess the ability of the systems to meet a range of new, enhanced standards as well as the baseline investment needed to address more urgent operational risks to maintain current service levels. Longer term strategic investment plans and enhancements needed from system planning will be incorporated into the 10 year plan 2024-34 as the outputs of system planning become available.

6.1.7. Principal options and implications to respond to 3 waters reform

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

	1-10 years (2031)	10-30 years (2051)	30-50 years (2071)
Continue current 3 Waters Group work programme (status quo)	Passive approach to reform, responses to the Government's reform programme would be reactive and any change in direction would have to be managed within existing budgets and staffing levels.	High likelihood of unplanned investment needs to meet new anticipated standards, which will negatively impact other capital investment projects and could affect service levels.	Unknown as yet.
Proactive, moderate scope transition work programme	Staff are prepared for potential transition into a new water services entity, the DCC has prior understanding of the impacts of reforms and options to manage transition. Projects within the programme aim to reduce risks and ensure a favourable balance sheet position at the time of any potential asset transfer. Timeline targets the 2024-24 10-year plan and some projects may not be complete prior to a potential transition.	Medium-long term investment plans based on improved evidence; any enhancements needed have been programmed via the best practicable solution method. Impacts on rates for various service level provision available.	As previous.
Proactive, comprehensive transition work programme	As above, but with accelerated delivery of key outputs and a wider scope of improvement activities.	As above, but with additional planning and data to produce robust long-term investment plans and a thorough understanding of further planning, policy and delivery improvements needed.	As previous.

Section 6.3 (Responding to changes in demand for infrastructure) includes further detail on how the DCC will respond to changes that arise out of the Government's Urban Growth Agenda.

Section 6.4 (Public health and environmental outcomes) includes further detail on how the DCC will respond to changes arising from 3 waters regulatory reforms and the Essential Freshwater Programme.

6.2. Replacing and renewing ageing infrastructure

Dunedin has ~~\$6.8~~\$4.1 billion in water supply, wastewater, stormwater and transport assets. The DCC's planning is increasingly focused on sound asset condition and risk assessment, planning and delivery opportunities, and long-term asset solutions that provide lasting value for residents, businesses and the environment. Asset management planning is most efficient and effective when all options, including renewals and upgrades, are considered holistically. This can identify opportunities to make more systemic improvements. Systematic improvements can extend network life while maintaining levels of service or in some cases improve levels of service where that would be of value to the community and the environment.

In the next 10 years, DCC has identified opportunities to address some infrastructure issues by investing in a combination of renewals and new capital. Projects such as the Central City Plan and Tertiary Precinct upgrades will replace ageing 3 waters and transport infrastructure and deliver public realm improvements to support a thriving tertiary and retail sector.

6.2.1. 3 Waters

The DCC 3 waters assets have a value of ~~\$5.1~~\$2.4 billion, with assets depreciating by approximately ~~\$31.9~~\$30.7 million annually. The renewals spend profile within this plan is a significant increase from previous plans due to the ageing asset base and the risk of not meeting stated levels of service. Budget increases year on year will enable a higher rate of renewals as the plan progresses. Annual budgets may be brought forward through the annual plan process if an increased rate of delivery is successful (as described in section 9). In order to deliver an increased programme, 3 waters has set up new delivery models and longer-term programme contracts. The stimulus funding grant received as part of the Government Three Waters Reform Programme has accelerated network renewals in year 1 of the plan. Proposed future grants are an opportunity to uplift the renewals programme further.

Assets do not always need replacing as they reach their theoretical life. Performance or condition can indicate that the asset can continue to run beyond the asset life within acceptable levels of risk (e.g. non-critical assets such as tobies) or alternative approaches to asset management may be adopted. For example, the largest and oldest of Dunedin's sewer pipes are actively monitored by CCTV to assess when renewal or replacement is needed. This allows 3 waters capital expenditure to be focussed on the renewal of assets not performing as required or unable to meet new standards, based on the criticality of those assets and the likely impact of any loss of service.

6.2.2. Transport

Dunedin's transport network is made up of a diverse range of assets. They are revalued annually and in 2020 had a total replacement value of \$1.7 billion. Assets depreciate by approximately \$23.4 million annually. Careful management of these assets is paramount to ensure investment is prioritised where most needed. Emphasis is therefore placed on regular inspections and ongoing condition assessments. This information helps guide renewal investment to the right place at the right time.

Many of the city's transport assets are ageing with a number nearing or having exceeded the end of their useful economic lives. When an asset reaches about 75% of its service life, deterioration will accelerate. For example, if a road pavement is left beyond this point without maintenance, the cost to renew the asset could be 4-5 times higher. Maintenance and renewal interventions are interlinked. Timely repairs can extend the time until a reseal is required on a road, resealing at the right time will extend the life of the pavement structure beneath. Routine maintenance deals with defects such as cracks and potholes before more serious problems develop.

In addition, certain renewals are considered as part of the Major Projects Programme, namely the Central City upgrade and the Tertiary Precinct. Both projects require significant transport and 3 water renewals so delivering them together creates efficiency and minimises disruption. Where

opportunities exist to combine these types of renewals activities and they are large enough in dollar value, they are delivered through the Major Projects Programme.

6.2.3. 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 (2031)	10-30 years (2051)	30-50 years (2071)
Renewals delivery continues at current rates, with no plans to increase internal or external delivery capacity	Transport and 3 waters 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. Gravel road re-metaling, pavement rehabilitation, pavement renewals, traffic service renewals and structures have a static spend in the 10 year plan to meet asset management requirements.	The value of renewals required versus those undertaken is expected to increase until at least 2048 based on the increasing age of assets and inflation. The programme will be regularly reviewed to determine whether strategic upgrades would be preferable.	The value of renewals undertaken is expected to flat line 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 will be gradually increased year by year as internal and external delivery capacity allows. For 3 waters in particular, this will allow the renewals backlog to be partly reduced and allow strategic upgrades to be undertaken at the same time as renewals as well as planning for anticipated new standards. The bulk of asset renewals for 2021-2023 target the highest risk issues at treatment plants that impact on health and safety and levels of service. For transport, footpath renewals increase over the 10 Year Plan to improve the condition of the asset to help facilitate active modes of transport. Drainage spend over the 10 Year Plan gradually increases to reflect that the city will be under increasing pressure with increased weather events and sea level rise.	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 deteriorates. Operations and maintenance costs can be reduced, and issues will become less prevalent.
Renewals delivery is accelerated in the early years of the plan, increased overall	As above, but with significant budget moved to years 1-6 to address priority renewals. Increased overall budget to allow deferred or removed projects to be completed, to reduce further reduce risks to	The renewals programme will be most effective in reducing maintenance and operating expenditure and has the lowest risk of	The value of renewals undertaken is expected to flat line at a much faster rate than in other options.

	1-10 years (2031)	10-30 years (2051)	30-50 years (2071)
renewals budgets.	service levels and health and safety. There is a high likelihood this option is not deliverable.	deteriorating service levels. Budgets in these years are not affected by any deferrals in the previous 10 years.	

6.3. Responding to changes in demand for infrastructure

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. An important part of good asset management is enabling sustainable growth by undertaking investments that address both service levels and future capacity at the same time, while taking opportunities to rationalise the complexity of networks that have grown over many decades. This can also reduce future repair and maintenance costs.

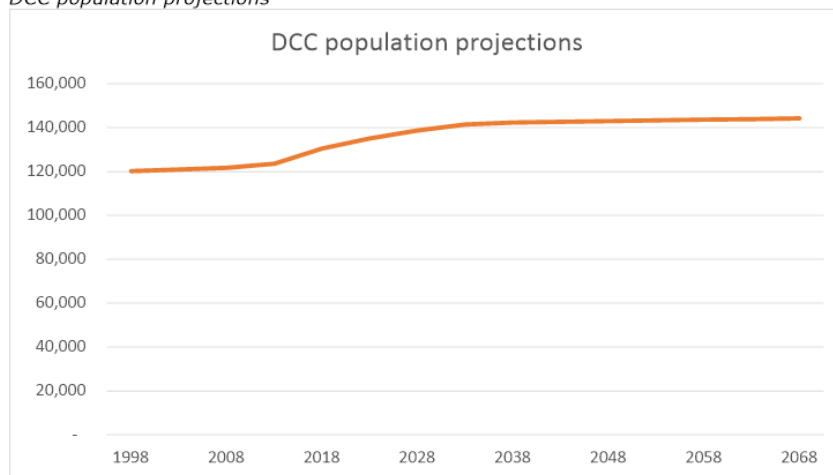
6.3.1. Population and dwelling growth

The COVID-19 pandemic has created uncertainty around Dunedin's future growth. Dunedin's population is projected to be relatively resilient in the near term, despite the impact of COVID-19. Current projections indicate the population will continue to grow sharply until 2033, reaching 141,417. From 2034 onwards, the population rate will begin to taper off returning to a medium growth scenario. By 2038, the 65 years and over demographic will be Dunedin's second largest age group (behind 25 and under).

Dunedin's dwelling numbers will experience similar trends to the Dunedin population, experiencing a sharp rate of expansion until 2038 reaching a total of 60,511 dwellings. Projections then indicate that dwelling expansion will slow. This is likely to be a result of an ageing population and the changing make up of families and households.

Variations to the 2GP will define where forecast growth might occur across Dunedin.

DCC population projections



6.3.2. Planning for growth in housing and business development

Under the National Policy Statement for Urban Development 2020, Dunedin is categorised as a tier 2 urban environment (the requirements of which are in the table below). This brings into effect a range of provisions relating to the amount of development capacity that is required to be

serviceable with infrastructure. 2GP Variation 2 comprises a number of discrete changes that will add additional housing capacity into the 2GP.

National Policy Statement on Urban Development 2020²

Term	Infrastructure requirements
Short-term (within the next three years)	Development capacity must have adequate existing development infrastructure to support the development of the land.
Medium-term (3 - 10 years)	Development capacity must have either: adequate existing development infrastructure to support the development of the land, or funding for adequate infrastructure to support development of the land identified in a long-term plan.
Long-term (10 - 30 years)	Development capacity must have either: adequate existing development infrastructure to support the development of the land, or funding for adequate infrastructure to support development of the land identified in a long-term plan, or development infrastructure identified in an infrastructure strategy.

6.3.3. Visitor growth

Dunedin's successful tourism marketing, which attracted large cruise ships and major stadium events, resulted in Dunedin's 'peak day' visitor numbers growing steadily from 2013 to 2018. However, with the impact of COVID-19 on tourism, 'peak day' visitor numbers are expected to drop sharply in the short term, with a recovery period between 2023-2028 as tourism markets re-establish. Pre COVID-19 levels of growth are projected by 2031, with peak day visitor numbers reaching 27,886 by 2033.

6.3.4. Economic growth

The COVID-19 pandemic has created uncertainty around Dunedin's future growth and economic performance. As detailed above, the impact on visitor numbers will have an impact on Dunedin's tourism economy.

The changing make up and rate of growth in the economy may impact on demand for network infrastructure. For example, Port Otago at Port Chalmers is New Zealand's 5th largest port (by 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. Reduced international demand for export products will reduce heavy vehicle movements accessing the port, which will put less pressure on road pavements and network congestion.

² <https://www.mfe.govt.nz/about-national-policy-statement-urban-development>

6.3.5. Principal Options and implications for responding to changes in demand for infrastructure

StatsNZ guidance issued in June 2019 recommended the use of the medium-high projections scenario for Dunedin until 2028, and the medium growth scenario from 2028 until 2043. While a pre-COVID single set of projections was developed, reflecting the most probable growth scenario, there is significant uncertainty in any projections. There is a particularly high level of uncertainty for projections over the longer term (e.g. 2028-68).

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

	10-years (2031)	10-30 years (2051)	30-50 years (2071)
<u>Plan and invest for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onward (target high demand 2GP and Variation 2 areas in 2021-31 for delivery, remaining 2GP and Variation 2 areas over a longer period)</u> <u>Plan and invest for a medium-high growth scenario over 2019-28 and a medium growth scenario from 2029 onward (target 2GP only in 2021-31)</u>	<u>Existing network infrastructure capacity will be adequate in currently serviced areas, with augmentation required in localised areas. 3 waters budgets allow for network growth required under high demand 2GP and Variation 2 areas.</u> <u>If actual growth is higher than the medium scenario, infrastructure will more quickly reach capacity and there is a risk of insufficient infrastructure in areas where assets are at or near capacity.</u> <u>Decisions on where and how to augment infrastructure in localised areas in response to growth will occur once Variation 2 to the 2GP has been adopted.</u> <u>Existing network infrastructure capacity will be adequate in currently serviced areas, with augmentation required in localised areas. 3 waters and transport budgets allow for network growth required under the 2GP.</u> <u>If actual growth is higher than the medium scenario, infrastructure will more quickly reach capacity and there is a risk of insufficient infrastructure in areas where assets are at or near capacity.</u> <u>Decisions on where and how to augment infrastructure in localised areas in response to growth will occur once Variation 2 to the 2GP has been adopted.</u>	<u>Existing network infrastructure capacity will need to be augmented in localised areas in both current and newly serviced areas, provide remaining capacity for 2GP and Variation 2.</u> <u>If actual growth is higher than the medium scenario, infrastructure capacity will be exceeded in localised areas and require additions to the capacity of some major assets.</u> <u>Existing network infrastructure capacity will need to be augmented in localised areas in both current and newly serviced areas, provide capacity for Variation 2. 3 waters and transport budgets will focus on changes needed under Variation 2.</u> <u>If actual growth is higher than the medium scenario, infrastructure capacity will be exceeded in localised areas and require additions to the capacity of some major assets.</u>	<u>The majority of the 3 waters and transport renewal programme will be complete, resulting in a lower average age for assets and increased network capacity.</u> <u>Major assets will be due for replacement or modernisation at this time.</u> <u>A decline in population may have funding consequences.</u> <u>Technological change may improve asset efficiency.</u> <u>The majority of the 3 waters and transport renewal programme will be complete, resulting in a lower average age for assets and increased network capacity.</u> <u>Major assets will be due for replacement or modernisation at this time.</u> <u>A decline in population may have funding consequences.</u> <u>Technological change may improve asset efficiency.</u>

	10-years (2031)	10-30 years (2051)	30-50 years (2071)
Plan and invest for a <u>medium-high growth</u> scenario over 2019-28 and a <u>medium growth</u> scenario from 2029 onward (target 2GP and Variation 2 in 2021-31)	As above, however budgets allow for infrastructure growth required under the 2GP and Variation 2, with adequate budgets to accommodate investment. If actual growth is higher than the medium scenario, servicing of Variation 2 will require an accelerated response. There is a high likelihood this option is not deliverable as investigation work is still underway and ability to undertake work is constrained by budgets, internal resource, contractor and material availability.	Planned growth has been serviced and so infrastructure capacity is not a limiting factor to development. Lower growth investment is needed in this period. If actual growth is higher than the medium scenario, infrastructure capacity will be exceeded in localised areas and require additions to the capacity of some major assets.	As above.

6.4. Public health and environmental outcomes

The 3 waters and transport networks provide important public health and safety benefits to the community and deliver services which can impact on the natural environment.

6.4.1. 3 Waters

With 3 waters reform, it is likely capital improvements will be required to meet enhanced protection of drinking water sources, water management practices and new standards for drinking water, wastewater and stormwater services. In anticipation of the reforms and the potential transition into a new entity (if the DCC does not opt out of the Government's service delivery reform programme), the DCC is undertaking a programme of work to strengthen regulation policies and improve asset ownership, asset management and delivery processes. The DCC is also underway with a project to update drinking water safety plans to better align with the new regulatory system. The DCC will continue with water system planning processes to guide capital investment strategies which will support the continued provision of safe drinking water to serviced communities.

Under the Local Government Act 2002 (LGA), the DCC is required to undertake a Water and Sanitary Services Assessment (WSSA) from time to time. The purpose of the assessment is to assess, from a public health perspective, the adequacy of water and other sanitary services available to communities in terms of five specified factors. The DCC is considering the best way to carry out the next reviews, and it may be most efficient to undertake it as part of system planning.

The Health Act 1956 requires the DCC to comply with the criteria set out in the Drinking Water Standards for New Zealand. The standards set maximum amounts for substances, organisms, contaminants or residues that may be present in drinking water, requires monitoring, and prescribes remedial actions in the event of non-compliance. Drinking water suppliers must also have approved Water Safety Plans for large supplies to identify and manage risk - from the raw water catchment to the treatment plant and within the distribution network - and operate in accordance with those plans.

Resource consents to discharge treated effluent to the environment are held for each of Dunedin's seven wastewater treatment plants, except for Mosgiel where effluent is transferred to Green Island for ultraviolet disinfection treatment before discharge. Three of the resource consents are due to expire within the next 10 years and so projects are planned to investigate best practicable options for new consents and the impact of anticipated new standards. System planning will address future consent changes and investment plans to address improvements needed.

The DCC currently has six constructed wastewater overflows consented by the ORC. These overflows are designed to manage the public health risk in heavy rainfall events by allowing discharge of diluted wastewater at specific points of 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. Under water reform, it is anticipated the quantity and quality of wastewater discharges will also have to meet new standards.

The DCC holds resource consents to discharge stormwater to the coastal marine area. Those consents expire in 2048. Key stormwater discharges are part of the environmental monitoring programme and work is underway to improve the stormwater hydraulic models for key areas. The 3 Waters Group plans to undertake stormwater system planning for all areas in the early years of the plan, starting with a review and improvement of the hydraulic models. Under the current rules of the Regional Plan: Water, most of Dunedin's stormwater discharges are permitted, subject to certain provisions. The wider implications of water reform mean tighter regulation on quality and quantity of stormwater discharges is likely.

The DCC's long-held approach has been to enable property owners to build and maintain their own pipes or open watercourse infrastructure. Roughly half the city is serviced by private pipes and streams, many of which are 100+ years old and in poor condition, with confusion over ownership and responsibility. Developing solutions to the complex stormwater problems is often beyond the means of most landowners. Failure of these assets can lead to flooding, sinkholes and landslips. A new approach to dealing with hazards from privately-owned stormwater assets was approved in 2019 (known as the watercourse programme), which aims to reduce these risks on the highest priority sites. Through the programme of work to prepare for reform, 3 waters will review the policy on watercourse asset ownership and the financial impacts of this on the DCC.

6.4.2. Transport

Waka Kotahi's Road to Zero aims to have a 40% reduction in deaths and serious injuries from 2018 – 2030 and sets out a series of initiatives to address road safety. The city's accident statistics show limited improvement in Dunedin with the death and serious injury numbers static over recent years. Safety initiatives are developed around our transport infrastructure for both motorists and vulnerable users such as pedestrians and cyclists.

An analysis of crash statistics indicates factors which contribute to Dunedin's safety record are: intersections; young drivers; older drivers; and distractions. 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. Improving network safety is a key issue to be addressed through specific safety improvement programmes, major capital projects and in considering safety improvements when undertaking renewal works.

Safety interventions undertaken by the Transport group include:

- upgrading pedestrian facilities
- upgrading major arterials with priority bus routes
- implementing road safety education campaigns to raise awareness of road safety, public transport safety and pedestrian safety
- using fixed safety cameras at intersections and other high-risk areas
- implementing a prioritised programme of safety engineering projects
- providing separated cycling infrastructure.

The ability to be able to move around easily across a variety of modes is linked to health, social and economic benefits. Providing transport choices will have health benefits as more active modes of transport are taken up. 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 active/sustainable transport will also contribute to the city's environmental commitments of carbon zero 2030, reduce congestion and improve the health of

those incorporating physical activity into their daily commute. Investment in providing safe and attractive infrastructure for active modes is expected to increase the desirability of active transport modes.

6.4.3. 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 (2031)	10-30 years (2051)	30-50 years (2071)
Existing public health and environmental impacts are not prioritised	Compliance with DWSNZ is not prioritised and water and wastewater treatment plants are not upgraded in a timely manner to keep pace with changing standards. Incidence and volume of wastewater overflows to the environment will likely increase as will incidences of habitable floor flooding. For 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.	Water treatment plants are not upgraded to meet DWSNZ changes and treatment processes fall short of increased standards. Wastewater discharges to the environment and the volume of discharges continue to increase. Consents required to continue to discharge to environment would be unlikely to be renewed resulting in prosecution and fines. Incidence of habitable floor flooding will increase. No specific investment to decrease the number of serious injuries or deaths on the Dunedin transport network.	Water treatment plants are not upgraded to meet DWSNZ changes and treatment plant processes become so outdated that compliance would not be able to be achieved without significant widespread large scale capital works. Wastewater discharges to environment likely to become the norm with the associated degradation of receiving waters. Discharges likely to have no consents and incur fines in each instance where a discharge occurs. No specific investment to decrease the number of serious injuries or deaths on the Dunedin transport network.
Improve public health & environmental outcomes by investing in public transport, road safety and 3 waters upgrades and renewals programmes. Investment is increased over time.	Water treatment plants meet DWSNZ standards and prepare for new standards and regulation by the newly established Taumata Arowai. Wastewater discharges reduce as renewals remove inflow and infiltration from wastewater networks. A long-term investment plan to address wet weather flows is developed. Stormwater discharge impacts are understood, best practicable solutions to flooding are implemented and system planning provides a long-term investment plan. Transport investments are focussed on reducing	Water treatment plants continue to meet DWSNZ measures and are updated as required to meet any changes in standards. Best practicable option for all wastewater overflows implemented. New sustainable solutions to stormwater management are implemented. Continued investment in road safety and active transport modes results in decreased road trauma on the	Water treatment plants continue to meet DWSNZ measures and are updated as required to meet any changes in standards. New sustainable solutions to stormwater management are implemented. Continued investment in road safety and active transport modes results in decreased road trauma on the transport network and a healthy connected community.

	10-years (2031)	10-30 years (2051)	30-50 years (2071)
	deaths and serious injury in high risk transport corridors. Public Health outcomes are also achieved by continued investment in active transport modes such as walking and cycling.	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.	As above, however budgets moved to years 1-6. Improvements to drinking water resilience, wastewater discharges and stormwater overflows can be addressed more quickly however lost opportunities to benefit from the synergies obtained through aligning cross-network renewals. Reducing the number of deaths and serious injury is achieved by additional investment in road safety. The strategic cycleway network is delivered earlier and expanded. There is a likelihood this option is not deliverable and may result in increased disruption to residents due to construction projects not being well aligned across 3 waters and transport assets and other asset providers.	As above.	As above.

6.5. Resilience to natural hazards

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.

6.5.1. Climate change

Climate change impacts include more extreme rainfall events, causing increased frequency and severity of flood events, while experiencing less rainfall overall can impact on water supply. Dry periods increase the risk of drought and catchment fire (which impacts on drinking water quality). 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 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.

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)³. Older people and vulnerable populations find it more challenging to manage the impacts of natural hazards. South Dunedin has an increasingly aged population and one of the lowest decile demographics in the country.

³ Parliamentary Commissioner for the Environment (2015) Rising Seas

The DCC will respond to climate change by following the Dynamic Adaptive Policy Pathways model that is embedded within the Coastal Hazards and Climate Change Guidance published by the Ministry for the Environment. DCC is currently focusing on, particularly through the South Dunedin Futures Project, broadening the community's understanding of the climate change risks that will affect them in the coming decades. In doing so, DCC want the community to be well informed and engaged in the investment decisions that will be needed to secure a prosperous future for the city. While many Dunedin communities want to see tangible actions to respond to climate change events, DCC's current focus is on preparing well rather than rushing and risk maladaptation outcomes.

Because of the complex nature of managing climate change risks, DCC is also developing partnerships with stakeholders to ensure the appropriate expertise is involved to make wise investment decisions for the future. These partnerships include: regional council, other local authorities, central government agencies including the Ministry for the Environment, the Climate Change Commission, the community, academics, the Infrastructure Commission and professionals such as engineers and lawyers.

6.5.2. Earthquakes

Seismic activity can cause widespread damage to network infrastructure. Destruction of critical built infrastructure and displacement of piped infrastructure can render 3 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 in from the north and a motorway in 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.

6.5.3. Flooding and landslides

Some parts of Dunedin are susceptible to flooding and landslides during heavy rainfall events. Flooding and landslides can damage homes, business and infrastructure. 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 rainwater and groundwater infiltration to the wastewater network from ageing and cracked pipes and inflow to the wastewater network from direct stormwater connections
- Low-lying areas where the groundwater is close to the surface so rainwater cannot drain away.
- Sea level rise, more extreme rainfall events and storm surges increasing the frequency of flood events in the future.
- Mud-tanks can become blocked and creating a flooding hazard
- The low elevation of some roading infrastructure can cause roads to become flooded and cut off.

Manhole surcharging can create a safety hazard in flood events on the Transport corridor when manholes covers become dislodged. Communities in low-lying coastal areas serviced by septic tanks (rather than a reticulated wastewater system) may be at higher risk of groundwater contamination during flood events. More extreme rainfall events and storm surges may lead to larger and more frequent slips and damage to 3 waters and transport infrastructure including sea walls, bridges and culverts.

As weather events become more frequent and severe, the infrastructure networks and community's ability to recover will continue to be put under increasing pressure.

6.5.4. Drought, higher mean temperatures and catchment fires

Prolonged periods of drought pose a risk to Dunedin's water supply. Furthermore, drier water catchments yield less water and are more prone to large scale fires. Catchment fires can result in

highly turbid water that 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 network are more likely at higher temperatures.

From a transport perspective, higher temperatures can cause degradation in the roading infrastructure. Droughts can also present a fire risk for roadside vegetation.

6.5.5. Building resilience to natural hazards

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

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).

System planning for 3 waters is focussed on an adaptive approach to investment, planning for natural hazards and ensuring resilient solutions are implemented. Long-term investment plans will be ready for the 2024-34 10 year plan, however early work to increase resilience to some water supplies and targeted metro wastewater treatment plant wet weather flow management are budgeted within the 2021-31 capital programme.

Planning is also 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 would likely be the least affected so may have to become a recovery hub for the lower South Island.

6.5.6. 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 (2031)	10-30 years (2051)	30-50 years (2071)
Planned renewals and projects will reduce some risks arising from natural hazards	Renewing pipes and other infrastructure in flood prone areas will reduce some risks arising from natural hazards. Continue to fund projects to improve the resilience of the water supply network. AF8 (Alpine fault quake resilience) ⁴ and Lifelines resilience projects will improve resilience of 3 waters network. 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.	Renewing pipes and other infrastructure in flood prone areas will reduce some risks arising from natural hazards. 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.	Natural hazard risks fully considered when renewals are planned. Updated design tolerances incorporated into asset renewals. 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, in particular climate change and the risk to assets. Projects such as South Dunedin Flood Alleviation assess the future impacts of climate change (such as sea level rise, rainfall patterns and flooding) and looks for solutions to mitigate these risks. We will also 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.

6.6. Planned increases or decreases in levels of service

The DCC upgrades assets in response to growth or higher service demands. These include improving taste and odour of drinking water and making improvements to roads to improve transport choice and safety.

6.6.1. 3 Waters

The highest priority service levels for 3 waters are: water quality and supply reliability, the adequate performance of networks and the impacts of 3 waters discharges and overflows on the environment, plus internal service measures such as health & safety.

The upcoming 3 waters reform will require further improvements to drinking water supplies; such as quality, quantity and management, and require improvements in wastewater and stormwater

⁴ 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 in response to a major earthquake on the Alpine Fault.

management. No funding allowance has been made in the 2021 – 31 10 year plan for enhanced standards in water, wastewater or stormwater as at the time of writing these are unknown.

A large part of the work programme within 3 waters in the shorter term is to prepare for anticipated new standards associated with reform. This will include: increased monitoring of assets, assessing internal capability and capacity to undertake the projects proposed in the capital expenditure programme (including the tranche 1 stimulus funding) and improving asset and compliance management practices.

6.6.1.1. Water

Some capital projects to upgrade water treatment capability have been initiated to improve drinking water aesthetics and taste and provide enhanced monitoring. At the water treatment plants, a programme of work to improve wet weather flow management has begun and additional monitoring has been installed to assist in understanding what investment will be needed to meet any national standards introduced through 3 waters reform.

6.6.1.2. Wastewater

Ageing pipes and sewers are creating 'nuisance' level problems for some residents. The larger issues are caused by inflow and infiltration into the wastewater systems which can lead to surcharge, flooding and hydraulic pressures at the wastewater treatment plants. Renewal programmes on the network are focussed on reducing inflow and infiltration to reduce wet weather overflows and treatment plant wash-out. At pump stations the aim is to increase reliability to maintain network performance and at the treatment plants assets are to be renewed to maintain compliance with resource consents and reduce health and safety risks.

6.6.1.3. Stormwater

Sea level rise leading to rising groundwater in low-lying parts of Dunedin will make it more difficult to meet current stormwater levels of service. As groundwater rises, additional investment will be required in wastewater and stormwater infrastructure to maintain existing service levels. To support this, the DCC will remain focused on the renewal of assets with new projects to address areas where levels of service issues currently exist. Following previous floods, investment in an expanded stormwater network, in addition to focused improvements in the most heavily affected areas (South Dunedin, Mosgiel), is anticipated.

6.6.2. Transport

The priority service levels for the transport network are:

- Safety – all users of the transport network are catered for in a safe network.
- Resilience – The availability and restoration of the network function when there is a weather or emergency event
- Accessibility – The ease with which people can reach key destinations and the transport networks available to them.
- Travel time reliability – The reliability of travel time on key routes during peak use
- Cost efficiency – The relative costs and efficiency of the network compared with other networks.

There are a number of projects in the 2021 – 31 capital programme, including the Shaping Dunedin Future Transport (SFDT) programme, that aim to respond to levels of service across the city in light of the hospital rebuild and growth in the city, some of which are 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.
- Strategic cycleway network: To fill the gaps and expand the existing cycling network across the city to provide a safe and connected cycle network.
- Central City bike hubs: Hubs where cyclists can lock their bikes in sheltered lockers and other facilities, such as repair and charging services, in North Dunedin, Central City and South Dunedin/Oval.

- Bus priority measures and safety improvements: Providing infrastructure to prioritise buses and safety improvements for pedestrians in and around the CBD.

ORC are investing in additional bus hubs and improved public transport and Waka Kotahi is investing in enhancing the state highway, intersections and other cycleways as part of the SDFT programme.

6.6.3. 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 (2031)	10-30 years (2051)	30-50 years (2071)
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. Does not plan for regulatory and legislative changes, which will see an increase in required levels of service for 3 waters, of which the impact upon rates is currently unknown.	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. Planning for 3 waters regulatory and service delivery reforms continue. Increase investment in active and public transport modes to contribute to carbon zero 2030 goals.	Balance our ability to manage future demands, with strategic investments aimed at encouraging sustainable growth through improved service levels. Planning and implementation to deal with the longer-term impacts of regulatory and legislative changes such as the anticipated wastewater and stormwater service level enhancements.	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.
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.

6.7. Zero Carbon 2030 target

In June 2019, Council declared a climate emergency and brought forward the city's emissions reduction target by 20 years. The 'Zero Carbon 2030' target seeks to achieve city-wide net carbon neutrality (excluding biogenic methane) by 2030. For biogenic methane, the target aligns with central Government, aiming to achieve a 24% to 47% reduction below 2017 levels by 2050, including 10% reduction below 2017 levels by 2030.

6.7.1. Current impact of 3 waters infrastructure on city-wide emissions

3 waters infrastructure impacts on city-wide emissions in a number of ways.

- Biological processes from wastewater treatment were assessed as being responsible for approx. 0.2% of the city's emissions in 2018/19.
- Some sludge generated in wastewater treatment processes is currently sent to landfill, contributing to solid waste emissions.
- Diesel, LPG and electricity used in distribution, treatment and disposal processes associated with 3 waters networks all contribute to stationary energy sector emissions.
- The availability of servicing in various parts of the city shapes urban form, which in turn impacts on transport sector emissions.
- Construction and maintenance processes associated with the 3 waters network also contribute to the city's emissions profile.

Historically, carbon emissions have not been a key consideration in the design of 3 waters plant and network infrastructure. As a result, neither existing plant nor network configuration is optimised to minimise emissions. In addition, the current need to prioritise reactive operational expenditure, to address process challenges and compliance risks, hinders significant immediate investment in aligning these facilities and assets with Zero Carbon ambitions. Another key consideration is service delivery reform and increasing treatment standards for water and wastewater - these are very likely to result in more intensive treatment processes, which in turn are likely to drive increases in energy demand. The extent to which these requirements may undermine emissions reduction efforts is currently unknown, but may be significant.

In terms of 3 waters' impact on urban form, urban intensification (particularly around the CBD, centres and along public transport routes) is preferable to urban expansion, because it is more likely to support and promote low emission transport systems. The DCC's overall urban form objective of a 'compact city with resilient townships' is intended to be achieved through urban 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 3 waters network, and the degree to which additional intensification is achievable is similarly limited in some locations by 3 waters network capacity.

6.7.2. Current impact of transport infrastructure on city-wide emissions

The transport sector is Dunedin's most significant, and fastest growing, source of emissions. In 2018/19, transport was assessed as contributing 39% of Dunedin's total gross emissions, with the largest proportion of this (27% of gross emissions) stemming from land transport. The configuration of the local road network, and the relative levels of service for different modes, shape residents' travel choices and therefore the city's emissions profile.

Dunedin has a reliance on cars, which has constrained the uptake of alternative modes of travel. According to the 2018 census data, 68.5% of the community within Otago used private or company vehicles as the means of travelling to work. Global and national trends suggest, however, that with increasing investment in infrastructure to improve the levels of service for alternative modes, there is a slow increase in uptake of these modes. This is reflected in cyclist numbers on monitored routes, and in bus patronage data in Dunedin.

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

6.7.3. Aligning infrastructure work programmes with the Zero Carbon 2030 target

For both transport and 3 waters, improvements in data quality has been identified as a key step in supporting efforts to reduce emissions.

- In the transport network, investigations into the end use of fuel purchased within Dunedin, and residents' travel choices, will help the Transport team prioritise and tailor emissions-reducing interventions.
- For the 3 waters network, an emissions baseline for existing plant and network operations needs to be established, to help identify and prioritise opportunities for emissions reduction.

Development of policies, processes and guidance to support the integration of the Zero Carbon 2030 target into infrastructure teams' planning and day-to-day operations, is underway. This includes revision of the DCC's existing Carbon Management Policy (2017) for the organisation (which will assist to align all infrastructure projects, including renewals, with emissions reduction ambitions). Clearly defining the outcomes sought to give effect to the Zero Carbon 2030 target will ensure these can be embedded in strategic planning, including 3 waters system planning. It is considered that this will, in turn, clearly align transport and 3 waters expenditure with Zero Carbon ambitions from 2024 onwards.

Looking forward, there is also provision in the 10 year plan to embed Zero Carbon-related considerations in the DCC's performance management framework, asset management and procurement processes, and reporting.

For transport, the speed and depth of changes required to achieve the Zero Carbon 2030 target represent a very significant departure from business-as-usual. Provision for these alternative modes, and residents' use of them, will need to increase substantially over the decade to 2030. This will rely not only on DCC investment, but also on the degree to which partner agencies focus their investment on facilitating a rapid transition to a low emission transport system – and the extent to which this is supported by the community. The development of a Zero Carbon Plan for the city, scheduled for 2021, is anticipated to assist with this process.

For both transport and 3 waters, the need to cater for population growth, discussed in section 6.3, is both a challenge and an opportunity in achieving alignment with the Zero Carbon 2030 target. City Development, in consultation with transport and 3 waters, is developing an approach to provide for Dunedin's growth. Variation 2 is considering additional changes to address the shortfall in medium-term housing capacity.

7. MAJOR PROJECTS AND DECISIONS

This section shows the major infrastructure projects and key infrastructure decisions over the next 50 years. Significant future decisions are subject to the DCC's Policy on Significance and Engagement, and significance will be determined by the DCC in the context of decisions about the 10 year plan.

Major projects and key decisions	Issues in response to	Description	Options	Type	Cost	Expected timing	Carbon Neutrality
3 Waters Reform							
Decision on participation in Three Waters Reform Programme ⁺ (*service delivery reforms –proposed transfer of local government 3 waters assets and service delivery functions to new water services entities)	Regulatory, legislative and service delivery changes	<p>The DCC will decide whether to continue participating or 'opt out' of the Government's 3 waters service delivery reform programme in late 2021.</p> <p>The Government will promote an amendment to the Local Government Act 2002 that, if passed, would enable councils to transfer ownership of 3 waters assets and services to new entities. The proposed amendment will also provide a fit-for-purpose consultation process that sets out how local government will engage with communities and iwi/Māori about the reform proposals and make decisions.</p> <p>This decision is only for service delivery reform. Council is unable to opt out of the regulatory</p>	<p>Option 1: agree to continue DCC participation in the Three Waters Reform Programme. This is expected to lead to the transfer of DCC 3 waters assets and service delivery functions to a new water services entity in about 2023.</p> <p>Option 2: 'opt out' of the Three Waters Reform Programme. Retain 3 waters assets and service delivery functions within the DCC.</p>	Council decision.	Costs relating to making this decision, including costs related to running a public consultation process, are yet to be determined.	Late-2021	Likely no effect on emissions

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		elements of 3 waters reform.					
Projects to prepare for regulatory, legislative and service delivery changes	Regulatory, legislative and service delivery changes Planned increase in levels of service	Prepare the 3 Waters Group, the wider DCC and Dunedin for implementation of changes to 3 waters regulatory systems, and the potential transition to a new entity for 3 waters service delivery. The purpose of these projects is to establish certainty on the impact of reform and reduce associated risks. Other benefits include enabling a co-operative exit, leveraging value for Dunedin and setting up a new water services entity for success. The focus areas are contract and capital delivery, asset ownership, system planning, asset management, strengthening regulation and servicing growth.	Options to be developed via the various projects currently in planning stages.	To be determined	Costs will be determined based on strategic need and deliverability.	2021 - 2023	Likely no effect on emissions
System Planning	Regulatory and Legislative Changes Planned increase in levels of service,	3 Waters 'whole of system' strategic planning to develop baseline and long-term investment plans. Identify current and future issues, develop objectives and levels of service and create long and short list options for the systems. In the short	Options to be developed via the various projects currently in planning stages. A decision will be made on long term	Majority of planning is OPEX, produces CAPEX plans, amount to be determined.	Costs will be determined based on strategic need, affordability and deliverability.	2021 - 2051	Unknown

	Response to growth in demand, Public health and environmental outcomes Renewing and replacing assets Resilience to natural hazards	term, the baseline stage of this work informs the Metro WWTP Resilience Project. Long-term, strategic capital investment plans are produced. These will inform the 2024-34 10-year plan.	investment plans in the 2024-34 10 year plan.				
Network infrastructure							
The need for new capital expenditure will be reassessed following decisions on areas for new development in the 2GP and then Variation 2	Response to growth in demand Public health and environmental outcomes	Using a medium growth scenario, demand is estimated at 4,000 new dwellings between 2021 and 2031 and 7,000 new dwellings by 2071. Growth funding has been allocated to allow for substantial planning and design within the first 12-18 months, followed by a steady programme of capital delivery over the remaining term of the 10 year plan. Detailed planning is in progress, with the initial planning focussed on high priority areas that have been identified in consultation with developers. As the planning and design develops, the phasing of capital works may change	Options for responding to increase in demand will be developed once the 2GP and Variation 2 appeals process is completed. The costs included in the 10 year plan are an estimate of the 3 waters and transport network infrastructure requirements to meet the growth needs of 2GP and Variation 2.	To be determined	\$104 million to be funded by development contributions and debt financing where appropriate.	2021 - 2036	Likely increase in emissions

		through the annual plan process to meet development requirements.					
Water and Sanitary Services assessment	Public health and environmental outcomes	The Water and Sanitary Services Assessment is a district-wide assessment of the provision of water and sanitary services (such as wastewater, stormwater, public toilets and cemeteries). The assessment reviews the adequacy of existing systems in serviced communities and any health risks arising from the absence of systems in un-serviced communities. The most recent assessment was completed in 2007.	Options will be considered in the Water and Sanitary Services assessment.	To be determined	Costs will be determined based on the outcomes and associated Council decisions from the Water and Sanitary Services Assessments.	2021-23	Possible increase in emissions
Other Network Renewals	Renewing and replacing assets Public Health and environmental outcomes	These are ongoing pipeline renewals projects (not already identified below) across all 3 waters network assets. These renewals will be focused on: areas of high inflow and infiltration rates, aged assets, high break rates and customer complaints. This will address risks in water supply reliability and pressure, water quality, wastewater overflows, flooding and pipeline collapse.	The preferred option is a steady spend over the 10-year period.	Renewals	\$57 million (note the remainder of the renewals budget is allocated to specific network renewals identified elsewhere in the table).	2021-2031	Likely no effect on emissions

Minor Network Renewals	Renewing and replacing assets Public Health and environmental outcomes	Reactive, smaller scale network renewals and repairs across all 3 waters, mostly undertaken by the network contractor.	Reactive work is undertaken as required.	Renewals	\$50 million	2021-2031	Likely no effect on emissions
Water supply							
Water supply resilience	Response to growth in demand Public health and environmental outcomes Renewing and replacing assets Resilience to natural hazards	Projects intended to improve the ability of the water supply network to provide adequate safe potable water regardless of forecast changes in climate and population, and in the event of a natural disaster. Activities include the Ross Creek to Mount Grand transfer line, water treatment plant renewals and upgrades and pump station renewals and upgrades. Some minor renewals and monitoring work have commenced as part of the 3 waters reform tranche 1 funding.	Further work is needed on detailed design and deliverability, plus risks may materialise which would change the timing of some projects. Options are in development.	New Capital and Renewals	\$84.9 -\$76.7 million	2021-2031	Likely no effect on emissions
Dam Safety Action Plan	Renewing and replacing assets Resilience to natural hazards	Physical works required in order to continue to comply with Dam Safety requirements. Some work has commenced as part of the 3 waters reform tranche 1 funding.	Physical works are undertaken as required in order to meet dam safety requirements.	Renewals	\$4.4 -\$4.0 million	2021-31	Likely no effect on emissions

Water take reporting	Regulatory and Legislative Changes Public health and environmental outcomes	Recent amendments to the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 make real-time collecting and transmitting of water use to regional councils mandatory. Implementation is required by 2022 for takes ≥ 20 litres/second (20 of the DCC's 29 takes). For takes ≥ 10 but < 20 litres/second (eight of the DCC's 29 takes) real-time monitoring is required by 2024. For takes ≥ 5 but < 10 litres/second (one of the DCC's 29 takes), implementation is required by 2026. The DCC currently downloads and supplies water take data to the regional council on a monthly basis. Work is underway to investigate adjustments and/or upgrades needed to meet the new real-time reporting requirements.	Work is underway to respond to regulatory changes.	New Capital	\$750,000	2028/29 – 2030/31 2020–2026	Likely no effect on emissions
Smart Metering	Renewing and replacing assets	Replacement of existing manual read meters on commercial premises with 'smart' meters capable of being read remotely and connection to the Internet of Things allowing the DCC	Work is underway with completion expected in 2026.	New Capital	\$1.4 million	2021–2025 2024	Likely no effect on emissions

		and customers to view consumption in real time.					
Port Chalmers Water Supply	Renewing and replacing assets Response to growth in demand	Investigate options to rationalise water supply to Port Chalmers year-round from the metropolitan supply. Funding is based on this being feasible, however, if not, it will be redirected towards renewal/upgrade of Port Chalmers water supply infrastructure to meet demand. This will reduce water quality risks, improve supply reliability and reduce operational costs Renewals are needed at the treatment plant if it is not to be decommissioned in the near future as part of the Water Supply Resilience project.	This project is currently programmed for 2027 but if delivery capacity can be increased this project can be brought forward.	New capital	\$14.4 million	2027-2031	Likely decrease in emissions
Deep Stream and Deep Creek raw water pipeline renewals	Renewing and replacing assets Resilience to natural hazards	Renew Deep Creek and Deep Stream pipelines to Mt Grand Water Treatment plant (which provide majority of Dunedin's water) to increase resilience and renew ageing pipes. Investigation of options and design will commence in the final year of the 2021-31 plan with construction to commence after 2031. Seismic and	Timing of project will be confirmed by a formal condition assessment within the next 5 years. The renewal date will be brought forward if the pipe condition warrants it.	Option dependent	\$80 million	2030-2036	Likely no effect on emissions

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		geotechnical assessments undertaken and construction with seismically resilient materials where necessary.					
Water network renewals – Waikouaiti/Karitane	Renewing and replacing assets Public Health and environmental outcomes.	Renewal of water assets to mitigate increasing asset failure rates. This work was accelerated as part of the 3 waters reform tranche 1 funding.	Design underway with construction to commence once design completed.	Renewals	\$6.5 million	2020 – 2022	Likely no effect on emissions
Network renewals Kaikorai Valley / North East Valley	Renewing and replacing assets Response to growth in demand	Renew water network assets to improve water supply fire flows. Renewals for all three networks in these areas will be undertaken as part of the new pipeline renewals contract.	This is an ongoing project. Renewals will be focused on areas with aged assets, high break rates and customer complaints.	Renewals	\$17 million (over water supply and wastewater renewals)	2019 - 2023	Likely no effect on emissions
Network renewals Careys Bay	Renewing and replacing assets Public Health and environmental outcomes.	Renewal of water assets to mitigate increasing asset failure rates. Renewal of wastewater assets to reduce wet weather flows to the downstream network. Construction of stormwater network where required.	Construction underway.	Renewals and new capital.	\$5.4 \$5.5 million across all three networks.	2021-24	Possible increase in emissions
Network renewals Sawyers Bay	Renewing and replacing assets	Renewal of assets across all 3 waters networks to decrease wet weather overflows in the	Design underway with construction to commence	Renewals and new capital	\$5.9 million across all three networks	2020-23	Likely no effect on emissions

	Public Health and environmental outcomes.	wastewater network, improve the ability of the stormwater network to deal with forecast future flows and aged water infrastructure. This work was accelerated as part of the 3 waters reform tranche 1 funding.	once design completed.				
Central City renewals	Renewing and replacing assets Public Health and environmental outcomes.	Renewal, rationalisation and upgrade of 3 waters infrastructure in the area covered by the central city plan (George Street, Stuart Street, Bath Street, Princes Street, Rattray Street and associated streets).	Options are still being considered for 3 waters approach in these areas but range from full replacement of all assets in certain areas to replacement of aged, failing or under capacity assets only. The scale of investment needed from 3 waters is a significant portion of the overall budget in years 2-3 and so benefit compared to other risks needs to be considered in the options.	Renewals	\$37.9 million across all three networks	2021-27	Likely no effect on emissions

Tertiary Precinct renewals	Renewing and replacing assets Public Health and environmental outcomes	Renewal and upgrade of 3 waters infrastructure in the area covered by the Tertiary Precinct Project (Harbour Terrace, Union Street East, Clyde Street and Albany Street).	Options are still being considered for 3 waters approach in these areas but range from full replacement of all assets in certain areas to replacement of aged, failing or under capacity assets only.	Renewals	\$11.2 million across all three networks.	2031-2035	Likely no effect on emissions
Wastewater							
Metro WWTP resilience	Response to growth in demand Public health and environmental outcomes Renewing and replacing assets Resilience to natural hazards	Renewals and new capital at the metropolitan wastewater treatment plants and Musselburgh pumping station to: maintain levels of service, ensure ongoing compliance with, and renewals of, resource consents, and biosolids treatment, removal and disposal. Most urgent elements are prioritised for years 1-3 Some minor renewals and monitoring work have commenced as part of the 3 waters reform tranche 1 funding. This work targets risks to H&S, plant reliability, sludge treatment reliability and compliance issues from inadequate	Further work is needed on detailed design and deliverability, plus risks may materialise which would change the timing of some projects. Options are in development.	New capital and renewals	\$114 Million	2021-33	Likely no effect on emissions

		wet weather flow management.					
Rural wastewater schemes	Public Health and environmental outcomes Renewing or replacing assets Planned increase in levels of service Resilience to natural hazards	Network and WWTP investigation to inform upgrades to the rural networks prior to the discharge consents expiring to ensure they can meet current and anticipated enhanced effluent quality targets and minimise the effect the effluent has on the environment. These projects also assess the capability and capacity of the wastewater systems to meet current and future demands and levels of service.	Design for Seacliff and planning for Middlemarch WWTPs renewals is underway. Options for Warrington and Waikouaiti will be developed as plant consents become due in 2024 and 2027 respectively.	RNew capital and renewals	\$10.7 \$9.9 million	2021-27	Likely no effect on emissions
Pump station renewals	Renewing or replacing assets	A programme of risk-based renewal and upgrades to wastewater pumping stations to maintain levels of service and replace ageing assets.	This project is to address pump stations that have been identified as requiring urgent attention.	Renewals	\$2 million	2021-25	Likely no effect on emissions
Stormwater							
Stormwater Hydraulic Models	Public Health and environmental outcomes Planned increase in levels of service	This project is part of the baseline stage for stormwater system planning. Capital work is associated with the creation, calibration and/or updating of stormwater network models which will allow	The level of model development will be assessed as part of the gap analysis stage. Development of a stormwater	Renewals and/or New Capital	\$1 million	2021-24	Likely no effect on, or a decrease in emissions

	Resilience to natural hazards	investment options to be tested and compared.	system plan will provide the 3 Waters Group with the tools necessary to ensure the greatest return on future investment.				
South Dunedin Flood Alleviation	Public health and environmental outcomes Planned increases in levels of service Renewing or replacing assets Response to growth in demand Resilience to natural hazards	Capital works to mitigate flooding in South Dunedin and mitigate risks from climate change. Solutions are informed through the work on existing hydraulic models, flow monitoring and incorporation of groundwater models and climate change predictions. Includes work on Forbury and Portobello Road areas. This project forms part of the larger South Dunedin Futures programme which aims to effectively respond to the climate-driven challenges facing South Dunedin, whilst potentially resolving other issues such as poor-quality housing at the same time.	Hydraulic model enhancements and calibrations are underway, which will inform the capital investment options and enable decisions on the best way forward. These models will be supported by information on environmental effects, ensuring that constructed infrastructure meets community expectations. It is possible further funding changes will be	New capital and renewals	\$34.7 \$36.7 million	2021-31	Likely no effect on emissions

			needed as options progress to minimise the flooding risk.				
Mosgiel stormwater network improvements	Public health and environmental outcomes Renewing or replacing assets Planned increases in levels of service Resilience to natural hazards	Improvement of hydraulic models to enable optimal options. Improvements to Reid Avenue swale to reduce flooding. Identify and undertake where needed, optimal infrastructure investment to reduce flooding.	Updating of hydraulic models allowing for targeted renewals and replacement.	Renewals	\$21.419.5 million	2021-28	Likely no effect on emissions
Watercourse Programme (New Capital)	Renewing or replacing assets Public health and environmental outcomes Resilience to natural hazards Planned increases in levels of service	New approach to watercourse related flood and landslip problems, resolving priority issues caused by watercourse asset failure under private ownership within current budgets. This results in minor extension of DCC's network with localised benefits in management of stormwater and meeting stated levels of service. Reduces other hazard risks such as sinkholes and landslips.	Projects are prioritised based on a standard multi-criteria tool and managed via a set delivery framework. Budget requests to be made each year as part of the annual plan process. The asset ownership policy for watercourses is planned for	New Capital	\$3.5 million annually	2021-22	Likely no effect on emissions

			review, along with assessing financial impacts to the DCC, to enable to longer-term strategy for managing these assets.				
Transport							
Central City upgrade	Public health and environmental outcomes Renewing or replacing assets Planned increases in levels of service	Renewal, rationalisation and upgrade of transport infrastructure to improve safety, accessibility and amenity in the area covered by the central city plan (George Street, Stuart Street, Bath Street, Princes Street, Rattray Street and associated streets).	Options will be considered through indicative and detailed business cases. The George St upgrade detailed business case will commence in early 2021.	New capital and renewals	\$60 million	2020 –31	Likely decrease in emissions
Dunedin urban cycle ways	Public health and environmental outcomes Planned increase in levels of service	Arterials Cycleway: Close the gaps in the existing cycleway network.	Options are being considered through a detailed business case expected to be completed in 2021.	New capital	\$9 million	2021 –23	Likely decrease in emissions
		North East Valley Cycleway: Provide a cycleway to connect North East Valley with the city	Work on a business case will be started in 2021.		\$11 million	2023-2036	
		Tunnels Trail Cycleway: Provide a cycleway connecting Dunedin and	Preferred alignment options and a		\$27 million	2023-2041	

		Mosgiel through chain hills area and the Caversham tunnel.	single stage business case are in development.				
Tertiary precinct improvement	Public health and environmental outcomes Renewing or replacing assets Planned increase in levels of service	Renewal, rationalisation and upgrade of transport infrastructure to improve safety, accessibility and amenity in the area covered by the Tertiary Precinct Project (Harbour Terrace, Union Street East, Clyde Street and Albany Street).	Options are being considered through an indicative business case that is currently underway.	New capital and renewals	\$20 million	2031-36	Likely decrease in emissions
City to waterfront cycling / pedestrian connection	Public health and environmental outcomes Planned increase in levels of service	New cycling and pedestrian bridge connecting the city centre and waterfront. Existing connections (i.e. level crossing at St Andrews Street, heritage pedestrian over bridge behind Railway Station and route across Castle and Wharf Street) have a number of issues including accessibility for cyclists and mobility impaired users, directness of route and safety issues.	Concept options have been considered through an indicative business case. The project was put on hold following the COVID-19 pandemic. Detailed design options will be explored through the detailed business case phase.	New capital	\$20 million	2024 - 28	Likely decrease in emissions
Major centres upgrade	Public health and environmental outcomes	Improve the safety and accessibility of main streets within Dunedin's	Design and phasing options are still to be determined	New capital and renewals	\$9.4 million	2024 -31	Likely no effect on emissions

	Renewing or replacing assets	commercial shopping centres.					
St Clair Seawall	Renewing or replacing assets Resilience to natural hazards Public Health and environmental outcomes	Renew and upgrade the existing coastal defences at St Clair Beach to build resilience and to benefit public safety, access and environmental outcomes at the coast.	Design options are still to be determined. The project is likely to include replacement of the existing sea wall and/ or supplementary protection with sand retention structure(s) or similar.	New capital	100.3 million	2032-2036	Likely no effect on emissions
Mosgiel heavy Vehicle by-pass	Public health and environmental outcomes Planned increase in levels of service	Re-routing heavy vehicles along another route rather than through Mosgiel town centre.	Route and design options are still to be determined.	New capital	15 million	2042-2051	Likely increase in emissions
Dunedin central city bypass	Public health and environmental outcomes Planned increase in levels of service.	Re-routing state highway traffic away from the central city.	Route and design options are still to be determined.	New capital	35 million	2032-2041	Likely increase in emissions
Harbour Arterial corridor	Planned increases in levels of service.	Improvements to the Harbour Arterial corridor to improve safety and efficiency to provide an alternative to accessing the CBD from the south.	Single stage business case to be started in early 2021.	New capital	\$16.3 million	2021 - 2027	Likely increase in emissions

	Response to growth in demand.	The route will utilise the following roads (south to north): Caversham Motorway (SH1)/Andersons Bay Road intersection – Andersons Bay Road – Strathallan Street – Wharf Street – Thomas Burns Street – Ward Street – Ward Street overbridge – Frederick Street/Anzac Avenue intersection.					
Parking Management	Planned increases in levels of service Response to growth in demand.	Technology for wayfinding of parking, replacing parking meters with more efficient technology, consolidation of off-street parking, installation of technology to assist more reliable parking and a review of the parking costs across the city.	A parking management policy is in development. A single stage business case assessing options to improve the parking experience will begin in 2021.	New capital	\$10.9 million	2021 - 2026	Likely decrease in emissions
Mosgiel and Burnside Park & Ride	Planned increases in levels of service Response to growth in demand.	Installation of a park and ride at Mosgiel and Burnside to enable people to take the bus into the CBD.	A single stage business case will need to be developed.	New capital	\$10.2 million	2023 - 2029	Likely decrease in emissions
Corridor Safety Improvements and bus priority measures	Public health and environmental outcomes	Safety improvements for pedestrians in the CBD and bus priority measures especially around Princess Street.	A single stage business case will need to be developed.	New capital	\$6.4 million	2021 - 2024	Likely decrease in emissions

	Planned increases in levels of service Response to growth in demand.						
Central cycle and pedestrian safety	Public health and environmental outcomes Planned increases in levels of service Response to growth in demand.	Safety improvements and provision for pedestrians and cyclists on St Andrew Street from Anzac Avenue to Great King street, George Street to Cumberland Street, Anzac Avenue to the Harbour Circuit via Minerva Street.	A single stage business case will need to be developed.	New capital	\$4.8 million	2021 - 2026	Likely decrease in emissions
Bike Hubs	Public Health and environmental outcomes. Planned increase in levels of service.	Creation of bike hubs where people are cycling particularly to work.	A single stage business case will need to be developed.	New capital	\$2.45 million	2022 - 2027	Likely decrease in emissions
Capital renewal programme	Renewing or replacing assets.	Planned renewals to pavements, seawalls, retaining walls, footpaths and kerb and channel to maintain existing levels of service in the transport network.	Range of design options will be considered subject to alignment with NZTA's One Network Road Classification system.	Renewals	\$245.8 million	2021-2031	Likely no effect on emissions

8. APPROACH TO DELIVERING THE NEW CAPITAL AND RENEWALS PROGRAMME

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. The budgets increase rates and debt requirements, but do not exceed the limits over the next ten years.

8.1.1. Ability to deliver on the planned capital programme

Our planned capital expenditure programme represents a significant uplift from the last 10 year plan, with renewals a key area of focus. The challenge for the DCC will be the ability to deliver this programme, acknowledging that the annual targets are higher than previous achievements, and the lead time for delivery is always longer than anticipated. These risks will be managed through improved forward planning, early contractor engagement, innovative procurement strategies ([such as those outlined in SOLGM Agile Procurement in the Water Sector document](#)), and strong disciplines around project management and monitoring to ensure progress is on track.

[Covid-19 represents a risk to delaying the planned capital and renewals programme. Planning and design work for the programme is able to progress under any alert level through remote working arrangements. DCC will therefore continue to develop the forward work programme during any ongoing Covid-19 alert level restrictions. However, contractor resources are impacted in alert levels. Reduced productivity is expected in alert levels 2 and 3, and only essential projects can progress under alert level 4. The DCC will work closely with its contracting partners to define essential services and look for opportunities to manage supply chain and programme delivery risks. This is likely to include ensuring diversified supply chains from a geographic and supplier perspective, having strong Covid-19 protocols in place and enhanced workforce and labour planning.](#)

8.1.2. 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.

In our last 10 year plan, the debt limit was fixed at \$350 million. This limit is not sufficient to fund planned investment in capital projects and does not recognise the impact of changing costs and/or activity.

The gross debt limit for this 10 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.

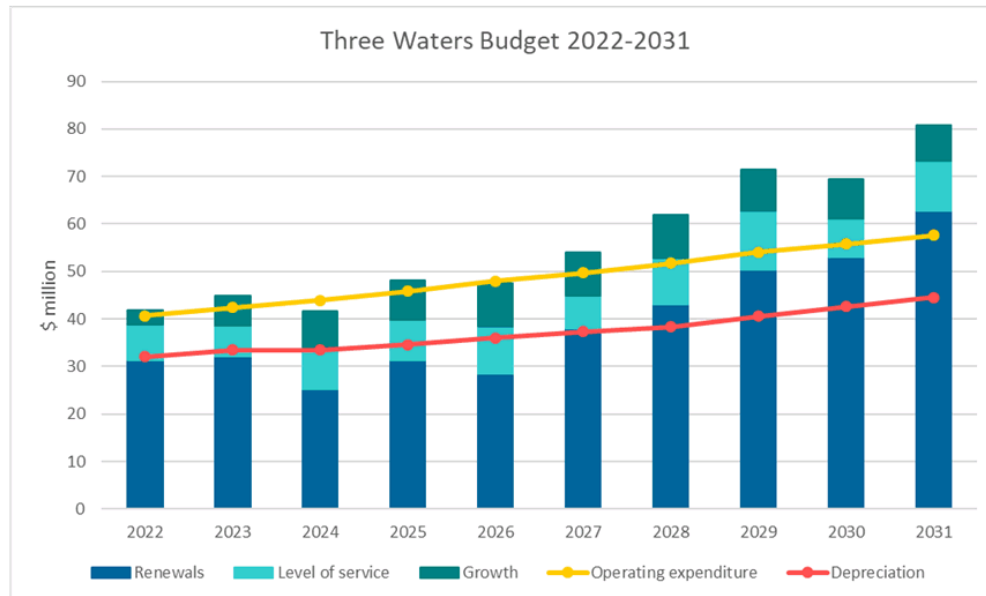
This debt limit is considered financially prudent, as it sits within the lending limits set by the Local Government Funding Authority (LGFA). The LGFA equivalent metric is based on net debt, where net debt is defined as gross debt less liquid financial assets and investments.

This section shows the planned capital, operating expenditure and depreciation for the first ten years.

8.1.3 Inflation

[Inflation has been applied to the capital estimates in line with the DCC's significant forecasting assumptions adopted for the 10 year plan 2021-31, and extrapolated out across the 50 year period of this strategy.](#)

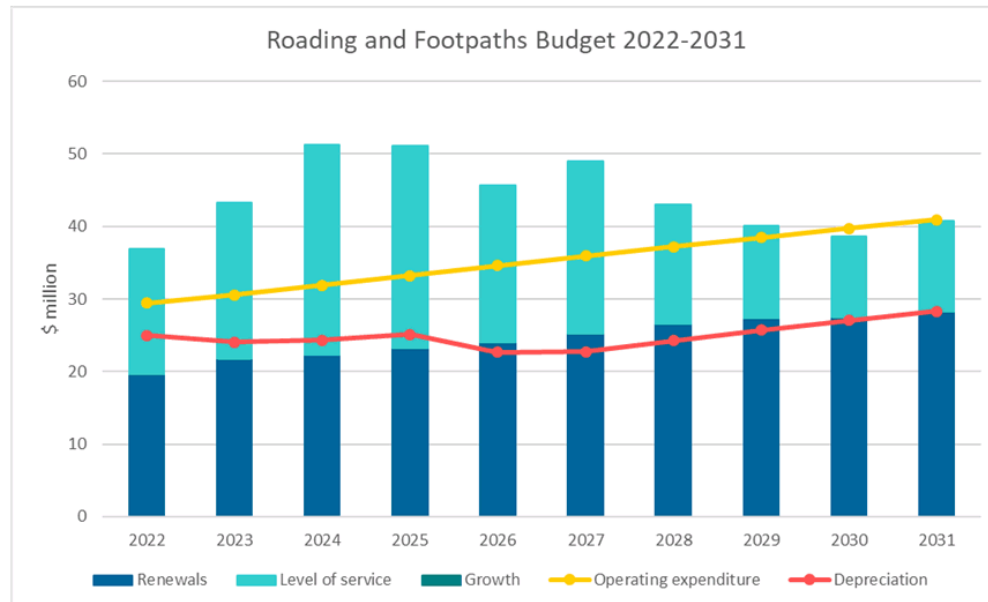
8.2. Three waters budget



3 Waters capital and operating expenditure budget

\$ million	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Operating expenditure	40.7	42.4	43.9	45.8	48.0	49.8	51.8	54.1	55.8	57.7	489.9
Depreciation	32.1	33.5	33.5	34.6	36.1	37.4	38.3	40.6	42.7	44.6	373.2
Total operating expenditure	72.8	75.9	77.4	80.5	84.0	87.1	90.1	94.7	98.4	102.2	863.2
Renewals	31.3	32.2	25.3	31.3	28.5	38.1	43.1	50.3	53.0	62.8	395.9
Level of service	7.5	6.4	8.4	8.5	9.9	6.8	9.8	12.5	8.2	10.5	88.4
Growth	3.0	6.3	7.9	8.2	9.1	9.1	9.1	8.7	8.3	7.6	77.4
Total capital expenditure	38.8	38.5	33.8	39.8	38.4	44.9	52.9	62.8	61.2	73.2	484.3
	41.8	44.9	41.6	48.0	47.5	54.0	62.0	71.5	69.5	80.9	561.7

8.3. Transport Budget



Roving and footpaths capital and operating expenditure budget

\$ Million	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
Operating expenditure	29.4	30.5	31.9	33.2	34.6	35.9	37.2	38.5	39.7	40.9	351.9
Depreciation	25.0	24.0	24.3	25.1	22.7	22.7	24.3	25.7	27.0	28.3	249.1
Total operating expenditure	54.4	54.6	56.2	58.3	57.3	58.6	61.5	64.2	66.7	69.2	601.0
Renewals	19.6	21.7	22.3	23.3	24.0	25.2	26.5	27.3	27.5	28.3	245.8
Level of service	17.3	21.6	28.9	27.8	21.8	23.8	16.4	12.8	11.1	12.4	193.8
Growth	-	-	-	-	-	-	-	-	-	-	-
Total capital expenditure	36.9	43.3	51.2	51.1	45.7	49.0	43.0	40.1	38.6	40.7	439.6

9. THE 50 YEAR PLAN FOR NETWORK INFRASTRUCTURE

This strategy acknowledges that there is an infrastructure renewals backlog, especially in 3 Waters. Renewals funding has significantly increased in the current 10 Year Plan for 3 Waters (an approximate 57% increase from the 2018-28 plan) in order to begin to address this shortfall, however the budget is still constrained due to affordability pressures, market and internal delivery capacities.

The DCC has identified work to address the highest priority risks and activities in most need of investment in years 1 to 5 of this 10 Year Plan. However, affordability pressures, market capacity and DCC project delivery capacity and capability mean investment trade-offs have been made. In this plan, renewals funding does not match depreciation until from 2027 due to affordability and deliverability. Renewals investment will be prioritised in the most need and highest risk areas while market and the DCC delivery capacity is established. The aim is to increase project delivery year on year and if an improved delivery rate is achieved, there is the option to re-allocate funds from later in the plan to earlier years through the Annual Plan process, providing further opportunities to tackle the renewals backlog.

The aim of the first three years is to increase the delivery market capacity, alongside improving the capability and capacity of internal DCC delivery functions to begin to address the renewals backlog. As detailed design of projects provides more clarity on scope, the estimated costs of renewal projects will become clearer and costs may change. As more clarity on regulatory changes emerges, alongside the capacity issues and cost constraints, the 2024 – 2034 programme will act as a 're-set' for both renewals and new capital. This programme will be based on addressing renewal backlogs as well as meeting enhanced treatment and discharge standards.

Large scale projects are difficult to anticipate in the longer term due to an increasing number of unknowns. However, within the timeframe of this 50 Year Plan, most 3 waters buildings and structures will require replacement or significant upgrades to ensure service levels are maintained. Further changes to the 3 waters and transport networks may also be required depending on demographic changes within the city. The impacts of climate change are likely to place pressure on the transport network's capacity to remain resilient in coastal, flood-prone, low-lying areas and will likely require some mitigation.

3 Waters investment in the short - medium term is to continue pipework renewals and large-scale plant renewals and focus on wet weather capacity upgrades at the WWTPs. These projects are listed in section 7. More clarity on regulatory changes and the outputs of the system plans will be available for the 2024-34 10 Year Plan and so it is expected that the medium to long term capital projects will evolve for the larger treatment plants.

Longer term, the replacement of the Deep Creek and Deep Stream raw water pipelines (including replacing the Taieri River pipe bridge) are planned, with design starting in the medium term. 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 increasing risk of failure denying the city of its two primary water sources.

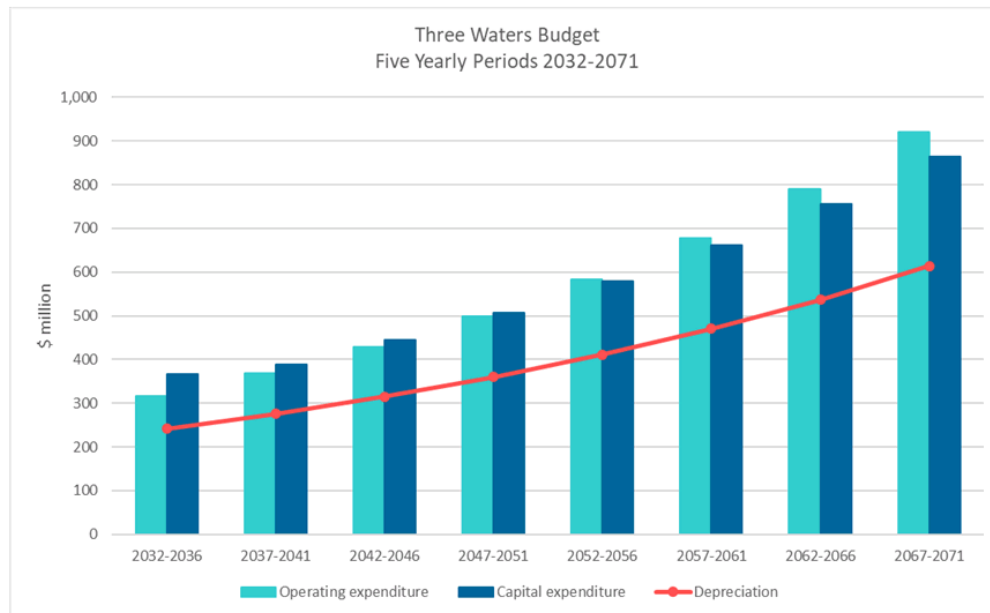
Significant 3 waters investment is required to service growth within the city, mainly within the networks. Most of the treatment plants have capacity to deal with forecast population changes, however some of the smaller water treatment plants will need upsizing. The solutions to the water treatment plants will be considered as part of the water system plan which may result in rationalising of plants to ensure they are able to comply with any new, more stringent water quality standards introduced through 3 Water's reform.

Transport renewals in the short – medium term will remain focused on maintaining the road network to appropriate levels of service. Investment decisions will be backed by condition assessments and prioritised according to the function of the road. Improved planning and increased investment will be required for assets such as sea walls, retaining walls and drainage assets in light of changing weather patterns. Larger projects look to address safety issues, improve the networks capacity and to provide transport choice for different modes that will facilitate a decrease in transport carbon emissions and a healthy connected city.

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

9.1. 3 Waters 50 year budget

Projected 3 waters capital and operating expenditure in 5 year bands for the 11 to 50 year period.

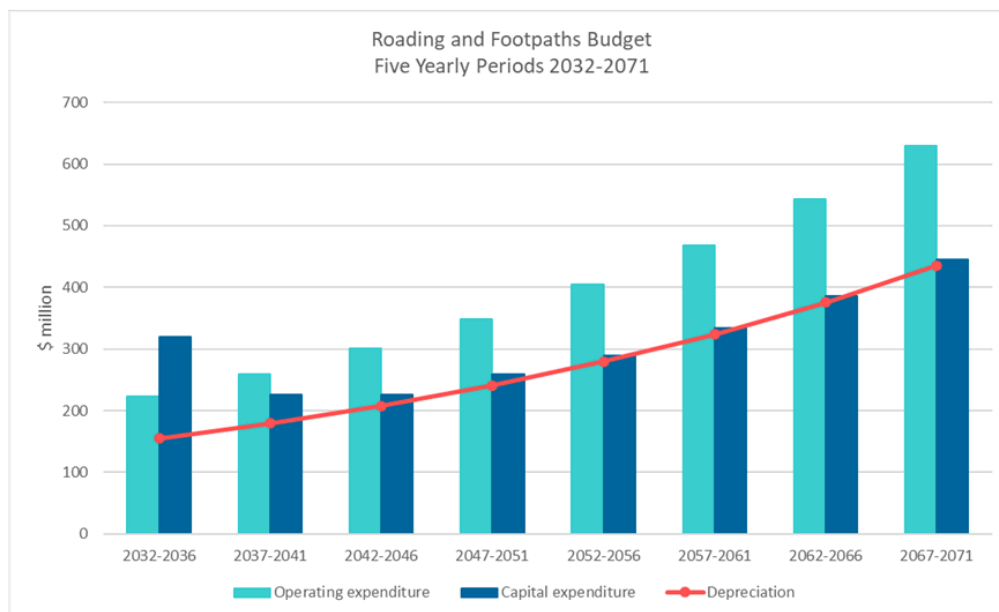


3 Waters capital and operating expenditure budget, five year bands for the 11 to 50 year period

\$ million	2032-2036	2037-2041	2042-2046	2047-2051	2052-2056	2057-2061	2062-2066	2067-2071	Total
Depreciation	241.5	275.9	315.2	360.1	411.4	470.1	537.0	613.6	3,224.8
Operating Expenditure	316.3	368.4	429.2	500.0	582.4	678.5	790.4	920.7	4,585.9
Capital Expenditure	367.2	388.7	444.1	507.4	579.7	662.3	756.6	864.4	4,570.3

9.2. Transport 50 year budget

Projected transport capital and operating expenditure in 5 year bands for the 11 to 50 year period.



Transport capital and operating expenditure budget, five year bands for the 11 to 50 year period

\$ million	2032-2036	2037-2041	2042-2046	2047-2051	2052-2056	2057-2061	2062-2066	2067-2071	Total
Depreciation	154.7	179.4	207.9	241.1	279.5	324.0	375.6	435.4	2,197.6
Operating Expenditure	223.8	259.5	300.8	348.7	404.3	468.6	543.3	629.8	3,178.8
Capital Expenditure	319.7	225.8	225.4	258.5	289.4	333.9	385.4	445.2	2,483.3