

Council Supplementary Agenda 24 June 2026

Meeting will be held at the Otago Regional Council Chamber, Aonui, 180 High Street, Dunedin, Otago, and live streamed on the [ORC YouTube channel](#).



Members:

Cr Hilary Calvert (Chair)
Cr Kevin Malcolm (Deputy Chair)
Cr Robbie Byars
Cr Chanel Gardner
Cr Neil Gillespie
Cr Matt Hollyer
Cr Gary Kelliher
Cr Michael Laws
Cr Andrew Noone
Cr Gretchen Robertson
Cr Alan Somerville
Cr Kate Wilson

Senior Officer: Richard Saunders, Chief Executive
Meeting Support: Kylie Darragh, Governance Support Officer

24 June 2026 10:30 AM

Agenda Topic	Page
Agenda	1
1. MATTERS FOR CONSIDERATION	3
1.1 Local Government Reform	3
The report provides Council with an overview of the local government reform programme and the voluntary Head Start reorganisation pathway. It sets out the functions, assets, and regional context relevant to how Otago Regional Council's (ORC) functions may be reorganised. It is intended to support a shared, well-informed understanding across the region as Otago councils consider whether to progress an outline proposal, and to inform any contribution that ORC makes to that work.	
1.1.1 ORC Core Functions 2026	26
1.1.2 Statement of Financial Position Apr-2026	38
1.2 South Dunedin Future - 3 Proposed Adaptation Futures	39
The purpose of this paper is to provide an outline and update on the South Dunedin Future (SDF) programme, present the latest technical reports relating to the three Proposed Adaptation Futures for South Dunedin, and seek approval of Councils to engage with affected communities and other stakeholders. At this stage, Councils have committed to completing the SDF programme only, with any future decisions on land use, infrastructure, and implementation subject to further consideration by Councils through long-term planning and financial processes.	

1.2.1	SDF Programme - Summary One-Pager (A3) (June 2026)	60
1.2.2	Proposed Adaptation Futures for South Dunedin - Overview Report	61
1.2.2.1	Proposed Adaptation Futures for South Dunedin - Part 1	61
1.2.2.2	Proposed Adaptation Futures for South Dunedin - Part 2	81
1.2.3	SDF Stormwater Modelling Report	99
1.2.4	SDF Stormwater Modelling Report - Appendices A-R (Maps)	131
1.2.4.1	SDF Stormwater Modelling Report Maps Part 1	131
1.2.4.2	SDF Stormwater Modelling Report Maps Part 2	140
1.2.4.3	SDF Stormwater Modelling Report Maps Part 3	149
1.2.4.4	SDF Stormwater Modelling Report Maps Part 4	158
1.2.4.5	SDF Stormwater Modelling Report Maps Part 5	167
1.2.4.6	SDF Stormwater Modelling Report Maps Part 6	176
1.2.4.7	SDF Stormwater Modelling Report Maps Part 7	185
1.2.5	SDF Stormwater Modelling Report - Appendix S (Schema Statement)	186
1.2.6	SDF Stormwater Modelling Report - Scoping Memo	189
1.2.7	SDF Groundwater Drainage Options Assessment Report	197
1.2.8	SDF Proposed Adaptation Futures Economic Evaluation Report	232
1.3	Recommendation to Exclude the Public	296
	That the public be excluded from the following items under LGOIMA 48(1)(a):	
	1.1 PE Minutes of Council	
	3.1 Appointment of Independent Member to Audit & Risk Committee	
1.3.1	Public Excluded Postamble	296

1.1. Local Government Reform

Prepared for: Council
Report No. GOV2603
Activity: Governance - Council
Author: Richard Saunders (Chief Executive)
Endorsed by: Richard Saunders (Chief Executive)
Date: 24 June 2026
Portfolio Leads: Chair Calvert and Cr Laws, Strategy and Customer

PURPOSE

- [1] The report provides Council with an overview of the local government reform programme and the voluntary Head Start reorganisation pathway. It sets out the functions, assets, and regional context relevant to how Otago Regional Council's (ORC) functions may be reorganised. It is intended to support a shared, well-informed understanding across the region as Otago councils consider whether to progress an outline proposal, and to inform any contribution that ORC makes to that work.

EXECUTIVE SUMMARY

- [2] The Government has recently kickstarted major reform of local government, and ORC's functions and assets will be reorganised under whichever pathway the region follows. This report explains the reform process, sets out what ORC does and what it holds, and identifies the features of those functions that should shape how they are organised under any new structure.
- [3] As part of the reform, the Government has introduced a voluntary Head Start pathway for councils to reorganise into new unitary authorities ahead of wider reform, with outline proposals due by 9 August 2026. Those regions not included in a Head Start proposal will be subject to a backstop process which is still to be defined by the Government.
- [4] The Government's stated preference is a single unitary authority for each region, combining regional and territorial council functions, with more than one considered only where a region is large and has significant complexity.
- [5] Otago Regional Council cannot submit a formal proposal in its own right. It can only support or contribute to one led by the territorial local authorities (TLAs). Under either pathway, the current elected regional council will not continue in its present form beyond the 2028 local government elections.

- [6] Through the Otago Mayoral Forum on 22 May 2026, the territorial authority mayors and the Council's Chair agreed to work together and to keep the Head Start option open. The Forum committed to an early engagement process alongside the collation of key financial data to help inform future decisions.
- [7] ORC delivers a broad range of statutory and community functions, from regional planning, environmental regulation, science and monitoring, and biosecurity, through to natural hazard management, flood protection, emergency management, maritime safety, and public transport. Many of these operate at catchment or regional scale because the issues they address cross territorial boundaries.
- [8] ORC holds total assets of \$1.14 billion, dominated by its \$788.1 million shareholding in Port Otago, alongside \$127.3 million of fixed assets, with a large proportion being flood protection infrastructure. How these assets, and the income from the Port Otago shareholding, would be held and applied under reorganisation is among the most significant financial questions reform raises for the region.
- [9] Reform offers gains in simplification, reduced duplication, and economies of scale. At the same time, several of ORC's functions, particularly water and flood management, biosecurity, environmental monitoring, and hazard work, depend on being managed at catchment or regional scale and on the continuity of long-term data and specialist expertise. The question for reform is therefore not whether these functions continue, but whether the proposed governance arrangements capture those gains while matching the scale of the problems and preserving the integration of the functions rely on.

RECOMMENDATION

That the Council:

- 1) **Notes** this report.

BACKGROUND

- [10] The Government is progressing two connected reform programmes that together reshape how regional functions are planned and delivered. The first replaces the Resource Management Act 1991 with new legislation, including the Planning Bill and the Natural Environment Bill, and introduces a new planning system built around regional spatial planning.
- [11] The second, Simplifying Local Government, reorganises councils into a smaller number of unitary authorities that combine the functions currently split between regional and territorial councils. These programmes do not stand alone. They intersect with emergency management reform, rates capping, and climate adaptation planning, and the cumulative effect on regional councils is substantial.

- [12] On 25 November 2025 the Government released its draft proposal, Simplifying Local Government¹. At that stage the draft proposed replacing regional councillors with a Combined Territories Board (CTB) made up of territorial mayors and tasked that board with developing a Regional Reorganisation Plan (RRP) to design the future system. The Government sought feedback before settling on the current reform pathway.
- [13] Each of Otago's six councils, the five TLAs and Otago Regional Council, made a submission. ORC lodged its submission on 20 February 2026. ORC agreed there is a need to simplify local government and supported reform where it reduces duplication and cost and strengthens public understanding, but it raised significant concerns with the draft model.
- [14] ORC strongly opposed replacing regional councillors with a CTB. Territorial mayors are elected to represent their own districts rather than the region, which ORC considered would create conflicts of interest and risk urbanising decisions in ways that weaken rural voices and the catchment-based environmental responsibilities regional governance carries. ORC argued that business-as-usual regional governance should remain with those holding a regional mandate for the duration of the current term, with commissioners only as a fallback.
- [15] ORC supported Regional Reorganisation Plans in principle but considered the redesign task better suited to an independent body, or to a South Island-wide process involving the Crown, regional and territorial councils, iwi/Māori, and independent experts. It argued that reorganisation should not be constrained by existing regional boundaries, so that catchment-scale issues and environmental systems crossing boundaries could be addressed, and that environmental protection and catchment outcomes should be made explicit in the assessment criteria. ORC also recorded that it values its long-standing relationship with mana whenua and supports iwi having a role in any future change mechanism.
- [16] Public consultation on the draft proposal closed on 20 February 2026. The Government received more than 1,100 submissions from councils, sector groups, iwi/Māori, and the public. Submitters broadly acknowledged the need to simplify local government, but many opposed the immediate replacement of regional councillors, raised concerns about council capacity given the parallel planning system reforms, and sought greater flexibility for locally led change.
- [17] On 5 May 2026 the Government confirmed its post-consultation approach, making five substantive changes to the November 2025 draft:
- A voluntary Head Start pathway was added, allowing groups of territorial and unitary authorities to submit reorganisation proposals now rather than waiting for the compulsory backstop process after 2028. The original proposal contained no early-mover mechanism.
 - The Combined Territories Board is no longer the confirmed model for the interim body that replaces regional councillors. The options now include a board of mayors, Crown commissioners, or a hybrid, with the specific model to be confirmed in 2027.

¹ [https://www.dia.govt.nz/diawebsite.nsf/Files/Local-Government-2025/\\$file/Simplifying-Local-Government-a-draft-proposal-27-November-2025.pdf](https://www.dia.govt.nz/diawebsite.nsf/Files/Local-Government-2025/$file/Simplifying-Local-Government-a-draft-proposal-27-November-2025.pdf)

- Regional councillors retain their seats until the 2028 local elections. The draft proposal would have replaced them immediately; under the revised approach they will not be re-elected in 2028, at which point the interim body takes over for councils not already reorganised through Head Start.
- The reorganisation focus shifted from Regional Reorganisation Plans developed by an interim board to councils voluntarily forming new unitary authorities that combine regional and territorial functions in a single body.
- Delivery of the new planning system was formally ringfenced as core business for all councils, regardless of which reform pathway they take.

[18] Several of these changes respond to themes ORC raised in its submission. Regional councillors holding a regional mandate now remain in place for the duration of the current term, and the Combined Territories Board model ORC opposed is no longer confirmed. The shift to a voluntary, council-led pathway also reflects the wider call across submissions for flexibility and local leadership. Other matters ORC raised, including the case for reorganisation unconstrained by existing regional boundaries and explicit environmental criteria, are partly addressed through the provision for cross-boundary proposals and the assessment criterion concerning catchment integrity, and will otherwise fall to be worked through in proposal development and detailed design.

[19] The Head Start pathway, its requirements, and its assessment criteria are set out in the Discussion section below.

DISCUSSION

[20] This section sets out the Head Start pathway and its assessment criteria, what reform means for the regional council, the region's position to date, and the functions, assets, and regional context that reform will affect.

Head Start Proposal

[21] The Government has published guidance for councils wishing to submit outline proposals under the Head Start voluntary reorganisation pathway, part of its broader Simplifying Local Government programme². The deadline for submissions is 9 August 2026, with Cabinet decisions on which proposals proceed to detailed design expected in September 2026. Proposals that are not submitted, or do not progress through assessment, will face the Government's backstop process following the 2028 local elections. Very few details on the backstop process are available.

[22] Head Start invites TLAs to propose amalgamation into new unitary authorities, taking on the functions currently held by regional councils. The policy document identifies a single unitary authority for the entire region as the most straight forward approach. The Government will also consider subregional proposals and cross-boundary groupings, provided these result in fewer local authorities overall and deliver clearer accountability for key functions including regional planning, transport, and catchment management.

² [https://www.dia.govt.nz/diawebsite.nsf/Files/Local-Government-2026/\\$file/Guidance-for-Head-Start-outline-proposals.pdf](https://www.dia.govt.nz/diawebsite.nsf/Files/Local-Government-2026/$file/Guidance-for-Head-Start-outline-proposals.pdf)

- [23] Proposals must involve at least two TLAs and represent either a majority of directly affected councils or their combined population. Individual councils, regional councils, and other organisations cannot submit formal proposals independently, though their support for or contribution to a proposal can be noted.
- [24] More than one unitary authority per region is only likely to be approved where the region is geographically large, contains many TLAs, and has significantly complex issues, and where the proposal clearly meets the criteria and does not fragment service delivery for key regional functions that require integration.

Level of detail expected

- [25] Outline proposals are intentionally light-touch, high-level, and strategic. Councils are asked to make the case for change using evidence they already hold, rather than generating new evidence or undertaking detailed modelling. For each criterion, a proposal should set out how it meets the criterion, why it is better than the status quo, the trade-offs and risks, and what still needs further work in the detailed design phase. The test at this stage is whether a proposal is workable in practice, not whether it is fully designed.

Assessment criteria

- [26] Proposals will be assessed by Ministry for Cities, Environment, Regions and Transport (MCERT) officials against five criteria. There are no strict thresholds, and Ministers are prepared to make trade-offs across criteria when weighing proposals as a whole. Cabinet makes the final decision on which proposals are agreed in principle.

- [27] The five criteria are:

- **Supports the new planning system** - proposals should make the new planning system easier to deliver, support a stable regional spatial planning process, and minimise disruption to reform work already underway. Where a catchment would be split, the implications and mitigations must be described. Note that any reference to a "region" in the Planning Bill or Natural Environment Bill applies to current boundaries, and councils must progress regional spatial plans on those boundaries regardless of Head Start outcomes.
- **Simplifies local governance** - proposals should reduce duplication, remove unnecessary governance layers, clarify accountability, and make the system easier for communities to understand. A single unitary authority is feasible in many cases; two or at most three may suit larger, more complex regions.
- **Economies of scale** - proposals should support effective delivery of regional functions such as transport and catchment management, and demonstrate responsible asset management, infrastructure investment, and financial sustainability. Efficiencies might come from governance, regulatory functions, emergency management, science and data capability, procurement, and shared services. Precise savings figures are not expected.

- **Maintains local voice** - proposals should show how communities will continue to be represented and heard in a larger system, including the high-level approach to elected representation, local or community boards, and opportunities for iwi/Māori to participate in decision-making. Full representation models and ward detail are not required.
- **Deliverability** - proposals should be realistic and capable of implementation before the 2028 elections, with a high-level transition approach, indicative milestones, key risks, and any support sought from Government. Alignment with related programmes such as Local Water Done Well and City and Regional Deals should be noted.

Treaty settlements

- [28] Proposals must either explain how existing Treaty settlement arrangements would transfer to new unitary authorities with equivalent effect or set out a plan to work through this with affected Post-settlement Governance Entities (PSGEs). Councils are not expected to have completed engagement or agreed any changes at the outline stage; the Crown retains responsibility for upholding settlements and will continue engagement after proposals are submitted.

Next steps if accepted

- [29] Proposals accepted in principle move to a detailed design phase (October 2026 to March 2027), covering spatial planning alignment, full mapping of regional functions to mitigate the risk of orphaned or under-resourced services, financial analysis of transition costs and longer-term sustainability, representative structures, transitional arrangements, and iwi/Māori and community engagement outcomes. Cabinet confirms final proposals in May 2027, with legislation expected to be enacted in Q1 2028 ahead of the October 2028 local elections.

Implications for the regional council

- [30] As set out above, Otago Regional Council cannot submit a formal proposal in its own right; its role is limited to supporting or contributing to one led by the TLAs, which the submitting councils can note.
- [31] If Otago's TLAs opt into Head Start and a proposal is approved, the regional council is reorganised into one or more unitary authorities before the 2028 elections, removing the need for regional council elections in the region.
- [32] If the region proceeds instead under the backstop, the Government intends to commence wider reform after the 2028 elections, with regional councillors replaced by an interim body such as a board of mayors, Crown commissioners, or a hybrid model. The exact timing of that change relative to the 2028 election has not yet been confirmed. Under either route, the current elected regional council does not continue in its present form beyond the reform.

Community involvement and decision-making

- [33] Communities will not vote directly on any proposal. Given the short submission window, councils are expected to provide local leadership on outline proposals, with the opportunity to consult communities before final Cabinet decisions in May 2027. Cabinet makes the final decision on which proposals proceed.

Otago's position to date

- [34] Otago's six councils each submitted on the Government's November 2025 draft proposal. At the Otago Mayoral Forum on 22 May 2026, the territorial authority mayors and the Chair of Otago Regional Council agreed to work together on reform and to progress work on a timeframe that keeps the Head Start option open.
- [35] A short community survey was undertaken by the Mayoral Forum across Otago from 27 May to 14 June 2026 to understand the outcomes residents are seeking, with the results informing the region's consideration of options. Reform costs, including modelling and engagement, are expected to be shared across the Otago councils and will arise regardless of which pathway the region follows.
- [36] Whichever pathway the region follows, reform will reorganise the functions ORC performs and which entity or entities deliver them in future. There will also need to be a redistribution of ORC's assets. Decisions of that kind are better made with a clear picture, which the remainder of this report sets out: the functions ORC delivers, the assets it holds, the people and geography of the region they serve and the characteristics of that work that point to the scale at which it is best delivered.

Core Functions of Otago Regional Council

- [37] Otago Regional Council performs a broad range of statutory and community functions that collectively manage Otago's natural environment, protect communities from natural hazards, and connect people and places. These functions are assigned by Parliament and reflect the inherent logic of regional-scale governance: many of the issues that matter most to Otago communities cannot be effectively managed within a single territorial boundary. The full description of each activity area and its scope is set out in Attachment 1.
- [38] Figure 1 shows the geographic spread of selected ORC activities across the region between 2022 and 2025. The data covers audit, bore, dairy, engineering and forestry inspections, biosecurity engagement and monitoring, catchment team engagements, consents issued and current consents, enforcement actions, pollution incidents, state of the environment monitoring sites, and environmental restoration project sites.

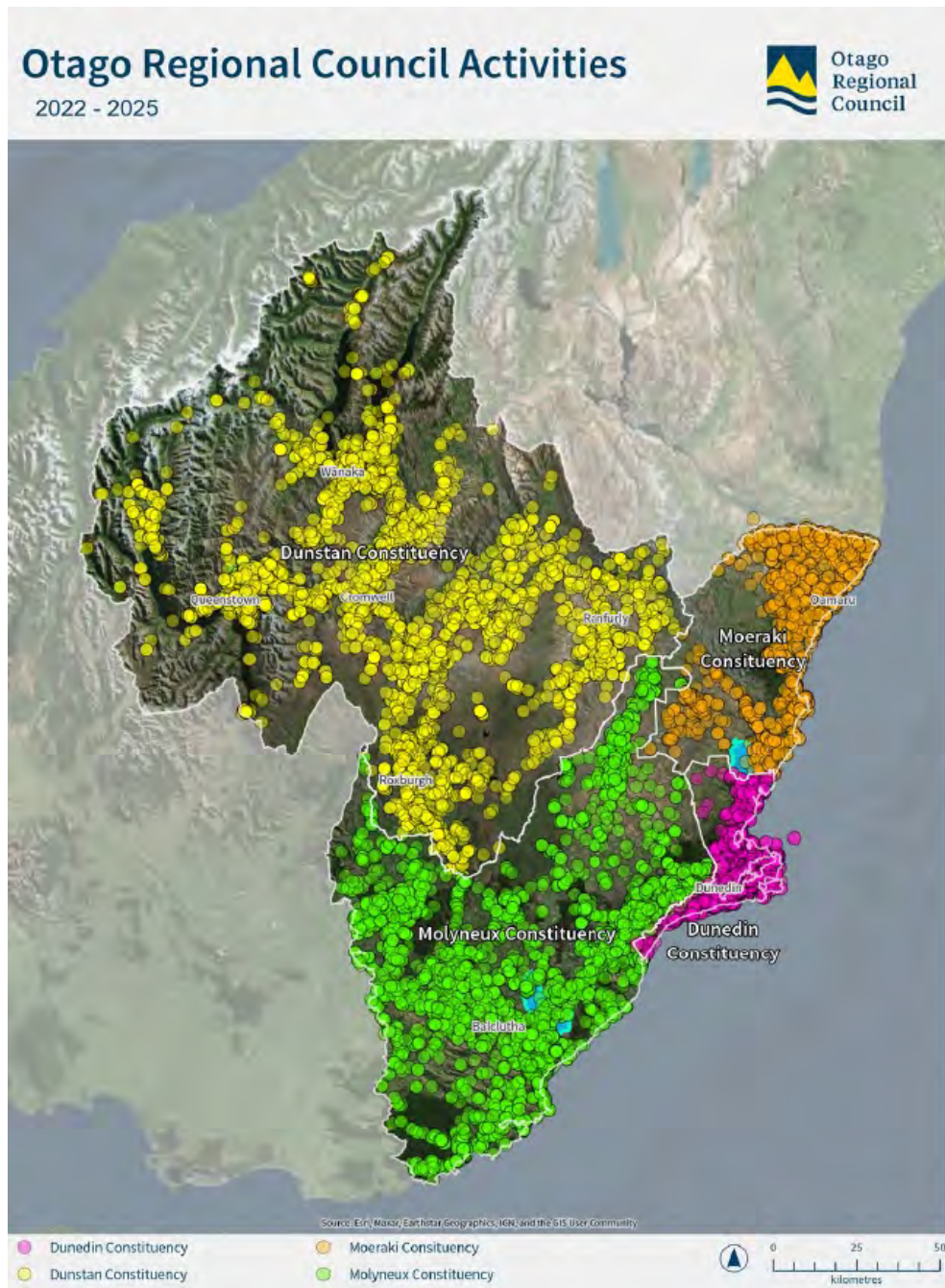


Figure 1: Span of Selected Activities Undertaken by Otago Regional Council across the Region

- [39] Regional planning establishes the policy framework through the Regional Policy Statement and regional plans for water, air, and the coast that gives direction to territorial authority district plans and underpins all resource management decisions across the region. It provides a single, consistent framework across Otago's districts and supports the TLAs own planning, including the Future Development Strategies for Queenstown and Dunedin. The Resource Management Framework is changing however

the Local Government Simplification policy sets out clearly the priority placed on implementation of the new planning system which includes a regional spatial plan and a natural environment plan, both of which closely align to ORC's current regional planning functions.

- [40] Environmental regulation gives effect to that framework through resource consenting, compliance monitoring, enforcement, and a 24/7 pollution response service, processing approximately 900 consent applications annually and ongoing monitoring of around 3,000 active consents. Environmental regulation also includes the harbourmaster function. Under the Maritime Transport Act 1994 ORC oversees maritime safety across Otago's harbours and coastal waters, except the Queenstown Lakes District which has its own harbourmaster, maintaining navigation aids, removing hazards, responding to marine oil spills, and working with Port Otago to keep commercial shipping in Otago Harbour safe.
- [41] Environmental monitoring and science underpins nearly all of ORC's work. The Council operates more than 350 monitoring sites across Otago covering river flows, water and air quality, groundwater, and coastal change, generating over 2,500 scientific tests per year. This environmental data infrastructure is a shared resource drawn on by TLAs, government agencies, and the public.
- [42] Biosecurity and biodiversity management addresses threats that spread across territorial boundaries without regard for local jurisdiction. ORC manages 51 designated pest species including Bennett's wallabies, wilding conifers, and aquatic pests through its Regional Pest Management Plan, undertaking over 3,000 pest inspections or monitoring visits annually.
- [43] Natural hazards and climate adaptation provides the hazard knowledge base that TLAs rely on for district planning, infrastructure decisions, and community risk management. ORC maps flood, landslide, coastal, and earthquake hazards across the region and leads long-term adaptation programmes such as South Dunedin Future and planning for communities at the Clutha delta.
- [44] Flood protection and river management involves the ownership and operation of substantial physical infrastructure serving approximately 43,000 hectares of rural and urban land: more than 218 kilometres of flood banks, 535 kilometres of drains, 14 pumping stations, and associated structures across seven major schemes. Emergency management sits alongside this, with ORC leading the Otago Civil Defence Emergency Management Group and coordinating response across all TLAs in the region.
- [45] Public transport rounds out ORC's community-facing functions. Under the Orbus brand, ORC plans, funds, and contracts 26 bus routes and a ferry service across Dunedin and Queenstown, carrying more than 5.3 million passenger trips per year. ORC also prepares the Regional Land Transport Plan that sets strategic direction for transport investment across the region.
- [46] These functions rest on a substantial base of physical infrastructure and financial assets. This section sets out those holdings and their value, because reform will decide where they sit and who is accountable for them.

Fixed Assets held by Otago Regional Council

- [47] ORC's fixed asset base is valued at \$127.3 million (Table 1). The largest share is flood protection infrastructure, which reflects ORC's core role managing rivers and drainage across the Otago region. Figures 2 & 3 show the geographic distribution of fixed assets.
- [48] Floodbanks are the single biggest category at \$34.3 million, with the Lower Clutha and Lower Taieri flood protection schemes holding most of that value. Structures add a further \$21.3 million, concentrated largely in the Leith Flood Protection Scheme in Dunedin. Protection works, including stopbanks and river control assets, contribute another \$11.4 million across several schemes.
- [49] ORC's property holdings total \$26.2 million, comprising \$17 million of investment property and \$9.2 million of operational land, alongside \$13 million in buildings mostly held within the property portfolio.
- [50] Plant, vehicles, and monitoring equipment account for \$10.7 million, spread across environmental science, hazards, harbour management, and operational support. Drainage assets such as drains, culverts, and bridges add \$8.6 million, primarily in the Clutha, Taieri, and West Taieri drainage schemes.
- [51] Transport infrastructure makes up \$1.5 million, covering public transport stops and infrastructure in Dunedin and the Wakatipu. Endowment land and computer software are minor at \$250,000 and \$42,000 respectively.

Table 1: Book Value of Otago Regional Council's Fixed Assets

Asset Category	Current Book Value
Bridges	\$ 2,677,151
Buildings	\$ 12,964,188
Computer Software	\$ 41,581
Culverts	\$ 2,165,268
Drains	\$ 3,768,751
Endowment Land	\$ 250,000
Floodbanks	\$ 34,294,266
Investment Property	\$ 17,000,000
Land	\$ 9,200,379
Plant and Vehicles	\$ 10,739,836
Protection Works	\$ 11,361,576
Structures	\$ 21,343,541
Transport Infrastructure & Hardware	\$ 1,458,344
Grand Total	\$ 127,264,881



Figure 2: Distribution of Otago Regional Council's Fixed Assets (Coastal Otago)

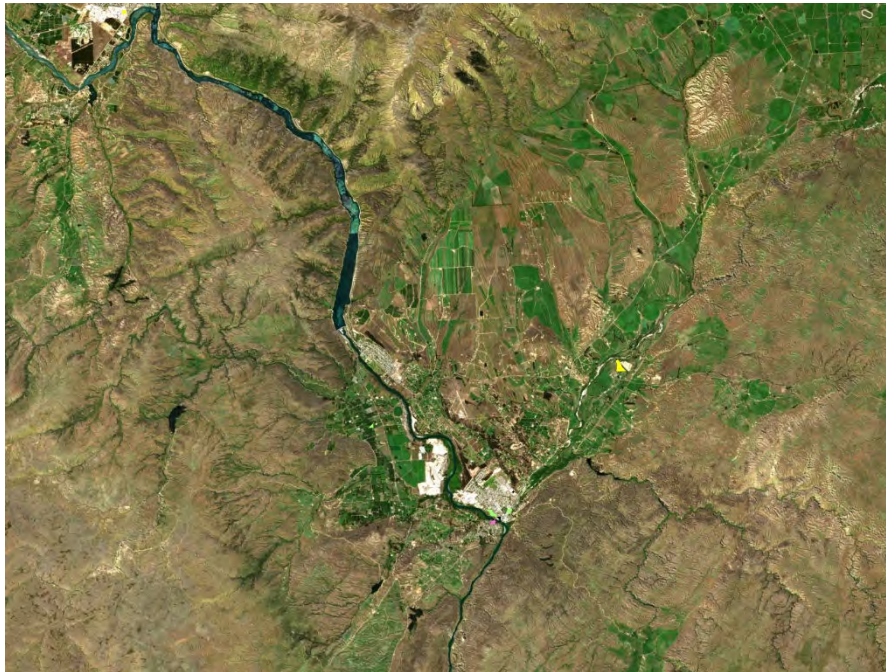


Figure 3: Distribution of Otago Regional Council's Fixed Assets (Central Otago)

Total Assets held by Otago Regional Council

- [52] ORC's total assets stand at \$1.14 billion as at 30 April 2026, against total liabilities of \$207.4 million, leaving net assets of \$935.4 million (see Attachment 2).
- [53] The asset base is dominated by ORC's shareholding in its subsidiary Port Otago, valued at \$788.1 million. Property, plant and equipment is the next largest holding at \$110.6 million, with investment property of \$17 million. Together these long-term holdings make up the bulk of the \$916.5 million in non-current assets.
- [54] Current assets total \$226.3 million. The largest component is a \$150 million related party receivable, the inter-entity loan to Port Otago, which falls due within twelve months. Cash holdings sit at \$20 million, other financial assets at \$32 million, trade receivables at \$21.4 million, and other current assets at \$2.8 million.
- [55] Total liabilities are \$207.4 million. Borrowings make up the largest share at around \$175.2 million, with \$155.2 million classified as current and \$20 million non-current. Trade and other payables account for a further \$28.4 million, and employee entitlements for \$3.8 million. Equity of \$935.4 million comprises \$808.2 million in reserves and public equity of \$127.2 million.
- [56] Port Otago is owned by ORC and is by far the Council's most valuable single asset. The dividend it returns helps fund ORC's activities and reduces the rates that would otherwise be required. How this shareholding, and the income it generates, would be held and applied under any reorganisation is one of the most significant financial questions reform raises for Otago. It is not settled at the outline stage and would be worked through in detailed design, but its size means it warrants attention early rather than late.

Regional Context

- [57] Otago is home to an estimated 253,900 people, spread unevenly across five districts that differ markedly in size, density, and growth. Dunedin City holds just over half the region's population at 132,800. Queenstown Lakes, at 53,800, is the next largest and has been among the fastest growing districts in the country, with a resident population that is small relative to its visitor numbers and servicing demands. Central Otago and Waitaki sit close to each other at 25,800 and 24,600, while Clutha is the smallest at 18,800.
- [58] This distribution is relevant to reform. The region combines one substantial urban centre with several smaller rural and high-growth districts whose needs and rating bases differ widely. Any future arrangement has to represent that range of communities and hold their confidence, which is one of the criteria proposals are assessed against.

Table 2: Estimated Residential Population

Estimated Residential Population	2026
Waitaki	24,600
Central Otago District	25,800
Queenstown Lakes District	53,800
Dunedin City	132,800
Clutha District	18,800
Otago	253,900

Source: Statistics New Zealand³

- [59] The region's age profile varies as much as its population distribution. Dunedin and Queenstown Lakes are the youngest districts, with median ages of 37.0 and 35.5 years, reflecting Dunedin's large student population and Queenstown's working-age tourism workforce. Central Otago and Waitaki are markedly older, both with median ages above 46. The regional median of 38.4 years sits close to the national figure, but this masks a near 11-year spread between the youngest and oldest districts. An older population profile in the rural districts has implications for service demand, workforce availability, and the rating base over time.

Table 3: Median Age

Area	Median age (years)
Central Otago District	46.7
Clutha District	42.7
Dunedin City	37.0
Queenstown-Lakes District	35.5
Waitaki District	46.1
Otago Region	38.4
New Zealand	38.1

Source: 2023 Census

- [60] Median personal incomes also diverge. Queenstown Lakes is well above the national median at \$52,600, while Dunedin is well below it at \$33,500, a figure influenced by the student population. Central Otago sits slightly above the regional median and Clutha and Waitaki below it. The regional median of \$39,100 is below the national figure of \$41,500. Income variation of this scale matters for any discussion of rating capacity and affordability, since the ability of communities to fund local services differs significantly across the region.

³ The regional total is calculated independently and may not equal the sum of sub-regional figures due to differences in rounding and estimation methodology used by Statistics NZ.

Table 4: Median personal income of adults

Area	Median personal income
Central Otago District	\$41,800
Clutha District	\$39,000
Dunedin City	\$33,500
Queenstown-Lakes District	\$52,600
Waitaki District	\$34,900
Otago Region	\$39,100
New Zealand	\$41,500

Source: 2023 Census

- [61] Rental costs follow a similar pattern. Queenstown Lakes has the highest median weekly rent in the region at \$600, half as much again as Dunedin and Central Otago at \$400 and \$390. Clutha, at \$250, has some of the most affordable rents in the country. The gap between the most and least expensive districts illustrates the different housing pressures councils face, from acute affordability and worker accommodation shortages in Queenstown Lakes to more low-cost markets in the south.

Table 5: Median weekly rent paid by households

Area	Median weekly rent
Central Otago District	\$390
Clutha District	\$250
Dunedin City	\$400
Queenstown-Lakes District	\$600
Waitaki District	\$296
Otago Region	\$400

Source: 2023 Census

- [62] Figure 4 shows the New Zealand Deprivation Index⁴ across the lower South Island, with each small area shaded by its decile.
- [63] The index is built from census data covering factors such as income, employment, qualifications, home ownership and household crowding, and ranks every small statistical area in the country from 1 (least deprived) to 10 (most deprived). Each decile holds a tenth of New Zealand's areas, so the colours show how each part of the region compares nationally rather than measuring hardship in absolute terms.
- [64] The pattern across Otago is uneven. Queenstown Lakes and much of Central Otago sit at the least deprived end of the scale, while higher deprivation concentrates in parts of coastal Waitaki, pockets of urban Dunedin, and rural communities in Clutha and along the Southland coast.

⁴ <https://www.stats.govt.nz/information-releases/new-zealand-index-of-socioeconomic-deprivation-2023-census/>

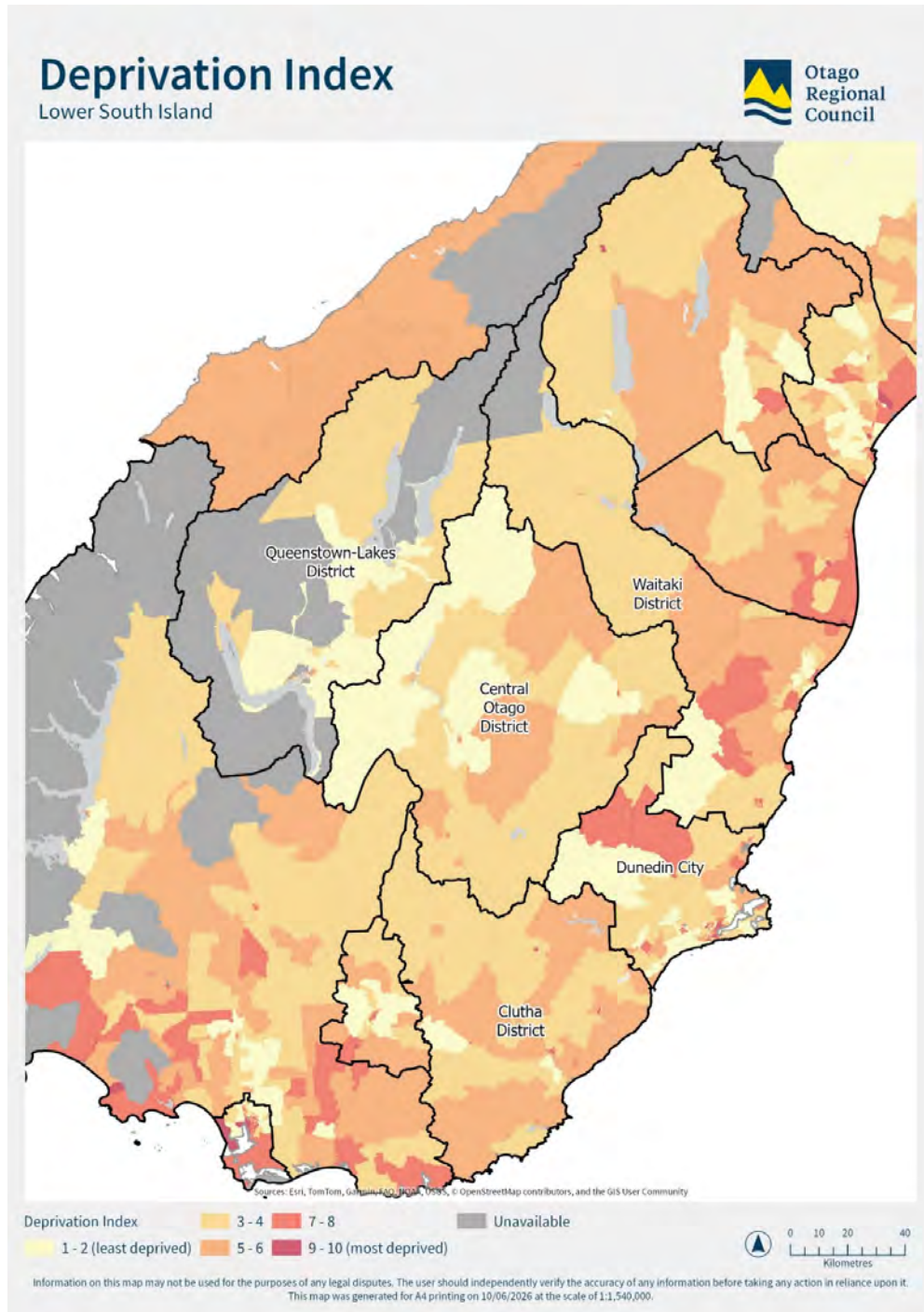


Figure 4: Deprivation Index Lower South Island

- [65] Educational attainment is comparatively even, with one exception. Dunedin and Central Otago sit at or near the national rate of 54 percent of adults holding a post-school qualification, while Clutha and Waitaki are lower at around 45 percent. Queenstown

Lakes stands out at 65.6 percent, consistent with its younger, higher-income population. The regional figure matches the national rate.

Table 6: Adults with a post-school qualification

Area	Adults with a post-school qualification
Central Otago District	52.8%
Clutha District	45.0%
Dunedin City	53.0%
Queenstown-Lakes District	65.6%
Waitaki District	44.9%
Otago Region	54.0%
New Zealand	54.0%

Source: 2023 Census

- [66] Otago is home to 23,910 Māori, around 2.7 percent of the national Māori population. Dunedin accounts for the majority at 13,914, with the remaining four districts each home to between 2,200 and 3,100 Māori residents. Kāi Tahu are mana whenua across the region, and any future governance arrangement will need to consider relationships with rūnaka and Māori communities in both urban and rural settings.

Table 7: Māori Population

Area	Māori population
Central Otago District	2,319
Clutha District	2,538
Dunedin City	13,914
Queenstown-Lakes District	3,060
Waitaki District	2,241
Otago Region	23,910
New Zealand	887,493

Source: 2023 Census

- [67] The region supports 34,611 businesses. Dunedin has the largest count at 13,050, but Queenstown Lakes is close behind at 11,517 despite having well under half Dunedin's population, reflecting the intensity of its visitor economy. Central Otago, Clutha, and Waitaki each support between 3,000 and 4,400 businesses, with primary sector activity prominent. Otago's districts are economically distinct, and reform proposals will need to serve communities whose economies range from a university city to a global tourism destination to productive rural hinterlands.

Table 8: Number of Businesses

Area	Number of businesses
Central Otago District	4,344
Clutha District	3,069
Dunedin City	13,050
Queenstown-Lakes District	11,517
Waitaki District	3,045
Otago Region	34,611
New Zealand	654,465

Source: 2025 Stats NZ Business Demography

- [68] The districts above are one way to divide Otago. Water divides it another way. A catchment is the area of land from which water drains to a common point, such as a river, lake, or harbour, so that rain falling anywhere within it runs through the same connected network of streams, rivers, and groundwater. ORC manages water and land at this scale rather than by district, an approach that reflects *ki uta ki tai*, the Te Ao Māori concept of caring for a catchment as one connected system from the mountains to the sea. The map below (Figure 5) shows Otago's major catchments.
- [69] These catchments do not follow district boundaries. The Clutha/Mata-Au and the Taieri/Taiari each span more than one district, and what happens in a catchment's upper reaches affects water quality, flooding, and supply for communities downstream in another district entirely. This is why several of ORC's functions, including water and land management, flood protection, and freshwater science, are organised around catchments rather than territorial boundaries. The environmental management section below explains why that alignment matters for how these functions are best delivered.

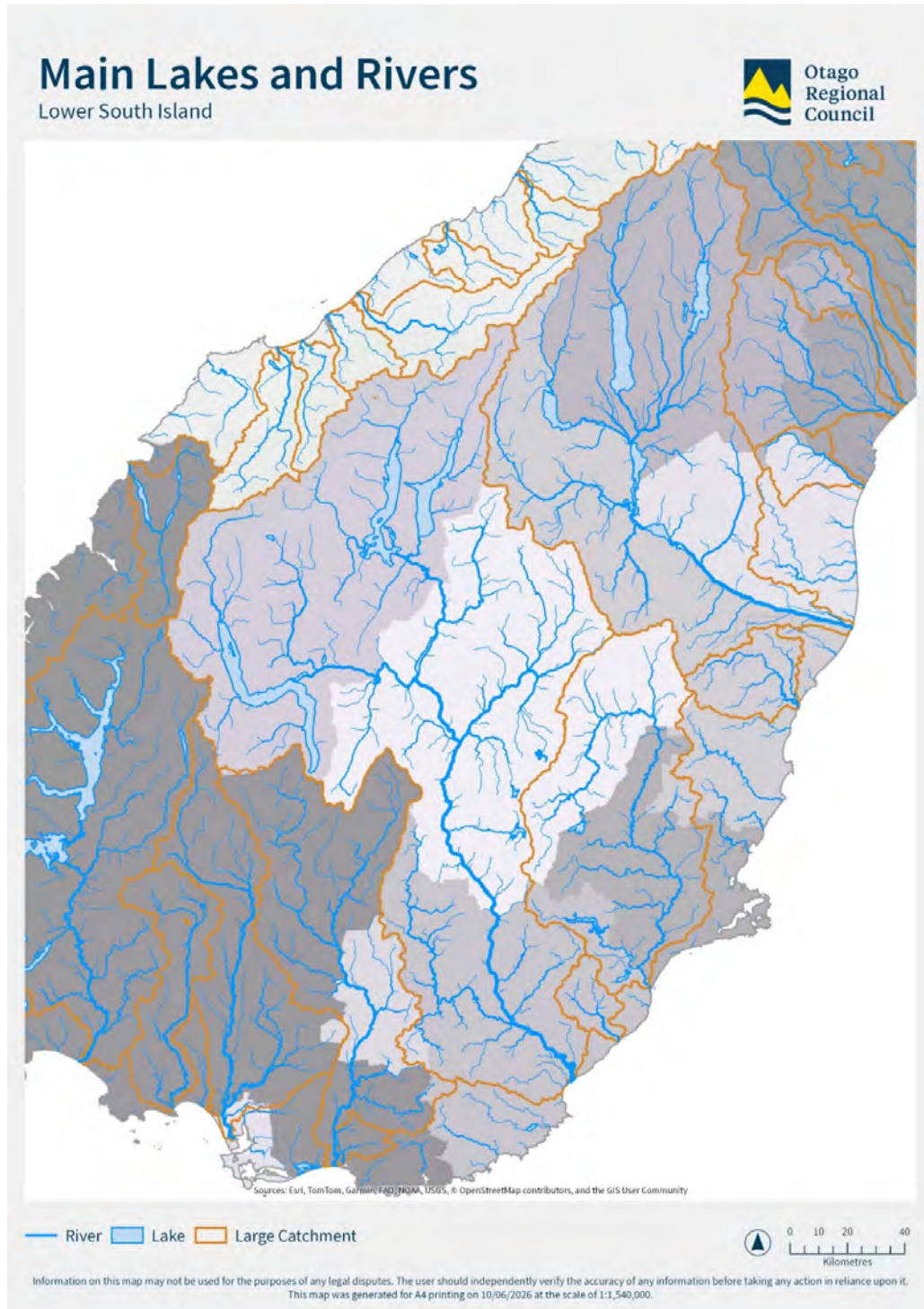


Figure 5: Lakes and Rivers of the Lower South Island

Environmental Management - Why Scale Matters

- [70] Reform is intended to simplify local government, and there is a genuine case for it. Fewer councils can reduce duplication, clarify accountability, and lower overheads, and larger organisations can capture economies of scale in procurement, systems, and shared services. This section addresses a narrower question: whether, for certain functions, the way they are organised, and not only how efficiently they are run, determines whether they work.
- [71] The regional-scale case reflects something more fundamental about the nature of the problems being managed. Natural systems do not organise themselves according to territorial boundaries. River catchments, pest populations, air quality zones, and natural hazard footprints all operate at scales that regularly exceed those of any single district.
- [72] Water management is particularly sensitive to issues of scale. Water moves through connected systems, from small catchments to whole river basins, so management works best when governance boundaries follow the water rather than cut across it. Where that alignment breaks down, the consequences are not theoretical. They show up in gaps in coverage, disputed accountability, and outcomes worse for communities than coordinated management would have produced.
- [73] The principle of matching governance scale to problem scale is well-established in environmental management practice. Flood protection is a chain of interdependent functions: monitoring tells you what the river is doing now; science tells you what it will do next; engineering translates that understanding into physical infrastructure; maintenance keeps the system working over decades. If that sequence is disrupted across multiple administrations, the links stop informing each other. Decisions about stopbank height and pump station capacity depend on understanding how water moves through the whole catchment, and that knowledge cannot be disaggregated to a district level without losing the coherence that makes it useful.
- [74] Kāi Tahu have long promoted the principle ki uta ki tai — from the mountains to the sea. It treats the environment as one connected system: what happens in the upper catchment shapes rivers, lakes, and the coast downstream, so the whole system must be managed together. The traditional areas of authority of papatipu rūnaka are defined by natural features such as rivers and mountain ranges, not by council boundaries, and several rūnaka hold interests that stretch across Otago and into Southland. The Otago Regional Policy Statement recognises this, requiring the environment to be managed in a way that supports the health of both the environment and the community - which depends on consistent management across the whole region. The Te Ao Māori conclusion is the same as the technical and economic one: environmental management works best, and Treaty of Waitangi obligations are most reliably met, when functions are organised at the scale of whole catchments and natural systems
- [75] Biosecurity illustrates the same principle from a different angle. Pest populations spread wherever conditions allow. Wallabies moving south from Canterbury, wilding conifers colonising tussock landscapes, aquatic pests moving between water bodies. Control programmes that operate comprehensively in one area but not the adjacent one provide only temporary protection.
- [76] Transboundary collaboration and co-management are considered essential for managing invasive species, because the interconnected nature of ecosystems means

that fragmented responses leave exactly the gaps that invasive populations exploit. The logic is straightforward: clear a property of wallabies and they return from neighbouring unmanaged land. The most effective response is one plan, one set of rules, and one coordinated programme across the full extent of the problem. Splitting that responsibility across smaller areas with different budgets and competing priorities does not reduce the pest. It relocates the failure point.

- [77] Scale also matters for environmental monitoring, which depends on continuity across time. Data sets need to be consistent and longitudinal. Fragmentation breaks that continuity in ways that often go unnoticed until the gaps are large enough to matter. Political and institutional disruption is one of the main threats to the consistent long-term records that environmental management and regulation rely on.
- [78] ORC's monitoring records extend back 50 to 60 years at some sites. That depth of record is what allows scientists to distinguish a 'bad year' from a genuine long-term decline and to identify a trend that demands a management response rather than a fluctuation that does not. Long-term monitoring programmes depend critically on institutional continuity. They can outlast the careers of the scientists who initiate them, and ensuring continuity of data quality and protocols across multiple generations of staff requires a stable institutional home with strong organisational memory. Split across multiple authorities with different methods, different budget cycles, and different institutional priorities, monitoring records become incomparable over time. Once a long-run baseline is broken, it cannot be reconstructed.
- [79] Fragmentation also imposes coordination costs that are often underestimated in proposals for structural change. Splitting functions across authorities does not make the need for coordination disappear. It converts what would otherwise be an organisation's internal decision into a negotiation between councils, carrying real costs in time, transaction costs, and disputed accountability, along with the persistent risk that matters sitting between jurisdictional seams receive inadequate attention from everyone.
- [80] Splitting water functions across multiple local agencies creates real costs: the time spent bargaining between them, the effort to enforce shared agreements, and the difficulty of keeping information consistent across organisations. These costs tend to grow over time. The informal goodwill that smooths relationships between councils early on gets tested as priorities diverge and budgets tighten.
- [81] There is also a workforce dimension that any structural arrangement must consider. The specialist expertise required for effective regional environmental management, including hydrologists, biosecurity officers, freshwater scientists, catchment advisors, hazard modellers, and harbourmasters, exists at ORC because it is pooled across a ratepayer base and geographic area large enough to justify those roles. Distributed across multiple smaller authorities, this expertise would be difficult to source independently, prone to costly duplication, or contracted out in ways that progressively erode the institutional knowledge on which good environmental decisions depend. Specialist roles are not simply transferable. They take years to build and, once lost, leave gaps that are slow and expensive to fill.
- [82] The risk of orphaned functions, where responsibilities fall between jurisdictions and receive inadequate resourcing from any of them, is particularly acute for functions

where costs are diffuse and benefits accrue over long timeframes. Biosecurity programmes, long-run environmental monitoring, hazard mapping, and catchment-scale water quality work all share this characteristic. They are costly to maintain, easy to underfund in any given annual planning cycle, and their value is only fully apparent when they are absent. These functions are most reliably sustained where responsibility for them is kept whole, under a single mandate across the full catchment area, with a dedicated funding base and the technical depth to understand and advocate for them, rather than divided among authorities each managing a fragment and each weighing those functions against more immediate local priorities.

- [83] Independent economic analysis, authored by Castalia⁵ and commissioned by Te Uru Kahika, reinforces these points through a formal institutional economics lens. Applying tests of subsidiarity, fiscal equivalence, economies of scope and scale, and accountability alignment, the report found that continued delivery of flood management, environmental monitoring, biosecurity, civil defence, and public transport at a regional scale makes sense for most functions where spillovers are material and catchment alignment is critical to effectiveness.
- [84] The report identifies strong economies of scope across flood management, environmental science, and emergency response, which are most effective when held within a single organisation for the reasons set out above. Splitting them across separate entities does not preserve those relationships. It severs them.
- [85] The report also identifies a genuine fiscal dimension to the biosecurity challenge. Regional ratepayers currently fund pest management programmes whose benefits extend well beyond regional boundaries: wallaby containment in Otago and Canterbury directly reduces the risk of spread into Southland, generating national economic and environmental value that regional rates alone do not recover. Sufficient scale and a regional mandate strengthen the case for national co-funding and help sustain programmes through budget cycles when local pressures might otherwise see them cut. Smaller authorities managing fragments of the same problem have weaker leverage on both counts.
- [86] Flood protection raises a related but distinct point. Once flood infrastructure is built, all properties and assets within the protected area benefit regardless of whether they contributed to its cost. This non-excludable character creates underinvestment risk whenever responsibility is divided, because no single authority bears the full cost of inadequate protection and the incentive to invest to the right level is diluted. This risk is lowest where accountability for the protected area is undivided and spans the whole catchment, backed by a dedicated rate base, rather than split among authorities each responsible for a portion.
- [87] The question in any reform discussion is therefore not whether these functions will continue to exist, but whether the governance arrangements proposed to deliver them are fit for purpose: whether they match the geographic scale of the problems, preserve the technical depth and institutional continuity that long-run environmental management requires, and eliminate rather than simply relocate the coordination burden that fragmented responsibility creates. These are the questions the

⁵ <https://www.teurukahika.govt.nz/news-and-publications/2025/november/castalia-report-functions-of-regional-and-unitary-councils-in-new-zealand-2025>

Government's own criteria place at the centre of any proposal, particularly the test that a reorganisation should not fragment regional functions that require integration, and the evidence above speaks directly to it. It does not argue for any particular entity, or for the regional council's continuation. It argues that, however the region is reorganised, these functions are best sustained when responsibility for them is held whole at catchment scale, backed by a dedicated funding base and the technical depth they require. That is the consideration this report asks Council and the TLAs to weigh as the region develops its position.

SUMMARY OF CONSIDERATIONS

COMMUNITY OUTCOMES

This work aligns with the following community outcomes from the ORC 2024-2034 Long-Term Plan:

Whole of Organisation

This work supports the whole organisation and, therefore, all Community Outcomes.

ALIGNMENT WITH CENTRAL GOVERNMENT LEGISLATION

This work is consistent with relevant central government policy and direction. Specifically, it aligns with Simplifying Local Government reform process.

ALIGNMENT WITH ORC INTERNAL POLICY

There is no specific ORC policy that is directly applicable to this work.

FINANCIAL CONSIDERATIONS

There are no financial considerations for this report. However, the report does outline the significant assets held by ORC that will be subject to the reorganisation process.

LEGAL/COMPLIANCE RISK

There is insignificant/minor risk that decisions arising from this report could expose Council to litigation, regulatory non-compliance, or breach of policy/legislation.

REPUTATIONAL RISK

There is insignificant/minor risk that decisions arising from this report could adversely impact Council's reputation or community trust.

CLIMATE RESILIENCE

The impacts of climate-related risks (e.g. flooding, drought, extreme winds, coastal erosion, wildfires) on this work has not been assessed.

CARBON EMISSIONS

The implications of this work on organisational or regional greenhouse gas emissions has not been assessed.

HE MAHI RAU RIKA: SIGNIFICANCE, ENGAGEMENT AND MĀORI PARTICIPATION POLICY

There has been no engagement with mana whenua or tangata whenua specifically for this work and no decisions of significance are sought through this paper.

ENGAGEMENT WITH MANA WHENUA

There has been no engagement with mana whenua or tangata whenua specifically for this work, but engagement will occur as part of the broader response to the reorganisation directive.

STAKEHOLDER ENGAGEMENT

No specific engagement has been undertaken for this report, but a community survey has recently been undertaken by the Mayoral Forum and will inform TLAs consideration of the future local government system.

COMMUNICATIONS

There are no communication implications or actions arising from this paper.

NEXT STEPS

[88] This report aims to provide information to contribute to broader discussions on the form and function of local government in the Otago region. No specific actions arise from this paper.

ATTACHMENTS

1. ORC Core Functions 2026 [1.1.1 - 12 pages]
2. Statement of Financial Position Apr-2026 [1.1.2 - 1 page]

Functions of the Otago Regional Council

New Zealand has 11 regional and six unitary authorities responsible for managing the natural environment at a scale that crosses territorial boundaries. This guide¹ describes the nine activity areas that reflect our statutory responsibilities assigned by Parliament and community's expectation for environmental stewardship, alongside an overview of how we operationalise these through our core functions.

The Otago Regional Council (ORC) covers one of New Zealand's most geographically diverse regions, from alpine lakes and Central Otago's dryland environments to coastal forests and the Otago Harbour. It manages natural resources on behalf of the Otago community through 12 elected councillors representing four constituencies: Dunedin, Moeraki, Dunstan, and Molyneux.

ORC has approximately 350 staff working across offices in Dunedin, Queenstown, and Alexandra, with seven operational depots throughout the region. It manages 134,000 rateable properties and operates a fleet of over 100 vehicles supporting its field operations.

ORC's vision is:

Our environment and communities are healthy and connected ki uta ki tai - from the mountains to the sea.

The following document outlines the core functions undertaken by ORC. In addition to these functions are a set of corporate and finance functions which supports the operation of the Council. These corporate and finance functions will be similar to those within TLA organisations.

¹ This guide is based on ORC's Annual Plan 2026-27, published plans and strategies, and the independent Castalia report on regional functions commissioned by Te Uru Kahika (October 2025).

1. Overview of ORC Functions

ORC's work is organised into nine activity areas that reflect our statutory responsibilities assigned by Parliament and community's expectation for environmental stewardship.

Activity Areas	Scope of work
Governance & Community Engagement	Council meetings, organisational strategy, iwi partnership, public communications, financial planning, legal services, and risk management. (no specific explainer on this as it is similar to TLA functions)
Regional Planning	Regional Policy Statement, regional plans for air, coast, and water, spatial planning support for territorial authorities, and RMA implementation.
Regulatory / Environmental Regulation	Resource consenting, compliance monitoring, enforcement, 24/7 pollution response, harbourmaster services, and public education on environmental rules.
Environmental Monitoring and Science	Environmental monitoring (350+ sites), freshwater, groundwater, soil, air and marine science, air quality monitoring, catchment management, community engagement and education, and supporting territorial authorities with environmental data and information.
Biodiversity & Biosecurity	Pest management (51 pest species), biodiversity monitoring, community conservation funding, and marine biosecurity programmes.
Natural Hazards & Climate Adaptation	Hazard mapping, flood forecasting and warnings, LiDAR surveys, climate adaptation planning, and technical support to territorial authorities.
Flood Protection, Drainage & River Management	Operation and maintenance of flood schemes (218km flood banks, 14 pump stations, 535km drains), river management, and post-flood repairs.
Emergency Management	Leading the Otago CDEM Group, coordinating emergency response across territorial authorities, 24/7 emergency capability, and community preparedness.
Transport	Orbus bus and ferry services (5.3 million trips per year), regional transport planning, fleet management, and Total Mobility scheme.

2. Core Functions - Regional Planning

Regional planning sets the policy framework that shapes how Otago's natural resources are used. ORC's regional plans and Regional Policy Statement provide the overarching direction that territorial authority district plans must give effect to. This is one of the most significant intersections between regional and territorial planning systems.

Regional Policy Statement

The RPS is the top-tier planning document for the region. It sets objectives and policies for managing natural resources, identifies significant resource management issues, and provides direction to all other plans in the region - both ORC's regional plans and territorial authority district plans. The current RPS is partially operative, with housing bottom lines recently inserted following central government direction. All appeals have been settled, and it is due to be made Operative.

Regional plans

ORC prepares and maintains regional plans for specific resource management domains:

- Regional Plan: Coast - manages activities in the coastal marine area.
- Land and Water Plan - in development but paused in 2025-26 following government directive pending RMA reform.
- Air Plan - similarly paused pending new legislation.

These plans contain rules that apply directly to landowners and resource users. They set environmental standards, define permitted and controlled activities, and establish the framework for resource consenting. Territorial authorities rely on these regional rules when processing district plan applications that involve water takes, discharges, air emissions, or coastal structures.

Spatial planning and urban development

ORC is actively supporting the development and review of Future Development Strategies in Queenstown and Dunedin - working with both councils on long-term growth planning. This includes enabling the transition to spatial planning under proposed legislation. ORC provides input into territorial authority district planning processes and responds to central government policy proposals that affect regional resource management.

Context: RMA reform and planning pause

Most of ORC's planning work has been paused in 2025-26 following a central government directive to hold plan development while RMA reform legislation progresses. ORC continues to provide statutory planning as required but has not filled vacancies in the planning team and has redeployed staff to other areas while awaiting policy direction. Planning work is expected to ramp up in 2026-27 once legislation has progressed. ORC planning staff are actively working with TLA staff to develop a plan to deliver the new Spatial Plan.

3. Core Functions - Environmental Regulation

ORC is the primary environmental regulator for Otago. It grants resource consents for activities affecting the region's natural resources, monitors compliance with consent conditions, enforces environmental rules, and operates a 24/7 pollution response service. This is the operational face of regional environmental management.

Resource consenting

ORC processes approximately 900 resource consent applications per year for activities including water takes, discharges to water and air, structures in the coastal marine area, riverbed disturbance, and certain land use activities. Consent processing involves technical assessment by ORC scientists and planners, public notification where required, and decision-making by either staff under delegated authority or by independent commissioners. The consent function is primarily funded through user-pays fees, reflecting the principle that those who use the environment for private benefit pay for the cost of assessment and monitoring.

Compliance and enforcement

ORC's compliance team investigates complaints, undertakes ongoing monitoring of approximately 3,000 active resource consents annually to check compliance with conditions, and takes enforcement action when needed. Enforcement tools range from informal warnings through to abatement notices, infringement fees, and prosecution. ORC takes formal enforcement action where environmental harm is serious or where consent holders repeatedly breach conditions. The team works alongside the consents team to close the loop - ensuring that the conditions imposed on consents are actually followed in practice.

Pollution hotline

ORC operates a 24-hour, 7-day-a-week pollution hotline (0800 800 033) for the public to report environmental incidents across air, water, and land. This service reflects ORC's role as the environmental watchdog - community members who observe pollution can trigger an immediate ORC response regardless of the time or day.

Public education

ORC provides workshops and information sessions on environmental rules and best practice alongside its regulatory work. Topics include dairy effluent management, winter grazing rules, consent processes, earthworks requirements, and contaminated land. The goal is to support compliance through education and understanding rather than relying solely on enforcement.

Harbourmaster

Under the Maritime Transport Act 1994, ORC appoints a Harbourmaster responsible for navigation safety in Otago's harbours and coastal waters. The Harbourmaster oversees commercial vessel movements in Otago Harbour (including cargo ships, cruise liners, and fishing boats), manages visitor moorings, issues event permits for on-water activities, monitors bar crossing conditions at river mouths, and maintains navigation aids. The harbourmaster service operates 24/7 for major incidents and undertakes more than 150 safety interactions with recreational boats each season.

4. Core Functions - Environmental Monitoring & Science

ORC holds Otago's environmental data infrastructure - the monitoring networks, scientific expertise, and long-term datasets that underpin all regional environmental decision-making. This capability supports not just ORC's own work but also provides the evidence base that territorial authorities, government agencies, and the public rely on to understand Otago's environment.

Scale of the monitoring network

ORC operates more than 350 environmental monitoring sites across Otago, covering:

- River flows, levels, and flood forecasting - more than 250 fixed sites for water quantity.
- Water quality - more than 100 river and lake monitoring sites, plus 25 summer swimming spots tested weekly for recreational safety.
- Groundwater - bores monitoring aquifer levels and quality.
- Air quality - 13 sites monitoring particulate matter (PM10 and PM2.5) to track compliance with the National Environmental Standards for Air Quality.
- Coastal - monitoring for sea level, coastal change, and estuarine water quality.

This network generates more than 2,500 science tests per year and feeds directly into ORC's Environmental Data Portal, which provides real-time and historical environmental information to the public.

Science capability

ORC employs scientists across hydrology, freshwater ecology, marine science, soil science, air quality, and related disciplines. This in-house expertise provides the technical foundation for consenting decisions, policy development, compliance assessments, and state of environment reporting. ORC scientists advise on complex technical questions - such as setting environmental flow limits for rivers, assessing the cumulative effects of discharges, or determining appropriate consent conditions for major projects. The science team also produces state of environment reports that track long-term trends in Otago's environmental health. These reports provide the evidence that both ORC and territorial authorities use to identify emerging issues and set priorities for future work.

Integrated catchment management

ORC's Integrated Catchment Management programme translates science into community action. Catchment advisors work directly with landowners and community groups to develop Catchment Action Plans - collaborative frameworks for improving water quality and biodiversity at a catchment scale. This on-the-groundwork bridges the gap between regional environmental standards and individual land management decisions. ORC also provides funding to Otago Catchment Communities to support community-led environmental projects.

Supporting territorial authorities

Territorial authorities utilise ORC's monitoring data and scientific expertise for their own decision-making. Examples include water quality data for wastewater discharge consents, hazard information for district plan provisions, and air quality data for assessing subdivision applications in areas with existing air quality problems.

5. Core Functions - Biodiversity & Biosecurity

Otago's biodiversity ranges from alpine ecosystems and dryland environments to coastal forests and internationally recognised wildlife on the Otago Peninsula. ORC manages pest plants and animals under the Biosecurity Act 1993, monitors indigenous biodiversity, and supports community conservation through funding and technical advice.

Regional Pest Management Plan

ORC's Regional Pest Management Plan identifies 51 species of plants and animals as pests in Otago due to their economic, social, cultural, or environmental impacts. The plan sets objectives for each pest species - ranging from eradication to containment to sustained control - and establishes rules that landowners must follow. ORC undertakes more than 3,000 pest inspections or monitoring visits per year to track pest distribution and support compliance with landowner obligations. The RPMP is currently under review.

Active pest programmes

Key pest management programmes include:

- **Wallabies:** Bennett's wallabies are spreading from Canterbury into Otago and pose a major threat to agriculture and indigenous ecosystems. ORC undertakes control operations and works with landowners to prevent further spread.
- **Wilding conifers:** self-seeding pines and other conifers are transforming Central Otago's tussock landscapes. ORC works within the National Wilding Conifer Management Programme to control spread and remove established trees.
- **Rabbits:** community-led management approach with ORC providing technical support and coordination.
- **Aquatic pests:** Check, Clean, Dry programme (co-funded with MPI) aims to prevent the spread of didymo and other freshwater pests between water bodies.
- **Marine biosecurity:** emerging programme responding to the threat of invasive marine species in Otago's harbours and coastal waters.

Biodiversity monitoring and strategy

ORC monitors indigenous biodiversity across the region, including threatened species assessments, ecosystem health monitoring, and tracking of indigenous vascular plants, bats, birds, and reptiles. The Otago Biodiversity Forum brings together agencies and community groups working on conservation. ORC is also developing a Biodiversity Strategy to guide its future work and investment in this area.

Community funding

ORC provides three funding streams for community environmental work: the ECO Fund for smaller projects, incentive funding for biodiversity enhancement on private land, and a large-scale Environmental Fund for significant multi-year projects. Recent examples include wetland restoration, riparian planting, and pest control programmes led by community trusts and catchment groups.

6. Core Functions - Natural Hazards & Climate Adaptation

ORC holds Otago's natural hazard knowledge base - decades of mapping, investigation, and modelling across earthquake, flood, landslide, tsunami, and coastal hazard risk. This technical capability supports both ORC's own infrastructure planning and provides the evidence territorial authorities rely on for their district plan provisions and infrastructure decisions.

Hazard mapping and assessment

ORC identifies and maps natural hazards across Otago through a combination of field investigation, remote sensing, and computer modelling. Current work includes flood hazard modelling for Lindsay Creek, the Water of Leith, Alexandra, and Middlemarch; debris flow hazard assessment in Teviot Valley and Roxburgh; coastal hazard mapping using LiDAR; and lake tsunami risk analysis. In 2025, ORC published the Otago Region Natural Hazards Exposure Analysis, a comprehensive assessment of community-level exposure to natural hazards across the region, available through an online map viewer.

This hazard information is used by territorial authorities when preparing district plans, assessing resource consent applications in hazard-prone areas, and planning infrastructure. ORC provides technical support to territorial authorities as an explicit output of this activity. The regional hazard knowledge base is a shared resource that prevents duplication and ensures consistency across council boundaries.

Flood forecasting and warning

ORC operates a 24/7 flood forecasting and warning service using data from its 350+ monitoring sites, weather radar, and rainfall forecasts. During flood events, ORC issues public warnings, provides real-time information to emergency services and infrastructure operators, and coordinates with territorial authorities on response. The October 2024 flood event demonstrated the value of this service as ORC's flood intelligence allowed pre-opening of river mouths, activation of pumps, and targeted warnings to at-risk communities.

LiDAR programme

ORC is undertaking a multi-year LiDAR (aerial survey) programme to capture high-resolution topographic data across the region. LiDAR provides the foundation for flood modelling, coastal change detection, landslide mapping, and infrastructure planning. The work is partly grant-funded and has been accelerated following the receipt of central government funding in 2025. The resulting data will be available to territorial authorities, infrastructure operators, and the public.

Climate adaptation programmes

ORC leads or supports long-term adaptation planning for communities facing compound climate and hazard risk:

- South Dunedin Future: multi-agency programme addressing low-lying land, shallow groundwater, and increasing coastal flood risk in South Dunedin. ORC's groundwater monitoring and technical investigations provide the scientific foundation for this work.
- Clutha delta: adaptation planning for communities at the delta, where sea level rise interacts with river flooding.
- Head of Lake Whakatipu: hazard and adaptation planning for Queenstown's lakefront communities.
- Roxburgh and Teviot Valley: debris flow and flood risk management in Central Otago.

7. Core Functions - Flood Protection & River Management

ORC provides flood protection and land drainage for approximately 43,000 hectares of rural and urban land across Otago. This function involves owning and operating substantial physical infrastructure such as floodbanks, pump stations, drainage networks, and river control structures built up over more than 80 years and managed for the benefit of protected communities.

Scheme infrastructure

ORC manages seven major flood protection and drainage schemes across the region:

- Lower Clutha scheme: protecting rural and urban land around Balclutha, with 110 km of flood banks, five pumping stations, four bridges, 153 km of drains, and 189 culverts.
- Lower Taieri scheme: protecting the Taieri Plains with 110 km of flood banks and associated infrastructure.
- West Taieri and East Taieri schemes: managing drainage across the Taieri catchment with pumping stations, drains, and bridges.
- Leith scheme: managing flood risk in Dunedin's urban area through concrete weirs, rock structures, and channelisation along the Water of Leith.
- Alexandra scheme: protecting the town from Clutha River flooding.
- Tokomairiro scheme: drainage infrastructure south of Dunedin.
- Shared operation of the Lower Waitaki schemes: protecting the Lower Waitaki Plain through river works including groynes, cross-banks, and riparian plantings, alongside three floodways.

In total, ORC manages more than 218 km of flood banks, 535 km of drains, 14 pumping stations, 42 bridges, and 369 culverts, plus weirs, walls, channel works, and erosion protection.

River management

Beyond the named schemes, ORC undertakes river management across Otago's waterways to maintain channel capacity, control erosion, and reduce flood risk. This includes vegetation management, gravel extraction, bank protection works, and channel maintenance.

Response and recovery

When floods occur, ORC mobilises response crews to operate pumps, close stop banks, monitor water levels, and coordinate with Civil Defence. After events, ORC assesses damage to flood scheme infrastructure and undertakes repairs.

Community engagement

ORC is establishing community liaison groups for each major flood scheme, starting with the Lower Taieri and Lower Clutha. These groups give communities a formal voice in how schemes are planned and maintained. The liaison group model reflects the long-term nature of flood protection, schemes-built decades ago must be maintained and adapted for changing conditions, and the communities protected by those schemes have a direct interest in how ORC manages that work. ORC also works with Environment Canterbury and the community via a Lower Waitaki River Management Group.

8. Core Functions - Emergency Management

ORC leads the Otago Civil Defence Emergency Management (CDEM) Group, which coordinates emergency management across all territorial authorities in the region. This function provides the organisational structure and capability for regional-scale emergency response, ensuring that when disasters occur, there is a coordinated approach across council boundaries.

CDEM Group structure

The Otago CDEM Group operates under the Civil Defence Emergency Management Act 2002. It is governed by a Joint Committee with membership from ORC and all Otago territorial authorities, and overseen by a Coordinating Executive Group of chief executives. ORC provides the administrative lead, staff the Emergency Coordination Centre, and employ the trained personnel who activate during emergencies.

Emergency Management Otago maintains staff in each territorial authority area, ensuring local relationships and knowledge alongside regional coordination capacity. During declared emergencies, a Group Controller coordinates the regional response and has powers to direct evacuations and resource deployment across territorial boundaries.

The four Rs

The CDEM Group Plan covers all four phases of emergency management:

- **Reduction:** working with territorial authorities and other agencies to identify and reduce risk through land use planning, hazard mitigation, and infrastructure investment.
- **Readiness:** preparing communities and agencies through training, exercises, public information campaigns, and maintaining response capability.
- **Response:** coordinating regional response during declared emergencies, operating the Emergency Coordination Centre, and supporting territorial authorities with incident management.
- **Recovery:** supporting communities to recover after events, coordinating welfare services, and managing the transition back to business-as-usual.

Regional coordination value

The regional CDEM model recognises that major emergencies rarely respect territorial boundaries. The October 2024 flood event affected Dunedin, Clutha, and inland areas simultaneously requiring coordinated response across multiple councils. The Group Controller role allows prioritisation of limited resources (such as portable pumps) across the region based on real-time assessment of need. Emergency Management Otago also maintains relationships with neighbouring CDEM groups, central government agencies, and emergency services that would be difficult for individual territorial authorities to replicate.

Current work

Active projects include an Otago-wide tsunami hazard study, upgrading the deployable command centre capability on CDEM response vehicles, and implementing new emergency management software systems. ORC is also working with territorial authorities on community response planning and public education to improve community preparedness before events occur.

9. Core Functions - Public Transport

ORC plans, funds, and contracts public transport services in Otago under the Orbus brand. This includes bus services in Dunedin and bus and ferry services in Queenstown — together carrying more than 5.3 million passenger trips per year. ORC also prepares the Regional Land Transport Plan and Regional Public Transport Plan that set strategic direction for transport investment across the region.

Service provision

ORC contracts 26 bus routes and a ferry service across Queenstown and Dunedin. Queenstown services carry approximately 1.9 million trips per year and are expanding to meet the needs of one of New Zealand's fastest-growing urban areas. Dunedin services carry approximately 3.4 million trips per year, linking suburbs to the city centre, university, and hospital. The Bee Card provides integrated ticketing across both networks, with more than 160,000 registered users and another 190,000 unregistered cards in circulation.

ORC also manages the Total Mobility scheme, which provides subsidised transport for people with disabilities who cannot use conventional public transport. Demand for the scheme is growing reflecting both demographic change and increased awareness of the service.

Fleet and infrastructure

ORC is progressively electrifying its bus fleet to reduce emissions and improve urban air quality. Real-time bus tracking is now available in both Dunedin and Queenstown through the Transit app. ORC is also preparing for the transition to the National Ticketing System, a central government initiative to standardise ticketing across New Zealand's public transport networks.

Regional transport planning

ORC prepares two key statutory plans that shape transport investment across Otago:

- Regional Land Transport Plan (RLTP): sets 30-year strategic objectives and a 10-year programme of transport projects for the region. Prepared by the Regional Transport Committee, which includes representatives from all Otago territorial authorities and Waka Kotahi. The RLTP determines which projects are eligible for National Land Transport Fund subsidies.
- Regional Public Transport Plan (RPTP) 2025-2035: adopted in June 2025. Sets objectives, policies, and service standards for public transport in Otago for the next decade. Includes updated policies on fares, funding, and service design following the Government Policy Statement on land transport 2024.

Emerging work

ORC is investigating transport options for commuters between Central Otago and Queenstown and Oamaru and Dunedin, developing a Regional Public and Active Transport Connectivity Strategy, and exploring community transport models to serve areas where conventional public transport is not viable. These initiatives reflect the challenge of providing transport services across a large, geographically diverse region with pockets of high demand separated by long distances.

Funding

Public transport is co-funded through National Land Transport Fund subsidies from Waka Kotahi (the largest component), regional rates, and fare revenue.

10. Core Assets - Port Otago

Port Otago Limited is 100% owned by ORC. It operates as a commercial port company and is one of New Zealand's primary export gateways for the lower South Island. Port Otago provides long-term dividend income that partially offsets the rates burden on Otago communities

Operations

Port Otago operates a deep container port at Port Chalmers and a bulk port in Dunedin, handling containerised freight, bulk commodities, and cruise ship visits. It also operates two wharf-side cold storage facilities and owns a property portfolio in Dunedin, Auckland, and Hamilton. The company employs its own staff and operates independently of ORC.

Financial contribution

In the 2024-25 financial year, Port Otago delivered a net profit after tax of \$64.6 million and paid an \$18 million dividend to ORC. This income flows into ORC's general revenue and helps offset the general rates requirement. Port Otago has provided consistent dividend income to ORC over many years, making it a distinctive feature of Otago's regional governance and funding structure.

Governance

Port Otago is governed by an independent board and makes commercial decisions without direction from ORC councillors. The relationship between ORC and Port Otago is set out in a Statement of Intent that defines performance expectations, dividend policy, and reporting requirements. ORC's ownership of Port Otago dates to the 1989 local government reforms, when port assets were transferred from the Otago Harbour Board to the newly formed Otago Regional Council.

11. Funding & Revenue

ORC uses multiple funding mechanisms, each designed to match who pays with who benefits. The mix of funding sources varies by activity, reflecting statutory requirements, equity principles, and practical considerations about cost recovery.

General rates

Paid by all ratepayers in Otago based on capital value. General rates fund activities with broad community benefit where specific beneficiaries cannot easily be identified. This includes environmental monitoring, regional planning, science, emergency management, governance, and most natural hazards work. The majority of ORC's operating expenditure is general rates funded.

Targeted rates

Paid only by ratepayers in specific areas who directly benefit from a service. The primary example is flood protection. Landowners within each flood scheme pay a targeted rate based on the level of protection they receive. Targeted rates ensure that those who benefit from expensive infrastructure pay for it, rather than spreading the cost across ratepayers who receive no benefit.

Fees and charges

Regulatory costs are largely paid by consent applicants. This user-pays mechanism reflects the principle that the cost of assessing environmental impacts should fall on those creating those impacts, not on the general ratepayer. Consent and compliance fees cover a significant portion of the function's operating costs.

Subsidies and grants

Central government subsidies from the National Land Transport Fund co-fund public transport services. Project-specific grants support biodiversity work, flood protection capital works, and LiDAR surveys. Grant income is variable year to year and depends on both ORC's project pipeline and central government funding priorities.

Port Otago dividend

Port Otago's dividend has grown to \$20 million per year towards ORC's general revenue. This income helps subsidise the general rate revenue and therefore reduces the rates burden on the Otago Community.

Reserves

ORC uses reserves to smooth the rates impact of large, irregular capital expenditure. Building reserves in years when costs are lower and drawing on them for major projects avoids sharp year-to-year rates increases. Flood protection capital works and transport infrastructure are the primary users of reserve funding.

The combination of these funding sources reflects the diversity of ORC's functions from public goods like environmental monitoring (general rates funded) to services benefiting specific groups (targeted rates and fees) to activities co-funded by central government (transport, biosecurity, hazard mitigation). The funding model balances equity, efficiency, and practical constraints on what can realistically be recovered through targeted mechanisms.

STATEMENT OF FINANCIAL POSITION

AS AT 30 APRIL 2026	April	2025		2026
\$'000	Current Year	Prior Year	Year to Date	Current Year
	Actual	Actual	Variance	Budget
Assets				
CURRENT ASSETS				
Cash and cash equivalents	20,033	18,387	1,646	2,455
Trade and other receivables	21,405	15,854	5,551	18,180
Property held for sale	0	0	0	0
Related party receivable	150,000	57,102	92,898	0
Other financial assets	32,006	29,737	2,269	29,181
Other Current Assets	2,836	1,281	1,556	1,433
Borrower Notes	0	125	(125)	0
Total Current Assets	226,281	122,486	103,795	51,249
NON-CURRENT ASSETS				
Shares in subsidiary	788,120	788,120	0	780,239
Property, plant and equipment	110,578	104,523	6,055	109,835
Intangible assets	46	157	(111)	2,025
Related party receivable	0	92,832	(92,832)	150,088
Investment Property	17,000	17,000	0	17,134
Borrower Notes	750	500	250	500
Total Non-Current Assets	916,494	1,003,132	(86,638)	1,059,821
Total Assets	1,142,775	1,125,618	17,157	1,111,070
Liabilities				
CURRENT LIABILITIES				
Trade and other payables	28,361	20,575	7,786	22,594
Employee entitlements	3,845	4,602	(758)	2,716
Borrowings	155,200	67,169	88,031	69,878
Total Current Liabilities	187,406	92,346	95,060	95,188
NON-CURRENT LIABILITIES				
Non current borrowings	20,000	107,832	(87,832)	110,438
Total Non-Current Liabilities	20,000	107,832	(87,832)	110,438
Total Liabilities	207,406	200,178	7,228	205,626
NET ASSETS	935,369	925,440	9,929	905,444
Equity				
PUBLIC EQUITY				
Public Equity	127,154	114,124	13,030	120,576
Total Public Equity	127,154	114,124	13,030	120,576
RESERVES				
Reserves	808,215	811,316	(3,101)	784,868
Total Reserves	808,215	811,316	(3,101)	784,868
TOTAL EQUITY	935,369	925,440	9,929	905,444

1.2. South Dunedin Future - 3 Proposed Adaptation Futures

Prepared for:	Council
Report No.	S&R2614
Activity:	Natural Hazards
Author:	Jonathan Rowe (Programme Manager)
Endorsed by:	Tom Dyer (General Manager Science and Resilience)
Date:	24 June 2026
Portfolio Leads:	Cr Kelliher and Cr Robertson, Science and Resilience

PURPOSE

- [1] The purpose of this paper is to provide an outline and update on the South Dunedin Future (SDF) programme, present the latest technical reports relating to the three Proposed Adaptation Futures for South Dunedin, and seek approval of Councils to engage with affected communities and other stakeholders. At this stage, Councils have committed to completing the SDF programme only, with any future decisions on land use, infrastructure, and implementation subject to further consideration by Councils through long-term planning and financial processes.

EXECUTIVE SUMMARY

- [2] The SDF programme is a joint initiative between the Dunedin City Council (DCC) and Otago Regional Council (ORC) to develop a climate change adaptation masterplan for South Dunedin. The Council-approved programme strategy is guided by the vision of “a safer and better South Dunedin, where sustainable urban regeneration leads to improved community resilience and wellbeing”. The SDF programme is on schedule to deliver the final climate adaptation masterplan in the first half of 2027 and to transition to implementation from 1 July 2027.
- [3] Creating a safer and better future for South Dunedin will require balancing a range of trade-offs, including choices about the scale and rate of change, the affordability of different options, and the level of ongoing risk that may be considered acceptable now and in the future. The SDF programme was designed as a vehicle for facilitating related analysis, discussions, and decisions.
- [4] Building on previous work and community feedback, the current stage of the SDF programme has undertaken further technical and economic analysis to develop a shortlist of three Proposed Adaptation Futures for South Dunedin. These include:
- Future 3 – Protect (Keep the land dry – raise land and pump water)
 - Future 4 – Restore (Make space for water – waterways and wetlands)
 - Future 5 – Reshape (Move out of harm’s way – raised land and green spaces)

- [5] Each future outlines a potential approach and proposed set of actions that could be taken over time to reduce flood risk and adapt South Dunedin to the anticipated impacts of climate change. The futures also illustrate the likely consequences of inaction. Findings are presented across four technical reports: on stormwater, groundwater, and economics, and an overview report describing the three proposed adaptation futures.
- [6] Encouragingly, this work indicates that it is technically feasible to significantly reduce flood risk in South Dunedin over the next 50–100 years, despite the anticipated increase in climate-related hazards. However, achieving this would require extensive and ongoing investment, disruption, and change over that period (and likely beyond). Reducing flood risk would involve a mix of new and upgraded infrastructure, land raising and redevelopment, and the creation of parks, wetlands, and waterways in some areas of South Dunedin. Implementing these public works would require councils to change planning rules and acquire private property in some areas.
- [7] The futures combine different adaptation actions across the short term (2025–2050), medium term (2050–2075), and long term (2075–2125). The futures are broadly similar in the short term, focusing on investment in stormwater and groundwater infrastructure and preparing for potential land-use change through planning measures and property acquisition. In the medium term, more substantive changes would be introduced, including land raising, new development patterns, and the creation of parks, wetlands, and waterways, alongside coastal protection and continued infrastructure upgrades. In the long term, major capital works would taper off, while new housing in lower-risk areas would provide additional development capacity.
- [8] The proposed actions and changes outlined in the three futures are significant, reflecting the scale and nature of the challenges facing South Dunedin. It is therefore important that councillors and the community consider these proposals in their wider context, including the expected benefits of being proactive and taking decisive action, as well as the likely consequences of delay and inaction. While there is acknowledged community frustration regarding the perceived lack of action on flooding since 2015, it has taken time to build a comprehensive understanding of the underlying problems and to identify workable long-term solutions. This analysis confirms there are no quick or simple fixes and that system-scale responses are required.
- [9] The economic assessment shows that maintaining the status quo in South Dunedin has an estimated cost of \$1.45 billion in net present value (NPV) over a 100-year period and likely more than \$2 billion once wider factors are considered. All three proposed futures deliver significantly better outcomes, with costs ranging from \$1.63 billion to \$2.45 billion NPV over a 100-year period. Net costs range from approximately \$280 million to \$1.112 billion NPV over a 100-year period, reflecting the benefits of adaptation action, including avoiding anticipated flood damages and associated disruption over time. While the futures all involve substantial upfront costs, benefits grow over time, and the anticipated costs of inaction are even higher. The cost of implementing the cheapest future (Future 4) is roughly 8 per cent of DCC's annual capital budget of around \$200 million, noting South Dunedin comprises around 10 per cent of the city's population.
- [10] Achieving meaningful flood-risk reduction in South Dunedin over the next 50–100 years will require system-wide interventions and consequential intergenerational decisions. The scale and duration of investment needed may commit future generations to specific adaptation pathways, long-lived infrastructure, and escalating operating costs. Even

with decisive action, residual risks associated with sea-level rise and climate change will persist. Decisions made today will therefore shape not only near-term outcomes, but also the choices, obligations, and risks inherited by future communities.

- [11] Subject to approval by Councils, the next step in the SDF programme is to engage with affected communities and other stakeholders on the proposed futures. Feedback will inform further technical and economic analysis to identify a single preferred future and finalise a climate adaptation masterplan for South Dunedin. However, technical work is now sufficiently advanced for implementation of ‘no and low regrets’ actions to proceed in parallel to this final stage. This includes DCC continuing delivery of the three stormwater projects already approved by DCC Council, alongside consideration of 10 new initiatives recommended over the next 25 years that are common across all three futures, which could be implemented regardless of which future is eventually selected as preferred. Work to scope, phase, and cost these initiatives could begin immediately, with funding and approval considered through the Long-Term Plan (2027–37) process, potentially enabling implementation to commence from 1 July 2027.

RECOMMENDATION

That the Council:

South Dunedin Future Technical Reports

- 1) **Notes** the background of the South Dunedin Future programme, including the Council-approved programme plan and strategy, and the work undertaken since the previous report to Council in September 2025.
- 2) **Notes** the contents of the attached South Dunedin Future technical reports, including:
 - a) Three proposed adaptation futures for South Dunedin, which provides an overview of the futures including the key features, actions, and associated costs and benefits;
 - b) South Dunedin Stormwater Modelling Report, which describes technical assessments of feasibility of a range of potential stormwater-related interventions intended to mitigate flood and other risks affecting South Dunedin;
 - c) South Dunedin Groundwater Modelling Report, which describes early-stage technical assessments to determine the feasibility of groundwater drainage systems aimed at managing risks from shallow and rising groundwater across South Dunedin; and
 - d) Economic Assessment of the three proposed adaptation futures for South Dunedin, which evaluates the economic performance of each of the futures against a status quo scenario.
- 3) **Notes** these four reports have undergone external technical peer review, and where technical issues remain outstanding, these are acknowledged in the reports or will be addressed in subsequent stages of the SDF programme.
- 4) **Notes** that additional reports have also been completed on the health and equity implications of the three proposed adaptation futures, the potential property implications of various adaptation actions, and on initial due diligence on potential future development in Ocean Beach Domain. Summaries of these reports are included in this paper, and the full reports will be available on the South Dunedin Future webpage.
- 5) **Endorses** the attached South Dunedin Future technical reports for the purposes of community engagement, noting any future decisions on land use, infrastructure, and project implementation would be subject to further consideration by Councils through long-term planning and financial processes.

Community Engagement

- 6) **Approves** progressing to the next step of the SDF programme, which involves staff engaging with partners, stakeholders and affected communities to seek feedback on the three proposed adaptation futures for South Dunedin and a status quo option.
- 7) **Notes** the proposed communications and engagement activities, including range of media and public communications, and mix of public and targeted stakeholder engagements planned for early-July to mid-August 2026.

Final stage of the SDF programme

- 8) **Notes** that following completion of community engagement in August 2026, feedback will be analysed, and key findings reported to Councils in September 2026.
- 9) **Notes** that community feedback will also inform a multi-criteria assessment of the three proposed adaptation futures against a decision-making framework previously approved by Councils, and that results of this assessment will be reported to Councils in September 2026.
- 10) **Notes** the final stage of the SDF programme will involve identifying a preferred adaptation future as the basis for finalising a climate adaptation masterplan for South Dunedin for Councils' consideration and approval by 30 June 2027.
- 11) **Notes** staff will seek to align the final stage of the SDF programme with Council's Long-Term Plan (2027-36) to promote coherence and support efficient transition to implementation of the masterplan and related activities from 1 July 2027.

Other Options

- 12) **Notes** other options explored in this paper, which include:
 - a) One or both Councils requesting further technical, economic, or other work on the climate and natural hazard-related risks affecting South Dunedin and potential responses, including those outlined in the proposed adaptation futures, before seeking approval of Councils to undertake planned engagement with partners, stakeholders, and affected communities; and
 - b) One or both Councils directing an alternative course of action from those described in previous options above.

BACKGROUND

- [12] The South Dunedin Future (SDF) programme is a joint initiative between the Dunedin City Council (DCC) and Otago Regional Council (ORC) to develop a climate change adaptation masterplan for South Dunedin. A programme plan, which outlined the high-level approach for delivering the SDF programme was approved by DCC and ORC Council Committees in July 2022 (refer OPS2223, Strategy and Planning Committee, 13 July 2022).
- [13] The SDF programme vision is "a safer and better South Dunedin, where sustainable urban regeneration leads to improved community resilience and wellbeing". The purpose of the programme is to enable South Dunedin to prepare for, and adapt to, the impacts of climate change, while also realising the opportunities that come with change. A programme strategy was approved by Councils in November 2023, which focusses on just transition, community safety, environmental and cultural restoration, social and economic resilience, and sustainable urban development (refer HAZ2302, ORC Council Meeting, 22 November 2023).

- [14] The SDF programme has been broken into five phases, five workstreams, and a number of programme actions. The workstreams include: (i) natural hazards; (ii) strategy and programme management; (iii) communications and community engagement; (iv) risk assessment; and (v) adaptation planning. This breakdown has been explained more fully in previous Council papers and workshops but is also illustrated in the A3 SDF Programme Overview (Attachment 1).

External technical assistance

- [15] The multidisciplinary nature of climate adaptation often requires specialised technical skills and experience, which may need to be sourced externally, where the capability or capacity is not available internally. External technical assistance has been used to support delivery of the SDF programme. In July 2023, following an open tender process, DCC contracted a consultant group comprising engineering, planning, and environmental services firms WSP, BECA and Tonkin & Taylor (collectively known as 'Kia Rōpine'), to support delivery of the SDF programme over the three years (2023/24 to 2025/26). The total value of this contract is presently \$2.622 million.
- [16] In August 2023, DCC also contracted a second consultant group comprising engineering, planning and environmental services firms Jacobs New Zealand Ltd, Royal HaskoningDHV and Bell Adapt Ltd, to undertake technical peer review of the risk assessment and adaptation planning workstreams. The total value of this contract is presently \$222,114.
- [17] External technical assistance has also been sourced to provide specialist advice on specific topics such as natural hazard assessment (ESNZ, \$29,050), property analysis and market implications (PWC, \$100,000), health and equity assessments (University of Otago, \$42,134), physical site assessments (Stantec, \$28,972), and mana whenua partnership (Aukaha, \$69,560).

SDF programme timeline and key activities

- [18] The following paras provide a summary of the SDF programme timeline and key activities undertaken to get to the current stage:
- a. **Identifying risks and possible responses (2023/24)**

Using existing natural hazard, asset, and place-based information, an initial risk-screening process was undertaken to identify areas of exposure, vulnerability, and potential risk in South Dunedin requiring further analysis. In parallel, best-practice approaches from comparable international programmes, alongside ideas generated through community and stakeholder engagement, were used to develop an initial list of 16 generic adaptation approaches. Reports on risk identification and these generic approaches were presented to Councils in December 2023 and consulted on in early 2024, with feedback informing subsequent stages of the programme.
 - b. **Risk assessment and development of Potential Adaptation Futures (2024/25)**

A detailed risk assessment was then undertaken to identify, classify, and prioritise risks across South Dunedin by assessing hazard exposure, vulnerability, likelihood, and consequences. Responding to this assessment, seven Potential Adaptation Futures were developed, each representing a distinct way of managing and mitigating the identified risks, and outlining the associated characteristics, costs, benefits, and trade-offs. Reports on the risk assessment and seven Futures were

presented to Councils in March 2025, consulted on in April–May 2025, and feedback was reported back to Councils in July 2025 and used to inform further analysis.

c. Shortlisting from seven to three Futures (2025)

In mid-2025, a multi-criteria assessment (MCA) was undertaken to shortlist the seven Futures to three, which would then undergo further development. This process involved technical and economic assessments by Council staff, Aukaha, and consultant specialists, drawing on community feedback and applying the programme strategy and decision-making framework previously approved by Councils. The MCA findings, together with additional contextual considerations, informed the shortlisting of Futures 3, 4 and 5, which was reported to Councils in September 2025. Positive community feedback about short-term infrastructure investment in Future 2 was also accommodated by integrating this as design principle for the three shortlisted futures.

d. Developing the three Proposed Adaptation Futures (2025/26)

The current phase of the SDF programme has focused on further technical and economic analysis to develop three Proposed Adaptation Futures. Detailed modelling and economic assessments have been used to identify adaptation actions to manage flood and climate-related risks in South Dunedin, along with indicative locations and timeframes for implementation. This work is documented in four reports: technical reports on stormwater, groundwater, and economics, and an overview report describing the three Proposed Futures. This work is described more fully below.

DISCUSSION

[19] There are four key outputs from this stage of the SDF programme, including: (i) an overview of the three proposed adaptation futures for South Dunedin (Attachment 2); (ii) South Dunedin stormwater modelling report (Attachments 3, 4, 5 and 6); (iii) South Dunedin groundwater assessment report (Attachment 7); and (iv) and economic assessment of the proposed futures (Attachment 8). The key components and findings of these reports are summarised below.

Overview of proposed adaptation futures for South Dunedin

[20] This report provides a technical but plain-language overview of three Proposed Adaptation Futures for South Dunedin. It outlines the key features, staging, performance, costs, and benefits of each future, supported by visualisations showing preliminary locations and how South Dunedin could evolve in the short, medium, and long term. The futures draw together findings from the stormwater, groundwater, and economic assessments. The three futures are:

- Future 3 – Protect (Keep the land dry – raise land and pump water)
- Future 4 – Restore (Make space for water – waterways and wetlands)
- Future 5 – Reshape (Move out of harm’s way – raised land and green spaces)

[21] The report indicates that it is technically feasible to significantly reduce flood risk in South Dunedin over the next 50–100 years, despite the anticipated increase in climate-related hazards. However, achieving these risk reductions would require

extensive and sustained investment, as well as significant change over that period and likely beyond. Flood risk is expected to increase over time due to rising sea levels, rising groundwater, and more intense rainfall, compounded by ageing infrastructure, increasing impermeable surfaces, and ongoing urban development. These factors interact in complex ways. While infrastructure upgrades are necessary to manage near-term risks, long-term resilience depends on system-scale interventions that change how land, water, and urban form work together.

- [22] Each future sets out a coherent approach and suite of actions that could be implemented over time to reduce flood risk and realise a range of opportunities that could accompany adaptation. Guided by design principles developed through technical analysis and community feedback in earlier stages, the futures combine different adaptation actions across the short term (2025–2050), medium term (2050–2075), and long term (2075–2125). The futures are broadly similar in the short term, focusing on investment in stormwater and groundwater infrastructure and preparing for potential land-use change through planning measures and property acquisition. In the medium term, more substantive changes would be introduced, including land raising, new development patterns, and the creation of parks, wetlands, and waterways, alongside coastal protection and continued infrastructure upgrades. In the long term, major capital works would taper off, while new housing in lower-risk areas would provide additional development capacity.
- [23] Across all three futures, investment is front-loaded in the short term, while the benefits accrue mainly in the medium and long term through avoided flood damage compared with a status quo future. As a result, flood risk is substantially reduced under all three futures, falling below present-day levels despite the impacts of climate change. For example, the proportion of buildings exposed to flooding above floor level is currently estimated at 23 per cent and is projected to rise to 47 per cent by 2100 under the status quo. Under the three futures, this reduces to around 5–7 per cent by 2100. Average annual damages from flooding and other climate impacts are also projected to fall significantly, from an estimated \$11m–\$212m per annum under the status quo to \$0.6m–\$3.3m per annum across the futures.
- [24] While the futures are effective in reducing flood risk, they involve substantial costs and trade-offs. Estimated implementation costs are approximately \$2.1 billion for Future 3, \$1.63 billion for Future 4, and \$2.45 billion for Future 5. Achieving flood risk reduction outcomes would involve extensive construction activity, major changes in land use, and significant adjustment for communities. Over time, South Dunedin would look, feel, and function very differently than today. Measures could include large-scale upgrades to underground infrastructure, land raising and redevelopment, and the creation of parks, wetlands, and waterways in some locations. Delivery of these interventions may require the acquisition of up to 1,750 private properties across South Dunedin. While this is assessed as necessary to achieve material reductions in risk, it would have a high level of impact on affected communities. Areas that may be subject to acquisition are shown in the report visualisations, noting that final locations would be confirmed later following detailed project design.
- [25] The futures are grounded in detailed technical analysis of stormwater, groundwater, and economic impacts, while also incorporating mana whenua values, earlier risk assessments, and community feedback. The commentary on each future includes a preliminary assessment against Kāi Tahu Rūnaka values co-developed with Aukaha Ltd

and key themes from community feedback in previous stages of the SDF programme. The futures are intended to be pragmatic and to strike a balance between technical feasibility, affordability, and community aspirations. Collectively, the futures are designed to support elected members and the public to better understand the scale of the challenge facing South Dunedin, explore different response pathways, and weigh the costs, benefits, and trade-offs associated with each option, including the consequences of taking limited or no action.

- [26] The actions set out in the futures reflect the scale of the challenges facing South Dunedin. The report situates these proposals within a wider context that highlights the benefits of early and decisive action, as well as the risks of delay. While there is acknowledged frustration within the community about the time taken to respond to flooding since 2015, the complexity of the issues has required sustained technical work to develop robust, system-wide solutions. The analysis confirms that there are no quick or simple fixes, whole-of-network responses are required.
- [27] Overall, the report shows that an effective response will require significant and sustained intervention to address current hazards while proactively reducing future risk. However, even under the proposed adaptation futures, residual flood and groundwater risk remains, particularly under extreme or compound events. Councils therefore retain discretion over the level of risk considered acceptable, the degree of intervention required, and the balance between public investment, private responsibility, and ongoing exposure.
- [28] Acting now would allow decision-makers and stakeholders to actively shape a safer and more resilient future for South Dunedin. By contrast, a delayed or insufficient response would see flooding become more frequent and severe over time, leading to increasing damage to infrastructure and property, compounding negative social and economic impacts, and leading to long-term decline across the area. In this scenario, water ultimately determines South Dunedin's future, with poor outcomes for communities, the environment, and the city as a whole. Other pathways are possible, such as lower levels of investment or change, but these would likely result in higher ongoing flood risk. The overview report presents a summary of the technical analysis to support informed discussion and decision-making about risks, options, and trade-offs.

South Dunedin stormwater modelling report

- [29] This report summarises the hydraulic modelling undertaken to design and test the performance of the three Proposed Adaptation Futures, which aim to manage and mitigate flood risk in South Dunedin. The modelling was used to identify systemwide changes required to effectively reduce current and future flood risk, including by determining preliminary infrastructure configurations, sizing, and costing. This work also assessed how each future performs across short-term (2025), medium-term (2060), and long-term (2100) time horizons, considering climate change, sea level rise, and different approaches to infrastructure and land use change. The modelling used a conservative climate change scenario Representative Concentration Pathway (RCP 8.5), which corresponds to very high greenhouse gas emissions, and is a common standard for designing and stress-testing infrastructure design. Though best practice recommends using a range of scenarios, to account for inherent uncertainty, so the modelling also uses a moderate climate change scenario RCP 4.5 for sensitivity testing. The model builds on an updated Integrated Catchment Model (ICM) completed in 2024 as part of the 3 Waters Integrated System Plan (ISP), which forms the baseline "status quo"

scenario and includes the three 'no regrets' stormwater projects approved by DCC Council in 2025.

- [30] The three futures modelled represent distinct strategic approaches aligned to the three futures shortlisted during previous stages of the SDF programme. Future 3 relies primarily on upgraded pipes, pump stations, and storage facilities; Future 4 shifts toward open waterways and wetlands supported by storage areas, pump and pipe upgrades; and Future 5 combines open waterways with land raising and designated floodable areas, alongside new pipe and pump infrastructure. Reflecting community feedback received in previous stages, all futures include substantial infrastructure upgrades in the short term, sized to manage increased rainfall intensities and duration. This is complemented by green infrastructure (open channels, storage basins, infiltration, and run-off areas) to help deal with higher sea levels, rising groundwater, and more frequent and severe storm events that are expected over time.
- [31] In the short term, the modelling applies a common package of infrastructure upgrades across all three futures, which is designed to remain in place and complement each of the three Futures over subsequent stages. Medium- and long-term upgrades then diverge as the futures progressively introduce additional infrastructure and land use changes aligned with each design approach. The modelling applied levels of service that reflect community feedback, including allowance for limited road flooding during heavy rainfall events, and balanced flood risk reduction objectives with technical feasibility, infrastructure scale, implementation challenges, and anticipated costs.
- [32] The modelling identifies several critical infrastructure measures that drive flood risk reduction across the futures. In addition to short-term upgrades to pumps and pipes, all options include new storage basins at Forbury Park, Tonga Park, and Bathgate Park to temporarily hold stormwater during peak events, with Culling Park added in Futures 4 (Restore) and 5 (Reshape). New and upgraded pump stations are required to manage increased flows and rising sea levels, particularly at key outfalls. Futures 4 and 5 also incorporate open channels where the existing pipe network is shallow and more adaptable, while Future 3 relies more heavily on pipe upgrades.
- [33] Overall, the modelling shows that all futures substantially reduce flood hazard compared with the existing network, particularly for 10th and 50th year rainfall events, and sensitivity testing indicates the results are robust across different storm durations and climate change scenarios. There are significant reductions in property flooding for both moderate and severe storm events, with fewer than 8 per cent of properties experiencing above floor flooding in events with a 1% chance of occurring each year. The modelling outputs have been used to inform cost estimates and residual risk assessments and provide confidence that, while no option eliminates risk entirely, each future can materially improve flood outcomes for South Dunedin over the long term.
- [34] Finally, the stormwater modelling report notes 10 key initiatives recommended over the next 25 years that are common across all three futures and therefore could be implemented regardless of which future is eventually selected as the preferred. This essentially means that technical work is now sufficiently well advanced to consider implementation of 'no and low regrets' actions – which could proceed as part and in parallel to the final stage of the SDF programme. This includes DCC continuing delivery of the three stormwater projects previously approved by that Council (refer Item 14, DCC Council, 28 January 2025), alongside potentially scoping, phasing, and costing the

10 key initiatives recommended in Attachment 3 with a view to presenting project and funding options for Council consideration as part of the Long Term Plan (2027–37) process. This could enable implementation to commence as early as 1 July 2027.

South Dunedin groundwater assessment report

- [35] This report presents early-stage technical assessments of groundwater drainage options to manage risks associated with shallow and rising groundwater across South Dunedin. Building on earlier numerical groundwater models developed by Otago Regional Council and subsequently updated by Earth Science New Zealand (formerly GNS), the report assesses how proposed groundwater management options could control groundwater levels compared with drainage currently provided by the existing, leaky stormwater and wastewater networks. The modelling outputs are visualised through maps and cross-sections and include estimates of groundwater inflows to stormwater and groundwater management infrastructure to inform pumping requirements. The findings support initial assessments of technical feasibility, indicative infrastructure configurations, sizing, and order-of-magnitude costing to inform further analysis.
- [36] The modelling explores the feasibility of introducing a pumped groundwater management system for South Dunedin. Rising sea levels will progressively reduce the effectiveness of gravity-based drainage, necessitating a transition to pumped systems over time. Although the current stormwater and wastewater networks provide some incidental groundwater drainage through leakage and pumped outfalls, South Dunedin already experiences high groundwater levels, which are expected to worsen as sea levels rise. The modelling therefore considers both short-term measures to address existing issues and longer-term solutions assessed under up to 1.1 metres of sea level rise over approximately the next 100 years. A key conclusion is that an active, pumped groundwater drainage system is fundamental to the long-term habitability of South Dunedin; without intervention, widespread periodic and, in some areas, permanent surface ponding is likely later this century.
- [37] The modelling assumes an integrated approach to stormwater and groundwater management. It tests whether an upgraded dual-purpose pipe network located within existing road and transport corridors would be sufficient to lower groundwater levels to target levels. Extending a tighter pipe network beneath private property was found to introduce significant additional complexity and cost. Results indicate that a network contained largely within transport corridors would be effective across most of South Dunedin, although challenges remain in the lowest-lying areas of Musselburgh, where groundwater levels are already very shallow.
- [38] Stormwater flows during major rainfall events are many orders of magnitude greater than groundwater flows, meaning groundwater volumes have only a minor influence on overall stormwater system sizing. The proposed approach centres on a large storage basin at Forbury Park, which would act as the primary collection point for both stormwater and drained groundwater. From there, water would be pumped to sea using high-capacity pumps during storm events, supported by lower-capacity pumps operating continuously to manage groundwater baseflows and maintain drainage capacity across the system.
- [39] Groundwater drainage would be continuous, with higher inflows following major storm events that gradually reduce over time. To minimise the risk of land settlement, modest

groundwater lowering is proposed, reflecting the presence of compressible soils beneath South Dunedin. The assessed groundwater drawdown is generally less than 0.8 metres, with limited areas up to 1.5 metres, and is expected to result in less than 50 millimetres of land settlement. Further site-specific investigations would be required to confirm these effects as options progress to more detailed design.

- [40] In the short term, the report recommends undertaking a pilot groundwater drainage trial to test a small-scale pumped system and improve understanding of groundwater behaviour, system performance, and design requirements. Further work is also recommended to assess the ecological and infrastructure implications of saline or brackish water in basins and canals, confirm land-settlement assumptions, and address corrosion risks to underground services. Overall, the findings confirm that future stormwater and groundwater management in South Dunedin will rely on pumped systems with increasing operational and maintenance demands over time, reinforcing the need for integrated design and a robust cost–benefit analysis as climate change impacts intensify.

Economic assessment of the three proposed adaptation futures

- [41] This report evaluates the economic performance of each of the three proposed adaptation futures for South Dunedin. It also considers overall value by comparing these to a status quo scenario that continues existing practices such as reactive maintenance, incremental upgrades and privately-led responses, without coordinated system-scale intervention.
- [42] A standard cost-benefit assessment framework is utilised following generally accepted best practices outlined by The Treasury, the Commerce Commission, and New Zealand Institute of Economic Research. The primary metric used throughout the economic evaluation is Annual Average Damage (AAD). AAD is the annualised expected cost of pluvial flood and coastal inundation damage across heavy rainfall or storm events that have a 10%, 2%, and 1% probability of occurring each year, weighted by their likelihood. Put simply, it represents what an insurer would pay each year, on average, if the community was fully insured against all storm events at their expected frequency and severity.
- [43] The primary economic benefit of each future is *avoided* AAD – the reduction in expected annual pluvial flood and coastal inundation losses relative to the status quo. The calculation is straightforward in concept: avoided damage equals the difference between what flood events would cost with adaptation (three futures) and what they would cost without it (status quo).
- [44] Over the full 100-year assessment period, the present value cost of the status quo scenario is assessed as \$1.45 billion. This includes anticipated property damage, fatality and injury costs, emergency services, trauma, income loss from displacement, and environmental costs. It excludes infrastructure repair, loss of activity or productivity, event clean-up costs, private property interventions (both proactive and reactive), and the economic consequences of insurance withdrawal. Including these would likely raise the cost above \$2 billion.
- [45] The estimated total implementation costs of the three futures range from \$1.63 billion to \$2.45 billion over the same period to 2125. Future 4 (Restore) has the lowest total cost, reflecting a greater reliance on green infrastructure, waterway restoration, and

natural flood storage, which are generally less capital-intensive than the large-scale land raising and pumping components that characterise Futures 3 and 5. The cost of implementing the cheapest future (Future 4) equates to roughly 8 per cent of DCC’s annual capital budget of around \$200 million, noting South Dunedin comprises around 10 per cent of the city’s population. All three futures generate substantial economic benefits through avoided flooding and related losses, estimated at \$1.34–\$1.35 billion.

- [46] The report also assesses the relationship between benefits and costs using a benefit–cost ratio (BCR). The BCR is based on the most directly evidenced impacts, including avoided property damage, avoided injuries and fatalities, reduced emergency and recovery costs, avoided trauma, avoided income loss from displacement, and avoided environmental damage. Broader benefits – such as increased property values, regeneration and redevelopment uplift, ecosystem service gains, reduced network disruption, and the value of maintaining insurability – are not included at this stage. This approach is deliberate and conservative, ensuring the core case is based on the most defensible evidence, with additional benefits transparently identified as potential upside. Benefits, costs, and BCRs are summarised in Table 1 below:

Table 1: Benefits, costs, and BCRs of Status quo and three futures

Scenario	Gross Costs (\$B)	Benefits (\$B)	Net Costs (\$B)	BCR (mid)	BCR range (+/- 15%)	Rank
Status quo	\$1.45-\$2.0	-	\$1.45-\$2.0	-	-	4
Future 3 - Protect	\$2.098	\$1.335	\$0.763	0.64	0.54 - 0.75	2
Future 4 - Restore	\$1.629	\$1.351	\$0.278	0.83	0.71 – 0.98	1
Future 5 - Reshape	\$2.448	\$1.336	\$1.112	0.55	0.46 – 0.64	3

- [47] While the initial whole-of-life BCRs for the three futures are below 1 at this early stage, this is typical of long-lived climate adaptation investments, which involve substantial upfront capital costs, while benefits increase over time as climate risks intensify. This pattern is consistent with other major public infrastructure investments in New Zealand, including transport projects, which often proceed with lower early-stage BCRs where wider resilience, equity, and long-term benefits are recognised. The current results are also based on more commercially weighted assumptions; applying more socially weighted approaches that emphasise broader societal benefits would materially improve the BCRs. Accordingly, these results should be interpreted as a conservative lower bound on economic performance, rather than a definitive assessment of long-term value.
- [48] The key finding of the economic assessment is that investing in adaptation delivers significantly better outcomes than maintaining the status quo, even under conservative assumptions. The cost of inaction in South Dunedin under a status quo scenario are estimated at \$1.45 billion in net present value (NPV) and likely more than \$2 billion once non-quantified factors are accounted for, as noted above. Future 4 (Restore) presents the strongest economic case, with an estimated net cost to the community of \$280 million NPV over the next 100 years, compared to \$763 million NPV for Future 3 (Protect) and \$1.112 billion for Future 5 (Reshape). All these net costs are materially lower than the estimated \$1.45-\$2.0 billion cost of the status quo, providing a strong, clear-cut case for adaptation investment irrespective of the headline BCR.

- [49] While the futures all involve substantial upfront costs, benefits grow over time and are comparable to other major public infrastructure investments at this early stage of development. Long-term modelling and sensitivity testing show that economic performance strengthens over time and that the relative ranking of the futures remains stable under alternative assumptions. The analysis is intentionally conservative, excluding several categories of potential upside benefits, including regeneration and redevelopment uplift, ecosystem services, avoided heritage losses, and the value of maintaining insurability. As the programme progresses toward identifying a preferred pathway and the analysis is refined, the overall economic case for adaptation is expected to further strengthen. Table 2 below illustrates a high-level cost breakdown for the status quo and three futures.

Cost items	Costs over 100-year timeframe in NPV (\$m)			
	Status Quo	Future 3	Future 4	Future 5
Infrastructure CAPEX (Stormwater and groundwater network; pump stations; outfalls; land raising; open waterways; wetlands, storage, coastal protection)	290	1,220	724	1,287
Property and land acquisition (Property purchase; ~25% uplift)	4	433	447	545
Repurpose land activities (Building demolition; utility removal; site reinstatement)	72	343	338	519
Capital maintenance (35% of CAPEX every 25yrs; once asset it built)	15	33	39	31
OPEX (1.5% of CAPEX per year; builds cumulatively).	31	70	81	66
Total	411	2,098	1,629	2,448

Table 2 – High level cost breakdown for status quo and three futures

Technical peer review

- [50] The four primary technical reports developed by the Kia Rōpine consultant team have undergone several rounds of review, including from staff across DCC and ORC, and by an external independent technical peer review team led by Jacobs NZ Ltd (supported by Royal HaskoningDHV, and Bell Adapt Ltd). The peer review process has been robust, extensive, and has led to many refinements to the reports. However, not all outstanding technical issues have been resolved, and remaining issues are: (i) acknowledged as data gaps, assumptions, limitations, or with disclaimers; (ii) matters that can be addressed in subsequent stages of the technical work; or (iii) subject to difference of professional opinion (i.e. the experts have agreed to disagree).

Additional technical reports

- [51] In addition to the four primary technical reports developed by the Kia Rōpine consultant team, additional reports have also been commissioned on specific topics of relevance to climate adaptation in South Dunedin – including health and equity, property implications, and potential development of Ocean Beach Domain. The reports are not

included as attachments, but are summarised below, and will be available on the South Dunedin Future website.

Health and equity assessment

- [52] A team of researchers led by the University of Otago, and comprising staff from Te Whatu Ora, Victoria University of Wellington, Urban Intelligence, Yasmine El Orfi, and Te Pūnaha Matatini Centre for Research into Complex Systems, was commissioned to undertake a review of the three futures through a health and equity lens. This review followed feedback from earlier stages of the SDF programme which identified an overemphasis on technical and economic factors, and limitations in consideration of social factors.
- [53] The health and equity assessment found that all three shortlisted futures would result in better outcomes than a status quo approach, which would lead to significant and widening harms. These harms are expected to arise primarily through declining housing quality, mental health impacts, and reduced access to the social, economic, and cultural foundations of wellbeing. Across all futures, improved access to public mental health and social support services would be essential, and health equity would need to be central to design and implementation to minimise risks and maximise co-benefits, particularly for groups likely to be disproportionately affected, including disabled communities.
- [54] As residual flood risk remains under all futures, due to the potential for extreme events, infrastructure failure, and accelerating climate change, some status-quo health risks would persist. Existing inequities by income, ethnicity and disability strongly shape health outcomes, particularly through the housing system, making stronger housing governance and protections for tenants critical. Pathways involving land elevation or new development also carry equity risks unless land value uplift is captured publicly and reinvested to reduce inequities. Tiriti-based approaches and Kāi Tahu values would need to be intentionally embedded in decision-making, and while all futures offer opportunities to reduce emissions, sustained climate mitigation remains the strongest long-term protection for health and wellbeing.

Property analysis and implications

- [55] PWC was engaged to provide high-level commercial property insights across the three shortlisted futures, focusing on feasibility, sequencing, market response, value creation, and the funding and financing implications of early adaptation interventions, including land raising and redevelopment opportunities. The scope also included provisional analysis of land value uplift, advice on potential delivery and partnership models, and a light-touch review of property and development assumptions used in the cost–benefit analysis to ensure alignment with realistic market conditions.
- [56] In the report, PWC concludes that all three futures require significant early public investment in infrastructure and property acquisition before private-sector redevelopment can occur, and that most short-term actions (to around 2050) are common and largely “no-regrets”. From a commercial perspective, Future 4 (Restore) is assessed as the most straightforward option due to its lower overall cost, reduced land repurposing, higher benefit–cost ratio, and avoidance of large-scale land raising, which PWC identifies as the most commercially challenging intervention.

- [57] The report highlights property acquisition as the single largest near-term cost and a critical enabler across all Futures, noting that delivery at scale is unlikely to be achievable without central government co-investment. Victoria Road (Ocean Beach Domain) sites are identified as the most strategically important early development opportunity, with potential to support relocation, deliver housing supply, and offset programme costs through value creation on council-owned land. Conversely, extensive land raising (particularly at Forbury Corner under Futures 3 and 5) is considered high-cost, long-lead-time and unlikely to be value-positive. Successful delivery would require a clear acquisition funding strategy, early planning certainty, active engagement with development and finance markets, and the establishment of a dedicated delivery entity (such as a CCO or Council–Crown vehicle) with the mandate and capability to manage long-term property acquisition and redevelopment.

Ocean Beach Domain due diligence

- [58] This stage of the SDF programme technical work considered options for making the best use of available land in South Dunedin, including exploring the possibility of changing land uses, for example of council-owned land such as Ocean Beach Domain. This area is already elevated and has a materially lower risk profile compared to the 'Flat', presenting an opportunity to utilise land more efficiently, potentially reducing or avoiding the more complex and costly process of land raising. Any loss of green space at Ocean Beach Domain could be balanced by proposed creation of new parks, waterways, and wetlands elsewhere in South Dunedin, likely resulting in a net gain in public green space. Developing Ocean Beach Domain would also respond to previous community feedback expressing a desire to stay in the local area (in the event they are required to move). As such, preliminary investigations were undertaken to test development potential of Ocean Beach Domain, including a desktop analysis of natural hazards, geotechnical conditions, and contaminated land. A preliminary legal review of title was also undertaken.
- [59] The desktop hazards and geotechnical assessment identified a range of physical constraints relevant to any future consideration of medium- to high-density residential development. Much of the site is underlain by loose coastal sands with very shallow groundwater, making some areas susceptible to liquefaction and sensitive to sea-level rise and flooding. Parts of the site, particularly in the western area, sit below the current minimum floor level requirement, meaning any development would require elevated floor levels and specifically engineered foundations to manage natural hazard risk. The assessment also identified contaminated land risks linked to historical land uses, including uncontrolled landfill activities associated with the former Chisholm Park Landfill and past recreational uses. While these issues do not necessarily preclude future development, they would require further detailed investigation, remediation or long-term land management, and may have a material influence on development feasibility.
- [60] Most of the Ocean Beach Domain land is held by Dunedin City Council under specific statutory regimes, primarily as recreation and local purpose reserves under the Reserves Act 1977. These reserves were originally transferred from the Crown, meaning that revoking reserve status would result in the land reverting to Crown ownership. At that point, the Crown would be required to comply with the right of first refusal provisions for Ngāi Tahu under the Ngāi Tahu Claims Settlement Act. The reserve land is also subject to numerous existing leases with sporting and recreational organisations. Other parts of the domain are subject to separate legal constraints. Tahuna Park, while not

subject to the Reserves Act, is considered a public park under the Local Government Act 2002, meaning any sale or long-term lease that restricts public access would trigger formal public consultation. Overall, the title review highlights that land status, Treaty settlement obligations, and existing leasehold interests are considerations that could materially affect the feasibility, process, and timing of any future redevelopment.

Communications and community engagement

- [61] The proposed actions and changes outlined in the three futures are significant, reflecting the scale and nature of the challenges facing South Dunedin. It is therefore important that stakeholders consider these proposals in their wider context, including the expected benefits of being proactive and taking decisive action, as well as the likely consequences of delay and inaction. While there is acknowledged community frustration regarding the perceived lack of action on flooding since 2015, considerable time has been required to build a comprehensive understanding of the underlying problems and to identify workable long-term solutions. This analysis confirms there are no quick or simple fixes, rather, that system-wide interventions are required. This means the proposed solutions are complex and are likely to be confronting, hard to process, and potentially unwelcome for many stakeholders.
- [62] The health and equity assessment highlights that how the proposed futures are communicated and engaged on will directly influence community wellbeing. In particular, clear, transparent, and participatory approaches can help avoid unintended impacts on mental wellbeing in a community already experiencing heightened stress and uncertainty. Building on engagement undertaken during earlier stages of the SDF programme, a comprehensive communications and community engagement approach has been developed for the current stage. The aim is to support partners, stakeholders, and decision-makers to access the latest technical work, understand the potential consequences, and provide informed feedback.
- [63] A range of communications activities are planned to support the public release of the proposed adaptation futures for South Dunedin. These include media releases and briefings, web and social media content, short videos, a flyer summarising key elements of the futures, and online access to all technical reports. Given the additional detail included in this stage of technical work, it is also proposed that councils provide specific information relating to the potential need for property acquisition to enable a wide range of flood risk reduction actions. Previous engagement has demonstrated high public interest in managed retreat and any associated property acquisition processes. It is therefore critical that councils are clear, transparent, and consistent in communications with affected stakeholders. Specific details on the underlying rationale for property acquisition, the potential implications, and intended process are included in planned communications and collateral.
- [64] While extensive efforts have been made, and continue to be made, to communicate the key elements of the proposed futures, the complexity and sensitivity of the issues mean they cannot be fully addressed through written communications alone. Experience from earlier stages of the SDF programme indicates that many stakeholders will want and need direct discussions with council staff to better understand what is proposed, reflect on how they may be affected, and provide feedback. Following the public release of the futures, a six-week public engagement process is planned for early-July to mid-August 2026. This would include targeted stakeholder sessions, alongside public workshops and drop-in sessions, supported by online resources and surveys to gather feedback from as

many affected stakeholders as possible. To support these discussions, an analysis has been undertaken of the potential impacts of each of the three futures on individual properties across South Dunedin, enabling more tailored and informed engagement with affected stakeholders.

OPTIONS

[65] The SDF Programme Plan provides for various decision points at the conclusion of each stage of technical work, where the approval of Councils is sought to proceed to community engagement. Three options are outlined below which involve proceeding with the SDF programme as scheduled, deferring the programme to undertake additional work as may be directed by Councils, or taking an alternative course of action as directed by Councils. The respective advantages and disadvantages of each option are described.

Option A – Proceed to community engagement (Recommended option)

Impact assessment

[66] This option includes proceeding as outlined in the SDF programme plan and according to the high-level schedule in Attachment 1. It would involve Councils noting the four technical reports included as attachments to this paper, endorsing the reports for the purpose of community engagement, and providing approval to commence planned communications and community engagement activities with partners, stakeholders, and affected communities.

Debt

[67] No debt funding is required for this option.

Rates

[68] There are no impacts on rates for this option as costs are already included in the SDF programme budget.

Zero carbon

[69] There is no material impact on city emissions from this option.

Advantages

- Enables SDF programme to maintain current scope, schedule, and budget.
- Aligns with operational objectives of SDF Programme, including making well-informed decisions, being community-centred, and mainstreaming climate adaptation by running a robust, transparent, and inclusive process.
- Enables councils to actively facilitate a dialogue with partners, stakeholders, and affected communities on the risks facing the area, potential responses, and to collect feedback.
- Enables staff and consultant teams to direct primary efforts to completing the final stage of the SDF programme, which involves finalising a climate adaptation masterplan for South Dunedin for Councils consideration and approval by 30 June 2027.
- Supports alignment between the final stage of the SDF programme and council's Long-Term Plan (2027-36), and DCC's 30-year Infrastructure Strategy and Water

Services Strategy processes, promoting coherence and a more efficient transition to implementation of the masterplan and related projects from 1 July 2027.

Disadvantages

- Although grounded in extensive analysis and community engagement, the futures rely on assumptions and simplified representations of complex social, economic, and environmental systems over a 100-year period. Adaptation planning can help manage this uncertainty but not eliminate it. This option therefore requires proceeding with imperfect information and despite a range of information gaps, assumptions, and uncertainties, each of which carries a degree of risk.

Option B – Defer and undertake additional technical work

Impact assessment

[70] This option would involve one or both Councils requesting further technical, economic, or other work on the climate and natural hazard-related risks affecting South Dunedin and potential responses, including those outlined in the proposed adaptation futures, before seeking approval of Councils to undertake planned engagement with partners, stakeholders, and affected communities.

Debt

[71] No debt funding is required for this option.

Rates

[72] There are no impacts on rates for this option as costs are already included in the SDF programme budget.

Zero carbon

[73] There is no material impact on city emissions from this option.

Advantages

- Undertaking additional technical work could enable some existing information gaps to be filled and resolve some outstanding technical issues or remaining uncertainties, thereby increasing confidence in key findings and enabling more informed communications, engagement, and decision-making.

Disadvantages

- Undertaking additional, unplanned technical work would likely disrupt the SDF Programme schedule, may require additional budget, and could generate criticism from partners, stakeholders, and affected communities who may prefer release of the latest technical work.
- This option could delay completion of the current and future stages of the SDF programme, which may have negative implications for coherence with Long-Term Plan (2027-36) processes and delay transition to implementation of the masterplan from 1 July 2027.
- Undertaking additional, unplanned technical work could be perceived by partners, stakeholders, and affected communities as bypassing community engagement and moving straight to the final stage of the SDF programme.
- Adaptation planning will always rely on assumptions and simplified representations of complex social, economic, and environmental systems over an

extended period. Additional analysis may help further reduce this uncertainty, but not eliminate it. There will always be a need to make decisions with imperfect information and despite a range of information gaps, assumptions, and uncertainties, each of which carries a degree of risk.

Option C – Alternate course as determined by Councils

[74] This option would involve an alternative course of action from those described in Options A and B above, as determined by one or both Councils. An analysis of potential impacts could be undertaken once details are known.

CONSIDERATIONS

Strategic Framework and Policy Considerations

[75] Strategic considerations are wide ranging, and include natural hazards, climate change impacts, risk mitigation, land use planning, and infrastructure investment, among others. These are described in the paper and attachments, which build on previous advice and Council decisions relating to SDF programme strategy and policy, as covered in the following reports:

- HAZ2109, ORC Council, 24 November 2021
- OPS2215, ORC Strategy and Planning Committee, 13 April 2022
- OPS2223, ORC Strategy and Planning Committee, 13 July 2022
- HAZ2302, ORC Safety and Resilience Committee, 10 August 2023
- HAZ2302, ORC Council, 22 November 2023
- GOV2343, ORC Council, 6 December 2023
- GOV2419, ORC Council, 24 July 2024
- GOV2430, ORC Council, 25 September 2024
- GOV2531, ORC Council, 19 March 2025
- HAZ2504, ORC Council, 23 July 2025
- HAZ2509, ORC Council, 24 September 2025

Financial Considerations

[76] Funding of the SDF programme is provided for in ORC's 2025/26 and 2026/27 Annual Plans. The SDF programme is also co-funded by the Dunedin City Council. No decisions have been made about funding for potential adaptation work that may arise from the SDF programme. These may be considered as part of the Long Term Plan (2027-37) process.

Significance and Engagement

[77] Extensive external engagement has been undertaken with a range of partners, stakeholders, and affected communities, which is noted in this report. Further community engagement is planned in subsequent stages of the SDF programme, as described in the report.

Legislative and Risk Considerations

[78] These are described in ORC paper HAZ2302 presented to Council on 22 November 2023. The Government's ongoing reforms relating to local government, resource management, and climate adaptation, and other sectors could have implications for the SDF programme and implementation of resulting plans or recommendations.

Climate Change Considerations

The South Dunedin Future Programme is enabling adaptation to the effects of future climate change.

Communications Considerations

[79] These are described in the report and include extensive communications and community engagement activities over coming months and subsequent stages of the SDF programme.

NEXT STEPS

[80] Subject to the decisions of Councils, next steps include:

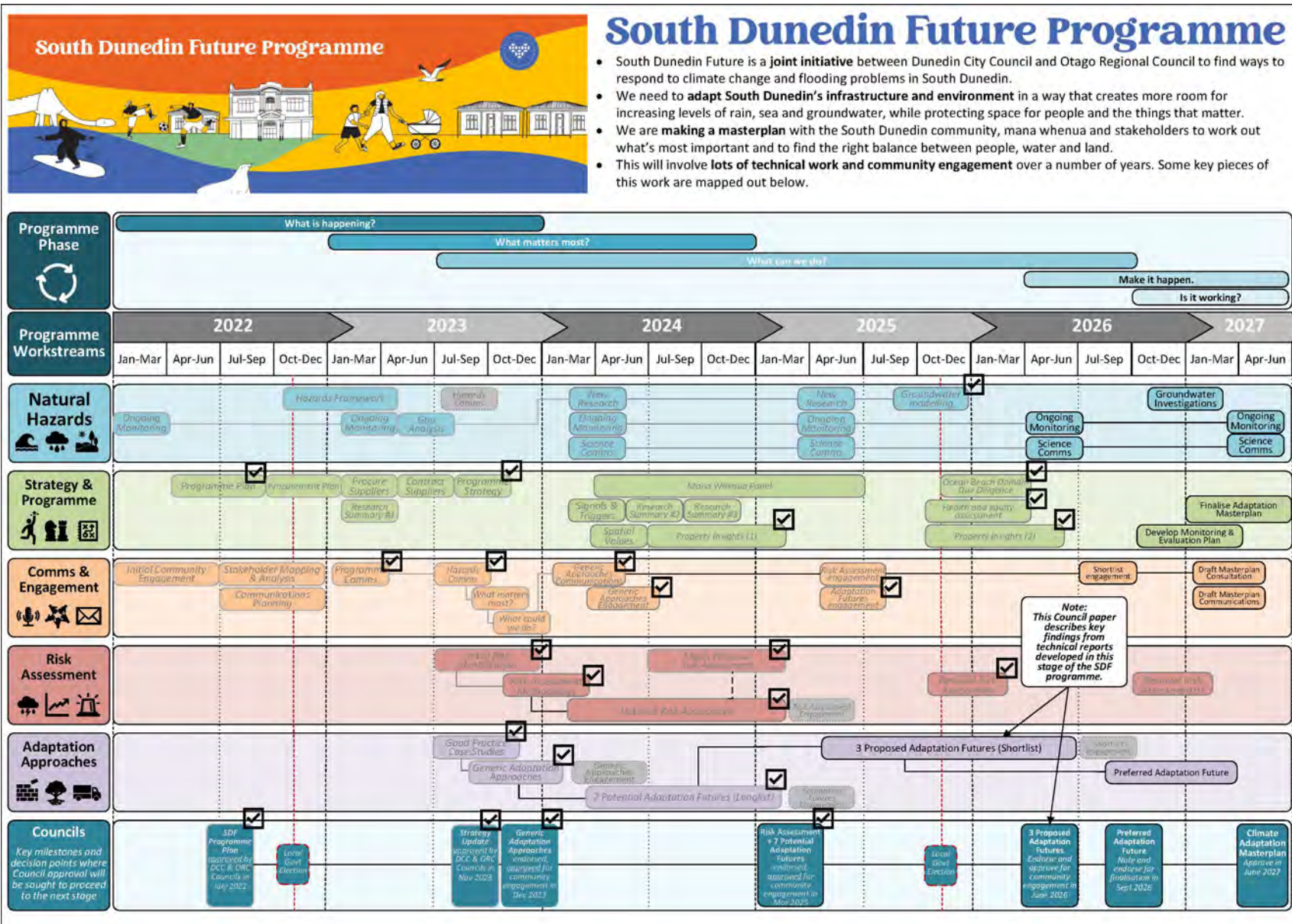
- Commencing communications and community engagement activities relating to the 3 Proposed Adaptation Futures for South Dunedin, as described above. These activities are planned to commence in early-July and extend through to late-August.
- Designing and commencing the final stage of the SDF programme, including identifying a preferred adaptation future and finalising a climate adaptation masterplan for South Dunedin. This will include:
 - analysis of community feedback on the 3 Proposed Futures and status quo option;
 - undertaking a multi-criteria assessment (MCA) of the 3 Proposed Futures and status quo option, incorporating community feedback and technical assessments against Council approved objectives and decision-making framework;
 - reporting the outcome of community engagement and the MCA process to Councils;
 - undertaking more detailed technical and economic work to refine the preferred adaptation future and finalise the adaptation masterplan;
 - aligning technical analysis with workplan and budget development being undertaken by relevant council teams for the Long-Term Plan (2027-36);
 - producing a climate adaptation masterplan for South Dunedin for Councils approval by 30 June 2027.

[81] At present, Councils have committed to completing the SDF programme only, including remaining technical work, economic analysis, and community engagement. Councils have not, at this time, committed to supporting any particular course of action that might be recommended by the SDF programme – including those relating to strategic land use planning, property acquisition, or infrastructure investment. Such decisions, and the roles and responsibilities of respective Councils in implementing them, would be subject to further consideration by respective Councils, including in the context of strategic and financial decisions associated with long term plan processes.

ATTACHMENTS

1. SDF Programme - Summary One-Pager (A3) (June 2026) [1.2.1 - 1 page]

2. Proposed Adaptation Futures for South Dunedin - Overview Report [**1.2.2** - 38 pages]
3. SDF Stormwater Modelling Report [**1.2.3** - 32 pages]
4. SDF Stormwater Modelling Report - Appendices A-R (Maps) [**1.2.4** - 55 pages]
5. SDF Stormwater Modelling Report - Appendix S (Schema Statement) [**1.2.5** - 3 pages]
6. SDF Stormwater Modelling Report - Scoping Memo [**1.2.6** - 8 pages]
7. SDF Groundwater Drainage Options Assessment Report [**1.2.7** - 35 pages]
8. SDF Proposed Adaptation Futures Economic Evaluation Report [**1.2.8** - 64 pages]



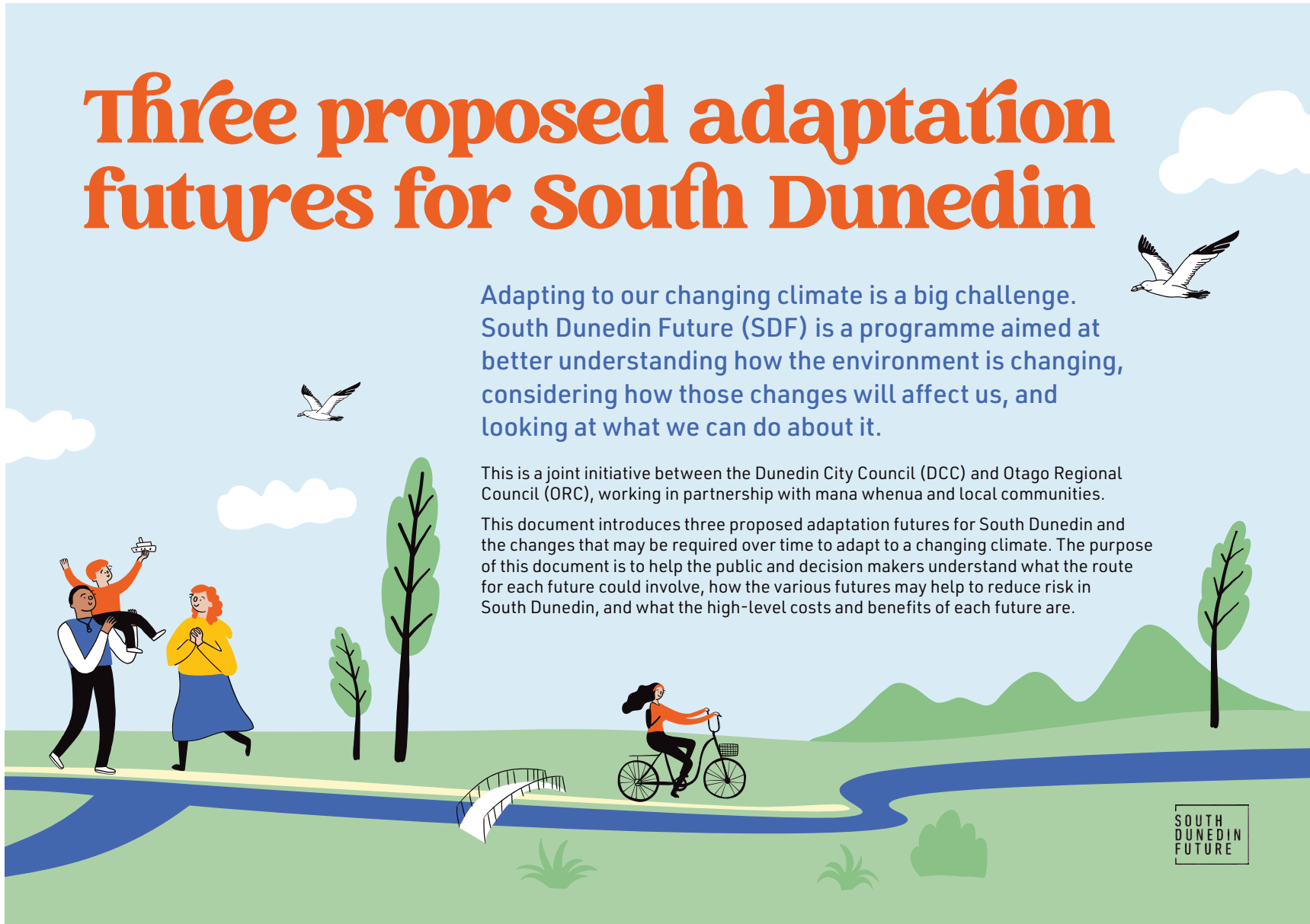
Council Meeting Supplementary Agenda - 24 June 2026

Three proposed adaptation futures for South Dunedin

Adapting to our changing climate is a big challenge. South Dunedin Future (SDF) is a programme aimed at better understanding how the environment is changing, considering how those changes will affect us, and looking at what we can do about it.

This is a joint initiative between the Dunedin City Council (DCC) and Otago Regional Council (ORC), working in partnership with mana whenua and local communities.

This document introduces three proposed adaptation futures for South Dunedin and the changes that may be required over time to adapt to a changing climate. The purpose of this document is to help the public and decision makers understand what the route for each future could involve, how the various futures may help to reduce risk in South Dunedin, and what the high-level costs and benefits of each future are.



SOUTH
DUNEDIN
FUTURE

Interacting council activities

South Dunedin Future is not occurring in isolation – there are a wide range of other council activities that are complementary to this adaptation planning process and will directly or indirectly influence the development of the adaptation masterplan and its subsequent implementation.

These activities contribute to making South Dunedin 'safer and better', by reducing floods and other risks and by helping regenerate different areas.

SOME KEY ACTIVITIES INCLUDE:

Three waters

- Quick-win stormwater projects (\$29.2 million) – Three projects underway include:
 - Diverting the Bay View Road and New Street stormwater systems
 - Upgrading the size of the Forbury Road stormwater pipe
 - Disconnecting the Hillside Road stormwater main and pumping it to Orari Street outfall.
- Short-term storm water projects (\$15 million) – Funding has been allocated in DCC's current 9-year plan (2025-34) for short-term flood alleviation work in South Dunedin, which will be one of the initial actions to implement the adaptation masterplan.
- Wastewater overflows at Surrey Street – DCC is undertaking renewals work across the three waters network to benefit South Dunedin and Surrey Street, as well as investigating options for addressing network issues contributing to wastewater overflows in and around Surrey Street during heavy rainfall events.

Property

- South Dunedin Library and Community Complex (\$22 million) – Te Whata o Kaituna opened in September 2025 and provides flexible reading, learning, creative and community engagement spaces. Located on King Edward Street, the Library contributes to the ongoing revitalisation of South Dunedin's commercial centre.
- Forbury Park purchase and redevelopment (\$13 million) – Purchased in February 2024, this 11.76 hectare site provides a wide range of options for DCC, including options for stormwater management. Design work is underway to incorporate the site into a green infrastructure network to support flood alleviation in South Dunedin and provide new community and recreational spaces.

St Clair / St Kilda coastline

- The St Clair to St Kilda coastline experiences coastal erosion. A separate project is currently underway to monitor and investigate how current and future coastal hazards may impact the coastline. The project is refining options for the next 50-year period to manage this erosion. DCC is working to align adaptation actions taken at the coast with those planned for inland areas of South Dunedin, so that they are complementary and lead to a coherent overall approach.
- Kettle Park Remediation (\$31-61 million) – DCC is designing a plan for the remediation of the former landfill at Kettle Park. This is expected to involve removing a large amount of contaminated material and changing the profile of the dunes to better protect South Dunedin from coastal erosion.

City development

- Plan evaluation (Natural hazards provisions in South Dunedin) – This project is evaluating the effectiveness of the district plan (ZGP) provisions that manage natural hazards in South Dunedin, to determine whether it is necessary to undertake a plan change.

Natural hazards

- Councils continue to actively monitor, investigate, and model natural hazards affecting South Dunedin. This includes monitoring groundwater, sea level rise, and land subsidence, as well as investigating coastal erosion and flooding, and understanding potential changes linked to the anticipated impacts of climate change.

Civil defence and emergency management

- Emergency Management Otago coordinates civil defence readiness, response, and recovery across the Dunedin City area, providing regional hazard information, planning, and support to help communities prepare for and manage emergencies.

Parks and recreation

- Playground upgrades: DCC has been undertaking a range of playground upgrades across South Dunedin, including at Bathgate Park (completed in 2024), St Clair (completed in 2025), and Marlow Park (scheduled for 2026).

What this could mean for different stakeholders

The Council's role is to:

- Coordinate and complete capital works (e.g. stormwater network upgrades, seawall, land raising) and works to enable these (e.g. engagement, changes to planning framework)
- Prepare and implement civil defence and emergency management plans
- Develop and implement plans, policies and regulations for the identification and management of natural hazards
- Facilitate the building of resilience and adaptive capacity within communities
- Where appropriate, work in partnership with communities to identify and manage risks.

While the council, on behalf of the community, is responsible for managing risks posed by natural hazards, **councils do not have an explicit legal obligation to protect privately owned assets from natural hazards.**

Private asset owners (such as individuals, organisations and businesses) are responsible for managing risks to their assets.

The private assets owner's role is to:

- Be aware of the risks and their responsibility for managing them
- Comply with regulations that apply to their assets and activities
- Take steps to understand the magnitude and nature of the specific risks
- Develop and implement strategies and actions to manage these risks at an individual property level.

3 Three proposed adaptation futures for South Dunedin

Methodology overview

The five stages of the SDF programme are summarised in the ribbon, to the right, which captures the key questions relating to adaptation planning, as outlined in the Ministry for the Environment's Coastal Hazards and Climate Change Guidance (2024). These are described below.

1 What is happening?

The initial stage of the SDF programme involved work to monitor and analyse a wide range of natural hazards affecting South Dunedin, such as flooding from heavy rain, rising groundwater and sea level rise. The South Dunedin Risk Assessment, released in March 2025, summarised our current understanding of how these hazards are expected to change over time. This information is updated as new data becomes available.

2 What matters most?

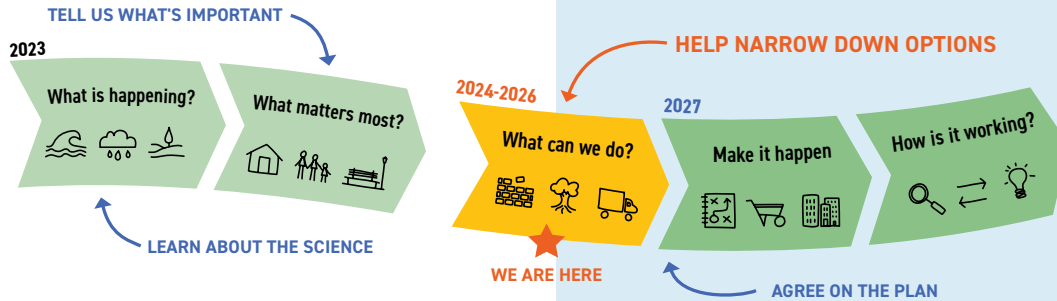
The Risk Assessment considers South Dunedin's exposure to these changing hazards, the vulnerability of things affected, and analyses the resulting risk - now and in the future. Understanding what is important and why allows an assessment of the consequences of risks to people, places and assets in South Dunedin. This work is informed by community engagement and mana whenua values. The Risk Assessment provides a picture of what could happen to the things we value if appropriate action is not taken.

3 What can we do?

There are many ways to adapt, generally grouped into four categories - protect, accommodate, retreat, and avoid. From the seven Potential Adaptation Futures released in 2025, three have been shortlisted. This phase of the SDF programme develops more detailed descriptions over time for these futures, showing possible actions in the short, medium and long-term. Feedback from the 2025 engagement sessions was used to inform the development of the three Proposed Futures.

4 Make it happen.

After a preferred future is selected and an adaptation masterplan is completed, delivery will occur through standard council processes, such as long-term planning, infrastructure strategies and District Plan changes. While the preferred future will provide a more detailed picture of potential changes in South Dunedin, it is important to note that no decisions have been made about major infrastructure or land use changes. Implementation is expected to take time and will depend on funding, consenting and national reforms.



5 Is it working?

A range of activities will also be put in place to monitor progress, to determine how well the adaptation masterplan is working and whether our actions are effectively managing risk. Based on the results, changes can then be made so that the plan remains fit for purpose.

IMMEDIATE NEXT STEPS

The next steps for the SDF programme include:

- Community engagement on the three proposed futures for South Dunedin.
- Further refinement of the three proposed futures into a preferred future, supported by a final round of community engagement.
- Presentation of the preferred adaptation future in an Adaptation Masterplan for South Dunedin, which is expected by early 2027.

Government guidance

In October 2025, central government released a National Adaptation Framework which sets out the approach to addressing climate-driven natural hazards across four pillars: risk and response information sharing, roles and responsibilities, investment in risk reduction, cost-sharing pre- and post-event.

Under the National Adaptation Framework, the first tranche of council adaptation plans will prioritise locations facing flooding and coastal hazards, reflecting the Government's risk-based approach to implementation. In addition, Civil Defence Emergency Management (CDEM) Group Recovery Plans will be required to "give effect to" the relevant adaptation plan and make sure recovery planning aligns with long-term climate adaptation planning.

The futures provide choices for communities of lower and higher risk areas within South Dunedin, enabling individual decision-making. The futures require council to invest early in infrastructure to manage flooding with a long-term (100-year) view in mind while providing opportunities for partnerships with investors to encourage development in the right places. The futures do rely on the ability to acquire property to transition high risk areas to lower risk uses, which is not explicitly addressed in the National Adaptation Framework.

4 Three proposed adaptation futures for South Dunedin

Refining futures

From 16 adaptation approaches, we developed seven potential futures, then refined these to three proposed futures with actions over time. From here, further analysis and engagement will help select a single preferred future to underpin South Dunedin's climate adaptation masterplan. The process is outlined below.

16 GENERIC ADAPTATION APPROACHES

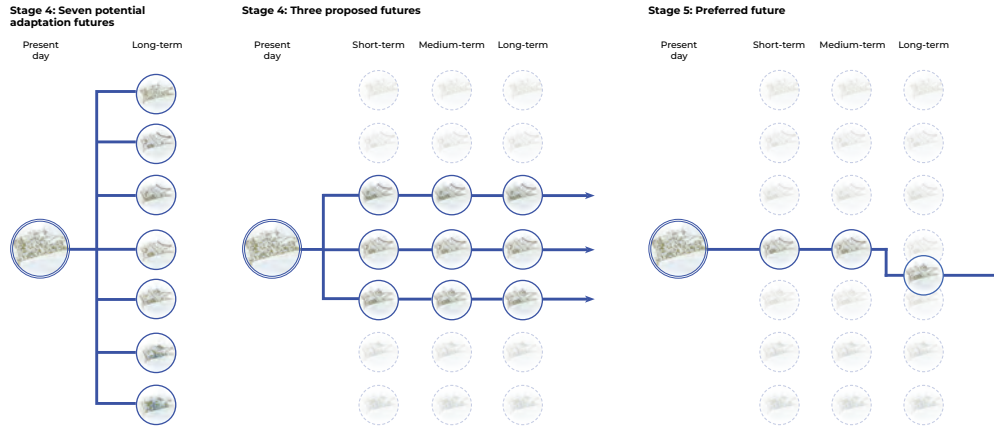
Drawing on best practice approaches from around the world, and ideas crowd-sourced from the community and stakeholders, an initial list of 16 generic approaches for helping South Dunedin adapt to flooding and future climate change was released in December 2023. These 16 approaches were categorised as one of protect, accommodate, retreat, and avoid, and were consulted on with the community in early 2024, with feedback informing further analysis.



7 POTENTIAL ADAPTATION FUTURES

The 16 approaches were then combined in different ways to form seven Potential Adaptation Futures for South Dunedin, which were released in March 2025. The seven futures included a 'Status Quo' future - essentially the path we're currently on if we don't change anything - and six other futures representing a spectrum of responses, with a focus on infrastructure at one end and land use change at the other. Community engagement on the seven futures was during April and May 2025.

A shortlisting process assessed all seven futures in an effort to determine which ones will best manage the risks facing South Dunedin, while also enabling more opportunities. This process involved technical and economic assessments of each future, against a set of strategic objectives and a decision-making framework previously approved by the Councils. It also considered community feedback. The process proposed Futures 3, 4 and 5 for further development - which was reported to councils and announced to the public in September 2025.



3 PROPOSED ADAPTATION FUTURES

Following the shortlisting process, stormwater and groundwater modelling for each of the three proposed futures was used to determine an appropriate mix of infrastructure, green and blue space, and land use change required to manage risk in different areas of South Dunedin.

The three proposed futures show what type of action we might take over time, covering short (next few decades), medium (mid-century), and long-term (toward the end of the century and beyond).

- **Future 3 – Protect (Keep the land dry – raise land and pump water)**
Hard infrastructure moves water, supported by wetlands and stormwater reserves. Raised land provides elevated, safer areas for development.

- **Future 4 – Restore (Make space for water – waterways and wetlands)**
A network of waterways, wetlands, pipes, pumps and coastal protection balances engineering with nature.
- **Future 5 – Reshape (Move out of harm's way – raised land and green spaces)**
Open waterways, green infrastructure and raised land development combine to manage flooding and groundwater while reshaping a resilient urban form.

REFINING TO A PREFERRED FUTURE

Following community engagement, further assessments, modelling and economic analysis will refine the options and identify a single preferred future that best manages risk while enabling long-term opportunities.

Reader's guide

This document provides an initial assessment of the proposed futures over time. They serve as a tool for informed discussions with the community and decision makers in this phase about how a combination of adaptation actions over time may help reduce risk, as well as what residual risks remain and the high-level costs and benefits.

Visualisations of the three proposed futures are intended to illustrate the potential changes required in South Dunedin to manage flooding and other risks. This provides a sense of what the area could look like in the future and how these changes might play out over the short-, medium- and long-term. The illustrations are based on the best available information and analyses to date and are intended to support further discussions with the community and stakeholders. Further optimisation will be required for exact locations and sizes of infrastructure.

WHAT'S INCLUDED IN THE SUMMARIES?

Future comparisons:

A dashboard summarises costs, social impacts and technical factors, with additional images showing key actions, differences and how risk changes over time.

Future overview:

Each future outlines actions across categories (e.g., pipes/pumps/overland flow paths, managed relocation). The page includes images to show how South Dunedin will look on a 'dry-day' and 'flood-day', where the 'flood-day' is based on a rare event (1% chance of occurring each year).

Objectives assessment:

Subject-matter experts assessed each future over time; these summaries provide the evidence base for decision-making. Communities are welcome to provide feedback if we have missed any key considerations.

Implementation approach:

Technical considerations and potential signals, triggers and adaptation thresholds (STATs) to prompt action are set out as part of the implementation approach.

Economic measures:

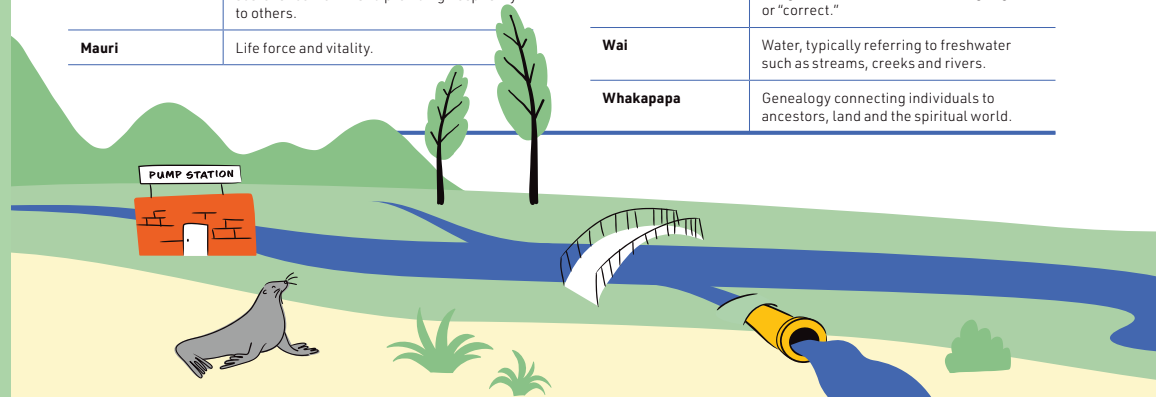
Present-value costs and benefits (in \$ billions) inform the estimated benefit to cost ratios (BCRs). A BCR of zero is not viable, and ~1 or higher suggests more positive outcomes. Costs are Council-only and are indicative and have a high uncertainty, based on similar projects. They exclude potential offsets.

Risk assessment:

Maps show residual risk for the present (current level without any intervention), and the short-, medium- and long-term. Residual risk can persist or re-emerge when design levels are exceeded, infrastructure fails, or operations falter (e.g., power outages, inadequate maintenance).

Glossary

Annual Average Damages (AAD)	The annualised expected value of flood damage across all probability events, weighted by their likelihood. AAD is the primary benefit metric in the economic evaluation. It captures both the frequency and severity of flood events and is directly linked to the flood modelling outputs and DCC Flood Damage Assessment methodology.	Moana	Sea, ocean or a large lake.
Benefit Cost Ratio (BCR)	The ratio of present-value benefits to costs; a BCR above 1 indicates benefits outweigh costs, helping compare options.	Present risk	The current level of risk before any new interventions, based on existing hazards, exposure and vulnerability.
Challenge of implementation	The practical difficulty of delivering an option, such as technical complexity, consenting, funding, timeframes, land access, and stakeholder alignment.	Properties acquired	The number and type of properties that must be purchased (voluntary or compulsory) to enable an intervention.
Hauora	Health and wellbeing.	Properties added	The number of new properties added through development or redevelopment (e.g., relocation to raised land).
Kaitiakitaka	Exercise of guardianship by mana whenua. Stewardship and guardianship, typically relating to the care and protection of an environmental area or natural resource.	Rakaitirataka	Māori sovereignty, leadership, and self-determination.
Ki uta ki tai	"From the mountains to the sea." Describes a holistic, inter-connected and or catchment-wide approach to natural resource environmental management that recognises the interconnectedness of all parts of an ecosystem.	Residual risk	The risk that remains after interventions, e.g., when events exceed design levels, assets fail, or operations falter.
Mana Whenua	Authority and power derived from the land. Refers to Māori who have occupied and cared for a place over generations, drawing sustenance from it and providing hospitality to others.	Social impact	The effects of an option on people and communities, wellbeing, equity, cultural values, access to services, displacement, and disruption.
Mauri	Life force and vitality.	Te Mana o Te Wai	A foundational concept in Aotearoa New Zealand's freshwater management that protecting prioritises the health and mauri wellbeing of water bodies is paramount to the health of the wider natural ecosystem environment and the health of people above other uses.
		Tikaka	Māori customs and correct ways of doing things. Derived from tika, meaning "right" or "correct."
		Wai	Water, typically referring to freshwater such as streams, creeks and rivers.
		Whakapapa	Genealogy connecting individuals to ancestors, land and the spiritual world.



Understanding futures

Each of the proposed futures shows the bundling and sequencing of interventions over time, covering short (next few decades), medium (mid-century), and long-term (toward the end of the century and beyond). The timing of adaptation interventions is based on dynamic signals (early warning), triggers (decision points), and thresholds (unacceptable outcomes). The summaries include more detailed information on the useful life of adaptation actions, linking together different actions such as infrastructure investment and creating green space.

An underlying principle of this type of dynamic approach is that interventions are only implemented when and where required. These respond to pre-agreed signals and triggers, so change occurs only if or when necessary to manage risk. The timing of these signals, triggers and associated interventions is indicative only, and in reality, may occur earlier or later depending on the rate of change in climate conditions.

For example, we might start to prepare for changes when we see certain signals (like worse or more frequent flooding), then implement agreed interventions when we hit certain triggers (like a certain number or severity of flood events), so we can make the changes before we hit certain thresholds (like insurance retreat).

For South Dunedin, we've already met some of the signals and triggers, and we'll need to start taking action soon to build more resilient communities.

Signals and triggers identified for the proposed futures are high-level at this stage. Measurable signals and triggers will be developed for the preferred future.

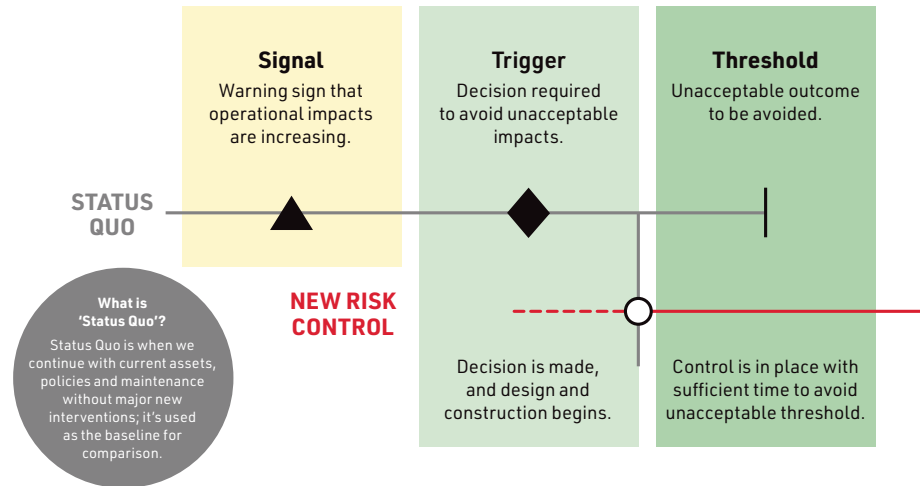
SWITCHING BETWEEN FUTURES

Although we will eventually agree on a preferred future, using this adaptive planning approach means we might switch between futures in a proactive, timely, and transparent way, guided by community objectives and data. After a signal is identified, consideration of whether the planned next step along the future is still the right one begins, with a decision made when the trigger is identified.

THINKING BEYOND 2125

To support long-term planning, we undertook preliminary sensitivity testing to understand how the futures perform beyond 2125. The futures have been developed for a very high emissions future (SSP5-8.5, 50th percentile) and are viable through to 2125 under those conditions. If a more extreme scenario were to eventuate (SSP5-8.5, 83rd percentile), the futures would remain effective but only up to approximately 2095.

On the upside, if we follow a 'middle-of-the-road' climate scenario (SSP2-4.5), the futures remain effective for longer, likely through to about 2150.



In particular, **Future 3 - Protect** and **Future 5 - Reshape** continue to perform well even under events that exceed their design conditions because development is shifted to higher, lower risk areas. **Future 5 -Reshape** is likely to perform better than **Future 3 - Protect** these over-design events because there is additional capacity to hold water in the waterways as compared to the pipe network. Under any of these futures, there remain options to shift communities to safer areas beyond 2125 or if conditions worsen faster than expected.

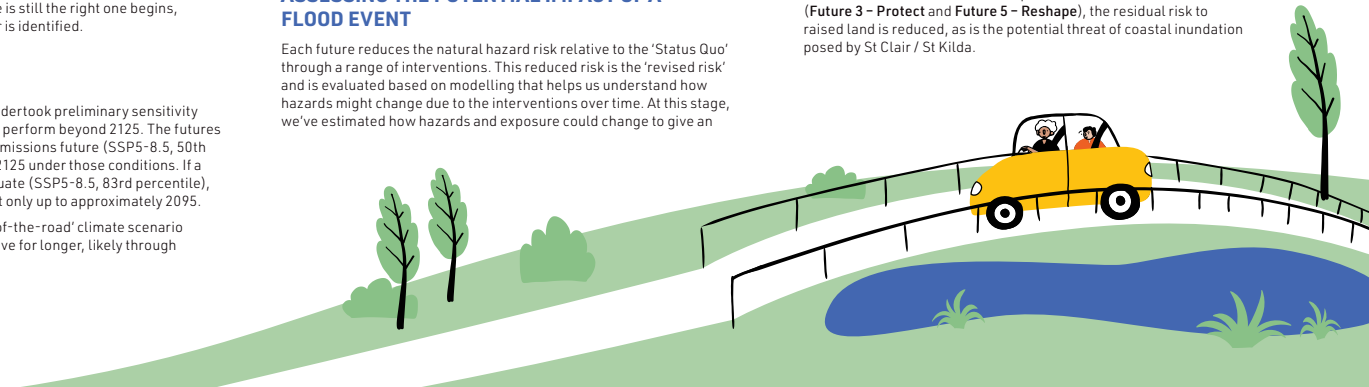
ASSESSING THE POTENTIAL IMPACT OF A FLOOD EVENT

Each future reduces the natural hazard risk relative to the 'Status Quo' through a range of interventions. This reduced risk is the 'revised risk' and is evaluated based on modelling that helps us understand how hazards might change due to the interventions over time. At this stage, we've estimated how hazards and exposure could change to give an

early indication of potential impacts. More detailed modelling and design work will be carried out later as the preferred future is developed further to optimise and minimise cost while maximising the benefits.

In all futures, short and medium-term interventions achieve drastic reductions in 'revised risk', with minimal difference in risk profile between each future. In the long term, high uncertainty remains regarding the long-term management of coastal hazards at St Clair / St Kilda, meaning coastal flooding poses an unknown level of risk.

In all futures there remains a 'residual risk'. This is the risk that remains after interventions are implemented. Where land is raised (**Future 3 - Protect** and **Future 5 - Reshape**), the residual risk to raised land is reduced, as is the potential threat of coastal inundation posed by St Clair / St Kilda.



Economic approach

This economic evaluation exists to answer a specific question: Does the evidence support investment in adaptation, and if so, which adaptation future delivers the most value for the public dollar? The answer requires holding two things in view simultaneously: what it will cost the community to act, and what it will cost the community not to.

The evaluation covers 100 years from 2027. Infrastructure investment of the kind contemplated in each future has a design life measured in decades. The consequences of under-investing in the past and continuing this through the 2020s will be felt in damage, in lost property value, in deteriorating liveability well into the 2070s and beyond. A 100-year lens is the minimum needed to capture the likely costs and benefits felt across the community.

The primary metric used throughout this evaluation is Annual Average Damage, or AAD. AAD is the annualised expected cost of flood damage across the events with a 10%, 2% and 1% chance of occurrence weighted by their likelihood. Put simply, it represents what the community would pay each year, on average, if it were fully insured against all pluvial flood events at their expected frequency and severity.

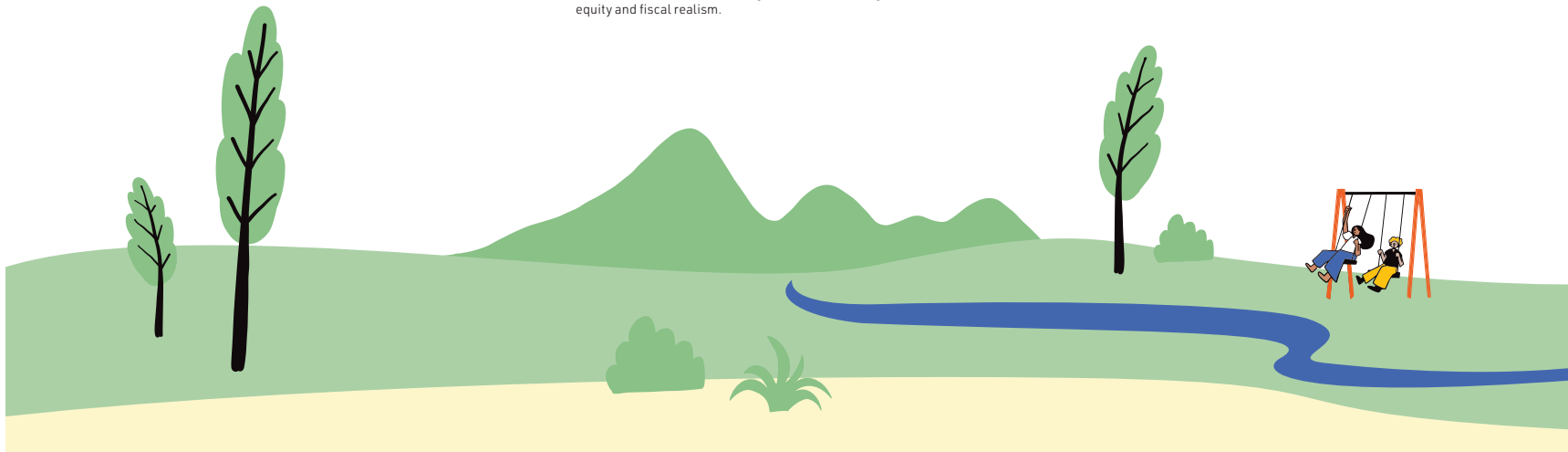
The economic evaluation follows a standard adaptation appraisal framework drawing on national and international guidance for long-term climate investment. The analysis assesses each proposed future by comparing its whole of life costs with the avoided damages and co-benefits achieved relative to the Status Quo baseline. This baseline represents a market driven reactive response to the increasing exposure to hazards and associated increasing AAD over time. By framing benefits as “avoided losses,” the evaluation enables a direct and transparent link between the hazard modelling, residual risk results, and the economic outcomes.

The BCR is calculated as the net present value of all the monetised benefits divided by the net present value of all the monetised costs. A BCR of 1 is where the net present value of the monetised benefits equals the monetised costs. If the BCR is less than 1, the costs outweigh the benefits (and vice versa).

The economic evaluation has assessed and compared the expected and indicative whole-of-life costs and benefits of each shortlisted future, relative to the counterfactual of not investing in future adaptation in the existing community. The key driver of this economic evaluation is to provide comparable evidence to DCC and does not represent all costs and benefits from ongoing and future activity in this area.

We relied on the outputs from other models for this work (see Economic Evaluation Report for more details).

Benefit-Cost Ratios are calculated using a central real discount rate of 6% and some sensitivity testing. This range reflects common practice for long-living public infrastructure and climate adaptation investments, where discounting must balance intergenerational equity and fiscal realism.

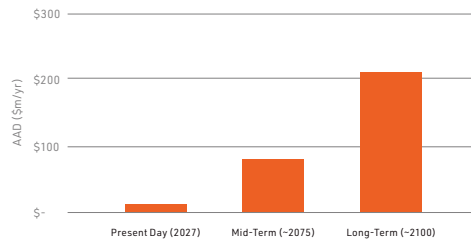


The cost of inaction – Status Quo

The Status Quo trajectory is not a hypothetical. South Dunedin already experiences flooding. The 2015 and 2024 events demonstrated the scale of disruption that moderate events can cause. The modelling underpinning this evaluation projects that the frequency of events of that severity, and worse, will increase substantially over the coming decades, driven by sea level rise, more intense rainfall, and groundwater pressures that are already detectable.

The economic evaluation quantifies this trajectory, enabling decision-makers to consistently compare the costs of acting and not acting. The central finding is clear: the cost of inaction is high and growing, spread across many years as damages to property are increasingly incurred, with its most severe consequences borne by the most vulnerable households. The question is not whether to act, but which action will retain the current community of approximately 13,500 in South Dunedin.

Cost of Inaction: Property-Level Annual Average Damage - Status Quo (\$m/yr)



The \$11 million to \$212 million AAD trajectory captures direct property and building damage from rainfall events and coastal inundation. *It does not capture the full economic and social cost of inaction, which is substantially larger and more complex.* The true cost of doing nothing includes a set of cascading consequences that compound the primary damage figures over time beyond what is shown here.

Annual Average Damage by Time Period – Status Quo Scenario

Building Level Property Damages - Status Quo	AAD 2025 QV (\$m)		
	Pluvial Flood Damages	Coastal Flood Damages	Combined Damages
Short-term (present day)	\$11m	\$0m	\$11m
Medium-term	\$43m	\$35m	\$78m
Long-term	\$60m	\$152m	\$212m

The \$1.4 billion and likely \$2 billion figure in context

Over the full 100-year assessment period, the present value cost of the Status Quo scenario exceeds \$1.4b plus (2025 NPV at a 6% central real discount rate). This includes property damage, fatality and injury costs, emergency services, trauma, income loss from displacement, and environmental costs.

It excludes infrastructure repair, loss of activity/productivity, event clean-up costs, private property interventions (both proactive and reactive), and the economic consequences of insurance withdrawal. Including these would raise the total materially above \$2b.

IAG noted that from the 2015 flood event with over 1,200 homes and businesses damaged by water, resulted in insurance payouts being about \$28m. They estimated the combined economic cost of \$138m (made up of \$64m economic damage and \$18m social damage).





















































The \$1.4b figure is therefore conservative. It represents the floor of the cost of inaction, not the ceiling.

The table below summarises the broader categories of economic harm that accompany and, in many cases, amplify the direct damage trajectory.

Each of these consequences interacts with the others: insurance withdrawal reduces property values, undermining the mortgage market and accelerating economic decline in the most exposed areas, which in turn makes recovery from flood events slower and more expensive.

Cost category	How it develops (with the Status Quo)	Trajectory
Infrastructure failure	Roads affected by deep flooding increase. Stormwater (pluvial flood events) covering the centreline of the road to a depth over 300mm increases from approximately twenty today to approximately 135 by 2120 for the 10% AEP event. Each failure disrupts access, supply chains, and emergency response. Park areas with 'unplanned' significant inundation increase from 0.5 hectares to approximately 4 hectares. Groundwater and coastal inundation further challenge the future efficacy of infrastructure, with approximately 1,200 properties becoming exposed to emergent groundwater through to 2120.	Rapidly worsening
Business and industrial disruption	Industrial areas face Annual Average Damages rising from \$30 million (current) to approximately 90 million per major event in the long term. Loss of trading days, supply chain disruption, and reduced investor confidence follow each significant flood.	Rapidly worsening
Insurance affordability and availability	As flood frequency and severity increase, alongside and increasing impact of groundwater, insurers will raise premiums, impose exclusions (particularly for groundwater, which is already commonly excluded), and in the most exposed areas, withdraw cover entirely. This mirrors patterns seen following recent major flooding events across New Zealand.	Trigger approaching
Mortgage viability and property values	Without insurability, lenders are unwilling to extend mortgages against flood-affected properties. Property values decline, eroding the household wealth that many lower-income homeowners have built over a lifetime.	Worsening
Fatality and injury costs	The frequency of dangerous flood events increases significantly. Fatality and injury costs, valued using Treasury-recommended value of statistical life (VoSL) and injury-cost parameters, constitute a material component of total avoided damages under each adaptation future.	Worsening
Intergenerational equity	Under the Status Quo, residual risk is increasingly privatised: households and businesses in the most exposed areas bear the full cost of flood damage, insurance withdrawal, and asset depreciation. This concentrates harm on those least able to absorb it and transfers the consequences of today's decisions onto future generations.	Growing concern
Coastal exposure	The risk assessment highlights the rising likelihood of coastal inundation occurring from the Medium term onwards. Furthermore, exceedances of the 1% AEP extreme sea level event is identified to be occurring with an almost yearly frequency with 40cm of sea level rise (PCE, 2015).	Rapidly worsening

South Dunedin proposed futures – dashboard

Futures		Main Actions	Costs	Properties acquired and added	Challenge of Implementation	Social Impacts	Residual Risk	Average Annual Damages
 <p>Status Quo Keep doing what we are doing Total Costs: \$0.41B Total Damages: \$1.45B</p>	Short	 Pipes and pumps (minor stormwater network), reactive retreat, individual interventions	\$254M	-57*				\$11M
	Medium	 Pipes and pumps (minor stormwater network), reactive retreat, individual interventions	\$115M	-103*				\$78M
	Long	 Pipes and pumps (minor stormwater network), reactive retreat, individual interventions	\$43M	-678*				\$212M
 <p>Future 3 Protect Total Costs: \$2.1B Total Benefits: \$1.34B</p>	Short	 Investment in pipes, pumps, land acquisition and rezoning	\$1,598M	-736				\$0.6M
	Medium	 Raise land, add pipes and coastal protection, expand pumps, create green spaces	\$452M	-456/+336				\$2.3M
	Long	 Increase pump capacity, expand green spaces, develop housing	\$48M	+1520				\$1.0M
 <p>Future 4 Restore Total Costs: \$1.63B Total Benefits: \$1.35B</p>	Short	 Investment in pipes, pumps, land acquisition and rezoning	\$1,284M	-1162				\$0.6M
	Medium	 Build canals, wetlands, and coastal protection, expand pumps, add pipes	\$287M	+840				\$1.6M
	Long	 Complete green space transition, add pipes, increase pumping, develop housing	\$58M	0				\$0.7M
 <p>Future 5 Reshape Total Costs: \$2.45B Total Benefits: \$1.34B</p>	Short	 Investment in pipes, pumps, land acquisition and rezoning	\$1,938M	-1144				\$0.6M
	Medium	 Raise land, build canals and coastal protection, develop housing	\$475M	-594/+336				\$2.5M
	Long	 Maintain infrastructure, complete green space transition	\$35M	+1780				\$3.3M



Short - 2025 to 2050
Medium - 2050 to 2075
Long - 2075 to 2125

 Pipes and Pumps
 Coastal Protection
 Land Raising
 Water Storage
 Waterways
 Change in Planning Rules

 Low
 Moderate
 High
 Very High
 With high coastal residual risk
 Higher residual risk due to failure or hazard event that exceeds design limits

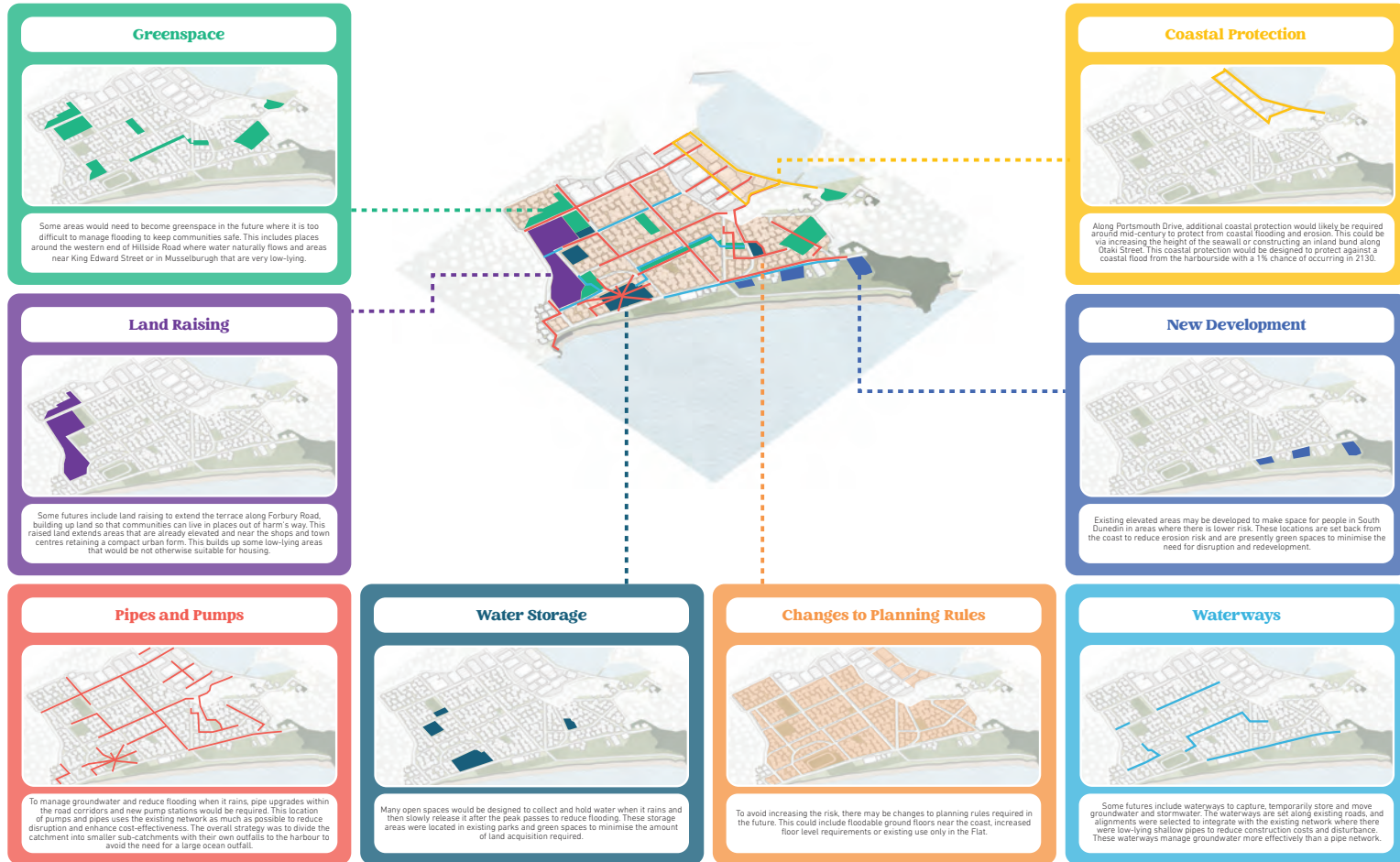
*Properties that would be impacted by emergent groundwater

South Dunedin Proposed Adaptation Futures, Apr 2026

Key actions

The image below depicts key actions that would be taken across all proposed futures. Some actions - including upgraded pipes and pumps and coastal protection - are shared across multiple futures.

Each key action is shown on the central map, illustrating how different parts of South Dunedin would be supported to manage flooding, adapt to climate change and build long-term resilience. Locations and size have been informed by community feedback on what level of flooding is acceptable.

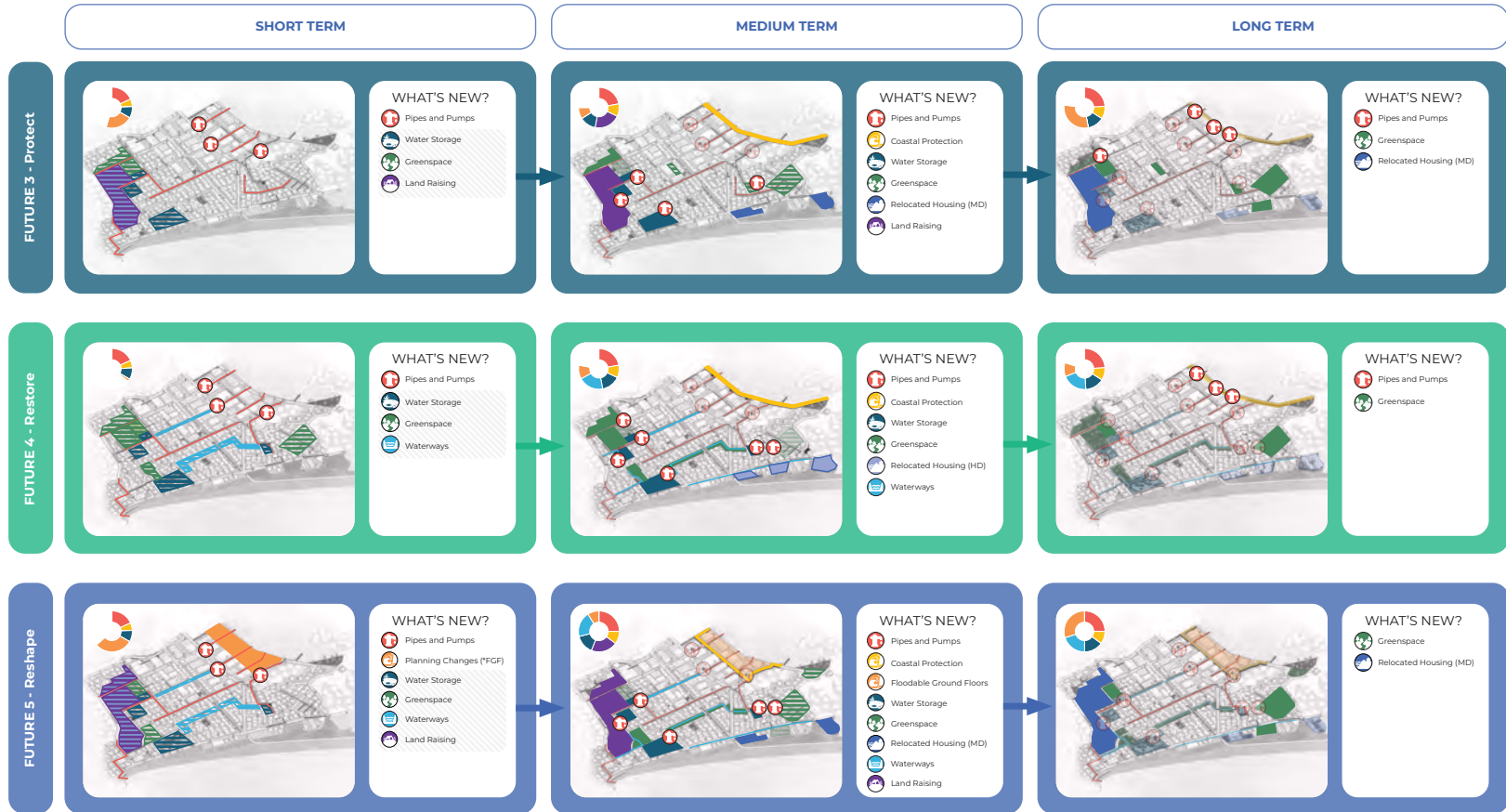


Key differences over time

The image below shows how each future evolves over the short-, medium- and long-term. For each future, the three timeframes show which new actions are added over time.

	Pipes and Pumps		Water Storage
	Coastal Protection		Waterways
	Land Raising		Changes to Planning Rules
	MD (Medium Density)		Acquisition Underway
	HD (High Density)		

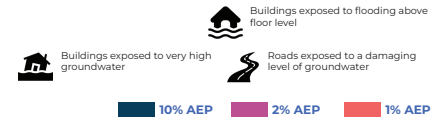
*FGF (Floodable Ground Floors)



Residual risk over time

The image below shows how residual risk changes over time across the proposed futures. It compares present day risk with short-, medium- and long-term projections, highlighting the buildings that remain exposed to flooding even after planned actions are implemented.

The maps illustrate the varying levels of risk that persist under each future, highlighting where vulnerabilities continue and where adaptation efforts reduce exposure over time.



13 Three proposed adaptation futures for South Dunedin

Future 3 – Protect

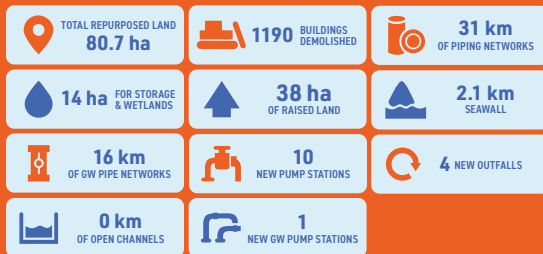
Future 3 – Protect manages stormwater and groundwater mainly via a network of pipes and pump stations to move water out of South Dunedin.

Roads help to direct and hold water during intense rainfall and stormwater reserves or constructed wetlands provide even more storage when required.

To support this, Council would improve the seawall along Portsmouth Drive, and raise an area of Forbury Corner to expand the existing high ground and create intensified space for people to relocate to, away from areas of highest risk. To minimise the amount of land raising required, a new residential development is included in the Ocean Beach Domain area.



KEY PROJECT FEATURES



What we heard about Future 3 – Protect

In 2025, Council asked for feedback from Aukaha (representing Kāi Tahu mana whenua) and the local community. We've used this feedback to inform development of the proposed futures.

KĀI TAHU RŪNAKA

Engagement with Aukaha indicated that Kāi Tahu mana whenua considers **Future 3 – Protect** a modest improvement to the Status Quo, but view it as fundamentally limited by its reliance on hard infrastructure. While the inclusion of larger stormwater retention areas and green spaces offers some ecological benefits, the approach does not fully align with Te Mana o Te Wai (wellbeing of water) or ki uta ki tai (mountains to sea) principles.

Aukaha noted moderate disruption and risks of inequitable transitions, with vulnerable communities potentially disadvantaged. They had favourable perceptions of **Future 3 – Protect** related to general risk reduction and an improvement in community hauora (health). However, the reliance on hard infrastructure rather than natural process limits the ability for mauri (life force) to be enhanced.

Overall, **Future 3 – Protect** is viewed as a compromise: slightly better than Status Quo, but misaligned with best outcomes for mana (recognised authority and prestige), whakapapa (genealogy) and cultural aspirations.

COMMUNITY ENGAGEMENT

South Dunedin communities' perspectives on **Future 3 – Protect** are mixed, reflecting both optimism and caution. Many respondents felt this option was taking South Dunedin in the right direction, with around 39% agreeing and 20% strongly agreeing. People appreciated the inclusion of wetlands, seeing them as visually appealing and beneficial for the area's character.

While **Future 3 – Protect** was seen as empowering by giving people choices about where and how they live, concerns remained about equity and transparency of potential property acquisition.

Overall, **Future 3 – Protect** was viewed as a balanced and cost-effective approach that could improve resilience and quality of life without requiring widespread relocation. However, some respondents expressed uncertainty about details such as how land would be raised, the timeframe for implementation, and what support would be available for affected residents.

FUTURE 3 – PROTECT

**Short-term
(next few decades)**



Pipes, pumps and flow paths

Over the next few decades, Council would invest heavily in pipes and pumps to reduce flooding, including new pump stations lifting peak capacity by 137% and upsizing or adding stormwater pipelines across 25 km of the network. Daily pumping would lower groundwater while providing sufficient capacity to drain rainfall. Roads would still flood periodically, but property impacts are generally avoided in storms with a 2% annual chance of occurring, with some damage risk in rarer 1% chance events.



Property acquisition

Property acquisition (shown in pink areas) would be required in high groundwater zones to prepare for safer development and infrastructure. Changes to planning rules begin in the Flat with changes in development rules to avoid increasing risk.



Storage

Parts of Forbury, Bathgate and Tonga parks would be adapted as stormwater storage, balancing sport, recreation, natural spaces, and water. They would connect to the piped and pumped network, with ponds drained to add system capacity. Most of the time Bathgate and Tonga would be dry, but during major rain they would temporarily store water, which is then pumped out after the peak. More blue-green space will be needed over time, requiring some land acquisition in the short-term.



New development

Areas shown in yellow along Victoria Road would be zoned for medium-density development to provide lower-risk residential development spaces for people to shift to over time. Any loss of existing park space would be balanced by creation of more parks and green spaces in higher risk areas, such as on the Flat. These types of 'land use swaps' would help enable the best use of land in South Dunedin.



FLOOD



Coastal protection

In the short-term, there are no changes to coastal protection along the harbourside.

Working together with the St Clair / St Kilda Coastal Plan: There are a few ways to protect the coast, from hard structures like seawalls and offshore barriers (offshore breakwater) to softer options like adding more sand. Any plan would also deal with the contaminated landfill at Kettle Park. Right now, the quickest and most effective thing to do is protect the area where the St Clair geobags end and the Kettle Park landfill begins. This would mean building an offshore breakwater there, removing some of the landfill, and reshaping the dunes at Middles Beach to help reduce erosion. This intervention is under development and appraisal at this stage.

FUTURE 3 – PROTECT

**Medium-term
(mid-century)**



Pipes, pumps and flow paths

Signals and triggers including flood depths greater than 150mm on residential lots or local roads during design events would prompt Council to invest in a further 5km of pipes and increase pump capacity by an additional 12%. Roads would still periodically flood, but impacts to properties are generally avoided during rainfall events with a 2% chance of occurring each year. During extreme events with a 1% chance of occurring each year, there would remain some risk of property damage.



Land raising and development

Property acquisition would be complete by this point and would provide more space to manage stormwater and raise land. The area around Forbury Corner would be cleared and built up to prepare for development in a safe elevated area. Land raising would make ground levels higher through placement of fill material to reduce risk to pluvial, groundwater and coastal flooding and would extend the natural terraced area.



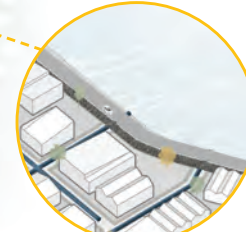
Storage

The existing storage areas have minor expansions in the medium-term. Over time, Tonga and Bathgate Parks are used more frequently to store heavy rainfall.



New development

Medium-density housing would be developed along Victoria Road with on site stormwater management, set back from projected future shorelines. Any park loss would be offset by new green space in higher risk flat areas to optimise land use in South Dunedin. In high groundwater areas (e.g., Musselburgh), converting to open space would enable tighter drain spacing while keeping these areas suitable for sport and recreation. New development along Forbury Road would begin once land raising is complete.



Coastal protection

Once sea level reaches 0.55m above 2005 levels, improved coastal protection along the harbourside would be required, with Council investing in extending the seawall to Bayfield Park and raising road levels to maintain emergency and community access. Construction of the seawall would need to take place during this period along the harbour edge to prevent overtopping into the industrial area and the Edgar Centre.

Working Together with the St Clair / St Kilda Coastal Plan: Rising sea levels and more storms would weaken and undermine the south coast seawall over time. To stop it from failing and to help keep sand on the beach, the seawall would need to be upgraded, shifted and possibly supported with extra sand. In future, buffer zones might be needed along the coast to allow room to move things back if erosion or flooding gets worse.



FLOOD

FUTURE 3 – PROTECT

**Long-term
(towards the end of the century and beyond)**



Pipes, pumps and flow paths

Council would increase pump capacity by a further 19% to keep land dry, with no additional pipes required if maintenance and periodic replacement are sustained. Roads would still flood periodically, but property impacts are generally avoided in storms with a 2% annual chance of occurring, though some risk would remain in rarer 1% events. Groundwater would be managed with daily pumping up to about 1.1 m of sea level rise, but becomes increasingly challenging beyond 2125.



Storage

The scale of storage in green space increases, providing further space for water on low-lying land as groundwater becomes more difficult to manage and rainfall is projected to increase. Water is stored in ponds then discharged when the network has capacity (e.g. after a storm passes).



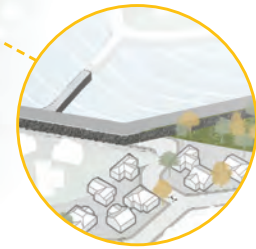
Green space creation

To avoid insurance retreat or unaffordable premiums, all acquired land would either be raised and developed or converted to green space for stormwater and groundwater management, reflecting the area's higher long-term risk. Green space would include reserves, sports fields, and parks - such as transforming the low-lying area behind King Edward Street for market days and community use. Council would keep flexibility to adapt to other futures, with gradual shifts to raised land (Future 6) as a very long-term option if risks become unmanageable.



New development

Medium-density residential space along Victoria Road and Forbury Road would be complete by this stage providing additional space for people in low-lying areas to shift to safer areas.



Coastal protection

In the long-term an extended seawall would provide coastal protection along the harbourside, along with a raised road levels to maintain emergency and community access.

Working Together with the St Clair / St Kilda Coastal Plan: Long term coastal risks on the South Coast are hard to predict, but managing erosion and flooding would likely require a mix of ongoing actions, and engineers would need updated information to decide which options work best. In some places, moving things further back from the coast may be needed.



FUTURE 3 – PROTECT

Objectives assessment

SUSTAINABLE URBAN DEVELOPMENT

Short-term

Early stormwater upgrades and limited uptake of water-sensitive design result in high embodied emissions. Changes to planning rules reduce flood risk and support compact growth.

Medium-term

Medium-density growth in safer areas and coastal protection improve resilience and create a compact urban form. High embodied emissions result from land raising and seawall construction, and there are ongoing operational emissions due to continued pumping.

Long-term

Transforming low-lying areas into greenways and focusing growth in elevated, walkable neighbourhoods improves resilience, while continued pumping results in ongoing emissions.

ENVIRONMENTAL AND CULTURAL RESTORATION

Short-term

Short-term engineered interventions increase stormwater discharges and limit ecological or cultural restoration, offering negligible biodiversity gains now, though changes to planning rules could enable future greenways.

Medium-term

Land elevation and new green spaces create habitat and improve water quality, but seawall expansion impacts nearshore ecosystems and cultural access. Limited co-design and reliance on hard infrastructure constrain deeper cultural restoration despite some alignment with Te Mana o Te Wai.

Long-term

Converting low-lying areas into greenways and wetlands would restore habitats and improve water quality, while cultural regeneration is enabled through natural landscapes; however, historic displacement, land-raising and seawall impacts remain, under-scoring the need for cultural integration to restore mauri and long-term ecological health.

PROMOTE COMMUNITY SAFETY

Short-term

Stormwater upgrades lower risks to homes and essential services, and changes to planning rules support safer choices despite community anxiety. While visible infrastructure boosts confidence even as construction disrupts access, ultimately improving health through reduced dampness and better living conditions.

Medium-term

Elevated land and coastal protection reduce flood exposure while green spaces lower residual risk and enhance recreation. Reliable transport access improves services despite temporary disruption. Ongoing seawall and pump maintenance is required. Overall wellbeing improves though uncertainty may affect psychological resilience.

Long-term

Green infrastructure and elevated land significantly reduce hazard exposure and create healthier living environments. Health improves and psychological resilience grows as communities stabilise, even as some impacts of past relocations persist. Residual risk from extreme events may require ongoing adaptation.

JUST TRANSITION

Short-term

Construction disruptions and buyouts risk stress and displacement, especially for culturally and linguistically diverse communities. While prioritising equity can reduce immediate flood risks for vulnerable groups, buyouts occurring before new elevated housing becomes available could create affordability pressures.

Medium-term

Land raising disrupts social structures and can fragment culturally diverse communities, while expanded elevated housing improves affordability and intergenerational equity. Accessible design supports elderly and disabled residents, and changes to planning rules limit redevelopment in high-risk areas, though relocation processes may still strain cultural ties, particularly for Pasifika and refugee households.

Long-term

Secure, affordable homes in elevated areas and new green spaces in former flood zones improve conditions for vulnerable communities, though past displacement may leave social scars, while long-term protection and amenity support intergenerational equity.

SOCIAL AND ECONOMIC RESILIENCE

Short-term

Upgraded stormwater systems reduce flood-related economic losses and support business continuity despite construction disruptions. Changes to planning rules and early land acquisition strengthen long-term adaptive capacity but create short-term uncertainty. Limited green infrastructure reduces potential amenity and ecological co-benefits.

Medium-term

Medium-density housing and coastal protection strengthen economic stability and reduce property damage, though construction and relocation may temporarily disrupt communities and local economies. Visible resilience measures improve adaptive capacity and public understanding of climate risks.

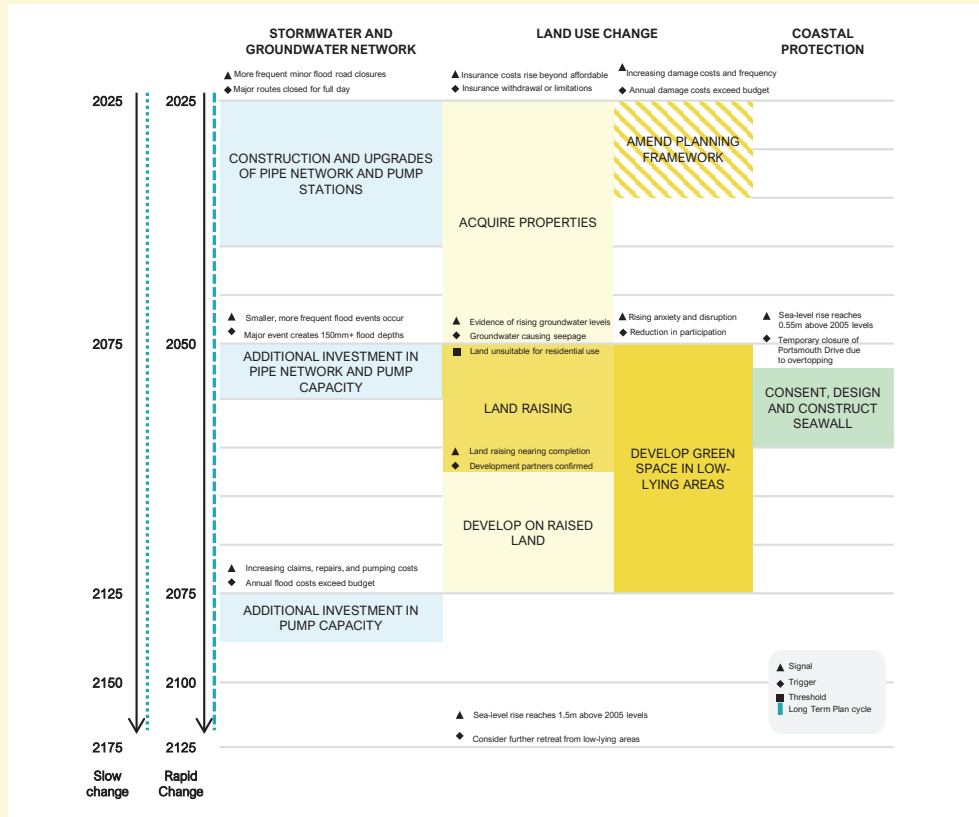
Long-term

Expanded greenways and elevated housing create a resilient urban system where businesses thrive in secure locations and improved infrastructure reduces flood-related losses. Active transport and public spaces foster social cohesion despite earlier fragmentation. Adaptive capacity strengthens through ongoing monitoring and flexible planning.

FUTURE 3 – PROTECT

Implementation approach

Adapting South Dunedin to a changing climate requires a sequence of interdependent actions, as shown below, which illustrates the indicative timeline for implementation. Actions along **Future 3 – Protect** are presented with sample signals (▲) and triggers (◆) representing early warning signs and resulting key decisions or enabling actions. Signals, triggers, and adaptation thresholds may be social, economic, ecological, physical, or cultural. The timing shown for signals, triggers, and actions is indicative only.



In the short-term, Council must first coordinate significant upgrades to the pipeline network and pumps to manage groundwater and stormwater efficiently. These upgrades need to be done simultaneously to avoid added cost and disruptions within the road corridor twice. Once drainage capacity is improved, Forbury Park and part of Tonga Park can be developed into greenspace for stormwater management. Short-term network upgrades have been designed to avoid needing to remove pipes in the future, and in the medium and long-term, increased stormwater capacity is largely provided by additional pumps.

At the same time, future development restrictions and opportunities require changes to the planning framework, which would need to be amended prior to physical works. In parallel, property acquisitions should be opportunistically pursued across Forbury Corner and Musselburgh. Properties acquired during this stage could be rented, leased, or similar until enough land is consolidated to enable large-scale transformation.

Finally, securing funding, consents and development partners would trigger major projects, including housing development at Tahuna and Forbury Corner. Enlargement of the existing seawall at Portsmouth Drive would require significant funds and should be complete prior to 2060 when the risk of overtopping increases due to sea level rise. Each step relies on the successful completion of the previous actions, creating a chain of dependencies that allow South Dunedin to adapt effectively to climate change.

WHAT ELSE DO WE NEED TO ACTION IT?

Changes in zoning: Council would need to make changes for development in the Flat and enable works related to upgrading infrastructure and raising land. This is a critical first step.

Financial incentives or penalties: Financial incentives can positively influence land use change and relocation required. Further work is needed into the mechanisms to achieve this but could include Council providing land-swaps, grants or low-interest loans for households relocating to raised land and development incentives in safer areas.

Property acquisition (buyouts): Land would need to be acquired to make space for pipes, pump stations and green infrastructure (e.g. stormwater management wetlands) which are "public works" because of their flood mitigation and public safety functions. Simultaneously, acquisition across Forbury Corner and Musselburgh would be required to enable land raising and safer development.

Funding mechanisms: Funding mechanisms are crucial for both the development of infrastructure and property acquisition. Further work is required to investigate possible funding mechanisms but could include public-private partnerships or development contributions for infrastructure upgrades (for example). Investigations into potential Central Government support through the Regional Infrastructure Fund (or similar) or protection of Crown assets (like schools) should occur.

FUTURE 3 – PROTECT

Economic measures

The Cost Benefit Assessment work seeks to compare the implications of shortlisted futures for South Dunedin. Costs and benefits are indicative and intended for comparison at this step of the South Dunedin Future (SDF) Programme.

Time period	Benefits (\$m)	Costs (\$m)	BCR
Short-term (0 - 25 years)	\$452	\$1,598	0.28
Medium-term (26 - 50 years)	\$372	\$452	0.82
Long-term (51 - 100 years)	\$511	\$48	10.61
Overall	\$1,335	\$2,098	0.64 (0.54 - 0.75)

Cost estimation approach

Based on spatial mapping of potential scenarios and typical unit rates from similar New Zealand projects. Calculated at 2025 present values, assuming staged implementation across the three time periods identified with construction spread over the first 10 years of each period. Includes:

- * Construction (capital, preliminaries, demolition, utilities)
- * O&M costs
- * Professional fees
- * Contingency and optimism bias (+66% per Treasury guidance)
- * Proactive Property acquisition - 1,190 properties (residential, commercial, social).

Whole-of-life costs: 25-year maintenance cycles + annual O&M. Pump stations include an allowance for annual electricity charges.

Exclusions: GST, escalation, downtime.

Costs do not account for potential offsets (e.g., land resale) or private owner contributions.

Range: \$2.1b (\$1.9b - \$2.5b), influenced by scale and uncertainty (especially land raising).

Monitised benefits include:

- * Avoided fatalities & injuries
- * Avoided residential, industrial & commercial property damage
- * Avoided infrastructure damage
- * Avoided trauma and social cohesion costs
- * Avoided water quality impairment
- * Avoided income loss and emergency services costs.

Benefits excluded due to data unavailability at this stage:

- * Redevelopment potential / Gains in property value
- * Avoided loss of open spaces and ecosystem services
- * Avoided heritage building damage
- * Value of insurability.

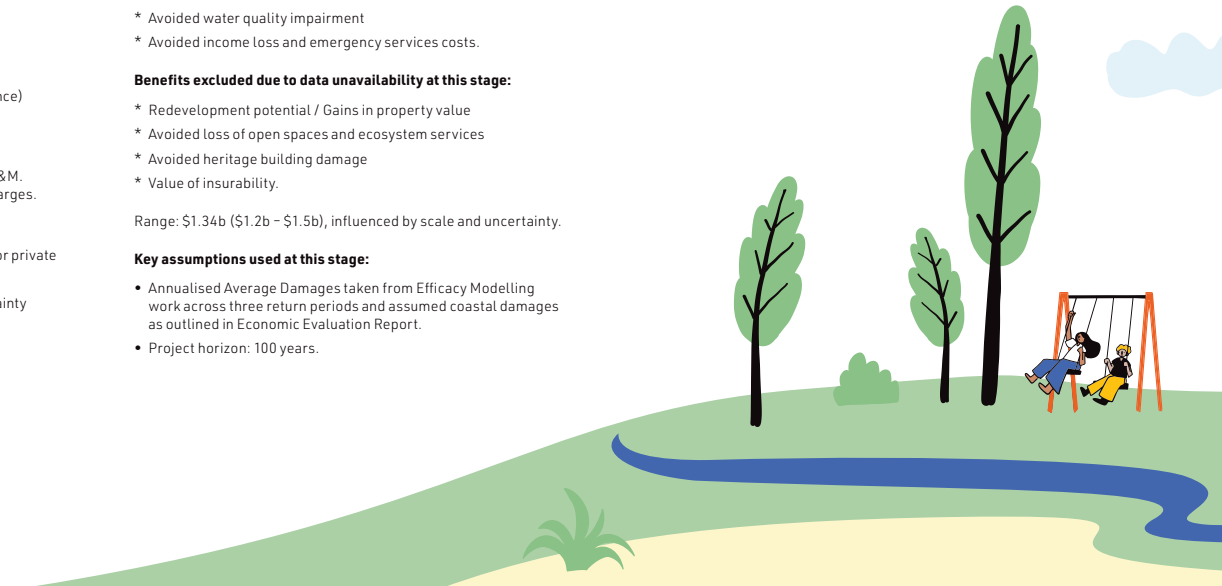
Range: \$1.34b (\$1.2b - \$1.5b), influenced by scale and uncertainty.

Key assumptions used at this stage:

- Annualised Average Damages taken from Efficacy Modelling work across three return periods and assumed coastal damages as outlined in Economic Evaluation Report.
- Project horizon: 100 years.

KEY PROJECT FEATURES

- 80.7 ha** TOTAL REPURPOSED LAND
- 10** NEW PUMP STATIONS
- 14 ha** FOR STORAGE & WETLANDS
- 1** NEW GW PUMP STATIONS
- 16 km** OF GW PIPE NETWORKS
- 31 km** OF PIPING NETWORKS
- 0 km** OF OPEN CHANNELS
- 2.1 km** SEAWALL
- 1190** BUILDINGS DEMOLISHED
- 4** NEW OUTFALLS
- 38 ha** OF RAISED LAND



FUTURE 3 – PROTECT

Risk assessment

Future 3 – Protect provides significant reduction in pluvial flooding and groundwater risk in the short-term relative to the baseline risk (present day, unmitigated).

This risk profile would further reduce over the medium-term despite increasing natural hazards. In the long-term, risk associated with most hazards are managed; however, high uncertainty remains regarding the long-term management of coastal hazards at St Clair / St Kilda, and further investigations are underway.

In all timeframes, residual risk remains, which is associated with the consequences of hazard events that exceed as-built design limits, and structural failures (e.g. seawall, groundwater pumping systems). It can also be associated with operational risks (e.g. power failures, lack of maintenance).

Overall, the Future 3 – Protect risk profile is largely similar to the other proposed futures, but has a slightly lower long term risk than Future 4 – Restore due to the raising of land that provides additional flood risk reduction benefits and minimizes residual risk.

HOW IT WOULD REDUCE RISK

In the short-term, stormwater infrastructure upgrades are predicted to remove the flood risk associated with frequent events (10% chance of occurring each year) and drive significant reduction of flooding associated with infrequent events (1% chance of occurring each year) across all buildings, lifelines, and critical infrastructure. Up to 33% of buildings may be exposed to infrequent flooding, with 11% of those likely to experience flooding above floor level. Otherwise, flooding would be generally contained within roads posing a low risk. Improved drainage and pumping also lowers groundwater levels so that buildings, parks, and roads are unlikely to be at risk.

In the medium-term, additional measures such as strategic acquisition of land for conversion to green space or raised land, and continued stormwater infrastructure improvements, coastal protection, and management of groundwater further reduce pluvial flood risk, coastal flooding risk and groundwater risk. The percentage of buildings exposed to infrequent flooding above floor level drops to 8%. In the long-term, this drops further to 6% primarily due to high density residential areas re-locating to raised land. This has the added benefit of reducing residual risks in relation to pluvial flooding, groundwater hazards and coastal flooding.

HOTSPOT SUMMARY OF RISKS TO SOUTH DUNEDIN FUTURE 3 - PROTECT: EXPOSURE OF BUILDINGS AND ROADS TO FLOODING AND GROUNDWATER



21 Three proposed adaptation futures for South Dunedin

Future 4 – Restore

Future 4 – Restore makes space for water by creating a network of open waterways and wetlands, supported by pipes, pumps, overland flow paths, and coastal protection.

This future represents a balance between engineered and nature-based solutions and creates the opportunity for an extended town belt-type landscape, integrating South Dunedin into Dunedin’s wider green network.

Some property acquisitions is required to create space for these interventions.



KEY PROJECT FEATURES

TOTAL REPURPOSED LAND 69 ha	1162 BUILDINGS DEMOLISHED	2.1 km SEAWALL
16 ha FOR STORAGE & WETLANDS	11 NEW PUMP STATIONS	4 NEW OUTFALLS
16 km OF GW PIPE NETWORKS	1 NEW GW PUMP STATIONS	
3.5 km OF OPEN CHANNELS	32.5 km OF PIPING NETWORKS	

What we heard about Future 4 – Restore

In 2025, Council asked for feedback from Aukaha (representing Kāi Tahu mana whenua) and the local community. We’ve used this feedback to inform development of our futures.

KĀI TAHU RŪNAKA

Engagement with Aukaha indicated that, for Kāi Tahu mana whenua, **Future 4 – Restore** moderately aligns with Te Mana o Te Wai and tikaka (custom) principles because it incorporates more natural systems alongside infrastructure, creating opportunities for ecological connectivity and cultural restoration. This benefits biodiversity, wai (water), and moana (ocean). **Future 4 – Restore** provides scope for mana whenua to re-establish connections, exercise kaitiakitaka (stewardship), and integrate tikaka into environmental restoration.

Additionally, Aukaha noted that lower levels of flooding would result in improved community hauora (health), with wider community benefits related to wellbeing. Therefore, from a te ao Kāi Tahu perspective, **Future 4 – Restore** promotes community safety.

While **Future 4 – Restore** represents strategic and coordinated adaptation, Aukaha stress that its success depends on careful implementation to avoid inequity and to realise cultural aspirations.

COMMUNITY ENGAGEMENT

The South Dunedin community found that **Future 4 – Restore** is a positive and balanced approach. The largest group of respondents (39%) agree this future takes South Dunedin in the right direction, and a further 20% strongly agree, citing the inclusion of waterways and wetlands for their visual appeal and potential to enhance the area’s overall character.

Communities value the creation of multifunctional spaces that support biodiversity, carbon sequestration, and spaces for community, alongside improved access to essential facilities. This future was considered cost-effective and proactive, offering resilience without requiring widespread relocation. However, respondents emphasised the need for clear strategies and transparent communication, particularly around timelines, and safety and maintenance of waterways.

FUTURE 4 – RESTORE

**Short-term
(next few decades)**



Pipes, pumps and flow paths

Given present day flood risk, Council would make short-term, significant investments in pipes and pumps: new pump stations lifting peak capacity by 137% in large storms and upsizing/adding stormwater pipelines across 25 km, designed to integrate with future waterways. Daily pumping would lower groundwater while draining rainfall; roads may still flood periodically, but property impacts are generally avoided in 2% AEP events, with some risk remaining in rarer 1% events.



Property acquisition

Property acquisition (shown in pink areas) would take place in high groundwater zones to prepare for green infrastructure. Rezoning begins in the Flat for changes in development rules to avoid increasing risk.



Storage

Parts of Forbury, Bathgate and Tonga park are used for stormwater storage balancing space for sports, recreational natural spaces, and water. This storage is connected to a stormwater pumped system, which drains the ponds and adds further capacity to the overall system. More blue-green spaces would be needed in the future requiring some land acquisition (shown in pink).



New development

Areas shown in purple along Victoria Road would be zoned for high-density development to provide lower-risk spaces for people to shift to in the future.



Coastal protection

In the coming decades, there are no changes to coastal protection along the harbourside.

Working together with the St Clair / St Kilda Coastal Plan: There are a few ways to protect the coast, from hard structures like seawalls and offshore barriers (offshore breakwater) to softer options like adding more sand. Any plan would also deal with the contaminated landfill at Kettle Park. Right now, the quickest and most effective thing to do is protect the area where the St Clair geobags end and the Kettle Park landfill begins. This would mean building an offshore breakwater there, removing some of the landfill, and reshaping the dunes at Middles Beach to help reduce erosion. This intervention is under development and appraisal at this stage.

FUTURE 4 – RESTORE

**Medium-term
(mid-century)**



Pipes, pumps and flow paths

Once flood depths greater than 150mm occur on residential lots or local roads, Council invests in a further 5.7km of pipes and increases pump capacity by an additional 21%. Roads still periodically flood, but impacts to properties are generally avoided during rainfall events with a 2% chance of occurring each year. During extreme events with a 1% chance of occurring each year, there remains some risk of property damage.



Property acquisition

Property acquisition would be complete by this point and would provide more space to manage stormwater and groundwater flooding.



Waterways and storage

The construction of a network of MacAndrew, Kaituna, Victoria, Coughrey, and West waterways occurs in the medium-term. Some of these align with historic natural systems, and multi-use green spaces for stormwater storage and recreation. Victoria waterway in particular helps to manage groundwater, capturing tidally influenced groundwater before it moves inland and helping to manage saltwater intrusion. In some places it is still difficult to manage groundwater though so Council would construct green spaces in areas of persistent groundwater emergence, like in Musselburgh.

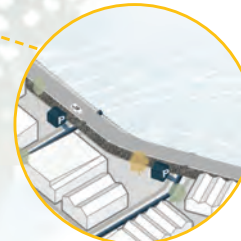


New development

High density residential areas would be developed along Victoria Road with on-site stormwater management, in an area buffered from our current understanding of where future shorelines would be. This provides safer areas for people to relocate to. Any loss of existing park space would be balanced by creation of more parks and green spaces in higher risk areas, such as on the Flat, to enable the best use of land in South Dunedin.



FLOOD



Coastal protection

Once sea level reaches 0.55m above 2005 levels, improved coastal protection along the harbourside would be required, with Council investing in extending the seawall to Bayfield Park to reduce risk to the school and raising road levels to maintain emergency and community access.

Working Together with the St Clair / St Kilda Coastal Plan: Rising sea levels and more storms would weaken and undermine the south coast seawall over time. To stop it from failing and to help keep sand on the beach, the seawall would need to be upgraded, shifted, and possibly supported with extra sand. The contaminated landfill at Kettle Park may also need ongoing remediation to prevent pollution. In future, buffer zones might be needed along the coast to allow room to move things back if erosion or flooding gets worse.

FUTURE 4 – RESTORE

Long-term (towards the end of the century and beyond)



Pipes, pumps and flow paths

To avoid annual flood damage/ response costs compromising delivery of core services, Council invests in a further 1.5km of pipe and increases pump capacity by an additional 10% to continue to allow stormwater and groundwater to flow out during high tides. Roads still periodically flood, but impacts to properties are generally avoided during rainfall events with a 2% chance of occurring each year. During extreme events with a 1% chance of occurring each year, there remains some risk of property damage.



Green space creation

When persistent flooding or groundwater interference begins to limit normal land use, all acquired land at Forbury Corner and Musselburgh would be transitioned to green space for stormwater and groundwater management, recognising the area's high long-term risk. These spaces would include a mix of natural reserves, sports fields, and parks, with sports fields managed via pumped drainage. Council will remain flexible to adapt to other futures, and if risks become unmanageable, a gradual move away from the Flat remains a very long-term option.



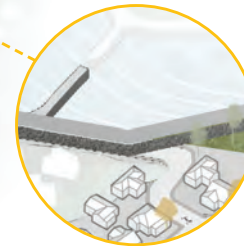
Waterways and storage

The waterways and storage systems continue to help manage stormwater and groundwater up to 1.1m of sea level rise.



New development

High density residential space along Victoria Road would be complete by this stage providing space for people in low-lying areas to shift to safer areas.



Coastal protection

In the long-term an extended seawall would provide coastal protection along the harbourside, along with a raised road levels to maintain emergency and community access.

Working Together with the St Clair / St Kilda Coastal Plan: Rising sea levels and more storms would weaken and undermine the south coast seawall over time. To stop it from failing and to help keep sand on the beach, the seawall would need to be upgraded, shifted, and possibly supported with extra sand. In future, buffer zones might be needed along the coast to allow room to move things back if erosion or flooding gets worse.



FUTURE 4 – RESTORE

Objectives assessment

SUSTAINABLE URBAN DEVELOPMENT

Short-term

Short-term strategic planning supports long-term housing and connectivity as stormwater upgrades and changes to planning rules shape a compact urban form, though embodied emissions remain a challenge and reliance on pumping heightens vulnerability. Early land acquisition enables future green infrastructure.

Medium-term

Open waterways, wetlands, and greenways enhance amenity and embed water-sensitive design. Multi-use green spaces provide flood storage and recreation to support a compact urban form, and coastal protection maintains shoreline connectivity.

Long-term

A more resilient urban form emerges through integrated waterways, wetlands and green corridors, with adaptive management and green infrastructure reducing pump reliance. Modular, circular design cuts waste and embodied carbon. Flexible transition planning preserves options for large-scale retreat if future risks escalate.

ENVIRONMENTAL AND CULTURAL RESTORATION

Short-term

Early planning for waterways and wetlands with mana whenua support mauri restoration and kaitiakitaka though short-term ecological gains are limited. Temporary loss of coastal open space poses cultural risks requiring strong engagement.

Medium-term

Wetlands and green corridors improve ecological connectivity, biodiversity, and water quality, while also strengthening rakatirataka (right to exercise authority) and kaitiakitaka through renewed links to historic waterways. Coastal protection supports access to Ōtakou marae, though risks include potential heritage disturbance and loss of some recreational spaces.

Long-term

Restoration enhances green infrastructure, ecosystems and cultural landscapes and while ki uta ki tai connections are limited, a holistic wellbeing focus strengthens Te Ao Māori values and relationships between place and people.

PROMOTE COMMUNITY SAFETY

Short-term

Changes to planning rules and early acquisition lower long-term hazard exposure while stormwater upgrades reduce flooding during frequent events and improve safety and access. Residual groundwater risk and reliance on pumps create vulnerability during extreme events or system failure.

Medium-term

Stormwater, coastal and groundwater interventions would remove flooding from frequent events and reduce impacts from rarer ones, improving access and safeguarding lifeline services. Coastal erosion risk at the St Clair / St Kilda dunes remains and requires ongoing resilience measures.

Long-term

Integrated greenways, modular systems and adaptive land use improve access and reduce hazard exposure. Very high residual coastal-erosion risk at the St Clair / St Kilda Dunedin persists and requires ongoing resilience strategies, with long-term resilience dependent on continual monitoring and adaptive responses.

JUST TRANSITION

Short-term

Reduced flood risk and maintained access improve certainty for vulnerable communities, while changes to planning rules signal long-term affordability gains. Narrowed short-term housing options, property acquisition, and construction disruption may create stress, particularly for low-income and culturally and linguistically diverse households.

Medium-term

Safer development zones and improved housing supply promote fairness, though higher development costs may affect affordability for low-income households. Construction and relocation can disrupt social and cultural ties, requiring inclusive support. Expanded green space enhances equitable access to recreation and amenity in South Dunedin.

Long-term

Gradual relocation helps maintain social cohesion and allows communities to adapt over time, while intensification and adaptive reuse support affordable housing supply; however, escalating risks could prompt further retreat, potentially displacing vulnerable populations and reducing long-term certainty for families.

SOCIAL AND ECONOMIC RESILIENCE

Short-term

Access to social and economic hubs is maintained, supporting business stability and future high-density growth, though construction disruption, acquisition uncertainty, and affordability pressures may strain community cohesion and require proactive support for vulnerable households.

Medium-term

Shared blue-green spaces strengthen community cohesion and enhance amenity and investment, while green infrastructure and coastal protection reduce economic risk, though relocation and affordability pressures still require careful mitigation.

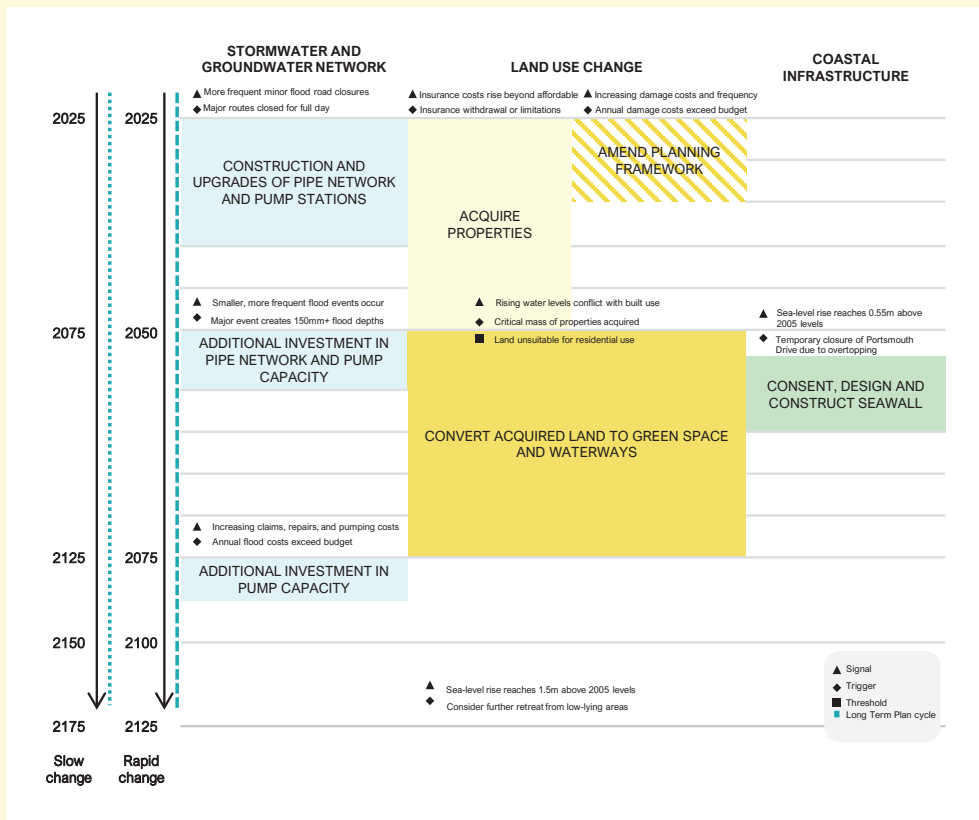
Long-term

Medium-density housing, active transport and mixed-use green spaces strengthen resilience and wellbeing, while reduced climate risk boosts economic stability. Balancing housing supply with green infrastructure needs will require continued innovation and policy support.

FUTURE 4 – RESTORE

Implementation approach

Adapting South Dunedin to a changing climate requires a sequence of interdependent actions, as shown below, which illustrates the indicative timeline for implementation. Actions during Future 4 - Restore are presented with sample signals (▲) and triggers (◆) representing early warning signs and resulting key decisions or enabling actions. Signals, triggers, and adaptation thresholds may be social, economic, ecological, physical, or cultural. The timing shown for signals, triggers, and actions is indicative only.



Early in the short-term, the planning framework must be amended to regulate development. These changes would restrict development in some low-lying areas to avoid exacerbating existing risks and allow for future land acquisition, while enabling development in other areas.

In the medium-term, land acquisition would continue to support later development of green space for stormwater management. Properties acquired during this stage could be rented, leased or similar until enough land is consolidated to enable large-scale transformation.

Where funding and development partners are confirmed, this would trigger major projects, including housing development at Tahuna.

The enlargement of the Portsmouth Drive seawall would be complete to manage the projected increasing coastal risks. In the long-term, all land acquired is expected to be developed into greenspace for stormwater management across low-lying areas, while Tahuna would be intensified into high-density residential developments to house the community. Each step depends on the successful completion of earlier actions, creating a chain of dependencies so that South Dunedin can adapt effectively to climate change.

WHAT ELSE DO WE NEED TO ACTION IT?

Changes in land use regulations: Council would need to make changes for development in the Flat and enable works related to upgrading infrastructure and developing the area near Tahuna.

Property acquisition (buyouts): Land would need to be acquired to make space for pipes, pump stations and green infrastructure (e.g. stormwater management wetlands) which are "public works" because of their flood mitigation and public safety functions. Areas identified for acquisition are where risk may be too challenging to manage in the long-term or where locations are required to manage risk for the wider area.

Funding mechanisms: Funding mechanisms are crucial for both the development of infrastructure and property acquisition. Further work is needed on possible funding mechanisms but public-private partnerships or development contributions are used for infrastructure upgrades and Central Government may provide support through the Regional Infrastructure Fund (or similar) or protection of Crown assets (like schools).











FUTURE 4 – RESTORE

Economic measures

The Cost Benefit Assessment work seeks to compare the implications of proposed futures for South Dunedin. Costs and benefits are indicative and intended for comparison at this step of the South Dunedin Future (SDF) Programme.

Time period	Benefits (\$m)	Costs (\$m)	BCR
Short-term (0 - 25 years)	\$457	\$1,284	0.36
Medium-term (26 - 50 years)	\$381	\$287	1.33
Long-term (51 - 100 years)	\$514	\$58	8.86
Overall	\$1,351	\$1,629	0.83 (0.71 - 0.98)

KEY PROJECT FEATURES

-  **TOTAL REPURPOSED LAND**
69 ha
-  **11**
NEW PUMP STATIONS
-  **16 ha** FOR STORAGE & WETLANDS
-  **1**
NEW GW PUMP STATIONS
-  **16 km** OF GW PIPE NETWORKS
-  **32.5 km** OF PIPING NETWORKS
-  **3.5 km** OF OPEN CHANNELS
-  **2.1 km** SEAWALL
-  **1162** BUILDINGS DEMOLISHED
-  **4** NEW OUTFALLS

Cost estimation approach

Based on spatial mapping of potential scenarios and typical unit rates from similar New Zealand projects. Calculated at 2025 present values, assuming staged implementation across the three time periods identified with Construction spread over the first 10 years of each period. Includes:

- * Construction (capital, preliminaries, demolition, utilities)
- * O&M costs
- * Professional fees
- * Contingency and optimism bias (+66% per Treasury guidance)
- * Property acquisition - 1162 properties (residential, commercial, social)

Whole-of-life costs: 25-year maintenance cycles + annual O&M. Pump stations include an allowance for annual electricity charges.

Exclusions: GST, escalation, downtime.

Costs do not account for potential offsets (e.g., land resale) or private owner contributions.

Range: \$1.63b (\$1.4b - \$1.8b), influenced by scale and uncertainty.

Monitised benefits include:

- * Avoided fatalities & injuries
- * Avoided residential, industrial & commercial property damages
- * Avoided infrastructure damage
- * Avoided trauma and social cohesion costs
- * Avoided water quality impairment
- * Avoided income loss and emergency services costs.

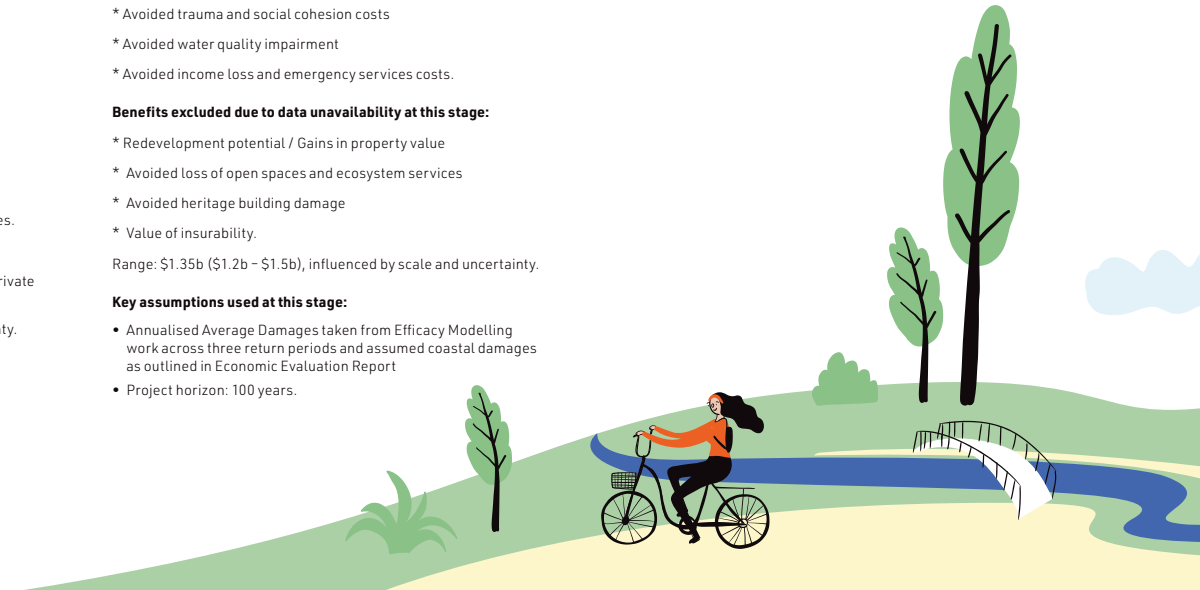
Benefits excluded due to data unavailability at this stage:

- * Redevelopment potential / Gains in property value
- * Avoided loss of open spaces and ecosystem services
- * Avoided heritage building damage
- * Value of insurability.

Range: \$1.35b (\$1.2b - \$1.5b), influenced by scale and uncertainty.

Key assumptions used at this stage:

- Annualised Average Damages taken from Efficacy Modelling work across three return periods and assumed coastal damages as outlined in Economic Evaluation Report
- Project horizon: 100 years.



FUTURE 4 – RESTORE

Risk assessment

Future 4 – Restore provides significant reduction in pluvial flooding and groundwater risk in the short-term relative to the Status Quo (present day, unmitigated) risk.

This risk profile would further reduce over the medium-term despite increasing natural hazards. In the long-term, risk associated with most hazards is managed; however, high uncertainty remains regarding the long-term management of coastal hazards at St Clair / St Kilda, and further investigations are underway. In all timeframes, residual risk remains, which is associated with the consequences of hazard events that exceed as-built design limits, and structural failures (e.g. seawall, groundwater pumping systems). It can also be associated with operational risks (e.g. power failures, lack of maintenance).

Overall, the Future 4 – Restore risk profile is largely similar to the other futures, but has a slightly higher long-term risk than Future 3 – Protect and Future 5 – Reshape as the other Futures benefit from additional risk reduction associated with raising land. This also means that Future 4 – Restore is more prone to residual risk and uncertainty regarding coastal hazards.

HOW IT WOULD REDUCE RISK

In the short-term, stormwater infrastructure upgrades are predicted to remove the flood risk associated with frequent events (10% chance of occurring each year) and drive significant reduction of flooding associated with infrequent events (1% chance of occurring each year) across all buildings, lifelines, and critical infrastructure. Up to 33% of buildings may be exposed to infrequent flooding, with 11% of those likely to experience flooding above floor level. Otherwise, flooding would be generally contained within roads posing a low risk. Improved drainage and pumping also lowers groundwater levels so that buildings, parks and roads are unlikely to be at risk.

In the medium-term, strategic acquisition of land for conversion to green space, and continued stormwater infrastructure improvements, coastal protection, and management of groundwater means pluvial flood risk, coastal flooding risk, and groundwater risk is generally low across all buildings, lifelines, critical infrastructure and roads. The percentage of buildings exposed to infrequent flooding above floor level drops to 8%. In the long-term, this drops further to 7% however, residual risk due to pluvial flooding and groundwater remains, as well as increased uncertainty regarding effective management of coastal hazards increases.

HOTSPOT SUMMARY OF RISKS TO SOUTH DUNEDIN FUTURE 4 - RESTORE: EXPOSURE OF BUILDINGS AND ROADS TO FLOODING AND GROUNDWATER



Future 5 – Reshape

Future 5 – Reshape focuses on creating space for water and people through a combination of open waterways, green infrastructure and raised land development.

It aims to manage flooding and groundwater risks while enabling resilient urban transformation, high-density housing, and long-term community viability while allowing space for water. This space for water provides a town-belt style amenity along the waterways.



KEY PROJECT FEATURES

TOTAL REPURPOSED LAND 102 ha	1738 BUILDINGS DEMOLISHED	34 km OF PIPING NETWORKS
16 ha FOR STORAGE & WETLANDS	44.5 ha OF RAISED LAND	1.5 km SEAWALL
16 km OF GW PIPE NETWORKS	7 NEW PUMP STATIONS	3 NEW OUTFALLS
3.5 km OF OPEN CHANNELS	1 NEW GW PUMP STATIONS	

What we heard about Future 5 – Reshape

In 2025, Council asked for feedback from Aukaha (representing Kāi Tahu mana whenua) and the local community. We've used this feedback to inform development of our futures.

KĀI TAHU RŪNAKA

Engagement with Aukaha indicated that Kāi Tahu mana whenua considers **Future 5 – Reshape** to have moderate to high alignment with Te Mana o Te Wai and a ki uta ki tai approach. Additionally, it was noted that lower levels of flooding would result in improved community Hauora (health), with wider community benefits related to wellbeing.

However, Aukaha stress that these benefits are offset by high levels of disruption to communities and businesses, with risks to a just and equitable transition.

While **Future 5 – Reshape** represents a strategic adaptation response, the views of Kāi Tahu mana whenua were that it is heavily reliant on hard infrastructure and disruptive land-use changes, making cultural and social outcomes dependent on strong equity measures and careful planning.

COMMUNITY ENGAGEMENT

The community expressed mixed views on **Future 5 – Reshape**. Around 35% of respondents agreed it was taking South Dunedin in the right direction, but opinions were divided on whether it offered real choice about where people could live. Many appreciated the option's focus on enhancing natural aspects and creating safer living environments, seeing it as a proactive response to climate risks. However, concerns were significant, with respondents wanting clearer information on how land would be raised, the timeframe for implementation, and what support would be available for affected residents.

While some believed quality of life would remain the same or improve slightly, others worried about social and mental health impacts from displacement and disruption. The perceived cost and loss of community and commercial areas were major drawbacks.

Overall, **Future 5 – Reshape** was seen as promising but challenging, requiring strong planning and equity measures.

FUTURE 5 - RESHAPE

**Short-term
(next few decades)**



Pipes, pumps and flow paths

Council would make substantial investments in pipe and pump infrastructure. New pump stations would lift peak pumping capacity by 137% in larger rainfall events (more than double current volumes). Upsizing existing stormwater pipes and adding new pipelines across 25 km of the network would increase capacity to better manage rainfall and groundwater. Daily pumping would lower groundwater while also providing sufficient capacity to drain stormwater during rain. Roads may still flood at times, but property impacts are generally avoided in events with a 2% annual chance of occurring, with some risk remaining in rarer 1% events.



Property acquisition

Property acquisition (shown in pink areas) would take place in zones with combined high groundwater and flood risk to prepare for safer development and infrastructure. Rezoning begins in the Flat for changes in development rules to avoid increasing risk.



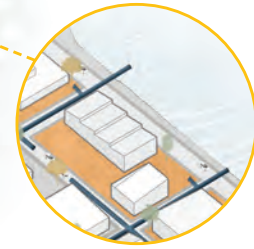
Storage

Parts of Forbury, Bathgate and Tonga park are used for stormwater storage balancing space for sports, recreational natural spaces, and water. This storage is connected to a pumped pipe system, which drains the ponds and adds further capacity to the overall system. More blue-green spaces would be needed in the future requiring some land acquisition (shown in pink).



New development

Areas shown in yellow near Ocean Beach Domain would be zoned for medium-density development to provide lower-risk spaces for people to shift to over time. This would minimise disruption for people wanting to remain in South Dunedin that currently live in areas that need to be converted to space for water or land raising.



Coastal protection

In the coming decades, there are no changes to coastal protection along the harbourside. The area in orange would be zoned for floodable ground floors or other property-level protection to manage future coastal flooding.

Working together with the St Clair / St Kilda Coastal Plan: There are a few ways to protect the coast, from hard structures like seawalls and offshore barriers (offshore breakwater) to softer options like adding more sand. Any plan would also deal with the contaminated landfill at Kettle Park. Right now, the quickest and most effective thing to do is protect the area where the St Clair geobags end and the Kettle Park landfill begins. This would mean building an offshore breakwater there, removing some of the landfill, and reshaping the dunes at Middles Beach to help reduce erosion.



FLOOD

FUTURE 5 - RESHAPE

**Medium-term
(mid-century)**



Pipes, pumps and flow paths

Once flood depths greater than 150mm occur on residential lots or local roads, Council would invest in a further 9km of pipes and increase pump capacity by an additional 18%. Roads still periodically flood, but impacts to properties are generally avoided during rainfall events with a 2% chance of occurring each year. During extreme events with a 1% chance of occurring each year, there remains some risk of property damage.



Land raising and development

Property acquisition would be complete by this point and would provide more space to manage stormwater and raise land. The area around Forbury Corner would be cleared and built up to prepare for development in a safe elevated area. Land raising would make ground levels higher through placement of fill material to reduce risk to pluvial, groundwater and coastal flooding and would extend the natural terraced area.



Waterways and storage

The construction of a network of MacAndrew, Kaituna, Victoria, Coughrey, and West waterways would occur in the medium-term. Some of these align with historic natural systems, and multi-use green spaces for stormwater storage and recreation. Victoria Waterway in particular helps to manage groundwater, capturing tidally influenced groundwater before it moves inland and helping to manage saltwater intrusion. In some places it would still be difficult to manage groundwater though so Council would construct green spaces in areas of persistent groundwater emergence, like in Musselburgh.



Coastal protection

To prevent overtopping-related structural failure, road damage, and safety risks, Council would add harbourside protection by building an inland coastal bund near Otaki Road and raising road levels to maintain emergency and community access.

By then, Portsmouth properties would have property level adaptation in place.

Working Together with the St Clair / St Kilda Coastal Plan:

Rising sea levels and more storms would weaken and undermine the south coast seawall over time. To stop it from failing and to help keep sand on the beach, the seawall would need to be upgraded, shifted, and possibly supported with extra sand. The contaminated landfill at Kettle Park may also need ongoing remediation to prevent pollution. In future, buffer zones might be needed along the coast to allow room to move things back if erosion or flooding gets worse.



New development

Medium-density residential space areas would be developed along Victoria Road with on-site stormwater management, set back from expected future shorelines. Any loss of existing park space would be balanced by creation of more parks and green spaces in higher risk areas, such as on the Flat, to enable the best use of land in South Dunedin. Along Forbury Road, new development begins when land raising is completed.

FUTURE 5 - RESHAPE

Long-term (towards the end of the century and beyond)



Pipes, pumps and flow paths

In order to keep land dry, no additional pipes or pumps are needed, provided good maintenance and periodic replacement occurs. Roads still periodically flood, but impacts to properties are generally avoided during rainfall events with a 10% chance of occurring each year. During extreme events with a 1% chance of occurring each year, there remains some risk of property damage.



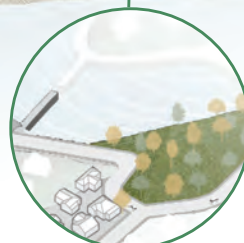
Waterways and storage

The scale of storage in green space increases, providing further space for water on low-lying land as groundwater becomes more difficult to manage and rainfall is projected to increase. Water is stored in ponds then discharged when the network has capacity (e.g. after a storm passes). While groundwater is reasonably well managed with up to 1.1m sea level rise with daily pumping, it becomes more challenging beyond 2125.



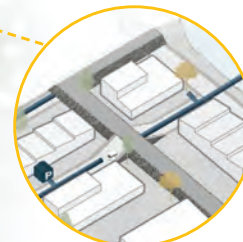
New development

Medium-density residential space along Tahuna, Victoria, and Forbury Roads would be complete by this stage.



Green space creation

To limit intolerable flooding of property, acquired land would either be raised and developed or converted to green space for stormwater and groundwater management, reflecting the area's high long-term risk. As the Portsmouth Drive seawall is not extended in this future, the area near Bayfield High School would likely become open space. Green space would include a mix of natural reserves, sports fields, and parks. Council would retain flexibility to adapt to other futures; if risks become unmanageable, a gradual shift to raised land (Future 6) remains a very long-term option.



Coastal protection

A coastal bund along the commercial area would be installed to reduce recurring overtopping and prevent coastal floodwaters entering the Flat. As coastal storms begin causing periodic seawater inundation in the commercial area, remaining businesses would need property level measures. The proposed bund alignment leaves some critical infrastructure, such as the Transpower substation, outside the protected area; as with the Edgar Centre, property owners would be responsible for their own interventions (for example, site bunds and door floodgates).

Working Together with the St Clair / St Kilda Coastal Plan: Rising sea levels and more storms would weaken and undermine the south coast seawall over time. To stop it from failing and to help keep sand on the beach, the seawall would need to be upgraded, shifted, and possibly supported with extra sand. In future, buffer zones might be needed along the coast to allow room to move things back if erosion or flooding gets worse.



FLOOD

FUTURE 5 - RESHAPE

Objectives assessment

SUSTAINABLE URBAN DEVELOPMENT

Short-term

Strategic changes to planning rules supports a compact urban form by limiting development in flood-prone areas and enabling higher-density housing. Stormwater capacity upgrades lower emissions from emergency pumping but still require ongoing energy use. Modular, circular infrastructure design minimises waste and supports long-term adaptability.

Medium-term

Raised land and an inland coastal bund create future development opportunities while reducing environmental impacts, with reused aggregates lowering emissions. Expanded wetlands and waterways act as carbon sinks and enable more passive stormwater management, reducing reliance on energy-intensive pumping.

Long-term

High-density, walkable communities reduce transport emissions, while adaptive reuse, modular design, and nature-based solutions minimise waste, sequester carbon and enhance biodiversity.

ENVIRONMENTAL AND CULTURAL RESTORATION

Short-term

There are limited ecological benefits in the short-term, as infrastructure upgrades focus on engineered solutions to move water.

Opportunities for mana whenua to engage in adaptation responses and re-establish connections through enhancement of rakatirataka and kaitiakitaka.

Short-term ecological gains are limited due to a focus on engineered water-management solutions, while adaptation processes provide opportunities for mana whenua to strengthen rakatirataka and kaitiakiaka through renewed connections to place.

Medium-term

New greenways and waterways improve habitat, connectivity, and biodiversity, though construction and land raising may cause temporary environmental impacts without strong erosion control. While interventions begin aligning with Te Mana o Te Wai, some reliance on hard infrastructure remains.

Long-term

Expanded green infrastructure improves mauri, ecological connectivity, and cultural ties, while mixed-use green spaces enhance holistic wellbeing and reinstated waterways and wetlands strengthen ki uta ki tai approaches and support cultural and ecological restoration.

PROMOTE COMMUNITY SAFETY

Short-term

Stormwater upgrades greatly reduce flooding from frequent events and contain rarer floods to roads, while strategic changes to planning rules improves long-term safety by reducing exposure, though residual risk remains due to reliance on pumping systems.

Medium-term

Coastal protection and raised land reduce pluvial flooding and coastal inundation for most buildings and critical infrastructure, though some key assets still require site specific protection. Residual risk persists at the St Clair / St Kilda dunes.

Long-term

Reliable groundwater and stormwater management protects properties, critical infrastructure and access routes, though residual risk from extreme events and coastal hazards still require ongoing monitoring and adaptive management.

JUST TRANSITION

Short-term

Early changes to planning rules and property acquisition increase certainty and protect service access for vulnerable groups, though they may create short-term housing supply constraints and affordability pressures.

Medium-term

Key access routes are protected by the inland bund and raised roads despite construction disruptions. Raised land enables higher-quality and more affordable housing though initial costs may challenge low-income households. Vulnerable groups remain protected but may face social and cultural disruption from relocation, and new green spaces improve equitable access to recreation.

Long-term

Raised neighbourhoods would ultimately provide high-quality housing for the whole community, including vulnerable groups, while relocating schools to safer areas improves education security, though risks of social fragmentation, affordability pressures and uneven transitions would persist.

SOCIAL AND ECONOMIC RESILIENCE

Short-term

Strong transport networks help maintain access to education and key community facilities, though property acquisition may create uncertainty for vulnerable households about continued access to those same services.

Medium-term

Raised land increases community feelings of safety and wellbeing, though coastal flood risk is rising in the area between Ōtaki Street and Portsmouth Drive.

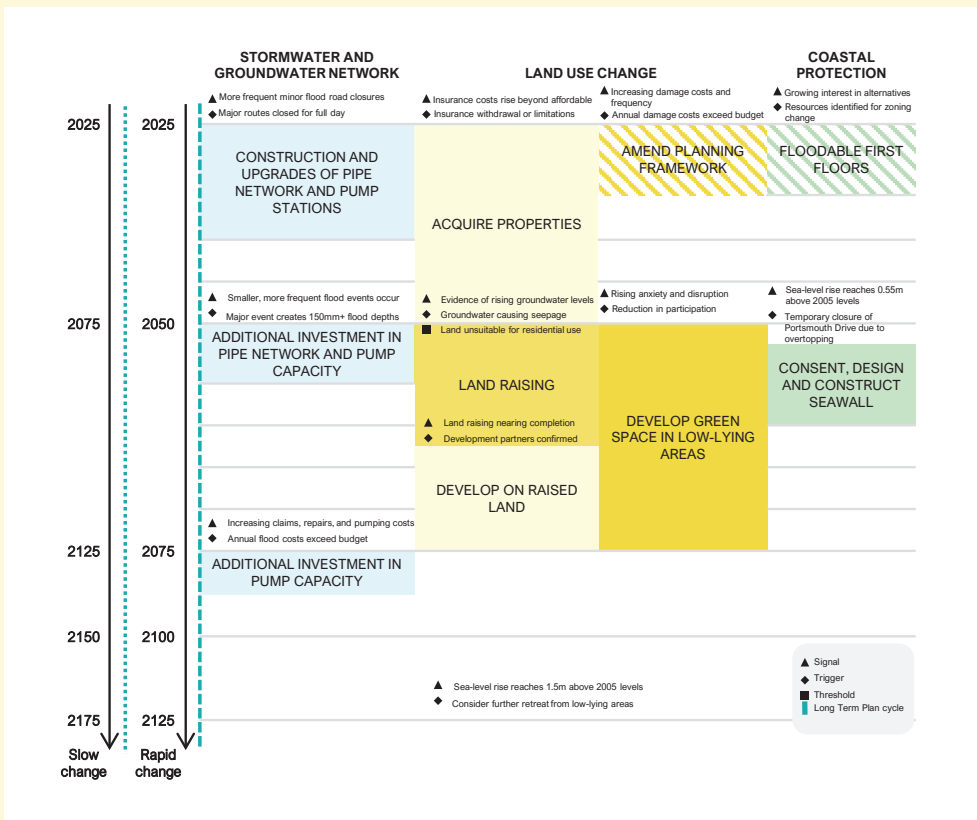
Long-term

More green spaces and relocating schools to safe zones improve wellbeing and long-term educational security, though floodable commercial areas and concentrated high-density housing on raised land may create property value disparities between elevated areas and remaining floodplains.

FUTURE 5 - RESHAPE

Implementation approach

Adapting South Dunedin to a changing climate requires a sequence of interdependent actions, as shown below, which illustrates the indicative timeline for implementation. Actions along **Future 5 - Reshape** are presented with sample signals (▲) and triggers (◆) representing early warning signs and resulting key decisions or enabling actions. Signals, triggers, and adaptation thresholds may be social, economic, ecological, physical, or cultural. The timing shown for signals, triggers, and actions is indicative only.



In the short-term, Council must first coordinate significant upgrades to the pipeline network and pumps to move water efficiently. These upgrades are critical before any stormwater storage areas can be established. Once drainage capacity is improved, Forbury Park and part of Tonga Park can be developed into greenspace designed for stormwater management. This includes waterways to enhance management of groundwater and the stormwater in the medium-term which have been designed to compliment the pipe network.

Early in the short-term, the planning framework must also be amended to regulate development. These changes would restrict development in some low-lying areas to avoid exacerbating existing risks and allow for future land acquisition, while enabling development in other areas. This includes introducing zoning provisions for floodable ground floors along Portsmouth Drive to manage risk.

In the medium-term, land acquisition would continue opportunistically. Properties acquired during this stage could be rented until enough land is consolidated to enable large-scale transformation prior to 2075. An inland coastal bund along Otaki Street constructed by 2060 helps to keep coastal flooding from the harbourside out of the Flat. Each of these steps depends on the successful completion of earlier actions, creating a chain of dependencies that allows South Dunedin to adapt effectively to climate change.

WHAT ELSE DO WE NEED TO ACTION IT?

Changes in land use regulations: Council would need to make changes for development in the Flat and enable works related to upgrading infrastructure and raising land. This is a critical first step.

Property acquisition (buyouts): Land would need to be acquired to make space for pipes, pump stations and green infrastructure (e.g. stormwater management wetlands) which are "public works" because of their flood mitigation and public safety functions. Simultaneously, acquisition across Forbury Corner and Musselburgh would be required to enable safer development. Areas identified for acquisition are where risk may be too challenging to manage in the long-term or where locations are required to manage risk for the wider area.

Financial incentives or penalties: Financial incentives can positively influence land use change and relocation required. Some potential financial incentives could include Council providing land swaps, grants or low-interest loans for households relocating to raised land and development incentives in safer areas.

Funding mechanisms: Funding mechanisms are crucial for both the development of infrastructure and property acquisition. Further work is needed on funding mechanisms, but public-private partnerships or development contributions could be used for infrastructure upgrades.

FUTURE 5 - RESHAPE

Economic measures

The Cost Benefit Assessment work seeks to compare the implications of proposed futures for South Dunedin. Costs and benefits are indicative and intended for comparison at this step of the South Dunedin Future (SDF) Programme.

Time period	Benefits (\$m)	Costs (\$m)	BCR
Short-term (0 - 25 years)	\$450	\$1,938	0.23
Medium-term (26 - 50 years)	\$378	\$475	0.80
Long-term (51 - 100 years)	\$507	\$35	14.58
Overall	\$1,336	\$2,448	0.55 (0.46 - 0.64)

Cost estimation approach

Based on spatial mapping of potential scenarios and typical unit rates from similar NZ projects. Calculated at 2025 present values, assuming staged implementation across the three time periods identified with Construction spread over the first 10 years of each period. Includes:

- * Construction (capital, preliminaries, demolition, utilities)
- * O&M costs
- * Professional fees
- * Contingency and optimism bias (+66% per Treasury guidance)
- * Property acquisition - 1,738 properties (residential, commercial, social).

Whole-of-life costs: 25-year maintenance cycles + annual O&M. Pump stations include an allowance for annual electricity charges.

Exclusions: GST, escalation, downtime.

Costs do not account for potential offsets (e.g., land resale) or private owner contributions.

Cost range: \$2.45b (\$2.1b - \$2.7b), influenced by scale and uncertainty (especially land raising).

Monitised benefits include:

- * Avoided fatalities & injuries
- * Avoided residential, industrial & commercial property damages
- * Avoided infrastructure damage
- * Avoided trauma and social cohesion costs
- * Avoided water quality impairment
- * Avoided income loss and emergency services costs.

Benefits excluded due to data unavailability at this stage:

- * Redevelopment potential / Gains in property value
- * Avoided loss of open spaces and ecosystem services
- * Avoided heritage building damage
- * Value of insurability.

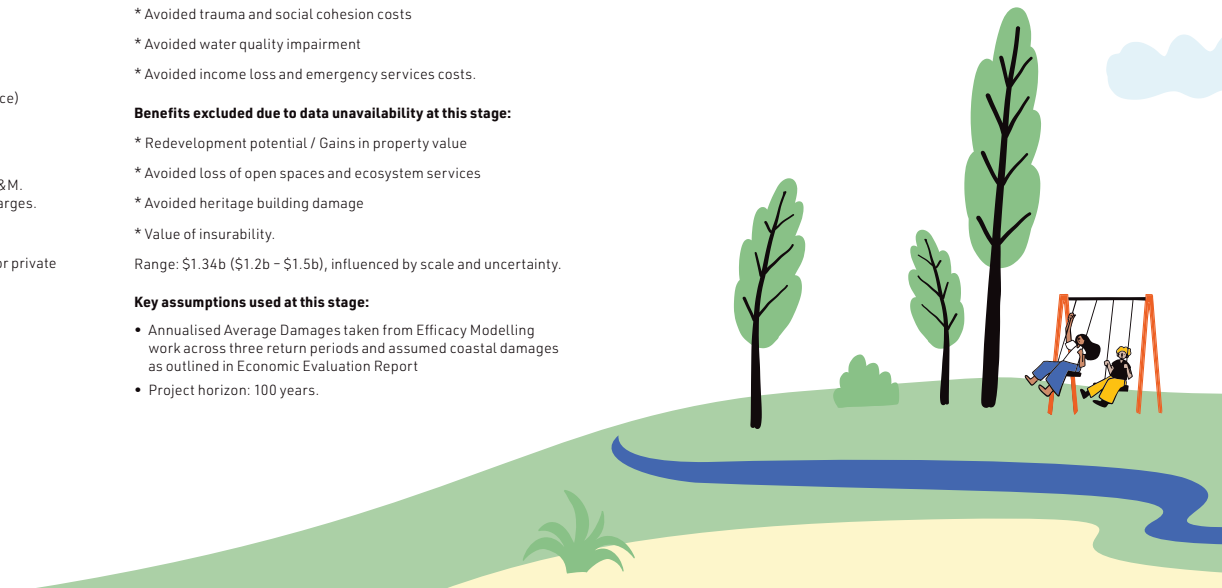
Range: \$1.34b (\$1.2b - \$1.5b), influenced by scale and uncertainty.

Key assumptions used at this stage:

- Annualised Average Damages taken from Efficacy Modelling work across three return periods and assumed coastal damages as outlined in Economic Evaluation Report
- Project horizon: 100 years.

KEY PROJECT FEATURES

- TOTAL REPURPOSED LAND**
102 ha
- 7**
NEW PUMP STATIONS
- 16 ha** FOR STORAGE & WETLANDS
- 1**
NEW GW PUMP STATIONS
- 16 km** OF GW PIPE NETWORKS
- 34 km** OF PIPING NETWORKS
- 3.5 km** OF OPEN CHANNELS
- 1.5 km** SEAWALL
- 1738** BUILDINGS DEMOLISHED
- 3** NEW OUTFALLS
- 44.5 ha** OF RAISED LAND



FUTURE 5 - RESHAPE

Risk assessment

Future 5 - Reshape provides significant reduction in pluvial flooding and groundwater risk in the short-term relative to the Status Quo (present day, unmitigated) risk.

This risk profile would further reduce over the medium-term despite increasing natural hazards. In the long-term, risk associated with most hazards is managed, however high uncertainty remains regarding the long-term management of coastal hazards at St Clair / St Kilda and further investigations are underway. In all timeframes, residual risk remains, which is associated with the consequences of hazard events that exceed as-built design limits, and structural failures (e.g. seawall, groundwater pumping systems). It can also be associated with operational risks (e.g. power failures, lack of maintenance).

Overall, the Future 5 - Reshape risk profile is largely similar to the other futures, but has a slightly lower long-term risk than Future 4 - Restore due to the raising of land that provides additional flood risk reduction benefits and minimizes residual risk.

HOW IT WOULD REDUCE RISK

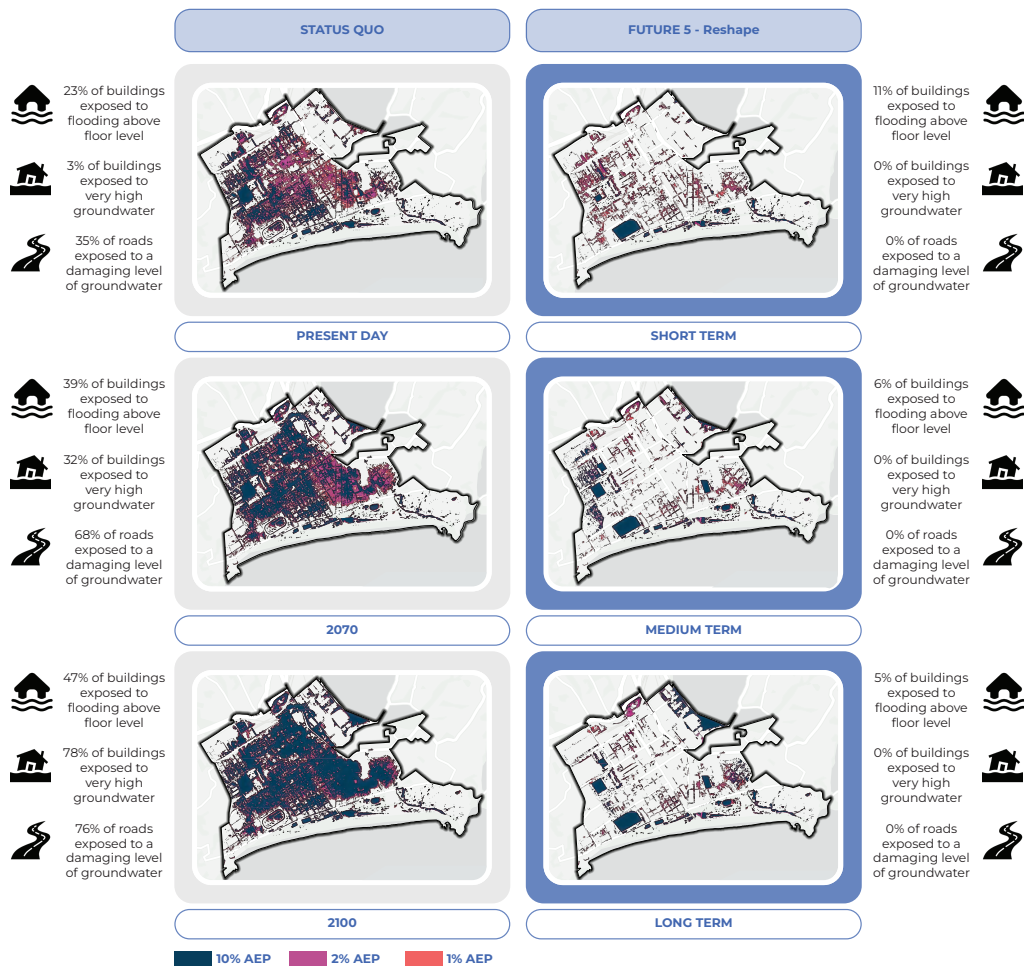
In the short-term, stormwater infrastructure upgrades are likely to remove flood risk associated with frequent events (10% chance of occurring each year) and drive significant reduction of flooding associated with infrequent (1% chance of occurring each year) events across all buildings, lifelines, and critical infrastructure. Up to 33% of buildings may be exposed to infrequent flooding, with 11% of those likely to experience flooding above floor level. Otherwise, flooding would be generally contained within roads posing a low risk. Improved drainage and pumping also lowers groundwater levels so that buildings, parks, and roads are unlikely to be at risk.

In the medium-term, additional measures such as strategic acquisition of land for conversion to green space or raised land, and continued stormwater infrastructure improvements, coastal protection, and management of groundwater means pluvial flood risk, coastal flooding risk, and groundwater risk further. The percentage of buildings exposed to infrequent flooding above floor level drops to 6%, and 5% in the long-term.

The Otaki Street coastal protection means coastal flooding exposure remains around the harbourside. This risk to buildings is managed through raised floors or intentional design of floodable ground floors. Although risk to buildings, roads and parks is generally low, coastal flooding at the harbourside may impact other activities that are carried out within this area and further consideration of safe access and egress may be required.

In the long-term, high-density residential areas located on raised land provides further risk reduction benefits, including reduced residual risk associated with pluvial flooding, groundwater, and coastal flooding.

HOTSPOT SUMMARY OF RISKS TO SOUTH DUNEDIN FUTURE 5 - RESHAPE: EXPOSURE OF BUILDINGS AND ROADS TO FLOODING AND GROUNDWATER



Summary & next steps

South Dunedin is already experiencing the impacts of a changing climate, and the work undertaken so far represents a significant step toward building a safer, more resilient future for the community.

This document has outlined the three proposed futures, **Future 3 – Protect**, **Future 4 – Restore**, and **Future 5 – Reshape**, and provided an initial picture of how each could unfold over the short-, medium- and long-term. Each future presents different opportunities, challenges, and trade offs, supported by technical analysis, community feedback, and the values of mana whenua.

Council will test the three proposed futures with the South Dunedin community and key stakeholders. This will help make sure that the preferred adaptation future reflects local priorities, cultural aspirations, technical evidence, and long-term wellbeing. Insights gathered during this engagement will help identify a preferred future for residents, mana whenua, businesses, and community groups.

WHAT HAPPENS NEXT

Adaptation Masterplan for South Dunedin

The final stage in the adaptation planning process involves refining the three proposed futures to a single preferred adaptation future. This may involve further detailed technical and economic assessments, additional modelling work, and will consider community feedback. The three proposed futures may be scored and ranked against a set of strategic objectives and decision-making framework previously approved by Councils.

The top ranked future will form the basis for the final climate Adaptation Masterplan for South Dunedin. This Adaptation Masterplan will outline the infrastructure investments, land use changes, and other actions required in South Dunedin to effectively manage the risks associated with a changing climate over the next 100 years and to realise opportunities that might come with change. It is likely there would be a further final community consultation on the Adaptation Masterplan, which may include a hearings process; however, this will be confirmed once the details of government reforms become available. Subject to the outcome of that consultation, a final Adaptation Masterplan would be presented to DCC and ORC for approval by late 2026 or early 2027.

Monitoring and revising the Adaptation Masterplan

Once the Adaptation Masterplan is adopted, it will be important to keep monitoring risk and rates of change to be sure that the plan is still fit for purpose into the future. The timeframes and assumptions in the final Adaptation Masterplan should be revised periodically, and the masterplan updated where needed.

Due to the long-term nature of the Adaptation Masterplan, there are practical risks of delays, funding shortfalls, or dependencies between actions – such as planning and policy changes needing to occur before infrastructure upgrades – that may undermine adaptation benefits if thresholds are exceeded before interventions can be delivered.

To manage this risk, signals should be carefully monitored to enable early planning and preparation of alternative responses if necessary, so that options are ready to progress before triggers – and the thresholds behind them – are met.

Implementation

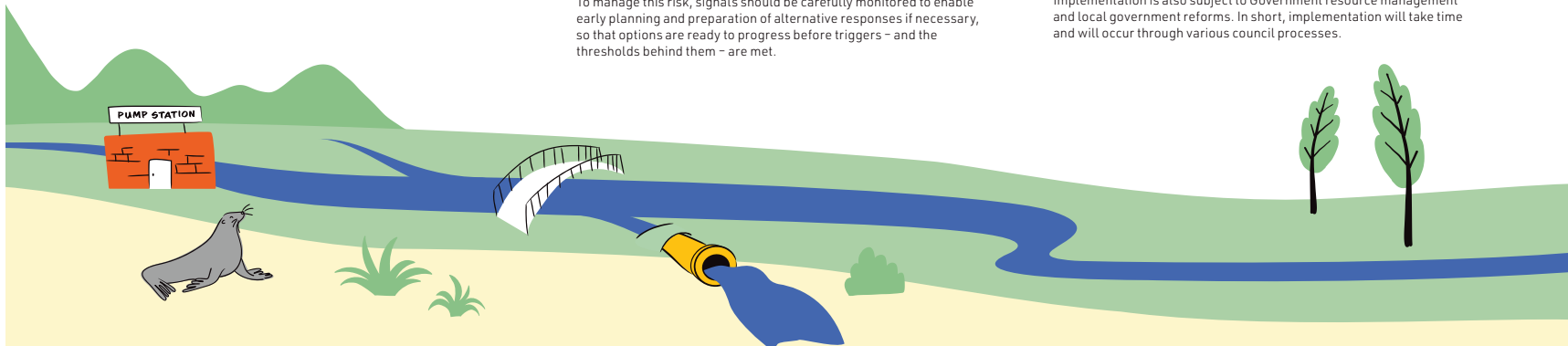
Following completion of the final Adaptation Masterplan for South Dunedin, and conclusions of the South Dunedin Future programme, focus will shift to implementation. This will occur via a range of separate processes. In the first instance, this is expected to be through the DCC's long-term planning processes, which will seek to outline priorities, budgets, and major projects for the 10-year period 2027-36. This may include, for example, infrastructure investments, new council policies, and changes to the District Plan, some of which will be focused on implementing elements of the Adaptation Masterplan.

Major infrastructure investments are typically captured in DCC's 30-year Infrastructure Strategy and then implemented following due diligence and design stages with funding approved in DCC's long-term plan.

Land use and zoning changes can only happen through formal District Plan change processes, which include detailed analysis, public submissions, and a public hearing. It is important to note that the South Dunedin Future programme will not change the zoning of any land. Any zoning change can only happen through a formal plan change process, which includes detailed analysis, public submissions, and a hearing. Once complete, the Adaptation Masterplan for South Dunedin will inform a range of council activities, including decisions and investments relating to transport, property, three waters, land use planning, among others. This will occur through the councils' normal long-term planning and budgeting processes, which include public consultation.

South Dunedin Future will explore options to retain or add housing capacity in South Dunedin and is interested in understanding how important this is for stakeholders. Later in 2026 and into 2027, DCC will be required to work on a Spatial Plan regionally, which will need to balance any options for growth in South Dunedin against citywide considerations, including the results from the city wide housing and business land needs assessment, other areas subject to natural hazard risk, infrastructure investment priorities, and the most effective and efficient way to meet the city's overall housing needs.

Implementation is also subject to Government resource management and local government reforms. In short, implementation will take time and will occur through various council processes.





Disclaimer and Limitations

WSP New Zealand Limited ('WSP'), Beca Limited ('Beca') and Tonkin + Taylor Limited ('T+T'), provide the South Dunedin Future Programme services in association with each other using the "Kia Rōpine" brand. WSP is engaged by the Dunedin City Council in accordance with the LTES Contract No. 10458 (Agreement') as the lead consultant and each of Beca and T+T are engaged by WSP as subconsultants pursuant to separate subconsultant agreements. Beca and T+T only assume liability to WSP in relation to the services, and only to the extent of the terms of their respective subconsultant agreements. WSP, Beca, and T+T are separate and independent legal entities, and no party is another's agent, partner, or joint venture party, nor do they have authority to bind each other or act on each other's behalf. This report ('Report') has been prepared by WSP (via the Kia Rōpine group) exclusively for the South Dunedin Future Programme team (Dunedin City Council and Otago Regional Council) ('Client') in relation to the South Dunedin Future Programme - Longlist Adaptation Options stage of the programme ('Purpose') and in accordance with the Agreement and Variation 6 to that Agreement.

The findings in this Report are based on and are subject to the assumptions specified in the Report, the Agreement and associated attachments, and Client Data supplied during the data request phase. WSP accepts no liability whatsoever for any use or reliance on this Report, in whole or in part, for any purpose other than the Purpose or for any use or reliance on this Report by any third party. In preparing this Report, WSP has relied upon data, surveys, analysis, designs, plans and other information ('Client Data') provided by or on behalf of the Client. Except as otherwise stated in this Report, WSP has not verified the accuracy or completeness of the Client Data. To the extent that the statements, opinions, information, conclusions, and/or recommendations in this Report are based in whole or part on the Client Data, those

conclusions are contingent upon the accuracy and completeness of the Client Data. WSP will not be liable for any incorrect conclusions or findings in the Report should any Client Data be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP. The work has been delivered alongside DCC and ORC in a collaborative, co-design methodology, and inputs provided by DCC and ORC have not been independently validated.

In addition, climate change is an evolving field, with uncertainty inherent in projections of future conditions, and unknowns which cannot be precisely estimated with present science. These matters should be considered by the Client as part of any decision-making and planning. Regular monitoring of actual data (e.g. sea level rise) and regular review and updates of the work contained in this report to take account of developments in scientific knowledge and changes in international and national guidance should be undertaken. This report is not intended to provide financial, investment, or legal advice. It should not be used as the sole basis for making financial or strategic decisions.

The Client is encouraged to seek professional advice in these areas. Due to the nature and stage of the project, broad assumptions have been made to support costing of options. The status of this cost estimate represents at best a strategic stage. It presents a range of potential future states for South Dunedin for comparative use ONLY. Cost estimates are exclusive of GST, project development, legal or marketing costs, escalation, operational costs/ downtime due to operations, removal of large / unforeseen ground objects, contaminated waste disposal or rebuild of existing properties in new location.

Renders/visuals presented are artist impressions, created for illustrative purposes only and incorporate initial, pre-feasibility engineering input. They serve as conceptual representations and may not accurately depict the final engineered design or construction details.



REV	DATE	DETAILS		NAME	DATE	
V1	3/12/2025	Draft for client review	Prepared by	Emma Kuparinen	18/05/2026	
V2	23/02/2026	Final for client review		Meg Taylor-Silva	18/05/2026	
V3	31/03/2026	Final		Amelia Tomkins	18/05/2026	
V4	18/05/2026	Minor revisions	Reviewed by	Laura Robichaux	18/05/2026	
Beca, WSP & Tonkin + Taylor. (2026). Three proposed adaptation futures for South Dunedin. Prepared for Dunedin City Council and Otago Regional Council.				Approved by	Cushla Loomb	18/05/2026
			Kevin Wood		18/05/2026	




SOUTH DUNEDIN FUTURES EFFICACY MODELLING HYDRAULIC MODELLING REPORT

31 MARCH 2026



SOUTH DUNEDIN FUTURES EFFICACY MODELLING
HYDRAULIC MODELLING REPORT

REV	DATE	DETAILS
A	4/12/2025	For Review
B	20/02/2026	Draft Final
C	31/03/2026	Final
D	18/05/2026	Updated with DCC comments

	Name	Date	Signature
Prepared by:	Prepared By	Kit Pascoe, Anvesh Ravula	
Reviewed by:	Reviewed By	Elliot Tuck	
Approved by:	Approved By	Cushla Loomb	

18 May 2026