The Aotearoa Circle

Mā te Kaitiakitanga ko te Tōnuitanga
Prosperity Through Guardianship

NATURAL INFRASTRUCTURE PLAN

Part 4C: Our Towns and Cities

The economic dependencies and growth opportunities presented by natural infrastructure for Aotearoa New Zealand's towns and cities

Contents

Introduction

Why investment in natural infrastructure matters

By recognising natural infrastructure as the productive infrastructure that it actually is, we can strengthen our economy, reduce risk, create jobs, and build a future we can proudly say we helped shape.

Aotearoa New Zealand's economy is intrinsically linked to the environment. With 70% of our exports reliant on natural resources, investing in resilience and natural capital is not a trade-off - it is a win-win.

That's why we believe our Natural Infrastructure Plan presents a 1 + 1 = 3 investment: it addresses today's challenges while building capacity for tomorrow.

It also points to the need for a shift in conversation beyond hard engineering solutions that may appear cheaper upfront, but often cost more over time in maintenance, repairs and lost co-benefits.

We understand why infrastructure matters. Roads move goods and services. Pipes deliver water and power. Bridges connect communities and enable commerce.

Natural infrastructure is less visible and therefore less valued. It exists in wetlands, native forests, dunes, rivers and floodplains. It quietly provides flood mitigation, water filtration, erosion control, carbon sequestration and temperature regulation without invoices, contracts or maintenance schedules.

Nature may be the most undervalued infrastructure asset we have. And because we undervalue it, we underinvest in it.

For too long, we have framed economic growth and environmental health as competing interests. This Plan demonstrates that we can - and must – achieve both. By doing so we can capitalise on the multiple benefits that investment in natural infrastructure offers - often with lower, long-term operating costs.

And as the New Zealand Infrastructure Commission Te Waihanga has identified, long-term strategy and planning are essential to guiding infrastructure investment and enhancing national resilience. This Plan adds a powerful tool to our infrastructure toolkit to support this.

Practical Actions

The Natural Infrastructure Plan has been developed through a coalition of 200+ contributors with over 10,000 combined hours of research, debate and collaboration. It reflects deep expertise and shared ambition.

What it is not is a list of aspirations. Instead, it provides practical actions from clear policy levers for government to significant opportunities for business, leadership and investment.

The plan also includes six case studies demonstrating the measurable benefits of incorporating nature-based solutions into infrastructure planning.

It encourages decision-makers to widen the lens through which infrastructure investments are assessed.

The Investment Decision Toolkit, for example, provides a structured way to evaluate natural infrastructure alongside traditional engineered solutions.

Public agencies, private companies and iwi can use these tools to compare options, assess long-term value and capture multiple co-benefits.

When making decisions that will shape infrastructure for decades, the greatest risk is not choosing the wrong option. The greatest risk is failing to consider all available options.

Natural infrastructure is not an environmental add-on. It is a credible, investable infrastructure asset.

By investing in natural infrastructure, we can reduce the risk in insurance, improve returns on investment, and know we will have enduring growth.

The question is no longer whether we can afford to invest in natural infrastructure.

It is whether we can afford not to.

Vicki Watson

Chief Executive
The Aotearoa Circle

About The Aotearoa Circle

The Aotearoa Circle, a unique leadership organisation, convenes public and private sector partners to tackle complex climate and nature challenges that threaten economic growth and future prosperity.

We know that our economy is intrinsically linked to our natural capital, yet it has been declining for decades.

That's why we have a mission and a deadline. If nature loss is not halted and reversed by 2035, Aotearoa New Zealand will reach a tipping point with lasting consequences for our economy, communities and global standing.

Our work considers pressing climate change and nature challenges facing our key sectors - from agriculture, energy and seafood to transport, finance, and tourism. We do this by delivering practical, cross-sector solutions that reduce risk, strengthen resilience, and ultimately aim to restore natural capital.

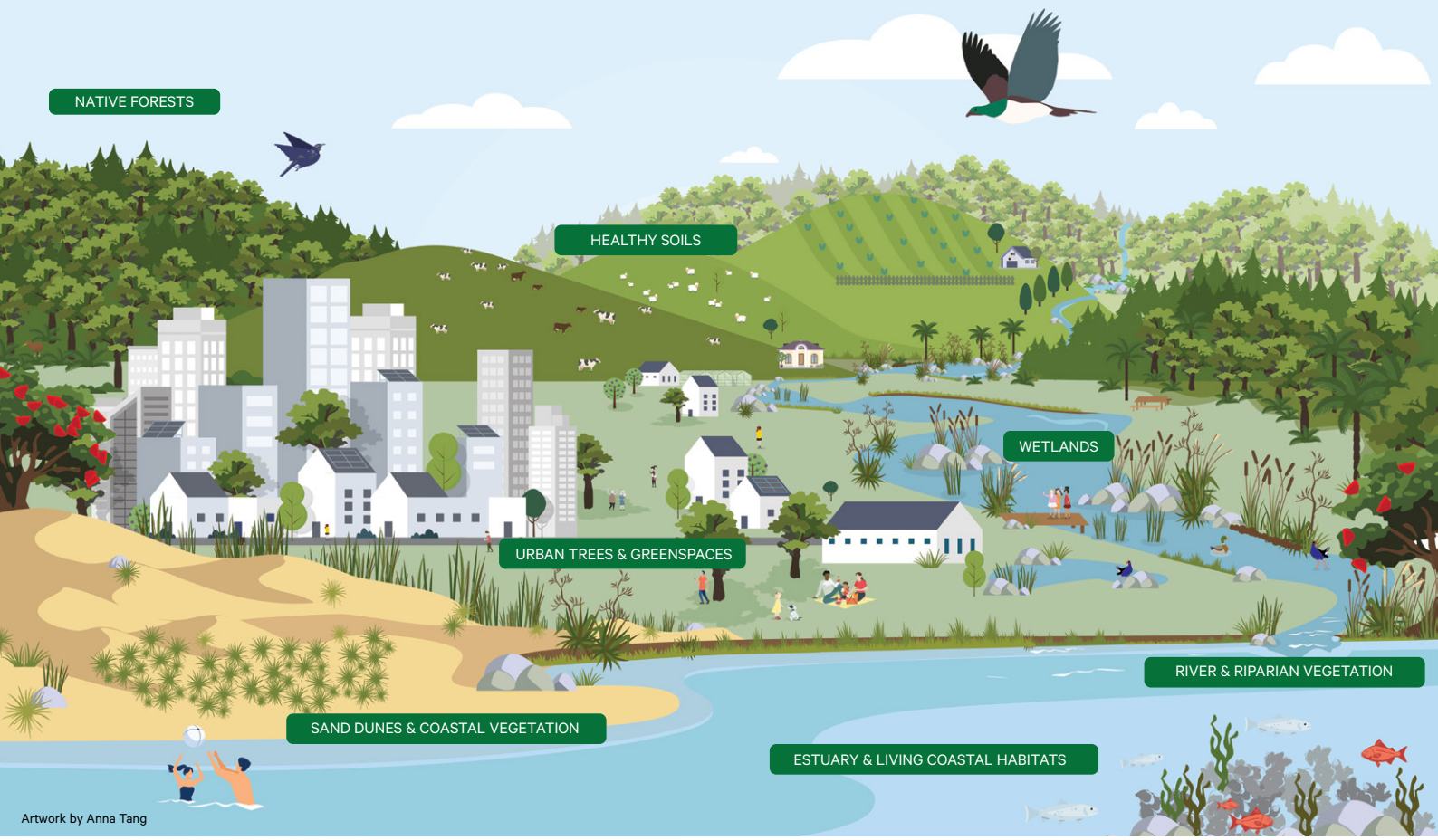
The Circle is guided by Guardians (our Board) and strengthened by future voices through our Rangatahi Advisory Panel (RAP) who actively participate in major workstreams, including the development of this plan.

Formed in 2019, our co-founder Sir Rob Fenwick stated at the time that, “Time is running out for the treasures of nature that we love, and it is worth using every last breath, all of our collective energy, to save our land and secure our future.”

Sir Rob’s vision continues to inspire and guide us each day.

www.theaotearoacircle.nz

What is natural infrastructure?



NATURAL INFRASTRUCTURE	SERVICES IT PROVIDES
NATIVE FORESTS	• Stabilises slopes and reduces erosion and landslides • Regulates water (slows runoff, sustains baseflows, improves quality) • Habitat for native species; supports cultural values and recreation • Stores carbon over long timeframes; provides local cooling and shade
RIVER & RIPARIAN VEGETATION	• Filters sediment, nutrients and some pathogens before they reach waterways • Shades streams, lowering temperatures for aquatic life • Stabilises banks and reduces erosion • Provides habitat corridors for native species and inanga spawning areas
WETLANDS	• Temporarily store floodwaters and buffers stormwater • Retain water and supports drought resilience • Filter nutrients and contaminants, improving water quality • Sequester and stores carbon (notably peat systems) • Provide habitat and mahinga kai values
URBAN TREES & GREENSPACES	• Reduce urban heat and provide shade for people and places • Intercept rainfall and reduce stormwater runoff • Improve air quality and support urban biodiversity and wellbeing
SAND DUNES & COASTAL VEGETATION	• Trap and stabilise sand, reducing coastal erosion • Buffer storm surge and waves; enable natural shoreline adjustment • Provide habitat for coastal species and protect communities and assets inland
ESTUARY & LIVING COASTAL HABITATS	• Attenuate waves and help stabilise shorelines • Filter water, cycle nutrients and improve clarity • Store “blue carbon” in sediments and vegetation • Provide nursery habitat that supports fisheries and biodiversity
HEALTHY SOILS	• Provide the foundation for food production by cycling nutrients, retaining moisture and supporting fertile land • Reduce erosion and sediment loss when healthy, protecting waterways and downstream ecosystems • Help buffer flooding by absorbing, storing and slowly releasing water across the landscape • Filter contaminants and improve water quality before water reaches rivers, estuaries and aquifers • Store carbon and support soil biodiversity that underpins ecosystem resilience

Executive summary

Securing the future of Aotearoa New Zealand's built environment through strategic investment in natural infrastructure.

Natural infrastructure plays an essential role in making our towns and cities safer, functioning, livable, and more efficient in terms of transport, water, energy, public spaces, businesses, and housing.

For example, the incorporation of wetlands, floodplains, urban forests, open streams and connected green corridors can reduce flood risks for our towns and cities, cool neighborhoods, improve air and water quality, support housing development, create amenities and help maintain access to insurance.

Natural infrastructure supports town and city attractiveness through parks, green corridors, shade, walkability, and recreational spaces that attract residents and businesses. In a changing climate, these natural systems strengthen the performance of grey assets, lower lifetime costs, and support the long-term function of urban environments.

Current risks for town and cities.

Climate change impacts are increasing risks for towns and cities in the form of increasing exposure to flooding, drought, heat, and coastal erosion. Ageing and overburdened networks, land constraints and rising insurance costs are also putting financial pressure on our towns and cities and those that live and work in them.

These pressures threaten the resilience and future growth of our urban areas.

But when natural infrastructure is integrated, with good spatial planning and long-term investment settings, businesses to communities and councils are better able to adapt, grow and thrive.

Opportunities for towns and cities.

The opportunities in using natural infrastructure lie in the potential to unlock constrained land for housing, improve the quality and attractiveness of urban places, strengthen supply chains, and reduce the cost and consequences of natural hazards.

For example, with a key national risk[1] being inundation and flooding, the use of natural infrastructure such as wetlands, floodplains, and daylighted streams (uncovering and restoring natural waterways obscured or diverted by urban infrastructure), can reduce flood risk, enhance biodiversity, provide public amenity, while lowering capital and maintenance costs.

Integrated catchment planning can connect water networks, bringing region-wide resilience to drought, unlocking land value, helping to mitigate disruptions to, or failure of, critical infrastructure, and systemically important supply chains.

The use of spatial planning, embedding natural infrastructure in planning and regulatory frameworks, and integrating mātauranga Māori are key opportunities for strengthening towns and cities. Better quality developments, that maximise green corridors of natural infrastructure, can drive uplift in property and land values, contribute to livable communities, and drive improved environmental outcomes.

What's needed to realise these opportunities.

To realise these opportunities, system-wide changes are needed including:

- Long-term, bipartisan or cross-party alignment
- Better alignment between central and local government
- Regulatory reforms that embed nature into planning and decision-making
- Improved spatial planning to identify areas for protection and development
- Funding shifts from reactive rebuilding to proactive adaptation
- Mechanisms such as biodiversity net gain and nature asset registers will also help bring nature onto balance sheets.

[1] Department of the Prime Minister and Cabinet. (2025). New Zealand's National Risks. https://www.dpmc.govt.nz/our-progammes/risk-and-resilience/national-risk -and-resilience-framework/new-zealands-national-risks

About this report

Purpose

This report, prepared in February 2026, outlines the key economic dependencies and growth opportunities presented by natural infrastructure as it pertains to one of Aotearoa New Zealand's key economic sectors.

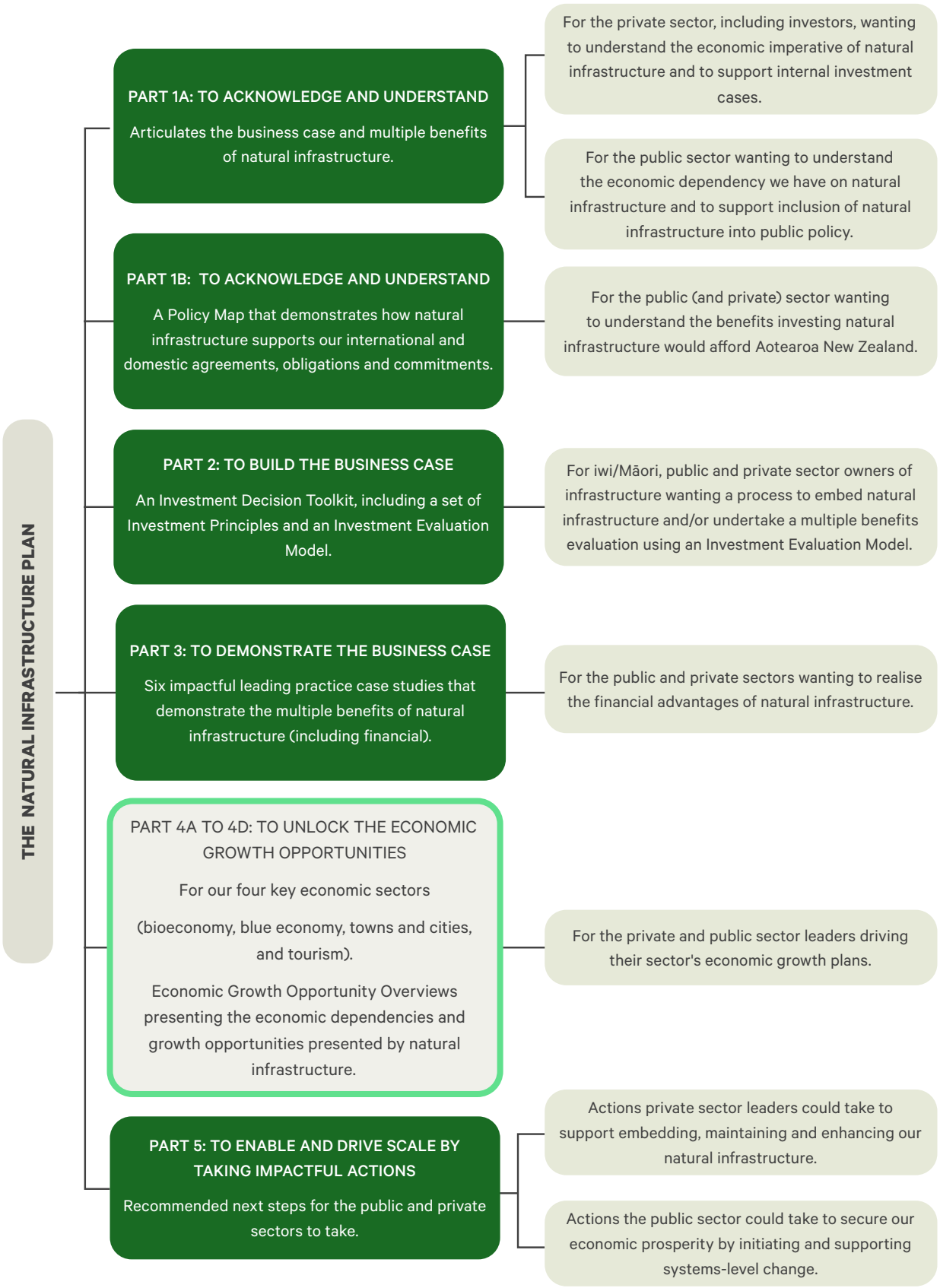
With our natural infrastructure being our most fundamental infrastructure, the purpose of this report is to outline, in a single document, the economic dependencies and growth opportunities presented by natural infrastructure.

This report has been prepared to support The Aotearoa Circle's Natural Infrastructure Plan (NIP).

Structure of the Natural Infrastructure Plan

The Natural Infrastructure Plan comprises several sections framed against the five objectives. Each has a specific purpose and intended audience.

Note: Parts 1B, 2, 3 and 4A-4D are available as separate PDFs to download .

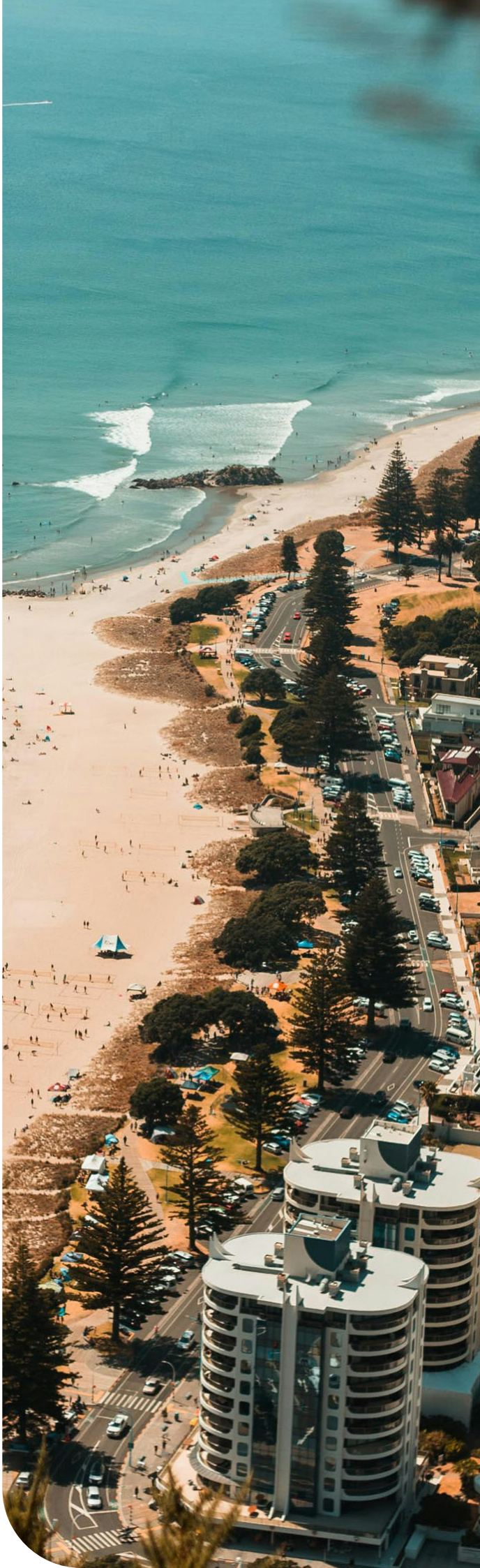


Next steps

It is envisaged that sector leaders utilise this report when developing national growth strategies.

It is also envisaged that these national growth strategies acknowledge and integrate the economic dependencies the sector has on natural infrastructure, and include plans to embed, maintain, and enhance our natural infrastructure.

To achieve enduring prosperity, and to realise economic growth opportunities, system-level changes are required. These systems-level changes, and other recommendations, are contained within the NIP.



A. Summary of the sector's national growth plans

The Government's Going for Growth Strategy[2] sets high level direction for economic development and includes an Infrastructure for Growth pillar.

While the strategy does not explicitly target towns and cities, its focus on improving infrastructure delivery and enabling economic growth has implications for urban development, housing supply and the ability of infrastructure systems to adapt to climate and demographic pressures. Accompanying regulatory and planning reforms are expected to create more predictable pathways for councils and developers to invest in infrastructure that supports resilient and livable cities including natural infrastructure.

The establishment of the National Infrastructure Funding and Financing agency[3] provides new mechanisms for attracting private capital into public infrastructure projects, including those that may incorporate nature-based solutions.

[2] Ministry of Business, Innovation and Employment. (2025). Going for Growth. https://www.mbie.govt.nz/assets/going-for-growth.pdf

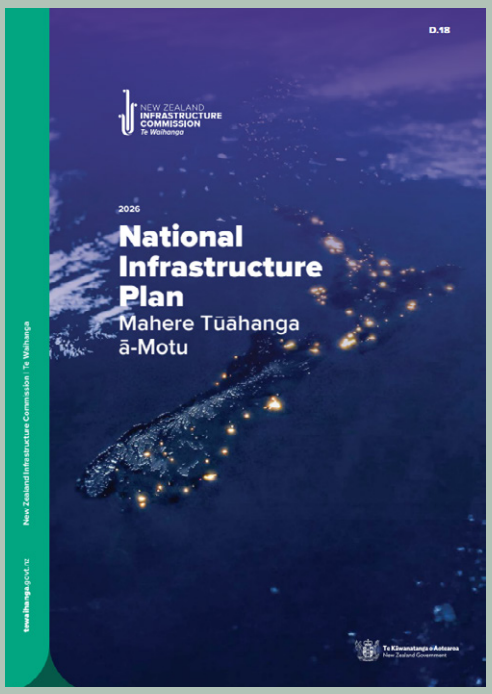
[3] National Infrastructure Funding and Financing. (2024). https://nationalinfrastructure.govt.nz/

Te Waihanga, Aotearoa New Zealand Infrastructure Commission's **National Infrastructure Plan**[4] (Plan) sets a 30-year vision for infrastructure investment across central and local government. The plan identifies population growth, climate resilience, technological change, and long-term infrastructure pressures as key national drivers. These drivers are particularly relevant for urban areas where population growth and infrastructure demand are concentrated, suggesting a need for integrated land use and infrastructure planning.

The plan also highlights the importance of long-term apolitical policy settings to provide certainty for councils and investors and emphasises the need to embed resilience and sustainability into long-term decision making. These regulatory tools also influence the quality of urban form and amenity by shaping where and how investment occurs in our towns and cities.

The National Infrastructure Pipeline and Infrastructure Priorities Programme have the potential to shape future infrastructure development across the country by improving transparency, prioritisation and value for money.

- The **National Infrastructure Pipeline**[5], maintained by Te Waihanga New Zealand Infrastructure Commission, provides a real-time snapshot of nearly 12,000 initiatives valued at approximately $275billion. The pipeline includes transport, water and urban development projects enabling councils, developers and investors to identify where nature based or hybrid infrastructure approaches could deliver greater resilience, long term cost savings or growth[6].
- The **Infrastructure Priorities Programme (IPP)**[7] provides an independent, standardised process to identify deliverable, high value projects. While the IPP does not explicitly prioritise natural infrastructure, its focus on value for money and long-term resilience provides a pathway for projects that incorporate natural or hybrid solutions where these demonstrate strong outcomes for communities, including those in urban areas.



[4] New Zealand Infrastructure Commission. (2026). National Infrastructure Plan. https://tewaihanga.govt.nz/national-infrastructure-plan

[5] New Zealand Infrastructure Commission (2025). Infrastructure Pipeline. https://tewaihanga.govt.nz/the-pipeline

[6] New Zealand Infrastructure Commission. (2026). National Infrastructure Plan. https://tewaihanga.govt.nz/national-infrastructure-plan

[7] New Zealand Infrastructure Commission. Infrastructure Priorities Programme. https://tewaihanga.govt.nz/our-work/infrastructure-priorities-programme

B. Scale of the investment opportunity and expected revenue and contribution to GDP

(i) Infrastructure investment is a significant economic lever for growth

Aotearoa New Zealand spends approximately 5.8% of GDP on infrastructure annually with projections indicating $17.5 billion in spend for 2025 (around 4.1% of GDP)[8]. The total investment opportunity exceeds $1 trillion over 30 years, with significant potential for private sector involvement. Closing the infrastructure gap could increase real GDP by up to 0.8% in the long term[9].

Aotearoa New Zealand is in the top 10% of OECD countries for infrastructure spend over the last decade, however, is in the bottom 10% of OECD countries in terms of value for money spent on infrastructure[10].

Aotearoa New Zealand also faces a significant infrastructure deficit of $200 billion resulting from years of underinvestment in core infrastructure. To address these and other key challenges, the plan makes several recommendations which fall under four key areas.

- Establishing affordable and sustainable funding, matching funding pathways to asset type, including user-pays, with investment informed by needs.
- Clearing the way for infrastructure, through spatial planning, maximising land use, creating the right enabling environment, supported by policy stability, workforce development, and public sector capability.
- A strong focus on maintenance, with asset management and investment planning at the core, with performance reporting and independent assurance oversight.
- Right-sizing new investment, with proposals passing through a readiness assessment, project transparency through publication of business cases, managing risks, and learning from completed projects.

[8] New Zealand Infrastructure Commission. (2025). Pipeline Snapshot. https://tewaihanga.govt.nz/the-pipeline/pipeline-snapshot

[9] New Zealand Treasury. (2024). Treasury Report T2024/1483: Developing an ambitious economic growth agenda. https://www.treasury.govt.nz/sites/default/files/2024-10/oia-20240662.pdf

[10] New Zealand Infrastructure Commission. (2025). Draft National Infrastructure Plan. https://tewaihanga.govt.nz/draft-national-infrastructure-plan

C. Nature-related dependencies of Aotearoa New Zealand's towns and cities

Around 750,000 people and 500,000 buildings, worth more than $145 billion, are near rivers and in coastal areas already exposed to damaging flooding[11].

(i) Economic dependencies on natural infrastructure

Figure 1 highlights how the activities most critical to towns and cities are not just supported by natural systems but are fundamentally shaped by them, with several activities showing High or Very High dependencies. For details on how this data was determined, please refer to **Appendix 2** of the main Natural Infrastructure Plan.

Rather than introducing new concepts, the figure reinforces the core message: **urban infrastructure does not operate in isolation to natural systems**, with performance closely tied to the stability of freshwater systems, coastal environments, soils, and ecological processes. The pattern in the chart shows that dependencies cluster in areas where cities carry the greatest service burden, water supply, waste management, transport access, and energy security demonstrating that pressures on nature translate quickly into pressures on the built environment. This strengthens the case for investing in natural infrastructure alongside grey assets, because **the resilience of urban services ultimately reflects the resilience of the natural systems they rely on.**

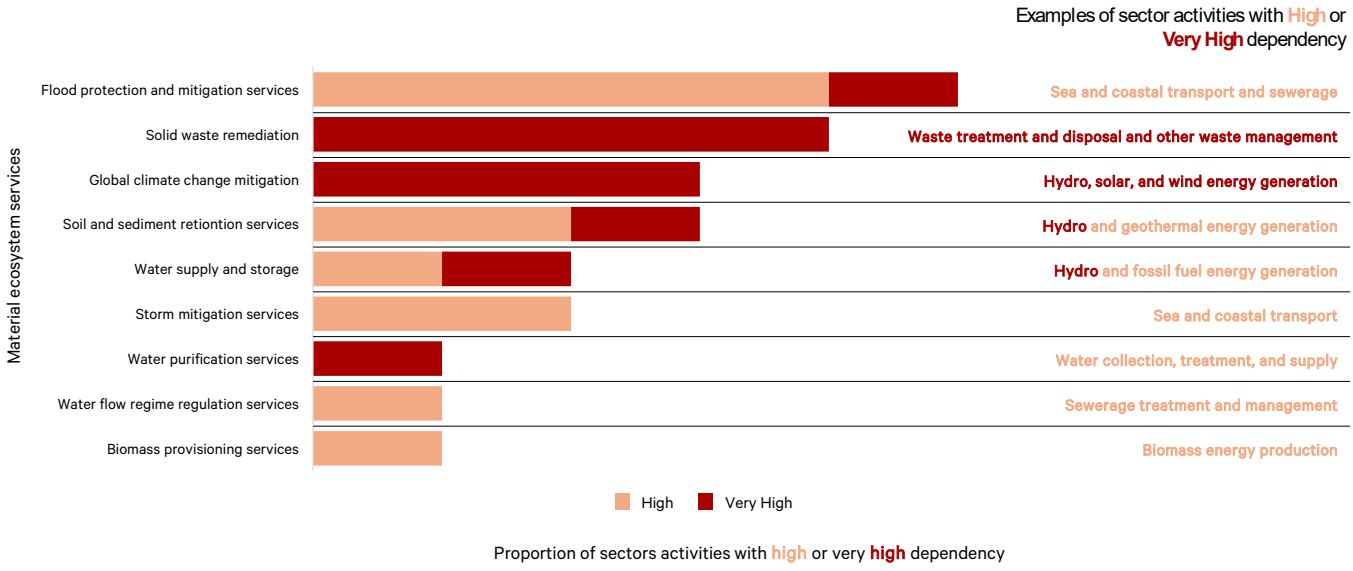


Figure 1: Examples of sector activities with High or Very High dependencies

[11] Ministry for the Environment & Stats NZ. "Our environment 2025: Tō tātou taiao." Our Environment 2025, 8 April 2025.

Energy production and potable water depend upon the reliable supply of freshwater

The collection and reliable supply of freshwater is critical to the function of New Zealand's potable water infrastructure and hydro electricity generation. The impacts of changes in water supply are listed as one of the most significant risks to New Zealand hydro-electricity generators in recent climate-risk disclosure reporting. Mercury Energy acknowledged that recent dry years reduced inflows across key catchments, limiting hydro generation and resulting in an estimated ~$100million impact on energy margin.9

Wastewater and solid waste management processes depend on active biological systems

Biological systems play a significant role in New Zealand's built environment by breaking down and treating waste substances, nutrients, and pollutants through the actions of micro-organisms, algae, plants and animals. Through interactions with solid waste, surface waters, and groundwater bodies, ecosystem services facilitate the decontamination of soils and water, reducing the cost of human interventions.

Infrastructure depends on protection from floods and storms by landscape features

Built infrastructure, including energy generation and transmission, roading and ports, and telecommunications are dependent on natural assets and landscape features such as forests, mangroves, coastal dunes, and riparian margins for protection against flooding and storm events in New Zealand. In the coastal zone alone, approximately **2,273km of roads, 5,572km of water pipes, and 49,709 buildings with a replacement value of $26.2billion are vulnerable flooding following a modest 0.6m rise in sea-level**[10].

In some cases, such as telecommunications, the dependency is indirect. Telecommunications remain functional only when the electricity network is resilient, and the electricity network itself depends on natural infrastructure to reduce outage risks. Regardless, natural infrastructure is essential to keeping society functioning during significant periods of disruption.

D. Nature-related impacts from Aotearoa New Zealand's towns and cities

Urban and infrastructure development is the leading cause of highly productive land in Aotearoa New Zealand, with a 54% increase in highly productive land used for development between 2002-19[12].

(i) Impact drivers

Figure 2 presents data for the impacts from activities most relevant to the towns and cities. For details on how this data was determined, please refer to **Appendix 2** of the main Natural Infrastructure Plan.

Whereas the previous figure highlighted how urban systems depend on nature, this one illustrates the reverse relationship: **that urban transport, water services, energy generation and waste management exert substantial pressure on freshwater, coastal and terrestrial ecosystems.** These pressures heighten the very challenges described in this section such as land constraints, declining ecological function and increasing climate-related risks, by reducing the natural capacity of catchments and coastal systems to buffer storms, manage flooding, and maintaining water quality.

The pattern in the chart underscores that **the built environment is not only vulnerable to environmental change but contributes to it.** Strengthening natural infrastructure can simultaneously reduce urban impacts and improve resilience.

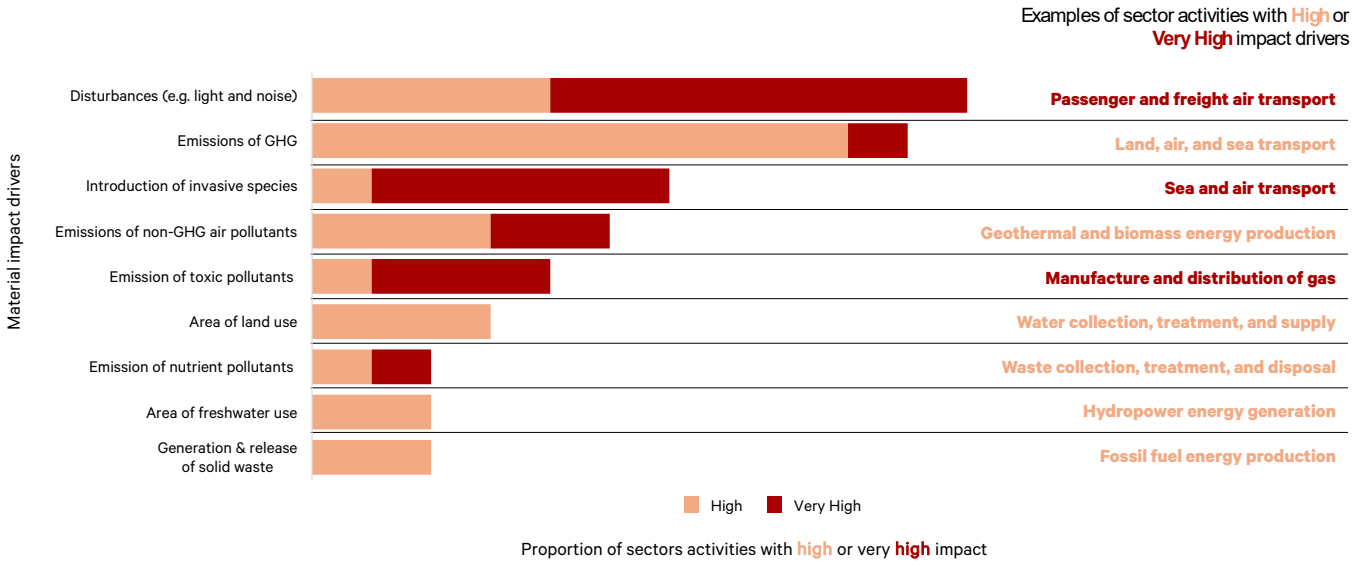


Figure 2: The sectors' greatest impact drivers on natural infrastructure, with examples of sector activities with High or Very High impact drivers

[12] MfE Our Land, 2024

Our towns and cities contribute significantly to greenhouse gas emissions

Energy generation from fossil fuels and biomass for heating, construction, and transportation, industrial processes, and waste processing generate a significant amount of **greenhouse gas** emissions. The gross **greenhouse gas** emissions from Energy, Industrial Processes and Product Use, and Waste categories made up a combined 45.9% of New Zealand's GHG Inventory in 2023[13]. However, all built infrastructure sectors **greenhouse gas** emissions have reduced in recent years as sectors switch to less emissions intensive technologies and energy sources.

Urban development is impacting land and resource availability

Increasing demands for housing and supporting infrastructure is placing higher impacts on land use and natural resources, such as water and soils. Currently, approximately 84% of New Zealanders live in urban areas. As our population grows, over 70% of this growth is expected to occur within the main urban centres. The loss of highly productive lands to urban development can have consequences for food and fibre production.

Our towns and cities can cause, and compound, natural hazards

Over 65% of New Zealanders live within 5km of the coast, putting many communities, infrastructure, and supply chains at risk to flooding and inundation. Built infrastructure protection practices often work against nature, putting pressure on coastal areas, rivers, and floodplains and the natural benefits they provide. By placing hard infrastructure, such as roading, alongside coastal areas often exacerbate risks to nature as the infrastructure prevents natural retreat of ecosystems and creates the squeezing of coastal ecosystems.

[13] MfE New Zealand GHG Inventory, 2023

E. Traditional infrastructure that towns and cities rely on

Towns and cities provide, and rely heavily on, traditional infrastructure systems: **land transport (roads, bridges, rail), water and waste networks, ports and airports, electricity and gas distribution, and telecommunications.**

Local and central government depend on these assets for service delivery to communities. In turn, the services support communities and economic prosperity.

Reliable and resilient **transport networks** are critical for the movement of people and goods. Road transport networks rely on electricity and cellular networks for real-time traffic monitoring via sensors and cameras, which inform dynamic light phases and traffic management.

People rely on land transport to reach education, work, healthcare and essential goods and services.

The movement of goods and the delivery of services also depend on strong and reliable transport networks. In turn, the movement of goods (for example, produce delivered to a supermarket) and services (for example, trades and construction or local government waste collection services) is heavily reliant on transport networks.

Resilient ports and airports are critical for the import and export of goods, domestic travel, and international tourism. **Port facilities** often depend on 'hard' traditional infrastructure including seawalls, coastal reclamation and breakwaters. **Airports** – which require large expanses of flat topography – often depend on flood mitigation systems, retaining and seawalls.

The primary sector, manufacturing and commercial operations, and the wider community depend on consistent energy supply through distribution networks. This energy powers homes, the operation of local government assets such as sports grounds, libraries and community facilities.

Local government is tasked with provision of water services, including a clean water supply for domestic and commercial consumption, reliable conveyance and high-quality treatment of liquid and solid waste produced by houses and businesses. This service provision relies on an extensive traditional infrastructure network comprised of pipes, pumps, treatment plants, and facilities.

F. Challenges and constraints facing the sector

Towns and cities face a distinctive set of challenges that constrain the uptake and delivery of natural infrastructure.

Spatial planning constraints exist in urban areas when retrofitting green corridors is a challenge because there is limited land availability. Urban intensification reduces private green space, increasing pressure on public natural infrastructure to provide amenity and resilience.

Natural infrastructure often requires more land than grey assets, creating competition between housing, transport and resilience needs. In many urban areas, these spatial constraints and competing land uses directly limit the feasibility of natural infrastructure, as their larger footprints reduce the number of viable sites available within towns and cities.

Multi-use land approaches, such as combining flood protection with recreation or productive uses, are increasingly necessary. These approaches create opportunities to maximise scarce urban land by delivering resilience benefits alongside productive activities or recreational amenities, enabling towns and cities to achieve multiple outcomes from the same footprint.

Regional spatial planning and integrated catchment planning are needed to address these trade-offs but are often underfunded or inconsistently applied. Existing grey infrastructure is often 'locked in' for a long-term design life and difficult to transition from once invested in. There is also limited understanding of the performance and lifecycle costs of nature-based solutions compared with traditional grey assets, reinforcing conservative design choices and long-term legacy asset bias.

There is also uncertainty around the long-term maintenance needs and performance variability of nature-based solutions compared with well-established grey infrastructure systems, which can reduce confidence among planners and engineers and limit their uptake.

Challenges remain in the **regulatory space**, including risk-averse consenting processes that favour traditional grey infrastructure. Regulatory and consenting frameworks remain heavily oriented toward traditional infrastructure, making nature-based solutions difficult to consent due to uncertainty, lack of standards, and fragmented approval pathways across agencies. **These regulatory and consenting constraints represent one of the major barriers to implementing nature-based solutions in towns and cities**, often delaying or preventing otherwise viable projects.

Compounding this is the **fragmented landownership between the public and private sector,** which can constrain delivery even when natural solutions are technically feasible.

Private property rights and multiple governance agencies can sometimes be a barrier to innovation. These differing ownership structures complicate implementation because natural infrastructure often needs to extend across multiple land parcels, requiring coordinated approvals, shared investment and aligned maintenance responsibilities that are difficult to achieve when incentives and obligations differ between private landowners, councils and other agencies. Within cities, responsibilities for roads, stormwater, transport corridors, parks, green spaces and open watercourses are split across multiple council departments and agency boundaries, each with separate budgets, planning processes and asset standards. This fragmentation makes integrated natural infrastructure delivery difficult and slow.

Behavioural and cultural barriers include community perception of safety when considering grey infrastructure versus green, an example being the perceived security of stop banks compared to 'room for river' corridors.

A shift of residential investment away from high-risk zones is also needed. But both are underpinned by resistance to change and status quo persistence due to the presence of sunk costs. Institutionally, engineering and planning cultures often favour engineered certainty over natural systems, reducing willingness to trial or scale nature-based approaches.

Increasingly traditional grey network assets and the services they provide are strained by **climate impacts and urban growth**. Many assets are ageing, increasingly costly to maintain, unable to adapt to changing needs, or in some instances, no longer fit for purpose. The sector also faces challenges from decentralization of responsibilities across agencies, capacity limitations and shortages of specialist skills needed to design and maintain natural infrastructure. Climate-related risks including flooding, slips and drought conditions exacerbate needs. Urban resilience is also dependent on upstream catchment-scale

natural infrastructure, meaning risks originating outside city boundaries can significantly affect urban communities.

Insurance retreat is a growing concern as well as increasingly expensive insurance premiums for vital assets such as ports and airports. In some areas, rising premiums and reduced availability of cover threaten the long-term viability of households, businesses and community infrastructure. We are seeing this with the managed retreat of communities in Northland, Auckland, the Bay of Plenty and Poverty Bay. As BRANZ cites managed retreat is expected to become more mainstream in New Zealand. “Designing with nature is a significant principle for moving to longer-term natural hazard resilience and sustainability in New Zealand. Managed retreat is the strategic, coordinated relocation of people and assets away from natural hazard risk. It works with nature rather than against it to avoid and reduce natural hazard risk[14].”

[14] https://www.buildmagazine.org.nz/assets/PDF/Build-163-62-Feature-National-Science-Challenges-Managed-Retreat-In-NZ.pdf

G. Resilience and growth opportunities presented by natural infrastructure

Natural infrastructure can enable towns and cities to meet growth demands in a variety of ways from supporting flood attenuation from severe weather events while also providing amenity benefit, enabling insurance access, and supporting community-led innovation. Local government plays a central role in planning, funding, and enabling these natural infrastructure approaches.

Significant opportunity exists to **better manage increasing risks** from inundations and flooding in towns and cities using natural infrastructure which is a key national risk[15]. Wetlands, connected water networks, riparian planting and naturalised systems coupled with permeable surfaces can reduce flood risk. This can in turn support land value uplift and development, whilst reducing risk/exposure and supporting avoided costs.

Natural infrastructure, when well planned, can require lower capital expenditure, provide lower long-term renewal and maintenance costs, and provide for greater flexibility as conditions change. This helps to mitigate disruptions to, or failure of, critical infrastructure, particularly as this underpins systemically important supply chains[16].

Integrated catchment level planning as well as the use of more coordinated and future-focused spatial planning to identify areas for development versus protection and connecting riparian networks, are a key opportunity to both unlock growth and provide essential services to communities that deliver long term benefits.

Spatial planning is a key requirement of the operating environment for infrastructure growth[17]. However, to realise this opportunity, the use of natural infrastructure needs to be embedded into local government planning, regulatory and investment frameworks, and the case for natural infrastructure needs to be better understood and integrated within decision frameworks. A consistent and predictable policy, regulatory and legislative environment is highlighted as necessary in the Plan[18]. In addition, working with iwi/Māori as partners to unlock mātauranga and support the better integration of that knowledge is essential.

Better quality development that includes green corridors, bringing biodiversity benefits and canopy cover, while also serving as **public amenity spaces, attract businesses and residents**, and can **increase the value** and appeal of urban developments, particularly as urban growth intensifies and encroaches on rural areas. Connected green corridors can also be used as shared user paths, that can support the uptake of safe active mode networks and address urban heat resilience. This will require co-ordination across infrastructure planning and land use, with local government providing leadership across these systems[19].

Local government plays a central role in realising these opportunities. Councils are responsible for spatial planning, land-use regulation, stormwater and water management, local transport networks, consenting and community amenities. Embedding natural infrastructure into district plans, infrastructure strategies, design standards, procurement processes and partnership agreements supports more resilient, lower-cost and higher-quality urban development.

[15] Department of the Prime Minister and Cabinet. (2025). New Zealand's National Risks. https://www.dpmc.govt.nz/our-programmes/risk-and-resilience/national-risk -and-resilience-framework/new-zealands-national-risks

[16] Department of the Prime Minister and Cabinet. (2025). New Zealand's National Risks. https://www.dpmc.govt.nz/our-progammes/risk-and-resilience/national-risk -and-resilience-framework/new-zealands-national-risks

[17] New Zealand Infrastructure Commission. (2025). Draft National Infrastructure Plan. https://tewaihanga.govt.nz/draft-national-infrastructure-plan

[18] New Zealand Infrastructure Commission. (2025). Draft National Infrastructure Plan. https://tewaihanga.govt.nz/draft-national-infrastructure-plan

[19] New Zealand Infrastructure Commission. (2025). Draft National Infrastructure Plan. https://tewaihanga.govt.nz/draft-national-infrastructure-plan

H. Innovative examples of natural infrastructure in our towns and cities

(i) Horizons Regional Council: Rangitikei River Climate Resilience[20]

The Rangitīkei River which flows from the Central Plateau south past Taihape, Mangaweka, Hunterville, Marton and Bulls, to Tangimoana, 40km southeast of Whanganui, has a history of flooding[21], impacting adjacent infrastructure and productive land. Historically, hard-engineering techniques, such as stop banks, have been used to reduce flood risks. This meant less space for floodwater to naturally dissipate, causing severe flooding, erosion and maintenance costs.

A project led by Horizons Regional Council focused on a more economically and resilient approach through the creation of a 60km "mobility" river corridor on the Lower Rangitīkei River, near Bulls. The project has the intent of enabling the river to flow more naturally, with excess water moving into original flood plains and dispersing accordingly. Areas of pastoral land within the river corridor will be planted in native species.

This project is expected to have positive economic, environmental and social outcomes for the Rangitīkei River and its users. It will not only assist in keeping communities safer but will help boost the region's economy, through employment of local businesses and iwi, as work on maintaining and building new infrastructure progresses.

(ii) Auckland: Daylighting Streams for Ecological and Social Resilience[22]

Auckland's Te Auaunga Awa (Oakley Creek) restoration project is a leading example of daylighting urban streams. Between 2016 and 2019[23], 1.5 km of the stream was restored, seven piped tributaries were daylighted, and 8ha of open space rehabilitated.

The initiative, which represented a $25m investment by Auckland Council[24], demonstrates how natural infrastructure can increase housing resilience, reduce costs, transform degraded urban waterways into vibrant ecological and community assets, while also addressing climate adaptation and equity[25].

During the 2023 Auckland Anniversary Day floods, the restored corridor effectively accommodated floodwaters.

The project reduced flood risk for nearly 200 homes and enabled housing intensification within a vulnerable floodplain. This is against the backdrop of Auckland Council spending $774million for Category 3 buyouts of an estimated 700 residential properties where there is an intolerable risk to life and it is not possible to reduce this risk.

The restoration incorporated natural infrastructure such as native planting, wetlands, swales, and raingardens. All improving water quality and ecological function. It also delivered significant social and cultural benefits, including outdoor classrooms, community orchards, and spaces for iwi/Māori cultural expression.

The project was co-designed with mana whenua and local communities, supporting social procurement initiatives and ensuring inclusive outcomes[26].

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20 Horizons Regional Council. (2021). The Rangitikei River Climate Resilience Project. https://www.horizons.govt.nz/HRC/media/Media/Rangitikei-factsheet.pdf

21 https://www.horizons.govt.nz/flood-emergency-management/infrastructure-climate-resilience-projects/rangitikei-river-climate-resilience

22 Auckland Council. (2019). Te Auaunga Awa (Oakley Creek). https://www.tiakitamakimakaurau.nz/understanding-conservation/matauranga-and-conservation-working-side-by-side/te-auaunga-oakley-creek/

23 World Landscape Architecture. (2020). Te Auaunga stream restoration project daylights seven piped tributaries. https://worldlandscapearchitect.com/te-auaunga-daylights-seven-piped-tributaries/

24 https://ourauckland.aucklandcouncil.govt.nz/news/2019/07/auckland-mayor-thrilled-at-te-auaunga-transformation/#:~:text=$25%20million%20stormwater%20project,parklands%20along%20the%20awa's%20banks.

25 Science Learning Hub. (2024). Restoring Te Auaunga – Oakley Creek. https://www.sciencelearn.org.nz/resources/3330-restoring-te-auaunga-oakley-creek

26 Auckland Council. (2020). Te Auaunga Awa (Oakley Creek) Park and Stream Restoration Project: an impact evaluation. https://knowledgeauckland.org.nz/media/1857/tr2020-007-te-auaunga-awa-oakley-creek-impact-evaluation.pdf

(iii) Sheffield City Council UK – Grey to Green[27]

Conceived as a transformative environmental project[28] to create a linear park, this project was innovative by reconnecting business districts and reusing redundant road infrastructure.

The linear park was designed with a functional focus on natural infrastructure (sustainable drainage systems) to more naturally route cleaned rainwater back into the River Don which flows through South Yorkshire. It was designed to form a safe and accessible route through the county attracting new businesses, investment, and jobs.

Resulting economic benefits include:

- Proactive relocation of businesses to the area and the creation of 540 jobs with further anticipated.
- Environmental benefits including a 561% increase in biodiversity for one part of the scheme
- A reduction in volumes of water diverted from sewage treatment annually, and reduction in the urban heat island effect.

(iv) Local Government Funding Agency: Financing Natural Infrastructure for local councils through LGFA Green and Social Loans

Councils can access dedicated finance for natural infrastructure through the New Zealand Local Government Funding Agency (LGFA) Green and Social Loan Programme.

These loans provide a financial incentive for projects that deliver environmental or social benefits and must meet the eligibility criteria set out in LGFA's Green and Social Loans Lending Programme.

Natural infrastructure projects commonly align with several LGFA green categories, including climate change adaptation, biodiversity restoration, sustainable water and wastewater management, and the sustainable management of natural resources. Eligible projects must demonstrate measurable environmental benefits and meet the minimum requirements for the relevant category.

Councils can apply by identifying the qualifying category, completing the LGFA application form, and providing supporting documentation. Approved projects receive a GS Loan with ongoing impact reporting requirements.

[27] Sheffield City Council, United Kingdom. (2022). Grey to Green. https://www.greytogreen.org.uk

[28] Sheffield City Council, United Kingdom. (2022). Grey to Green. https://reports.livingstreets.org.uk/pedestrianpound/CaseStudy12Sheffield/index.html

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Contact us

This report forms a key part of a wider Natural Infrastructure Plan.

For questions or additional information on the Natural Infrastructure Plan please reach out to The Aotearoa Circle.

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The Natural Infrastructure Plan, including its associated separate parts, have been prepared by The Aotearoa Circle in collaboration and consultation with Circle Partners and other key stakeholders to stimulate discussion, improve understanding and support consideration of nature as critical national infrastructure. The plan reflects the views at the time of publication and is intended for general information purposes only.

While reasonable care has been taken in the preparation of this document, The Aotearoa Circle makes no representations or warranties, express or implied, as to the accuracy, completeness, or currency of the information. Readers are urged to seek their own independent professional advice on specific matters before acting on any information contained in this Plan.

The Aotearoa Circle

Mā te Kaitiakitanga ko te Tōnuitanga
Prosperity Through Guardianship

4 March 2026

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