Waimate District
Climate Resilience Strategy

Briefing notes for Transport Action Plan Workshop

waimatedc.govt.nz/climate

Waimate District Council

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Below is a summary with associated links to help you make an informed decision when contributing to our online survey or workshop for our Transport Action Plan as part of our community engagement for the Waimate District Climate Resilience Strategy.

Key policy documents pertaining to this action plan

Emissions Reduction Plan (ERP)

https://environment.govt.nz/publications/aotearoa-new-zealands-first-emissions-reduction-plan/

National Adaptation Plan (NAP)

https://environment.govt.nz/publications/aotearoa-new-zealands-first-national-adaptation-plan/

Canterbury Climate Change Risk Assessment (CCCRA)

https://www.canterburymayors.org.nz/wp-content/uploads/Canterbury-CCRA-Report_FINAL_V5.0.pdf

Transport Action Plan: Outcomes

- Reduce transport-related carbon emissions.
- Improve the climate resilience of transport infrastructure.

ERP / NAP: Goals

1. Reduce reliance on cars and support people to walk, cycle and use public transport.
2. Rapidly adopt low-emissions vehicles.
3. Begin work now to decarbonise heavy transport and freight.
4. Reduce the vulnerability of assets exposed to climate change.
5. Ensure all new infrastructure is fit for a changing climate.
6. Use renewal programmes to improve adaptive capacity.

Background

The Climate Change Response (Zero Carbon) Amendment Act 2019 introduced 2050 emissions reduction targets that are consistent with the Paris Agreement's commitment to limit warming to 1.5˚C above pre-industrial levels. The targets require gross emissions of biogenic methane to reduce to at least 10% below 2017 levels by 2030 and to between 24 and 47 per cent by 2050. Emissions of all other greenhouse gases must reach net zero by 2050. This last target is the one that applies to transport.

Source: https://www.transport.govt.nz/area-of-interest/environment-and-climate-change/climate-change/

These briefing notes are grouped under our two strategy goals:

1. Net zero emissions for the district.
2. Build climate resilience through a just and equitable intergenerational approach to planning and preparing for the impacts of climate change.

Information pertaining to net zero emissions

Transport is one of our largest sources of greenhouse gas emissions nationally.

It is responsible for:

- approximately 17 per cent of gross domestic emissions
- 39 per cent of total domestic CO2 emissions.
- Transport equated to 54% of the Waimate District Council's greenhouse gas emissions in the 2018/19 financial year.

To reach net-zero long-lived emissions by 2050, we need to largely decarbonise transport.

Urgent action and system-wide changes are needed to put our transport emissions on the trajectory to a low-emissions future. The current transport system is also inequitable. Māori, Pasifika, disabled people, low-income households, women, older people, children and rural communities are often underserved by the transport system. They are also overburdened by related negative impacts, such as deaths, serious injuries and illness from transport crashes, and pollution. To ensure an equitable transition, the transport system needs to be more inclusive and affordable.

Focus area 1: reduce reliance on cars and support people to walk, cycle and use public transport

The amount people travel in fossil-fuelled vehicles is at the heart of the transport emissions challenge. We cannot rely on just decarbonising the vehicle fleet quickly. Improving urban form, offering better transport options, and using other demand management levers to reduce distance travelled by cars is vital. Most of this reduction needs to occur in our largest cities, where people are more likely to have transport options other than travelling by car. These measures can also deliver significant benefits beyond reducing emissions, such as improving travel choice and accessibility, better health and safety, and less congestion.

Focus area 2: rapidly adopt low-emissions vehicles

Two-thirds of transport emissions come from the light vehicle fleet. Alongside reducing reliance on light vehicles, decarbonising the light vehicle fleet is critical for meeting our targets.

Focus area 3: begin work now to decarbonise heavy transport and freight

Reducing emissions from freight transport will be critical to achieving a 41 per cent reduction in transport emissions by 2035.

Heavy vehicles, most of which are for freight, emit almost a quarter of our total transport emissions.

Source: https://environment.govt.nz/publications/aotearoa-new-zealands-first-emissions-reduction-plan/

Information pertaining to climate resilience

District wide implications from the CCCRA

The Waimate District has 1286km of rural roads, 52km of urban roads and 185 bridges.

Asset owners have existing duties as lifeline utilities under the Civil Defence Emergency Management Act 2002 to "function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency".

The rail route and State Highways 1 and 83 provide important connections to, from and throughout district. In some cases, the state highways are the main, or even the only, connection serving the towns of St Andrews, Makikihi, Glenavy and providing access to the Hakataramea Valley. Both rail and state highway routes are generally located in the flat lowlands along the coastal and Waitaki River fringe.

The district's roads and rail have high exposure to surface water flooding, with 300km of roading, and approximately 17 km of railway exposed. Both the July floods of 2022 and the Rangitata flood event of 2019 highlighted the importance of state highways in connecting communities.

No roads in the district are exposed to sea level rise. However, for rail there is approximately 1km of railbed exposed at the 1% AEP + 0.0 m sea level rise. (AEP – Annual Exceedance Probability - is the probability of a certain event occurring in a single year. A one per cent AEP has a one per cent, or 1-in-100 chance of occurring in any one year, and a 10 per cent chance of occurring in any 10 year period). This increases to 2km with 0.3m sea level rise, and a little over 4km with 0.8m sea level rise. Of the rail exposed sea level rise is projected to be up to 0.8 m under RCP 8.5.

The numerous rivers within the district mean that many of the district's transport connections are exposed to flooding and erosion. Many bridges also serve as critical connections, as is often highlighted during flooding events, during which flooding and debris cause damage. Critical connections can be cut to the wider region that disrupt and impacted critical supply chains.

The sensitivity of roads and bridges to flood damage such as erosion is influenced by both road condition and material type. Rural roads and unsealed roads are often in poorer condition than urban roads, as they have less frequent maintenance. Increased rainfall and flooding events can cause washouts of roads, leading to extensive disruption and a high cost for repair. For example, the South Canterbury floods in 1986 caused $30 million (measured in equivalent 1991 dollars) in rail and road damage, with floods, slips, washouts and surface flooding occurring. Many roads were scoured out.

Coastal erosion, increased rainfall, and flooding can all cause scouring of bridge foundations, which can lead to foundation failure. Rail sensitivity to flood and heavy rainfall is influenced by ballast material and construction. Ballast can be susceptible to washout during flood events, causing delays and reducing speeds.

The adaptive capacity for state highways and main trunk lines is generally limited due to their permanent nature, need to connect to the communities that they serve, and limited alternative geographic corridors. However, some actions can be taken, through increased maintenance or strategic planning, to reduce impact from climate related hazards.

These include:

- Raising road and rail levels, and increasing redundancy within the network (Byett, et al., 2019).
- Destressing tracks to ensure buckling does not occur in increased temperatures.
- Managed retreat.
- Technical and operational solutions, e.g. change in design standards to ensure alignment with flood risk strategies(Gardiner, et al., 2009b).

Summarised from: https://www.canterburymayors.org.nz/wp-content/uploads/Canterbury-CCRA-Report_FINAL_V5.0.pdf

Canterbury Climate Change Risk Assessment (CCCRA) Transport Risk Summary

11.2 Linear transport

Risk to linear transport includes risks to roads, bridges, and rail networks. The highest rated risks from climate change include those due to changes in rainfall and sea level rise, with associated flooding, and coastal erosion. Risk to linear transport due to inland flooding and erosion is rated to increase to extreme by late century. This is because exposure to flooding is projected to increase and is also due to the high sensitivity of these assets to erosion. There is currently a moderate sensitivity to flooding, which is likely to increase to high over time. Linear transport generally has a medium adaptive capacity to flooding.

There is a low rated adaptive capacity of linear transport to coastal erosion, with retreat or abandonment of assets being the likely feasible options.

Linear transport is also at risk from increased temperature as pavements can melt, rails can warp, and maintenance of unsealed roads made more difficult at high temperatures. Specific assets have differing levels of adaptive capacity. For rail, risk resulting from increased temperatures and landslides is rated as extreme by the end of the century. This is due to its extreme exposure and extreme sensitivity to these hazards at 2100. However, the adaptive capacity for rail assets is rated as moderate, as increased maintenance is likely to decrease the risk. Bridges are rated to have a low adaptive capacity to risk, due to their permanent nature and the high cost of replacement.

Risk statement	Risk				High level description
	Present	2050 (RCP8.5)	2100 (RCP4.5)	2100 (RCP8.5)	
Risk to rail due to increasing coastal erosion	High	High	Extreme	Extreme	Coastal erosion is likely to increase with projected sea level rise and increasing storminess. Sections of rail are exposed to coastal erosion, particularly along the Kaikoura Coast. Coastal erosion may damage tracks severely, and cause disruption to services. Some coastal routes have limited options for alternative inland routes, and are required to continue to serve existing communities.
Risk to rail due to increasing landslides and soil erosion	Moderate	High	Extreme	Extreme	A large section of the Kaikoura rail line is located adjacent to coastal cliffs. Coastal erosion may erode or destroy the track causing disruptions and damage. There is potential for strengthening of these sections of cliff face or improved coastal defences.
Risk to rail due to higher mean temperatures	Low	Moderate	High	High	Projected increasing temperatures may increase the occurrence of buckling of tracks. Maintenance can be done to avoid buckling i.e. destressing
Risk to rail due to sea-level rise and salinity stresses	Low	Moderate	High	High	Projected sea level rise may cause inundation and increase salinity stress for coastal rail routes such as those along the Kaikoura Coast. This may cause coastal erosion, disruption to services and increase corrosion due to salt water intrusion. Some coastal routes have limited options for alternative inland routes, and are required to continue to serve existing communities.
Risk to roads and bridges due to increasing coastal erosion	Moderate	High	Extreme	Extreme	Coastal erosion is likely to increase with projected sea level rise and increased storminess. Coastal roads and bridges may be exposed to erosion which can damage bridge footings, road foundations, and erode surfaces. Options to adapt include retreat or abandonment.
Risk to roads and bridges due to river and surface flooding	Low	High	Extreme	Extreme	Projected increases in extreme rainfall events are likely to result in increased surface and riverine flooding. Bridges exposed to flooding may be damaged through erosion, debris strike or washout. Flooding can cause disruption and damage to roads, which is influenced by material, type of structure, condition and age. Improved resilience can be achieved though maintenance and provision of alternative routes.
Risk to roads and bridges due to sea-level rise and salinity stresses	Low	Moderate	High	High	Projected sea level rise is likely to increase exposure of roads to inundation and salinity stress. Roads exposed to inundation may be damaged and travel routes disrupted.

Source: Aotearoa-New-Zealands-first-emissions-reduction-plan.pdf

21.7 Reduced transport disruptions

Fewer instances of snowfall and icy conditions will likely result in reduced disruptions to the transportation network. Disruptions can subsequently impact surrounding communities, freight, and the broader economy. Reducing the instances of transportation disruptions presents an opportunity to reduce direct disruption costs to businesses and communities, operational and maintenance costs, as well as injuries and fatalities. Across the Canterbury region, there are several major routes (such as Arthur's Pass and Lewis Pass) which are regularly disrupted multiple times per annum due to snow and ice. Under RCP 8.5, this opportunity will continue to grow from present day until 2100.

21.7.1 Benefits of reduced transport disruptions

This opportunity leads to benefits within the Ngā pono of Hauora (physical health), Hapori (sense of community), Ngā Waihanga (infrastructure services), and Ōhanga (prosperity).

- Hauora (physical health): Reduced snow and ice road conditions will likely contribute to the reduction of the number and severity of vehicle incidents, as well as the severity of physical and mental health impacts. Active modes users will also benefit from reduced snow and icy conditions due to less potential for falls and associated injuries. A decrease in snow and ice conditions may lead to fewer incidents and increased use of active transport modes (contributing to better health outcomes).
- Hapori (sense of community): Transport gives people the ability to connect and travel beyond their communities for work, services, recreation, community, family, and religious and cultural purposes. Reduced transport interruptions may foster better community connections, resulting in better mental health outcomes.
- Ngā Waihanga (infrastructure services): With warmer temperatures, road freeze-thaw cycles could reduce. This could limit the damage to paved surfaces, potentially leading to reduced transportation disruptions and winter maintenance costs.
- Ōhanga (prosperity): Road closures or difficult driving conditions on key road linkages (such as Lewis Pass and Arthur's Pass) can cause delays in freight movements as truck drivers have to drive to the conditions or take alternative routes. A reduction in snow and ice conditions on roads may provide safer driving conditions and better freight reliability.

21.7.2 Associated risks

As discussed in Section 10.2 of the CCCRA, there are a range of other risks to transportation which may result from an increase in average temperatures, flooding, and extreme weather events. Active transport modes may also be used less due to heat-stress related illnesses. Bridges and pavements may need increased frequency of repairs due to expansion, bleeding and rutting. There could also be a risk of increased air pollutants from exposure of asphalt to hot weather. The increase in extreme weather events (such as extreme rainfall, which may lead to landslides and flooding) may also lead to further disruptions, balancing or negating the effect of reduced disruptions from reduced snow and ice.

21.7.3 External factors

External factors, such as uptake of alternate low-carbon modes, asset management, transport related policies, fuel and congestion taxes, and fees, may impact transport disruptions.

Source: https://www.canterburymayors.org.nz/wp-content/uploads/Canterbury-CCRA-Report_FINAL_V5.0.pdf

Canterbury Regional Land Transport Plan 2021 – 2031: Ten-year transport priorities

Greater resilience of Canterbury's transport infrastructure is needed to secure regional and national supply chains. These risks place pressure on our transport links and have the potential to isolate districts or communities; in many instances alternative routes that must be used are indirect, resulting in extremely long detours, or are unsuitable for certain vehicles (such as high-productivity motor vehicles). These impacts are well illustrated by the flooding of the Rangitata River in late 2019, which effectively cut the South Island in two. Longer term, climate change will increase this risk and extreme weather events that compromise the network's security are expected to become more frequent. The changing climate is expected to increase the vulnerability of the network.

Source: https://www.ecan.govt.nz/your-region/plans-strategies-and-bylaws/canterbury-transport-plans/

Innovation in heavy transport

Some forms of heavy transport, such as aviation and shipping, are challenging to decarbonise. Short term reductions in emissions can come from optimising how we use what we have - ensuring things run as efficiently as possible, minimising the amount we move freight around, and using the lowest emission option available.

In the medium- to long-term, switching to low-carbon fuels such as electricity, biofuels or green hydrogen will be central to reducing emissions from heavy vehicles. It is important that work to enable this switch begins.

We know there are barriers to decarbonisation. Low or zero emission fuels are more expensive than their fossil alternatives, Electric Vehicles may be range limited, or limited by how much they can carry, new technology can be expensive, or trying new technology can be risky.

Because of these barriers, significant change in heavy transport is unlikely without supporting policies. Businesses and others need to be supported to test and trial options so we can learn and deploy at scale. The Commission's modelling last year showed that by 2035, we will be on track if around 95% of medium trucks and 73% of heavy trucks imported into Aotearoa are electric or hydrogen powered.

Source: https://www.climatecommission.govt.nz/news/progress-on-transport-shows-what-is-possible/

Emissions Reduction Plan – key objectives & actions pertaining to transport

Transport

Why reducing transport emissions is important

Transport is one of our largest sources of greenhouse gas emissions and is responsible for 17 per cent of Aotearoa New Zealand's gross emissions.

More sustainable transport options can also reduce the cost of transport and reliance on global fossil fuel markets.

Key actions

- Reduce reliance on cars and support people to walk, cycle and use public transport including by:
  - ↳ improving the reach, frequency and quality of public transport and making it more affordable for low-income New Zealanders
  - ↳ increasing support for walking and cycling, including initiatives to increase the use of e-bikes
  - ↳ ensuring safer streets and well-planned urban areas.

- Rapidly adopt low-emissions vehicles including by:
  - ↳ continuing to incentivise the uptake of low- and zero-emissions vehicles through the Clean Vehicle Discount scheme and consider the future of the road user charge exemption for light electric vehicles beyond 2024
  - ↳ increasing access to low- and zero-emissions vehicles for low-income households by supporting social leasing schemes and trialling an equityoriented vehicle scrap-and-replace scheme
  - ↳ improving EV-charging infrastructure across Aotearoa to ensure that all New Zealanders can charge when they need to.
- Begin work now to decarbonise heavy transport and freight including by:
  - ↳ providing funding to support the freight sector to purchase zero- and low-emissions trucks
  - ↳ requiring only zero-emissions public transport buses to be purchased by 2025
  - ↳ supporting the uptake of low-carbon liquid fuels by implementing a sustainable aviation fuel mandate and a sustainable biofuels obligation.

National Adaptation Plan – key objectives & actions pertaining to transport

Objectives

Resilient infrastructure protects and enhances the wellbeing of all New Zealanders.

The Government has identified three objectives for the infrastructure sector.

Government objectives to build resilient infrastructure

Code	Objective	Explanation
INF1	Reduce the vulnerability of assets exposed to climate change	• Understand where infrastructure assets and their services are exposed and vulnerable to climate impacts. • Prioritise the risk management of assets so that services can continue if disruption occurs.
INF2	Ensure all new infrastructure is fit for a changing climate	• Consider long-term climate impacts when we design and invest in infrastructure, so the right infrastructure is in the right places. • Understand future adaptation options and finance them as part of the investment in new infrastructure to build capacity to adapt.
INF3	Use renewal programmes to improve adaptive capacity	• Consider long-term climate impacts when making decisions to maintain, upgrade, repair or replace existing infrastructure.

Source: MFE-AoG-20664-GF-National-Adaptation-Plan-2022-WEB.pdf

Action 8.5: Progress the Rail Network Investment Programme

Timeframe: Years 1–6 (2022–28)
Lead agencies: MOT; Waka Kotahi
Relevant portfolio: Transport
Primarily supports: Objective INF2
Status: Current

KiwiRail's Rail Network Investment Programme (RNIP) is a 10-year programme of investment in Aotearoa New Zealand's rail network, to restore it to a resilient and reliable state. Mitigating climate change is a key focus within the RNIP when considering resilience projects for investment. Restoration of the national rail network to a reliable and resilient state will also reduce its vulnerability to climate hazards and provide a platform for future investment to support growth. In addition, mode neutrality (using a range of transport modes) supports resilience within the national supply chain.

Action 8.6: Invest in public transport and active transport

Timeframe: Years 1–6 (2022–28)
Lead agency: MOT; Waka Kotahi
Relevant portfolio: Transport
Primarily supports: Objective INF3
Status: Current

Investment in multi-modal infrastructure can increase the resilience of the transport system and help manage the vulnerability of existing assets. More use of public transport and active modes will help reduce reliance on private vehicles. It will increase system redundancy, improve equity and support sustainable growth. Safe and attractive alternatives to driving create a more resilient transport system, support sustainable growth and reduce emissions.

Action 8.7: Embed nature-based solutions as part of the response to reducing transport emissions and improving climate adaptation and biodiversity outcomes

Timeframe: Years 1–3 (2022–25)
Lead agency: MOT
Relevant portfolio: Transport
Primarily supports: Objective INF2
Status: Current

Nature-based solutions involve sustainable management and natural features and processes to tackle socio-environmental challenges such as climate change. At a local, regional and national scale these measures can reduce transport emissions and improve climate adaptation as well as biodiversity.

Key initiatives include:

- considering the role of nature-based solutions in reducing transport emissions and contributing to other benefits
- ensuring transport policy and investment encourage nature-based solutions, including protecting existing carbon sinks and supporting new long-term carbon sequestration opportunities.

Source: MFE-AoG-20664-GF-National-Adaptation-Plan-2022-WEB.pdf

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