Puke Kapo Hau Traffic Effects Assessment

Transport Effects Assessment

Prepared for Mercury NZ Ltd
Prepared by Beca Limited

8 October 2025

Contents

Appendices

Revision History

Revision N°	Prepared By	Description	Date
1.0	Alex Dean	For substantive application	8/10/2025

Document Acceptance

Action	Name	Signed	Date
Prepared by	Alex Dean BE (Natural Resources) (Hons) 8 years' experience	[redacted]	8/10/2025
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Approved by	Megan Taylor BE (Civil) (Hons) CPEng 19 years' experience	[redacted]	8/10/2025
on behalf of	Beca Limited		

1 Glossary

Term	Meaning
AADT	Annual Average Daily Traffic
CAS	Crash Analysis System
CC	City Council
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
DC	District Council
HCV	Heavy Commercial Vehicle
KDWF	Kaiwera Downs Wind Farm
km/h	kilometres per hour
RCA	Road Controlling Authority
SFAIRP	So Far As Is Reasonably Practicable
TCD	Traffic Control Devices
TTM	Temporary Traffic Management
vpd	vehicles per day
NOC	Network Outcomes Contractor
NZTA	New Zealand Transport Agency

2 Executive Summary

This transport effects assessment is prepared in respect of resource consent applications for Puke Kapo Hau. An existing land use resource consent is held for the wind farm, however the proposed layout and specification requires a variation to this resource consent under s42(4)(b) of the Fast-track Approvals Act 2024. Additionally, new land use resource consents are required for a transmission line connection between the wind farm and the National Grid, and associated infrastructure. The land use consent contains multiple resource consent conditions that will continue to apply to the Puke Kapo Hau (see conditions 61-68 inclusive) with minor changes to the conditions in the reference of road controlling authorities and reference to Construction Traffic Management Plan..

The proposed construction of Puke Kapo Hau consists of an additional 44 wind turbines with a maximum tip height of 165m to the 12 125m turbines that were installed in 2011, a new substation and 110kV transmission line, and 60MW/2hr Battery Electric Storage System (BESS). The construction of the wind farm will require transport of the different components, materials, and workers to the site. The assessment of effects for the wind turbine construction is in comparison to an adopted real-world configuration of 47 wind turbines with a maximum tip height of 145m. The assessment of effects for the substation, transmission line, and BESS is based on the new generation of traffic associated with the construction of these components.

There are five main routes that are assessed for the purpose of this assessment to deliver the different components, materials, and workers to the site for construction of the proposed wind farm. Two of the assessed routes from South Port in Bluff can cater for the different requirements of over-weight and over-dimension vehicles. The other three routes are from Dunedin/Port Chalmers, Lyttelton Port in Christchurch, and South Port in Bluff, and generally follow state highways. These routes will generally be used to transport smaller components, materials, and workers to the wind farm using standard heavy vehicles and high productive motor vehicles (HPMVs). The five routes are shown in Figure 2-1 below.

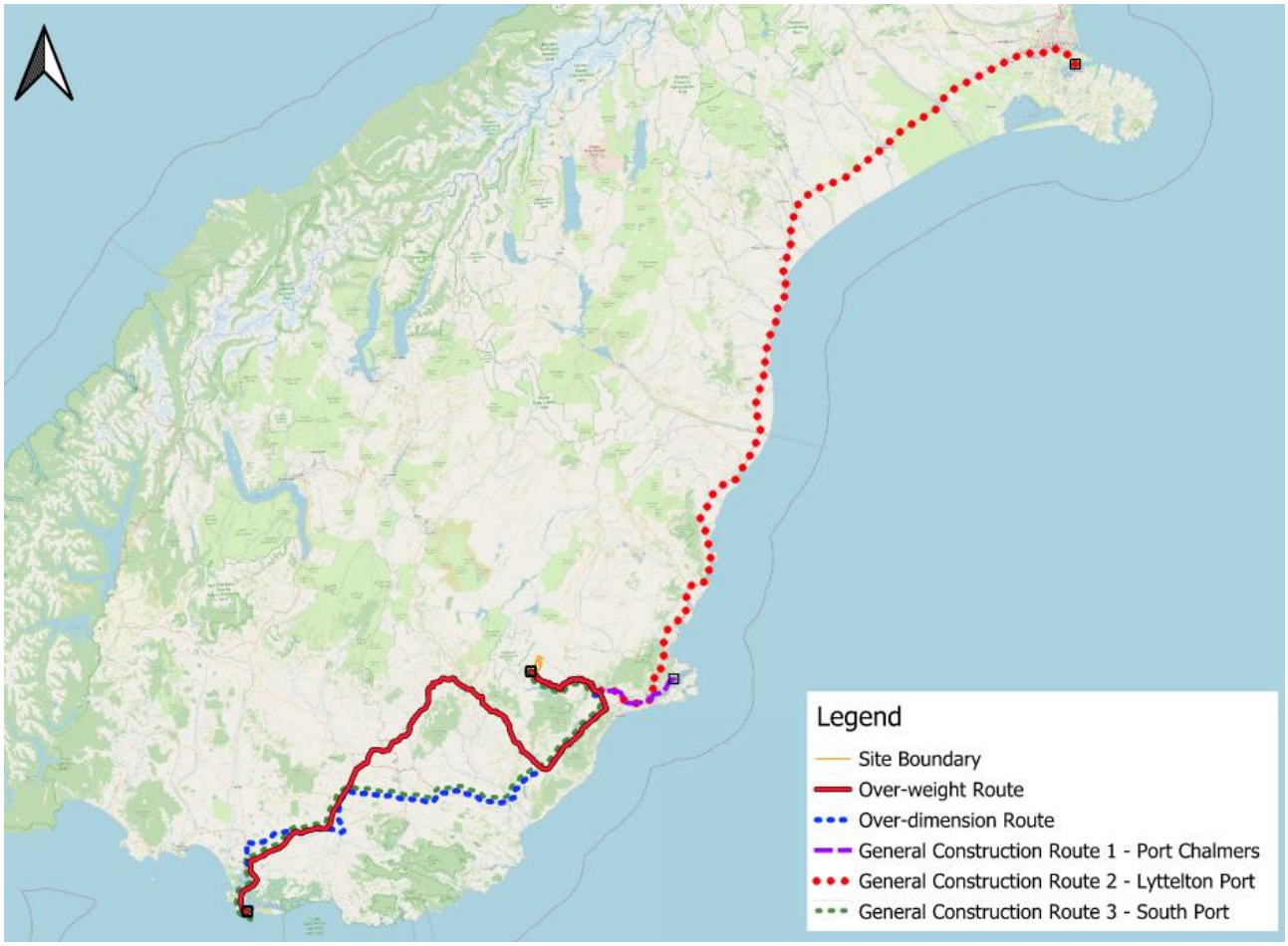

Figure 2-1 Outline of location of Mahinerangi Wind Farm and proposed routes for construction traffic.

General Construction Route 1 has been used for the assessment of trips associated with general materials and workers. Construction vehicle routes will be determined by contractors and suppliers, but for the purpose of this assessment, it is anticipated that the key route taken would be SH1, SH87, Mahinerangi Road and Eldorado Track to the site. This route was assessed under the existing land use resource consent and was used for the construction of Mahinerangi Wind Farm Stage 1.

General Construction Routes 1, 2, and 3 have been used for the assessment of trips associated with transmission line towers and components, and BESS modular units. It is possible that these components are transported from any of the other ports.

The transformer and the turbine components including the tower, nacelle, and blades are oversize and over-weight, and require specialist vehicles and appropriate routes to transport to the site. The over-weight components require routes that comply with permits for over-weight vehicles on structures. The blades require a relatively straight route with clearance on both sides to allow tracking and overhang of the blades.

The proposed routes to site may require slight modifications to the road network such as pavement widening, relocation of signs or poles, and construction of pull over bays to allow the movement of the large vehicles. The modifications are expected to be feasible and will be discussed with the road controlling authorities at the time of permitting.

The proposed changes to the conditions of the existing resource consent include a reduction in the total number of turbines. This results in 1,011 fewer return trips required by heavy vehicles compared to the additional 47 turbines, however there is an increase of 718 trips on Mahinerangi Road. The increase in effects on Mahinerangi Road will not be significant, with an average increase of two trips per day, and the effects can be managed under the CTMP. Other changes to the transport specific conditions of consent in

changing the named road controlling authorities do not have any impact on the transport effects for the construction of Puke Kapo Hau.

For the new resource consents for the transmission line, BESS, and substation, there are expected to be 878 heavy vehicle return trips. The transmission line and BESS construction traffic will have minor effects as these involve standard heavy vehicles and HPMVs following the existing HPMV network. The substation requires a transformer to be transported via the over-weight route. This will have temporary and short duration minor effects due to the low number of vehicle movements on the network (one return trip for over-weight over-dimension and three return trips for pilot vehicles). These transport effects will be effectively mitigated through the Construction Traffic Management Plan (CTMP) and appropriate permits.

3 Introduction

3.1 Overview

Tararua Wind Power Limited ("TWP"), a fully owned subsidiary of Mercury NZ Limited, is progressing Stage 2 of the Mahinerangi Wind Farm which is to be known as "Puke Kapo Hau" ("the Project", "Puke Kapo Hau" or "MWF Stage 2").

This Transport Effects Assessment has been prepared by Beca Limited (Beca) on behalf TWP for the resource consent applications for Puke Kapo Hau. The Puke Kapo Hau project is a Schedule 2 of the Fast-track Approvals Act 2024 Listed Project.

TWP holds a land use consent for the development of the Mahinerangi Wind Farm up to 200MW installed capacity and up to 100 wind turbines, with a maximum tip height of 145m. Stage 1 of the wind farm was completed in 2011 and 12 Vestas V90 turbines with a maximum tip height of 125m were built. Puke Kapo Hau is proposed to be the final stage and will consist of 44 additional turbines which will have a maximum tip height of 165m. Puke Kapo Hau also includes new activities including a 110kV transmission line, substation and BESS[1].

The Stage 1 turbine components were transported from Port Chalmers in Dunedin to the Mahinerangi Wind Farm site. The increased size of turbine components proposed as part of Puke Kapo Hau prevents the practicable use of the route originating from Port Chalmers. New feasible routes to the site have been identified originating from South Port in Bluff. A description and map of the routes can be found in section 4.2.

Puke Kapo Hau is proposed to be authorised by way of a variation to the existing land use consent. TPW have adopted a real-world configuration for assessment purposes. This is as follows:

- What is consented: 47 wind turbines, 147m high, 9m ground clearance, 136m rotor diameter, 12m width tracks
- What is proposed: 44 wind turbines, 165m high, 20m minimum ground clearance, 136m rotor diameter, 5.5m (min) width tracks.

The relevant transport effects for the variation to the existing resource consent assessed in this report focuses on those relating to the changes in consent conditions i.e. the difference in effects between what is consented and what is proposed.

TWP also seeks new consents for the substation, 110kV transmission line and BESS proposed for Puke Kapo Hau. Feasible routes for trips associated with the construction of these components have been identified from Port Chalmers, Lyttelton Port, and South Port. For these activities all transportation effects are included in this Transport Effects Assessment.

[1] New regional council consents and those under the National Environmental Standards for Freshwater are also required although they do not raise any traffic related issues.

3.2 Scope of transport effects assessment

This Transport Effects Assessment includes the following:

- An overview of the proposal and existing characteristics of the road network
- An identification of the safety performance of the proposed transport routes
- Expected construction traffic generation along the proposed new routes for the construction of Puke Kapo Hau and expected operational traffic generation.
- An assessment of the effects of changes to the existing conditions of consent, in particular conditions 61-68
- An assessment of the effects of transporting components for the new land use consent, in particular the transmission line, transformer, and BESS
- Overall conclusions regarding effects and proposed mitigations aligned with the existing resource consent conditions.

3.3 Existing resource consent conditions

The existing resource consent was granted in 2009 for the development of up to 100 wind turbines with up to 200MW generating capacity. The existing transport specific conditions relating to the 2009 resource consent are summarised in Table 3-1.

Refer to **Appendix A** for the specific conditions of transport from the resource consent.

Table 3-1 Existing transport specific conditions

Number	Summary of Condition
61	A Traffic Management Plan shall be prepared and submitted by the consent holder to the Chief Executive of Clutha District Council before any access to the site by construction traffic begins. The purpose of the Traffic Management Plan will be to set out and detail the extent and timing of construction traffic activity, and any temporary traffic management provisions to be put in place during this time. The Traffic Management Plan shall include the following requirements:
61 i)	The plan shall be prepared after consulting with the Dunedin City Council and Transit New Zealand as road controlling authorities and shall implement the outcome of that consultation.
61ii)	Set out the nature and timing of local physical improvement works to be undertaken on the roading network at the consent holder's cost to accommodate access to the Mahinerangi Wind Farm. These works shall include the following as a minimum: a. The upgrading of routes used for transport of materials by other than light vehicles to ensure the safe operation of the road including works to ensure that two vehicles (other than over-dimension vehicles) can safely pass each other based on vehicle tracking that is consistent with the operating speed of the road. b. The upgrading of routes used for transport of over-weight and over-dimension vehicles to provide for the swept path of vehicles on horizontal curves. c. The upgrading of local access routes used for transport of materials by heavy vehicles (defined as vehicles that require a heavy vehicle licence to operate) to an all-weather surface where necessary and only on those uphill sections of the routes heading towards the Mahinerangi Wind Farm with gradients 10% or steeper. d. The provision of school-bus bays beyond the traffic lane at all pickup and drop-off points on routes used for transport of materials by other than light vehicles.

Number	Summary of Condition
	e. The installation of suitable passing/stopping bays, in agreed locations, if considered necessary by the road controlling authority.
61 iii)	Detail the intended traffic arrangements and provisions for the delivery of over-weight and over-dimensioned major components to the site, including any time restrictions for the movement of over-weight and over-dimensioned vehicles. No heavy construction traffic will access the site except via Mahinerangi Road and Eldorado Track and between the house of 7.00 am and 10.00 pm. This does not prevent the use of any other roads between the port and State Highway 87 outside these hours. This may require the development of a layby for temporary parking of such vehicles before they reach Mahinerangi Road.
61 iv)	Manage construction traffic (other than component delivery by over-dimension and over-weight vehicles) during the construction phase. This shall include as a minimum: f. Identification of all roads within Clutha District that are to be used by construction traffic (Waipori Falls Road shall not be used for any construction traffic). g. The provision for the notification of the principals of all schools along routes to be used by construction traffic of the commencement and cessation of seasonal construction periods. h. The provision for dust suppression on the routes used for the transport of goods to the site. i. Ensuring that all construction traffic within Clutha District utilises those roads that have been identified for use by construction traffic in the Traffic Management Plan. j. Ensuring that all heavy vehicles associated with construction are clearly identified with labels to confirm that they are associated with the Mahinerangi Wind Farm to facilitate the monitoring of vehicle movements. The labels shall also provide a phone number to enable any complaints to be made. k. The management practices to be adopted to avoid conflict with stock droving on the affected roads.
62.	The existing condition of all roads to be used by construction traffic, other than light vehicles, in Clutha District (as identified in the Traffic Management Plan) shall be investigated and reported upon in a Base Condition Report that shall be prepared by the consent holder. The Base Condition Report shall contain information including classified traffic counts, high speed data capture, system recording - profile, texture and roughness and falling weight deflectometer. The Base Condition Report shall identify the existing condition of roads, those roads that require upgrading, potential remedial works during construction, and monitoring requirements during and at the end of the construction period. A Draft Base Condition Report shall be lodged with the Chief Executive of the Clutha District Council not less than nine months prior to the commencement of construction works at the project site.
63.	The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Base Condition Report and to certify its adequacy prior to the Base Condition Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder.
64.	The consent holder shall be responsible for the maintenance of roads subject to the Base Condition Report for the duration of the construction period except for any maintenance,

Number	Summary of Condition
	repairs or reconstruction of these roads arising from unusual or extreme weather events. The consent holder shall prepare a Maintenance Standard Report that will detail the minimum level of service to be provided by the consent holder on the roads. A Draft Maintenance Standard Report shall be lodged with the Chief Executive of Clutha District Council not less than nine months prior to the commencement of construction works at the project site.
65.	The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Maintenance Standard Report and to certify its adequacy prior to the Maintenance Standard Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder. The Chief Executive may require the consent holder to produce an Additional Base Condition Report during the construction period, where road condition appears to be worse than determined in the Maintenance Standard Report. The Additional Base Condition Report may be subject to review by a technical peer reviewer, with the cost met by the consent holder.
66.	For the avoidance of doubt, the consent holder will only be responsible for the costs of maintenance of the roading network to the extent that the costs are additional to those that would be anticipated by Clutha District Council in the normal course of events (ie the consent holder will pay a reasonable proportion of the costs of maintenance required as a result of the use of the roads by wind farm construction traffic).
67.	The consent holder shall be responsible for preparing a Post-construction Condition Report at the conclusion of construction works with respect to all roads subject to the Base Condition Report. A Draft Post-construction Condition Report shall be lodged with the Chief Executive and shall provide data with respect to road conditions that is consistent with that contained in the Base Condition Report. The Post-construction Condition Report may be reviewed by a technical peer reviewer at the cost of the consent holder prior to the Post-construction Condition Report being formally accepted by the Chief Executive.
68.	The consent holder shall ensure that roads subject to the Base Condition Report are restored to a standard that is consistent with or exceeds the condition recorded in the Base Condition Report.

4 Proposal

4.1 Site description

TWP is applying for approvals to develop Puke Kapo Hau by installing 44 new wind turbines with a tip height of up to 165m. The project will also include a new 110kV transmission line from the wind farm to the National Grid, connecting to the 110kV Halfway Bush – Roxburgh Line, and installation of a new substation and BESS.

As outlined, the Puke Kapo Hau wind farm development requires a variation to the existing land use resource consent for, amongst other things, the increase in consented tip height from 145m to 165m. The proposed maximum number of consented wind turbines will be reduced from the consented maximum of 100 to 56 turbines (12 existing turbines and 44 proposed turbines). The new 110kV transmission line between the wind farm and the National Grid and BESS require new resource consents. The components that are relevant for the purpose of this Transport Effects Assessment are outlined in Table 4-1.

Table 4-1 Summary of wind farm components and proposed route

Component	Proposed Details	Assessed Route
Wind Turbine over-dimension components (blades)	132 blades, up to 67m long	**Over-dimension route** - South Port to Mahinerangi via State Highway and local roads through Edendale, Mataura, Balclutha, Allanton, and Outram. This route avoids Beaumont Highway due to tight corners.
Wind Turbine over-weight components (tower, nacelle, hub)	Components for 44 wind turbines, up to 24m long, up to 72 tonne	**Over-weight route -** South Port to Mahinerangi via State Highway and local roads through Invercargill, Mataura, Gore, Allanton, and Outram. This route avoids Balclutha Bridge due to weight restrictions
Transformer for substation	118.7 tonne	**Over-weight route -** South Port to Mahinerangi via State Highway and local roads through Invercargill, Mataura, Gore, Allanton, and Outram. This route avoids Balclutha Bridge due to weight restrictions.
Transmission Line	15 transmission towers, up to 45m tall	**General construction route 1 -** Port Chalmers to Mahinerangi via State Highway Or **General construction route 2** - Lyttelton Port to Mahinerangi via State Highway Or **General Construction route 3** -South Port to Mahinerangi via State Highway
Battery (BESS)	60MW/2hr modular system	**General construction route 1 -** Port Chalmers to Mahinerangi via State Highway Or **General construction route 2** - Lyttelton Port to Mahinerangi via State Highway Or **General Construction route 3** -South Port to Mahinerangi via State Highway
General Construction Materials	Aggregate, cement, steel, and other supplementary materials and workers	Origin not specified, however vehicles are generally expected to be local and join **General Construction Route 1,** Dunedin to Mahinerangi route via State Highway

4.2 Construction routes

4.2.1 Routes overview

There are five assessed routes to deliver the different components, materials, and workers to the site for construction of Puke Kapo Hau used for the purposes of this assessment. These different routes originate from either Port Chalmers/Dunedin, Lyttelton Port in Christchurch or South Port in Bluff, and are grouped based on whether they are suitable for general construction components and materials or the over-weight and over-dimension requirements of the turbine and transformer components. The routes are shown in Figure 4-1.

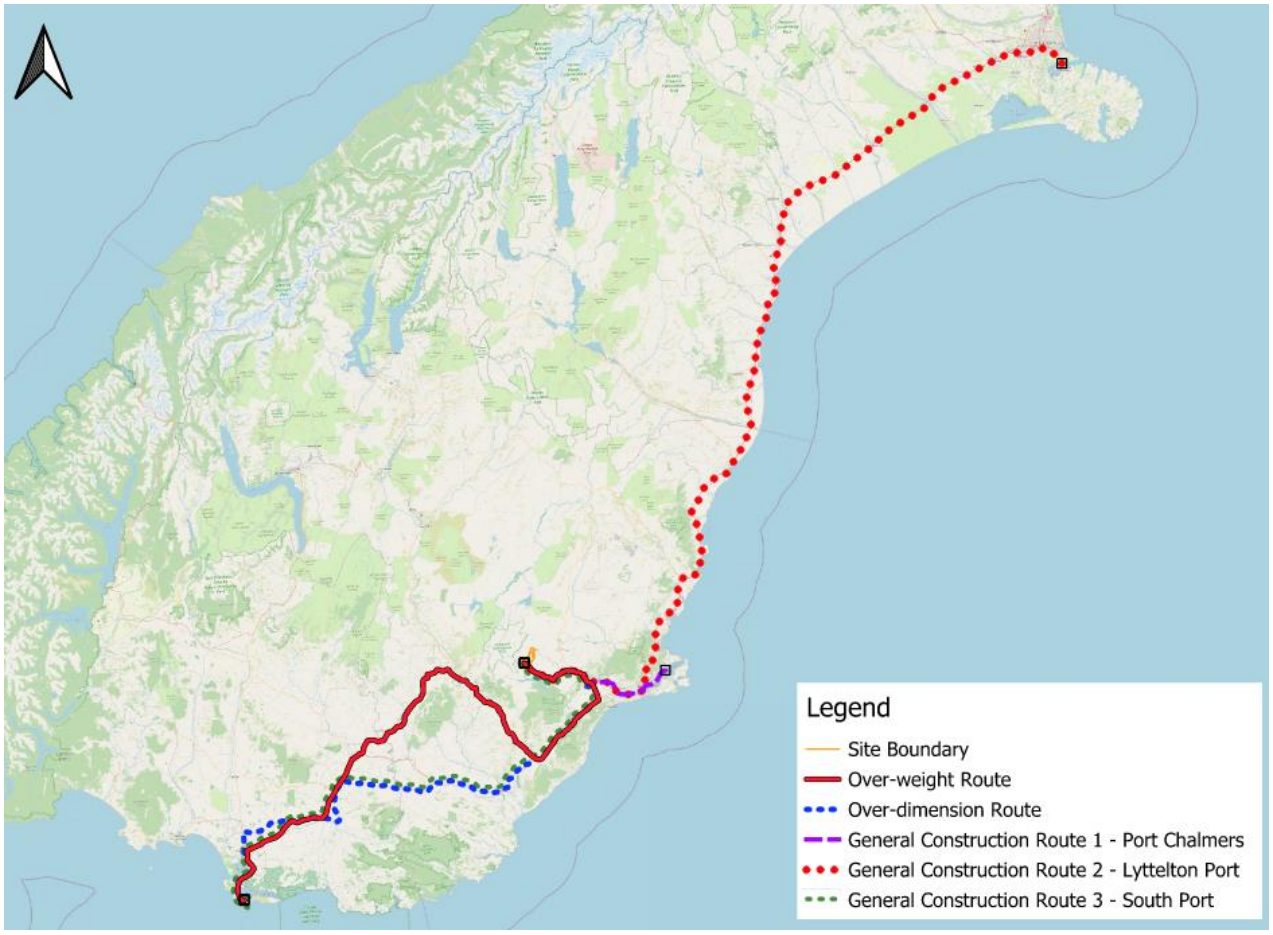

Figure 4-1 Map of all assessed routes to the site from the various potential ports

4.2.2 General construction traffic

General Construction Route 1 has been used for the assessment of trip types associated with general materials and workers, operational traffic, and visitor traffic. Exact construction vehicle origins and routes will be determined by contractors and suppliers, but for the purpose of this assessment, it is anticipated that the main route taken would use SH1, SH87, Mahinerangi Road and Eldorado Track to the site. This route was assessed under the existing land use resource consent and was used for the construction of Mahinerangi Wind Farm Stage 1.

Any of the three General Construction Routes 1-3 may be used for trip types associated with transmission line towers and components, and BESS modular units. Each of these routes follows the State Highway network and HPMV network which are design to carry heavy vehicles. The last section of all three routes will be on local roads between SH87 and the site on Mahinerangi Road and Eldorado Track. These routes can be seen in Figure 4-2.

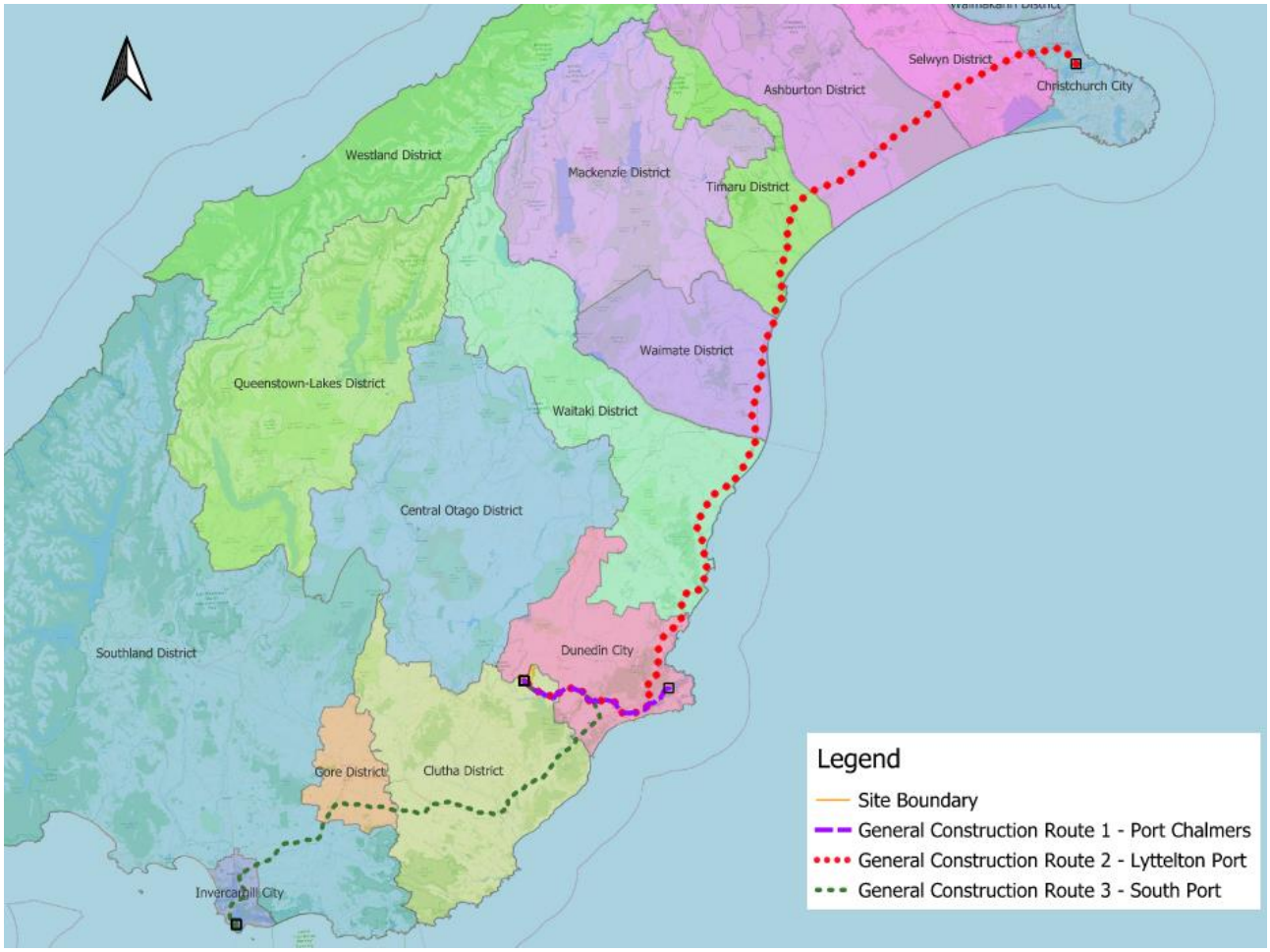

Figure 4-2 Map of the three general construction routes in relation to district council boundaries

4.2.3 Transport of turbine components

The transformer and the turbine components including the tower, nacelle, and blades are over-dimension and over-weight, and require specialist vehicles and appropriate routes to transport to the site.

Two routes from South Port have been assessed which appropriately provide for the different requirements for the blade route and the main component route. These can be seen in Figure 4-3.

(a) Over-dimension route: The blades require a relatively straight route with clearance on both sides to allow tracking and overhang of the blades. This removes SH8 from Raes Junction to Lawrence from consideration as it is generally too narrow for the turbine blades.

(b) Over-weight route: The general components are over-weight and must only be transported across bridges which are approved for the weight. The expected load for some components, for example the nacelle and the transformer, is too heavy to be accommodated on the Balclutha Bridge on SH1.

The over-dimension route includes traversing Balclutha Bridge. The approaches to the Balclutha Bridge include constrained corners particularly at the north end of the bridge, with minimal clearance to the bridge parapets. Consideration of transporter and trailer choice, as well as specific vehicle tracking manoeuvres are expected to allow the blade transporter to use the bridge with no alterations to bridge elements required.

Both assessed routes start at South Port, Bluff, Lyttelton and largely use the strategic highway network to transport the blades, main components and transformer to the wind farm. It is expected that some local roads would also be required on particular sections of the chosen route.

These include the following locations:

(a) Invercargill on Shannon Street and Elles Street,

(b) Southland between Edendale and Mataura,

(c) Gore, on Avon Street, Richmond Street, and Norfolk Street

(d) Dunedin, between Allanton and Outram

(e) Clutha, on Mahinerangi Road and Eldorado Track

The construction of Kaiwera Downs Wind Farm (KDWF) used largely the same transport route from South Port to Mataura and South Port to Gore.

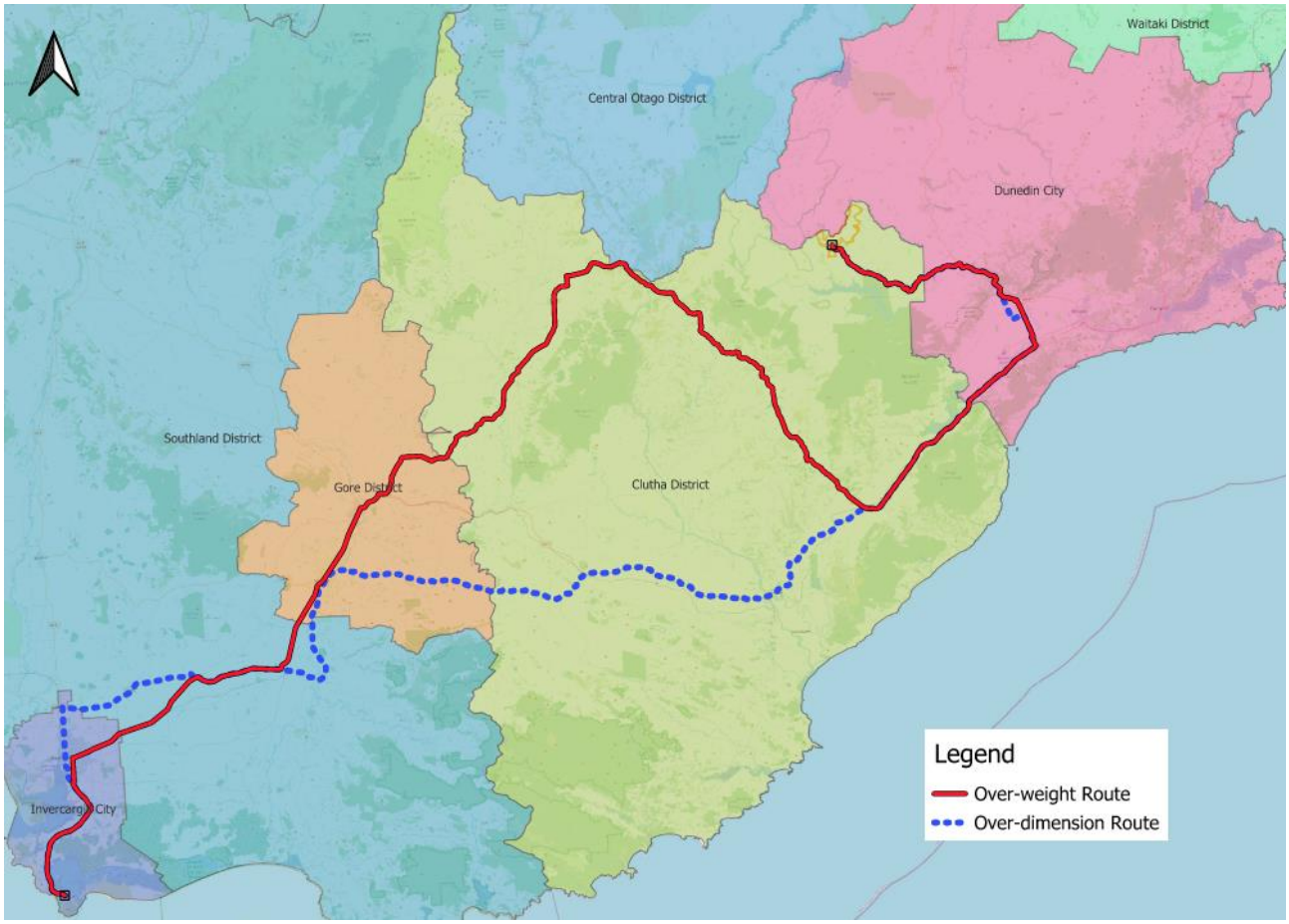

Figure 4-3 Map of the over-weight and over-dimension routes in relation to district council boundaries

Additional detail on these routes can be found in **Appendix B.**

5 Existing Environment

5.1 Location

Mahinerangi Wind Farm is located on the eastern foothills of Lammermoor Range and is approximately 5km north of Lake Mahinerangi and 50km west of Dunedin City. The wind farm is located within the Clutha District Council jurisdiction. The local roading network around the site is shown in Figure 5-1.

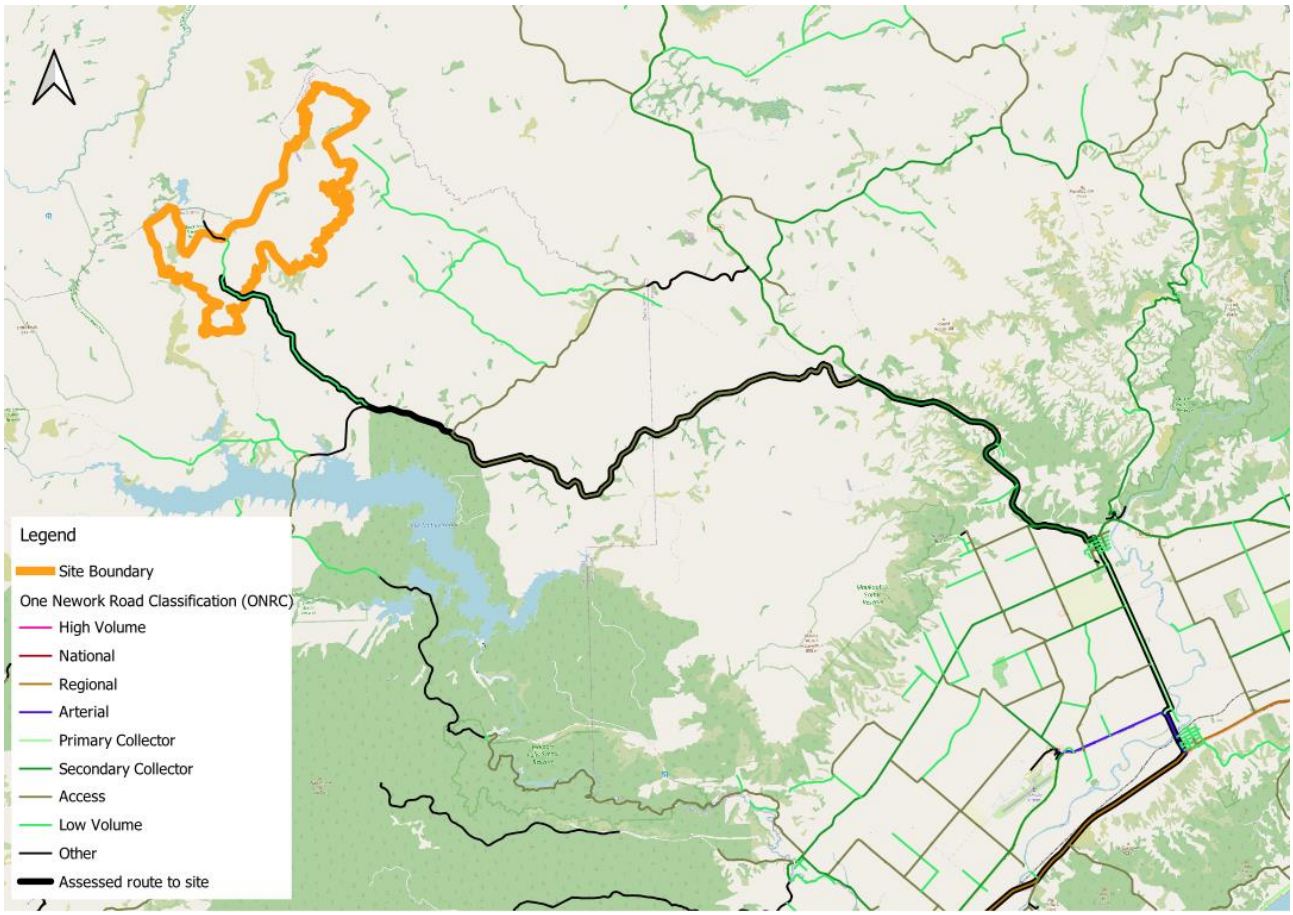

Figure 5-1. Map of local road network and route near Mahinerangi Wind Farm (as per layout approved by 2008 resource consent)

5.2 Existing use

Existing land uses on the Puke Kapo Hau site are the operation of Mahinerangi Wind Farm Stage 1 and farming activities.

Mahinerangi Wind Farm Stage 1 was completed in 2011 with the establishment of twelve 125m tall turbines . The turbines are located at the western corner of the Wind Farm site and can be accessed via 5m wide gravel tracks. The turbines are connected to the National Grid110kV transmission line through an underground cable network of 33 kV transmission line. The existing resource consent for Mahinerangi Wind Farm was granted by the Environment Court in 2009. The resource consent authorises the construction and maintenance of 100 turbines with a maximum generation capacity of 200MW.

Mahinerangi Wind Farm Stage 1 currently employs three people who undertake standard operations work for routine maintenance (regular inspection, electrical maintenance, etc). There is a maximum number of 10 return trips per day with an average of 5 return trips per day for the wind farm site under the current operation.

5.3 Other unimplemented resource consents

There are no known unimplemented resource consents that are likely to be implemented affecting the local transport network that would materially impact the Puke Kapo Hau site at this stage.

6 Transport Network

6.1 Road hierarchy

The site is located on the low volume Eldorado Track which is accessible through Mahinerangi Road. The site is 26.5km from SH87. The surrounding road network to the nearest ports can be seen in Figure 6-1.

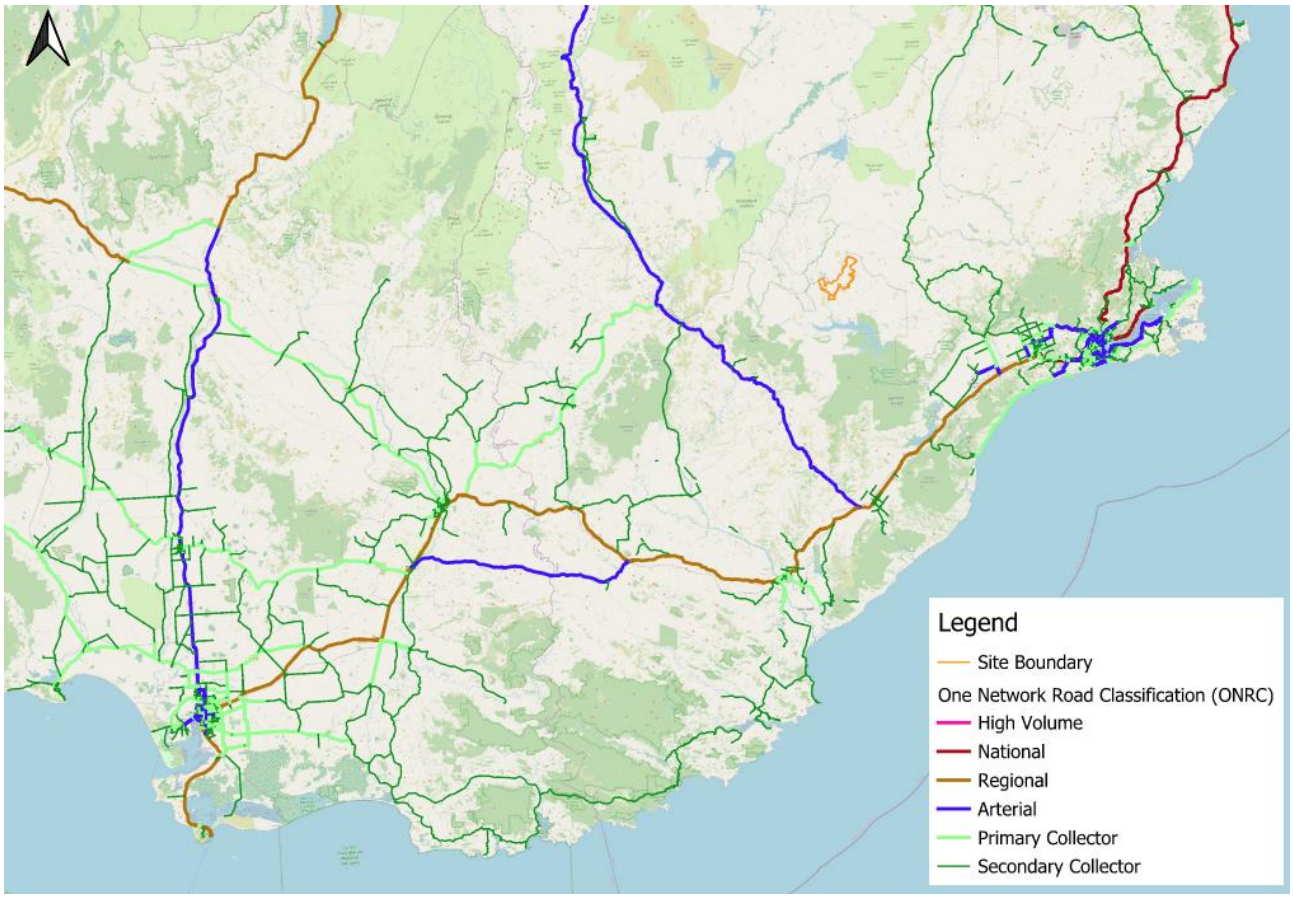

Figure 6-1 Road network for the area.

There have been no changes to the relevant road hierarchy classifications since resource consents for Mahinerangi Wind Farm were granted in 2009. The routes to transport the wind farm components used for this assessment are largely on State Highways, with use of some local roads in Invercargill City Council, Southland District Council, Gore District Council, Dunedin City Council, and Clutha District Council. Approximately 18% of the assessed route is on local roads.

SH1 and SH87 are both capable of transporting large volumes of heavy vehicles and both are classified as part of Clutha and Dunedin's heavy network routes.

Mahinerangi Road is a classified as a rural collector road under the Clutha District Plan. Under this Plan, district collector roads are heavy traffic routes.

Eldorado Track is a district access road under the Clutha District Plan and is not classified as a heavy traffic route, however it was used under the existing resource consent to construct the turbines for Mahinerangi Wind Farm Stage 1.

6.2 Alternative modes

The walking, cycling, and public transport networks are limited close to the wind farm as it is located in a rural area on low volume metal roads.

In urban areas along the route, such as Dunedin, Invercargill, Gore, and Balclutha, there is provision for walking, cycling, and public transport. During construction of the wind farm, there may be interaction between the generated traffic and these alternative modes.

There are 13 schools directly adjacent to the over-weight and over-dimension transport routes. During pick up and drop off, many alternative modes are used as pupils walk, bike, or take the bus to school which may overlap with the transport of the wind farm components. To maintain the safe movement of school children to and from the school, the movement of large vehicles will be communicated to school principals and controlled through the processes outlined in the CTMP.

6.3 Existing traffic flows

The existing traffic volume data has been sourced from NZTA MegaMaps, which identifies the traffic volume in Annual Average Daily Trips (AADT) for every segment of road. An understanding of the overall traffic volume on the route can inform where more mitigation measures and traffic management may be necessary to reduce any impacts of the construction traffic on the general road network. The traffic volumes on the three routes vary from 50vpd near Puke Kapo Hau up to 11,200vpd in Invercargill and 35,000vpd on the motorway in Dunedin. A distribution of the traffic flows along the over-weight and over-dimension routes can be seen in Figure 6-2 and Figure 6-3.

The critical area for traffic volume is in Mosgiel, where the AADT is up to 14,000vpd with around 4% heavy vehicles. This route is congested, and DCC is investigating options for a heavy vehicle bypass.

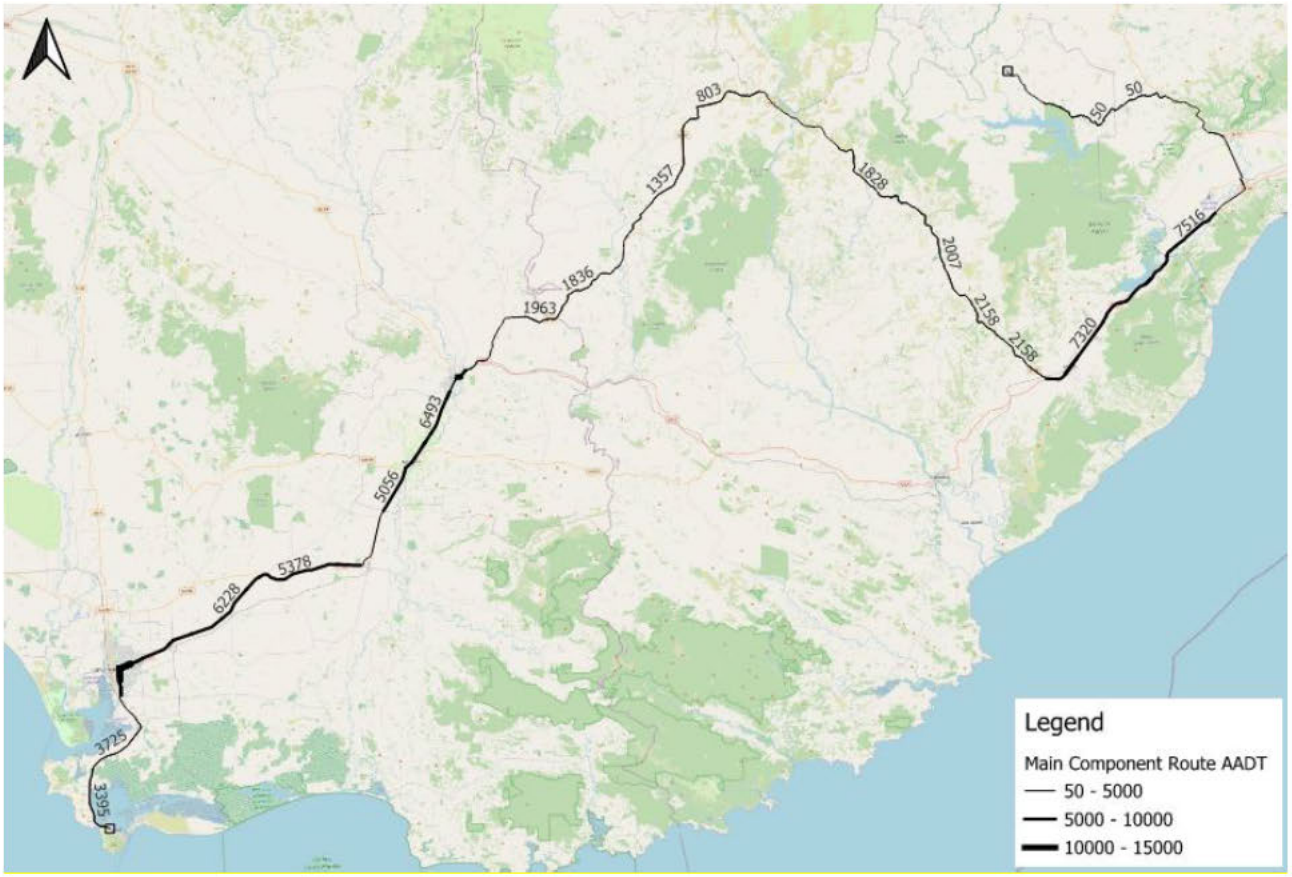

Figure 6-2 AADT Traffic flow along over-weight route

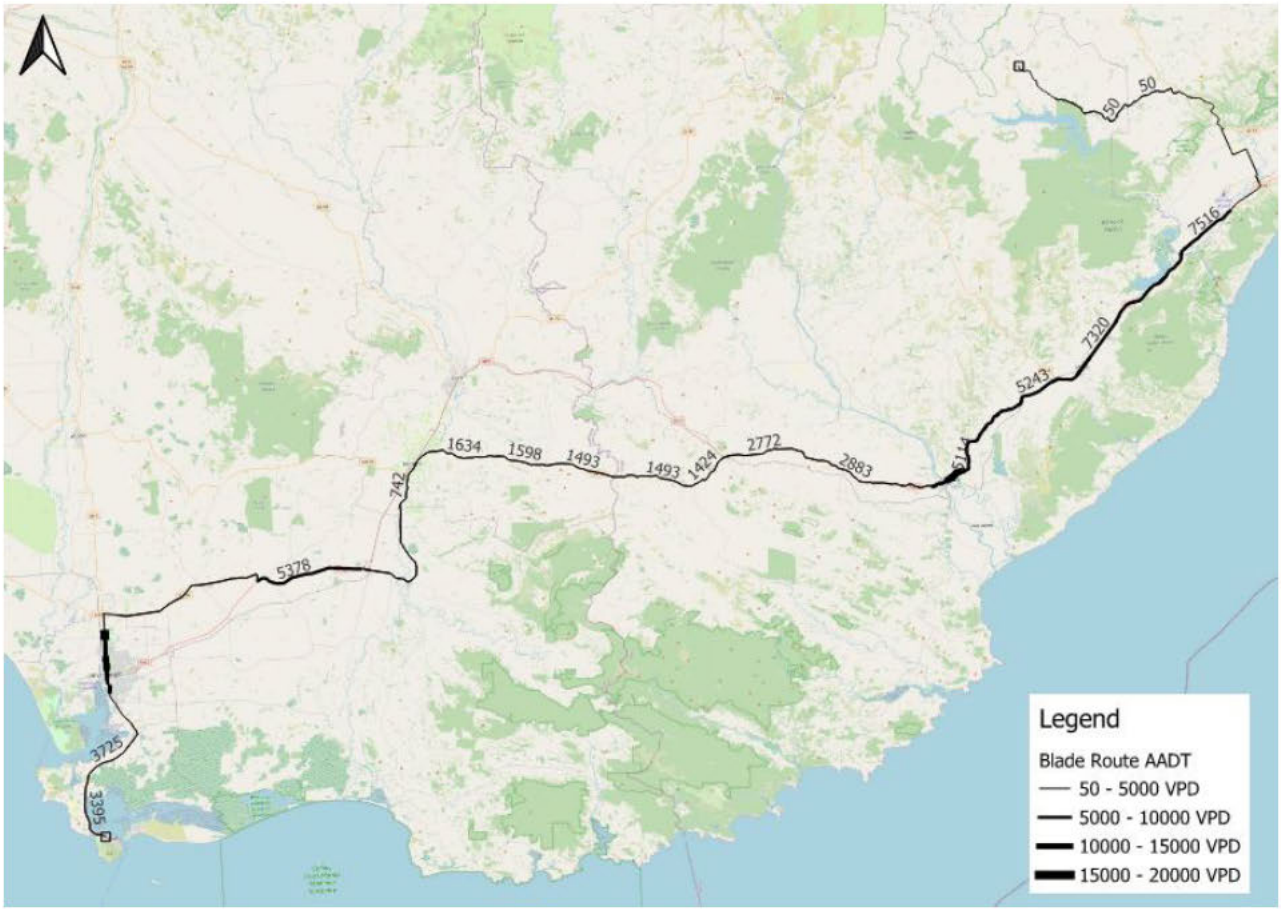

Figure 6-3 AADT along over-dimension route

6.4 Traffic patterns

The historical travel patterns on the State Highway network have been collated from NZTA's Traffic Management System (TMS). Figure 6-4 below show the average daily traffic and traffic growth over the past 10 years.

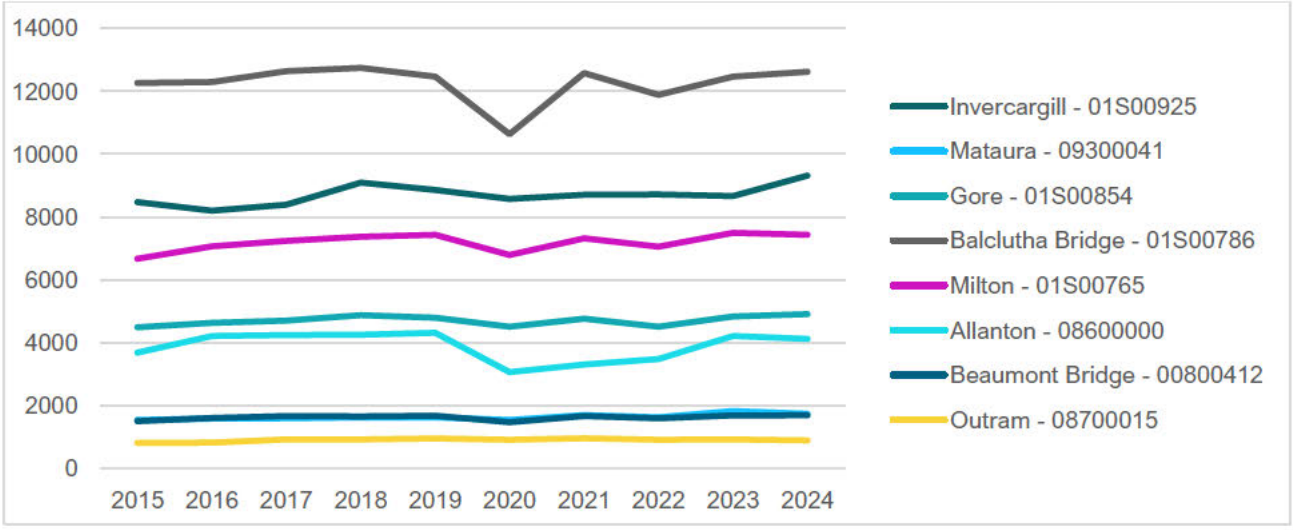

Figure 6-4 Annual Average Daily Traffic Growth along the routes from South Port

There has generally been low growth across the TMS sites over the past 10 years of between -0.6% and 1.2%. This trend is expected to continue in the future. For assessment purposes, it is anticipated that the AADT over the next 2-3 years will be similar to the 2024 values.

The traffic volumes in Figure 6-5 show a typical weekly traffic flow for each of these TMS sites. The peak traffic volume generally occurs between 6am and 7pm, with less than 15% of total trips occurring outside of this time.

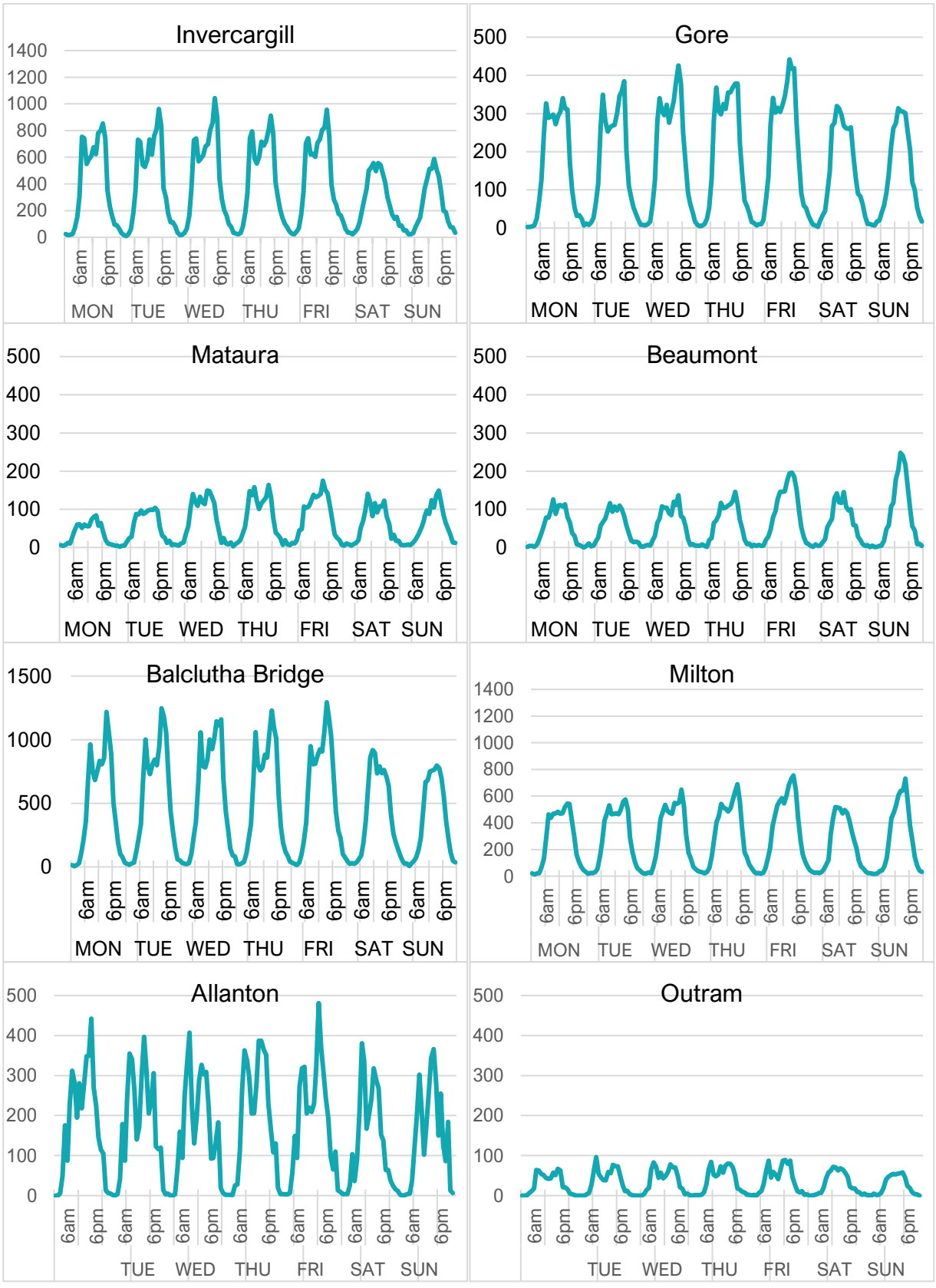

Figure 6-5 Weekly traffic volume at select monitoring sites on the over-weight and over-dimension routes

6.5 Safety assessment

Crash data from the NZTA Crash Analysis System (CAS) has been used to review historic crashes on the five assessed routes. The over-weight and over-dimension routes, and general construction route 3 cover areas of the transport network with lower traffic volumes and lower reporting rates of crashes. The transport of components on these routes is likely to involve uncommon types and combinations of vehicles. For these reasons, a crash analysis period of 10 years from 2014 to 2023 has been used, including all types of crashes. General construction routes 1 and 2 are generally on higher volume roads, and will be carrying standard heavy vehicles and HPMVs which are expected on State Highways. For these reasons, a standard five-year crash analysis period of 2019 to 2023 has been used, with a focus on heavy vehicle crashes.

The collective and personal risk have also been used to provide further context. These risk measures allow for an understanding of the inherent risk of the road without relying on historical crash data, which has some aspect of randomness or noise, especially on roads with a low traffic volume. Collective Risk measures the total expected deaths and serious injuries over the next five years per km of road. Personal Risk takes into account the traffic volume on the road and measures the risk of an individual dying or being seriously injured on the road corridor. Further breakdown of these measures and the categories is provided in **Appendix C**. A high collective or personal risk is generally an area of concern where additional mitigation may be required. In medium-high risk areas, some mitigation may be considered depending on the types of crashes that have occurred historically.

The safety assessment covered in the following sections has been geographically divided into local government areas that the three transport routes cover. This approach has been undertaken to identify any localised crash trends and understand any high-risk areas along the route.

6.5.1 Invercargill

The proposed route lengths within Invercargill City are approximately 51km for both the over-dimension route and over-weight route. The state highway portion of this region runs from Bluff, through the centre of Invercargill to the outskirts of the urban boundary and covers 46.5km. The rest of the routes are 4km on Shannon Street and Elles Road which are local roads.

The crash data for the proposed routes within Invercargill has been summarised in Table 6-1.

Table 6-1 Invercargill CAS injury crashes.

Sections of the proposed routes	Minor	Serious	Fatal	% involving truck
Local Road	47	11	0	1.7%
State Highway	205	40	7	10.7%

Key contributing factors to these crashes are driver's poor observation, alcohol factors or vehicles failing to give way or stop. These factors imply the road layout is the cause for many of these crashes, with restricted sight visibility at intersections or mid-blocks leading to adverse outcomes.

27 of the total injury crashes involved heavy vehicles. Out of the total number of crashes involved, truck related injury crashes are found to be very uncommon for the proposed routes with approximately 1.7% on Local roads and 10.7% on State Highways for the past 10 years involving heavy vehicles.

The routes generally have a personal and collective risk of between low and medium. There is one section of medium-high personal risk south of the urban area of Invercargill.

The route through Invercargill does not have any standout areas where safety for the transport of the turbine components is a concern from a traffic safety perspective.

There are no existing safety concerns on the over-dimension and over-weight routes through Invercargill. However, vehicles will need to take caution within the urban environment where there are numerous intersections and a large range of road users. This can be managed through a Construction Traffic Management Plan.

6.5.2 Southland

The proposed route lengths within Southland District are approximately 84km for both the over-dimension route and over-weight route. The state highway portion of this region covers 65.9km and the rest of the routes between Edendale and Mataura are 9.1km of local roads.

The crash data for the proposed routes within Southland has been summarised in Table 6-2

Table 6-2 Southland CAS injury crashes.

Sections of the proposed routes	Minor	Serious	Fatal	% involving truck
Local Road	15	2	3	5%
State Highway	59	25	3	13.6%

In total, there are 20 injury crashes on local roads within Southland and 88 injury crashes on the state highways along the proposed routes. Out of the local road crashes, 5% of these involved heavy vehicles and for State Highway crashes, 13.6% of these involved heavy vehicles. Key contributing factors to these crashes are alcohol, bend/loss of control, and incorrect lane or position along the corridor. These factors imply the road layout is the cause for many of these crashes, with narrow winding lanes leading to adverse outcomes.

There are six fatal crashes along the route on Southland. Two of the fatal crashes along the routes were on wet and overcast weather conditions along the State Highway and three of the fatal crashes were on Wyndham Road with loss of control on a bend in wet conditions. One of the fatal crashes involved a heavy vehicle. The crash involved driving in dark and wet conditions with the light vehicle driving on the wrong side of the road and swerving into a fence line to avoid collision with an oncoming truck.

The transport routes through Southland have collective risk of low to medium, and a personal risk of up to medium-high. The medium high personal risk is on the eastern approach to the Mataura River bridge and the section just south of the border with Gore District.

The route on the local roads between Wyndham and Mataura presents some challenges for the over-dimension loads, as there is an apparent increased risk of run off crashes. This will be managed through pilot vehicles in advance warning oncoming traffic of the oversized vehicle, and slow movements through areas with decreased forward visibility which will be outlined in the CTMP.

6.5.3 Gore

The proposed route length within Gore District is approximately 70km. The State Highway portion of this region covers 64km and the rest of the route includes 6km of Local Roads along Wyndham Road and Forth Street.

The CAS Data for the proposed routes within Gore has been summarised in Table 6-3.

Table 6-3 Gore CAS injury crashes.

Sections of the proposed routes	Minor	Serious	Fatal	% involving truck
Local Road	12	2	0	7.1%
State Highway	144	34	7	6.5%

For the proposed routes with Gore District, there are 199 injury crashes on Local and State Highway roads with a split of 14 crashes on Local roads and 185 on State Highways. 7.1% of Local Road crashes are heavy vehicle crashes and 6.5% of State Highway crashes involve heavy vehicles. Factors that contributed to the crashes on the proposed routes within Gore includes poor observation, drivers under the influence of alcohol and poor positioning along the corridor.

Seven fatal crashes were reported on State Highway roads, one of which involved a heavy vehicle at night. A light vehicle was crossing the centre lane and had collided head on to an oncoming heavy vehicle. Two of the seven fatal crashes had happened in wet or dark conditions and four of these crashes involved drivers with alcohol intake. Four of the fatal crashes were along SH93 where the corridor has multiple corners and slight vertical gradients.

The routes have a collective risk of up to medium high between Charleston and Gore, and a personal risk of up to medium high on Wyndham Road.

The highest risk area appears to be Wyndham Road, which will be managed through use of pilot vehicles to warn oncoming traffic and slow movement through the corridor particularly where there is poor forward visibility which will be outlined in the CTMP.

6.5.4 Clutha

The proposed route lengths within Clutha District are approximately 110km for the over-dimension route and 148 over-weight route. The majority is on State Highway except the last 20km on Mahinerangi Road and Eldorado Track.

The crash data for the proposed routes within Clutha has been summarised in Figure 6-4.

Table 6-4 Clutha CAS injury crashes.

Sections of the proposed routes	Minor	Serious	Fatal	% involving truck
Local Road	16	2	0	11%
State Highway	451	118	12	6.5%

Within the Clutha District there are 602 injury crashes for the crash period of 10 years. 584 of these crashes occurred on the State Highway and 18 crashes occurred on the local road. 6.5% of injury crashes on the State Highway involved a heavy vehicle and 11% of injury crashes on the local roads involved a heavy vehicle.

Many of these crashes have factors of drivers under the influence of alcohol, poor observation, and incorrect lane positioning along the proposed routes. 51.3% of the injury crashes are vehicles losing control or have a head on collision at bends or 21.9% of injury crashes occur at straight roads with a head on or vehicles losing control on the straight corridor.

Along the proposed route, there were 12 fatal crashes within Clutha District. Four of these crashes had factors of alcohol, two being related to fatigue. The rest of the crashes had factors of poor observation, positioning on the road and poor handling. Four of the fatal crashes had involved a head on type crash between a light vehicle and the heavy vehicle. Of the Four fatalities on the proposed routes; one included a driver tail gating and overtaking within their lane. The vehicle was in the incorrect lane and had a head on collision with an oncoming heavy vehicle. Another fatal crash involved a head on collision with a heavy vehicle as the driver of the light vehicle was distracted. A third crash was during twilight and a vehicle was in the incorrect lane and veered into an oncoming truck. The last crash occurred with a driver losing concentration and drove into the wrong lane, colliding with an oncoming truck.

The route has collective risk of medium high on the southern and north approached to Balclutha, and between Milton and Clarendon. The personal risk on the route has various sections of medium high on Beaumont Highway, Kuriwao Gorge south of Clinton and the road from Clinton to Balclutha. There is a section of high personal and collective risk north of Milton, near the transition from 70km/h to 50km/h.

The proposed routes in Clutha District do not have any material safety issues that need to be mitigated further than using the CTMP.

6.5.5 Dunedin

The proposed route lengths within Dunedin City are approximately 58.2km for both the over dimension route and over-weight route. There is 46.7km of the State Highway and 11.5km of local roads in Outram along the proposed route.

The crash data for the proposed routes within Dunedin has been summarised below in Figure 6-5.

Table 6-5 Dunedin CAS injury crashes.

Sections of the proposed routes	Minor	Serious	Fatal	% involving truck
Local Road	5	2	1	N/A
State Highway	63	15	1	8.9%

88 injury crashes had occurred in Dunedin with 79 crashes occurring on State Highways and nine crashes occurring in local roads within Outram. 8.9% of State Highway crashes had involved heavy vehicles with no heavy vehicle crashes along local roads. Two of the crashes are fatalities and involved a vehicle swinging in wide into a head on collision and the other fatal injury involved a right angle type crash at the intersection of Church Road and Huntly Road. The stop sign had been slightly concealed by an overgrown hedge at the intersection. Key contributing factors to these injury crashes are fatigue, poor road factors and poor observation from drivers.

The route has collective risk of high between Waihola and Titri, with other sections of medium high. The personal risk is medium-high on SH87 north of Outram.

Overall, there will not be any adverse effects on the existing road safety based on the additional traffic generation from the construction of the turbines. The movements between Waihola and Titri should be undertaken carefully with use of the pilot vehicles to warn oncoming traffic of the oversized vehicles which will be outlined in the CTMP.

6.5.6 Lyttelton to Dunedin

The proposed route from Lyttleton to Dunedin is 369km long, with all roads of this route located being state highways. The crash data for the proposed route between Lyttleton and Dunedin is summarised in Table 6-6.

Table 6-6 Lyttleton to Dunedin crash severities and truck injury crashes.

Sections of the proposed routes	Minor	Serious	Fatal	% involving truck
State Highway	529	117	31	16.9%

Crash data from CAS has been used to compare crash rates on the proposed route to other similar state highways, considering factors such as urban and rural settings, as well as similar traffic volumes. The truck crash rates on the proposed Lyttleton to Dunedin route are approximately 9% of total injury crashes. On Christchurch to Picton and Wellington to Napier routes, the typical truck crash rate is 7%. The overall number of crashes on Lyttleton to Dunedin is lower than that on Christchurch to Picton or Wellington to Napier, by a factor of approximately half. This indicates that although there is a slightly higher proportion of truck crashes, the overall number of truck crashes is lower. Compared to similar state highways, the Lyttleton to Dunedin route does not have a significantly worse safety record. With the number of trucks proposed to travel on this route, less than minor impacts on the safety performance are expected.

It is noted that along the route, there is a slightly higher density of fatal crashes involving heavy vehicles at the Rakaia Bridge on SH1. The bridge is noted to be narrow with a high volume of traffic at 14,875 vehicles per day and 15% Heavy vehicle movements (MobileRoads). The two fatal crashes that have occurred on the bridge involved light vehicles overtaking slow traffic and colliding head-on to oncoming trucks.

Many of the fatal crashes have occurred on the rural road sections on the route and a high percentage of reported crashes involve drivers of light vehicles crossing the centre line. Key crash factors along this route include 39% of crashes related to poor observation, 26% of crashes related to alcohol.

Based off the assessment, the route from Lyttelton to Dunedin is deemed safe for heavy vehicles as the assessed route is similar to the other State highway routes in New Zealand (Christchurch to Picton and Wellington to Napier).

The additional construction traffic generated using the routes would not adversely affect the existing safety or operational efficiency of the road.

7 Construction Route Assessment

7.1 Access and parking

The access to Puke Kapo Hau will be on Eldorado Track, using the same existing access gate as for Stage 1.

The existing access to the wind farm is off Eldorado Track through a series of 5.6m wide gate, which serves one way access. These gates provide access to different internal access roads that lead to the wind turbines. The gates at the accesses are kept locked due to the ongoing wind farm and farming operations on site. There are no proposed changes to the current accesses to the Mahinerangi Wind Farm Stage 1, shown in Figure 7-1.

Figure 7-1 Access to Mahinerangi Wind Farm Stage 1.

The internal tracks to the locations for the turbines to be installed do not form part of this transportation assessment and will be addressed by Riley Consultants Ltd.

Parking will be provided at the operations/maintenance facility with a sealed parking area of 830m^2.

7.2 Transportation requirements

The over-dimension and over-weight components require specialist vehicles and procedures to transport from South Port to the site. Permits for over-dimension and over-weight loads are required from NZTA in accordance with *Land Transport Rule: Vehicle Dimensions and Mass Rule 2016* (VDAM Rule). Permits will also be required from local authorities where the chosen route uses roads under their control.

The type of wind turbine adopted for the purposes of this transportation assessment is a turbine with a 136m rotor diameter and 4.3MW generation capacity. The 48m Goldhofer Trailer with a custom cantilever support trailer was used to transport the same sized turbine blades to the Kaiwera Downs Wind Farm between Mataura and Clinton. Ten rows of the 8 Self Propelled Modular Transporter (PMT) trailer and eight rows the of the 8 PMT trailer with a 9m extension beam were used to transport the nacelle and tower sections to Kaiwera Downs Wind Farm. The same transporters have been used for the purposes of this assessment of the transportation of the wind turbine parts to Puke Kapo Hau. A 16 axle Goldhofer Platform Trailer with pilot

escorts are assumed to be used to transport the transformer to the site. The proposed transporters for the wind turbine components and parts can be seen in Table 7-1 and in Figure 7-2 and Figure 7-3.

Table 7-1 Transporter configurations for the major components

Component	Weight	Length	Width	Height	Transporter
Top Tower	Up to 45t	27m	3.37m	3.3m	8 axles of 8 PMT trailer with 9m extension
Mid Tower	Up to 50t	Up to 24m	4.2m	3.7m	8 axles of 8 PMT trailer with 9m extension
Base Tower	Up to 60t	15.2m	4.56m	4.2m	8 axles of 8 PMT trailer with 9m extension
Nacelle	Up to 72t	N/A	4.56m	4.2m	10 axles of 8 PMT trailer
Turbine Blades	Up to 20t	67m	4.2m	3.6m	48m Goldhofer Trailer with custom cantilever support
Hub and Nose Cones	Up to 34t	5.5m	3.5m	4m	N/A
Ancillary Equipment	N/A	N/A	N/A	N/A	Standard 40-foot containers using container trucks
Transformer	118.7t	55.60m	3.65m	5.4	16 axle 3.6m Goldhofer
Transmission Line Towers	<34t	23m	2.55m	4.3m	Standard 40-foot containers using container trucks
BESS	<34t	23m	2.55m	4.3m	Standard 40-foot containers using container trucks

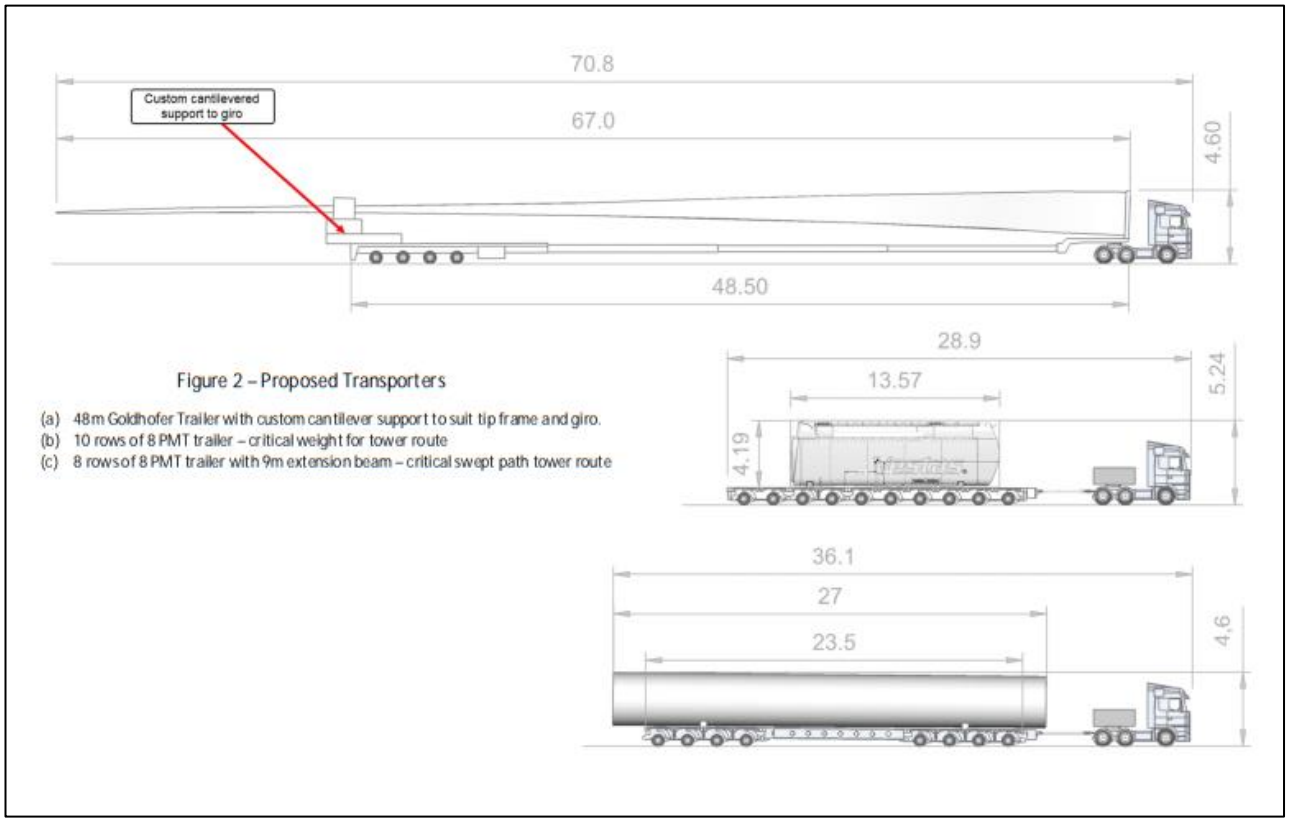

Figure 7-2 Proposed transporters for the wind turbine components and parts.

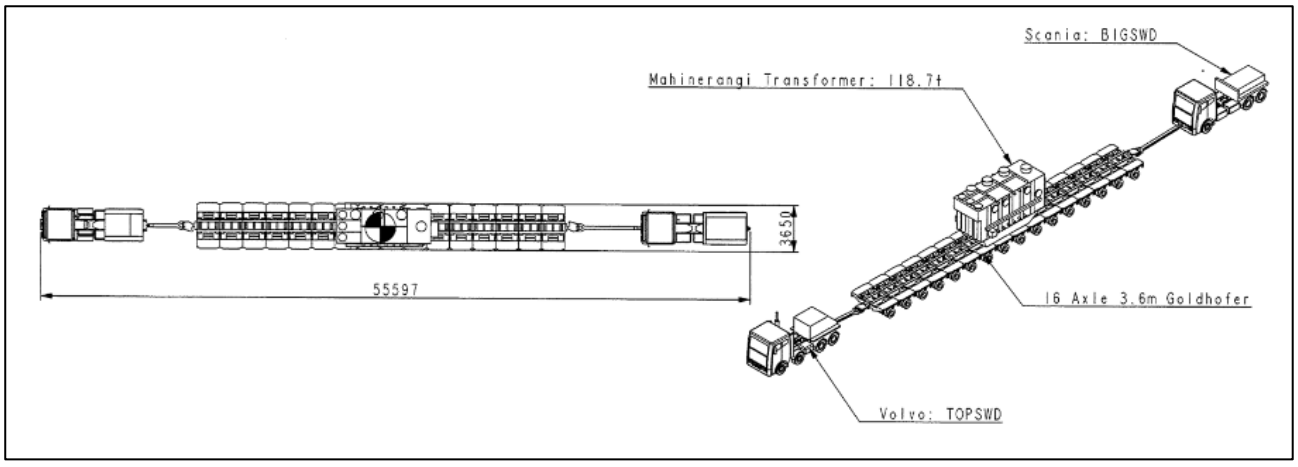

Figure 7-3 Proposed transporters for the transformer.

7.3 Proposed upgrades to the routes

The proposed routes to site may require slight modifications to the road network such as pavement widening, relocation of signs or poles, and construction of pull over bays to allow the movement of the large vehicles. The modifications are expected to be feasible and will be discussed with the road controlling authorities at the time of route selection and permitting.

7.4 Overheight interaction with powerlines

Low hanging powerlines over the road may restrict the transport of some over-height components. Permits and approvals from the electrical and communication authorities will be obtained as part of the CTMP to allow the transporters to pass under their lines. The electrical network for the majority of the assessed over-

weight and over-dimensioned routes is managed by PowerNet Limited with the final section of the routes passing through the jurisdiction of Aurora Energy as shown in Figure 7-4. There are expected to be overhead wires at various locations on the chosen routes that will need to be checked for height and possibly temporarily or permanently raised to avoid conflicting with the movement of turbine components. This is commonplace for oversize/over-dimension transport of the nature proposed.

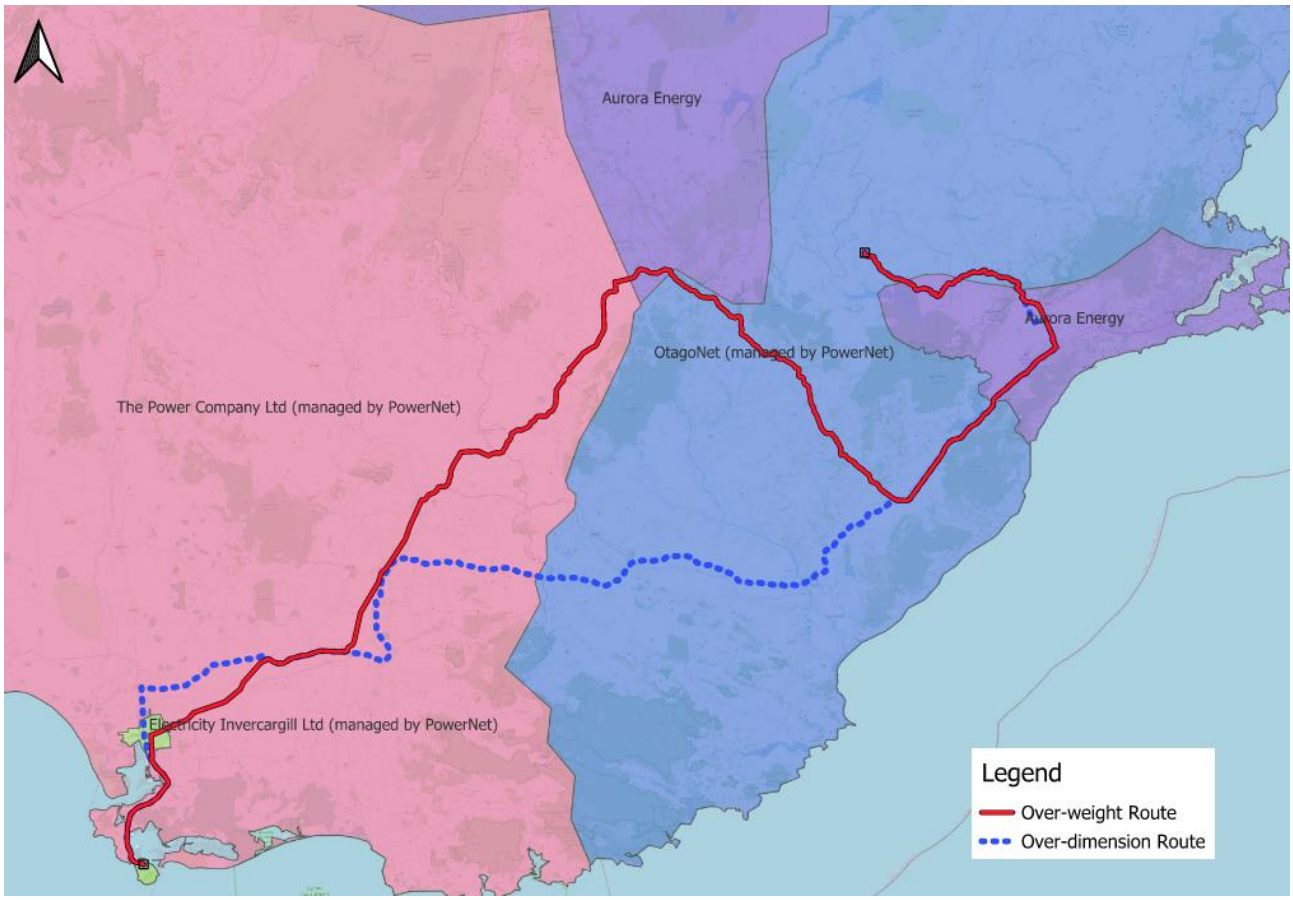

Figure 7-4. Relevant lines companies across the transport routes.

7.5 Outline of discussions with road controlling authorities

Territorial authorities on the assessed transport routes were engaged with to understand specific requirements to be expected during permitting. A summary of the engagement completed with these territorial authorities is outlined below:

- The local authorities have requested an assessment of the proposed transporters and route to determine the feasibility of using their assets.
- In general, fixed traffic management is not required and the movements can be managed through the use of pilot vehicles.
- Any movements past schools should be mitigated appropriately in the CTMP.
- Major forestry owners should be notified prior to the commencement of construction as identified in the CTMP.
- The assessed routes largely align with routes used for other wind farms, including Kaiwera Downs Wind Farm, and are expected to be appropriate for Puke Kapo Hau if chosen.
- The Balclutha Bridge is a particular restriction for vehicle tracking of the blade transporter. It is expected that careful selection of transport and trailer, and specific vehicle tracking can allow the blades to pass without impacting the bridge.

8 Traffic Generation

8.1 Overview of traffic generation

The expected traffic generation of the following trip types associated with Puke Kapo Hau has been assessed:

- Transportation of blades, and main turbine components;
- Transportation of transformer
- Transportation of transmission line and battery components
- General construction traffic
- Operational and maintenance traffic
- Visitor traffic.

The assessment analyses the traffic generation associated with the installation and operation of 44 4.3MW turbines. These have been compared to the real world consented layout of 47 3.45MW turbines. Each of the trip types listed above are described in detail in the following sections.

8.2 Wind turbine component transportation

Each wind turbine will require the separate transportation of:

- 3 x Turbine blades
- 1 x Nacelle
- 1 x Base tower
- 4 x Tower sections
- 1 x Hub
- 1 x Nose Cone

For each turbine, there will be 9 over-weight and over-dimension vehicle return trips and 4 heavy vehicle return trips, which results in 572 trips associated with the transportation of 44 wind turbines at the site.

In addition to the heavy vehicle movements, there will likely be pilot vehicles and support vehicles on standby. These vehicles will typically be light vehicles.

8.3 General construction traffic

General wind farm construction traffic has been assessed under the existing resource consent. There are no material changes to the quantum of proposed traffic movements identified under the existing resource consent, as the trips will largely be generated from Dunedin with fewer wind turbines proposed. The distribution of traffic movements will differ from the existing consent in relation to water carting.

Trips associated with the substation and transmission line were assessed previously for the proposed layout in the 2008 resource consent. Any trips associated with these components have been assessed as part of the new land use resource consent only.

8.3.1 Aggregate and concrete

Sand, aggregate, and cement will need to be delivered to the site for the construction of foundations, roads and tracks, and site facility platforms. These trips are expected to be taken using truck and trailers. The total number of these return trips for the proposed layout is 7,284. The specific breakdown of these trips for the different parts of wind farm construction are listed in Table 8-1 Total heavy vehicle deliveries (return trips)

8.3.2 Water carting

Under the existing resource consent, water was able to be taken from Lake Mahinerangi and Deep stream Reservoir. Under the proposed resource consent, water will be carted to site from further afield. This results in an increase in trips on Mahinerangi Road, as previously the trips were generated more locally to the site and used El Dorado Track or on-site access roads. The effects of this change are assessed in further detail in section 10.3 General construction traffic.

8.3.3 Light vehicles

50 construction workers are estimated to be on site during the construction period mostly from Dunedin. Some workers however may be travelling by vans from nearby accommodation in Outram to site, generating up to approximately 25 trips to site each day. The number of light vehicle trips will not have any material change in the assessed effects for the local transport network (as addressed below).

8.3.4 On-site traffic

A number of vehicle movements will only be using the internal access tracks for moving earthworks or transportation of parts and equipment. As outlined below, the onsite movement will not have any effects beyond the site area into the wider transport network and these movements have not been included in the summary table below.

8.4 Operational and maintenance traffic

When the construction of Puke Kapo Hau is completed, it is assumed that up to 10 staff will be employed to maintain and operate the wind farm. For other wind farms, many of the staff carpool to the site. If each staff member was to drive their own personal car, this would generate an additional 20 movements per day for Mahinerangi Road and the surrounding network.

8.5 Visitor and tourist traffic

Wind farms can generate some tourist and sightseeing trips, although as wind farms have become more commonplace the level of public interest in the provision and operation of wind farms is not expected to be material. Puke Kapo Hau is remote from areas with high population and is a 48km round trip detour from the nearest State Highway. Although it is unlikely, there is still some tourist appeal to view the wind turbines due to their sheer scale and movement of the turbines. Public access to the turbines is limited and the general public will be able to use public roads which have a view of the turbines.

8.6 BESS transportation

A 60MW/2hr BESS is proposed for Puke Kapo Hau. The BESS is a modular system and therefore can be transported in sections using HPMVs. A total of 42 heavy vehicle (truck and trailer) return trips are expected for the transport and installation the BESS modular units.

A total of 70 heavy vehicle trips are expected to deliver aggregate for the platforms for the BESS.

8.7 Transmission line transportation

25 transmission pylons are proposed to be installed at Puke Kapo Hau for the 110kV transmission line. The pylons are up to 45m in height and will be separated into up to five segments for transport to site. The pylon components do not require over-weight or over-dimension permits to transport and can be undertaken using standard vehicles. A total of 125 heavy vehicle round trips are proposed.

The transmission line also requires minor arms, cables, and foundation cages. These are expected to be transported in a single semitrailer for each transmission pylon, resulting in a further 25 round trips.

Materials for tracks, pads, and other construction trips are also required, with 550 truck and trailer return trips.

8.8 Transformer transportation

A single transformer is proposed for the substation serving Puke Kapo Hau. Due to the weight of the transformer and limits on axle loads on bridges, the transporter will be over-weight and over-dimension. The transporter will be supported by a lead and trail truck. There will be a total of one return trip of the over-dimension over-weight vehicle to deliver the transformer to the site.

The transformer will be accompanied by a minimum of 1x Class 1 pilot escort and 2x Class 2 pilot escorts. Up to ten containers of accessories to fully assemble the units once on site. 64 return trips by heavy vehicles are expected to deliver materials for the foundations of the substation.

8.9 Summary of vehicle trips

A summary of the expected heavy vehicle deliveries is shown below in Table 8-1.

These represent return trips to the site. For example, there will be 572 trips to deliver turbine components to the site under the proposed layout, and 572 trips back to the port. This results in 1144 movements on the network.

Table 8-1 Total heavy vehicle deliveries (return trips)

Activity	Consented Real-world Layout (veh)	Proposed Layout (veh)	Probable Origin
Turbines			
Tower Sections	188	176	South Port
Nacelles	47	44	South Port
Blades	141	132	South Port
Hubs/Nose Cones	47	44	South Port
Ancillary Equipment	188	176	South Port
Subtotal	**611**	**572**	
Foundations			
Concrete	430	510	Dunedin, Lee Stream Quarry
Water	125	147	Dunedin
Reinforcing Steel	78	73	Dunedin
Structural Fill and Platform	1,880	2,475	Dunedin, Lee Stream Quarry
Subtotal	**2,513**	**3,205**	
Roading			
Base Course	4,690	2,990	Dunedin, Lee Stream Quarry
Drainage	31	29	Dunedin
Subtotal	**4,721**	**3,019**	
General			
Mobilisation	125	117	Dunedin
Demobilisation	125	117	Dunedin
Civil Miscellaneous	157	147	Dunedin
Consumables	470	440	Dunedin
Site Facilities Platforms	292	386	Dunedin
Water	1,565	1,565	Dunedin

Activity	Consented Real-world Layout (veh)	Proposed Layout (veh)	Probable Origin
Subtotal	**2,734**	**2,772**	
Total trips for components and materials which have been assessed under the existing resource consent	**10,579**	**9,568**	
BESS			
Supply and install units	N/A*	42	Port Chalmers, Lyttelton or South Port
Pavement	N/A*	70	Dunedin, Lee Stream Quarry
Subtotal	N/A*	**112**	
Transmission Line			
Transmission Towers	N/A*	125	Port Chalmers, Lyttelton or South Port
Supplementary Material	N/A*	25	Port Chalmers, Lyttelton or South Port
Tracks and Pads	N/A*	550	Port Chalmers, Lyttelton or South Port
Subtotal	N/A*	**700**	
Substation			
Transformer	N/A*	2	South Port
Foundations	N/A*	64	Dunedin
Subtotal	**N/A***	**66**	
Total trips for components and materials assessed for the new land use resource consent	**N/A***	**878**	

*These activities did not require consent or were not included in the proposal at the time of application of the existing resource consent. The total number of heavy vehicle return trips for components and materials assessed under the resource consent has reduced by 1,011 trips for the proposed layout.

The total number of heavy vehicle return trips for components and materials related to the new land use resource consent for substation, transmission line and BESS is 878 trips.

9 Proposed Changes to Transport Conditions of Consent

The proposed changes to the transport specific conditions of consent are outlined in Table 9-1. These have been developed to reflect changes to the proposed layout and address any concerns which were not adequately addressed under the existing conditions. A draft CTMP has been provided in **Appendix D**. The CTMP outlines the key activities to be undertaken to mitigate the transport effects. It should be updated throughout the design and construction of the wind farm to reflect the selection of transporters, ports, and routes to deliver components and materials to the site.

Table 9-1 Proposed changes to transport specific conditions of consent

Number	Summary of Condition	Proposed changes
61	A Traffic Management Plan shall be prepared and submitted by the consent holder to the Chief Executive of Clutha District Council before any access to the site by construction traffic begins. The purpose of the Traffic Management Plan will be to set out and detail the extent and timing of construction traffic activity, and any temporary traffic management provisions to be put in place during this time. The Traffic Management Plan shall include the following requirements:	Delete all instances of “Traffic Management Plan” and replace with “Construction Traffic Management Plan”
61 i)	The plan shall be prepared after consulting with the Dunedin City Council and Transit New Zealand as road controlling authorities and shall implement the outcome of that consultation.	Delete “Transit New Zealand” and replace with NZ Transport Agency Waka Kotahi.
61ii)	Set out the nature and timing of local physical improvement works to be undertaken on the roading network at the consent holder's cost to accommodate access to the Mahinerangi Wind Farm. These works shall include the following as a minimum: a. The upgrading of routes used for transport of materials by other than light vehicles to ensure the safe operation of the road including works to ensure that two vehicles (other than over-dimension vehicles) can safely pass each other based on vehicle tracking that is consistent with the operating speed of the road. b. The upgrading of routes used for transport of over-weight and over-dimension vehicles to provide for the swept path of vehicles on horizontal curves. c. The upgrading of local access routes used for transport of materials by heavy vehicles (defined as vehicles that require a heavy vehicle licence to operate) to an all-weather	No change

Number	Summary of Condition	Proposed changes
	surface where necessary and only on those uphill sections of the routes heading towards the Mahinerangi Wind Farm with gradients 10% or steeper. d. The provision of school-bus bays beyond the traffic lane at all pickup and drop-off points on routes used for transport of materials by other than light vehicles. e. The installation of suitable passing/stopping bays, in agreed locations, if considered necessary by the road controlling authority.	
61 iii)	Detail the intended traffic arrangements and provisions for the delivery of over-weight and over-dimensioned major components to the site, including any time restrictions for the movement of over-weight and over-dimensioned vehicles. No heavy construction traffic will access the site except via Mahinerangi Road and Eldorado Track and between the house of 7.00 am and 10.00 pm. This does not prevent the use of any other roads between the port and State Highway 87 outside these hours. This may require the development of a layby for temporary parking of such vehicles before they reach Mahinerangi Road.	Delete "and between the house of 7.00 am and 10.00 pm" and replace with "and between the hours of 6.00 am and 10.00 pm"
61 iv)	Manage construction traffic (other than component delivery by over-dimension and over-weight vehicles) during the construction phase. This shall include as a minimum: f. Identification of all roads within Clutha District that are to be used by construction traffic (Waipori Falls Road shall not be used for any construction traffic). g. The provision for the notification of the principals of all schools along routes to be used by construction traffic of the commencement and cessation of seasonal construction periods. h. The provision for dust suppression on the routes used for the transport of goods to the site. i. Ensuring that all construction traffic within Clutha District utilises those roads that have been identified for use by construction traffic in the Traffic Management Plan. j. Ensuring that all heavy vehicles associated with construction are clearly identified with labels to confirm that they are associated with the Mahinerangi Wind Farm to facilitate the monitoring of vehicle movements. The labels shall also provide a phone number to enable any complaints to be made. k. The management practices to be adopted to avoid conflict with stock droving on the affected roads.	Delete all instances of "Traffic Management Plan" and replace with "Construction Traffic Management Plan"

Number	Summary of Condition	Proposed changes
62.	The existing condition of all roads to be used by construction traffic, other than light vehicles, in Clutha District (as identified in the Traffic Management Plan) shall be investigated and reported upon in a Base Condition Report that shall be prepared by the consent holder. The Base Condition Report shall contain information including classified traffic counts, high speed data capture, system recording - profile, texture and roughness and falling weight deflectometer. The Base Condition Report shall identify the existing condition of roads, those roads that require upgrading, potential remedial works during construction, and monitoring requirements during and at the end of the construction period. A Draft Base Condition Report shall be lodged with the Chief Executive of the Clutha District Council not less than nine months prior to the commencement of construction works at the project site.	Delete all instances of “Traffic Management Plan” and replace with “Construction Traffic Management Plan”
63.	The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Base Condition Report and to certify its adequacy prior to the Base Condition Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder.	No change
64.	The consent holder shall be responsible for the maintenance of roads subject to the Base Condition Report for the duration of the construction period except for any maintenance, repairs or reconstruction of these roads arising from unusual or extreme weather events. The consent holder shall prepare a Maintenance Standard Report that will detail the minimum level of service to be provided by the consent holder on the roads. A Draft Maintenance Standard Report shall be lodged with the Chief Executive of Clutha District Council not less than nine months prior to the commencement of construction works at the project site.	No change
65.	The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Maintenance Standard Report and to certify its adequacy prior to the Maintenance Standard Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder. The Chief Executive may require the consent holder to produce an Additional Base Condition Report during the construction period, where road condition appears to be worse than determined in the	No change

Number	Summary of Condition	Proposed changes
	Maintenance Standard Report. The Additional Base Condition Report may be subject to review by a technical peer reviewer, with the cost met by the consent holder.	
66.	For the avoidance of doubt, the consent holder will only be responsible for the costs of maintenance of the roading network to the extent that the costs are additional to those that would be anticipated by Clutha District Council in the normal course of events (ie the consent holder will pay a reasonable proportion of the costs of maintenance required as a result of the use of the roads by wind farm construction traffic).	No change
67.	The consent holder shall be responsible for preparing a Post-construction Condition Report at the conclusion of construction works with respect to all roads subject to the Base Condition Report. A Draft Post-construction Condition Report shall be lodged with the Chief Executive and shall provide data with respect to road conditions that is consistent with that contained in the Base Condition Report. The Post-construction Condition Report may be reviewed by a technical peer reviewer at the cost of the consent holder prior to the Post-construction Condition Report being formally accepted by the Chief Executive.	No change
68.	The consent holder shall ensure that roads subject to the Base Condition Report are restored to a standard that is consistent with or exceeds the condition recorded in the Base Condition Report.	No change

10 Appraisal of Transport Effects

10.1 Overview of effects

The effects have been assessed in relation to types of trips that are generated. The transport effects related to the changes in conditions for the variation of the existing resource consent are assessed in Sections 10.2 to 10.5. Sections 10.6 and 10.7 assess the transport effects of the new resource consents for the transmission line, BESS, and transformer construction traffic.

The changes in the Puke Kapo Hau layout include a reduction in the number of wind turbines being installed and an increase in maximum tip height. The consented real-world layout reflects a potential 47 3.45MW wind turbines being installed. The proposed layout reflects a potential 44 4.3MW turbines being installed. There is a decrease in heavy traffic movements resulting from the proposed layout. In terms of the increase in tip height, possible routes have been considered and are viable.

10.2 Wind turbine components traffic

The Balclutha Bridge is likely to be used as part of the route for the transport of the wind turbine blades due to tracking restrictions on alternative routes. The north end of the Balclutha Bridge is constrained, with vehicle tracking for the turbine blade showing minimal clearance. The careful selection of transporter trailer, and specific vehicle tracking movements which will be undertaken during detailed design are expected to provide enough clearance to avoid any damage to the bridge or parapets. This means there are no additional effects expected for the Balclutha Bridge.

Due to the reduction in the number of wind turbines being installed, there are 39 fewer turbine component trips associated with the construction of Puke Kapo Hau. As the number of trips have reduced, the expected adverse effects have also reduced, and therefore the resulting change in the transport effects do not require any further mitigation.

10.3 General construction traffic

SH87 is appropriate for the movement of heavy construction vehicles between SH1 and Outram. Eldorado Track and Mahinerangi Road are not classified on the heavy vehicle route but the route has been previously used for the construction of Stage 1 of the Mahinerangi Wind Farm and carry heavy vehicles associated with stock/equipment from adjacent farming and forestry lands.

There is an overall reduction of 972 heavy vehicle return trips associated with the general construction traffic when comparing the consented real-world layout to the proposed layout. However there is a change in the distribution of trips on the network due to the change in origin of water for cartage. There will be an increase of 718 heavy vehicle trips on Mahinerangi Road when compared to the consented real-world layout. This represents an 8.7% increase in the heavy vehicle trips expected during the construction period, or an average of two additional trips per day. The increased effects on Mahinerangi Road as a result of these trips is expected to be mitigated appropriately through the measures outlined in the CTMP and do not require any further mitigation.

10.4 Operational and maintenance traffic

The Wind Farm is assumed to have up to 10 employees to operate and maintain the site. It is expected the same number of employees would operate and maintain the site under the real-world consented layout. There is no change in transport effects related to wind farm operational traffic.

10.5 Visitor and tourist traffic

The changes to the conditions of the land use resource consent do not change the effects of any visitor traffic to the wind farm.

10.6 Transmission line, BESS, and substation construction traffic

The traffic generated from the construction of the transmission line and battery will be up to 876 standard heavy vehicles and HPMV vehicles over an 18-month timeframe. Assuming 22 working days per month, this indicates an average of two return trips per day, or four trips on the road network. These trips are expected to be made from Port Chalmers, Lyttelton or Southport. The traffic volume on the different routes is shown in Table 10-1.

Table 10-1 Expected increase in route traffic volume related to traffic generation

Route	Traffic Volume (AADT, vpd)	Expected increase in traffic volume
Lyttelton to Dunedin	4,000 – 30,000	0.01 – 0.11%
Dunedin/Port Chalmers to Mosgiel	6,000 – 20,000	0.01 – 0.07%
Southport to Mosgiel	1,500 – 10,000	0.02 – 0.29%
Mosgiel to Mahinerangi Road	900	0.49%
Mahinerangi Road and Eldorado Track	97	4.56%

The increase in traffic volume on the routes to Mosgiel are negligible, and fall within expected daily variation of traffic flow on these routes. Between Mosgiel and the site, the increase in heavy vehicle movements may be noticeable, however any effects will be minor as the road network generally has capacity to absorb these movements. The additional heavy vehicle movements are not expected to have significant impacts, and any effects on the operational efficiency or safety of the road network can be mitigated through the permits and temporary traffic management outlined in the CTMP.

10.7 Transformer construction traffic

The transformer is likely to follow the over-weight route from South Port to site. The expected traffic generated by the transformer is one over-weight over-dimension return movement and three return movements for pilot vehicles, travelling in convoy. The effects of these movements will be minor, due to the low volume of movements, and can be managed through the permits and temporary traffic management outlined in the CTMP.

11 Conclusion

The change in conditions relating to the variation to the existing resource consent result in fewer overall trips generated for the construction of Puke Kapo Hau compared to those for the consented real-world layout. There is a change in distribution of the trips with an average increase on Mahinerangi Road of two trips a day. This increase will not introduce significant adverse effects, and can be mitigated through the CTMP.

The number of trips associated with the construction of the substation, transmission line, and BESS is fewer than 10 per day, and therefore any effects will be minor and able to be mitigated through the use of permits, temporary traffic management, and the CTMP.

A

Appendix A – Transport Conditions from Resource Consent

TRAFFIC CONDITIONS

61. A Construction Traffic Management Plan shall be submitted by the consent holder to the Chief Executive of Clutha District Council before any access to the site by construction traffic begins. The purpose of the Construction Traffic Management Plan will be to set out and detail the extent and timing of construction traffic activity, and any temporary traffic management provisions to be put in place during this time. The Construction Traffic Management Plan shall include the following requirements:

i) The plan shall be prepared after consulting with the Dunedin City Council and ~~Transit New Zealand~~ the New Zealand Transport Agency Waka Kotahi as road controlling authorities, and shall implement the outcome of that consultation.

ii) Set out the nature and timing of local physical improvement works to be undertaken on the roading network at the consent holder's cost to accommodate access to the Mahinerangi Wind Farm. These works shall include the following as a minimum:

a) The upgrading of routes used for transport of materials by other than light vehicles to ensure the safe operation of the road including works to ensure that two vehicles (other than over-dimension vehicles) can safely pass each other based on vehicle tracking that is consistent with the operating speed of the road.

b) The upgrading of routes used for transport of over-weight and over-dimension vehicles to provide for the swept path of vehicles on horizontal curves.

c) The upgrading of local access routes used for transport of materials by heavy vehicles (defined as vehicles that require a heavy vehicle licence to operate) to an all-weather surface where necessary and only on those uphill sections of the routes heading towards the Mahinerangi Wind Farm with gradients 10% or steeper.

d) The provision of school-bus bays beyond the traffic lane at all pickup and drop-off points on routes used for transport of materials by other than light vehicles.

e) The installation of suitable passing/stopping bays, in agreed locations, if considered necessary by the road controlling authority.

iii) Detail the intended traffic arrangements and provisions for the delivery of over-weight and over-dimensioned major components to the site, including any time restrictions for the movement of over-weight and over-dimensioned vehicles. No heavy construction traffic will access the site except via Mahinerangi Road and El Dorado Track and between the hou~~se~~rs of ~~7~~6.00 am and 10.00 pm. This does not prevent the use of any other roads between the port and State Highway 87 outside these hours. This may require the development of a layby for temporary parking of such vehicles before they reach Mahinerangi Road.

iv) Manage construction traffic (other than component delivery by over-dimension and over- weight vehicles) during the construction phase.

This shall include as a minimum:

a) Identification of all roads within Clutha District that are to be used by construction traffic (Waipori Falls Road shall not be used for any construction traffic).

b) The provision for the notification of the principals of all schools along routes to be used by construction traffic of the commencement and cessation of seasonal construction periods.

c) The provision for dust suppression on the routes used for the transport of goods to the site.

d) Ensuring that all construction traffic within Clutha District utilises those roads that have been identified for use by construction traffic in the Construction Traffic Management Plan.

e) Ensuring that all heavy vehicles associated with construction are clearly identified with labels to confirm that they are associated with the Mahinerangi Wind Farm to facilitate the monitoring of vehicle movements. The labels shall also provide a phone number to enable any complaints to be made.

f) The management practices to be adopted to avoid conflict with stock droving on the affected roads.

62. The existing condition of all roads to be used by construction traffic, other than light vehicles, in Clutha District (as identified in the Construction Traffic Management Plan) shall be investigated and reported upon in a Base Condition Report that shall be prepared by the consent holder. The Base Condition Report shall contain information including classified traffic counts, high speed data capture, system recording - profile, texture and roughness and falling weight deflectometer. The Base Condition Report shall identify the existing condition of roads, those roads that require upgrading, potential remedial works during construction, and monitoring requirements during and at the end of the construction period. A Draft Base Condition Report shall be lodged with the Chief Executive of the Clutha District Council not less than nine months prior to the commencement of construction works at the project site.

63. The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Base Condition Report and to certify its adequacy prior to the Base Condition Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder.

64. The consent holder shall be responsible for the maintenance of roads subject to the Base Condition Report for the duration of the construction period except for any maintenance, repairs or reconstruction of these roads arising from unusual or extreme weather events. The consent holder shall prepare a Maintenance Standard Report that will detail the minimum level of service to be provided by the consent holder on the roads. A Draft Maintenance Standard Report shall be lodged with the Chief Executive of Clutha District Council not less than nine months prior to the commencement of construction works at the project site.

65. The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Maintenance Standard Report and to certify its adequacy prior to the Maintenance Standard Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder. The Chief Executive may require the consent holder to produce an Additional Base Condition Report during the construction period, where road condition appears to be worse than determined in the Maintenance Standard Report. The Additional Base Condition Report may be subject to review by a technical peer reviewer, with the cost met by the consent holder.

66. For the avoidance of doubt, the consent holder will only be responsible for the costs of maintenance of the roading network to the extent that the costs are additional to those that would be anticipated by Clutha District Council in the normal course of events (ie the consent holder will pay a reasonable proportion of the costs of maintenance required as a result of the use of the roads by wind farm construction traffic).

67. The consent holder shall be responsible for preparing a Post-construction Condition Report at the conclusion of construction works with respect to all roads subject to the Base Condition Report. A Draft Post-construction Condition Report shall be lodged with the Chief Executive and shall provide data with respect to road conditions that is consistent with that contained in the Base Condition Report. The Post-construction Condition Report may be reviewed by a technical peer reviewer at the cost of the consent holder prior to the Post-construction Condition Report being formally accepted by the Chief Executive.

68. The consent holder shall ensure that roads subject to the Base Condition Report are restored to a standard that is consistent with or exceeds the condition recorded in the Base Condition Report.

B

Appendix B – Road Network Description

Route Summary – Over-weight and over-dimension loads

The transformer and the turbine components including the tower, nacelle, and blades, are oversize and overweight, and require specialist vehicles and appropriate routes to transport to the site. The blades require a relatively straight route with clearance on both sides to allow tracking and overhang of the blades.

A summary of the roads the assessed over-weight route uses is shown in Table 1-1.

Table 1-1 Over-weight route details.

Main Component route (Road name)	Length (km)	Heavy vehicle network	Road Controlling Authority
Shannon St	5	Yes	Invercargill City Council
SH1	22.5	Yes	NZTA
Elles Rd	3.9	Yes – From SH1 to 228 Elles Road	Invercargill City Council
SH1	62.5	Yes	NZTA
Hyde Street	0.5	Full length	Gore District Council
River Street	0.7	Yes – From SH1S to 73 River St	Gore District Council
SH1	4.5	Yes	NZTA
SH90	29.1	Yes	NZTA
Duncan Rd South	1.2	Yes – From SH90 to Station Road	Clutha District Council
Duncan Road North	2.3	No	Clutha District Council
SH90	27	Yes	NZTA
SH8	58.7	Yes	NZTA
SH1	36.6	Yes	NZTA
SH86	1.5	Yes	NZTA
Allanton Road	6.2	Yes	Dunedin City Council
SH87	8.8	Yes	NZTA
Mahinerangi Road	19.6	No	Dunedin City Council / Clutha District Council
Eldorado Track	8.4	No	Clutha District Council

The over-dimension route is used for the transport of the 67m wind turbine blades. The assessed route goes through Balclutha and is summarised in Table 1-2.

Table 1-2 Over-dimension route details.

Blade route	Length (km)	Heavy vehicle network	Road Controlling Authority
Shannon Street	1	Yes	Invercargill City Council
SH1	27	Yes	NZTA
SH6	9	Yes[1]	NZTA
SH98	22	Yes	NZTA
SH1	39	Yes	NZTA
Salford Street	0.7	Yes	Southland District Council
Ferry Road	1.1	Yes - From Otatara Road to Fosbender Road	Southland District Council
Edendale Wyndham Rd	2.7	No	Southland District Council
Ferry Street	2.2	No	Gore District Council
Wyndham Road	15.4	Yes – From Forth St to Gore	Southland / Gore District Council
Forth Street	0.5	Yes	Gore District Council
Kana Street	0.2	Yes – From SH93 to Crawford Road	Gore District Council
SH93	43	Yes	NZTA
SH1	88	Yes	NZTA
SH86	1.5	Yes	NZTA
Allanton Road	3.8	Yes	Dunedin City Council
Granton Road	1.8	No	Dunedin City Council
Church Road East	3.6	No	Dunedin City Council

[1] Full High Productivity Motor Vehicle Routes (HPMV), NZTA

Blade route	Length (km)	Heavy vehicle network	Road Controlling Authority
Woodside Road	0.25	No	Dunedin City Council
SH87	8.8	Yes	NZTA
Mahinerangi Road	19.6	No	Dunedin City Council / Clutha District Council
Eldorado Track	8.4	No	Clutha District Council

C

Appendix C – Crash and Incident History

1 Safety Assessment

A review of crash data from the local road network has been completed. The crash data uses the NZTA Crash Analysis System (CAS) to identify the history of the reported crashes for the selected area. It is probable that given the remoteness of the areas investigated, there are low reporting rates of crashes. For this reason and combined with the generally low traffic volumes in the area, a 10-year analysis period from 2014 - 2023 has been considered analysing only injury crashes (Minor, Serious, Fatal).

An overview of the crash data has shown 7.5% of the crashes involve heavy vehicles, with 4% of crashes resulting in a fatality and 20% resulting in a serious injury,

The collective and personal risk have also been used to provide further context. These risk measures allows for an understanding of the inherent risk of the road without relying on historical crash data, which has some aspect of randomness or noise, especially on roads with a low traffic volume. Collective Risk measures the total expected deaths and serious injuries over the next five years per km of road. Personal Risk takes into account the traffic volume on the road to measures the risk of an individual dying or being seriously injured on the road corridor. A high collective or personal risk is generally an area of concern where additional mitigation may be required. In medium-high risk areas, some mitigation may be considered depending on the types of crashes that have occurred historically.

Table 1-1 Collective risk band by DSi thresholds

Collective Risk Band	Rural (5yr DSi per km)	Urban (5yr DSi per km)
High	$1.10 \times \text{length}^{-0.196}$	$2.30 \times \text{length}^{-0.338}$
Medium-High	$0.55 \times \text{length}^{-0.109}$	$1.20 \times \text{length}^{-0.338}$
Medium	0.25	$0.65 \times \text{length}^{-0.338}$
Low-Medium	0.10	$0.30 \times \text{length}^{-0.338}$
Low	0	0

Table 1-2 Personal risk band by DSi threshold

Collective Risk Band	Rural (5yr DSi per km)
High	>= 14
Medium-High	9.5 - <14 or >=20 with 2 injury crashes
Medium	8 - <9.5 or >=20 with 1 injury crash or 12-<20 with 2 injury crashes
Low-Medium	5-<8
Low	<5

2 Invercargill

Figure 2-1 shows the distribution and severity of crashes within the Invercargill City Council district boundaries for a crash period of 10 years (2014-2023).

Figure 2-1 Invercargill CAS Data.

There are 259 minor injury crashes, 53 serious crashes and 7 fatal crashes along the overweight route and overdimension route within the Invercargill region. For comparison, the heavy vehicle crash data has been summarised in Table 2-2. Many of these crashes were the result of poor observation (52%), alcohol factors (21%) or drivers failing to give way or stop (27.4%). The main crash types were rear end/obstruction (32%), crossing/turning type movements (27%) which are typical of urban intersection crashes.

Table 2-1 CAS Data

Crash type	Minor	Serious	Fatal
A - Overtaking and Lane change	9	1	1
B - Head On	5	3	1
C - Lost Control or off road (straight roads)	28	11	1
D - Cornering	36	7	1
E - Collision with Obstruction	18	1	0

Crash type	Minor	Serious	Fatal
F - Rear end	58	3	1
G - Turning versus same Direction	14	7	0
H - Crossing (No turn)	26	5	0
J - Crossing (Vehicle turning)	0	0	0
K - Merging	29	4	0
L - Right turn against	9	0	1
M - Manoeuvring	12	4	0
N - Pedestrians crossing road	9	3	0
P - Pedestrians other	12	4	0
Q - Miscellaneous	0	0	0

The truck crash data has been pulled out from the proposed routes within Invercargill with 20 Minor injury crashes, 4 serious and 3 fatal crashes. This can be seen in Table 2-2.

Table 2-2 Truck crash severities.

Vehicle type	Minor	Serious	Fatal
All	259	53	7
Truck	20	4	3

A fatal crash is recorded in CAS involving a heavy vehicle with a runoff type crash. A truck had rolled over while navigating a gentle corner. The factors leading to the crash includes driver distraction and that the driver was not wearing their seatbelt.

The personal and collective risk for the routes within the Invercargill City Council boundary were extracted from NZTA MegaMaps. The transport routes generally have collective risk of low to medium with a small section of the main component route on Elles Road having a medium-high collective risk. The personal risk ranges from low to medium with a small section on Clyde Street with a medium-high risk.

3 Southland

An assessment of the crashes on roads within the Southland District Council district boundaries has been carried out. An output from CAS in Figure 3-1 shows the extent of area and crash severity for a crash period of 10 years (2014-2023).

Figure 3-1 Southland CAS Data for proposed routes.

There are 46 minor injury crashes, 19 serious crashes and 6 fatal crashes along the overweight route and overdimension route within the Southland region. The results from this crash analysis can be seen in Table 3-1. Many of these crashes were the result of alcohol factors (41%), poor observation (21%) and positioning on the road (21%). The main crash types (shown in Table 3-1) were straight road head on or lost control (45%), lost control or head on during bends (24%) and rear end type crashes (17%).

The route overall appears to be relatively safe for heavy vehicles with very few crashes. Particular care should be taken on the local roads between Edendale and Mataura where there is an increased frequency of crashes particularly relating to position on road and poor observation.

Table 3-1 CAS table summary for Southland.

Crash type	Minor	Serious	Fatal
A - Overtaking and Lane change	1	0	0
B - Head On	4	5	1
C - Lost Control or off road (straight roads)	19	3	2
D - Cornering	8	4	3

Crash type	Minor	Serious	Fatal
E - Collision with Obstruction	1	1	0
F - Rear end	5	2	0
G - Turning versus same Direction	2	1	0
H - Crossing (No turn)	1	0	0
J - Crossing (Vehicle turning)	1	1	0
K - Merging	1	1	0
L - Right turn against	1	1	0
M - Manoeuvring	0	0	0
N - Pedestrians crossing road	1	0	0
P - Pedestrians other	0	0	0
Q - Miscellaneous	1	0	0

The truck crash data has been pulled out from the proposed routes within Southland with 6 Minor injury crashes, 6 serious and 1 fatal crash. The truck fatal crash was on SH1 west of Edendale, where a truck pulled over and lost control. This can be seen in Table 3-2.

Table 3-2 Truck crash data for Southland.

Vehicle type	Minor	Serious	Fatal
All	46	19	6
Truck	6	6	1

The personal and collective risk for the routes through the Southland District were extracted from NZTA MegaMaps. The transport routes through Southland generally have collective risk of low to medium, and personal risk up to medium-high. The medium high personal risk is on the eastern approach to the Mataura River bridge and the section just south of the border with Gore District.

4 Gore

An assessment of the crashes on roads within the Gore District boundary has been carried. Figure 4-1 shows the extent of area and crash severity for a crash period of 10 years (2014-2023).

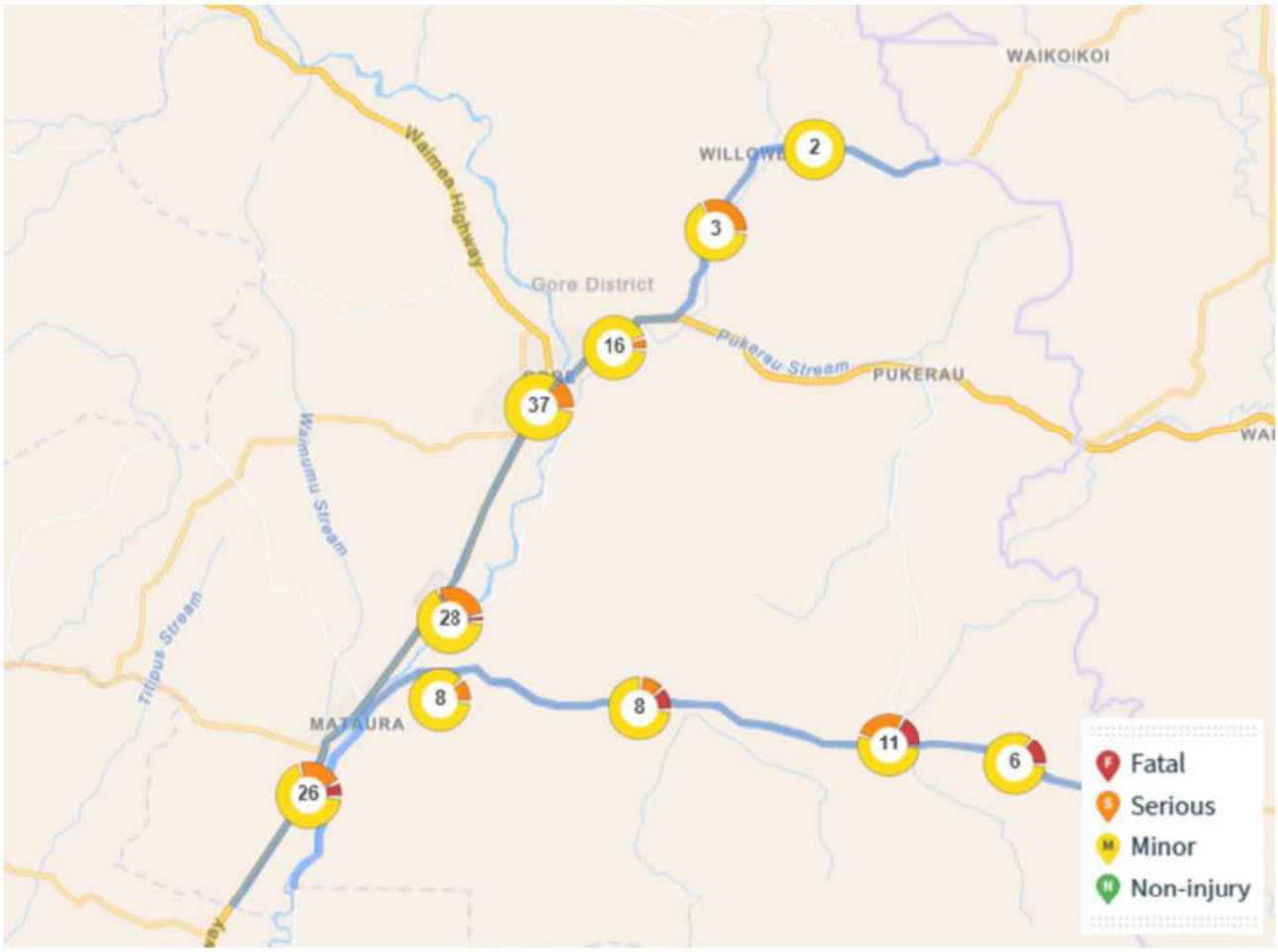

Figure 4-1 Gore District CAS data.

The results from this crash analysis can be seen in Table 4-1. There are 111 minor injury crashes, 27 serious crashes and 7 fatal crashes along the main component route and blade route within the Gore district boundaries. Many of these crashes, were the result of alcohol factors (31%), poor observation (37%) and poor handling (24%). The main crash types were straight road head on or lost control (29%), lost control or head on during bends (26%) and crossing or turning type crashes (17%).

Table 4-1 Vehicle movement coding and crash severity for Gore District.

Crash type	Minor	Serious	Fatal
A - Overtaking and Lane change	2	0	1
B - Head On	4	3	2
C - Lost Control or off road (straight roads)	26	6	2
D - Cornering	28	7	2
E - Collision with Obstruction	7	2	0
F - Rear end	4	1	0
G - Turning versus same Direction	9	1	0

Crash type	Minor	Serious	Fatal
H - Crossing (No turn)	9	0	0
J - Crossing (Vehicle turning)	6	2	0
K - Merging	2	0	0
L - Right turn against	4	1	0
M - Manoeuvring	2	0	0
N - Pedestrians crossing road	3	3	0
P - Pedestrians other	4	1	0
Q - Miscellaneous	1	0	0

The truck crash data has been pulled out from the proposed routes within the district with 8 Minor injury crashes, 4 serious injury crashes and 1 fatal crash. A summary of the truck crashes is in Table 4-2.

Table 4-2 Crash severity associated with truck crashes.

Vehicle type	Minor	Serious	Fatal
All	111	27	7
Truck	8	4	1

The personal and collective risk for the routes through the Gore District were extracted from NZTA MegaMaps. The transport routes through Gore generally have collective risk of low to medium-high, and personal risk up to low-medium. The medium-high collective risk is on the section between Mataura and Gore through Charlton.

The route overall appears to be relatively safe for heavy vehicles with very few crashes. Particular care should be taken on the local roads between Mataura and Gore where there is an elevated collective risk.

5 Clutha

An assessment of the crashes on roads within the Clutha District Council boundaries has been carried out in Figure 5-1. An output from CAS in shows the extent of area and crash severity for a crash period of 10 years (2014-2023).

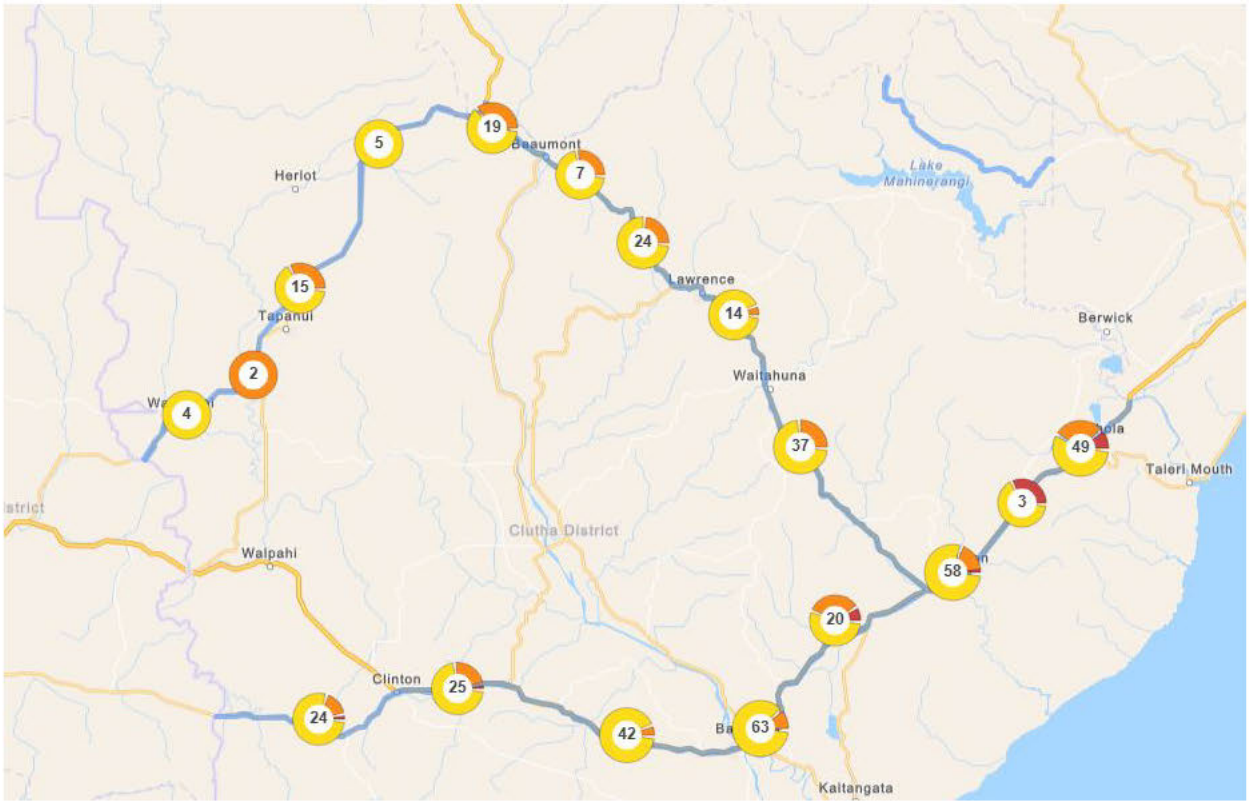

Figure 5-1 Clutha District CAS Data.

The results from this crash analysis can be seen in Table 5-1 and there are 312 minor injury crashes, 87 serious crashes and 12 fatal crashes along the Overweight route and overdimension route within the Clutha region. Many of these crashes, were the result of poor handling (27%), road factors (26%) and poor observation (23%). The main crash types were lost controls or head on crashes on bends (51%) and lost controls or head on crashes on straight roads (22%). Table 5-1 Crash types and crash severity for Clutha District.

Crash type	Minor	Serious	Fatal
A - Overtaking and Lane change	5	2	0
B - Head On	14	12	11
C - Lost Control or off road (straight roads)	59	16	0
D - Cornering	152	36	1
E - Collision with Obstruction	12	0	0
F - Rear end	13	2	0
G - Turning versus same Direction	14	5	0
H - Crossing (No turn)	6	0	0
J - Crossing (Vehicle turning)	0	0	0
K - Merging	8	3	0

Crash type	Minor	Serious	Fatal
L - Right turn against	3	1	0
M - Manoeuvring	2	2	0
N - Pedestrians crossing road	10	2	0
P - Pedestrians other	8	2	0
Q - Miscellaneous	0	0	0

The truck crash data has been pulled out from the proposed routes within Clutha with 31 minor injury crashes, 1 serious injury crash and 2 fatal crashes as seen in Table 5-2.

Table 5-2 Truck crashes and crash severity.

Vehicle type	Minor	Serious	Fatal
All	312	87	12
Truck	31	1	2

The personal and collective risk for the routes through the Clutha District were extracted from NZTA MegaMaps. The blade route through Balclutha has a collective risk which is generally classified as medium and the main component route has a collective risk which ranges from low to medium. A high collective risk area for both routes is the section of SH1 outside Titri just before the Waipori river. The personal risk for both routes is largely low to medium with small sections of medium high personal risk.

6 Dunedin

An assessment of the crashes on roads within the Dunedin City Council district boundaries has been carried out in Figure 6-1 for crash period of 10 years from 2014-2023. An output from CAS in shows the extent of area and crash severity.

Figure 6-1 Dunedin CAS Data.

The results from this crash analysis can be seen in Table 6-1 and there are 123 minor injury crashes, 45 serious crashes and 4 fatal crashes along the Overweight route and over dimension route within the Dunedin region Table 6-1. Many of these crashes, were the result of driver poor observation (40%), poor handling (22%) and incorrect lanes or position (16%).

The main crash types along the routes were classed as straight road lost control or head on (30%) or read end or obstruction crash type (26%).

Table 6-1 Crash severities for each crash movement using Dunedin CAS data.

Crash type	Minor	Serious	Fatal
A - Overtaking and Lane change	2	2	0
B - Head On	6	6	2
C - Lost Control or off road (straight roads)	33	10	0
D - Cornering	17	11	0
E - Collision with Obstruction	10	1	0
F - Rear end	16	2	0
G - Turning versus same Direction	10	5	0

Crash type	Minor	Serious	Fatal
H - Crossing (No turn)	3	0	1
J - Crossing (Vehicle turning)	0	0	0
K – Merging	8	3	0
L - Right turn against	3	0	0
M - Manoeuvring	4	3	0
N - Pedestrians crossing road	7	1	0
P - Pedestrians other	9	5	2
Q - Miscellaneous	0	0	0

The truck crash data has been pulled out from the proposed routes within Dunedin with 7 Minor injury crashes, 3 serious injury crashes and 2 fatal crashes.

Table 6-2 Truck crash severities in Dunedin.

Vehicle type	Minor	Serious	Fatal
All	123	45	4
Truck	7	3	2

Personal and collective risk for the area was also extracted from NZTA MegaMaps. The personal risk for the road between Allanton and Outram ranges from Low on Allanton Road to Medium on Church Road West. The personal risk is Medium-High on SH87. The collective risk ranges from Low to Low-Medium.

7 Lyttelton to Dunedin

An assessment of crashes has been completed for the route Lyttleton to Dunedin along SH1 in Figure 7-1. The CAS data for crash injuries is assessed for a 5-year crash period from 2019-2023.

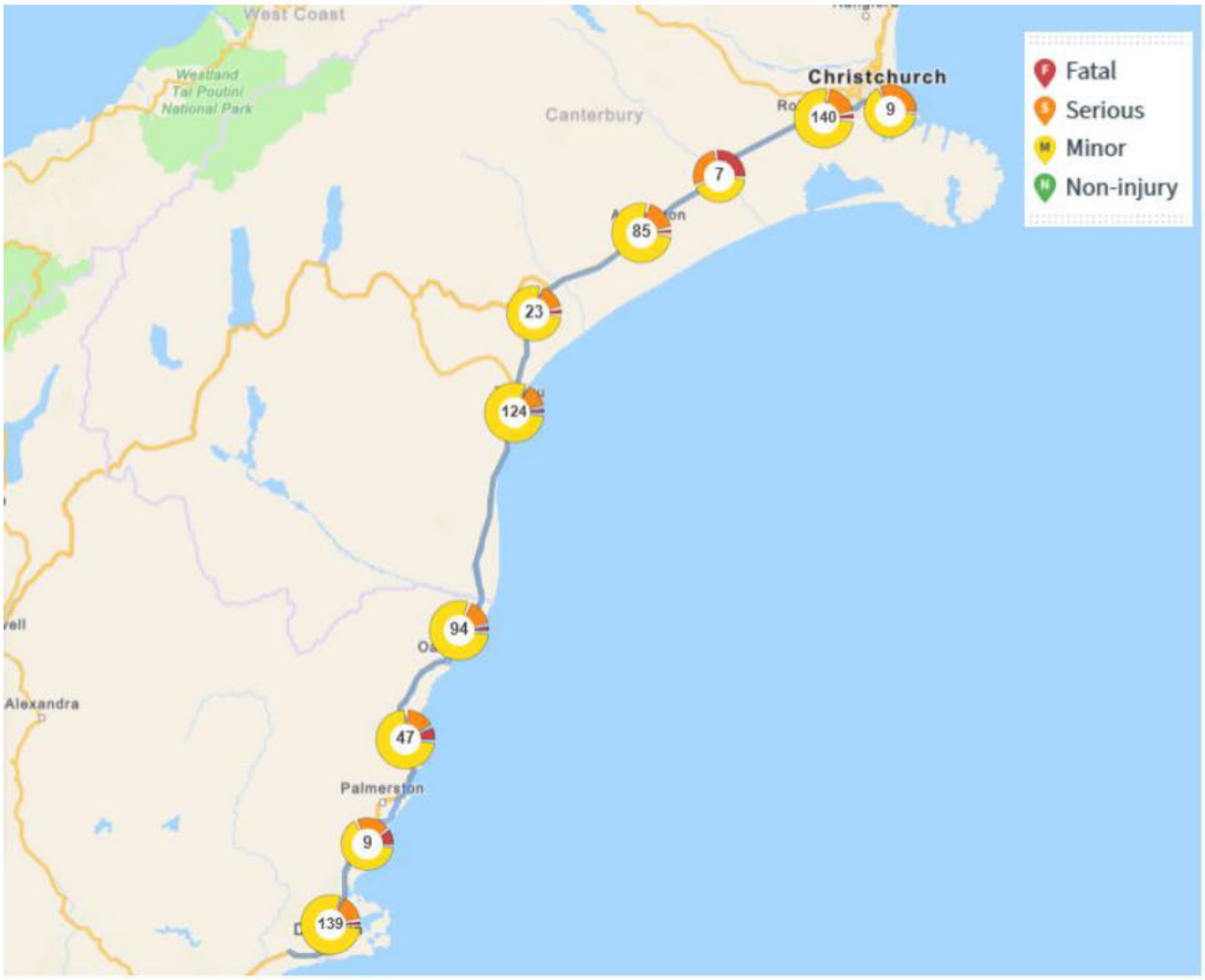

Figure 7-1 Lyttleton to Dunedin route.

The results of the CAS crash data are summarised in Table 7-1 and separated into crash types. The highest number of crashes along the route include Rear end crashes, Lost control or off road for straight corridors. Majority of the corridor is a flat, straight road within Canterbury region and starts to become more hilly and windy in northern Otago.

Table 7-1 Crash types and severities for heavy vehicle crashes along the route.

Crash type	Minor	Serious	Fatal
A - Overtaking and Lane change	32	10	3
B - Head On	28	19	10
C - Lost Control or off road (straight roads)	96	22	5
D - Cornering	76	14	5
E - Collision with Obstruction	20	5	1

Crash type	Minor	Serious	Fatal
F - Rear end	100	10	0
G - Turning versus same Direction	24	5	1
H - Crossing (No turn)	32	7	0
J - Crossing (Vehicle turning)	33	6	1
K - Merging	11	1	1
L - Right turn against	32	8	2
M - Manoeuvring	17	4	2
N - Pedestrians crossing road	16	2	0
P - Pedestrians other	0	0	0
Q - Miscellaneous	4	1	0

The truck crash data has been pulled out from the proposed routes within Lyttelton to Dunedin with 68 minor injury crashes, 31 serious injury crash and 12 fatal crashes as seen in Table 7-2.

Table 7-2 Proportion of truck crashes to all vehicle crashes for Lyttelton to Dunedin route.

Vehicle type	Minor	Serious	Fatal
All	529	117	31
Truck	68	31	12

It is noted that along the route, there is a slightly higher density of fatal crashes involving heavy vehicles at the Rakaia Bridge on SH1. The bridge is noted to be narrow with a high volume of traffic of 14,875 vehicles per day and 15% Heavy vehicles (MobileRoads). The two fatal crashes that have occurred on the bridge involved light vehicles overtaking slow traffic and colliding head onto oncoming trucks.

Many of the fatal crashes have occurred on rural roads on the route and high percentage of reported crashes involving light vehicles where the drivers had crossed the centre line. Key crash factors include 39% of crashes related to poor observation, 26% of crashes related to alcohol.

Based off the assessment, the route from Lyttleton to Dunedin is deemed safe for over-dimensioned vehicles with no historic safety impacts along the route and the additional traffic generated using the routes would not adversely affect the existing safety of the road.

D

Appendix D – Draft Construction Traffic Management Plan

Appendix D - Puke Kapo Hau Construction Traffic Management Plan

Construction Travel Management Plan

Prepared for Mercury NZ Ltd
Prepared by Beca Limited

8 October 2025

Contents

Appendices

Revision History

Revision N°	Prepared By	Description	Date
2.0	Alex Dean	For substantive application	08/10/2025

Document Acceptance

Action	Name	Signed	Date
Prepared by	Alex Dean	[redacted]	08/10/2025
Reviewed by	Andrew Stevens	[redacted]	08/10/2025
Approved by	Megan Taylor	[redacted]	08/10/2025
on behalf of	Beca Limited		

1 Introduction

1.1 Introduction

Tararua Wind Power Limited ("TWP"), a fully owned subsidiary of Mercury NZ Limited, is progressing Stage 2 of the Mahinerangi Wind Farm which is to be known as "Puke Kapo Hau" ("the Project", "Puke Kapo Hau" or "MWF Stage 2").

This Draft Construction Traffic Management Plan (CTMP) has been prepared to support resource consent applications for Puke Kapo Hau. An existing land use resource consent is held for the wind farm, however the proposed layout and specification requires a variation to this resource consent under s42(4)(b) of the Fast-track Approvals Act 2024. Additionally, new land use resource consents are required for a transmission line connection between the wind farm and the National Grid, and associated infrastructure.

The existing land use consent contains multiple resource consent conditions that will continue to apply to Puke Kapo Hau (conditions 61-68 inclusive). In particular, condition 61 sets the requirement to prepare a Traffic Management Plan prior to construction commencing, as well details of what the plan will cover.

This draft CTMP outlines the procedures to be followed by TWP and its subcontractors during the construction of Puke Kapo Hau. As a draft CTMP it will be updated as design of the wind farm proceeds.

The plan specifically addresses transportation activities related to the construction of internal roads, wind turbines, transmission lines, Battery Energy Storage System (BESS) and substation, including the delivery and commissioning of equipment. The procedures outlined within are designed to aid the safe and efficient operation of the local road network throughout the duration of the construction phases of the project.

1.2 Location of Wind Farm

The site is located near Dunedin, Otago, in the South Island of New Zealand. The wind farm is situated on the eastern foothills of the Lammermoor Range, approximately 5km north of Lake Mahinerangi and 50km west of Dunedin City, within the Clutha District Council jurisdiction.

1.3 Traffic Management Plan Operational Period

This draft CTMP will remain valid for the duration of the construction of Puke Kapo Hau . The draft CTMP will be finalised prior to the start of the construction period.

1.4 Purpose of a CTMP

The draft CTMP sets out the approach, standards, and measures to effectively address the traffic impacts associated with construction activities for the duration of Puke Kapo Hau. It aims to avoid, reduce, manage, or mitigate these effects. The draft CTMP outlines general strategies to mitigate the effects of construction traffic on road users, including public transport, pedestrians, cyclists, local residents, and businesses. However, as the project is still subject to a variation to the existing consent, some information was unavailable at the time of drafting and will require updating and finalisation post consent during detailed design. The contractor leading the detailed design phase will be responsible for updating the draft CTMP to include exact dates and specific information as it becomes available.

Phasing of the events and critical dates will be detailed as the project nears the implementation stage prior to construction.

Key Objectives:

- Establish a preliminary framework and outline initial findings for the draft CTMP, which will be refined and finalised before construction of Stage 2 begins. The finalised CTMP will remain active for the entire construction period and will serve as the primary tool for managing construction traffic effects.
- Create a basis for developing Site-Specific Traffic Management Plans (SSTMPs), Base Condition Report (BCR), Maintenance Standard Report (MSR), and Corridor Access Requests (CARs). These documents will enable physical works within the road corridor upon approval by the relevant Road Controlling Authorities (RCAs). The draft CTMP aligns with the Traffic Effects Assessment (TEA) prepared by Beca.

2 Traffic Movement / Flows

2.1 Proposed Routes

The traffic movements for the construction works will predominately consist of the transportation of materials for the construction of Stage 2 of the wind farm (cement, concrete, aggregates, and steel). Currently, routes from three ports including Port Chalmers, Dunedin (Route 1), Lyttelton Port, Christchurch (Route 2) and South Port, Bluff (Route 3) have been assessed as potential options for the importation of the required construction materials and components. The exact route that the construction traffic and associated vehicles will originate from will be confirmed at the detailed design stages of the project.

It is expected that in order for the wind farm components to travel from one of the designated ports to the site, they will predominately travel along the state highway network with travel on various sections of local road networks required for short sections, particularly as the construction traffic gets closer to the development site.

As per the TEA the potential construction travel route options are shown below in **Figure 2-1**.

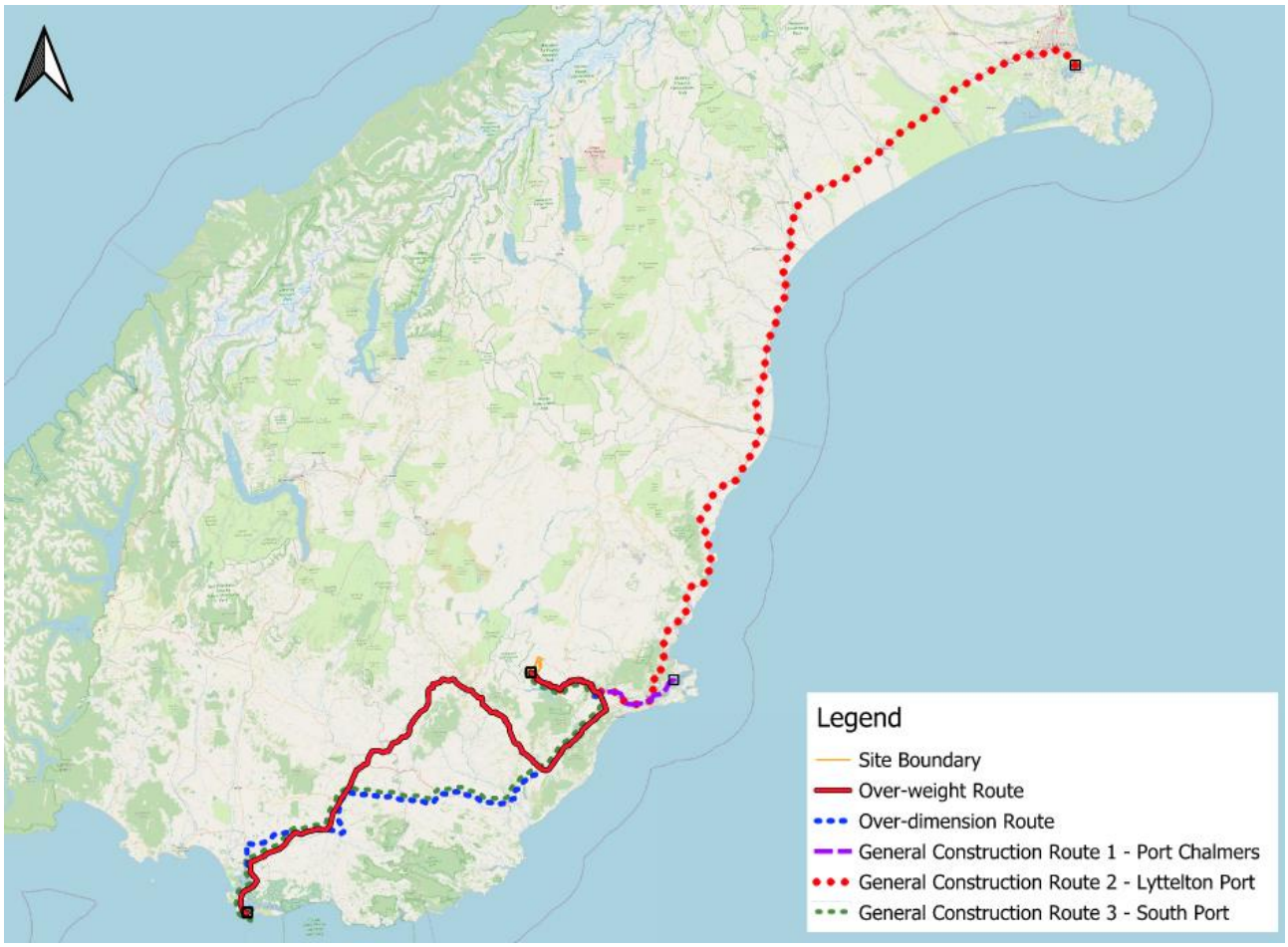

Figure 2-1 Potential construction travel routes from Bluff. Dunedin, and Christchurch

2.2 Overhead Powerlines

Areas of low-hanging powerlines along the route will be identified later in the detailed design stages of the project. Mitigations to reduce the adverse effects on the wider power network have been identified including providing rubber skid rails to be installed on relevant over-dimension loads to safely navigate under the powerlines. If skid rails are not sufficient, additional measures can be implemented following discussions with

the relevant power companies within the regions. PowerNet and Aurora Energy will provide further details after high-load permits are submitted and the proposed routes are assessed. PowerNet requires a minimum notice period of 20 working days, while Aurora Energy requires at least 12 working days to review the route and determine any necessary mitigation measures.

2.3 Detailed Design Stage

Throughout the proposed construction traffic routes there are various locations where some street signage will be required to be temporarily removed or swung out of the way of the over dimension vehicle as the tracking paths may exceed the existing envelopes on these roads both overhead and at ground level. The exact location of these improvements will be identified at the detailed design stage when vehicle tracking analysis should be used to accurately identify areas and infrastructure that poses a challenge for the tracking of the transporter vehicle.

2.4 School Bus Routes

While there are no school bus routes directly adjacent to the wind farm site, many schools and bus routes along the potential construction traffic routes may be impacted by transport activities associated with the project. All school principals along the route will be communicated with to advise of the timing and extent of oversize and overweight traffic movements. To help reduce conflicts for children boarding and alighting school buses, one approach could be offering site radios to drivers in areas where overweight and overdimension construction traffic overlaps with bus routes. This would enable direct communication with pilot vehicles, helping to coordinate the movement of wind farm components past buses when all children are on board.

Additionally, any adjustments to the proposed scheduling of transportation activities that could affect school bus stops along the construction routes must be promptly communicated to the affected school communities, reducing disruption, and maintaining safety as a priority.

2.5 Vehicle Speeds

All vehicles will adhere to the signposted speed limits and restrictions on public roads while travelling to and from the wind farm. Over-dimension and overweight vehicles, however, may travel at slower speeds than the posted limits, with their maximum speed capped at 90 km/h. However, in many cases, these vehicles are expected to move significantly slower, which could cause frustration for other road users. To minimise disruption, appropriate traffic management measures will be implemented such as travelling outside of peak traffic times, the use of pilot vehicles to control the movement of the transporters and warn oncoming and following traffic of the slower speed and limited overtaking opportunities. In some instances passing/stopping bays may be installed in agreed locations where considered necessary by the road controlling authority in line with Condition 61 (ii) e.

When travelling within the wind farm site on the proposed access tracks, vehicles shall not exceed the speed limit set by the head contractor and/or local authorities.

2.6 Construction traffic operation hours

In line with Condition 61 (iii), during the construction phase, heavy goods transport and oversized vehicles accessing or leaving the site will be limited to using Mahinerangi Road and El Dorado Track, and to the daytime hours of 6:00am to 10:00pm daily. Laybys for temporary parking may be required for over-weight / over-dimension loads that would otherwise access the site outside of these times. These laybys will need to be arranged prior to departure and agreed with between the transporter and the RCA.

2.7 Light Vehicle Movements

It is estimated that, during the construction phase, there will be an average of 80 light vehicle movements per day to accommodate the 150 construction workers expected per day. Peak traffic is expected to occur at the start and end of the workday, between 6:30am and 8:00am, and again from 4:30pm to 6:00pm. This will primarily consist of private vehicles and vans, with construction staff carpooling to and from the site. These movements will take place from Monday to Saturday.

2.8 Traffic Flows

A summary of the expected heavy vehicle movements is shown below in **Table 2-1**.

Table 2-1 Heavy Vehicle Movements

Activity	Consented Real-world Layout (veh)	Proposed Layout (veh)	Probable Origin
Turbines			
Tower Sections	188	176	South Port
Nacelles	47	44	South Port
Blades	141	132	South Port
Hubs/Nose Cones	47	44	South Port
Ancillary Equipment	188	176	South Port
Subtotal	**611**	**572**	
Foundations			
Concrete	430	510	Dunedin, Lee Stream Quarry
Water	125	147	Dunedin
Reinforcing Steel	78	73	Dunedin
Structural Fill and Platform	1,880	2,475	Dunedin, Lee Stream Quarry
Subtotal	**2513**	**3205**	
Roading			
Base Course	4,690	2,990	Dunedin, Lee Stream Quarry
Drainage	31	29	Dunedin
Subtotal	**4,721**	**3,019**	
General			
Mobilisation	125	117	Dunedin
Demobilisation	125	117	Dunedin
Civil Miscellaneous	157	147	Dunedin
Consumables	470	440	Dunedin
Site Facilities Platforms	292	386	Dunedin
Water	1,565	1,565	Dunedin
Subtotal	**2,734**	**2,772**	
Total trips for components and materials which have been assessed under the existing resource consent	**10,579**	**9,568**	

BESS			
Supply and install units	N/A*	42	Port Chalmers, Lyttelton or South Port
Pavement	N/A*	70	Dunedin, Lee Stream Quarry
Subtotal	N/A*	**112**	
Transmission Line			
Transmission Towers	N/A*	125	Port Chalmers, Lyttelton or South Port
Supplementary Material	N/A*	25	Port Chalmers, Lyttelton or South Port
Tracks and Pads	N/A*	550	Port Chalmers, Lyttelton or South Port
Subtotal	N/A*	**700**	
Substation			
Transformer	N/A*	2	South Port
Foundations	N/A*	64	Dunedin
Subtotal	**N/A***	**66**	
Total trips for components and materials assessed for the new land use resource consent	**N/A***	**878**	

*These activities were not consented under the existing resource consent and therefore they have not been assessed under the “Consented Real-world Layout”.

3 Road Improvements and Maintenance

3.1 Road improvements

Constraints affecting the movement of large over-dimension and over-weight vehicles required for transporting construction materials and wind turbine components have been identified along the roads designated as potential construction traffic routes. However, various mitigation measures are available to address these challenges including modifications to the road network or tailored strategies such as specific vehicle selection and vehicle tracking to facilitate the safe and efficient passage of large construction vehicles.

The Balclutha Bridge is likely to be used for the transport of the wind turbine blades due to tracking restrictions on alternative routes. The north end of the Balclutha Bridge is constrained, with existing vehicle tracking showing a small margin for clearance. The careful selection of transporter trailer, and specific vehicle tracking movements are required to provide enough clearance to avoid any damage to the bridge or parapets.

Additional details about the potential roading upgrades will be incorporated into the final CTMP during the detailed design phase, once exact construction traffic routes have been finalised.

3.2 Road maintenance

TWP have obligations for the maintenance of the road network affected by the construction traffic associated with the wind farm expansion. These are outlined as conditions of consent which are described in the TEA and shown in **Table 3-1**.

Table 3-1 Transport specific conditions of consent

Number	Conditions of Consent
61	A Construction Traffic Management Plan shall be prepared and submitted by the consent holder to the Chief Executive of Clutha District Council before any access to the site by construction traffic begins. The purpose of the Construction Traffic Management Plan will be to set out and detail the extent and timing of construction traffic activity, and any temporary traffic management provisions to be put in place during this time. The Construction Traffic Management Plan shall include the following requirements:
61 i)	The plan shall be prepared after consulting with NZ Transport Agency Waka Kotahi as road controlling authority and shall implement the outcome of that consultation.
61ii)	Set out the nature and timing of local physical improvement works to be undertaken on the roading network at the consent holder's cost to accommodate access to the Mahinerangi Wind Farm. These works shall include the following as a minimum: a. The upgrading of routes used for transport of materials by other than light vehicles to ensure the safe operation of the road including works to ensure that two vehicles (other than over-dimension vehicles) can safely pass each other based on vehicle tracking that is consistent with the operating speed of the road. b. The upgrading of routes used for transport of over-weight and over-dimension vehicles to provide for the swept path of vehicles on horizontal curves. c. The upgrading of local access routes used for transport of materials by heavy vehicles (defined as vehicles that require a heavy vehicle licence to operate) to an all-weather surface where necessary and only on those uphill sections of the routes heading towards the Mahinerangi Wind Farm with gradients 10% or steeper.

Number	Conditions of Consent
	d. The provision of school-bus bays beyond the traffic lane at all pickup and drop-off points on routes used for transport of materials by other than light vehicles. e. The installation of suitable passing/stopping bays, in agreed locations, if considered necessary by the road controlling authority.
61 iii)	Detail the intended traffic arrangements and provisions for the delivery of over-weight and over-dimensioned major components to the site, including any time restrictions for the movement of over-weight and over-dimensioned vehicles. No heavy construction traffic will access the site except via Mahinerangi Road and Eldorado Track and between the hours of 6.00 am and 10.00 pm. This does not prevent the use of any other roads between the port and State Highway 87 outside these hours. This may require the development of a layby for temporary parking of such vehicles before they reach Mahinerangi Road.
61 iv)	Manage construction traffic (other than component delivery by over-dimension and over-weight vehicles) during the construction phase. This shall include as a minimum: f. Identification of all roads within Clutha District that are to be used by construction traffic (Waipori Falls Road shall not be used for any construction traffic). g. The provision for the notification of the principals of all schools along routes to be used by construction traffic of the commencement and cessation of seasonal construction periods. h. The provision for dust suppression on the routes used for the transport of goods to the site. i. Ensuring that all construction traffic within Clutha District utilises those roads that have been identified for use by construction traffic in the Traffic Management Plan. j. Ensuring that all heavy vehicles associated with construction are clearly identified with labels to confirm that they are associated with the Mahinerangi Wind Farm to facilitate the monitoring of vehicle movements. The labels shall also provide a phone number to enable any complaints to be made. k. The management practices to be adopted to avoid conflict with stock droving on the affected roads.
62.	The existing condition of all roads to be used by construction traffic, other than light vehicles, in Clutha District (as identified in the Traffic Management Plan) shall be investigated and reported upon in a Base Condition Report that shall be prepared by the consent holder. The Base Condition Report shall contain information including classified traffic counts, high speed data capture, system recording - profile, texture and roughness and falling weight deflectometer. The Base Condition Report shall identify the existing condition of roads, those roads that require upgrading, potential remedial works during construction, and monitoring requirements during and at the end of the construction period. A Draft Base Condition Report shall be lodged with the Chief Executive of the Clutha District Council not less than nine months prior to the commencement of construction works at the project site.
63.	The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Base Condition Report and to certify its adequacy prior to the Base Condition Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder.
64.	The consent holder shall be responsible for the maintenance of roads subject to the Base Condition Report for the duration of the construction period except for any maintenance, repairs or reconstruction of these roads arising from unusual or extreme weather events. The consent holder shall prepare a Maintenance Standard Report that will detail the minimum level of service to be provided by the consent holder on the roads. A Draft Maintenance

Number	Conditions of Consent
	Standard Report shall be lodged with the Chief Executive of Clutha District Council not less than nine months prior to the commencement of construction works at the project site.
65.	The Chief Executive of Clutha District Council may appoint a technical peer reviewer to review the Draft Maintenance Standard Report and to certify its adequacy prior to the Maintenance Standard Report being formally accepted by the Chief Executive and construction works commencing at the project site. The cost of retaining the services of the technical peer reviewer shall be met by the consent holder. The Chief Executive may require the consent holder to produce an Additional Base Condition Report during the construction period, where road condition appears to be worse than determined in the Maintenance Standard Report. The Additional Base Condition Report may be subject to review by a technical peer reviewer, with the cost met by the consent holder.
66.	For the avoidance of doubt, the consent holder will only be responsible for the costs of maintenance of the roading network to the extent that the costs are additional to those that would be anticipated by Clutha District Council in the normal course of events (ie the consent holder will pay a reasonable proportion of the costs of maintenance required as a result of the use of the roads by wind farm construction traffic).
67.	The consent holder shall be responsible for preparing a Post-construction Condition Report at the conclusion of construction works with respect to all roads subject to the Base Condition Report. A Draft Post-construction Condition Report shall be lodged with the Chief Executive and shall provide data with respect to road conditions that is consistent with that contained in the Base Condition Report. The Post-construction Condition Report may be reviewed by a technical peer reviewer at the cost of the consent holder prior to the Post-construction Condition Report being formally accepted by the Chief Executive.
68.	The consent holder shall ensure that roads subject to the Base Condition Report are restored to a standard that is consistent with or exceeds the condition recorded in the Base Condition Report.

3.3 Dust Control

The contractor shall work closely with the person in charge of temporary traffic management to apply dust suppression measures ahead of planned trips. They should also follow any additional guidance provided, including localised speed restrictions, to minimise dust impacts effectively.

Additionally, the operator is required to prepare a Temporary Traffic Management Plan (TTMP) for the operation of water carts on the road. This plan shall align with the procedures outlined in the New Zealand Guide to Traffic Management (NZGTTM). The operator should keep a copy of the approved plan readily available at all times during operations.

4 Stock Droving

There are eight identified landowners with properties bordering Mahinerangi Road between SH87 and three along Eldorado Track, all of whom regularly move stock along these key transport routes. Without proper management, increased construction traffic could disrupt normal stock movement practices.

Before construction begins, the Traffic Management Coordinator will consult with landowners to confirm sections of the transport routes where stock movements occur, noting typical times, durations, and key landowner contact details.

To facilitate ongoing coordination, the Traffic Management Coordinator's contact details could be provided to all affected landowners. This will maintain open lines of communication regarding stock movement schedules, allowing for effective management throughout the project.

5 Construction Methodology

For the local road improvements, the assumed construction sequence is as follows:

- Design approval and Council permits including submission and approval of CARs including CTMPs for maintenance and construction works with the local road corridors
- Establishment of traffic management controls
- Survey and set out
- Establishment of construction crews
- Establishment of environmental controls
- Fencing (temporary as and if required)
- Earthworks and Pavement construction
- Testing
- Sealing or cement stabilising (where specific)
- Permanent and or temporary signage as required
- Dis-establishment

Primary Works – Main Construction Works

- Establishment of environment controls
- Establishment and Disestablishment of the Site Compound Area
- Establishing and Disestablishing of Concrete Batching Plants
- Construction of access tracks to proposed wind turbine locations
- Installation of stormwater drainage
- Construction of wind turbine tower foundation including steel and concrete works
- Construction of hardstands for construction cranes for wind turbine assembly
- Construction of Operational and Maintenance Facilities
- Construction of a Substation
- Construction of overhead powerlines

Programme

The programme is yet to be confirmed but will be identified following the detailed design stages of the project.

6 Driver Protocols

All drivers involved with the project will be required to undertake an on-site induction. This induction will include a briefing around the specific driver protocols detailed below for this project and provide evidence of their license and competence in operating the plant, equipment, or task they will be undertaking for the project.

All matters relating to the use of state highway network, local, and site roads will be conveyed to vehicle operators, drivers, and all other project personal, including contractors as part of daily site pre-start induction meetings.

All drivers involved in the project are subject to specific protocols when travelling along the district roads. These will be aimed at ensuring safe driving practices and full compliance with the law, including speed limits, appropriate following distances, observing any engine braking restrictions, and affording priority to other traffic.

Legal speed limits will need to be followed by drivers travelling to and from the site on the public road network, maximum on-site speed limits will be imposed by TWP once on-site work commences.

6.1 Over-dimension and Over-weight Loads

All oversize loads will be planned and approved prior to transporting using the New Zealand Transport Agency Waka Kotahi (NZTA) over-dimension and over-weight processes detailed on their website. It will be the responsibility of the transporting company to obtain these permits and submit approved application forms prior to transportation and delivery of to ensure the above minim overarching processes are adhered to.

The key oversize vehicles will consist of:

- Turbine blades transporter vehicles
- Turbine components transporters
- Transformer transporter

The key over-weight vehicles will consist of:

- Transformer transporter

There is expected to be a total of 132 blades transported to the site all of which will be transported individually on their own vehicle.

There is expected to be a total of two transformers transported to the site both of which will be transported individually on their own vehicle.

7 Signage

Any additional signage required for works shall be installed at strategic locations which will provide information for construction traffic and a warning for local road users of the presence of heavy traffic. This will be the responsibility of the contractor under the TTMP, which is required to be agreed upon with the RCA prior to works commencing.

The information signs shall provide information advising road users of the presence of construction traffic, contractor phone numbers, and any relevant traffic restrictions/hazards on the site.

Temporary Traffic Management Transport Route

At least 15 working days prior to commencement of construction works a TTMP will be prepared and submitted to the RCA in the region. Two of which are confirmed which include:

- New Zealand Transport Agency Waka Kotahi (NZTA)
- Clutha District Council (CDC)

All temporary traffic management will be supplied, installed, and managed as per NZGTTM. NZGTTM must be applied to any activity that varies the normal operating conditions of the road reserve.

1. All activities must be managed in terms of an approved Traffic Management Plan (TMP).
2. Temporary Traffic Management (TTM) must be installed before any work activity commences.
3. Worksites must be always under the control of a Site Traffic Management Supervisor (STMS).
4. For attended worksites, the STMS may delegate site control to an inspector.

8 Monitoring and Reporting

Monitoring of public roads and traffic management will be undertaken and will be the responsibility of the construction work manager and STMS associated with this project.

8.1 Incident Reporting

Accident / Incident Reporting and Investigation

All visitors and construction works are required to report any event or circumstance that could or did result in:

- An injury
- Damage to the environment
- Damage to property or equipment
- An uncontrolled or new hazard or hazardous situation
- Lost production time
- Adverse effect on product quality
- Customer or external party complaint.

All employees working throughout the construction period of the wind farm are authorised to stop any process that could result in any of the events above until such time as adequate corrective action has been taken.

All event / issues reports are passed to the person who looks after the administration of Quality, Safety, and Environmental outcomes on site. All incidents (including near misses) are investigated in accordance with the contractor's procedures. All reports are required to be loaded / stored in order to develop a risk register, giving all employees a chance to learn from the incidents and potentially prevent them occurring in the future.

Crashes / Incidents at Worksites

All vehicle crashes, including those involving public vehicles, or any near misses must be reported immediately to the project manager. Within 24 hours (One working day), an accident investigation report will be completed and sent to the customer's representative. If evidence of a crash is found at the worksite—such as broken headlight glass or damaged equipment—a crash report must still be prepared.

The project manager and STMS are responsible for thoroughly reviewing all traffic control measures and equipment to identify opportunities for improvement. Serious incidents, particularly those involving injuries, must be reported immediately to the Consent Holder's Project Manager and the Chief Executive of Clutha District Council. Additionally, any notifiable incidents or injuries must be promptly reported to WorkSafe.

The crash register will be reviewed weekly by the project manager, with all corrective actions documented. Once updated, the register will be forwarded to the Chief Executive of Clutha District Council on a weekly basis, ensuring accountability and continuous safety enhancements.

9 Communications

Stakeholders

The following local stakeholders have been identified in Table 9-1.

Table 9-1 Stakeholder communication

Stakeholder	Format of Communication
Road Users	Signage as approved through TMP
Residents in the local area	Letter drop with contact person
Schools	Letter drop to principals
Major Forest owner	Letter drop with contact person

When stakeholders are impacted by construction related traffic they will be engaged with according to their specific level of impact they experience, including the following:

- Low Impact: Minimal disruption, such as minor changes to usual traffic flow or short duration increase in noise. Stakeholders receive general updates and accessible communication channels for inquiries through temporary traffic management signs.
- Moderate Impact: Noticeable disruptions, including temporary delays, and altered access routes. Stakeholders are engaged through regular updates, detailed notices, and opportunities to ask questions or provide feedback.
- Significant Impact: Significant interference, such as long-term road closures, restricted property access, or heavy congestion. Stakeholders are actively engaged through personalised communication, meetings, and tailored solutions to reduce inconvenience.

Stakeholders who are significantly affected may be invited to be involved in planning any activities that will influence them wherever possible. For those indirectly affected or impacted in terms of access, providing clear information about the activities, along with contact details, inviting them to share any concerns or insights that could assist in coordinating efforts.

Any complaints or concerns raised will be promptly investigated and recorded through a Non-Conformance Report. Corrective actions shall be identified to address and resolve these issues effectively. Open communication and proactive problem-solving remain key priorities.

Meetings

Meetings form an important part of the project communication process. The following Table 9-2sets out the minimum requirements for meetings - contract requirements may specify additional requirements.

Table 9-2 Meeting schedule

Meeting	Minimum Frequency	Who Should Attend
Contract Meeting	As required	Engineer to contract or engineers Representatives Project Manager, may include subcontractor representatives
Planning Meeting	Weekly	Project Manager – Foreman Subcontractor representatives
Toolbox	Weekly	Team leads, attended by entire work team
Daily Briefing & Hazard ID	Daily	Team leads, attended by entire work team

Reporting

Reporting is an important part of keeping the wider team informed, and a critical part of governance oversight. Table 9-3 lists reports required for the duration of this contract.

Table 9-3 Reporting frequency

Report	Frequency	Purpose
Daily Job Record	Daily	Record plant, equipment and workforce on site
Weekly Report	Weekly	Summarise progress, issues and incidents Include photos where possible
Monthly Report	Monthly	Project manager – Foreman Subcontractor representatives

Feedback

Promoting strong performance and accountability within the team should be achieved through obtaining stakeholder feedback. Commuter behaviour on-site will be monitored to identify any areas requiring adjustment. Observed issues will be addressed promptly to uphold a high level of understanding, acceptance of construction works, and compliance with TTM standards.