Sustainable action for a better tomorrow

The ENA and associated South Island EDBs

South Island EV Journey Charging Project – Methodology Report

Final Report

24/02/2025

Revision	Date	Revision Details	Author	Verifier	Approved
1	3/12/2024	Initial Report	HOC	DT	BS
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Contents

1. Glossary

EV	Electric Vehicle
DC	Direct Current
EDB	Electricity Distribution Business
CPO	Charge Point Operator
AADT	Annual Average Daily Traffic
CCC	Climate Change Commission
EECA	Energy Efficiency and Conservation Authority

2. Project Details

2.1 Project Background

The New Zealand Government has committed to installing 10,000 public electric vehicle charging points across the country by 2030. Achieving this ambitious target requires thoughtful and informed decisions regarding the location and capacity of charging points to enable efficient investment in infrastructure. To date there has been no detailed analysis to identify suitable locations for these charging points, with respect to both traffic patterns and networks' available electrical capacity. A two-stage study was conducted to address this gap.

2.2 Stage 1: Modelling Charging Demand

DETA has completed a South Island wide analysis of light vehicle traffic flows using daily NZTA through-traffic data for major traffic routes to identify areas where charge points will be needed to service 2030 EV journey charging demand. Average, peak and 90th percentile traffic flows in each location were analysed to ensure the charging points will cope during peak traffic seasons.

This analysis focuses only on light vehicles (less than 3.5 T) and journey charging needs. This demand forecast does not aim to meet the charging needs of local traffic in the area charging publicly or any drivers using destination charging. Current DC charging capacity in each location has been removed from the total forecasted demand, however in some circumstances this capacity will be classified as destination charging, rather than journey charging.

2.3 Stage 2: EDB Engagement

On completion of modelling 2030 charging demand, DETA engaged with EDBs to gain information about the available electrical capacity on their network to meet the forecast demand. Information regarding available transformer capacity to meet the forecast demand and high-level connection costs was sought.

The provided data enabled the production of a map showing transformers in each location with spare capacity and their indicative connection costs.

2.4 Document Purpose

This document provides a description of the assumptions and methodology used for calculating forecast traffic charging demands and how EDBs were engaged to gain transformer and costing data.

A summary of each section follows:

- Modelling Assumptions: States assumptions and data used in the forecast demand model.

- Modelling Methodology: Step by step process of how the demand forecast was built, broken down into location and traffic monitoring site selection, traffic analysis, and demand forecast.
- EDB Engagement Approach: Description of information requested from EDBs.
- Appendices: Supporting information on the choice of traffic monitoring sites, EV uptake forecast, turn-in rates, average battery capacity and current charging capacity.

3. Modelling Assumptions

3.1 Key Assumptions

- 2021 quarter hourly traffic counts[1] were used for modelling purposes as they were the most recent and complete annual data available for traffic flows. 2021 daily traffic counts[2] were used to calculate the peak and 90th percentile traffic days.
    - This detailed data was used for high-resolution traffic profiles in the model and the traffic forecast generally correlated well following checks using NZTA AADT for 2023, see Appendix A.5. In locations where discrepancies were larger than 15% (primarily due the effects of Covid-19), individual adjustment factors were overlaid to align with NZTA data.
    - When comparing peak traffic days in 2021 with 2022 and 2023 data there was little difference. This traffic analysis could be reviewed following the publication of more recent data.

- Local population data used to determine turn-in rates were taken from the 2023 census[3]

- The current charging capacity (DC chargers 25 kW and over) at each location was subtracted from the total 2030 demand forecast to calculate required additional charging demands. This assumes that all current DC chargers are used as journey chargers, and not by locals, or as destination chargers. This approach may underestimate the charging demand needed in 2030 and could be resolved through the provision of charging data to allow for a better understanding of charging behaviours. Current charging capacity data were retrieved from:
    - NZTA Journey Planner[4]
    - ChargeNet NZ[5]
    - PlugShare[6]
    - Tesla FindUs[7]

- The annual traffic increase is assumed to increase in-line with New Zealand's forecast economic growth rate of 3% pa[8].

[1] TMS traffic quarter-hourly: Oct 2020 to Jan 2022 | Waka Kotahi open data
[2] TMS daily traffic counts CSV | Waka Kotahi open data
[3] Place and ethnic group summaries - Stats NZ
[4] EV Chargers | NZTA Journey Planner
[5] Find your local EV charging station | ChargeNet
[6] EV Charging Station Map | PlugShare
[7] Find Us | Tesla
[8] Regional Economic Profile | New Zealand | Economic growth

- 10% of the NZ light vehicle fleet will be BEV in 2030. This number is an average of EECA's TIMES-NZ TUI and TIMES-NZ KEA models and the CCC's model for the percentage of EVs in the national light vehicle fleet. 10% is seen to be optimistic at this stage due to the reduced uptake in recent years attributed to the removal of government financial incentives.

- Average light EV battery capacity will be 70 kWh based on current NZ EV market share[9].

- EVs will stop and charge their battery for an average of 30% of battery capacity based on provided NZ public charging data, giving an average energy delivered per charge of 21 kWh.

- Turn-in rates for each location were estimated based on the distance traffic monitoring sites were away from a 'medium' or 'major' town. It was assumed that the closer a monitoring site is to a larger town, the lower the turn-in rate would be as the respective town is more likely to be a destination rather than a stop on a driver's journey. Distances were calculated using google maps.

3.2 Additional Data Sources

- NZTA state highway traffic monitoring sites[10]
- EECA light EV uptake forecasts[11]
- CCC light EV uptake forecast[12]

[9] EV Market Stats 2024
[10] State highway traffic monitoring sites
[11] New Zealand Energy Scenarios TIMES-NZ 2.0 | EECA
[12] Ināia tonu nei: Modelling and data » Climate Change Commission

4. Modelling Methodology

The modelling method consists of three stages:

- Location and traffic monitoring site selection
- Traffic analysis
- Demand forecast

4.1 Location and traffic monitoring site selection

1. Locations on state highways around the South Island were analysed in terms of journey charging suitability. A maximum of six locations per EDB were selected based on distance apart from each other (minimum of 20 km between locations and maximum of 100 km), and a qualitative assessment of where drivers are most likely to stop on trips in-between destinations in terms of amenities and route. Locations were selected and collated, with 2-6 locations per EDB, and sent to CPOs and EDBs for feedback.

2. Once the locations were confirmed, NZTA traffic monitoring sites were selected to provide traffic data for modelling. These sites were chosen using the following criteria:
    a. The monitoring site must count both lanes of traffic. One exception was made for the stretch of State Highway 1 around the Christchurch airport. There was no monitoring site that counted both lanes adequately, so a monitoring site for each lane was used at similar points on the highway.
    b. The site must be at least 5 km away from a town centre to help minimise the impact of local travel. While a minimum of 5 km was targeted, sites are chosen on a case-by-case basis, so some will be located within this distance due to lack of other adequate sites. The list of monitoring sites used can be found in Appendix A.1.
    c. The site must have the highest annual average daily traffic (AADT) total out of each of the sites on the state highways passing through or leading to a town. The maximum AADT would give a conservative basis (highest volume of traffic) for charging demand which is desired. In most cases, a traffic balance around the town adds up to this maximum traffic count when there are multiple state highways passing through or leading to a town

3. For each chosen traffic monitoring site, the AADT for 2021 and 2022 were compiled.

4.2 Traffic analysis

1. For each monitoring site, average daily traffic profiles for each month of 2021 were calculated using quarter hourly data from the NZTA traffic monitoring site information. The quarter hourly data were converted to half hourly data.

2. The average of daily profiles for each month was calculated to get an average 2021 daily traffic profile for each site.

3. Daily traffic profiles were forecast out to 2030 using the 2021 average annual traffic profile and an assumed traffic growth rate of 3.0% pa.

4.3 Demand forecast

1. To estimate the average EV charging demand, the 2030 average daily traffic forecast for each site was multiplied by the following parameters:
    a. 10% EV uptake, based off the average of the EV penetration in the national light vehicle fleet models from the CCC and EECA's TIMES-NZ TUI and TIMES-NZ KEA models. See Appendix A.2 for further detail.
    b. A turn-in rate dependent on the distance of the monitoring site from the town (percentage of EVs stopping to charge over total EVs driving past). See Appendix A.3 for details.
    c. Average battery capacity of 70 kWh. See Appendix A.4.
    d. Average battery charge of 30%. See Appendix A.4.

2. Peak and 90th percentile factors:
    a. The peak daily total traffic count in 2021 was identified (2022 peak traffic count was used where there was lack of recorded data in 2021).
    b. The yearly 90th percentile daily traffic count for 2021 was calculated (2022 peak traffic count was used where there was lack of recorded data in 2021)
    c. The peak day factor was calculated by taking the 2021 peak daily traffic count over the 2021 AADT (2022 data used where necessary).
    d. The 90th percentile factor was calculated by taking the 2021 90th percentile daily traffic count over the 2021 AADT (2022 data used where necessary).

3. Peak and 90th percentile charging demand:
    a. Peak charging demand forecast was calculated by multiplying the average EV demand profile for 2030 by the peak day factor. This forecast was compared to a selection of actual peak days for various traffic monitoring sites and corresponded well.
    b. 90th percentile charging demand forecast was calculated by multiplying the average EV demand profile for 2030 by the yearly 90th percentile factor.

4. RFI data:
    a. The 2030 **total** charging demand for each location used in the RFI was taken as the highest charging demand over a day for the 2030 average, peak and 90th percentile forecast.
    b. The 2030 **additional** charging demand was calculated by subtracting current 2024 charging capacity in each location from the total charging demand forecasted. The current charging capacity was a total of all the DC chargers 25 kW and above in each location. A complete list of the current chargers used can be found in Appendix A.5.
    c. The 2024 **total** charging demand for the 2030 average, peak and 90th percentile forecast was also shown, as well as the 2024 **additional** charging demand, by subtracting the current charging capacity available.

5. EDB Engagement Approach

On the completion of modelling the 2030 charging demand in each location, each EDB was sent a Request for Information (RFI). The following information was requested for each location in the EDB:

1. A list of the **top 5 distribution transformers in terms of low connection cost** with spare capacity that can currently meet the **2030 90th percentile traffic day peak additional demand** (rounded up to the nearest 25 kW).

   For each transformer, consideration should be given to the following EECA guideline points around public EV charging hubs:
   - Hubs in highly visible locations on, or adjacent to the highway network.
   - Proximity to customer services such as cafeterias, other food, and toilets.

   For each transformer:
   - The rated capacity and available capacity (kVA)
   - Location
   - Indicative connection cost (+/- $10,000)
   - If the spare capacity on the 5 transformers cannot meet the demand, indicate which transformer(s) that will be easiest to upgrade and provide the upgrade cost (+/- $10,000)

2. Information about current available capacity and plans to upgrade transformers in the next five years.

3. Specific sites where it would be cheap to connect with available capacity, and there is space for cars to charge (e.g. carpark near the council building on West St.).

The Data Template tab included the listed information and a template for EDBs to fill out for each location that did not have negative capacity. An example of the Data Template tab in the RFI can be found in Appendix B.

- 2024 and 2030 total forecasted demand (avg., peak, 90th percentile)
- 2024 DC charging capacity
- 2024 and 2030 additional capacity (avg., peak, 90th percentile)
- Peak time
- Peak/Avg. factor
- 90th percentile/Avg. factor
- Turn-in rate.

It was stated that "Negative 2030 90th percentile additional capacity shows that the model has forecasted that there will be sufficient charging capacity in 2030 in these locations. **Distribution transformer data is not necessary** to find for these places." However, some EDBs have provided upgrade costs for these locations anyway.

Appendix A: Assumptions and Data

A.1 List of Traffic Monitoring Sites Chosen for Each Location

Table 1: Description of the Traffic Monitoring Sites for each Location

Location	Traffic Monitoring Site Description
Blenheim	Koromiko
Picton	Koromiko
Motueka	RIWAKA - Telemetry Site 86
Murchison	MURCHISON - Telemetry Site 35
Nelson	Ruby Bay Bypass
Richmond	Ruby Bay Bypass
Springs Junction	LEWIS PASS - Telemetry Site 32
Takaka	Takaka Hill (Riwaka Valley Rd)
Westport	Westport - Nth of SH 6 Junction
Karamea	Nth of Mokihinui River
Franz/Fox	South of Waiho Flat Rd
Reefton	Reefton - Sth of Inangahua River
Greymouth	Kumara Junction - Nth of SH 73 Junction
Hokitika	Ruatapu - Sth of Township (Bittern Creek)
Punakiki	PUNAKAIKI - Telemetry Site 39 - Just Nth of Canoe Creek
Amberley	WAIPARA - Telemetry Site 52 -(WIM Site)
Cheviot	1.5 km Nth of Hurunui R.
Culverden	Sth of SH7A Junction (Hanmer Turnoff)
Kaikoura	Parnassus - Nth of Leader R.
Akaroa	Robinsons Bay - East of Robinsons Valley Rd
Arthurs Pass	Arthurs Pass Village - Counter Housed Courtesy Dept of Conservation
Darfield	Aylesbury - West of Corner
Rolleston	Burnham - Sth of Burnham Rd
SH1Nth of CHCH airport - Inc	CHCH W Mway btwn Sawyers Arms and Macleans Island - Inc
SH1Nth of CHCH airport - Dec	CHCH W Mway btwn Sawyers Arms and Macleans Island - Dec
Ashburton	Rakaia - Nth of Hatfield Overdale Rd
Methven	Methven - Sth of Reynolds Rd
Fairlie/Geraldine	FAIRLIE - Telemetry Site 98
Lake Tekapo	Nth of Irishman's Creek Rd at ERP
Mt Cook	Lake Pukaki - Nth of SH8 Junction
Timaru	Pareora - Nth of Campbells Rd
Twizel	Pukaki - Sth-west of SH 80 Junction
Oamaru	Glenavy - Nth of Township
Omarama	Omarama past township
Dunedin	Sth Allanton-after Stack St
Alexandra/Clyde/Cromwell	ALEXANDRA - Telemetry Site 44
Queenstown	Between Jacks Point and Lakeside Estate
Tarras	TARRAS - Telemetry Site 110
Wanaka	WANAKA - Telemetry Site 109
Balclutha	Nth Balclutha-before Johnson Rd
Gore	Mataura Sth of SH 96 junction Brydon
Lumsden	Dipton
Te Anau	Mararoa-past Princhester Creek Bridge
Invercargill	Winton
Milford	Homer Tunnel
Haast	Haast - West of Greenstone Creek

Note that *SH1Nth of CHCH airport – Inc* refers to the side of the road where traffic is travelling towards the end of SH1 in Bluff, and *SH1Nth of CHCH airport – Dec* refers to the side of the road where traffic is travelling towards the start of SH1 in Cape Rēinga[13].

A.2 Chosen EV Uptake Forecast

The CCC, TIMES-NZ TUI and TIMES-NZ KEA EV uptake forecasts as a percentage of the total light vehicle fleet can be seen in Figure 1.

Figure 1: CCC, TIMES-NZ TUI, TIMES-NZ KEA, Average of the Three Forecasts, and Average of Times Kea and Tui

TIMES-NZ TUI represents a scenario where climate change is recognised as an important issue among various priorities, with most decisions driven by individual choices and market forces.

TIMES-NZ KEA represents a scenario where climate change is treated as the top priority, with New Zealand intentionally adopting coordinated strategies to transition to a low-emissions economy.

The current proportion of BEVs in New Zealand's light vehicle fleet is 1.8%[9], at 78,404 vehicles. The increase in number of BEVs within New Zealand's light vehicle fleet from 2017-2024 (year to date) can be seen in Figure 2.

[13] Traffic monitoring for state highways | NZ Transport Agency Waka Kotahi

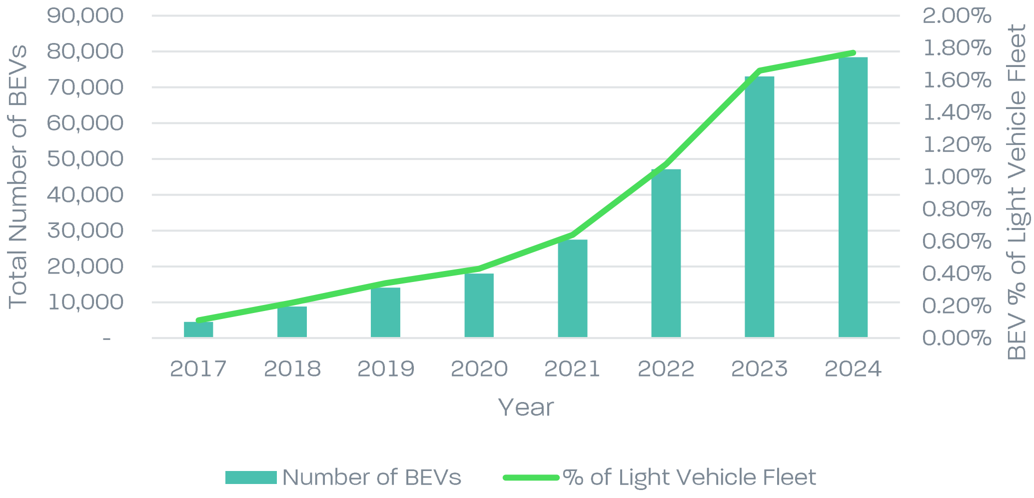

Figure 2: Number of BEVs and %BEVs within Light Vehicle Fleet from 2017-2024(YTD)[https://evdb.nz/ev-stats]

Between 2017 and 2024, the percentage of BEVs in NZ's light vehicle fleet has increased by 1.7%, from 0.11% to 1.77%. It could be expected that EV uptake between 2024-2030 would be higher than from 2017-2024. However, this comparison makes the 15% (CCC), and possibly 11% (TIMES-NZ KEA) by 2030 appear optimistic.

On the other hand, TIMES-NZ TUI forecasts 3% by 2030. This would mean a slower average annual rate of BEV increase than 2017-2024, which is also not an expected outcome.

An average of the three models was taken, which projects approximately 10% by 2030. This projection may seem reasonably optimistic but will ultimately depend on a number of unknown factors including technology advancements and associated costs of BEVs, cost of electricity/fossil fuels, government policies and social influences.

A.3 Turn-in rates

The turn-in rate estimates how many EVs will turn in at each location based on how far away a traffic monitoring site is to a medium or major town. A medium town has a population of 1,000 – 10,000 and a major town has a population over 10,000. 2023 census population data was used.

Various criteria were used to allocate different turn-in rates based on the distance traffic monitoring sites are away from a town, with the conditions shown in the table below.

Table 2: Turn-in rate conditions

Condition #	Condition Description	Turn-in rate
1	If within 20 km of major town	5%
2	If between 20 – 50 km of major town and within 20km of medium town	10%
3	If between 20 – 50 km of major town and 20 – 50 km of a medium town	10%
4	If between 50 – 80 km of major town and within 20km of medium town	15%
5	If between 50-80 km from a major town and between 20 – 50 km from medium town	15%
6	If between 50 – 80 km from a major town and between 50 – 80 km from a medium town	20%
7	If further than 80 km from a major town, and within 20 km from a medium town	15%
8	If further than 80 km from a major town and between 20 – 50 km from medium town	20%
9	If further than 80km from a major town and between 50 – 80 km from medium town	25%
10	If further than 80 km from a major town, and further than 80 km from a medium town	30%

Lower turn in rates were assumed for monitoring sites that are closer to major towns due to the assumption that traffic heading to major towns are likely returning home or staying for a period of time, thus will likely charge either residentially, or using destination chargers.

A.4 Average Battery Capacity and Average Charge in 2030

The YTD 2024 EV market share was used to estimate the average 2030 EV battery capacity as 70 kWh, as seen in Table 2. Another data source gives 71.3 kWh as an average battery capacity[14].

It was assumed that the type of light EVs entering the country in 2024 will be mainstream in 2030, as these vehicles enter the second-hand market. 30% of the light EV fleet in NZ is currently made up of Nissan Leafs with 30 kWh batteries, however, it is assumed that Nissan Leafs will be used less on the open road where data for this analysis is taken, so the lower capacity will have less of an impact in 2030.

An average of 30% of vehicle battery capacity per charging session was assumed to remain constant from 2024 to 2030. This average was taken from current NZ EV charging data DETA Consulting has access to. This approach could result in the modelling underestimating overall journey charging demand as battery sizes increase in the future. However, as battery capacities increase, vehicles will also need to stop to charge less (which will result in a lower turn-in factor) – which is assumed to therefore balance out any charging demand increase from increased battery sizes.

[14] https://ev-database.org/cheatsheet/useable-battery-capacity-electric-car

Table 3: Light EV market share data

Light EV type	Battery capacity range (kWh)	Average battery capacity (kWh)	% of light EV market share	Average market share battery capacity (kWh)
Compact	10 – 50	40	10%	70
Mid-size	51 – 70	60	30%	
High-end	71 - 120	80	60%	

A.5 Comparison of 2023 model traffic data and NZTA AADT data

The basis of this model uses quarter hourly traffic data from the year of 2021 to build an average daily traffic profile for each location. 2021 data was used as this was the most recent full data set publicly available from NZTA. During 2021, New Zealand experienced an Alert Level 4 lockdown period in August, with the South Island moving to Alert Level 3 after a week. Despite this, the country was largely returning to normal life, however borders were not fully opened to all visitors and students until the 31st of July 2022.

Due to this disruptive and abnormal time, using 2021 traffic volumes could appear to inaccurately estimate the base daily traffic profile, which was used to forecast out to 2030 by increasing the traffic volumes by 3% each year. To check the validity of the model, the most recent AADT traffic data available (2023) from NZTA[10] was compared against the sum of the half hourly traffic values on the average traffic day in 2023 for each traffic monitoring site.

A graph showing the difference between the two values compared to the DETA model for all locations can be seen in the figure below. Note that a negative percent indicates that the model based on 2021 data was higher than the 2023 measured traffic volume, and a positive percent indicates that the model based on 2021 data was below the 2023 data.

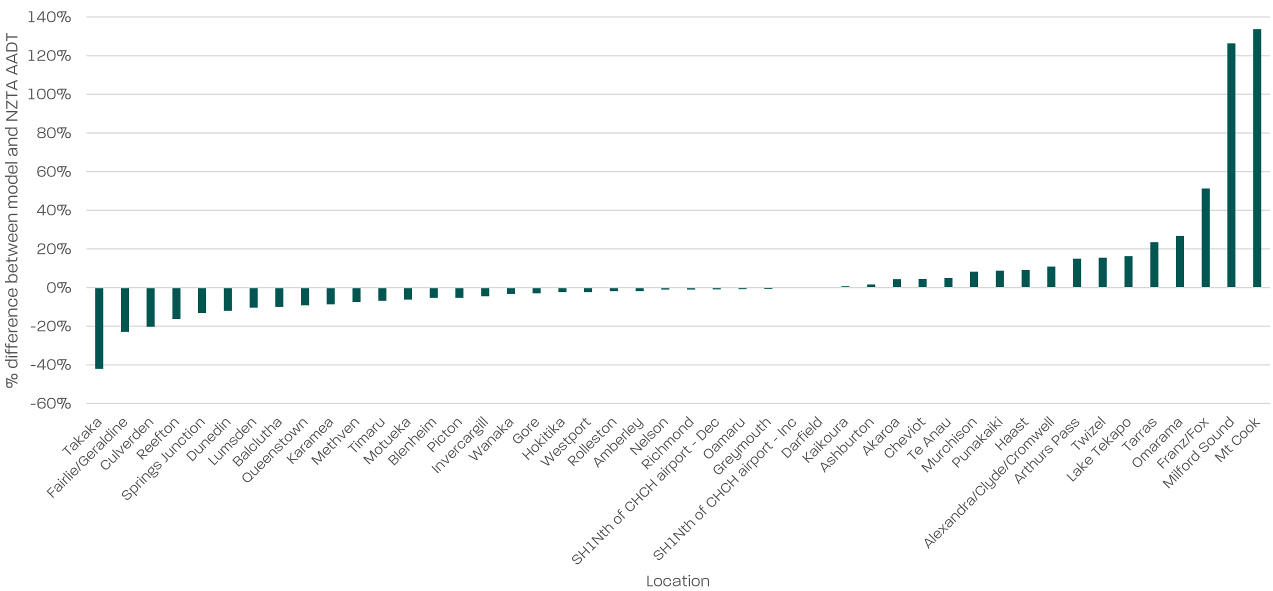

Figure 3: % difference between model and NZTA AADT compared to model for 2023 for all locations.

It was found that when comparing the NZTA data against the model, 19 out of the 46 locations had an absolute difference of 5% or below. 35 locations had an absolute difference of 15% of below. A bar chart showing the numbers of monitoring sites against the absolute difference between the model and NZTA AADT, increasing in increments of 5%, depicts these results below.

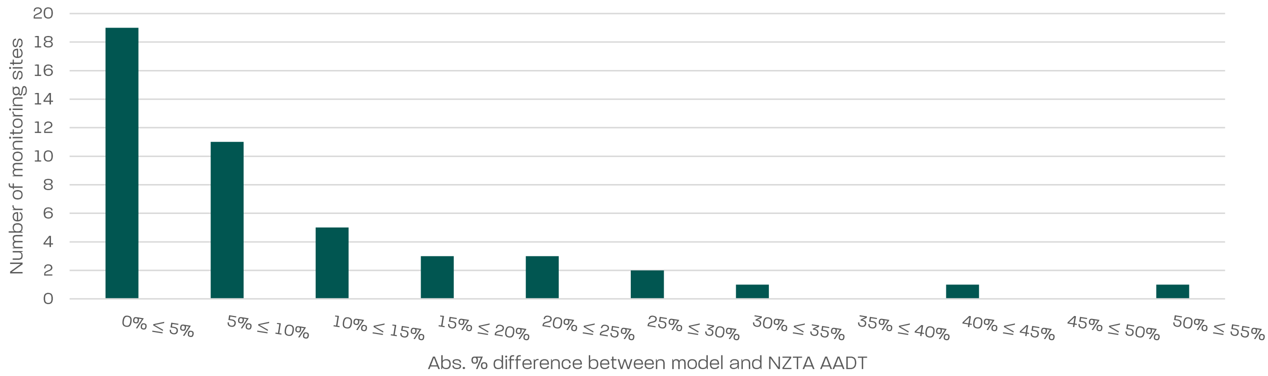

Figure 4: Number of monitoring sites against the absolute percent difference between the model and NZTA AADT, increasing in increments of 5%.

There were two outliers not shown in Figure 4 which were:

- Mt Cook, 134%
- Milford Sound, 126%

The high discrepancy for Mt Cook and Milford Sound was due to the very low numbers of international tourists in the country in 2021, who make up majority of visitors to these places. This is also likely to be the reason for Franz/Fox high discrepancy of 51%. The reason for the high discrepancy for Takaka (-42%) was unable to be determined, but may be due to NZ residents travelling within the country, rather than heading overseas. To account for these discrepancies, the two outliers and all locations where the abs. difference was greater than 15%, adjustment factors were overlain to align the profiles with typical operation. These factors are shown below:

Table 4: Locations with abs. discrepancies above 15% and their respective adjustment factors

Location	Discrepancy	Adjustment factor
Mt Cook	134%	2.34
Milford Sound	126%	2.26
Franz/Fox	51%	1.51
Takaka	-42%	0.58
Omarama	27%	1.27
Tarras	24%	1.24
Fairlie/Geraldine	-23%	0.77
Culverden	-20%	0.80
Reefton	-16%	0.84
Lake Tekapo	16%	1.16
Twizel	15%	1.15

Aside from the 11 locations where adjustment factors were overlain, the results show that for the other 35 locations, the model using 2021 traffic data as a base does well at forecasting 2023 traffic volumes. However, as more data becomes available, the model should be reviewed and updated.

A.6 List of Current Charging Capacity for Each Location

EDB	Location	Address of Journey Charger/s	Owner of Charger	Current Capacity at Each Site (kW)	Current Capacity in Location (kW)
Marlborough Lines	Picton	101 High Street, Picton 7220	Z Energy	75	75
	Blenheim	2226 State Highway 1, Blenheim 7202, NZ	ChargeNet NZ	50	1725
		1 Westwood Avenue, Blenheim 7271, NZ	ChargeNet NZ	300	
		Park Terrace, Blenheim 7201	Marlborough Lines Ltd	450	
		Cnr Kinross and Redwood Streets, Blenheim 7201, NZ	The Warehouse Ltd	25	
		14 Main Street, Central,. Blenheim, 7201, NZ	bp charge	150	
		2 Park TerraceBlenheim, Marlborough 7201	Tesla	750	
Nelson Elecrtricity	Nelson	75 Vanguard St, Nelson 7010, NZ	ChargeNet NZ	50	1700
		81 Trafalgar Street, Nelson 7010, NZ	Network Tasman Ltd	50	
		49 Saxton Road, 7011 Nelso	Meridian Energy Limited	25	
		14 Main Street, Central,. Blenheim, 7201, NZ	bp charge	75	
		99 Quarantine RoadNelson, Nelson 7020	Tesla	1500	
Network Tasman	Richmond	177 Queen Street, Richmond, 7020, Nelson	bp charge	150	200
		280 Queen Street, Richmond 7020, NZ	Network Tasman Ltd	50	
	Murchison	Fairfax St, Murchison 7007, NZ	ChargeNet NZ	50	50
	Motueka	271 High Street, Motueka 7120	ChargeNet NZ	300	300
		270 High St, Motueka 7120, NZ	The Warehouse Ltd	25	
	Springs Junction			No DC Charging	0
	Takaka	16 Willow Street, Golden Bay 7110, NZ	Network Tasman Ltd	50	50
Buller Electricity	Karamea	103 Bridge Street, Karamea 7893, NZ	ChargeNet NZ	25	25
	Westport	5 Adderley Street, Westport 7825, NZ	ChargeNet NZ	50	50
Westpower	Reefton	47 Broadway, Reefton 7830, NZ	ChargeNet NZ	25	25
	Greymouth	13 Tarapuhi Street, Greymouth 7805	ChargeNet NZ	50	75
		174 Mawhera Quay, Greymouth 7805, NZ	The Warehouse Ltd	25	
	Hokitika	116 Revell Street, Hokitika 7810, NZ	ChargeNet NZ	50	50
	Franz/Fox	63 Cron Street, Franz Joseph Glacier 7886	ChargeNet NZ	75	75
	Punakaiki			No DC Charging	0
MainPower NZ	Kaikoura	124-128 Beach Rd, Kaikōura 7300, NZ	ChargeNet NZ	50	1600
		105 Beach RdKaikōura, Canterbury 7300	Tesla	1500	
		51 West End, Kaikōura 7300	ChargeNet NZ	50	
	Cheviot	4 Seddon St, Cheviot 7310, NZ	ChargeNet NZ	50	50
	Amberley	123 Carters Rd, Amberley 7410, NZ	ChargeNet NZ	50	50
	Culverden	27A Mountain View Rd, Culverden 7392	ChargeNet NZ	50	50
Orion New Zealand	Arthurs Pass	80 State Highway 73, Arthurs Pass 7875	ChargeNet NZ	50	50
	Akaroa			No DC Charging	0
	Darfield	33 South Terrace, Darfield 7510	ChargeNet NZ	50	50
	SH1 near Airport	530 Sawyers Arms Road, Bishopdale, Christchurch 8051	Z Energy	300	2700
		Z russley	Z Energy	225	
		800 Harewood Rd, Harewood, Christchurch 8051, NZ	Charge Net NZ	600	
		418 Main South RoadHornby, Canterbury 8441	Tesla	1500	
		661 Russley Road, Harewood Christchurch, Canterbury 8051,	bp charge	75	
	Rolleston	1705 Main South Road Rolleston, Canterbury 8042,	bp charge	75	435
		92 Rolleston Drive, Rolleston 7614	Orion New Zealand Ltd	50	
		174 Mawhera Quay, Greymouth 7805, NZ	The Warehouse Ltd	50	
		4 Brookside Road, Rolleston 7614	Z Energy	260	
EA Networks	Ashburton	109 West Street, Ashburton 7700	Electricity Ashburton Ltd	50	1050
		35 Moore Street, Ashburton 7700	ChargeNet NZ	300	
		358 West Street, Ashburton 7700	bp charge	300	
		141 West Street, Ashburton 7700	Z Energy	400	
	Rakaia	41 Bridge Street, Rakaia 7710	Electricity Ashburton Ltd	50	50
	Methven	160 Main St, Methven 7730	Electricity Ashburton Ltd	50	50
Alpine Energy	Fairlie/Geraldine	14 Geraldine-Fairlie Hwy, Geraldine 7930	Alpine Energy Limited	50	100
		Opposite 53 Main St, Fairlie 7925	Alpine Energy Limited	50	
	Timaru	62 Theodosia Street, Timaru 7910	Z Energy	225	750
		193 Evans Street Waimataitai, Canterbury 7910,	bp charge	75	
		223 Hilton Highway, WashdykeTimaru 7910	Tesla	375	
		98 Evans St, Timaru 7910	ChargeNet NZ	75	
	Twizel	Opposite 64 MacKenzie Drive, Twizel 7901	Alpine Energy Limited	150	150
	Mt Cook	105 Bowen Drive, Mt Cook National Park 7999	Alpine Energy Limited	50	50
	Lake Tekapo	State Highway 8, Tekapo 7999	Alpine Energy Limited	50	50
Network Waitaki	Oamaru	1B Wansbeck St, Ōamaru 9400	Network Waitaki Ltd	410	630
		3 Eden Street, Ōamaru 9400	Network Waitaki Ltd	220	
	Omamara	29 Omarama Ave, Main Omarama Twizel HighwayOmarama 9448	Tesla	250	660
		2 Sutherland Road, Ōmārama 9412	Network Waitaki Ltd	410	
Aurora	Wanaka	42 Ardmore St, Wanaka 9305	ChargeNet NZ	50	550
		135 Sir Tim Wallis Drive, Wanaka 9305	ChargeNet NZ	500	
	Alexandra/Clyde/Cromwell	9 Thompson St, Alexandra 9320	ChargeNet NZ	50	50
		2A The Mall, Cromwell 9310	ChargeNet NZ	50	150
		8 Elspeth Street, Cromwell 9310	ChargeNet NZ	100	
	Queenstown	9 Athol St, Queenstown 9300, NZ	ChargeNet NZ	100	850
		19 Grant Road, Queenstown 9300	ChargeNet NZ	450	
		Hawthorne Dr, FranktonQueenstown 9300	Tesla	250	
		302 Hawthorne Drive, Queenstown 9300	ChargeNet NZ	50	
	Dunedin	75 Saint David Street, Dunedin 9016, NZ	ChargeNet NZ	50	2000
		Water St, Dunedin 9016, NZ	ChargeNet NZ	75	
		95E Hanover Street, Dunedin 9016	ChargeNet NZ	300	
		49 Timaru StreetDunedin, Otago 9012	Tesla	1500	
		64 Hillside Rd, Dunedin 9012, NZ	The Warehouse Ltd	25	
		86 Hillside Rd, Dunedin 9012	ChargeNet NZ	50	
	Tarras			No DC Charging	0
Powernet	Balclutha	23 Charlotte Street, Balclutha 9230	ChargeNet NZ	50	50
	Te Anau	6 Mokonui Street, Te Anau 9600	ChargeNet NZ	75	75
	Gore	4 Irk St, Gore 9710	ChargeNet NZ	50	50
	Lumsden	14 Diana St, Lumsden 9730, NZ	ChargeNet NZ	50	50
	Invercargill	116 Esk Street, Invercargill 9810	ChargeNet NZ	50	75
		70 Leven St, Invercargill 9810, NZ	The Warehouse Ltd	25	

Appendix B: Example EDB RFI (Westpower)

		2024							Constant factors			
Locations	Traffic Monitoring Site Descriptions	2024 Total Forecasted Demand			2024 DC Charging Capacity (kW)	2024 Additional Capacity Needed			Peak Time	Peak / Avg	90th / Avg	Turn-in rate
		Avg (kW)	Peak (kW)	90th (kW)		Avg (kW)	Peak (kW)	90th (kW)				
Franz/Fox Township	South of Waiho Flat Rd	5	16	8	75	-70	-59	-67	3:30:00 PM	3.01	1.47	30%
Reefton Township	Reefton - Sth of Inangahua River	10	21	15	25	-15	-4	-10	1:30:00 PM	2.03	1.49	25%
Greymouth Township	Kumara Junction - Nth of SH 73 Junction	20	31	24	75	-55	-44	-51	4:30:00 PM	1.56	1.21	15%
Hokitika Township	Ruatapu - Sth of Township (Bittern Creek)	5	10	8	50	-45	-40	-42	11:30:00 AM	1.91	1.58	15%
Punakaiki Township	PUNAKAIKI - Telemetry Site 39 - Just Nth of Canoe Creek	6	12	8	0	6	12	8	3:00:00 PM	2.20	1.35	20%

		2030							Constant factors			
Locations	Traffic Monitoring Site Descriptions	2030 Total Forecasted Demand			2024 DC Charging Capacity (kW)	2030 Additional Capacity Needed (Factoring in 2024 Charging Capacity)			Peak Time	Peak / Avg	90th / Avg	Turn-in rate
		Avg (kW)	Peak (kW)	90th (kW)		Avg (kW)	Peak (kW)	90th (kW)				
Franz/Fox Township	South of Waiho Flat Rd	43	128	63	75	-32	53	-12	3:30:00 PM	3.01	1.47	30%
Reefton Township	Reefton - Sth of Inangahua River	80	163	120	25	55	138	**95**	1:30:00 PM	2.03	1.49	25%
Greymouth Township	Kumara Junction - Nth of SH 73 Junction	155	242	188	75	80	167	**113**	4:30:00 PM	1.56	1.21	15%
Hokitika Township	Ruatapu - Sth of Township (Bittern Creek)	42	79	66	50	-8	29	**16**	11:30:00 AM	1.91	1.58	15%
Punakaiki Township	PUNAKAIKI - Telemetry Site 39 - Just Nth of Canoe Creek	44	97	59	0	44	97	**59**	3:00:00 PM	2.20	1.35	20%

Negative additional capacity shows that the model has forecasted that there will be sufficient charging capacity in 2030 in this location. **Distribution transformer data is not necessary** to find for this place.

Franz/Fox Township					
	Rated capacity (kVA)	Available capacity (kVA)	Indicative connection cost ($)	Location	Comments
Transformer 1					
Transformer 2					
Transformer 3					
Transformer 4					
Transformer 5					

Reefton Township					
	Rated capacity (kVA)	Available capacity (kVA)	Indicative connection cost ($)	Location	Comments
Transformer 1					
Transformer 2					
Transformer 3					
Transformer 4					
Transformer 5					