

**BEFORE THE PROPOSED SELWYN DISTRICT PLAN
HEARINGS PANEL**

Under the Resource Management Act 1991

In the matter of

**The Proposed Selwyn District Plan - Hearing 1 Strategic
Directions**

Between

Selwyn District Council

And

Transpower New Zealand Limited (Submitter ref: DPR-0446)

**Statement of Evidence of Rebecca Eng for Transpower
New Zealand Limited dated 23 July 2021**

Summary Statement

1. Transpower New Zealand Limited ("**Transpower**") operates the National Grid, which transmits electricity throughout New Zealand. Within the Selwyn District, there are nine high voltage National Grid transmission lines, traversing approximately 341km, and varying from 350 kilovolts (kV) to 66kV. There are three substations and one outdoor switchyard. National Grid assets in the Selwyn District serve communities at local, regional and national levels.
2. The National Policy Statement on Electricity Transmission 2008 ("**NPSET**") requires the National Grid to be appropriately recognised in the Proposed Selwyn District Plan (the "**Proposed Plan**"). The Proposed Plan must give effect to the NPSET. This means that the Proposed Plan must include provisions to recognise and provide for the national significance of the National Grid, manage the effects of the National Grid, and manage effects on the National Grid.
3. While a resilient National Grid remains at the heart of New Zealand's energy future, climate change has become a central issue for governments globally and hence for Transpower as a responsible owner and operator of the National Grid on behalf of New Zealanders. The National Grid will play a critical role for New Zealand in meeting its zero carbon aspirations, by both investing in its existing assets and enabling connections to new sources of renewable energy.
4. Transpower wishes to see appropriate planning provisions included in the Proposed Plan to ensure that Transpower is able to develop, upgrade, operate, and maintain the National Grid to enable a sustainable, secure and reliable supply of electricity to the Selwyn District and nationally.
5. Transpower considers that the amendments and additions set out in **Ms McLeod's** evidence will best give effect to the objective and policies of the NPSET and the Canterbury Regional Policy Statement within the Strategic Directions chapter of the Proposed Plan. **Ms McLeod** seeks some amendments to the recommendations in the s42a report to provide (among other matters) clarity in respect of the role of the Strategic

Directions provisions. I concur with the amendments sought in **Ms McLeod's** evidence.

Introduction

6. My full name is Rebecca Mary Eng. I am a Senior Environmental Planner at Transpower New Zealand Limited ("**Transpower**"), within the Environmental Regulatory Team. My team sits within Transpower's Environmental Policy and Planning Group, whose responsibilities include:
 - a) Strategic planning. This is achieved through the development and implementation of Transpower's strategic resource management policy at national, regional and local levels;
 - b) Ensuring the protection of Transpower's network;
 - c) Ensuring that all necessary environmental approvals are obtained for Transpower's physical works; and
 - d) Managing engagement with landowners and other parties who wish to undertake land use and development under or near the National Grid to ensure that Transpower's assets are able to be operated, maintained, upgraded and developed.
7. I have been employed by Transpower for six years. My role involves leading Transpower's resource management policy workstream including to ensure planning documents give effect to the National Policy Statement on Electricity Transmission 2008 ("**NPSET**").
8. I have a Master of Resource and Environmental Planning from Massey University. I have over 18 years' experience working as an environmental planner in New Zealand and the United Kingdom and I am a member (Intermediate) of the New Zealand Planning Institute. My relevant experience and qualifications are included in **Appendix A**.
9. I confirm that I am authorised to give this evidence on behalf of Transpower.

10. Although this matter is not before the Environment Court, I confirm that I have read the 'Code of Conduct for Expert Witnesses contained in the Environment Court Consolidated Practice Note 2014. As I am employed by Transpower, I acknowledge I am not independent; however, I have sought to comply with the Code of Conduct. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of Evidence

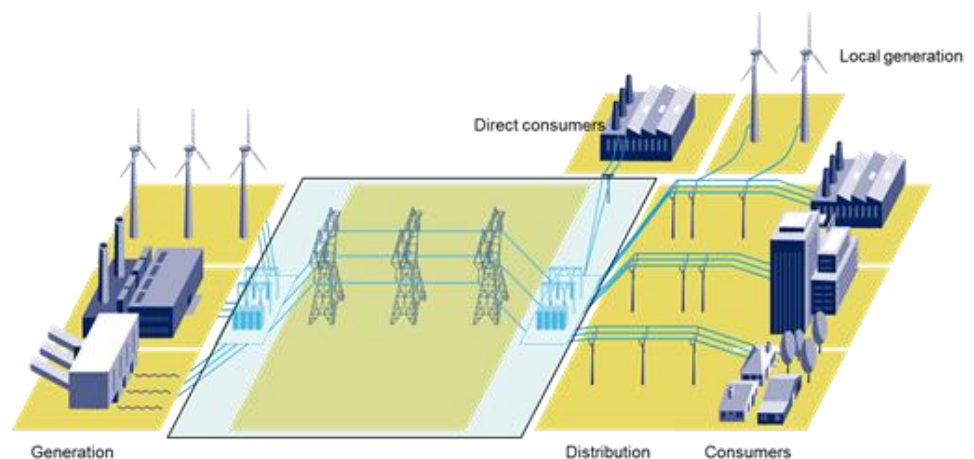
11. My evidence will address the following:
- a) Transpower and the National Grid;
 - b) Transpower's assets within Selwyn District;
 - c) Transmission Tomorrow and Whakamana i Te Mauri Hiko; and
 - d) Conclusions.

Transpower and the National Grid

12. Transpower is a State-Owned Enterprise that plans, builds, maintains, owns and operates New Zealand's high voltage electricity transmission network – the National Grid (or "**The Grid**"). The Grid links generators to distribution companies and major industrial users. It extends from Kaikohe in the North Island to Tiwai in the South Island and carries electricity throughout New Zealand.
13. New Zealand has become increasingly dependent on electricity. It is an intrinsic part of living and working in the 21st century. Electricity now accounts for about 25% of all energy used in New Zealand. Each year, \$5 billion worth of electricity is traded on the wholesale electricity market. Transpower, whose main role is to ensure the delivery of a reliable and

secure supply of electricity to New Zealand, has a fundamental role in the industry and in New Zealand's economy.

14. Transpower is not a generator of electricity and has no retail sales of electricity. It can be considered a 'freight company' for electricity, in that it carries bulk electrical energy from where it is generated by companies such as Contact Energy, Meridian and Genesis to the local lines distribution companies (e.g. Orion and Mainpower in Canterbury) and some major users of electricity (e.g. Tiwai Point Aluminium Smelter, NZ Steel at Glenbrook and Marsden Point Oil Refinery).
15. Transpower also manages New Zealand's power system in real time. In its role as System Operator, Transpower operates the electricity market to ensure electricity transmitted through The Grid is delivered whenever and wherever it is needed, 24 hours a day, seven days a week.
16. Transpower plays a significant part in New Zealand's economy, with all major industries, cities and communities being reliant on a secure and reliable supply of electricity.



Source: Electricity Commission, *Electricity in New Zealand*, 2009

Figure 1: Electricity industry in New Zealand

17. As a State-Owned Enterprise, Transpower's principal objective is to operate as a successful business. It must operate within certain legislative constraints and report regularly to its shareholding Ministers. Transpower is required to deliver and operate a National Grid that meets the needs of users now and into the future.

18. One of Transpower's key objectives therefore is to maintain and develop the National Grid, which contributes to New Zealand's economic and social aspirations. This objective is reflected in the single objective in the NPSET, as outlined in **Ms McLeod's** evidence.
19. Prudent investment in The Grid, long term transmission planning strategies, and developing technologies are crucial to ensure the most can be made from existing infrastructure. Proper maintenance and access to the Grid is essential in order to defer the need for new lines and substations and to create better options for when new build is required. This will, in turn, help to limit the cost and environmental footprint of the National Grid for future generations. This is more critical than ever in the context of the Climate Change Response (Zero Carbon) Amendment Act 2019, which I expand on later in this evidence.

The National Grid Network

20. The National Grid comprises some 12,000-circuit km of transmission lines and more than 160 substations across the country. This is supported by a telecommunications network of some 300 telecommunication sites, which help link together and communicate with the components that make up the National Grid.
21. The Grid comprises a high voltage backbone which runs the length of the country and links major generation (such as the South Island hydro lakes) to major loads in the main cities (e.g. Christchurch). The bulk of the Grid backbone was built around 60 years ago and comprises most of the 220 kilovolt (kV) lines throughout New Zealand, along with the High Voltage Direct Current (HVDC) link between the North and South Islands. This transmission line runs from Benmore to Haywards in Upper Hutt and includes the Cook Strait Cables. The HVDC link traverses through the Selwyn District.
22. Connected to this Grid backbone are regional Grid lines (also owned or operated by Transpower) which connect smaller generation stations such as Coleridge Power Station and supply regional communities. At a district and regional level, transmission lines traverse the countryside and link substation sites in order to get electricity to the main centres

(e.g. Christchurch and Rolleston) and to some smaller centres where the electricity load is then transferred to the local distribution networks. The regional 66kV network traversing through Selwyn also supplies electricity to the West Coast.

23. A district map showing National Grid substations and transmission lines in the Selwyn District is included on **Page 4** of Transpower's submission and a copy is attached to this evidence.

Transpower's assets within Selwyn District

24. The National Grid lines that traverse the Selwyn District are:
- a) Benmore-Haywards A 350kV high voltage direct current overhead transmission line on towers;
 - b) Benmore-Islington A 220kV overhead transmission line on towers;
 - c) Brackendale-Hororata A 66kV overhead transmission line on towers;
 - d) Bromley-Islington A 220kV overhead transmission line on towers;
 - e) Christchurch-Twizel A 220kV overhead transmission line on towers;
 - f) Coleridge-Brackendale D 66kV overhead transmission line on poles and pi poles;
 - g) Coleridge-Otira A 66kV overhead transmission line on towers, poles, pi poles and triple poles;
 - h) Hororata-Islington E 66kV overhead transmission line on towers, poles, pi poles and triple poles; and
 - i) Roxburgh-Islington A 220kV overhead transmission line on towers.
25. In addition to the transmission lines, Transpower owns and operates the following facilities within the Selwyn District, all of which are designated:
- a) Coleridge Outdoor Switchyard;

- b) Arthurs Pass Substation;
 - c) Castle Hill Substation; and
 - d) Hororata Substation.
26. These assets are shown on the map in **Appendix B** to my evidence. National Grid transmission lines cover a total of approximately 341km within the Selwyn District.
27. The Grid is an interlinked network. Electricity flows along transmission lines via lines supported by towers (pylons), poles or pi poles and can vary in any instant, depending on actual generation at power stations and the demand for electricity across New Zealand. In operating the electricity market as System Operator, Transpower uses real-time information about electricity use by consumers and electricity generation available from generators to balance electricity demand and supply, ensuring optimum performance of the network.
28. The National Grid provides connectivity between all sources of generation and consumers. Without the National Grid, consumers across New Zealand would be dependent on locally generated electricity which would be more expensive and less reliable. As such, the National Grid plays an important role in the sustainable management of natural and physical resources.

Transpower's projects in the Selwyn District

29. Orion New Zealand Limited ("**Orion**") and Transpower are establishing a new Grid Exit Point ("**GXP**") in rural Norwood to improve the capacity and security of Orion's electricity distribution network. The Norwood GXP will include the development of two separate Orion and Transpower substations, as well as related alterations to Transpower's existing National Grid Roxburgh-Islington A 220kV transmission line. Transpower's substation will be known as a National Grid Substation, while Orion's substation will be known as a Zone Substation.
30. Orion is leading the site selection, land acquisition and environmental approvals processes for the Norwood GXP project. Any environmental

approvals required to authorise Transpower's ongoing operation, maintenance, upgrade and development of the National Grid Substation will be transferred to Transpower. Pre-application consultation has been carried out with Selwyn District Council, and the Notices of Requirement for Designations to be included in the district plans and other relevant resource consents are anticipated to be lodged in September 2021. This project exemplifies the role the National Grid plays in meeting the demand for a sustainable, secure and efficient electricity supply now and in the future. This is what the NPSET requires decision-makers to recognise and provide for (Policy 1).

31. Other than this project, Transpower is carrying out business as usual maintenance works on its assets within the Selwyn District, such as pole replacements (primarily on the 66kV network), foundation strengthening, and flood protection works.

Transmission Tomorrow

32. Transpower's 2016 publication "Transmission Tomorrow" (updated in 2018) sets out Transpower's strategy for the future development of the Grid for the next 30 years and beyond. Transmission Tomorrow documents Transpower's view that there is an enduring role for the National Grid. Transpower's lines and substations will be required for many years into the future to power the economy while enabling New Zealand's continued reliance on renewable forms of electricity generation, including from the South Island hydro lakes.

New Zealand's Paris Commitment and Decarbonisation

33. In early 2018 Transpower published its white paper "Te Mauri Hiko – Energy Futures" (Te Mauri Hiko). This project closely examined a range of electricity supply, demand and future technology scenarios and began exploring what will be required for New Zealand to maximise the potential of the energy opportunity it is facing, including meeting its Paris Climate Accord commitments. Greenhouse gas emission reduction targets were agreed by New Zealand at the 2016 Paris Climate Accord and have been translated into domestic climate policy via the Climate Change Response (Zero Carbon) Amendment Act 2019.

34. An updated Transmission Tomorrow was published in 2018. It underlined the need to decarbonise New Zealand's economy. Transmission Tomorrow sets out how Transpower will go about planning and the developing the transmission system as demand for electricity increases following electrification of the transport and process heat sectors, and as new renewable generation is added to the system.
35. Since then Transpower has released a further document "Whakamana i Te Mauri Hiko – Empowering our Energy Future" which sets out a blueprint for how New Zealand might get to a zero-carbon future. It is consistent with the findings of both the Interim Climate Change Committee and the Productivity Commission that the greatest opportunities for emissions reductions outside of agriculture lie in the energy sector; specifically around increasing the proportion of renewable electricity in the system and the electrification of emissions intensive transport and process heat sectors.
36. While a resilient National Grid remains at the heart of New Zealand's energy future, climate change has become a central issue for governments globally and hence Transpower as a responsible owner and operator of the National Grid on behalf of New Zealanders. Technology continues to advance rapidly. Electricity is increasingly positioned as an energy source for whole economies, rather than just homes and some business processes.
37. As the economy electrifies in pursuit of the most cost efficient and renewable sources, the Whakamana i Te Mauri Hiko base case predicts that electricity demand is likely to more than double by 2050. Whakamana i Te Mauri Hiko suggests that meeting this projected demand will require significant and frequent investment in New Zealand's electricity generation portfolio over the coming 30 years, including new sources of resilient and reliable grid connected renewable generation. In addition, new connections and capacity increases will be required across the transmission system to support demand growth driven by the electrification of transport and process heat. Transpower's current estimation is that around 70 new National Grid connections will be required in the next 15 years, with this trend continuing through to at

least 2050. Simply put, New Zealand's electricity transmission system is the infrastructure on which our zero-carbon future will be built.

38. This work supports Transpower's view that there will be an enduring role for the National Grid in the future, and the need to build new National Grid lines and substations to connect new, renewable generation sources to the electricity network.
39. In terms of a brief summary, the National Grid:
 - a) transports electricity across the country (connecting generation to consumers);
 - b) supports New Zealand's national and regional economic growth;
 - c) plays an essential role in maintaining reliability and security of supply of energy;
 - d) provides a basis for investment decisions to be made by both suppliers and consumers of electricity;
 - e) enables competition among suppliers and retailers of electricity, thereby providing the basis for competitively priced electricity;
 - f) assists the development of new electricity generation technologies, including renewable energy, by providing access to markets;
 - g) enables the electrification of transport and process heat, without which there is no way in which our Paris Agreement and net-zero carbon economy commitments can be met; and
 - h) is predicted to play a key role in the decarbonisation of the economy.

Conclusions

40. The National Grid is critical to the social and economic wellbeing of the Selwyn District and our nation generally. It will also play a critical role in New Zealand's carbon zero commitment and mitigating the effects of climate change. This will necessitate the upgrade of existing, and construction of new, National Grid assets. As an infrastructure asset of

national significance, the NPSET requires that the National Grid be recognised and provided for in the Proposed Plan.

41. Transpower's relief will ensure integrated management of activities through the District Plan to provide for sustainable development of both the National Grid infrastructure and other natural and physical resources, both of which are critical for the future development of the Selwyn District and New Zealand.

Rebecca Eng
23 July 2021

Appendix A – Relevant Experience and Qualifications

Career Summary

Senior Environmental Planner, Transpower New Zealand Ltd: July 2015 – present

Principal Policy Analyst, Parks & Recreation Policy - Central, Auckland Council: January 2014 – July 2015

Senior Planner, Barker & Associates, Auckland: February 2012 – January 2014

Associate, RPS Group plc, London, United Kingdom: September 2006 – May 2011

Planner, Beca, Wellington & Tauranga: December 2002 – June 2006

Qualifications

Master of Resource & Environmental Planning, Massey University (2004)

Bachelor of Resource & Environmental Planning (First Class Hons)(Massey Scholar), Massey University (2002)

Affiliations

Intermediate Member of the New Zealand Planning Institute

Appendix B – National Grid Assets within the Selwyn District

Transpower Assets

Selwyn District

Legend

Territorial Land Authority

Boundary

NZ Roads

Highways

Transpower Assets

Cable Protection Zone

Overhead Fibre Cable

Underground Fibre Cables

Site

ACSTN

COMMS

HVDC

TEE

Transmission Line

0kV Overhead

11, 66kV Underground

11, 33, 66 kV Overhead

110kV Underground

110 kV Overhead

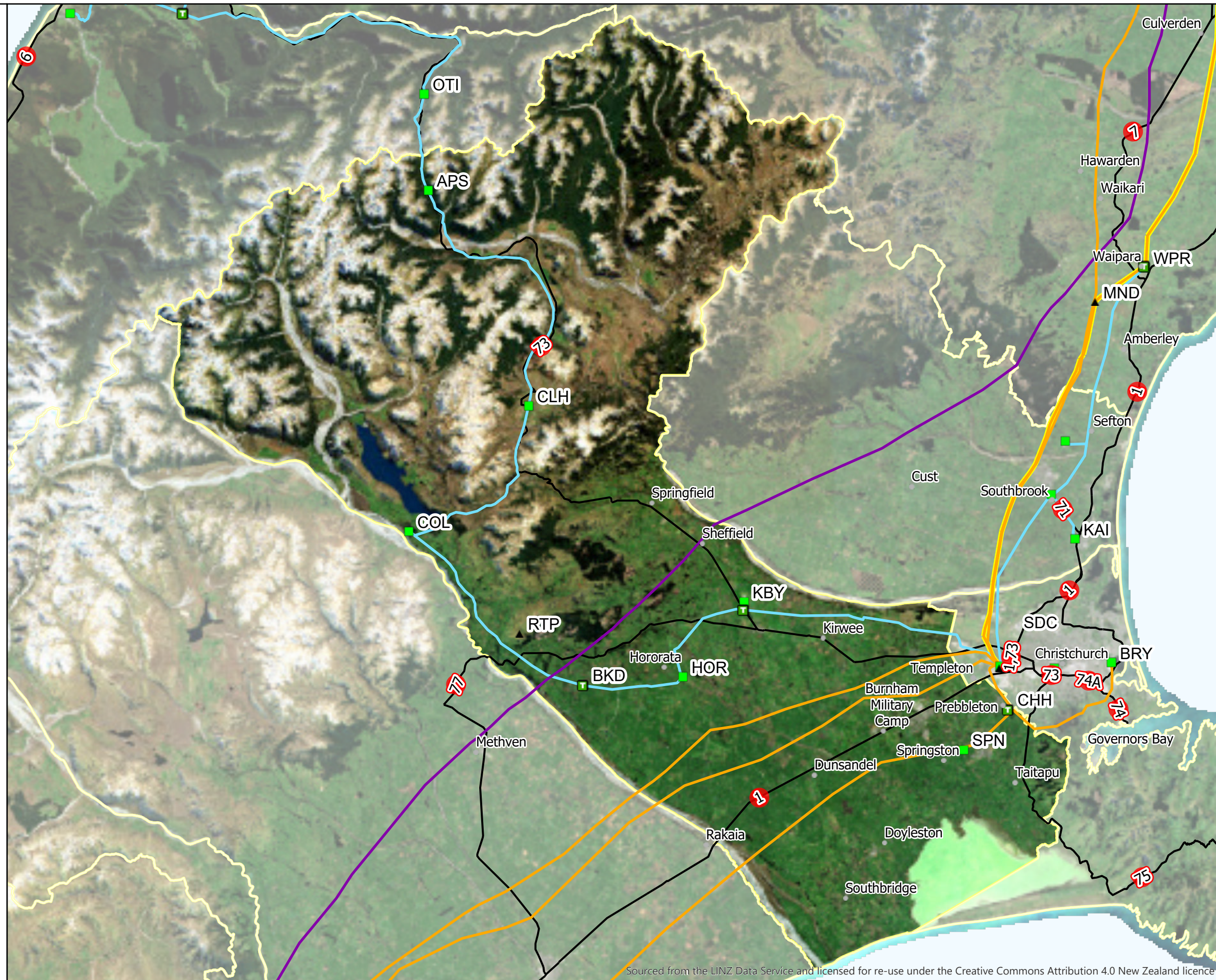
220kV Underground

220 kV Overhead

350 kV Overhead

350kV Submarine

400kV Overhead



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TRANSPOWER

Prepared by: Transpower Geospatial

Projection: NZTM 2000 Scale: 1:510,000 Plan Size: A3L

0 1,000 2,000 km

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