Before the Proposed Plan Change 38 and Proposed Plan Change 42: Hearings Panel

Under	the Resource Management Act 1991 (the Act)
In the matter of	Taupō District Council Proposed Plan Change 38 – **Strategic Directions** Taupō District Council Proposed Plan Change 42 – **General Rural and Rural Lifestyle Environments**
Between	**Taupō District Council** Local authority
And	**Transpower New Zealand Limited** Submitter 110 and Further Submitter FS225

Statement of evidence of Rebecca Mary Eng for Transpower New Zealand Limited

Dated 9 August 2023

1. Executive Summary

1.1. Transpower New Zealand Limited ("Transpower") owns and operates the National Grid, which transmits electricity throughout New Zealand from energy generation sources to distribution networks and direct-connect customers. Transpower has a variety of assets within the Taupō District comprising twenty 220,000 kilovolt (220kV) transmission lines and 14 substations.

1.2. The Taupō District hosts assets that form part of the National Grid's "backbone" transmission assets, including the "Wairakei Ring" which is a critical part of the network, enabling bulk power transfer between the lower North Island, the upper North Island and Hawke's Bay/Bay of Plenty. Anticipating a future need to connect new renewable electricity generation and ensure the National Grid can respond to an increase in electricity demand out to 2050, Transpower has a multi-staged project underway to increase the capacity of the National Grid backbone within the Central North Island and the Wairakei Ring. Phase 1 of this work involves upgrading existing National Grid transmission lines to relieve capacity constraints.

1.3. 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. In this role Transpower will play a critical role for New Zealand in meeting its zero carbon aspirations, by both investing in its existing National Grid assets and enabling connections to new sources of renewable energy.

1.4. The National Policy Statement on Electricity Transmission 2008 ("NPSET") requires the National Grid to be appropriately recognised in the Taupō District Plan (the "District Plan"). The District Plan must give effect to the NPSET. This means that the District 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. Given the confined scope of Proposed Plan Changes 38 and 42 to rural matters, Transpower wishes to see appropriate planning provisions included in Plan Changes 38 and 42 to ensure that the National Grid is protected from inappropriate subdivision, use and development in accordance with Policies 10 and 11 of the NPSET.

1.5. Transpower will be appearing at the hearings for both Plan Changes 38 and 42. Given the inter-related nature of the plan changes, the appointment of one hearing panel for

both plan changes, and that Transpower's evidence relates to matters relevant to both plan changes, Transpower considers it more efficient and effective to provide one set of evidence. However, to assist the panel, contained within my evidence are separate sections to address submission points on the respective plan changes.

1.6. My evidence should be read with the planning evidence of **Ms Pauline Whitney** and technical engineering evidence of **Mr Hein Pretorius**.

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2. Qualifications and Experience

2.1. My full name is Rebecca Mary Eng. I am the Technical Lead - Policy 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 can be operated, maintained, upgraded and developed.

2.2. I have been employed by Transpower for eight years. My role involves leading Transpower's resource management policy workstream including to ensure planning documents give effect to the NPSET.

2.3. I have a Master of Resource and Environmental Planning from Massey University. I have over 19 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**.

2.4. I confirm that I am authorised to give this evidence on behalf of Transpower.

2.5. 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 2023. As I am employed by Transpower, I acknowledge I am not independent; however, I have sought to comply with the Code of Conduct when preparing my written statement of evidence and will do so when I give oral evidence before the Hearings Panel. 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.

3. Scope of Evidence

3.1. Transpower will be appearing at both the PC38 and PC42 hearings. Given the inter-related nature of PC38 and PC42, the appointment of one hearing panel for both plan changes, and that Transpower's evidence relates to matters relevant to both plan changes, Transpower considers it more efficient and effective to provide one set of evidence.

3.2. On this basis my evidence will address the following:

a. Transpower and the National Grid;

b. Transpower's assets and projects within the Taupō District;

c. New Zealand's Paris Commitment and decarbonisation;

d. Transpower's preferred approach to National Grid corridor implementation; and

e. Conclusions

3.3. The first three sections are most relevant to the Proposed Plan Change 38 hearing. The remainder, outlining Transpower's preferred approach to National Grid corridor implementation, is relevant to Transpower's submission points on Proposed Plan Change 42 ("**PPC42**"). However, the evidence is intended to be read as a whole and together with the technical engineering evidence of **Mr Pretorius** and the expert planning evidence of **Ms Whitney**.

4. Transpower and the National Grid

4.1. 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.

4.2. 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 approximately 26% of all energy used in New Zealand.[1] Each year, $6 billion worth of electricity is

[1] Energy statistics | Ministry of Business, Innovation & Employment (mbie.govt.nz)

traded on the wholesale electricity market.[2] 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.

4.3. 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., The Lines Company and Unison Networks in Taupō) and some major users of electricity (e.g. Tiwai Point Aluminium Smelter and NZ Steel at Glenbrook).

4.4. 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 National Grid is delivered whenever and wherever it is needed, 24 hours a day, seven days a week.

4.5. 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.

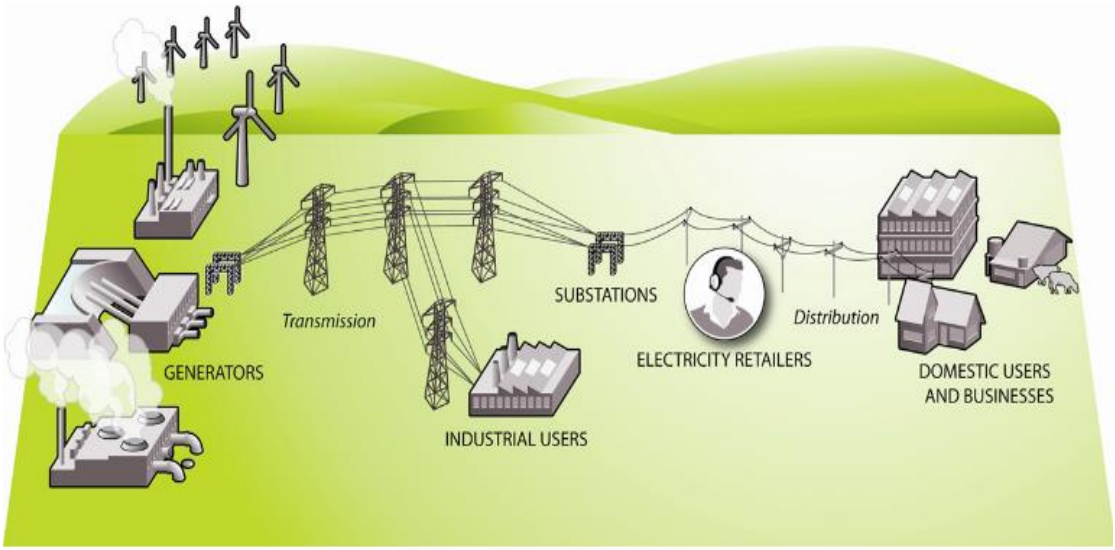

Figure 1. Electricity Industry in New Zealand. Source MBIE

4.6. 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

[2] Clearing manager | Electricity Authority

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.

4.7. 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.

4.8. 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 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

4.9. The National Grid comprises some 11,000 circuit km of transmission lines and approximately 170 substations across the country. This is supported by a network of some 300 telecommunication sites, which help link together and communicate with the components that make up the National Grid.

4.10. 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 and central North Island hydro and thermal generation sources) to major loads in the main cities (e.g., Wellington, Auckland and Christchurch). The bulk of the Grid backbone was built around 60 years ago and comprises most of the 220kV lines throughout New Zealand, along with the High Voltage Direct Current (HVDC) link between the North and South Islands. Later in my evidence I further describe the 220kV grid backbone assets in the Taupō District.

5. Transpower's Assets and Projects within Taupō District

National Grid Assets in Taupō

5.1. There are 20 National Grid transmission lines that traverse the Taupō District. These are listed on **page 5** of Transpower's original submission and in **Appendix B** of **Mr Pretorius's** evidence.

5.2. There are also 14 substations within the district and four communication sites. The substations include Aratiatia, Atiamuri, Maraetai, Nga Awa Purua, Ohakuri, Ohaaki, Poihipi, Rangipo, Tokaanu, Whakamaru, Wairakei, Whakamaru North, Tauhara and Te Mihi. The communication sites include Atiamuri Radio, Whakapapataringa, Wairango and Whakamaru Radio. The Tauhara substation has been commissioned since Transpower lodged its original submission in December 2022. I

5.3. A district map showing National Grid substations and transmission lines in the Taupō District is included in **Appendix 1** of Transpower's submission and a copy is attached to this evidence at **Appendix B**.

5.4. 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.

5.5. For National Grid transmission planning purposes, the majority of the Taupō District falls within the "Central North Island" (CNI) region. This is shown graphically in Figure 2. The CNI region comprises 220kV and 110kV transmission circuits. All the 220kV circuits form part of the "grid backbone", and the CNI is a main corridor for 220kV transmission circuits through the North Island. All the National Grid transmission line assets that traverse the Taupō District are 220kV. The 220kV transmission system connects the Central North Island to the Wellington region to the south, the Taranaki region to the west, the Waikato region to the north, and the Hawke's Bay region to the east. Most of the CNI generation capacity is connected to the 220kV circuits and output significantly exceeds local demand. The National Grid enables surplus generation to be exported to other demand centres.[3]

[3] Transpower Transmission Planning Report, 2022, page 192

Figure 2: Central North Island region transmission. Source: Transpower Transmission Planning Report 2022)

5.6. The "Wairakei Ring" [4] is in the Taupō District. It is a critical part of the National Grid, enabling bulk power transfer between the lower North Island, the upper North Island and Hawke's Bay/Bay of Plenty. The Wairakei Ring is depicted graphically in Figure 3.

[4] The transmission lines that make up the "Wairakei Ring" run between Wairakei and Whakamaru, with the lower capacity line connecting through Atiamuri, and Ohakuri, while the larger double circuit line connects directly between Wairakei and Whakamaru.

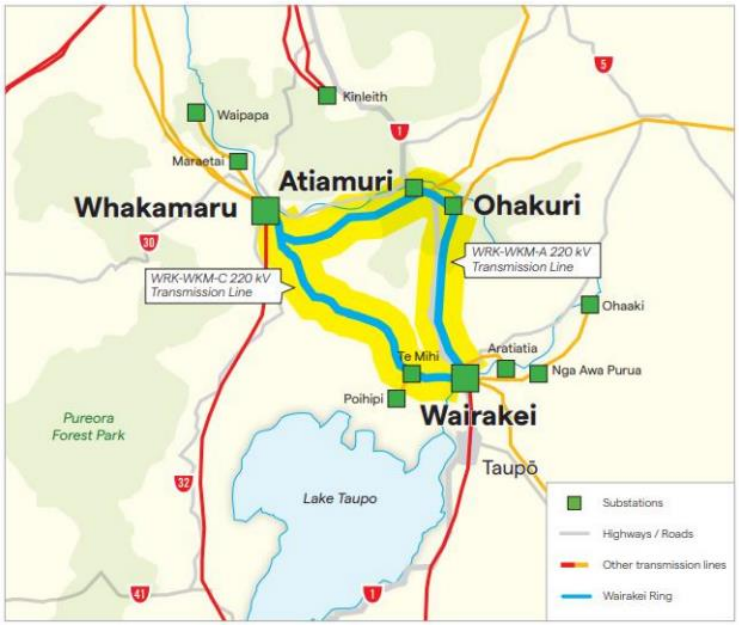

Figure 3: Wairakei Ring. Source: Transpower Net Zero Grid Pathways 1 Major Capex Proposal (Staged) December 2022

5.7. 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 a significant role in the sustainable management of natural and physical resources.

Transpower's Projects in the Taupō District

5.8. Transpower has a range of live upgrading, customer connection and long term strategic projects on National Grid assets within the Taupō District. In April 2023 construction was completed on a new series reactor at Atiamuri, to address a capacity issue on the Wairakei Ring, and to provide sufficient capacity for new generation.

5.9. Consent was recently granted for the construction of a new Transpower substation to support Contact Energy's 174 megawatt Tauhara geothermal steam turbine power station. Transpower intends to serve a Notice of Requirement to designate the site and works later in 2023.

5.10. Transpower's Net Zero Grid Pathways (NZGP) is a multi-year programme of work through which Transpower will investigate, plan, consult on and seek investment approval for large projects to deliver the transmission system New Zealand needs to electrify the economy and meet decarbonisation targets in the future. One part of NZGP is the Central North Island (CNI) 220kV capacity project.

5.11. Transpower identified that with the expected eventual closure of Tiwai Aluminium smelter and expected new generation in the North Island, there will be a need to relieve potential constraints in the core National Grid network.

5.12. The CNI project is about increasing the capacity of the 220kV grid between Bunnythorpe and Whakamaru in a staged manner to meet the requirements of increasing generation and demand. The first project underway is to increase the operating temperature of the sections of two transmission lines that connect between Tokaanu and Whakamaru, known as a thermal upgrade. To date, this work has primarily involved raising existing towers but will also include foundation strengthening, access track upgrades, vegetation removal and mid-span earthworks.

5.13. As part of the CNI project Transpower is also investigating further investment in the Wairakei Ring, to increase transmission capacity by 25% on the 220kV grid between Whakamaru and Wairakei. A decision from the Commerce Commission on Transpower's options for this work is due at the end of 2023.

6. New Zealand's Paris Commitment and decarbonisation

Transmission Tomorrow (2016)

6.1. Transpower's 2016 publication "Transmission Tomorrow" set 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.

Te Mauri Hiko – Energy Futures (2018)

6.2. 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. 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.

6.3. Transmission Tomorrow was updated in 2018 and 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.

Whakamana I Te Mauri Hiko – Empowering our Energy Future (2020)

6.4. Since then, Transpower has released a further document "Whakamana i Te Mauri Hiko – Empowering our Energy Future" (2020) 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.

6.5. 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.

6.6. This work supports Transpower's view that there will be an enduring role for existing National Grid assets in the future, and the need to build new National Grid lines and substations to connect new, renewable generation sources to the electricity network.

6.7. In terms of a 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.

6.8. The following section is included to provide context for Transpower's submission points on **PPC42**.

7. Transpower's Preferred Approach to National Grid Corridor Implementation

7.1. Most National Grid transmission lines and substations were originally built in the early to mid-twentieth century in (what were then) rural areas over open land which posed little to no constraint on the ability to operate, maintain, upgrade and develop the National Grid. Nationwide, only a small proportion of transmission lines are designated, and in particular only two[5] of the 20 transmission lines that traverse the Taupō District are designated.

Inappropriate development under and near the National Grid

7.2. Over time, urban boundaries have expanded and both urban and rural development has occurred under, and in close proximity to, National Grid assets. Under the Electricity Act 1992, Transpower has little direct control over activities underneath or adjacent to its assets that have been constructed under, and in close proximity to, the National Grid without Transpower's knowledge or consent. The risks and effects of

[5] The Brownhill-Whakamaru 400kV capable transmission line that formed part of Transpower's North Island Grid Upgrade Project (District Plan designation reference D109) and the Wairakei-Whakamaru C 220kV overhead transmission line (District Plan designation reference D112).

inappropriate land use and development of this nature is covered in detail within **Mr Pretorius**'s evidence.

7.3. The Resource Management (National Environmental Standards for Electricity Transmission Activities) Regulations 2009 ("NESETA") does not include any provisions to regulate subdivision, land use or development carried out by third parties near the National Grid. Under the RMA, the NPSET was developed (in part) as a mechanism to provide better management controls. Policies 10 and 11 provide direction to protect the National Grid from inappropriate subdivision, land use and development, albeit these policies are not prescriptive in the form of rules or definitions. Policy 12 of the NPSET directs territorial authorities to identify the National Grid on their relevant planning maps, whether or not the network is designated.[6] **Ms Whitney**'s evidence sets out the specific wording of Policies 10 and 11 of the NPSET[7] and includes a copy of the NPSET itself at **Appendix A**.

7.4. While **Mr Pretorius**'s evidence describes what the risks and effects of inappropriate subdivision, land use and development are to the National Grid, the purpose of my evidence is to describe the "how," that is, the strategic planning approach that Transpower supports for implementing Policies 10 and 11 of the NPSET in the form of definitions and rules within District Plans. My evidence also provides examples of Transpower working constructively with landowners/developers on subdivision proposals near the National Grid, to demonstrate how mutually beneficial outcomes can be achieved at the subdivision stage.

National Grid Corridor Purpose

7.5. The National Grid corridor approach supported by Transpower has eight important purposes, namely:[8]

a. **To ensure that sensitive activities, such as residential development, are generally not provided for near National Grid structures and lines**: Sensitive activities include the establishment of dwellings, schools and papakāinga close to the Grid. The purpose of Policy 11 of the NPSET is to prevent sensitive activities (including the expansion of existing sensitive activities) such as these from being established near the National Grid;

[6] In this regard, the relevant transmission lines are shown in the Operative District Plan ePlan maps.

[7] Whitney, 9 August 2023, paragraph 5.9-5.11.

[8] Some of these are also addressed in the evidence of Mr Pretorius.

b. **To manage reverse sensitivity effects**: These effects occur when people undertake activities close to an existing line or structure. For example, National Grid lines can cause noise (especially in damp weather), reduced visual amenity, radio and television interference, perceived effects of electric and magnetic fields from the lines, and interference with landowners' business activities beneath the lines. These effects often lead to neighbouring landowners/occupiers wanting to constrain operation or alter the existing lines. Landowner complaints can ultimately lead to constraints on the operation, maintenance and upgrade of existing National Grid assets;

c. **To protect the integrity of the National Grid (structures and lines)**: Structures, earthworks and other land use activities that are too close to a transmission line and support structures can affect the stability of that line and contribute to electricity outages. The presence of these structures and activities can also increase the need for, and thereby the risk associated with, mobile plant (such as cranes, forestry haulers and excavators) and other equipment. Transpower wishes to ensure that safe distances are maintained so the risk of coming into contact with the lines is minimised;

d. **To enable efficient and safe operation, maintenance and potential upgrade operations**: National Grid Yards/Corridors provide a relatively clear area for line workers to gain access to the line and structures in order to conduct operational maintenance on high voltage equipment, sometimes at great heights. Examples of these activities are provided in **Mr Pretorius**'s evidence. The National Grid corridors also limit the need for costly workarounds (for example, bypass lines), when maintaining and operating the Grid. In addition to this, corridors can also preserve the ability to undertake upgrades in the future, rather than potentially having to construct a new asset;

e. **Reliable and secure electricity supply**: To provide the residential, rural, commercial and industrial electricity users in the Taupō District with a reliable and secure supply of electricity;

f. **To provide the community, Council and Transpower with the knowledge and confidence that the lines are being managed in a safe and sustainable manner**: To provide certainty as to how that management is being achieved in response to the policy framework established by the NPSET; and

g. **To minimise safety hazards**: Electricity transported at high voltages can cause serious, or even fatal, injuries to people who come in close contact with the lines. Corridor management is therefore of paramount importance as it provides for the wellbeing, health and safety of people.

7.6. Councils were required to implement the NPSET within their relevant statutory planning documents by 10 April 2012.[9] As at August 2023, 40 out of 64 district plans have given effect to Policies 10 and 11 of the NPSET through the inclusion of objectives, policies, definitions and rules within their district plans. **Table 1** below indicates the extent of progress across all territorial authority plans in giving effect to the NPSET since 2008. **Appendix C** includes a full list of progress towards implementing the NPSET corridors by council.

District Plans with operative National Grid Corridor provisions	40 (63%)
Councils underway with consultation processes to implement the National Grid Corridors[10]	22 (34%)
Councils that have not yet started any process	2 (3%)
Councils that are reviewing operative National Grid provisions as part of plan review for a second time (as a subset of the green category above).	Far North, Porirua, Waimakariri, Grey (as part of Te Tai o Poutini Plan)

Table 1: Giving effect to the NPSET in territorial authority plans

7.7. Transpower's preferred approach to implementing the NPSET in District Plans across the country has been to require land use setbacks (referred to as the "National Grid Yard") and a subdivision corridor with associated rules (referred to as the "National Grid Subdivision Corridor"), to ensure the safe and sustainable management of the National Grid, third party activities, and landowner and occupier usage near the assets. These outcomes have been achieved through the ongoing policy and plan review and plan change processes undertaken by district and city councils throughout New Zealand since 2008.

7.8. The current approach supported by Transpower has been settled since 2012 following Environment Court appeal, Board of Inquiry, Independent Hearings Panel processes and ongoing engagement with Transpower's key stakeholders such as Federated

[9] The NPSET "Explanatory note" on page 4 states: "*The national policy statement requires local authorities to give effect to its provisions in plans made under the Resource Management Act 1991 by initiating a plan change or review within four years of its approval*." The NPSET came in to force on 10 April 2008.

[10] This is both pre-notification consultation and RMA Schedule 1 consultation processes.

Farmers and Horticulture New Zealand. The provisions Transpower seeks in Taupō are broadly consistent with operative National Grid corridor provisions in other jurisdictions around the country, including Hutt City, Upper Hutt City, Invercargill, Ōpōtiki, Hurunui, Kāpiti Coast, Far North and Whangārei.

7.9. Transpower values its relationship with councils, the community and landowners, and endeavours to work with them to reach the best outcome for all parties concerned. Transpower works with councils around the country prior to, and after notification of plan changes and plan reviews to give effect to the NPSET. Transpower continues to engage with councils once operative plan provisions are in place, including involvement in the resource consent process. It has a team of staff members and an online enquiry portal dedicated to this task.

National Grid Yard

7.10. Transpower generally seeks, and has sought in the PPC42, a 12 metre setback either side of the transmission line centreline for 220kV assets. The National Grid Yard is also defined to include a setback from National Grid support structures, as shown in Figure 4. As well as certain buildings and structures which may have direct effects on, or compromise, the Grid, sensitive activities, intensively used buildings, and certain earthworks are a non-complying activity within the National Grid Yard. This area is shown in pale green in Figure 4.

National Grid Subdivision Corridor

7.11. Transpower supports a subdivision corridor to be set at a specified width depending on the voltage of the line. Subdivision has a restricted discretionary activity status within this corridor, provided a complying building platform can be accommodated outside of the 12 metre National Grid Yard setback (as measured from the centreline or support structure). Under Transpower's preferred regime, subdivision requires non-complying resource consent if the building platform is located within the National Grid Yard and/or vehicle access to support structures is permanently impeded.

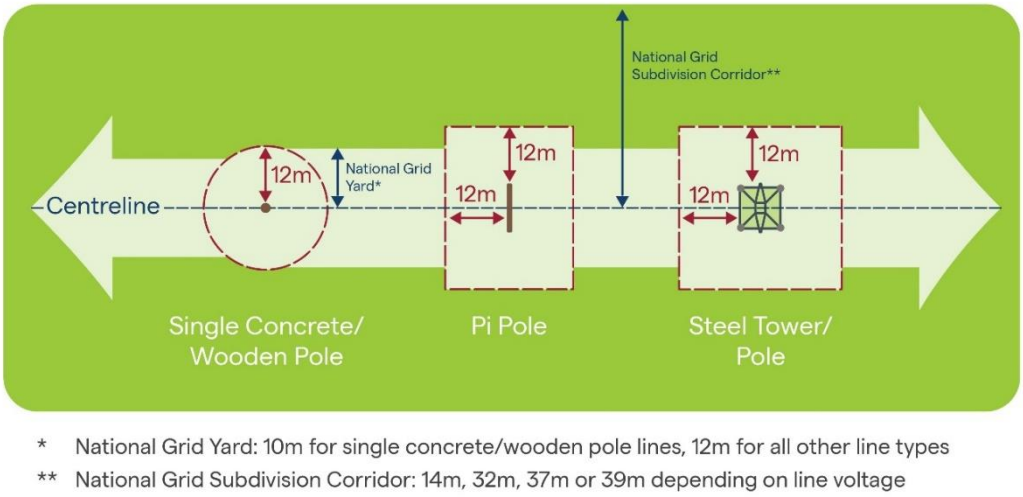

Figure 4: National Grid Yard (Light Green) and National Grid Subdivision Corridor (Green)

7.12. The National Grid Yard and National Grid Subdivision Corridor provisions Transpower seeks in District Plans are informed by:[11]

a. Conductor swing calculations: The 12m National Grid Yard reflects the position of the conductors in normal "every day" wind conditions when operation and maintenance activities would generally be carried out. The subdivision corridor broadly reflects the area of land that could be beneath the conductors in high wind conditions. The approach to calculating the National Grid Yard and National Grid Subdivision Corridor is described further in Mr Pretorius's evidence;

b. The maintenance, access and workspace requirements: The 12m National Grid Yard will allow the support structures and conductors to be accessed and provide sufficient space for most (but not all) maintenance activities. The 12m National Grid Yard will not eliminate all inconvenience caused by operation and maintenance activities, nor necessarily ensure full access for maintenance activities is provided in all circumstances - it attempts to strike a reasonable balance in absence of more comprehensive property rights and protections;

c. An understanding that restrictions on land uses (both the geographical extent of land restricted and the range of uses restricted) need to be justified and allow for continuing reasonable use of the land. Some of Transpower's operation,

[11] Some of this information is also covered within Mr Hein's evidence.

maintenance, upgrading and development could be carried out more efficiently if larger National Grid Corridors were provided (and/or if the corridors were linked to more stringent land use restrictions). However, as day-to-day maintenance is not carried out in high winds, it was considered more reasonable to focus on the 12m National Grid Yard for restricting land use;

d. Whether activities could compromise the Grid. Transpower does not seek a clear corridor, as there are some limited activities that are unlikely to compromise the National Grid now or in the future. Requiring resource consent for all development would add unnecessary costs, both for the landowner and Transpower (who would be notified of the applications). Instead, the rule framework Transpower proposes has some limited permitted activities; and

e. The need for the District Plan provisions to be clearly understood by Plan users, and enforceable by councils.

7.13. The corridors are based on the operational and maintenance needs of Transpower's existing assets. They have not been sized to provide for major rebuilds or new lines. For new lines projects, Transpower's general approach is to obtain a designated corridor and an easement over the affected properties involved in the project. Both the designation and easement would contain restrictions on the activities within the designated/easement area, that is Transpower seeks clear corridors to ensure the safe and efficient operation of the line. Transpower seeks a corridor that is clear of buildings and structures (other than fences) and restricts all earthworks unless Transpower agrees. Such a restrictive approach is not considered appropriate for the corridors that are required to implement Policies 10 and 11 of the NPSET – those corridors are the minimum Transpower requires and are a compromised position.

7.14. The corridor and yard provisions sought by Transpower necessarily go beyond compliance with the New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP34:2001). NZECP34:2001 relates to electrical safe distances - it does not address the resource management matters in Policies 10 and 11 of the NPSET. Transpower does not support simple reliance upon NZECP34:2001, as it does not ensure the National Grid infrastructure and surrounding land are proactively and sustainably managed for the future. For example, NZECP34:2001 compliant development can still prevent access to National Grid support structures and does not distinguish between land use types (e.g., sensitive activities).

Subdivision Examples

7.15. The regulation of subdivision in the vicinity of the National Grid will enable Council to give effect to Policies 10 and 11 of the NPSET and to manage the potential effects of a subdivision on the operation/maintenance and upgrading of the network - including retaining an area for access to the network.

7.16. In my view subdivision within the Taupō District should be regulated near the transmission lines because:

a. Transpower wants to avoid the creation of allotments on which it would be difficult or impossible to construct a complying dwelling;

b. Subdivision is an opportunity to design around the transmission lines, so that subsequent development can occur safely and not compromise the National Grid;

c. The public has an expectation that at least one dwelling can be constructed on each legal title. The requirement to demonstrate complying building platforms is consistent with this;

d. Subdivision can disrupt access to lines because it often precedes changes to land uses, including fences and driveways (which can prevent or facilitate access to land). Transpower has the legal right under the Electricity Act 1992 to access the lines but the physical ability to access the lines also needs to be protected;

e. Transpower cannot rely on NZECP34:2001 to protect the National Grid from the effects of subdivision, as it does not restrict the subdivision of land near lines or substations, and it does not prevent underbuilding;

f. Subdivision also means Transpower will in the future need to manage its operations around a greater number of landowners and their activities; and

g. Transpower is not always recognised by councils or applicants as being affected by subdivision applications.

7.17. Subdivision provides the framework for future land use and is enduring. Integrated planning at the subdivision stage can avoid land use conflicts later. In particular, restricted discretionary activity status (defaulting to non-complying if certain

requirements are not met) at the subdivision stage provides the opportunity for Transpower and the Council to consider whether buildings can be sited in a safe manner, including safe earthworks and construction, and in a way that avoids transmission activities being compromised. It also avoids reverse sensitivity effects arising from the visual, noise and other impacts of the National Grid (consistent with Policy 10 of the NPSET).

7.18. The District Plan needs to establish rules to avoid potential future adverse effects on National Grid infrastructure. Given the significance of the issues involved, and the directives of the NPSET, this is an appropriately proactive approach to pursue.

7.19. The following are some examples of successful subdivision outcomes near the National Grid, to demonstrate how the National Grid Subdivision Corridor provisions can be implemented in practice. This includes the provision of roads underneath the lines and lot configuration that provides fully complying and usable lots.

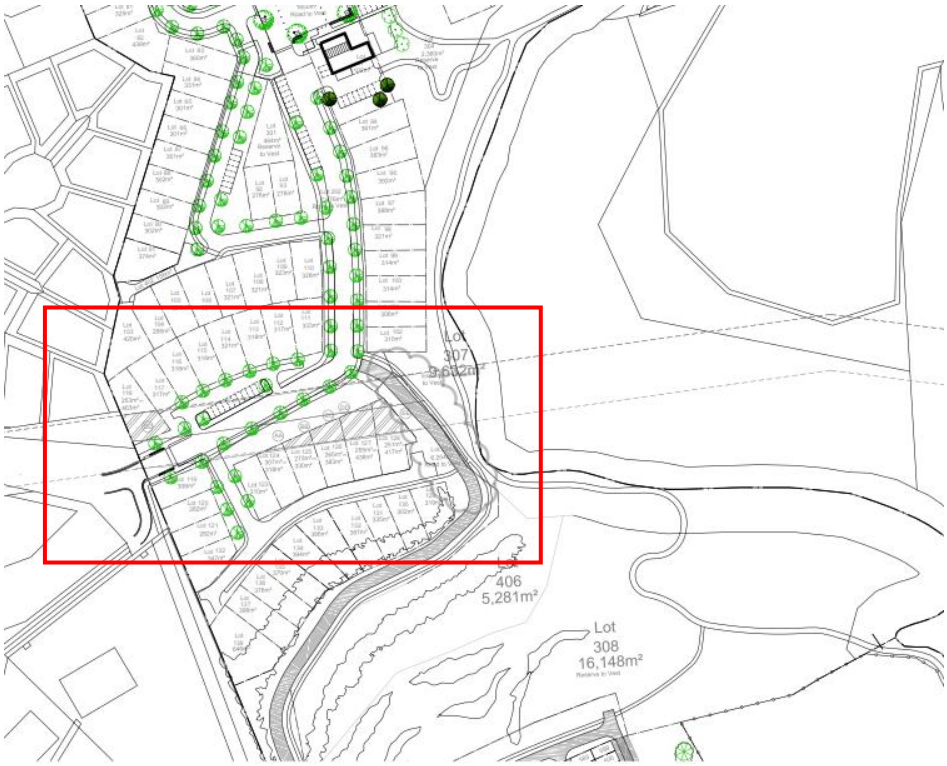

Figure 5: Subdivision at Lake Hayes, Queenstown

7.20. Compatible development of greenfield sites is possible, especially if those plans take account of Transpower infrastructure. The subdivision in Figure 5 in Queenstown is an example where Transpower has supported subdivision around the National Grid. The application was approved with “no build” consent notices imposed as conditions over some residential allotments within the corridor, which is shown running horizontally

through the centre of the image. The “no build” areas are indicated by the diagonal striping over parts of some lots on the south side of the road. In consultation with Transpower, the developer designed the subdivision so that the transmission line corridor traversed primarily roads and reserves.

7.21. Figure 6 is an aerial photo of this subdivision scheme plan, post-construction. It shows the road broadly following the alignment of the transmission line centreline, with dwellings set back.

Figure 6: Implemented subdivision at Lake Hayes, Queenstown

7.22. Another example of compatible greenfields subdivision development is the Industrial Highbrook Development in South Auckland (Figures 7 and 8) where the roads and industrial buildings were planned and constructed to minimise the impacts on Transpower’s infrastructure, and consequently the road users and owners/occupiers of the neighbouring land. As can be seen from the photos, the road has been designed around a clear yard and comparatively clear corridor.

Figure 7: Highbrook Development in South Auckland

Figure 8: Highbrook Development in South Auckland

8. Conclusions

8.1. The National Grid is critical to the social and economic wellbeing of the Taupō 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 in the future. As an infrastructure asset of national significance, the NPSET requires that the National Grid be recognised and provided for in the District Plan.

8.2. Policies 10 and 11 of the NPSET require that other activities around the National Grid do not compromise the operation, maintenance, development and upgrading of the infrastructure, that reverse sensitivity effects are managed, and that sensitive activities are generally not provided for around the infrastructure. Transpower has refined its approach to the implementation of the NPSET in districts around the country. For the reasons set out above, Transpower requests that PPC38 and PPC42 include the provisions recommended in **Ms Whitney's** evidence.

8.3. This relief will ensure integrated management of activities through the rural zones 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 Taupō District.

Rebecca Mary Eng

9 August 2023

Appendix A: Statement of Experience

Career Summary

Technical Lead – Policy, Transpower New Zealand Ltd: January 2022 – present

Senior Environmental Planner, Transpower New Zealand Ltd: July 2015 – December 2021

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: Map of Taupō District Assets

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Transpower Assets

Taupo District

Legend

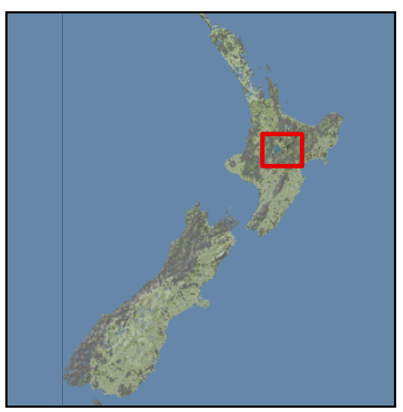
Territorial Land Authority
- Boundary

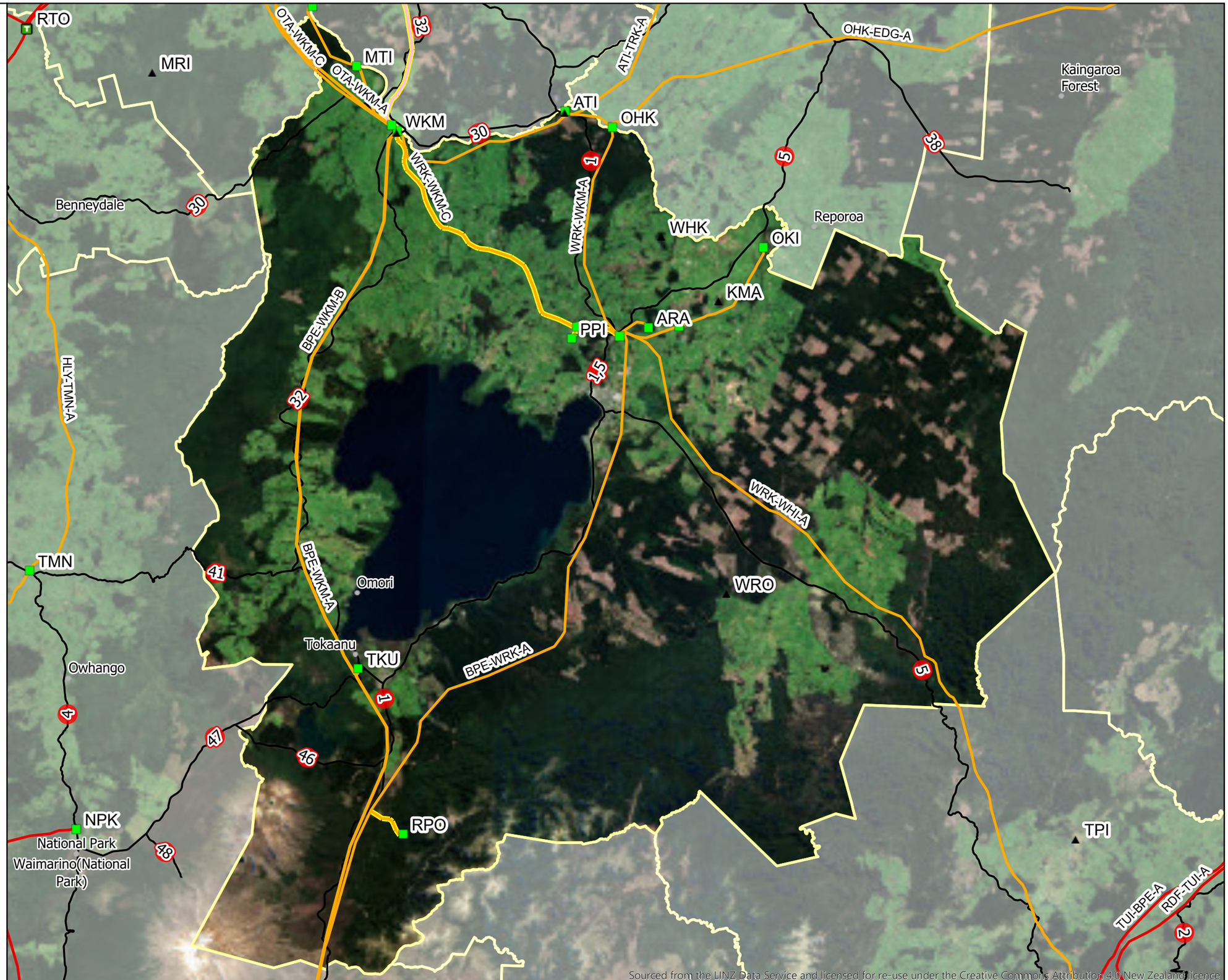
NZ Roads
- Highways

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





TRANSPOWER
Prepared by: Transpower Geospatial

Projection: NZTM 2000 Scale: 1:440,000 Plan Size: A3L

0 1,000 2,000 km

External Disclaimer

This document is produced for external release. Its conclusions are based on the information currently available to Transpower and may change as further information becomes available either internally or externally.

Date: 8/04/2020 *Drawn by: berrymanem*

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Appendix C: District Plans with Operative National Grid Corridor Provisions

Legend	
"Operative" National Grid corridor provisions	
Councils underway with consultation processes to implement the National Grid Corridors[12]	
Councils that have not yet started any process to give effect to Policies 10 and 11 of the NPSET (that Transpower is aware of)	

District/ Unitary Plan	Year operative
Waimakariri District	2008
Stratford District	2009
Kawerau District	2011
Upper Hutt City	2012
Ōtorohanga District	2012
Ashburton District	2012
Tauranga City	2012
Western Bay of Plenty District	2013
Central Otago District	2013
Waimate District	2013
Horowhenua District	2013
Rangitikei District	2013
Ruapehu District	2013
Whangārei District	2014
Hauraki District	2014
Matamata-Piako District	2014
South Waikato District	2015

[12] This is both pre-notification consultation and RMA Schedule 1 consultation processes. These councils may have some form of regulation of land use and development near the National Grid, but the provisions may not give effect to the NPSET.

District/ Unitary Plan	Year operative
Rotorua District	2015
Waipa District	2015
Grey District	2015
Southland District	2015
Hastings District	2016
Porirua City	2016
Hutt City	2016
Napier City	2016
Far North District	2017
Kaipara District	2017
Thames-Coromandel District	2017
Auckland	2017
Hamilton City	2017
Whakatāne District	2017
South Taranaki District	2017
Palmerston North City	2017
Whanganui District	2017
Ōpōtiki District	2019
Manawatū District	TBC
Christchurch City	2017
Invercargill City	2017
Hurunui District	2017
Kāpiti Coast District	2018
Clutha District	2015
Dunedin City	Appeals

District/ Unitary Plan	Year operative
Queenstown-Lakes District	Appeals
Taupō District	Submissions (rural zones only)
Waikato District	Appeals
Waitomo District	Submissions
New Plymouth District	Appeals
Central Hawke's Bay District	Appeals
Tasman District	Pre-notification
Nelson City	Pre-notification
Marlborough District	Appeals
Buller, Westland and Grey	Submissions (Te Tai o Poutini Combined District Plan)
Mackenzie District	Pre-notification
Selwyn District	Awaiting decisions
Timaru District	Submissions
Masterton, Carterton and South Wairarapa Districts (combined plan)	Pre-notification
Wellington City	Hearings
Gore District	Pre-notification
Waitaki District	Pre-notification
Wairoa District	N/A
Tararua District	N/A
Gisborne District (No national Grid assets)	N/A
Kaikōura District (no National Grid assets)	N/A
Chatham Islands (no National Grid assets)	N/A