

Before the Independent Hearings Panel
appointed by the Waimakariri District Council

under: the Resource Management Act 1991

in the matter of: Submissions and further submissions in relation to the
proposed Waimakariri District Plan, Variation 1 and
Variation 2

and: Hearing Stream 5: Noise, Notable Trees, Historic
Heritage, Signs, Light, Energy and Infrastructure,
Transport, Earthworks

and: **MainPower New Zealand Limited**
Submitter 249

Statement of Evidence of Mark Appleman

Dated: 7 August 2023

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STATEMENT OF EVIDENCE OF MARK APPLEMAN

- 1 My full name is Mark Henry Appleman.
- 2 I am the General Manager of Network Strategy and Planning at MainPower New Zealand Limited (*MainPower*) (submitter number 249).
- 3 In this role I am responsible for developing the strategy for managing MainPower's network assets and then delivering the annual work plan to develop and maintain the MainPower network.
- 4 I am authorised to provide evidence on behalf of MainPower for the proposed Waimakariri District Plan (*proposed Plan*) review.
- 5 I have previously prepared a brief of evidence for Hearing Streams 1, 3 and 4 of the proposed Plan. I adopt that evidence for the purposes of this hearing and provide supplementary detail relevant to Hearing Stream 5 matters below.
- 6 My qualifications and experience are set out in full in my Hearing Stream 1 evidence.
- 7 While I am an employee of MainPower, I have expertise in the field of electrical engineering and confirm that I have read and agree to comply with the "Code of Conduct for Expert Witnesses" contained in the Environment Court Practice Note 2023. In particular, unless I state otherwise, the technical matters on which I give evidence are within my area of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

SUMMARY OF PREVIOUS EVIDENCE

- 8 As explained in my Hearing Stream 1 evidence, MainPower is responsible for the establishment, operation, maintenance and upgrade of the electricity distribution network in North Canterbury. MainPower's work frequently involves installing, maintaining/repairing and upgrading of our electricity infrastructure (including lines, towers, poles, cables, transformers and kiosks).
- 9 MainPower undertakes, and will continue to undertake, these activities in accordance with the relevant legislation and codes of practice. MainPower seeks that the proposed Plan provide clarity and certainty to enable the secure and efficient operation of the electricity distribution network. MainPower's submissions, evidence and presentations in the proposed Plan process are based on a desire to achieve sustainable environmental outcomes and to meet customer requirements for a safe and reliable source of electricity.

ENERGY AND INFRASTRUCTURE CHAPTER

- 10 In relation to the Energy and Infrastructure chapter, it is important that the provisions are clear and that relevant rules are easy for plan users to identify. MainPower's view is that clear rules reduce the likelihood of breaches of NZECP 34:2001 and the Electricity Act, resulting in reduced risk to landowners and enabling the safe and efficient operation, maintenance and upgrade of the electricity distribution network.
- 11 We believe that the overall approach of the proposed Plan could be improved by providing better linkages between the Energy and Infrastructure chapter and other chapters. This would make it easier for plan users to understand the effect of rules that apply across the district to protect electricity infrastructure and reduce the risk of interference with MainPower assets.
- 12 My Stream 1 evidence outlines the risks of having structures/fences or earthworks in close proximity to MainPower's network assets. To summarise it can cause increased risk to people (electric shock) and property, and complications to operation, maintenance and upgrade activities. This impacts on the reliability of electricity supply for our customers.
- 13 With specific reference to EI-R19 and EI-R25 it is important to be clear about the need for the proposed Plan to support the efficient installation of Kiosk Substations. A typical MainPower Kiosk Substation is shown below and consists of:
- 13.1 HV Switching Station;
 - 13.2 Transformer; and
 - 13.3 LV Distribution Cabinet.



- 14 MainPower continues to support the community to transition to a low carbon economy and we also support higher density housing. As a result of this, there will be an increased need to supply both the replacement and installation of Kiosk Substations.
- 15 The Kiosk Substations need to be able to be installed on both private land and in the road reserve. Typically, these Kiosk

Substations require a foot print of 4 x 4m (16m²) and a height of 3.0m.

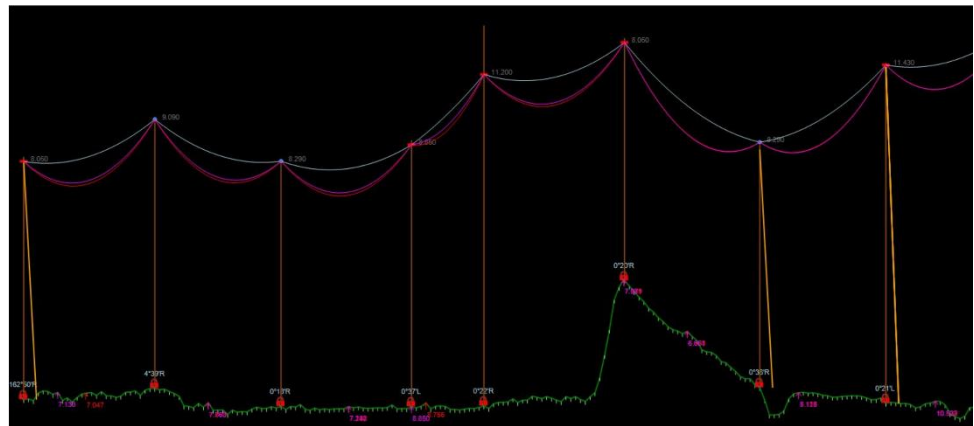
- 16 Within the proposed Plan rules, MainPower seeks that there be no distinction between Kiosk Substations required to be installed outside or inside the road corridor, and that the area be 30m² and 5.5m height.
- 17 It should be noted that, while MainPower seeks this area, the area also supports a buried earth ring. The actual transformer and cabinets extending out of the ground is much less than the area sought.
- 18 Furthermore, the proposed Plan needs to be flexible enough to accommodate advances in switchgear design. For example, the sustainable use of Air Insulated Switchgear will mean that the area required to support future Kiosk Substations will need to increase.
- 19 My evidence for Hearing Streams 3 and 4 outlines examples of where there is a functional / operational need for MainPower to locate its electricity distribution assets in particular areas. It is important that this is also recognised in the Energy and Infrastructure chapter.
- 20 With specific reference EI-R12 MainPower seeks that poles are able to be replaced to their original height.
- 21 However, it must also be recognised that it is not always possible for MainPower to replace with equivalent replacement poles. For aged 8.5m poles the standard is now an 11m pole. Also, as demand increases on the network, there are instances where a taller regulator pole may be required to support voltage regulation in some areas.
- 22 In all cases MainPower is acutely aware of the environmental impact of our infrastructure assets on consumers, who are also our owners. It is not in MainPower's interest to install poles and wires that negatively impact the community.
- 23 A recent example of this is illustrated below, where MainPower installed a Regulator Pole to support voltage in the Kainga area.
 - 23.1 The location is a stock bank along the Waimakariri River, with an existing easement of poles routed down Greigs Road on the Motorway reserve.
 - 23.2 There was a need to install an 11.2m pole, in a location where poles are on average 8 m.
 - 23.3 The need for the increase in pole height was to support additional voltage regulation activity in the Kainga area,

effectively eliminating the need to install ground-based infrastructure which would have been the next option.

23.4 This represents a 37.5% increase in replacement pole height.

23.5 The height increase is consummate to the existing line, considering the pole located on the stock bank.

23.6 The proposed 11.2m pole was positioned following consultation with an impacted party.



24 I understand that Council's reporting officer has recommended that the proposed Plan limit replacement poles or towers to a 15% increase. MainPower needs to be able to install higher replacement poles/towers in certain circumstances as outlined above.

NOISE CHAPTER

25 MainPower and the service it delivers continues to support community sustainability, even more so as the community seeks to de-carbonise. The service is a Lifeline Utility that the community is becoming more dependent upon as other carbon-based energy sources become less sustainable.

26 This requires MainPower to continue to grow and plan for new activities in the community, including the use and increase use of plant and equipment like mobile plant, generation and aeronautical services.

27 MainPower seeks that the proposed Plan Noise provisions accommodate:

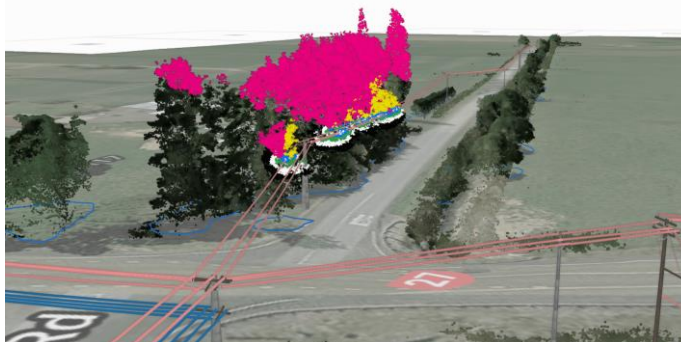
27.1 The use of generators and mobile equipment (including vehicles) for its day-to-day operations;

27.2 The use of generators and mobile equipment (including vehicles) for emergency response;

- 27.3 The use of generators to minimise electricity interruption either due to plan work or a longer emergency response; and
- 27.4 The use of drones, helicopters and fixed wing aircraft for both day-to-day operations and fault response.

NOTABLE TREES CHAPTER

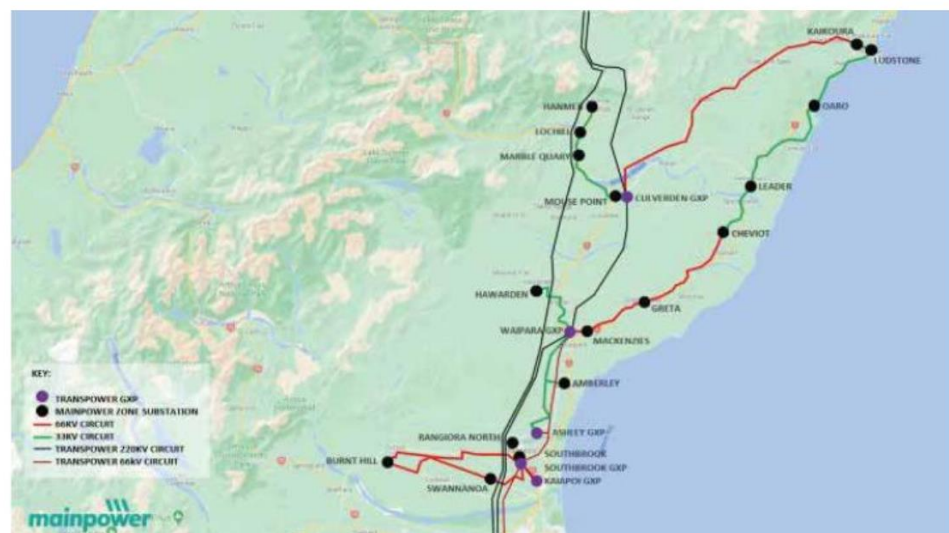
- 28 Vegetation presents a significant risk to MainPower and its services to the North Canterbury Community.
- 29 Vegetation coming into contact with power lines can result in:
 - 29.1 Loss of electricity supply to the community;
 - 29.2 Wildfire, and the subsequent impact of wildfire on the community including loss of homes; and
 - 29.3 Voltage rise around the tree, presenting as an electric shock hazard in the public space.
- 30 Wildfire is a key risk under the MainPower climate change adaptation strategy, where we already model conductor sag and blowout across the network for the purposes of:
 - 30.1 Vegetation risk assessments under different weather conditions (1 in 50 year wind / storm event);
 - 30.2 Prioritisation and planning – measuring vegetation risk by span, cluster, volume, vegetation type, fall zone; and
 - 30.3 Tracking – import completed vegetation works to remove cleared defects.
- 31 The image below shows an example within MainPowers’ Digital Twin modelling the impacted area (Red / Pink Area) of vegetation in proximity to power lines considering increased wind speeds and the need to remove vegetation in this zone due to the risk it presents.



EARTHWORKS CHAPTER

Around SEDL Corridors

- 32 MainPower seeks that the proposed Plan include corridor protection setback rules to ensure its Significant Electricity Distribution Lines (SEDL) are protected from inappropriate land uses including earthworks. The asset owners of these lines are both Transpower and MainPower. This is primarily a matter of safety i.e. to protect people undertaking activities in close proximity to lines and to protect staff working on the lines. Earthworks in close proximity to lines can also complicate operation, maintenance and upgrading activities and can add significantly to the costs and duration of works.
- 33 Beyond the personal safety concerns, SEDLs are the lines that interlink regions and are high voltage and high energy, provide inter regional resilience and if negatively impacted result in power loss to a large number of consumers. The SEDLs are illustrated below.



- 34 Excavation and earthworks near overhead line support structures can destabilise the ground and the structure itself. This creates a significant safety hazard and can undermine the structural integrity of the overhead line.
- 35 MainPower seeks that the proposed Plan include corridor protection setback rules to ensure existing SEDLs are protected from inappropriate land uses and earthworks.
- 36 Therefore, it is important that MainPower and Transpower SEDLs are shown in the proposed Plan. Equally it is just as important to include corridor protection rules regulating earthworks in proximity to SEDLs, as it is to include corridors regulating the location of buildings and structures near SEDLs.

- 37 MainPower seeks that rules which protect SEDLs from risks caused by earthworks within corridors or immediately adjacent to SEDL poles, towers and support structures are included in the Proposed Plan to recognise that earthworks should:
- 37.1 be no deeper than 300mm within 6m of a foundation of the electricity distribution line support structure;
 - 37.2 be no deeper than 3m between 6 and 10m from the foundation of the electricity distribution line support structure;
 - 37.3 not destabilise an electricity distribution line support structure; and
 - 37.4 not result in a reduction in the ground to conductor clearing distances below what is required by Table 4 in the NZECP 34:2001.
- 38 For all other structures MainPower proposes that earthworks should:
- 38.1 be no deeper than 300mm within 2.2m of a foundation of the structure;
 - 38.2 be no deeper than 0.75m between 2.2 and 5 m from the foundation of the structure;
 - 38.3 not destabilise an electricity distribution line support structure; and
 - 38.4 not result in a reduction in the ground to conductor clearance distances below what is required by Table 4 in NZECP34:2001.
- 39 The setbacks sought by MainPower are consistent with the safe distances required in NZCEP34:2001. This is necessary to protect against activities which destabilise support structures but also to manage safe distances defined in NZCEP34:2001 due to stock piling or building near power lines.
- Services Clash**
- 40 While MainPower and Transpower distribute high energy through overhead structures, there are also equally high-power distribution underground. These services present equally high impact to people and the community if disturbed, including:
- 40.1 high risk to public and employee's safety, especially if electrical services are disturbed; and

- 40.2 major risk of disruption to business arising from loss of power and communication.
- 41 Instances of excavation by contractors disturbing underground distribution infrastructure have three agencies of failure, as follows:
- 41.1 Known Services - Accurately Located - Contractors failing to effectively manage excavations in accordance with best practice.
- 41.2 Known Services - Inaccurately Located - Common reasons have been the service location not being sufficiently rigorous and failing to detect changes in depth or alignment or use of pot holing.
- 41.3 Unknown Services - Services have been installed and Geographic Information System (GIS) may be incomplete.
- 42 MainPower seeks that the proposed Plan recognise the basic service location and management best practice, The 5 P's Plan, Prepare, Pothole Protect and Proceed, as follows:
- 42.1 Plan - Understanding what underground infrastructure is present in the vicinity of the excavation work site. Use Dial Before You Dig (DBYD)
- 42.2 Prepare - Prepare work by reviewing the plans and contacting the utility asset owner if assistance is needed. Engage service location including the location of unknown services in developed areas.
- 42.3 Pothole - Undertake potholing prior to excavation to validate the type and position of the services.
- 42.4 Protect - Install protective barriers and support in accordance with the asset owner's requirements and identified information which needs to be communicated to everyone onsite.
- 42.5 Proceed - Proceed with the work required in confidence that essential and in some cases dangerous services are protected.

CONCLUSION

- 43 MainPower is driven to provide the North Canterbury community with electricity distribution services that are safe, reliable, sustainable and efficient. It is important that the proposed Plan clearly sets out where rules that protect the electricity distribution network are located, and contains provisions that adequately

provide for maintenance, repair and upgrade works to the network. For the purposes of Hearing Stream 5 this includes provision for Kiosk Substations, replacement of existing poles that may need to be taller in some instances and sufficient setbacks in relation to vegetation and earthworks.

7 August 2023

Mark Appleman