1. Introduction

1.1 My name is Benjamin Roy Cartwright. I am employed by Transpower as an Engineer – Lines within the Tactical Engineering Team. I will proceed to summarise the key points from my statement of evidence dated 31 May 2022. I note my evidence stands and having read the evidence of other parties, have no amendments to make.

2. Activities undertaken by Transpower

Transmission lines

2.1 Overhead transmission lines include five basic components: conductors (wires); structures (poles or towers); insulator sets; foundations; and earthwires. These are described in Appendix A of my main statement of evidence.

2.2 These components are designed to perform specific functions, and it is often difficult to change their look, location, or size to minimise adverse effects without compromising that function.

2.3 Transmission line components require ongoing inspection and routine maintenance, to address aging, wilful damage, corrosion and degradation. The most frequent maintenance activities are:

a. foundation and structure refurbishment or replacement,

b. conductor, insulator and associated hardware maintenance or replacement;

c. vegetation and tree control; and

d. earth potential rise mitigation (or EPR)

2.4 Physical access to transmission lines is required for all maintenance and project work, including for staff, vehicles, helicopters and large construction equipment. A regulated transmission corridor is essential for providing adequate access and working space at the poles, towers and mid-span.

Within the Central Hawkes Bay, the majority of the 700 support structures are single poles. The access and maintenance requirements of these are largely the same as for tower support structures.

Access and under-build

2.5 Under-build can delay, restrict or compromise the ability of Transpower to undertake maintenance or project work. In order to undertake vital maintenance works, and upgrades if required, appropriate access to the National Grid must be maintained. Access to the National Grid is particularly important to consider when consent authorities are assessing proposals by third parties to change land use or to subdivide land.

2.6 When a system fault occurs, the Grid needs to be restored quickly to reduce impacts on businesses and communities throughout the Central Hawkes Bay District, and beyond. Inadequate access to Transpower's assets creates significant additional costs and delays for Transpower when restoring the Grid

2.7 Prudently designing buildings, structures or activities with the transmission line in mind ensures vital National Grid infrastructure is protected and can be maintained and upgraded.

3. Regulating third party activities around the National Grid

3.1 The transmission network gives rise to specific risks, such as lethal electric shocks. These risks increase if there are inappropriate activities located under the transmission lines, or in close proximity to them.

Risks arising from the National Grid

3.2 Transpower operates its assets as safely as possible, but there are risks due to the high voltages being carried on the network. Lethal electric shocks can be caused by earth potential rise, conductor drop and flashovers. Hazards can also be caused by trees, mobile plant and other materials coming into contact with, or close to, overhead lines.

3.3 Transmission lines can also cause concern or annoyance, because of how they look, their mechanical or electrical noise, electrical interference, and perceived health effects. These effects can lead to requests for Transpower to underground lines, relocate lines, or to raise or lower conductors.

3.4 Sensitive activities, commercial buildings and intensive development (including some farm buildings) should be avoided beneath transmission lines because of electrical risk, annoyance caused by the transmission lines, and the challenges presented by these activities when Transpower needs to access, maintain, upgrade and develop the lines.

4. The National Grid Yard/ Corridor

4.1 The engineering evidence based 10m National Grid Yard (either side of the centreline) is the area (measured horizontally) beneath the conductors in "everyday" wind conditions. A 12m setback around each tower or support structure is also required for access, maintenance, and safety purposes. The wider National Grid Subdivision Corridor is the area sought for subdivision which extends to the width defined by the swing of the conductors in high wind conditions. These areas are the bare minimum to ensure that Transpower's maintenance, repair, upgrade and operation activities are not compromised.

5. NZECP34

5.1 NZECP34:2001 serves an important purpose in prescribing minimum safe distances for the construction of buildings and structures, for the use of mobile plant, and for excavation near transmission line support structures and overhead lines. It does not address the wider third-party effects that compromise the National Grid, which are managed by the NPSET.

5.2 The minimum safety requirements in NZECP34:2001, neither seek to protect the integrity of the National Grid from the effects of third parties, nor prevent development (including sensitive and intensive development) from occurring directly underneath transmission lines. As discussed in my evidence, such development can constrain operational and maintenance activities on lines. While Table 1 of NZECP references 8m setback from poles, these are minimum safe distances and do not address access and maintenance requirements.

5.3 Further, NZECP34:2001 does not adequately account for EPR hazard contours. Table 1 of NZECP34 was developed partially to account for EPR, however, the science behind this has developed since 2001. In my experience, the distances in Table 1 rarely cover the EPR contours.

5.4 I note that Transpower has been involved presently in the rewriting on NZECP, a standard that is administered by MBIE, and work is ongoing.