

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a notice of requirement issued by **WEL NETWORKS LIMITED** pursuant to section 168(2) of the Act for designations (3) to authorise the implementation of the Western Network Upgrade Project

STATEMENT OF EVIDENCE OF RONALD FORESTER JACKSON

1. INTRODUCTION

- 1.1 My name is Ronald Jackson. I am employed by WEL Networks ("WEL") as a Network Assessor.
- 1.2 I have 7 years experience in survey, draughting and surveying related roles with the Lands and Survey Department (1970 – 1977) and 29 years experience working in the electricity industry in Asia and New Zealand. I have also completed a paper in overhead line design at the Queensland University of Technology.
- 1.3 In terms of my electricity industry experience, I was employed by the (then) Horowhenua Power Board ("HPB") in Levin in 1980 first as the chief draughtsman and subsequently as the network planner for distribution (which included both substations and overhead lines).
- 1.4 I was first employed by WEL Networks Ltd ("WEL") in 1990, originally as a Line Design Engineer and then as a Project Manager. In that role, I have been involved in designing and project managing numerous overhead lines, including the 33kV line re-conductoring from Hamilton substation to Horotiu substation, the 33kV line from Horotiu to Weavers substation, the lines at the Huntly mines. I have also undertaken work for WEL as a Contract Manager Consultant in Indonesia, where I worked for two years in rural line design and construction.

- 1.5 Since 2003, I have been employed by WEL as a Network Assessor. My responsibilities include the review, update and implementation of worksite inspections to ensure compliance with all relevant health, safety and quality standards and regulations. I also update and implement the worksite assessment process itself and carry out other daily job assessments.

Involvement in project

- 1.6 I have been involved in the Western Network Upgrade Project (“WNUP”) since 2007. My role in that project is to assess the possible line routes for the 110kV line from the Te Uku Wind Park to the Te Kowhai substation and to identify the most appropriate line route, having regard to a range of factors including technical considerations, construction feasibility, environmental factors and issues raised by the owners and occupiers of land on and adjacent to of the line route and, more recently, submitters. In that capacity, I was primarily responsible for the preliminary design of the line route and pole positions for the 110 kV line. I have also worked alongside WEL representatives who have been negotiating with landowners, etc., in relation to any proposed changes to the line route, in each case providing information on the feasibility of the suggested route changes.

Purpose and scope of evidence

- 1.7 The purpose of my evidence is to clarify the basis for the decisions taken in relation to the line route, in terms of alternative routes, construction methodology and equipment choices. My evidence needs to be considered alongside that of David Mollekin which addresses the entire project and the overall philosophy and approach which was adopted in terms of assessing alternatives and the factors which are considered in assessing options in terms of line route and equipment.
- 1.8 Specifically, my evidence will:
- (a) Provide a broad overview of the proposed line route and infrastructure (Section 3).
 - (b) Provide a detailed description of the 110kv line route by reference to the properties which the line crosses, including details of the infrastructure to be used and works to be undertaken, including rationalisation of existing infrastructure. I will also focus on areas adjacent to the line route where the proposed placement of the line in

roads is a contentious issue, as reflected by submissions lodged (Sections 4 - 22).

1.9 A summary of my evidence is contained in section 2.

1.10 I am authorised to present this evidence on behalf of WEL.

2. SUMMARY OF MY EVIDENCE

Overview of sub-transmission line

2.1 Within the corridor to be designated, the detailed design of the line (including pole types and locations, etc) is yet to be undertaken. WEL will let contracts for the final design of and construction of the line, but contractors will be required to comply with the conditions on the designation and all other applicable statutory requirements and regulations.

2.2 The route travels in a north-easterly direction from the Te Uku Wind Park to State Highway 23, across private property. It continues in a north easterly direction over The Deviation (via both private property and State Highway 23), crossing a number of small waterways on the way. On the east of The Deviation, the line route continues in a north easterly direction across both private property and Karakariki Road until it reaches the Cunningham property. From there, the route crosses the Waipa River to Te Kowhai substation.

2.3 Eleven types of poles (either be concrete or steel) will be used, which will depend upon the location of the poles and what lines the poles are required to carry.

Vanhoutte, Clifford, Richards, Van der Helm properties

2.4 The route commences at the Wind Park substation and crosses the Vanhoutte property in a north-easterly direction to the boundary of the Clifford property just north of the existing Telecom Tower. The route on the Clifford property runs in a straight line to the northern boundary, where it then runs parallel to that boundary through rolling to steep country in a generally north-easterly direction until it meets the boundary of the Richards' property. The line then runs along the Richards/Van der Helm property (at the request of the landowners) in a general northerly direction to State Highway 23.

- 2.5 The route crosses State Highway 23 to the northern side of the Richards' property in a generally easterly direction. This aspect of the route was selected to avoid an area of potential subdivision. Mr Sutton's submission relates to this aspect of the line. WEL has considered the impact on Mr Sutton's property and elected to locate the line behind a ridgeline, so that the visual effects from the Sutton property are reduced.
- 2.6 Some indigenous vegetation on the Clifford property (which mostly consists of pongas with a few trees) will need to be removed where it will affect the pole locations or required lines clearance will be removed. Pines will be cleared on the Van der Helm/ Richards properties because they are located on the line route requested by the landowners. Twenty suitable replacement trees will be planted in consultation with Mr Richards.

Large/Gibbs/Williamson/Hammond properties

- 2.7 The line passes through the Large property (no poles are located on that site) to the Gibbs property and passes through that property to the north-eastern boundary, following the existing 11kV/33kV line (with the exception of a minor deviation at the request of Mr Gibbs). The line then crosses State Highway 23 onto the Williamson property and continues in a straight line before it again crosses State Highway 23 outside the Hammond and Hope properties. The rationale for the pole locations outside the AC Hope property is to keep the line away from the Hammond residential homestead and to comply with NZTPA requirements.

Consideration of alternatives to avoid Gibbs/Williamson/Hope properties

- 2.8 WEL has considered a number of options in order to avoid the Gibbs, Williamson and AC Hope properties, including placing the line along State Highway 23 in that area, considering a more northern route proposed by those parties and undergrounding the line.
- 2.9 None of those options were considered to be feasible by WEL. In relation to placing the line in State Highway 23, this option would be contrary to WEL and New Zealand Transport Agency ("NZTPA") policy, particularly because it would pose a traffic hazard/risk to NZTPA and a security of supply risk to WEL. In relation to the "high route", this was not a practical option and WEL was unable to secure agreement with necessary landowners.

- 2.10 Undergrounding of the sub-transmission line was also considered not to be feasible due to the costs associated with undergrounding and other reasons outlined by Mr Mollekin. WEL therefore concluded that there were no viable alternatives to the route which had been initially identified.

Hope, Vela, Balme, Tainui, McCauley, Kirkbride, Lyndon properties

- 2.11 The route crosses through the Hammond property (no poles located on this site) into the C E Hope property in a generally easterly direction and runs in a north easterly direction before turning to the north as it runs towards the Te Kowhai substation. There are two existing 33kV lines currently running across the Hope property, being the northern and southern 33kV lines that cross the deviation. The northern 33kV line will be removed in its entirety soon after the 110kV line has been commissioned.
- 2.12 On the Vela property, the route follows the existing northern 33kV route through a forest plantation in a north easterly direction until it reaches the Balme property. The rationale for the route is that the northern 33kV line currently runs through there. The route follows a straight line across the Balme property to the north east boundary of that property and then proceeds across the Tainui property, generally in a straight line toward the north east. The route avoids an airstrip and a natural conservation area on that property and runs along an existing farm track in order to utilise that track for the purposes of construction etc.
- 2.13 The route then travels north east through the McCauley property and through the Anderson before crossing again into the far north eastern corner of the McCauley property. The route follows a straight line across the Kirkbride property to the McCallum property, where it turns in a northerly direction before entering the Lyndon property. WEL has an agreement to undertake screen planting on the McCallum property where appropriate and in consultation with surrounding landowners.

Karakariki Road and Armstrong property

- 2.14 After leaving the Lyndon property the route follows Karakariki Road to the north all the way to the Cunningham property (with one minor exception insodar as it crosses a small corner of the Armstrong property) The route crosses Karakariki Road in a number of places to avoid houses located close to the street and to minimise the number of angles in the line and enable appropriate clearances from the centre line of the road reserve.

- 2.15 There will be some vegetation clearance required in the road reserve along this section of the route and on the Armstrong property, although the proposed line route avoids the indigenous bush in that area.

Consideration of alternatives to Karikariki Road

- 2.16 WEL considered a number of alternatives along Karakariki Road, particularly in the vicinity of the McCauley to Lyndon properties. It was difficult to obtain agreements with landowners in that area and after attempting unsuccessfully to do so, WEL looked at options for locating the line on Karakariki Road from the McCauley property northward, which would have had a greater impact on houses along the road front. The landowners in that area held a meeting to which WEL was invited in order to investigate possible options and, as a result, the group agreed upon a route from the McCauley property, through the Kirkbride and Lyndon properties to Karakariki Road. That route passes around the back of the nearby block of properties, rather than in front of them on the road reserve and keeps away from the landowners' houses.
- 2.17 The route does enter Karakariki Road just south of the Fletcher property and pass on the eastern side of the road. The rationale for locating the pole on that side of the road is that the Fletcher house is much further away from the roadside than the houses on the other side of the road and, therefore, the impact on the Fletcher house would be much less. Placing the line on that side of the road also avoids the need to remove mature native trees outside the Christian Camp. While trees need to be removed outside the Fletcher property, they are poplars and gum trees. WEL has offered to undertake planting on the Fletcher property to mitigate the loss of those trees.

Cunningham property and Waipa River crossing

- 2.18 From Karakariki Road, the route traverses the Cunningham property (to the Waipa River. The rationale for the route is largely to take a reasonably direct line to the Te Kowhai substation. WEL originally proposed that the route passé between a stand of Kahikatea trees, but the landowner requested that the route travel along the northern boundary of the farm, which has resulted in the need to remove some of the Kahikatea trees on the northern boundary.
- 2.19 The route along Karakariki Road and into the Cunningham property passes in front of Mr McGowan's property along the road reserve. WEL investigated options to locate the line through the Henderson property but that landowner's preference was that the line be located on the road reserve. That was

acceptable to WEL because we were able to secure a straight route and didn't need to remove any vegetation.

- 2.20 From the Cunningham property, the route crosses the Waipa River in an easterly direction to the Transpower site at which the existing Te Kowhai GXP is located and the WEL Te Kowhai substation is proposed to be located. It is expected that the clearance above the Waipa River will be in the vicinity of 15 to 20 metres, but in any event will be required to comply with NZECP34, Maritime NZ and local authority requirements.

3. OVERVIEW OF SUB-TRANSMISSION LINE ASPECT OF WNUP

- 3.1 This section provides an overview of that aspect of the WNUP relating to the sub-transmission line. David Mollekin has already provided a general introduction to and overview of the key elements of the Western Network Upgrade Project ("WNUP"), including a brief description of the sub-transmission line route. This section contains on a more detailed description of the line route and the infrastructure to be used.

Concept design

- 3.2 Within the corridor proposed to be designated by WEL's notice of requirement, the final detail of the proposed sub-transmission line has not been finally settled and the design of the components (including pole types and locations, etc) is conceptual and has yet to be undertaken. The preliminary design has been developed having regard to a number of factors, including the constraints outlined in David Mollekin's evidence.
- 3.3 Further work needs to be undertaken before a detailed design can be completed and the precise location of the line and its design (including pole positions and heights) are arrived at, including micro-siting and ensuring that lines clearances comply with NZECP 34: 2001.
- 3.4 As Mr Mollekin explained, WEL will let contracts for the final design of the line and for the construction of the line. Contractors will be required to comply with NZECP 34:2001, the conditions of the designation and with any specific agreements made with landowners.

Overview of proposed route

- 3.5 David Mollekin has provided a general overview of the proposed route and I will address the route in detail below.

- 3.6 Briefly, the route descends from the Wind Park through the Vanhoutte property in a north easterly direction across the Clifford property. From there it travels down the boundary of the Van der Helm and Richards properties until it reaches the State Highway.
- 3.7 The route then crosses the State Highway into the Richards' northern property and crosses the Maungaokahu Stream before traversing the Gibbs property. The route crosses the State Highway to the Williamson property, where it crosses the Maungaokahu Stream three times before crossing the State Highway again in front of the Hammond and AC Hope properties. The Williamsons, Gibbs and AC Hope are submitters.
- 3.8 The route then traverses the property of AK Hope (who is not a submitter) toward the east, before turning north to the forestry block owned by Vela Holdings, where it crosses the deviation. Over the deviation, it heads north through the Balme property to the Tainui property, where it cross the Kakariki stream. The route continues to the north east through the McCauley, Anderson and Kirkbride properties, crossing the Kakariki stream twice.
- 3.9 The route passes through the McCallum and Lyndon properties before reaching Karikariki Road in the proximity of the Fletcher property. Ms Fletcher is a submitter. The route then follows Karikariki Road north all the way to the end of the road, passing through a corner of the Armstrong property on the way.
- 3.10 At the end of Karikariki Road, the route enters the Cunningham property which is adjacent to the McGowan property. Mr McGowan is a submitter. The route traverses the Cunningham property to the Waipa River, which it crosses to the existing Transpower Te Kowhai substation site. Mr Samujh and Mr Hodge, who are submitters, live in the vicinity of the Te Kowhai substation.
- 3.11 I will provide a more detailed description of the line route on a property by property basis below.

Overview of infrastructure

- 3.12 The sub-transmission line will consist of 11 types of poles, which will either be concrete or steel (which primarily depends upon whether the poles will need to be transported by helicopter, in which case they are likely to be steel, or by vehicle, in which case they are likely to be concrete). Steel poles will have steel reinforced foundations.
- 3.13 The different types of poles that will be used are shown in the photos **attached** at **Appendix A**. A general description of each type of pole is set out below.
- 3.14 **Pole type A** is used to carry a 110kv line on its own. It has delta construction at the top with a communications conductor under built. These poles are used where the route is straight.
- 3.15 **Pole type B** is used to carry a 110kv line on top in a delta configuration with 33kv flat configuration under built and is used where the route is straight.
- 3.16 **Pole type C** is used for angles and carries a 110kV line in a vertical configuration with a communications conductor below the 110kV configuration. This pole enables the conductor to be terminated in order to achieve the necessary angle.
- 3.17 **Pole type Ca** is an angle pole used in situations where a lesser angle is required than a Pole C pole. Pole Ca doesn't require the line to be terminated, but enables the line to continue. The configuration of the lines on Pole Ca is similar to the configuration on Pole C.
- 3.18 **Pole type D** is very similar to Pole B, but carries an 11kV line rather than a 33kV line. The 110kv line is in a delta configuration at the top with a flat configuration for the 11kv underneath.
- 3.19 **Pole type E** is a terminating pole which can be used either on a straight or on an angle, but in particular is used where a delta construction is used on the poles immediately preceding and after Pole E. Pole E can be used particularly where there is a long line span, e.g., across rivers or across bush areas where an ordinary Pole A could not take the weight of the line and the line would therefore need to be terminated.

- 3.20 **Pole type F** enables the 110kv line to continue in a straight direction in a delta configuration at the top of the pole, but also enables an angle to be created on the 11kv line underneath for a change of direction.
- 3.21 **Pole type G** carries a 110kV line in vertical configuration with 11kV under built. This pole enables the angle of the line to be lessened where the pole is in close proximity to legal boundaries, etc.
- 3.22 **Pole type Ga** is very similar to Pole G but carries a 110kV line only.
- 3.23 **Pole type Da** carries a 110kv line in delta configuration on the top. It enables the 11kv line to be terminated at the pole and an underground cable to be run to a ground mount transformer.
- 3.24 **Pole type Ea** is a termination pole and is very similar to Pole E. These poles are used at the substations themselves.
- 3.25 As noted above, where rationalisation of existing infrastructure occurs, i.e. where the existing 33kV or 11kV line is strung with the new 110kV line, poles along the route will be replaced with one of the above new poles.

4. **VANHOUTTE PROPERTY**

Route description

- 4.1 The route that traverses the Vanhoutte property commences at the Wind Park substation (Pole 1Ea) and crosses in a north-easterly direction to the boundary of the Clifford property (between Poles 8E and 9B) just north of the existing Telecom Tower. The route is generally straight and from the Wind Park substation, takes the straightest line down to State Highway 23.
- 4.2 There are no residential houses in proximity to the proposed route. Pole 1Ea is located on the edge of a paper road and NOR 3 will result in a designation over the paper road. Pole 3B lies 12 metres west of the paper road.

Infrastructure

- 4.3 The line will consist of a 110kv line (to feed to Te Kowhai substation) and a 33kv line (which will meet up with WEL's existing Western Area network). The existing 11kv line that currently feeds the Vanhoutte cowshed and the Telecom Tower (and lies largely within the designation corridor) will be undergrounded. The existing 11kv line that traverses Vanhoutte's property

from pole 521493 located 30 metres west of pole 6B to State Highway 23 will remain.

- 4.4 This section of the line will consist of eight poles, including one Ea pole at the Wind Park substation, two E type angle poles and five B type straight poles between the angle poles.

Access and construction

- 4.5 There is relatively good access to all of the eight pole sites on the Vanhoutte property. In that regard, it is possible that the poles could be transported in via the access routes. Alternatively, the poles will be flown in and placed into position via helicopter in remote or hilly areas. Poles 5E, 6B and 7B will have steel reinforced foundations because they are steel poles, installed by helicopter and bolted in place.

Other relevant matters

- 4.6 There is no known vegetation clearance required on the Vanhoutte property.

5. CLIFFORD PROPERTY

Route description

- 5.1 The line route on the Clifford property runs from the Vanhoutte boundary (between Poles 8E and 9B) in a straight line to the northern boundary of the Clifford property, where it then runs parallel to that northern boundary in a generally straight line. The route proceeds through rolling to steep country in a generally north-easterly direction until it meets the boundary of the Richards' property (at Pole 49E), just past Richards' boundary with the Van der Helm boundary.

- 5.2 The Cliffords requested that the route be aligned close and parallel to the northern boundary in order to minimise the visual impact on the landowner and other residents in Waitetuna Valley Road by taking the line away from the ridgeline .

- 5.3 There are no residential houses in proximity to the proposed route.

Infrastructure

- 5.4 There is no existing infrastructure on the Clifford property. Forty new poles will be installed, which will carry a 110kv line with a 33kv underbuilt. The