

**IN THE ENVIRONMENT COURT AT WELLINGTON**

**IN THE MATTER** of the Resource Management Act  
1991 ("**the Act**")

**AND**

**IN THE MATTER** of clause 14 of the First Schedule of  
the Act

**BETWEEN** **MIGHTY RIVER POWER LIMITED**

ENV-2010-WLG-000139

**AND** **TRUSTPOWER LTD**

ENV-2010-WLG-000145

**AND** **FEDERATED FARMERS OF NEW  
ZEALAND**

ENV-2010-WLG-000148

**AND** **MERIDIAN ENERGY LTD**

ENV-2010-WLG-000149

**AND** **MINISTER OF CONSERVATION**

ENV-2010-WLG-000150

**AND** **PROPERTY RIGHTS IN NEW ZEALAND**

ENV-2010-WLG-000152

**AND** **NEW ZEALAND TRANSPORT AGENCY**

ENV-2010-WLG-000153

**AND** **HORTICULTURE NEW ZEALAND**

ENV-2010-WLG-000155

**AND** **WELLINGTON FISH & GAME COUNCIL**

ENV-2010-WLG-000157

**AND** **A DAY**

ENV-2010-WLG-000158

**AND** **GENESIS POWER LTD**

ENV-2010-WLG-000159

**AND**

**WATER & ENVIRONMENTAL CARE  
ASSOCIATION INC.**

ENV-2010-WLG-000160

**Appellants**

**AND**

**MANAWATU-WANGANUI REGIONAL  
COUNCIL**

**Respondent**

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**STATEMENT OF EVIDENCE BY LINDSAY EUAN FUNG FOR  
HORTICULTURE NEW ZEALAND IN RELATION TO THE APPEALS ON  
THE PROPOSED ONE PLAN FOR MANAWATU WANGANUI  
REGIONAL COUNCIL ON SUSTAINABLE LAND USE/ACCELERATED  
EROSION**

**(17 FEBRUARY 2012)**

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**ATKINS | HOLM | MAJUREY**

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## QUALIFICATIONS AND EXPERIENCE

1. My name is Lindsay Euan Fung. I am the Vegetable Research & Innovation Manager of Horticulture New Zealand. I have a Doctor of Philosophy in tree physiology and genetics from the University of Canterbury.
2. I have spent over 9 years as a scientist/researcher in tree physiology and breeding, and a further 8 years as a science manager for several organisations.
3. In my years as a scientist I was the leader at HortResearch for a FRST and Regional Council funded programme for soil conservation trees – aimed primarily at hill country use, but also for riverbank stabilisation.
4. In my science management roles I was employed by Horizons Regional Council as a Team Leader for the environmental scientists (covering areas of soil management, water quality and quantity, biodiversity, coastal areas and waste management). I was also employed as a Science and Policy Manager at Deer Industry New Zealand and had oversight of research on environmental management in deer farms and involvement in Deer Industry Focus Farms where environmental management was an important component.
5. I am currently employed by Horticulture New Zealand and have similar oversight of a range of research and innovation projects which include soil and nutrient management for vegetable growers.
6. Christopher Keenan, Resource Management and Environment Manager for Horticulture New Zealand and Sonia Whiteman, the previous Vegetable Research & Innovation Manager, provided evidence to the Hearings Panel on the issues in this statement of evidence in February 2010. This earlier evidence is not included in the Technical Evidence Bundle as it was not considered technical evidence by the Hearings Panel because, as I understand it, due to time constraints imposed on the exchange of technical evidence at that time. Copies of Mr Keenan's and Dr Whiteman's statements of evidence are attached as an appendix to my "will say" statement provided for expert witness caucusing.

7. I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's Consolidated Practice Note dated 1 November 2011. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## **CONTEXT AND SCOPE OF MY EVIDENCE**

### **Context**

8. I have attended witness caucusing and have signed the Record of Witness Caucusing on Sustainable Land Use and Accelerated Erosion dated 16 February 2011 (**Joint Statement**).
9. The particular issue that my evidence addresses is industry activity in soil and nutrient management. Specifically ongoing work from two completed projects described previously in the submitted evidence of Mr Keenan and Dr Whiteman.

### **Scope and summary**

10. The horticulture industry has been proactively refining tools and processes to aid horticultural growers manage nutrient inputs and maintain soil on site (i.e. minimise soil loss from paddocks). These refinements are logical progressions from two completed projects covering: i) soil management (Holding It Together or HIT), and ii) nutrient management (Nitrogen Management for Environmental Accountability or NMEA).
11. The speed at which these refinements are introduced into growers' practices depends upon external parties and available funding, but the horticulture industry has already made advances in providing growers with information on best management practices that will allow growers to choose those that are most appropriate for any given situation.
12. A report prepared for Horizons Regional Council by NIWA, "Lake Horowhenua review. Assessment of opportunities to

address water quality issues in Lake Horowhenua" is also briefly commented upon. I have attached a copy of this review to my evidence as Appendix 1.

### **SOIL MANAGEMENT INITIATIVES**

13. The HIT project has been explained in the evidence of Mr Barber. In this part of my evidence I provide an update of the project since the time evidence was given to the Hearings Panel in February 2010.
14. HIT, a three year project, was recently completed in October 2011. This project covered four main topic areas on soil management:
  - (i) Surface runoff or ponding.
  - (ii) Cover cropping and soil amendments.
  - (iii) Soil compaction.
  - (iv) Cultivation practices.
15. During the project the "Code of Practice for Commercial Vegetable Growing in the Horizons Region" was developed using information from the project and previous work in soil management. This code is now operational and referenced in New Zealand GAP<sup>1</sup>.
16. As part of the project, eight sediment traps were placed around a range of grower sites in the Horowhenua area. The trial and observations are described in the evidence of Mr Barber at paragraphs 31 and 32.
17. More detailed information from the project has been presented to growers through industry publications and websites, and most recently as a handbook "A Guide to Smart Farming"<sup>2</sup> that has been provided to all vegetable growers throughout the Horizons region (and the country).

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<sup>1</sup> NZ GAP was explained in detail to the Hearings Panel by Mr Peter Ensor. A copy of the relevant extracts from Mr Ensor's evidence is contained in the evidence of Mr Keenan

<sup>2</sup> 'A Guide to SMART FARMING', D.J. Bloomer and J. Powrie (eds), LandWISE 2011, ISBN 978-0-473-20374-0

18. Horticulture New Zealand and New Zealand GAP have applied to the Sustainable Farming Fund to develop a web-based soil management risk-assessment module for New Zealand GAP auditing that will provide a standardised process for determining appropriate mitigation measures to minimise soil loss from paddocks.

#### **NUTRIENT MANAGEMENT INITIATIVES**

19. While nutrient management is not directly related to sustainable land use and accelerated erosion, the application of nutrient management does provide co-benefits, particularly for managing phosphorus as this is typically associated with soil loss from the paddock.
20. The NMEA project described by Dr Whiteman in the previous evidence resulted in the development of horticulture and arable modules for the nutrient model OVERSEER® in 2009 (version 5.4.3). A training programme for OVERSEER® was then developed by the Massey University Fertiliser and Lime Research Centre that is aimed at growers (i.e. non-technical users/experts in fertilisers and soil/plant chemistry).
21. While version 5.4.3 was a useful first step (where previously there had been no consideration of horticultural or arable crops), subsequent testing revealed some significant bugs in the software that compromised modelling outputs. As a result OVERSEER® version 6 has attempted to address these shortcomings and is due for release around April 2012. The owners acknowledge that a significant concern around the rate of mineralisation remains unresolved.
22. Horticulture New Zealand and the Foundation for Arable Research formed a working group of growers and industry representatives in 2010 to liaise with OVERSEER® researchers and the fertiliser industry. The working group has signalled that it will trial the new version 6 following its release and will then seek a wider pilot trial using 20 growers from across the country to fully evaluate the new version for use in cropping systems. The trial will evaluate both the model and the training programme. Should the new version and the training programme be easy to adopt by growers, the working group will then discuss with New Zealand GAP how

this can be best incorporated into the New Zealand GAP assessment.

23. Horticulture New Zealand does not consider that version 6 will be the definitive model for informing nutrient management and estimating nutrient losses, but does support its ongoing refinement and recognition as a useful tool for nutrient management in the absence of other tools for horticulture and in particular vegetable production.
24. Recently the New Zealand Fertiliser Manufacturers' Research Association has invited Horticulture New Zealand to join an establishment committee to form a governance group for "The Nutrient Management Adviser Certification" programme (due to have its first meeting on 24 February 2012). Horticulture New Zealand has advised its willingness to participate.
25. Horticulture New Zealand is also actively involved in extension work for the Land Use Change & Intensification II research programme (LUCI II) which will develop specific horticulture crop models to more accurately determine water and nutrient usage in relation to yields. While the focus of the research programme is in the Canterbury region, these models will be applicable to crops grown in the Horizons region.

#### **LAKE HOROWHENUA REVIEW**

26. The report prepared for Horizons Regional Council by NIWA and referred to above<sup>3</sup>, (the Lake Horowhenua review), states that vegetable production is 2.9% of the land use area in the Horowhenua catchment (Table 2-1, page 18). Vegetable production is predominantly centred around the Arawhata Stream, with a lesser area adjacent to Levin by the Queen Street Drain. Small, isolated pockets of production are also near Mangaroa and Patiki streams (Figure 2, page 19).
27. The report states that: "About 80% of the external P load on the lake from the catchment is a single point source: Queen Street drain." (page 10) and that it "currently the largest

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<sup>3</sup> Attached as Appendix 1

external source of phosphorus (P) nutrient to the lake (see Table 3-1)." (page 18).

28. While the report cannot definitively demonstrate origins of nutrients, *urban* stormwater appears to be a significant source of P. As noted<sup>4</sup> a lesser area of vegetable production occurs adjacent to the Queen Street Drain. On face value, given the observations from the Horowhenua sediment loss trials<sup>5</sup> regarding sediment loss (and associated P), and that vegetable growing is more concentrated around the Arawhata Stream, vegetable production does not appear to be a major contributor to P entering into Lake Horowhenua.
29. The report also identifies major N inflows, but as these are not considered to be associated with soil movement from paddock to waterways, this will be discussed in the water quality evidence.

## **CONCLUSION**

30. In the areas of soil and nutrient management, Horticulture New Zealand and its associated vegetable product groups are continuing activities to promote best management practices via New Zealand GAP. There is also ongoing commitment to improving the existing tools and processes and development of new tools where there are currently information gaps.
31. This approach will be most effective if these initiatives are supported by regional council policies and collaborative interaction between the growers, industry bodies, territorial authorities and the regional council.
32. My brief assessment of the "Lake Horowhenua review" is that there is little evidence to suggest that commercial vegetable production is a major contributor of phosphorous via soil loss from paddocks to waterways.

**L E Fung**

**17 February 2012**

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<sup>4</sup> Paragraph 26 of this evidence

<sup>5</sup> Paragraph 16 of this evidence and the evidence of Mr Barber

**APPENDIX 1**

**LAKE HOROWHENUA REVIEW. ASSESSMENT OF OPPORTUNITIES  
TO ADDRESS WATER QUALITY ISSUES IN LAKE HOROWHENUA**

**JUNE 2011 - NIWA**