

**IN THE
MATTER**

of the Resource Management Act
1991

AND

**IN THE
MATTER**

of a Board of Inquiry
appointed under Section 146

REGARDING

resource consent applications
MWRC 104553 to 104560
inclusive and PNCC RC0068 and
TDC 1448 by **MIGHTY RIVER
POWER** for the Turitea windfarm
proposal.

**MEMORANDUM TO THE BOARD
ON SET BACK DISTANCES**

12 October 2009

**Tararua Aokautere Guardians Inc
Box 255, Palmerston North**

INTRODUCTION

1. The Board of Inquiry has requested additional information regarding set-back distance as it relates to the terrain particular to that of the proposed Turitea windfarm.
2. Set-back distance is defined as the distance that a wind turbine may be placed from an existed or consented dwelling.
3. This memorandum is an attempt to collate the most relevant research and the ensuing mandated set-backs in various jurisdictions throughout the world. It is not an exhaustive list because many of the cited regulations in the popular literature could not be corroborated – many because of a language barrier.
4. Table 1 is a list of the research most cited by legislators who have established set-backs. Of particular interest is the recurring theme that noise (and thus health) affects cannot be predicted with sound measurements and their associated standards, and that a set-back distance is widely considered to be the only way to ensure the safety of people.

<i>Researcher</i>	Dr. Amanda Harry
<i>Topic</i>	Wind turbine noise and Health. A 2007 study (Dr. Amanda Harry M.B.Ch.B.P.G.Dip.E.N.T. Barbara J. Frey and Peter J. Hadden, Feb
<i>Précis</i>	Likely the best single source to date within the emerging body of documentation on health issues affected by industrial wind turbines. The review concludes that a safe buffer zone of at least 2km should exist between family dwellings and industrial wind turbines of up to 2MW installed capacity, with greater separation for a wind turbine greater than 2MW installed capacity.
<i>Peer review or reference</i>	2 citations.
<i>Distance proposed</i>	2.4 km
<i>Researcher</i>	Dr Nina Pierpont
<i>Topic</i>	Book in publication; <i>Wind Turbine Syndrome</i> , to be published by K-Select Books, Santa Fe, NM, USA
<i>Précis</i>	The culmination of three years of clinical research treating people living in close proximity to wind turbines.
<i>Peer review or reference</i>	F. Owen Black, MD, FACS, Senior Scientist and Director of Neuro-Otology Research, Legacy Health System, Portland, Oregon. "Her detailed recording of the harm caused by wind turbine noise will lay firm foundations for future research. It should be required reading for all planners considering 'wind farms.'" Professor Lord (Robert) May, PhD, of Oxford University OM, AC, Kt, FRS. President of the Royal Society (2000-2005), Chief Scientific Advisor (1995-2000) to the UK government. "Impressive. Interesting. And important. Dr. Pierpont has clinically defined a new group of human subjects who respond to low frequency, relatively high amplitude forces acting upon the sensory and other body systems." Christopher Hanning MD, FRCA, MRCS, LRCP. Founder of the British Sleep Society.

	<p>"This is an extraordinary book. It is personal and passionate, which makes it compelling reading. But it is much more—authoritative, meticulous, and scholarly. It clearly takes its place as the leading work on the topic. In addition to Dr. Pierpont's detailed clinical accounts, there is accumulating evidence of adverse health effects from Japan, New Zealand, the UK, USA, and Canada. There are also some 357 organizations from 19 European countries demanding an enquiry by the European Union about health and many other adverse effects of wind farms. At a minimum, the EU would be wise to consult with Dr. Pierpont. This book is a must-read for all health care professionals, especially those in clinical practice. One cannot but hope that politicians and policy makers at all levels heed the wake-up call that there are serious consequences to precipitant decisions relating to so-called green energy."</p>
<i>Distance proposed</i>	Up to 3.5 km in mountainous terrain such as the Turitea windfarm.
<i>Researcher</i>	Académie Nationale de Médecine (National Academy of Medicine), France.
<i>Topic</i>	An investigation conducted by the Ddass [Direction Départementale des Affaires Sanitaires et Sociales] in Saint-Crépin (Charent-Maritime) revealed that sound levels 1 km from an installation occasionally exceeded allowable limits. While waiting for precise studies of the risks connected with these installations, the Academy has recommended halting wind turbine construction closer than 1.5 km from residences.
<i>Précis</i>	Suggests much larger setbacks, between 1.5 and two kilometers away from homes and schools
<i>Peer review or reference</i>	http://www.academie-medecine.fr/recherche.cfm
<i>Distance proposed</i>	1.5 to 2 km
<i>Researcher</i>	RetexoGruppe - RISP GmbH
<i>Topic</i>	Manufacturer of Turbines
<i>Précis</i>	In its site location instruction, Retexo recommends that turbine set-back distances be observed.
<i>Peer review or reference</i>	retexo.de
<i>Distance proposed</i>	2 km
<i>Researcher</i>	Professor Mariana Alves-Pereira Department of Environmental Sciences & Engineering The New University of Lisbon, Portugal
<i>Topic</i>	Vibroacoustic disease: the need for a new attitude towards noise
<i>Précis</i>	A principal researcher on Vibro-Acoustic Disease (VAD). Her findings demonstrate that wind turbines in the proximity of residential areas produce acoustical environments that can lead to the development of VAD in nearby home-dwellers.
<i>Peer review or reference</i>	Published by CITIDEP & DCEA-FCT-UNL, edited by Pedro Ferraz de Abreu & João Joanaz de Melo © CITIDEP 2000 6 citations.

<i>Distance proposed</i>	2 km.
<i>Researcher</i>	G. P. Van den Berg, a physicist at the University of Groningen in the Netherlands
<i>Topic</i>	Effects of the wind profile at night on wind turbine sound" (Journal of Sound and Vibration, 277 (2004), 955–970)
<i>Précis</i>	Van den Berg believes that he has at last explained the mystery of why modern onshore wind turbines can cause noise problems for residents at distances of a mile or more. He studied sound around the Rhede wind-farm (an installation of 17 turbines), on the Dutch/German border. "Residents living 500 m and more from the park have reacted strongly to the noise; (and) residents up to 1900m distance have experienced night time disturbance. Yet, conventional wind industry calculations have assumed that turbines would present no noise problem over 500m.
<i>Peer review or reference</i>	Cited by 28 other peer-reviewed authors.
<i>Distance proposed</i>	2 km

5. The following statutory territorial authorities have imposed set-back distances by regulation.

<i>Authority</i>	<i>Description</i>	<i>Set-back</i>	<i>Reference</i>
Region of Molise, Italy	20 × the turbine height from urbanized areas.	1,800 m (for 90 m turbines)	http://www.wind-watch.org/documents/european-setbacks-minimum-distance-between-wind-turbines-and-habitations/
Scotland	SPP6 legislation	2,000 m	http://www.scotland.gov.uk/Resource/Doc/244403/0068333.pdf
Trempealeau County Board, Wisconsin, USA	Ordinance Section 17 (e)	1,600 m (1 mile)	www.windcows.com/WISCONSINWINDENERGYNEWS.html
Ontario, Canada	Proposal	1,500 m for windfarm exceeding 26 turbines	http://www.ene.gov.on.ca/en/news/2009/060901mb2.pdf
Basilicata, Italy		2 km	http://www.wind-watch.org/documents/european-setbacks-minimum-distance-between-wind-turbines-and-habitations/
Hepburn Shire, Australia	Located in central Victoria, Population: 15,000	2 km	http://www.hepburnshire.com.au/Page/Download.asp?name=FinalWindEnergyGuidelines290709.pdf&size=46000&link=../Files/FinalWindEnergyGuidelines290709.pdf
Riverside County California	Population 2,073,571	3000ft for more than 10 turbines	http://www.rctlma.org/genplan/content/gp/chapter03.html