

Acoustic Matters – 23 March 2010**1. Construction Noise**

- 1.1 Noise from all construction work shall be measured and assessed in accordance with NZS6803, and shall comply with the noise limits for long-term duration set out in that Standard.
- 1.2 A CNMP shall be prepared prior to the commencement of any construction works and shall be properly implemented at all times. The CNMP shall be generally in accordance with section 8 and the relevant annexures of NZS6803, which detail the relevant types of construction to which the CNMP is to apply, and procedures that will be carried out to ensure compliance with that Standard.
- 1.3 The CNMP shall be prepared by an appropriately qualified and experienced acoustic consultant, and shall be submitted to the Environmental Services Group Managers of each respective Council for review, acting in a technical certification capacity. Should a response not be received within 30 working days of receipt, the Consent Holder shall be entitled to proceed in accordance with the conditions of consent.

2. Operational Noise (Non Turbine Related)

- 2.1 Noise from all other activities on the site (other than wind turbine generator operation, and construction activities including concrete manufacture) shall not exceed the following:

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|-------------------|-----------------|
| 7.00am to 10.00pm | 50dB L_{Aeq} |
| 10.00pm to 7.00am | 40dB L_{Aeq} |
| 10.00pm to 7.00am | 70dB L_{Amax} |

when measured at or within the boundary of any site other than the wind farm site. For the purpose of clarity, this condition does not apply to dwellings in respect of which the Consent Holder has reached agreement with the landowner. The noise shall be measured in accordance with NZS6801 and assessed in accordance with NZS6802.

3. Operational Noise (Turbines)

- 3.1 The turbines shall be designed, constructed, operated and maintained so that wind farm sound levels shall comply with NZS6808. For the avoidance of doubt, this condition shall require compliance with the following noise limits in accordance with NZS6808:



- (a) Unless the high amenity noise limit is applicable, the turbines shall be designed, constructed, operated and maintained so that wind farm sound levels ($L_{a90(10 \text{ min})}$) shall not exceed the background sound level by more than 5dB, or a level of 40dBA $L_{a90(10 \text{ min})}$, whichever is the greater;
 - (b) Where the high amenity noise limit is applicable, the turbines shall be designed, constructed, operated and maintained so that wind farm sound levels ($L_{a90(10 \text{ min})}$) shall not exceed the background sound level by more than 5dB, or a level of 35dBA $L_{a90(10 \text{ min})}$, whichever is the greater;
 - (c) The high amenity noise limit shall apply at any time between 10pm to 7am at locations with low background sound levels, as identified in accordance with section C5.3.1 of NZS6808.
- 3.2 Notwithstanding section 5.3.1 of NZS6808, all residential and rural areas in the Palmerston North District Plan are available for assessment as High Amenity Areas, despite the absence of explicit recognition of them as High Amenity Areas in the District Plan. In addition, assessment of rural and residential land as High Amenity Areas shall not be prevented by reason of noise levels from the Te Rere Hau wind farm.
- 3.3 Wind farm sound shall be measured and assessed in accordance with NZS 6808 within the:
- (a) notional boundary of any residential dwelling either existing or consented at the date of this consent (excluding residential dwellings on properties on which turbines are located or where the owner has provided written consent to the wind farm); or
 - (b) property boundary of any residentially zoned site on which a residential dwelling is able to be constructed as a permitted activity in accordance with the relevant plan rules, as at the date of this consent.
4. **NMP**
- 4.1 A NMP shall be submitted to the Palmerston North City Council and Tararua District Council Principal Planners for review, acting in a technical certification capacity, prior to commencement of operation of the wind farm. Should a response not be received within 30 working days of receipt, the Consent Holder shall be entitled to proceed in accordance with the conditions of consent.



4.2 The NMP shall be prepared by the Consent Holder in conjunction with an appropriately qualified and experienced acoustic consultant, and shall, as a minimum, include the following:

- (a) An assessment of background sound levels;
- (b) Wind turbine selection, having regard to the sound power level predictions obtained in accordance with section 6.2, and the special audible characteristics in clause 5.4.1 of NZS6808;
- (c) Procedures for ensuring compliance with the noise conditions of these consents, including noise compliance testing, methods for addressing non-compliance, and contacts and complaints procedures;
- (d) Procedures for addressing turbine malfunctions that cause material noise effects beyond typical operational noise;
- (e) Requirements for post construction noise monitoring and assessment; and
- (f) Provisions regarding review and updating of the NMP.

4.3 The Consent Holder shall operate the wind farm and act in compliance with the NMP at all times.

5. Noise Monitoring Costs

5.1 The Consent Holder shall pay all reasonable costs associated with the compliance testing or assessment undertaken in accordance with these conditions.

6. Pre-Instalment Assessment

Noise Prediction Report

6.1 The Consent Holder shall provide Palmerston North City Council's Environmental Services Group Manager with a Noise Prediction Report in accordance with NZS6808.

Background Noise Surveys

6.2 The Consent Holder shall engage an appropriately qualified and experienced acoustic consultant to undertake pre-installation background noise surveys at positions identified by the Consent Holder in consultation with the Palmerston North City and Tararua District Councils in addition to those undertaken for the Resource Consent



application. The surveys shall be undertaken, and results assessed, in accordance with sections 7 and 8.2 of NZS6808.

7. Review of Noise Conditions

- 7.1 In accordance with section 128 of the Act, the Palmerston North City and Tararua District Councils may at one, three and five years after the completion of all construction works, or, if the wind turbine generators are installed in stages, then one year after completion of each stage and then three and five years after the final completion, serve notice on the Consent Holder of its intention to review any of the noise conditions of this consent.
- 7.2 Any reviews must be completed within six months of the notice being given in accordance with condition [7.1].

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DRAFT PROVISIONS FOR NOISE MANAGEMENT PLAN – 23 March 2010**1. Definitions**

1.1 For the purposes of this noise management plan, unless the context otherwise requires:

(a) "CLG" means the Community Liaison Group established in accordance with condition [X] of the resource consent conditions.

(b) "contributing turbines" means the 10 closest turbines to a particular monitoring site.

(c) "operational" means when a turbine's blades first begin to rotate.

2. Noise prediction report and background noise surveys

2.1 A noise prediction report and background noise surveys shall be provided in accordance with conditions [X] and [X] of the resource consent conditions.

2.2 The wind farm shall be designed with wind turbines that minimise noise emissions and that do not generate special audible characteristics.

3. Noise monitoring during start up

3.1 The Consent Holder shall arrange for a minimum of 3 continuous Noise Monitoring Terminals (NMT) to be installed at appropriate locations around the wind farm site, and moved as different turbines (or groups of turbines) become operational. The NMTs shall be installed from when the first wind turbine (or group of turbines) become operational, until three months after the last turbine (or group of turbines) become operational or until such time as an appropriately qualified and experienced acoustic consultant engaged by the Consent Holder determines that sufficient representative monitoring has been undertaken of all contributing turbines, operating in representative wind speeds, directions and times of day/night.

3.2 The NMT shall be capable of carrying out audio recordings as necessary.

3.3 The NMT shall also be capable of producing a "regression curve" based on a rolling 10-day block of data, which is suitable for comparison with the noise limit regression curve in accordance with the procedures specified in NZS6808.

3.4 The Consent Holder shall ensure that after the first two weeks of monitoring, the rolling "regression curve" is emailed to the Palmerston North City Council's Environmental

Services Group Manager on a weekly basis for the remainder of the monitoring period, and after that, provided as requested by the local authority.

- 3.5 The appropriate number and locations for the NMT shall be determined as required throughout the monitoring period, by an appropriately qualified and experienced acoustic consultant engaged by the Consent Holder in consultation with the Environmental Services Group Manager of Palmerston North City Council or Tararua District Council as appropriate. In making this determination, the acoustic consultant shall in particular have regard to the number and location of contributing turbines currently operational and/or about to become operational, and their proximity to any residential properties.
- 3.6 The Consent Holder shall submit a monthly report to the Palmerston North City Council's Environmental Services Group Manager outlining the results of the noise monitoring undertaken in accordance with clause [3.1], and reporting on compliance with the noise consent conditions. The first of these reports shall be provided one month after the first wind turbine (or group of turbines) becomes operational, and the last of these reports provided within 20 working days of the last turbine (or group of turbines) becoming operational.

4. Operational noise monitoring and assessment

Monitoring to determine compliance with NZS6808

- 4.1 If requested by the Environmental Services Group Manager of either the Palmerston North City or Tararua District Council, the Consent Holder shall undertake additional post-installation noise monitoring at any location, at any wind speed and direction, or time of day, for the purpose of determining compliance with the noise consent conditions or investigating complaints.
- 4.2 Any post-installation noise monitoring required in accordance with clause [4.1] shall be undertaken by an appropriately qualified and experienced acoustic consultant, and in accordance with the requirements of NZS6808. The results shall be submitted to the Environmental Services Group Manager of the appropriate Council within 10 working days after completion of the testing.
- 4.3 Should either the Palmerston North City or Tararua District Councils choose to undertake its own noise monitoring for whatever reason then the Consent Holder shall provide the wind data required to analyse the results in accordance with the noise consent conditions.

Assessment with respect to complaints regarding unreasonable noise

- 4.4 If requested by the Environmental Services Group Manager of either the Palmerston North City or Tararua District Council, the Consent Holder shall engage an appropriately qualified and experienced acoustic consultant, who together with the Council's Environmental Health Officer, shall undertake an assessment in similar meteorological conditions to those existing at the time of the complaint, to determine whether noise emanating from the wind farm is unreasonable in terms of section 16 of the Act. For the avoidance of doubt, this assessment may require sound file recordings to be taken and analysed.
- 4.5 A request in accordance with clause [4.4] may be made:
- (a) at any time after the first turbine (or group of turbines) becomes operational; and
 - (b) as a result of complaints regarding unreasonable noise emanating from the wind farm, in circumstances where the Council's Environmental Services Group Manager considers that such a complaint may not solely relate to a non-compliance with the noise limits from NZS6808.
- 4.6 The results of the assessment undertaken in accordance with clause [4.4] shall be submitted to the Environmental Services Group Manager of the appropriate Council within 10 working days after completion of the assessment.

Monitoring to determine any cumulative effects issues

- 4.7 Prior to any wind turbines becoming operational in turbine zones [X] to [X], a continuous NMT shall be installed at position representative of the noise received in area marked "A" in the plan attached as Appendix [X] to this Schedule. The consent holder shall engage an appropriately qualified and experienced acoustic consultant who shall, in consultation with the Environmental Services Group Manager of Palmerston North City Council or Tararua District Council as appropriate, determine the appropriate location for the NMT.
- 4.8 The NMT shall be installed for a minimum of three years from the date of commissioning the first turbine or group of turbines. The NMT shall be capable of collecting the following data, which shall be available to the Consent Holder (or its acoustic consultant) "on line" to enable remote evaluation of it, and saved for at least three months to allow subsequent analysis if required:



- (a) 10 minute measurements of LA_{eq} , LA_{90} and LA_{max} ;
 - (b) 1 minute LA_{eq} measurements;
 - (c) One third spectral data available for the above time periods; and
 - (d) Either direct recordings of the following meteorological data: wind speed and wind direction, or have this information available from a nearby station.
- 4.9 If requested by the Environmental Services Group Manager of either the Palmerston North City or Tararua District Council, the Consent Holder shall engage an appropriately qualified and experienced acoustic consultant to review the data from the NMT to determine if there has been any non-compliance with the noise consent conditions that may have resulted in a complaint, and if so, the turbines that contributed to this.
- 4.10 If the review of the NMT data is conclusive as to any non-compliance with the noise consent conditions, and the causes of this, the results of the review shall be submitted to the Environmental Services Group Manager of the appropriate Council within 10 working days after completion of the review.
- 4.11 If the review of the NMT data is not conclusive as to any non-compliance with the noise consent conditions, and the causes of this, the acoustic consultant shall as soon as reasonably practicable considering the relevant meteorological conditions undertake any additional field measurements they consider necessary to reach a conclusion as to the cause and validity of the noise complaint. The results of the field investigations shall be submitted to the Environmental Services Group Manager of the appropriate Council within 10 working days of the investigations being completed.
- 4.12 In the event the expert review and field investigations (if any) demonstrate a non-compliance with the noise consent conditions, and that such an exceedence would not have occurred had there not been any contribution of noise from the Turitea turbines (whether or not there was also any contribution of noise from the turbines of the Te Rere Hau wind farm), the requirements of clause [5.3] shall apply.
- 4.13 For the avoidance of doubt, the NMT required in accordance with clause [4.8] may be one of the NMTs required in accordance with clause [3.1].


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5. Response to Noise Monitoring and Assessment

- 5.1 The Consent Holder shall provide copies of any reports or assessments submitted in accordance with clauses [3.6], [4.2], [4.6], [4.10] or [4.11] to the CLG, within the same timeframes as the respective clauses require they be submitted to the appropriate Council(s).
- 5.2 If the monitoring or assessments undertaken in accordance with clauses [3.1], [4.1], [4.4] and [4.7] show there has not been any non-compliance with the noise consent conditions nor any unreasonable noise finding, then the Consent Holder shall not be required to take any further action by way of response to that monitoring and assessment.
- 5.3 If the monitoring or assessments undertaken in accordance with clauses [3.1], [4.1] or [4.4] show there has been any non-compliance with the noise consent conditions and/or there is an unreasonable noise finding, or the circumstances in clause [4.12] apply:
 - (a) As soon as reasonably practicable, the Consent Holder shall engage an appropriately qualified and experienced acoustic consultant to undertake such assessment as may be necessary to determine which turbine(s) are likely to be causing the non-compliance or unreasonable noise (if this has not already been determined);
 - (b) Within one working day of being advised which turbine(s) are likely to be causing the non-compliance or unreasonable noise, the Consent Holder shall de-rate, including if necessary stopping, those turbines;
 - (c) Once de-rated, the relevant turbines may only be re-commissioned after the Consent Holder has undertaken such repairs, testing and/or any other measures as may be necessary to ensure that those turbines can be operated without causing any non-compliance with the noise consent conditions or unreasonable noise;
 - (d) For the avoidance of doubt, during the time that any turbine is subject to de-rating in accordance with clause [5.3(c)]:
 - (i) the relevant turbine(s) may be operated in such circumstances and for such durations as may be necessary for undertaking compliance testing;



- (ii) the relevant turbine(s) may be operated at such times or in such meteorological conditions where the monitoring or assessments undertaken in accordance with clauses [3.1], [4.1], [4.4] or [4.7] have confirmed that the operation of the turbines in those conditions will not result in any non-compliance with the noise consent conditions; and
 - (iii) the Consent Holder shall submit a weekly report to the Palmerston North City Council's Environmental Services Group Manager and the CLG outlining the current status of the investigations being undertaken with respect to the relevant turbines.
- (e) When any turbine (or turbines) are re-commissioned in accordance with clause [5.3(c)], the Consent Holder shall engage an appropriately qualified and experienced acoustic consultant to undertake such further monitoring and assessment as the consultant considers necessary to confirm that the turbine (or turbines) are now operating in compliance with the noise consent conditions. The results of this monitoring or assessment shall be submitted to the Palmerston North City Council's Environmental Services Group Manager and the CLG within 10 working days of the turbine (or turbines) being re-commissioned.
- (f) For the avoidance of doubt, if the monitoring and assessment undertaken in accordance with [5.3(e)] shows that there is still a non-compliance with the noise consent conditions, the requirements of clauses [5.3(a)-(e)] shall apply as appropriate and necessary.



Nigel Lloyd



Nevil Hegley



Christopher Day