
under: the Resource Management Act 1991

in the matter of: an application to the Selwyn District Council to change the Selwyn District Plan ('PC50') - including proposed amendments to the 'Dairy Processing Management Area'.

Statement of evidence of Robert Michael Blakelock

Dated: 7 March 2017

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STATEMENT OF EVIDENCE OF ROBERT MICHAEL BLAKELOCK

INTRODUCTION

- 1 My full name is Robert Michael Blakelock.
- 2 I am a Consultant in the international acoustical consulting firm of Marshall Day Acoustics (*MDA*). I hold a Bachelor of Engineering degree with First Class Honours in Mechanical Engineering from the University of Canterbury. I have worked in the field of acoustics with MDA for the last six years.
- 3 I have been involved in many environmental and industrial noise assessment projects around New Zealand, including a number of dairy factories.
- 4 I have been involved in the monitoring and modelling of Fonterra sites including Takaka, Brightwater, Tua Marina, Kaikoura, Clandeboye, Edendale and Kauri.
- 5 I have also been involved in the monitoring and/or modelling of five dairy sites for other operators.
- 6 I am familiar with the Darfield dairy factory and surrounding area, having undertaken commissioning noise surveys and on-going noise monitoring around the site since 2012.
- 7 Although this is a council hearing, I have read and agree to comply with the Code of Conduct for Expert Witnesses (Environment Court Practice Note 2014). This evidence is within my area of expertise except where I state that I am relying on facts or information provided by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SCOPE OF EVIDENCE

- 8 My evidence will focus on the modelling methodology used to predict the noise levels at surrounding properties and noise contour plots contained in the Noise Assessment report (MDA reference. Rp 001 R01 2013648C dated 17 September 2015, *the Noise Assessment*). The Noise Assessment is attached to the Assessment of Environmental Effects of Fonterra's Plan Change 50 (*PC50*) request.
- 9 My colleague, **Rob Hay**, will address the other noise related aspects of this application.

SUMMARY OF EVIDENCE

- 10 The detailed noise model is prepared using internationally recognized modelling software and prediction models that calculate

noise levels at receivers on a conservative basis (e.g. down-wind propagation).

- 11 Noise levels from existing equipment are based on close-up measurements of the existing equipment and calibrated against annual monitoring results.
- 12 Noise levels from future equipment are predicted based on measurements of the existing equipment.
- 13 Predicted noise levels from future expansion are based on a potential expansion scenario whereby the site essentially doubles, within the constraints of the proposed Outline Development Plan.
- 14 The Noise Assessment predicted noise levels for two peak activity scenarios. Specifically, a worst-case 15-minute period including either rail activity or peak tanker activity.

PREDICTION METHODOLOGY

- 15 To accurately predict noise levels arising from the proposed site expansion, a detailed noise model has been prepared using the internationally recognised noise modelling software package SoundPLAN. This software takes into account the directivity and propagation of noise, including effects relating to ground and atmospheric absorption and meteorological effects. The calculations are based on ISO 9613-2:1996 "Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation". This standard adopts the conservative approach of assuming that a light wind is always blowing from the noise source to the receiver. The calculations also hold for average propagation under a well-developed, moderate, ground based temperature inversion, such as may commonly occur on clear, calm nights.
- 16 This noise model has been developed in two parts:
 - 16.1 The existing site; and
 - 16.2 The proposed expansion.

Existing Site Noise Model

- 17 I built the existing site noise model based on noise measurements of the existing plant during multiple detailed noise surveys. In particular, comprehensive surveys were conducted on 28 November 2012 and 3 December 2013 during the commissioning phase for the Stage 1 and Stage 2 developments respectively. Specific measurements of rail and container handling activity have been conducted on multiple occasions, as well as additional on-site measurements of specific items of equipment.

- 18 In addition to these measurements, I have used the results of the annual noise monitoring surveys around the site to assist in calibrating the model.

Proposed Expansion Noise Model

- 19 The expansion of the Darfield site is based on the existing equipment and activities. Therefore, the expansion noise model is based on noise data for the existing equipment.
- 20 The location of future activities can be understood by reference to the draft Outline Development Plan.
- 21 The expansion model is combined with the existing site model to predict cumulative noise emissions at surrounding properties.

MODEL ASSUMPTIONS

- 22 The key assumption for each model is that noise emissions are based on a worst-case 15-minute scenario involving peak heavy vehicle movements, i.e. during a shift change, and peak rail activity. As such, noise emissions will generally be lower than the noise levels predicted.
- 23 The existing plant assumptions include:
- 23.1 Two coal fired boilers sharing a common discharge stack;
 - 23.2 Milk reception and associated milk handling pumps, pipework and silos;
 - 23.3 Clean in Place (CIP) facility and tanker CIP bay;
 - 23.4 Ancillary services buildings and outdoor equipment;
 - 23.5 Dry store operations including two top-lifter outdoor container handlers operating; and
 - 23.6 Existing heavy vehicle movements, most of which are tankers.
 - 23.7 Rail movement on the existing rail siding using two diesel electric locomotives. One movement (i.e. train arrival or departure) occurs in the 15-minute scenario.
- 24 The expansion scenario is based on the addition of:
- 24.1 Two new dryers with associated silos of the same design and capacity as Dryer 2;
 - 24.2 Two new boilers of the same design and capacity as the existing Boiler 2;

- 24.3 An expanded dry store facility resulting in a doubling of total building area;
 - 24.4 An additional two container handlers;
 - 24.5 A doubling in all associated ancillary services buildings and associated outdoor equipment;
 - 24.6 A doubling in total heavy vehicle movements. Note that as described in Section 4.3 of the Noise Assessment, the number of movements during the peak period is not changed on the basis that tanker shifts will be staggered. In other words the peak period is extended.
 - 24.7 A doubling in the number of rail movements, including commencing night-time rail movements. Note that the noise level during each rail event will not change as a result of the additional movements.
- 25 Noise contours have been predicted for two worst-case 15-minute periods with the proposed expansion scenario. These are labelled as "Scenario 1 – Peak Tankers" and "Scenario 2 – Rail Movement". The scenarios have been modelled separately as rail movements cannot practically occur at the same time as product load out and peak hour tanker movements because the train crosses the site access road.

Dated 7 March 2017



Robert Michael Blakelock