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 Rob Lachlan Hay

Dated: 8 March 2017

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STATEMENT OF EVIDENCE OF ROB LACHLAN HAY

INTRODUCTION

1 My name is Rob Lachlan Hay.

2 I am an Associate in the international acoustical consulting firm of Marshall Day Acoustics (*MDA*). I hold a Bachelor of Science and Masters of Science degree from the University of Canterbury, majoring in Chemistry.

3 I have worked in the field of acoustics for over 13 years. I joined MDA in 2006, and I have been involved in a number significant large scale environmental noise assessment projects throughout New Zealand including manufacturing, transportation and retailing activities.

4 In recent years I have been involved in the annual noise surveys for the majority of Fonterra's South Island manufacturing and warehousing sites. I have also carried out, and more recently led the MDA team responsible for, the acoustic design, consenting and commissioning of a number of large brown field and green field dairy factory developments, notably Edendale, Darfield and Pahiatua.

5 I have advised Fonterra during the review of a number of district plans with respect to appropriate noise limits, reverse sensitivity and appropriate noise rules. These Districts include Southland, Clutha, Dunedin, Waimate, Selwyn, Hurunui, Kaikoura, Marlborough, Tasman, South Taranaki and Whangarei. Much of this advice has centred on balancing the needs of what can be achieved in terms of noise control at both existing and possible new dairy factories and distribution centres, against the needs of local communities to have acceptable levels of acoustic amenity. In this context the primary focus of my work for Fonterra has been assisting in the development of a more uniform noise criteria and rules to apply nationally to their production and distribution facilities.

6 I am familiar with the Darfield Factory and its surrounds.

7 I have been asked by Fonterra to provide evidence in support of proposed plan change 50 (*PC50*) to the Selwyn District Plan (*District Plan*) relating to the creation of a Dairy Processing Management Area around the Darfield site.

8 Although this is a Council hearing, I have read the Environment Court's Code of Conduct and agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues addressed in this statement of evidence are within my area of expertise.

SCOPE OF EVIDENCE

9 I will provide a summary of the key points relating to:

9.1 noise standards;

9.2 reverse sensitivity to noise effects;

9.3 the existing noise environment;

9.4 proposed noise control boundary (NCB); and

9.5 matters raised in Submissions and in the Officer's Report.

10 I do not intend to duplicate matters already addressed in my report (Rp 001 R01 2013648C, dated 17 September 2015, which accompanied Fonterra's PC50 request), except to emphasise or clarify relevant points. Instead I adopt this report as part of my evidence.

SUMMARY OF FINDINGS

11 Based on my assessment provided in my report and this evidence, my findings can be summarised as:

11.1 The proposal will result in noise levels no greater than consented at any existing dwelling, and in fact substantially lower at all except The Oaks.

11.2 No adverse noise effects will arise from the adoption of the noise control boundary and sound insulation rule proposal.

11.3 The noise control boundary will result in certainty for all parties (present and future).

11.4 Noise effects arising from night-time rail movements will be less than minor at The Oaks, and substantially less elsewhere. These effects can be further minimised by restricting the number of trains permitted in any given night.

NOISE STANDARDS

12 In this section I will discuss the following:

12.1 The District Plan's noise limits;

12.2 The consented noise limits for the Darfield Factory;

12.3 NZS6802:2008 guidelines for noise, particularly at night; and

12.4 World Health Organisation Guidelines.

13 The Darfield site currently operates 24 hours per day for the production season. There is little difference between the daytime and night-time operating state other than a generally greater level of maintenance, contractor and administration activity during the daytime.

14 The primary purpose of daytime noise limits is to protect general community amenity by preventing significant annoyance and associated adverse health effects. The primary purpose of night-time noise limits is to preserve adequate sleep amenity. The requirement to protect both general and sleep amenity must be balanced against the needs of the community to provide for its economic wellbeing, enabling necessary businesses and services to operate, and allowing for an appropriate level of night-time activity to take place.

15 Where dwellings are situated within rural areas, close to transport infrastructure or close to industrial zones, it is normal to allow a slightly more permissive noise standard than would be expected in areas of higher amenity, such as quiet suburbs or remote countryside locations.

NOISE STANDARDS

District Plan Noise Standards

16 This is reflected in the existing Rural Zone noise limits applying to the area surrounding the Darfield site. The daytime limits of 60 dB L_{A10} and 85 dB L_{AFmax} are greater than those typically recommended in various standards (discussed further below), while the night-time noise standards of 45 dB L_{A10} and 70 dB L_{AFmax} are at the upper end of the generally recommended range. For dwellings of broadly typical New Zealand construction these noise standards allow for adequate sleep amenity to be achieved in bedrooms, even with windows open ajar for ventilation.

17 It is common for these standards to apply at the notional boundaries of dwellings in rural zones. It is also common for infrastructure such as roads and railways to be exempt from compliance with district plan noise limits.

Consented Noise Standards (RC115199)

18 The Darfield site currently operates under noise limits that are very similar to the District Plan noise limits, but differ by using the L_{Aeq} parameter and the 2008 versions of both New Zealand Standard 6801 and 6802 for measurement and assessment of noise respectively.

19 The level of amenity provided can be considered to be the same.

NZS 6802:2008

20 NZS6802:2008 suggests a guideline maximum of 55 dB $L_{Aeq\ (15\ min)}$ (daytime) and 45 dB $L_{Aeq\ (15\ min)}$ / 75 dB L_{AFmax} (night-time) that

should not generally be exceeded (clause 8.6.2). In a rural zone it would be expected that these limits would apply at the notional boundary.

World Health Organisation (WHO) Guidelines

21 WHO recommend daytime noise performance standards in outdoor living areas of no more than 55 dB $L_{Aeq\ (16\ hour)}$ in order to prevent the onset of serious annoyance in the most vulnerable portion of the population.

22 During the night-time WHO also recommends noise levels of no greater than 45 dB $L_{Aeq\ (8\ hour)}$ outside bedroom windows. This is to enable satisfactory sleep amenity while windows are open for ventilation. This advice is consistent with the upper guideline recommendations from NZS6802:2008. WHO recommend a noise level of 30-35dB L_{Aeq} inside bedrooms and ideally the received noise should be at the lower end of that range. Typically, normal construction methods for dwellings achieve a 15 dB reduction of noise received at the façade, with windows ajar. So a dwelling that receives 45 dB at its façade would achieve an internal noise level well within the 30 – 35 dB range.

Summary of Noise Standards

23 Time averaging and parameter differences aside, the degree of amenity protection afforded by all of these performance standards is very similar. The District Plan and consented limits are slightly more conservative at night than NZ56802 or WHO standards owing to the minimal averaging permitted, while being more permissive during the daytime as a result of the limit being 5 dB greater than that recommended in either NZS6802 or WHO.

REVERSE SENSITIVITY

24 In some large scale industrial and infrastructure environments it is anticipated that activities may produce noise effects that extend beyond their own site boundary, but which are acceptable, often subject to appropriate land use controls, at dwellings on adjoining sites.

25 Examples of this include ports and airports, road and rail corridors, very large industrial activities, and entertainment venues such as outdoors music, sports and motorsport venues.

26 The location of such activities is often selected, at least in part, to minimise the number and proximity of noise sensitive activities nearby.

27 A lawfully established and well run industrial activity would be disadvantaged should a new dwelling be constructed too close to the activity, or should subdivision of rural land create a higher density of dwellings where they may similarly be exposed to unacceptable noise levels. This is because of the potential for complaints arising

from these new dwellings in close proximity to an existing source of noise, and a possible rise in objections for future development. Reverse sensitivity has been acknowledged as an effect by the Environment Court.

28 It is common practice to provide some degree of protection from this scenario by the use of building setbacks, noise control boundaries and/or sound insulation criteria. Such controls do not necessarily prevent development or subdivision on neighbouring land but they do require certain standards (e.g. insulation) to be met.

29 I note the District Plan already makes provision for this through the implementation of noise control boundaries associated with Dairy Processing Management Areas. In my opinion this represents both practical and effective planning.

30 Fonterra's Darfield site was intentionally established in a location that was well away from existing noise sensitive activities (dwellings in this case), and well serviced by the road and, especially, rail infrastructure necessary to allow its function as a manufacturing and distribution centre. This was done, in part, to ensure that noise effects on neighbouring, but distant, dwellings would be minimal.

31 For these reasons it is appropriate to provide a minimum set-back around the Darfield site to require the relevant developer/property owner to provide appropriate sound insulation for any new noise sensitive activities within the zone of potentially adverse noise effects.

EXISTING NOISE ENVIRONMENT

32 The noise environment in the vicinity of the proposed expansion is dominated by the existing dairy factory operation and traffic on State Highway 73, along with a contribution from rail on the Midland line.

33 The contribution to noise at existing dwellings is summarised in Table 1 of my report. The Oaks, a dwelling on the corner of West Coast and Clintons Roads and about 700 metres from the boilers, receives the greatest level of noise during normal operation (plant + vehicles on site) at around 38 dB $L_{Aeq\ (15\ min)}$. Other dwellings (those listed and also those close to listed properties) receive around 27 to 31 dB $L_{Aeq\ (15\ min)}$. At night during lulls in traffic this is likely to be the dominant noise audible. When road or rail traffic is passing, and for extended periods during the daytime, the plant is likely to be either inaudible or form only a minor part of the soundscape at nearby dwellings.

FONTERRA DARFIELD NOISE CONTROL BOUNDARY (NCB)

34 My report explains the underlying assumptions for the full expansion scenario at Fonterra's Darfield site. The process of modelling and the technical aspects of this have been covered in the evidence of **Mr Robert Blakelock**.

35 I have reproduced three figures from this report in order to emphasise keys points. Those figures appear at the end of my evidence.

Operational Noise

36 In **Figure 2**, the operational noise, (peak hour) scenario it is clear that no existing property other than The Oaks will receive in excess of 45 dB $L_{Aeq\ (15\ min)}$. The Oaks will thus receive the currently consented level of noise appropriate to the night-time, while all other existing dwellings will receive less than the consented level (generally 3 to 10 dB less). Satisfactory and appropriate night-time amenity is thus ensured.

37 Figure 2 also shows that the 50 dB $L_{Aeq\ (15\ min)}$ noise contour lies generally on Fonterra owned land, although it does skirt along the boundary common to land owned by **Mr Buttle**. Thus adequate daytime amenity is ensured at any location on **Mr Buttle's** land, whereas, in order to meet night-time standards, it may be appropriate to provide a slightly enhanced level of sound insulation for any future dwellings that may constructed between the 45 dB $L_{Aeq\ (15\ min)}$ noise contours and the Fonterra boundary.

38 To clarify, this 'peak hour' scenario represents the period during which there is a tanker shift change, not a period of one hour over which noise is averaged.

Rail Noise

39 In **Figure 3**, the predicted noise contours resulting from the operation of the rail spur, combined with normal plant operation is shown. This demonstrates that no existing dwelling would receive noise in excess of the current consent noise limits, other than The Oaks, where this noise would not be unacceptable given the existing noise environment and the satisfactory internal noise level for protecting sleep amenity that would result, even with windows ajar for ventilation.

40 Control of rail noise is proposed to be via limiting the number of rail movements occurring during any given night to no more than two, rather than relying on noise measurements. This provides an easy means of verifying and enforcing rail noise that does not require expertise, expensive equipment and significant co-ordination.

Proposed NCB

41 In **Figure 4**, the proposed regularised NCB is shown. The reasons for preferring a regularised NCB are given in my report, but can be

summarised as enhancing the practicality of enforcement and certainly for all parties.

42 At this boundary I propose a daytime noise limit of 55 dB $L_{Aeq\ (15\ min)}$ / 85 dB L_{AFmax} and a night-time noise limit of 45 dB $L_{Aeq\ (15\ min)}$ / 70 dB $L_{AFmax.}$ These noise limits will ensure that all existing dwellings (other than The Oaks) will receive a lower noise level than that allowed under either the consent or the District Plan.

43 Should any dwellings be constructed within the NCB, I propose a sound insulation rule to prevent reverse sensitivity.

44 I note that at worst the expected noise level any new dwelling could be exposed to is 50 dB $L_{Aeq\ (15\ min)}$. If constructed on land owned by **Mr Buttle** this would require the dwelling to be constructed hard against the Fonterra boundary. Even then the daytime noise level represents the onset of moderate annoyance in the most vulnerable of the population using outdoor areas. At night, even with windows ajar for ventilation, a typical dwelling built in that area would be expected to be no more than 35 dB $L_{Aeq\ (15\ min)}$ within bedrooms.

45 The likelihood for a dwelling to require any enhanced sound insulation or ventilation is therefore low in my opinion, and only even possible on a very small area of **Buttle**-owned land. Actual insulation requirements would need to be confirmed on a case by case basis.

SUBMISSIONS AND OFFICERS REPORT

Submissions

46 I have reviewed those aspects of submissions that relate to noise.

47 The **Douglas/Jenkins** submission describes the factory, and in particular train (un)loading as noisy and expresses fears this will get worse. Noise monitoring conducted since the development of the Stage 2 dryer and dry store demonstrates noise levels at this dwelling of 30 dB $L_{Aeq\ (15\ min)}$ or slightly less. While the site will be audible at times (especially the (un)loading activity) it cannot be described as noisy. Under the future expansion scenario noise levels will remain well below the District Plan and Consent permitted noise level at night of 45 dB $L_{Aeq\ (15\ min)}$.

48 The **Douglas/Jenkins** submission also discusses noise arising from trucks on the road and noise from contractors working on the Darfield site. While not explicitly stated I assume that the reference to trucks refers primarily to tankers, as these are the most common form of HGV associated with the site and they are active 24 hours.

49 Arguments around tanker traffic on public roads were thoroughly canvassed during both Stage I and II resource consent hearings for the site. I do not intend to address this further other than to reiterate that the purpose of the State Highway network is to enable

the flow of goods and material in an efficient manner, the increase in noise levels arising from the addition of Fonterra tankers onto the road are small; and any use of tankers on local roads would be because there are farms that require servicing by the tankers and the chosen local roads are the most efficient means of achieving that aim. Again, this is the purpose of local roads in a rural area.

50 The reference to contractors is not explicit. However, I assume that this refers to contractors working on the farm area of the site closest to the Douglas/Jenkins dwelling, rather than the factory site some 1500 metres away.

51 Any contractors in this area will be undertaking farming related activities. These activities are subject to the standard daytime District Plan Noise Limits (60 dB L_{A10} and 85 dB L_{AFmax}), except where specifically exempted, as indeed similar activities undertaken by other farming operations are.

52 The **Eaves** submission raises concern about contractors cutting grass during the season. I have addressed this point above.

53 The **Buttle** submission raises a number of points. Primarily the submission claims that the effects of noise for outdoor living areas has not been assessed. This is not entirely accurate. While my report focussed on existing dwellings, I did make reference to the Dryer 2 consent assessment of effects, which mooted future expansion as described in my report attached to the PC50 request. Further, the submission suggests that the requirement to achieve additional sound insulation is not reasonable.

54 In any event, I have discussed the potential for both adverse daytime and night-time noise related effects on future development on the **Buttle** property above, both generally (Noise Standards) and specifically (paragraphs 37, 44 and 45). Even in the somewhat fanciful scenario in which a future dwelling is constructed as close to the Fonterra boundary as permitted under the District Plan, the resulting outdoor noise level will be 50 dB $L_{Aeq\ (15\ min)}$. This is significantly below both the District Plan and consented or permitted daytime noise limit.

55 While a dwelling constructed anywhere within the NCB will be subject to greater night-time noise levels than desirable, this was discussed during the consent hearings for both dryers 1 and 2 and are in my view already part of the permitted baseline for assessment. This is the reason for the proposed reverse sensitivity sound insulation rule.

56 The degree of excess noise will be between 0 and 5 dB, depending on where exactly a future dwelling is constructed. As noted above, it is actually possible for a standard dwelling to achieve a satisfactory internal noise level within bedrooms with windows ajar for ventilation, depending upon the design, construction and

orientation of the dwelling. Even at worst the most likely solution would be to assume windows must be closed and an alternative means of ventilation would be required.

57 In summary, should a future owner of sub-divided land choose to build within the NCB, and very close to the boundary of a large pre-existing dairy factory, there exist a large range of design options to mitigate any noise effects that would range from no additional cost or quality compromise, to a minor cost which would also enhance the general amenity and well-being within the dwelling.

58 I do not accept that any significant adverse noise effects arise from the proposed future development or NCB implementation. In fact, it is my view that the NCB crystallises the extent of potential future noise effects in a beneficial manner for both existing and future dwellings.

Officers Report

59 I have reviewed both the Officers report prepared by **Ms Foote** and the supporting acoustics peer review prepared by **Dr Trevathan**.

60 At paragraph 77 of the officers report a number of points are raised. I address these below.

60.1 There is a discrepancy between Rule E26.1.1.17 and my report as to when daytime begins (0730 vs 0700). While I am of the view that 0700 is appropriate, the daytime defined in Rule E26.1.1.17 is definitive.

60.2 With respect to construction noise I have not proposed an exemption, rather I propose that construction noise is explicitly assessed and controlled using New Zealand Standard NZS 6803: 1999 *"Acoustics - Construction Noise"*. In the context of the application I consider this to be an important point.

60.3 With regard to night-time rail movements I am of the view that the best way to define this is by stating that the limitation is two movements on any given night, with the night-time defined by the chosen District Plan times.

61 I agree with **Dr Trevathan's** conclusions and analysis relating to the **Douglas/Jenkins** and **Eaves** submissions. My report did not discuss vehicle noise generated on public roads (State Highway or Local) for reasons canvassed above. I also note that should tanker traffic on Auchenflower and Bleakhouse Roads double, that would be because the capacity required by dairy farms serviced by these roads had doubled. This would be the case regardless of which dairy factory was to receive the milk and is therefore irrelevant to the current application, even if it were considered appropriate to assess traffic noise on public roads.

62 I agree with **Dr Trevathan's** conclusions with respect to the **Buttle** property.

Dated 8 March 2017

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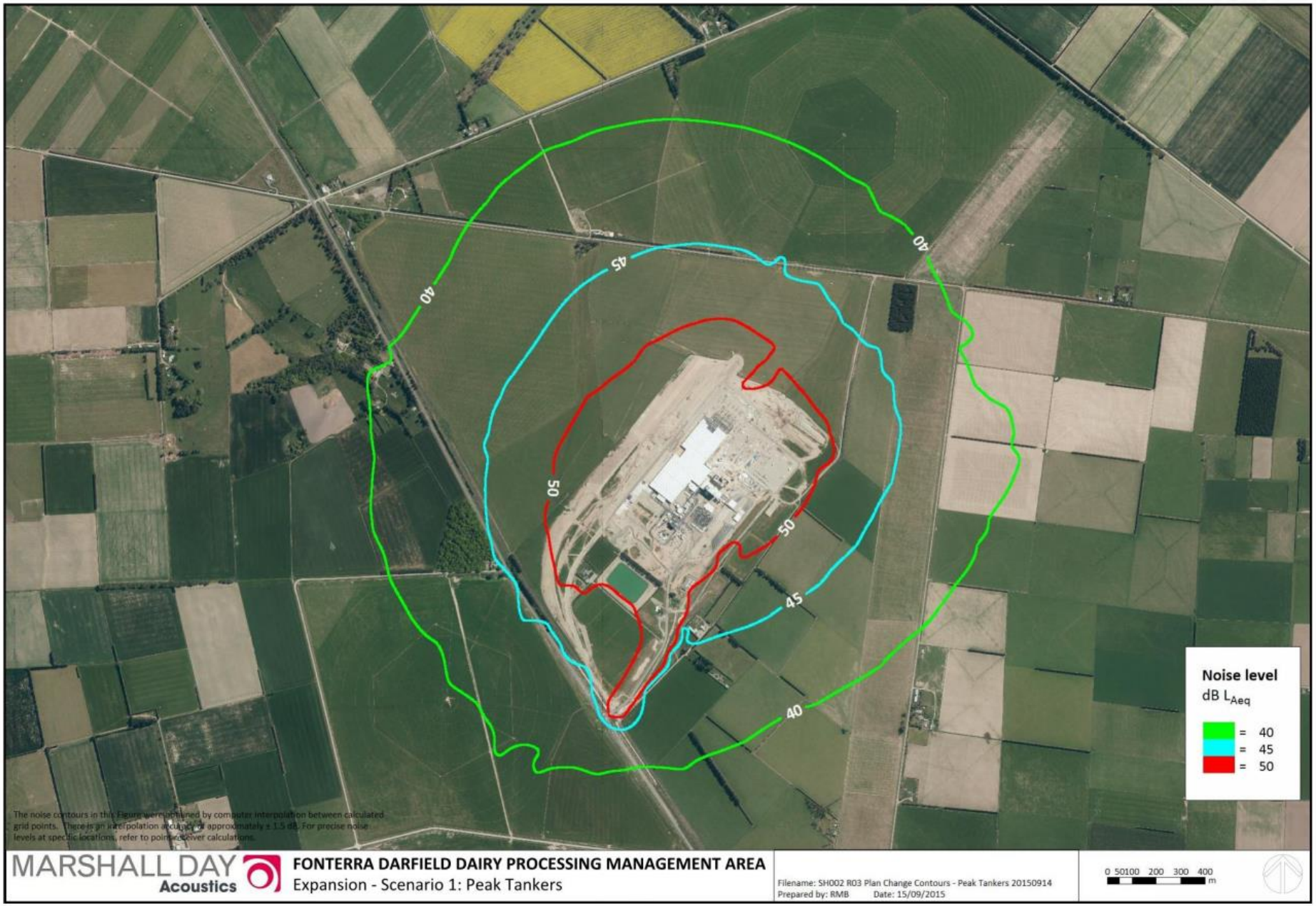
Rob Lachlan Hay

Figure 2: Full Expansion – Peak Hour (No Rail).



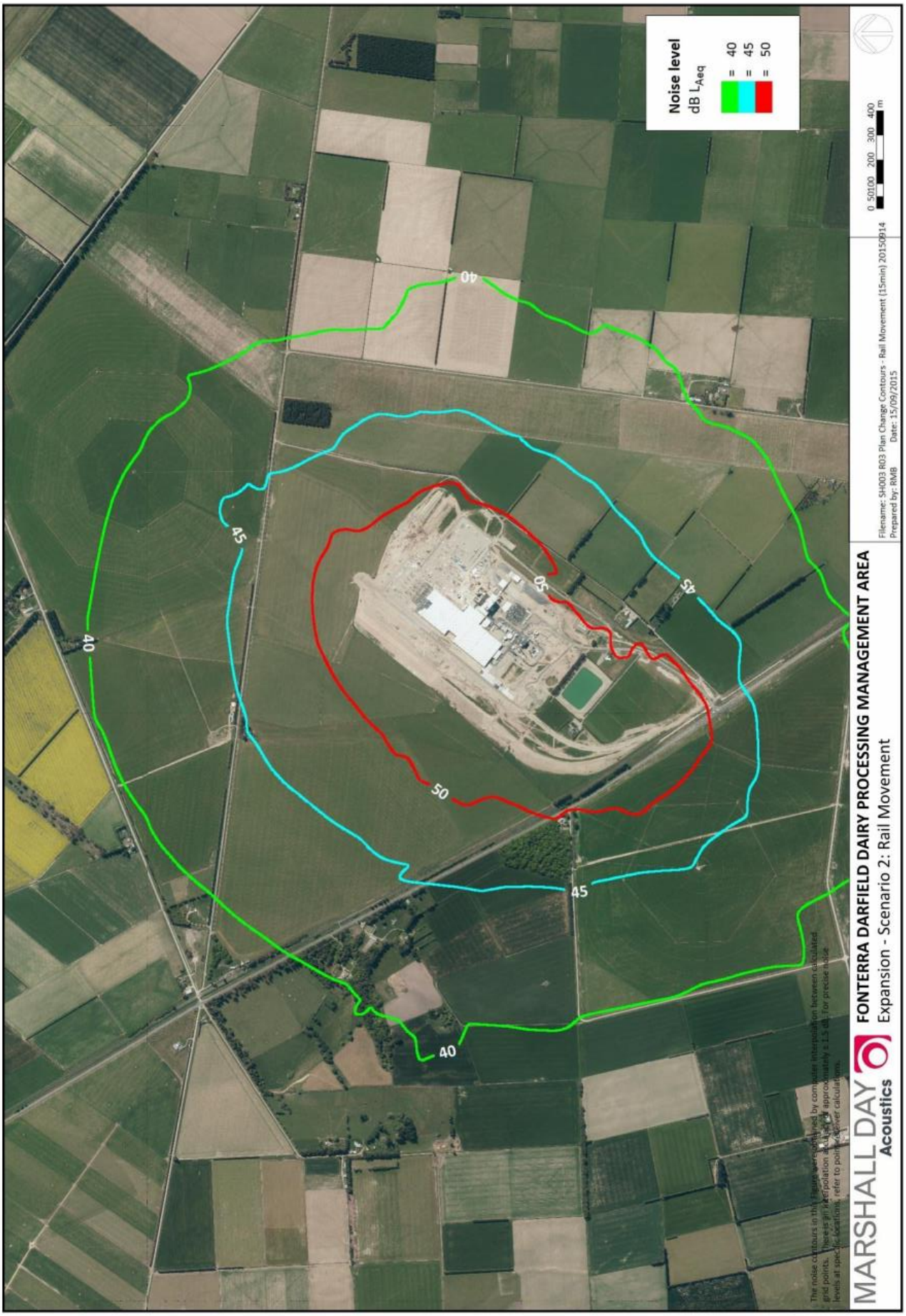


Figure 3: Full Expansion – Rail Movement

FONTERRA DARFIELD PROCESSING MANAGEMENT AREA - ODP