

ANNEXURE 10

Noise Assessment (and Addendum dated 20 June 2012)

Rezoning of Denwood Trustees Property

Noise Assessment

23 December 2010



Project: **Lincoln Area ODP**

Prepared for: **Denwood Trustees
Springs Road
RD4
Christchurch**

Attention: **Dennis Woods**

Report No.: **Rp003 R01 2009514**

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EXECUTIVE SUMMARY

Marshall Day Acoustics has assessed likely noise effects arising from the rezoning of Denwood Trustees property from Rural Outer Plains to Living 3.

The land concerned is surrounded by a mix of Rural Outer Plains, Business 3, Living 1, 2 and proposed LZ and Business 2 Zoned land.

With the mitigation described below (embodied as part of the proposed Outline Development Plan for the proposed Business 2 Zone) the noise effects of the rezoning on both the proposed Living 3 Zone and the surrounding existing and proposed Zones will be less than minor.

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1.0 INTRODUCTION

Marshall Day Acoustics has been engaged to assess the likely noise effects associated with the rezoning of part of the Denwood Trustees property, currently Rural Outer Plains, to Living 3. Acoustical terminology used in this report is explained in Appendix A.

This report summarises our findings and makes specific reference to:

- Suitability of proposed noise limits;
- Proximity to a proposed Business 2 Zone to the immediate northeast of the site;
- Actual and potential noise effects of the rezoning; and
- Mitigation measures as appropriate.

2.0 SITE ACTIVITY & LOCATION

The general locality of the site is shown in Figure 1. Lincoln Township can be seen in the northeast corner of the image. The site is bordered to the north by a mix of Rural Outer Plains and Business 3 Zones (Lincoln University), although this land is currently used for agricultural purposes. To the northeast a Business 2 Zone is proposed under Council initiated Plan Change 7 (Rolleston and Lincoln). To the east, across Springs Road, there is currently undeveloped land zoned for residential development (Living 1 and 2) and proposed Living Z (under Plan Change 7). To the south is Rural Outer Plains Zoned land.

Figure 1: General Locality

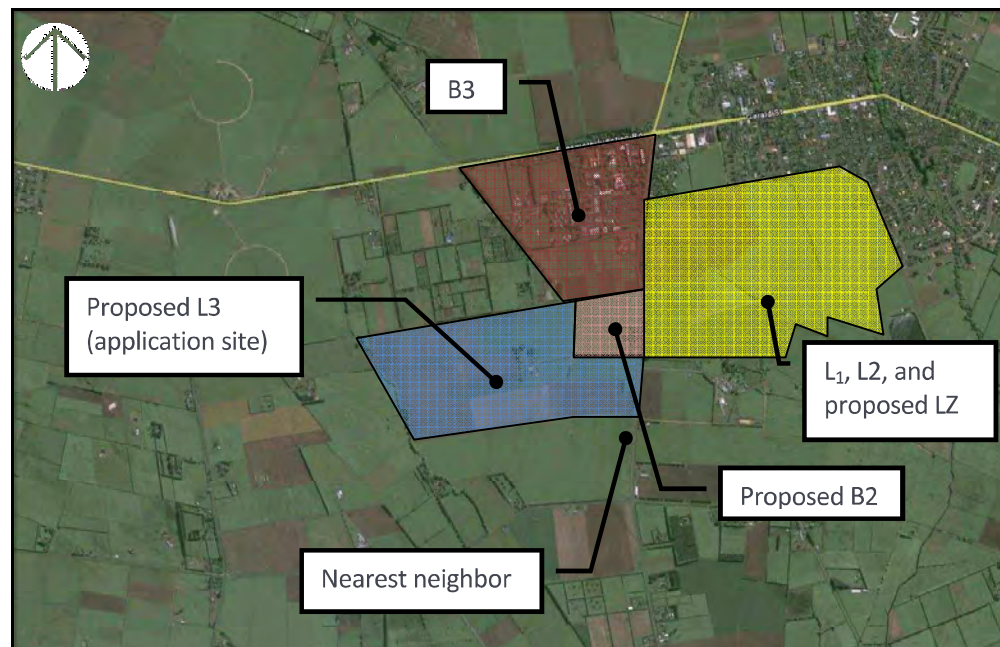
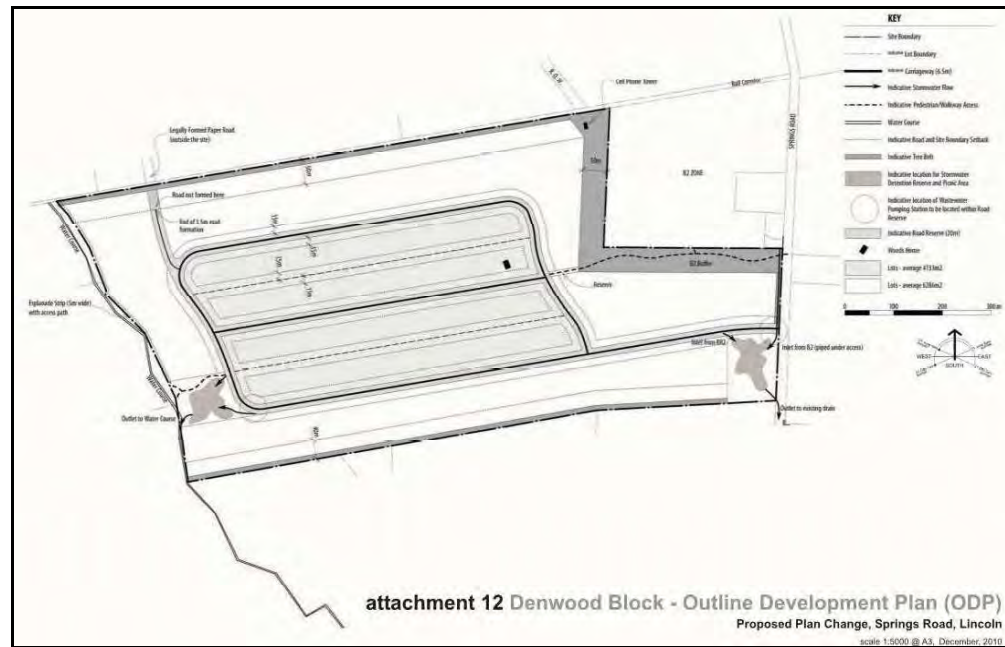


Image courtesy Google

The nearest neighbour in the Outer Plains Rural Zone (indicated in Figure 1) is approximately 120m south of the proposed Living 3 zone as measured to the notional boundary of the dwelling from the proposed Living 3 Zone boundary.

A preliminary subdivision plan is provided in Figure 2 (a larger copy is provided in Appendix B). This shows the Proposed Living 3 subdivision with respect to the proposed Business 2 Zone and the Business 3 Zone to the north.

Figure 2: Preliminary Subdivision Plan



The buffer zone indicated between the proposed Business 2 Zone and the proposed Living 3 Zone is on the order of 50 to 70 metres in width and accommodates a three metre high landscaped earth bund in the first 30 metres closest to the Business 2 Zone.

We understand that the average lot size within the Living 3 Zone is 5000 m². However the minimum lot size in the outer part of the Denwood block will be 6000 m² in area.

3.0 EXISTING NOISE ENVIRONMENT

We have not conducted any assessment of existing noise levels in the area. Our assessment is confined to consideration of the level of amenity anticipated under the District Plan, and any changes in that amenity that would result from the proposed rezoning.

4.0 SELWYN DISTRICT PLAN

The Selwyn District Plan Business 2 Zone noise rules are contained in the Town Volume, Sections 22.4.1.4 (noise to other Business zones) and 22.4.1.5 (noise to Living and Rural zones) of the Plan. Activities within the Rural Zone are controlled by Rural Volume Section 9.16.1. These rules are summarised in Table 1.

The rules which apply to this area based on existing and proposed zoning can be summarised as shown in Table 1.

Table 1: Permitted District Plan Noise Limits

Zone Producing Noise	Daytime		Night-time	
	dB L _{A10}	dB L _{AFmax}	dB L _{A10}	dB L _{AFmax}
Rural				
At any living zone boundary	55	85	40	70
At any notional boundary in a rural zone	60	85	45	70
At the notional boundary of any classroom in the Business 3 (University) zone	60	85	45	70
Business 3 (University)				
At any Living Zone boundary or the notional boundary in a rural zone	55	85	40	70
At a Business 2 zone	No restriction			
Business 2				
At any living zone	55	85	40	70
At any notional boundary in a rural zone	55	85	40	70
At the boundary of the Business 3 (University) zone	65	85	45	70
At any other site in the Business 2 zone	No restriction			

5.0 DISCUSSION

The Selwyn District Plan generally sets noise limits in the Rural Zone that allow a greater level of noise during the daytime than many other Districts in New Zealand. We assume that this is an intentional signal by Council that, within reason, a greater level of activity and therefore noise, is to be expected in these zones.

The noise limits set for Living Zones (daytime and night-time), and at the notional boundary of dwellings in the Rural Zone during the night-time, are typical of many other Districts and are consistent with guidance provided by New Zealand Standard NZS 6802:2008 “Acoustics - Environmental Noise” and also the World Health Organisation in its guideline values for community noise in specific environments.

We have considered both noise emissions from the proposed Living 3 Zone and also reverse sensitivity arising from noise emissions from surrounding zones to the proposed Living 3 Zone.

5.1 Noise from the Living 3 Zone

Given the noise limits provided in the District Plan we do not consider the Rural Outer Plains, Business 2 or Business 3 Zones to be noise sensitive. Provided that activities within the proposed Living 3 Zone are conducted in a manner that results in compliance with the noise limits given in Table 1 we expect there to be no adverse effect at any surrounding Zone, or proposed Zone, arising from the creation of the proposed Living 3 Zone.

Given that this is a Rural Residential Zone we expect that the anticipated activities within this Zone should have no difficulty in complying with the Zone noise limits when conducted in a reasonable manner.

5.2 Noise to the Living 3 Zone

Similarly, the presence of the proposed Living 3 Zone should not have any adverse effect on surrounding zones arising from reverse sensitivity.

5.2.1 Business 2 (proposed)

The immediately adjacent proposed Business 2 Zone has a significant buffer zone including three metre high mounding. Marshall Day Acoustics has been involved in the design of the Business 2 Zone and has considered the implications of the District Plan noise rules for this Zone in depth. We are confident that it is practicable for an appropriate business to locate to this zone and establish itself in such a manner that compliance with the District Plan Rules in Table 1 are achieved, without any onerous or overly restrictive mitigation.

5.2.2 Business 3

The Business 3 land owned by Lincoln University is separated from the proposed Living 3 Zone by the proposed Business 2 Zone and associated green space. Once again this buffer should be more than adequate to allow any reasonable activity to occur within the Business 3 Zone and still comply.

In addition the size and orientation of the proposed lots within the Living 3 Zone are such that there is adequate scope for dwellings to be constructed well clear of the Business 3 Zone boundary.

In any case the noise rules applying in the proposed Living Zone are no more stringent than those applying to the current Rural Outer Plains Zone, and in addition the Business 3 Zone already shares a common boundary with Living 1 Zoned land. Thus the proposed Living 3 Zone will not result in any additional restriction of activity within the Business 3 Zone.

5.2.3 Rural Outer Plains

The noise level applying at the boundary of the proposed Living 3 Zone is 5 dB lower than that currently applying at the notional boundary of any dwelling in the Rural Zone.

However, given the nature of typical farming activities in the area it is not immediately obvious to us in what manner this would adversely affect surrounding farmers. This is particularly so given the General Exemptions provision of Rule 9.16.3 of the District Plan:

Noise limits in any part of the Plan shall not apply:

9.16.3.1 In any area to activities of a limited duration required by normal primary production activities including agriculture, horticulture, aquaculture, forestry and fishing, provided that the activity shall comply with the requirements of Section 16 of the Resource Management Act 1991.

For the purposes of Rule 9.16.3.1, “activities of a limited duration” means: Activities which are temporary and/or intermittent in nature, such as crop harvesting, crop irrigation, general use of farm machinery or crop protection devices (other than audible bird scarers). Such uses may occur on a limited number of days in a year, a limited number of hours in a day or a limited number of days in a week or month.

Certainly the reverse sensitivity effects in this case would be no greater than those arising from the Living 2 development to the east of Springs Road.

6.0 MITIGATION

We do not consider that any specific mitigation is required with respect to surrounding Rural Outer Plains, Business 3 or Living 1 & 2 Zoned land, provided that the applicable existing noise rules and provisions of the District Plan apply to each of the proposed and existing Zones.

We do consider that mitigation is required for the proposed adjacent Business 2 Zone. This would be adequately addressed by the proposed landscaping buffer that forms a part of that Zone.

We note that the proposed Business 2 Zone and its associated landscaped buffer provide adequate mitigation for the Business 3 Zone, hence no further mitigation is necessary.

7.0 CONCLUSION

We have assessed the likely noise related effects arising from this proposal. In our view any adverse noise effects will be less than minor.

Other than the mitigation described above, embodied in the proposed Business 2 Zone, no further mitigation against noise effects is required. The current noise rules of the District Plan provide adequate protection of amenity.

APPENDIX A – GLOSSARY OF TERMINOLOGY

Sound Pressure Level (L_p)	A logarithmic ratio of a sound pressure measured at distance, relative to the threshold of hearing (20 μ Pa RMS) and expressed in decibels.
dB	Decibel – A measurement of sound level expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
dBA	A measurement of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear. All noise levels are quoted relative to a sound pressure of $2 \times 10^{-5} \text{Pa}$
$L_{A10}(t)$	The A-weighted noise level equalled or exceeded for 10% of the measurement period. This is commonly referred to as the average maximum noise level. The suffix "t" represents the time period to which the noise level relates.
$L_{A\text{max}}$	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.

20 June 2012

Denwood Trustees
Springs Road
RD4
Christchurch 7674

Attention: Dennis Woods

Dear Dennis,

ADDENDUM TO REPORT (PC28 & LIVING 3 ZONING)

This letter is an addendum to our report dated 23 December 2010 (Rp 003 R01 2009514) submitted in support of the Denwood Trustees application for Plan Change 28 (PC28). This revision of the addendum incorporates a revised ODP drawing dated 19 June 2012. The revised ODP plan does not result in any change in our opinions or conclusions expressed in previous versions of this addendum.

We understand that as a result of recent Plan Change hearings the eastern portion of your site and some other adjacent land has been placed into two newly created zones; a B2 (deferred) and an LZ (deferred) Zone. These are indicated in the attached proposed ODP.

At the time we prepared our initial report no LZ Zone was proposed, the B2 Zone was to be placed roughly where the LZ(deferred) Zone is now indicated; and the balance of the Denwood Block was proposed to become Living 3 (L3) under PC28.

The purpose of this addendum is to address the noise related implications of introducing an adjacent LZ Zone and moving the location of the B2 Zone.

There are two factors to be considered as a result of this proposed change in land use:

- Whether the introduction of the LZ (deferred) Zone (not previously considered) is likely to result in any adverse noise effect either on, or arising from, the proposed L3 Zone; and
- Whether the translation of the B2 (deferred) Zone to the south of the location initially proposed will result in any adverse noise effects that are substantively different on the proposed L3 land, and which have not already been considered in our original report.

DISTRICT PLAN NOISE LIMITS

Plan noise limits applying to the site and surrounding land are summarised in Table 1 below.

These noise limits are presented in the form of noise originating from a nominated zone, being received within a different nominated zone. The noise level is to be assessed at any point beyond the boundary of the site from which the source of any noise of interest is situated.

Table 1: Permitted District Plan Noise Limits

Zone Producing Noise	Daytime		Night-time	
	dB L _{A10}	dB L _{AFmax}	dB L _{A10}	dB L _{AFmax}
Rural				
At any living zone boundary	55	85	40	70
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Business 3 (University)				
At any Living Zone boundary or the notional boundary in a rural zone	55	85	40	70
At any other zone	60	85	45	70
Business 2				
At any living zone	55	85	40	70
At any notional boundary in a rural zone	55	85	40	70
At the boundary of the Business 3 (University) zone	65	85	45	70
At any other site in the Business 2 zone		No restriction		
Living Zones				
Residential, spiritual or educational activity		No restriction		
Any activity which is not a residential activity, spiritual activity or educational activity assessed beyond any other site boundary	50	85	35	70

COMPATABILITY OF PROPOSED L3 & LZ (DEFERRED) ZONES

Both zones are residential in nature, albeit that the LZ is higher density. Fundamentally, we regard the two zones as **compatible with respect to noise effects**. We note that, due to allowance for a potential future bypass road, there is a buffer space separating the two zones. This will also provide a buffer between the two Living Zones although we do not regard this as necessary from a noise perspective.

SOUTHWARD SHIFT OF B2 (DEFERRED) ZONE

The nature of the interface between the B2 (deferred) Zone and the proposed L3 Zone remains identical to that previously proposed. In our view there is no requirement to modify the proposed landscape buffer or other mitigations, compared to those previously considered. The Draft ODP (attached) provides a level of amenity consistent with that recommended in our original report and one that provides the minimum required setback for achieving adequate noise amenity between the two zones.

BUSINESS 3 LAND

Lincoln University own Business 3 land to the immediate northeast of the subject area. The area of adjoining B3 and proposed L3 land is on the order of a few metres and has been set aside as a reserve strip as indicated in the draft ODP. We understand that the University and Denwood Trustees reached a private legal agreement that the entire north boundary of the Denwood site is to have a 1.8 m high wooden fence constructed along the common boundary, and that on the Denwood side of the fence a shelterbelt is to be planted and maintained at a height of 5 metres as indicated in the attached ODP.

The above mitigation, combined with the average 5000 m² lot size in the proposed L3 zone, allows considerable scope for locating dwellings away from the boundary adjacent to the B3 Zone, giving adequate scope for mitigation of noise effects that may arise.

The existing baseline of potential noise effect against which the proposal must be considered is the existing Rural zoning of the Denwood Block, which would require activities within the University B3 Zone to comply with a noise rule of 55 dB L_{A10} (daytime) and 40 dB L_{A10} (night-time) at the notional boundary of any dwelling.

The existing land is an undeveloped site and therefore a dwelling could be constructed as of right, with the only restriction being a 20 m setback from the boundary. Under the L3 proposal the noise rule remains the same, but would now apply at the site (and in this case L3 Zone) boundary. However, in this case the agreed landscape buffer means that any dwelling is extremely unlikely to be constructed any closer to the B3 Zone boundary than is allowed for under the existing situation. As noted above, the 1.8 m boundary fence will also provide additional noise mitigation.

We do not see that the University should have any concern regarding the proposed change.

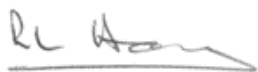
CONCLUSION

In our view the proposed ODP provides an equivalent level of amenity to that required by our original assessment. No new noise effects that have not been considered have been introduced and no change in scale of effects will result.

If you have any further questions please contact me.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD



Rob Hay
Senior Consultant



OUTLINE DEVELOPMENT PLAN AREA 5 - LINCOLN
Plan Change 28 June 19, 2012