**BEFORE THE CENTRAL OTAGO DISTRICT COUNCIL**

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| **IN THE MATTER** | of the Resource Management Act 1991 |
| **AND** | |
| **IN THE MATTER** | of a requested change to the Central Otago District Council's Operative District Plan - Plan Change 13 (PC13). |

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**EVIDENCE OF WILLIAM PETER REEVE**

**ACOUSTIC ENGINEER ENGAGED BY HORTICULTURE NEW ZEALAND**

**DATED 16 MAY 2019**

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**Qualifications and experience**

1. My name is William Reeve. I am a Senior Acoustic Engineer with Acoustic Engineering Services Limited, an acoustic engineering consultancy with head office based in Christchurch. I hold a Bachelor of Engineering with Honours from the University of Auckland. I am a Member of the Acoustical Society of New Zealand.

2. I have over seven years' experience in the field of acoustic engineering consultancy and have been involved with a large number of environmental noise assessment projects throughout New Zealand on behalf of applicants, submitters and as a peer reviewer for Councils.

3. My relevant experience includes frost fan noise prediction in North Canterbury, Marlborough and Central Otago, including on Ripponvale Road, near the PC13 site. I have also provided acoustic advice regarding helicopter noise in rural areas throughout the South Island, noise associated with horticultural activity during harvest season, gunshot noise and advice relating to Plan Changes where new residential activity is proposed in rural areas. I have measured noise from bird scarers in Marlborough and Wanaka.

4. While this matter is not before the Environment Court, I have read and agree to comply with the Code of Conduct for Expert Witnesses (Environment Court Practice Note 2014). I confirm this evidence is within my area of expertise, except where I state 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 expressed.

5. I am familiar with the site and surrounds having visited in May 2019. I have also discussed orchard operations with Michael Jones of Suncrest Orchards to gain a full understanding of the extent and timing of orcharding activities that generate noise.

**Background**

6. In January 2019, I was engaged by Horticulture New Zealand to undertake a review of the methodology and findings of the report titled *Assessment of Noise Effects for River Terrace* prepared by Styles Group and dated the 20th of June 2018 (the Acoustic Assessment), along with the Plan Change 13 request document and the included indicative masterplan.

7. I have since reviewed the acoustics evidence prepared by Jon Styles, planning evidence prepared by Jeffrey Brown on behalf of River Terrace Developments Limited, the s42A report prepared by Mr Whitney and the summaries of submissions.

8. As my engagement is with Horticulture New Zealand, my evidence relates to noise associated with activity on nearby orchards. I have not considered noise associated with motorsport activities, the State Highway, or the nearby aerodrome.

9. In my evidence, I consider various noise generating aspects of horticultural activity, and discuss whether the proposed controls will be sufficient to control reverse sensitivity noise effects, or will place an additional burden on normal horticultural activities.

10. Mr Styles places some reliance on the proposed no complaints covenant to "mitigate expectations". I have not seen any evidence that supports an assertion that a no complaints covenant will reduce the effects of any noise received at new dwellings. With this in mind, I have not discussed no complaints covenants in any detail in this evidence. I consider that comment on whether this is a useful and enforceable mechanism is better addressed in the evidence of planning, or legal submissions.

**General horticultural noise**

11. In his evidence, Mr Styles states that he considers noise from frost protection and bird scaring to be the primary horticultural noise

sources that need to be considered. He discusses how other general horticultural noise sources raised in the S42a report, such as tractor movements, use of machinery, chainsaws, shooting and diesel engines for irrigation are insignificant in the overall evaluation of noise effects.

12. I consider that there are aspects of general horticultural noise that have been overlooked by Mr Styles and should be assessed in more detail. While these may be seasonal, they will generate high noise levels when they occur.

13. In his evidence, Mr Styles relies on the fact that day to day noise exposure at residential sites will be no greater than 55 dB $L_{Aeq}$ which he states is a standard *"applied all over New Zealand at the interface between noise makers and residential activity"*. I agree that this is a typical daytime standard for noise received at the notional boundary of dwellings in rural areas.

14. Provision 4.7.6E of the District Plan outlines a similar daytime noise limit of 55 dBA $L_{10}$ along with a 40 dBA $L_{10}$ / 70 dBA $L_{max}$ night time control for noise from activities in the Rural Area, when received at the notional boundary of any dwelling. This applies to general orchard activities excluding *"any temporary activity (as defined)"* along with the use of frost fans and audible bird deterrent devices (bird scarers).

15. The Acoustic Assessment states that the existing District Plan rules will apply at any new dwellings within the proposed RTRA zone.

16. However, Mr Styles does not appear to discuss the exemption outlined in Rule 12.7.4 (iii) which states that *"Noise limits in any part of the plan shall not apply… In any area to activities of a limited duration necessary for the production (but not processing) of primary products"*. The above noise limits would therefore not apply to the majority of noise generating activities on adjoining orchards.

17. The indicative masterplan which accompanies the Plan Change Request depicts dwellings close to the Suncrest Orchard boundaries to the west of the site. Given the close proximity of the proposed dwellings to the orchard boundary, they will receive elevated noise levels from these normal horticultural activities at times.

18. As an example, on the adjoining Suncrest Orchard, winter pruning teams will operate multiple chainsaws, between three and eight hydroladders and mulching equipment near the proposed residential boundary. I observed this activity occurring on Suncrest and other nearby orchards when I visited the area in May.

19. Based on brief measurements of this activity, I consider it likely that this would generate noise levels of above 55 dB $L_{Aeq\ (15\ min)}$ if this occurred within 50 metres of a dwelling. I understand these teams typically cover between half a hectare to a hectare per day.

20. Tractors and air blast sprayers will also be used at times close to the proposed residential boundaries. I understand that spraying can occur during the early morning period (before 7 am), and sometimes at night when weather conditions are favourable.

21. A 90 horsepower tractor towing a Silvan air blast sprayer (total assumed sound power of 109 dB $L_{WA}$) which passes 60 metres from a dwelling, would generate noise levels above 55 dB $L_{Aeq\ (15\ min)}$ when this occurs, at times before 7 am. I understand these noise levels are consistent with measurements undertaken by Marshall Day Acoustics of the actual equipment used in Suncrest Orchard.

22. A 50 - 60 metre buffer between the above orchard activities and nearby dwellings would be required for a standard of 55 dB $L_{Aeq\ (15\ min)}$ to be met. While this type of activity does not occur on a daily basis, it does illustrate why a setback is typically desirable between rural activity and intensive residential development to manage noise effects.

23. I understand that a new rule requiring a three metre high solid fence along the boundary with orchard activity is proposed, primarily as a

result of concerns about spray drift. If this fence is constructed to an appropriate acoustic standard, it could reduce noise from some types of horticultural activity. However, it may not reduce noise levels significantly from pruning / chainsaw use at height, or noise received at the upper floor of dwellings.

**Bird scarers**

24. The District Plan 4.7.6 E (b) includes a specific rule for bird scarers. This rule requires percussive devices to achieve a level of 65 dB ASEL or 70 dB ASEL where the device is more than 500 metres from any Residential Resource Area or Rural Settlements Area. Non-percussive devices must achieve 55 dBA $L_{10}$.

25. In my experience, the noise level limit of 65 dB ASEL at the notional boundary of dwellings is consistent with rules for percussive bird scarers in other rural areas of New Zealand. However, it is unusual that the District Plan does not place a restriction on the number of events. In my opinion, this is also an important factor in people's response to this type of noise, particularly in areas where there are multiple devices.

26. I understand that the adjoining Suncrest Orchard currently uses quadbikes with air horns and air cannons for bird scaring. Three quadbikes operate between the hours of 6 am and 9 pm, 7 days a week between the middle of November and early February. There are two teams on shift.

27. Currently, any of these devices operating on the nearby orchards are located more than 500 metres from any Residential Resource Area or Rural Settlements Area, so the less restrictive limit (70 dB ASEL) for percussive devices applies.

28. The Acoustic Assessment by Styles Group states that if the proposed RTRA zoning is adopted, then a limit of 65 dB ASEL will be required to be met at the notional boundary of any dwelling on the site, which is more restrictive.

29. The increased density of residential development on this site will therefore restrict bird scaring activities that may otherwise have been able to comply with the District Plan limits if the site was developed to contain the maximum number of residential properties in accordance with the current zoning.

30. The northern end of the subject site is currently in the Rural Resource Area, and the southern end is within a Rural Residential Area.

31. I understand from the evidence of Jeff Brown that the Rural Area of the site can contain one house and that the Rural Residential Area could accommodate up to 18 rural residential lots as a controlled activity subject to various development standards. These include a 25 metre side and rear yard for a dwelling in the Rural Area. Currently there are no dwellings on this site.

32. The indicative masterplan which accompanies the Plan Change Request depicts dwellings close to the Suncrest Orchard boundaries to the west of the site.

33. High density residential development close to the western boundary of the site will in effect create a sacrificial informal 'buffer' for bird scaring devices within the Suncrest Orchard to the west. These devices may not be able to be used close to the boundary without exceeding the District Plan noise limits proposed by the plan change. This places restrictions over and above what may be expected with the current zoning.

34. As discussed above, I recommend that a buffer is included between orchard activities and nearby dwellings.

35. The Acoustic Assessment also relies heavily on the no complaints covenant, to set expectations of incoming residents. As discussed previously, I have not seen any evidence that supports an assertion that a no complaints covenant will reduce the effects of any noise received at these dwellings.

36. The Acoustic Assessment states that insulation measures adopted to control frost fan and motorsport noise will also reduce noise received inside dwellings from bird scarers. While I agree that this will be the case, this does not address noise received in outdoor areas.

37. Since outdoor amenity has been raised as an issue in submissions, and the S42a report, Mr Styles discusses outdoor amenity in more detail in his evidence, although primarily in relation to motorsport noise. Mr Styles notes that a reduction in outdoor amenity is common for any residential area subject to the effects of temporary activities.

38. I do not consider this comment to be relevant for noise from bird scarers, which will occur throughout the summer months. While dwellings can be upgraded, noise received in outdoor areas cannot easily be mitigated. Noise from bird scarers which complies with the District Plan 65 dB ASEL rule may still lead to annoyance for residents using outdoor areas associated with their dwellings.

**Frost fans**

39. The current District Plan night time noise limit requires noise levels from frost fans received inside any habitable space within a dwelling to meet a level of 45 dB $L_{AFmax}$. This $L_{AFmax}$ limit is consistent with the World Health Organisation (WHO) guidelines for night time noise limits in sleeping areas to prevent awakening events.

40. I note that along with the $L_{AFmax}$ guideline, the WHO also provides a 30 dB $L_{Aeq\ (8\ hour)}$ internal noise level to protect against sleep disturbance. The Acoustic Assessment states that based on a 6 dB adjustment between the $L_{AFmax}$ and $L_{Aeq}$ noise metrics, the internal noise level within dwellings would only need to be below 39 dB $L_{Aeq}$ to meet the District Plan limit. If nearby frost fans operate at the maximum permitted noise level (65 dB $L_{10}$ at 300 metres) for more than an hour in a given night they would therefore generate internal

noise levels exceeding the 30 dB $L_{Aeq\ (8\ hour)}$ WHO internal noise guideline.

41. Based on the frost fan records provided by Suncrest Orchard for the 2018 year, frost fans operated on 15 nights a year, for between 30 minutes and 9 hours at a time, most commonly for 5 hours or more in a night.

42. In general terms, I agree that constructing new dwellings to achieve an appropriate Outdoor to Indoor Transmission Class (OITC), in combination with a requirement to provide a ventilation system so that windows can remain closed could adequately manage noise effects from frost fans (which only operate during the night time period). In the context of individual dwellings establishing in rural areas, ensuring internal noise levels do not exceed a 45 dB $L_{AFmax}$ limit alone may be acceptable. However in this case, the proposal will introduce a significant number of dwellings into an area where the night time WHO 30 dB $L_{Aeq}$ guideline may be exceeded, if the dwellings are only designed to meet the District Plan 45 dB $L_{AFmax}$ requirement.

**Helicopters**

43. I understand that the Suncrest orchard to the west of the property uses a Hughes 500 helicopter for tree drying and frost control on occasion. The Sarita orchard to the northwest also uses a helicopter for tree drying (flying out of Queenstown). Typically tree drying activity involves a helicopter flying low and slowly over the orchard, which will generate high noise levels if this occurs near any residential dwellings.

44. Mr Styles discusses the use of helicopters for frost protection and crop drying, ultimately concluding that helicopter use will be infrequent. He does not discuss the noise levels expected when these events do occur.

45. Based on measurement data for the same model of helicopter used

by Suncrest Orchard, I estimate that tree drying activity may result in maximum noise levels in the order of 70 - 80 dB $L_{Aeq}$ when the helicopter operates within 100 metres of the western boundary of Suncrest Orchard.

46. Noise levels will be very high for nearby residents when this activity occurs, requiring residents to retreat indoors, and likely disrupting normal domestic activity inside. I understand that so far this season there have been 30 flying hours associated with this activity at Suncrest Orchard.

**Summary**

47. I have identified several areas where the potential reverse sensitivity effects due to noise may impact on adjoining horticultural activity.

48. There is an exemption from the District Plan noise limits for activities of a limited duration necessary for the production of primary products. Normal horticultural activities including pruning and spraying are covered by this exemption. However, while these types of activity do not occur on a daily basis, they will result in high noise levels exceeding 55 dB $L_{Aeq\ (15\ min)}$ when they take place in the closest areas of the Suncrest Orchard to the west.

49. I consider that a 50 - 60 metre buffer between the closest horticultural activity and nearby dwellings would be required to ensure that noise levels from these activities will less frequently exceed 55 dB $L_{Aeq\ (15\ min)}$.

50. For noise from bird scarers, it is unusual that the District Plan does not place a restriction on the number of events. In my opinion, this is an important factor in how people respond to this type of noise. While the proposed dwellings will be upgraded to control internal noise levels, noise received in outdoor areas cannot easily be mitigated. Noise from bird scarers which otherwise complies with the District Plan 65 dB ASEL rule, but occurs throughout the summer

months with no limit on the number of events, may still lead to annoyance in outdoor areas of the proposed residential dwellings.

51. In addition, high density residential development close to the western boundary of the site will also in effect create a sacrificial informal 'buffer' for bird scaring devices within the Suncrest Orchard to the west. These devices may not be able to be used close to the boundary without exceeding the District Plan noise limits proposed by the plan change. This places restrictions over and above what may be expected with the current zoning.

52. Generally I agree that an appropriate level of dwelling upgrades along with a ventilation system can be a reasonable control to mitigate the effects of frost fan noise during the night time period. However, the proposal also introduces a number of new dwellings into an area where the WHO 30 dB $L_{Aeq}$ night-time internal noise guideline may be exceeded, if these upgrades are only to the level required by the District Plan.

53. I consider that these issues will need to be resolved if high density residential development will occur on the adjoining sites, otherwise noise reverse sensitivity effects on adjoining horticultural operators will have the potential to be significant.

William Peter Reeve

16 May 2019