MalcolmHuntAssociates
noise and environmental consultants
mha@noise.co.nz 04 4762 5689 P O Box 11-294, Wellington

Date of Issue:	**24 March 2025**
To:	Timaru District Council c/- Jen Vella, Legal advisor Anderson Lloyd
Copy to;	Council's section 42A Reporting Officer, Liz White, consultant planner
Project :	Proposed District Plan Noise Chapter – Response to Technical Noise Issues Raised
Prepared By :	Malcolm Hunt, Malcolm Hunt Associates

Proposed District Plan – Response to Technical Noise Issues Raised For Inclusion in Council's section 42A Report

This document sets out my views on technical noise questions arising from public submissions on the Noise Chapter of the Proposed Timaru District Plan. My recommendations and reasons for these are set out **APPENDIX A** attached. The submission points I have responded to are those which the s42A officer (Liz White) has asked for my comment on.

I have given each question careful consideration. My recommendations have been based on, among other things, guidance set out within the relevant NZ and international standards, integration with matters raised in other sections of the district plan, the specific context of the Timaru district and my experience with the matters raised within district plan processes at other Council's and previous noise assessment work carried out for Timaru District Council since 2018.

I set out a summary of my qualifications and experience in **APPENDIX B** attached. I confirm that have prepared this advice in accordance with the Code of Conduct for Expert Witnesses contained in Part 9 of the Environment Court Practice Note 2023. I also confirm the issues addressed in this review are within my area of expertise except where I state that I am relying on the evidence or advice of another person or published reports (for which I have provided references).

Malcolm Hunt
Bachelor of Science
Master of Engineering[mech]
RSH Diploma in Public Health

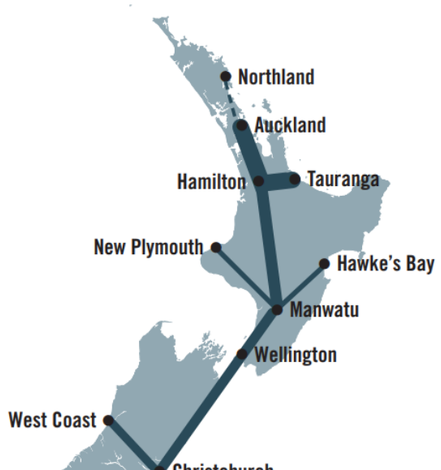
Appendix A – Response to Technical Questions Raised Within Submissions on the Proposed Timaru District Plan Noise Provisions

Submitter & Sub Point	Brief Summary of Point	Noise Expert Reasons
Jet Boating [48.14] And [48.15]	The submitter considers that noise from recreational jet boating activities is not excessive, is intermittent and of short duration and that the noise source is ever moving. In these circumstances, the submitter considers that the effect of the generated noise is acceptable and comparable to other noise generating activities such as vehicles using the road network, trains operating on their rail network and aircraft flying in the vicinity. The submitter further states that other Districts provide an exception for noise from recreational jet boating activities. The submitter therefore seeks that additional exception is added to NOISE-R1 to exclude noise generated by recreational jetboating from the rule, as follows: *Activities of a limited duration by non-commercial motorised watercraft operating on the surface of waterbodies.* The submitter states that an organised recreational jet boating event can be considered to be a Temporary Event and therefore is a Temporary Activity. The submitter considers there is no practical difference in noise generation between individual activities and an organised event. As such they consider the noise exemption requested for NOISE-R1 should be applied to NOISE-R2 as well, i.e. amend NOISE-R2 to include: *This rule does not apply to noise generated by:* *1. Non-commercial temporary event motorised watercraft operating on the surface of waterbodies.*	I agree with the submitter, that noise effects of recreational jet boating activities are generally intermittent and of short duration. As such, I consider daytime LAeq(15 minute) noise limits of Table 24 will generally be able to be complied with for typical recreational jet boating. Table 24 has no daytime LAFmax noise limits (up to 10pm) so once-per-15 minute pass-by noise will likely fully comply. In addition, noise compliance is applied at the notional boundary position in rural areas which are typically not located immediately at the shore. Therefore, I question a need to exempt noise emissions due to general recreational jet boating from compliance with Table 24. If there are cases where compliance may not be achieved, mitigation to ensure compliance with these limits is considered reasonably necessary to control effects on amenity values within the receiving environment and potential effects on health and well-being of people. Noise due to intermittent daytime recreational jet boating activities on water bodies in the district are not considered likely to cause excessive or unreasonable noise when compliant with a daytime LAeq(15 minute) 50 dB noise limit which, in rural areas applying at the notional boundary of any building used for a noise sensitive activity. Compliance with Table 24 noise performance standards seems reasonably assured for daytime recreational jet boating activities, which I consider avoids the need for the exemption sought. I agree that an organised recreational jet boating event would fall within the definition of a Temporary Event and therefore subject to NOISE-R2. Noise limits specified in PER-2 are reasonably liberal and only apply in respect to noise received within any residential zone. PER-3 also applies if the temporary event exceeds six hours, or if the noise occurs between 10pm and 10am, then the more stringent Table 24 noise standards apply. Thus, a daytime organised jet boat event of a few hours' duration would only be subject to PER-2 which applies relatively liberal limits only in respect to noise received at residentially zoned sites. Thus, daytime organised jet boat events held on bodies of water not located within proximal distance to residential zones would not be subject to any specific noise rules, avoiding the need for an exemption in my view. Owing to the sensitivity of the residential receiving environment, Temporary Event PER-2 noise limits are considered reasonably necessary. For the above reasons, an exemption to NOISE-R2 for noise from jet boating activities is not considered necessary.
Helicopters Sth Cant. [53.18] and NZAAA [132.22]	The submitter seeks that aircraft using airstrips and helicopter landing sites for activities in the Natural Open Space Zone (NOSZ) are exempted from NOISE-R1 in the same way as applies to GRUZ-R14. *Note that the submitter has sought that a new rule be included in the NOSZ for this activity, but this has not been recommended in the s42A report for the zone chapter, on the basis that where undertaken by DOC, the exemption under s4(3) of the RMA would apply (which would include noise) and this activity where undertaken by someone else would be permitted in the zone rules as a 'Park Management Activity' (under NOSZ-R2). Therefore, please assess the request in terms of it being an exemption for "aircraft using airstrips and helicopter landing sites that is a Park management activity under NOSZ-R2"*	The starting point is that RMA s.31(1)d imposes a duty on Council to control effects of noise throughout the district, including from aircraft using airstrips and helicopter landing sites in the Natural Open Space Zone (NOSZ). Some exemptions exist within the Proposed Plan for activities related to the management of the conservation estate. In addition, RMA s4(3) exempts activities undertaken by the Department of Conservation within the conservation estate from having to comply with any aspect of the district plan, providing the activity is consistent with a conservation management strategy, conservation management plan, or management plan established under the Conservation Act. In my view, due to the dispersed nature of the overall noise effect, the exemption involves a low overall noise effect such that aircraft operating as a park management activity in the NOSZ not undertaken by DOC should also be exempt from the PDP controls. I believe the term 'Park management activity' is suitable as it is a reasonably specific, yet practical, definition of the exempted activity. Requiring noise emissions from other types of aircraft and helicopters activities undertaken at airstrips or helicopter landing sites in the NOSZ as a non-park management activity (such as commercial passenger flights or sightseeing) are recommended to be controlled by the noise requirements set out in the PDP
NZDF [151.13]	In NOISE-R3, NZDF seeks that: - PER-2 is deleted (which requires fixed noise sources to meet the noise limits generally	NZDF Submission point 151.23 seeks PER-2 be amended so that fixed (stationary) noise sources be subject to NZDF requested noise limits which are in many cases 5 dB higher (more permissive) than the LAeq and LAFmax limits specified in Table 24 for noise from permitted activities received within General Rural Zone, Rural Lifestyle Zone, Settlement Zone, Natural Open Space Zone, Open Space Zone, Sport and Active Recreation Zone, Māori Purpose Zone and the General Residential Zone. However, the

	applying) and replaced with specific noise limits (refer detail in submission). - PER-1 is amended, so that it does not require noise from weapons firing and use of explosives to be assessed in accordance with NZS6802:2008, stating that this standard is not designed to assess impulse sound such as gunfire.	NZDF proposed noise limits are 5 to 10 dB less than Table 24 limits applying to noise received within the Large Format Retail Zone, Town Centre Zone, City Centre Zone, General Industrial Zone, Neighbourhood Centre Zone, Local Centre Zone and Mixed Use Zone. I consider fixed noise sources such as pumps, motors and generators are amenable to being located, oriented and if necessary screened or enclosed such that it is not unreasonable for PER-2 to require compliance with Table 24 noise performance standards. As above, permitted noise standards for some zones are more permissive than the submitter's proposed limit which will benefit the submitter. As the expected noise outcome of fixed plant noise complying with the PER-2 (as notified) will be more consistent with the district plan policies and objectives for each zone, the amendment requested for PER-2 is not supported. NZDF seeks PER-1 be amended to ensure NZS6802:2008 is not applied to impulse sounds such as gunfire. I agree this type of sound falls outside the scope of NZS6802:2008 and the request is accepted. PER-1 is recommended to be amended to read (added words are underlined); **PER-1** NOISE-S1 is complied with excluding the requirement to assess noise from weapons firing and/or the use of explosives using NZS 6802:2008 Acoustics – Environmental noise. Although not raised in the NZDF submission, the same issue arises in relation to assessing impulse noise due to the operation of bird scaring devices. For the above reasons, NOISE-R5 (Noise from bird scaring devices) PER-1 is also recommended to be amended to exclude the use of NZS 6802:2008 when assessing this type of noise. My recommendation is as follows; **NOISE R-5 Noise from bird scaring devices** **PER-1** NOISE-S1 is complied with excluding the requirement to assess impulsive noise from bird scaring devices using NZS 6802:2008 Acoustics – Environmental noise.
Fulton Hogan [170.36]	Seeks that NOISE-R4 is amended to align with the Auckland Unitary Plan, to allow for construction in the road to exceed the noise limits in NZS6803:1999, provided that the works are for less than three nights at any one receiver and a noise management is in place. The standard sought to be added to NOISE-R4 is: *PER-2 The noise levels specified in PER-1 do not apply to unplanned repair or maintenance works or planned works in the road between the hours of 10pm and 7am where:* *1. The number of nights where the noise generated by the works exceeds the relevant noise levels at any one receiver is three nights or less and* *2. the works cannot practicably be carried out during the day or because the road controlling authority requires this work to be done at night time; or* *3. because of the nature of the works the noise produced cannot be practicably be made to comply with the relevant noise levels; and* *4. a construction noise and vibration management plan is provided to the Council no less than five days prior to the works commencing.*	It is acknowledged some types of construction noise associated with road repairs or planned works on busy roads, such as state highways, may reasonably need to take place during night time hours but may also breach the night time noise limits of NZS6803:1999 between the hours of 10pm and 7am. I agree that night time road works may be necessary to provide an acceptable level of safety for both road users and road workers with some of these works incapable of compliance with the night time noise limits of NZS6803:1999. It is therefore generally accepted that the proposed approach for adding a new PER-2 is reasonably necessary however, for the reasons outlined below, I recommend some amendments to proposed wording; a) Limiting cumulative night time noise effects – amendments are required to the proposed wording to avoid noise effects of recurring night time road works which I consider should occur with reasonable infrequency. Exceedance is therefore recommended to be limited in occurrence such that works exceeding the relevant noise limits only be permitted for three nights or less within any seven day period. b) Need for night time exceedances – it is considered the need to allow for night time exceedances on the basis of road user and worker safety should only be permitted for night time works that cannot practicably carried out during the day. It is not agreed that non-compliant night works be permitted within the new PER-2 simply because the road controlling authorities deems this appropriate. I agree that some night works may be particularly noisy and the nature of the works means the noise produced cannot be practicably made to comply with the relevant night time noise limit. c) Applicable roads – as above regarding need for this exemption, due to generally lower traffic volumes, I consider there to be more practical opportunities to conduct road works on local roads during daytime, compared to state highways. I therefore recommend enabling exceedance of the night time noise limits of NZS6803:1999 should be limited to road works carried out on state highways. It is considered sensitive receivers alongside local roads are located in quieter areas and would be more sensitive to night time noise compared to receiver locations alongside designated state highways in the district. A new provision, PER-2 is recommended to be inserted in NOISE-R4, based on modifications to the submitter wording as follows; **PER-2** The noise levels specified in PER-1 do not apply to unplanned repair or maintenance works or planned works ~~in the road~~ undertaken within any state highway designation between the hours of 10pm and 7am where: 1. The number of nights where the noise generated by the works exceeds the relevant noise limits ~~levels~~ at any one receiver is three nights or less within any seven day period and 2. the works cannot practicably be carried out during the day ~~or because the road controlling authority requires this work to be done at night time~~; or 3. because of the nature of the works the noise produced cannot be practicably be made to comply with the relevant noise limits ~~levels~~; and 4. a construction noise and vibration management plan is provided to the Council no less than five days prior to the works commencing.
Hort NZ [245.93]	The submitter supports a permitted activity rule providing for audible bird scaring devices, but states that the rules are more limiting than the Operative District Plan and not discussed in/supported by the background reports.	1) It is agreed the Single Event Level (SEL) noise unit as defined with NZS6801:2008 is a superior noise unit as this unit takes into account all sound energy of a bird scarer 'shot' (not just the peak sound) and correlates well with effects on people compared to a peak level C-weighted measurement. SEL measures the total amount of sound energy of a particular noise and offers a good description of transient noise event. C-weighted sound levels can be difficult to measure in the field due to low frequency wind effects at the microphone. To convert typical 'gas gun' type bird scarers, dBC (peak) sound levels have been adjusted downwards to equate to an equivalent noise event measured using A weighted SEL dB values.

	The submitter states that a peak measure is not the most appropriate measure for enabling mitigations of noise effects and that 65dBSEL should be used as it is the more common measure for bird scaring devices. It further consideration that PER-3 is not effects based, and that the limitations of 7am - 8pm do not recognise that bird activity occurs from before sunrise to just after sunset. Therefore it consider that the times do not provide for adequate protection of crops. It seeks that PER-4 is amended to restrict use of bird scarers to half an hour before sunrise and half an hour after sunset; and that PER-2 and PER-3 are deleted and replaced by the following: *PER-2* *Noise from any bird scaring device must not exceed 65dB at any point within the notional boundary of any habitable room on another site in the Rural Zone or at any point within a Residential Zone (excluding any dwelling/s located on the same site as the device is being operated), unless the adjacent landowner has provided written approval to the activity and a copy has been provided to the Council.* *PER-3* *Discrete sound events of a bird scaring device including shots or audible sound must not exceed 3 events within a 1-minute period and must be limited to a total of 12 individual events per hour.*	2) With regards to allowing for replacement SEL noise limits to be exceeded where the affected landowner and occupier have provided written approval, I consider this to be a planning matter, and have therefore left it to Ms White to comment on this aspect of the submission. 3) Adverse effects of Impulsive sound from bird scaring devices are recommended to be controlled not only limiting hours of operation and the received level of sound, but also by reducing the sharpness quality of the higher sound levels received at close distances when the device is oriented directly towards the receiver. For this reason, where the device is located within 500m from any noise sensitive receiver site I consider it reasonably necessary to manage the 'sharpness' of the banging sound by orienting the bird scaring device away from the direction of residences located within 500m of the device. As the sound level received at sites located beyond 500m is received at a far lower level (and would not possess a 'sharp' sound quality if oriented towards these distant dwellings) I consider that devices located beyond this distance do not need to be controlled in terms of orientation of the device. 4) Due to potentially adverse sleep impacts, it is not agreed that bird scaring devices would result in acceptable noise effects should they commence 30 minutes before sunrise. This could be as early as 6am to 6.15am during February and March (when bird scarers are commonly employed). Noise effects up to 30 minutes after sunset can be considered acceptable as bird scarer noise events at these times avoids the noise-sensitive night time period and therefore does not raise the same concern regarding noise effects on people. 5) It is not agreed to increase the firing rate as requested within the submitter's proposed PER-3 wording. The submitter's proposal compares unfavourably (and will potentially cause a far greater degree of adverse noise effects) than PER-2 (as notified) which seeks to manage bird scaring noise emissions by allowing; a. Up to 12 noise events per hour where the noise events do not exceed 70dBC peak; OR b. Up to six events per hour where the noise events do not exceed 85dBC peak within the notional boundary of any noise sensitive activity on any adjoining site under different ownership. In light of the above assessment, the following amendments are recommended to NOISE-R5; **PER-1** NOISE-S1 is complied with excluding application of NZS 6802:2008 Acoustics – Environmental noise. **PER-2** Noise from any bird scaring device either: 1. must not exceed ~~a 70dBC peak or un-weighted level~~ A weighted SEL 55 dB measured within the notional boundary of any noise sensitive activity on any adjoining site under different ownership, and the device must not be used at a frequency of more than 12 times per hour; or 2. must not exceed ~~an 85dBC peak or un-weighted level~~ A weighted SEL 65 dB within the notional boundary of any adjoining noise sensitive activity on any site under different ownership, and the device must not be used at a frequency of more than 6 times per hour; and **PER-3** Unless located at least 500m from any building housing a noise sensitive activity on an adjoining site under different ownership bird scaring devices must be oriented with the direction of fire facing away from any noise sensitive activity on any adjoining site under different ownership; and **PER-4** Bird scaring devices must only be used between 7am and ~~8pm~~ and half an hour after sunset on any calendar day.
Property Income [56.1] and Fonterra [165.112]	Notes that the southern part of the Port Zone is not covered by either of the noise control boundaries and therefore no rule appears to apply (i.e. NOISE-R8 does not address this area). The submitters consider that a further permitted standard is required to address this, as follows: *For any activity within the Port zone but outside of the Port Noise Control Boundaries shown on the planning maps, the following noise limit applies:* *on any day between 10pm to 7am the following day, noise generated must not exceed 45 dB LAeq (9 hours) when measured at or within any residentially zoned site, provided that any single 15 minute sound measurement level must not exceed 50 dB LAeq and 75 dB LAmax.*	I agree that there is a gap regarding noise generated within the southern part of the Port Zone and this should be addressed along the lines suggested. The following amended wording is proposed; **PER-1** NOISE-S1 is complied with excluding noise from port activities taking place within Precinct 7 (PER-2 and PER-3) which shall be measured and assessed using ~~The maximum noise generated from activities is measured in accordance with~~NZS 6809:1999 Acoustics Port Noise Management and Land Use Planning; and **PER-2** For noise from activities taking place within Precinct 7, ~~W~~when measured ~~at any point at or~~ on any site not located within the Port Zone and landward of the Port Noise Inner control boundary shown on the planning maps, the following noise limits apply: 1. the 5 day Ldn noise limit must not exceed 65 dB Ldn; 2. LAeq 'night' (10pm to 7am) must not exceed 60 dB LAeq (9hours) provided that no single 15 minute measurement will exceed 65 dB LAeq and 85dBA LAmax **PER-3** For noise from activities taking place within Precinct 7, ~~W~~when measured ~~at any point at or~~ on any site not located within the Port Zone and landward of the Port Noise Outer control boundary shown on the planning maps, the following noise limits apply: 1. on any day between 10pm to 7am the following day, noise generated must not exceed 52 dB LAeq (9hours)provided that no single 15 minute sound measurement level must not exceed 57 dB LAeq and 77 dB LAmax; **PER-4** For noise from activities taking place on any site within the Port Zone outside Precinct 7, the following noise limits apply;

		1. on any day between 10pm to 7am the following day, noise generated must not exceed 45 dB LAeq (9 hours) when measured at or within any residentially zoned site, provided that any single 15 minute sound measurement level must not exceed 50 dB LAeq and 75 dB LAmax. Note: For the purpose of Port Noise, daytime is defined as 7am to 10pm on any day, and night time is defined as 10pm to 7am the following day.
PrimePort [175.66] and TDHL [186.38]	The submitters consider that there are several issues with the rule, being that the Port NCBs (both Inner and Outer) are only intended to apply outside the Port Zone and therefore should not apply to activities within the Port Zone; and these NCBs were modelled based on Port noise generation from within Precinct 7 only and therefore have not accounted for industrial activity that may be happening outside Precinct 7. Further, they are concerned that there appears to be no noise rule applying to Port Zone activities that sit outside the Port Noise Control Boundaries, but inside the Port Zone. The submitters also consider that the measurement of industrial and other noise within the Port Zone (i.e. non-Port industrial and other activity occurring outside Precinct 7) is more appropriately measured under NZS 6801:2008 Acoustics - Measurement of environmental sound, and assessed in accordance with NZS 6802:2008 Acoustics - Environmental noise. The changes sought are: • PER-1 is amended to apply within Precinct 7 only; • PER-2 and PER-3 are amended to apply to measurement at any point outside the Port Zone, and apply only within Precinct 7; • A new PER is added to require compliance with NOISE-S1 anywhere other than Precinct 7 • A new PER is added to require that other than Precinct 7, compliance with NOISE-S2 is required within the GRZ, MRZ, MUZ and CCZ.	As above, I agree that there is a gap as explained in the submission and this should be addressed. Amended wording is proposed. Response to these issues is addressed above
ECan [183.143]	Seeks alignment of NOISE-R8 with Rule 8.21 in Regional Coastal Environment Plan	Rule 8.21 of the Coastal Plan contains a rule purporting to apply to noise generated within the Coastal Marine area including the "Operational Area of the Port of Timaru" (see page 104 of the CREP) . It is considered the port noise limits set out in Rule 8.21 cannot be aligned with NOISE-R8 due the requirements of Regulation 15 of the *National Planning Standards* (NPS) which requires port noise to be assessed using the applicable port noise standard (only) . As per page 66 of the NPS the relevant standard is NZS 6809:1999 *Acoustics Port Noise Management and Land Use Planning*. Conversely Rule 8.21 of the Coastal Plan refers to use of older 1991 versions of NZS6801 and NZS6802 which is contrary to the NPS recommendations.
Rooney Holdings [174.72] (and others)	Consider that the rule should only apply to new buildings, and seek that it is amended so that it does not apply to alterations to existing buildings. They consider that a minor alteration of an existing building should not trigger an extensive upgrade to the building, which may not be viable long term, and that the rule as drafted may result in alterations to existing buildings not being undertaken.	I do not agree that there should be blanket exemptions from acoustic insulation required under NOISE-R9 and NOISE-S3 for habitable rooms within buildings that are altered. This is considered inefficient as it would result in acoustic insulation required under NOISE-R9 and NOISE-S3 only being provided to occupiers of habitable rooms found within new buildings used for noise sensitive activities. There is a practical opportunity to cost-effectively incorporate the necessary acoustic insulation and ventilation (where needed) when a building is altered, with often the market providing a reward for those modified buildings that do incorporate acoustic protection for occupants. Two amendments are considered reasonably necessary to give effect to address (in part) the submitters concerns regarding habitable rooms created within existing buildings. The amendments propose to clarify acoustic insulation requirements under NOISE-S3.1 would only apply where a significant alteration (20% of the room floor area) is proposed to a habitable room within an existing buildings in addition to application to habitable rooms established within buildings not previously used for an activity sensitive to noise. The following amendments are recommended NOISE-S3.1; Any habitable room in a new building used for a noise sensitive activity, ~~or~~ an alteration to an existing building that changes its use to a noise sensitive activity, or where the floor area of a habitable room within an existing building is increased by 20% or more must be designed, constructed and maintained to achieve a minimum external to internal noise reduction for habitable rooms of not less than 35 dB Dtr,2m,nT,w + Ctr.
Waka Kotahi [143.118]	NOISE-R9: The submitter seeks that: • The spatial area this rule applies to in relation to State highway is amended to either: increase the distance from the state highway in posted speeds	I recommend that the proposed wording is rejected, for the following reasons; 1. The submitter seeks NOISE-R9 be amended to require acoustic insulation and ventilation be applied to habitable rooms within new or altered buildings used for a noise sensitive activity located within 100m distance from State Highway 1, where the applicable traffic speed limit is greater than 50km/h, rather than a distance of 80m as notified. There is no evidence or reasoning provided to offset the additional compliance costs that may be experienced at such locations distant from the highway (where often the highway noise are minimal (being at least partially screened by the built environment). No noise measurements or calculations have been

	of greater than 50km/h to 100m for State Highway 1; or use the variable noise contour approach. • Road noise is excluded from PER-1.2. • '20m' is replaced with '50m' in PER-2.b. Note – refer to detail in submission as to why changes are sought.	provided in support of this request. Noise levels vary considerable alongside state highways. A check on noise levels using the NZTA *road noise calculator tool*[1] using future traffic volumes (based on arithmetic growth of traffic volumes between 2019 and 2024) supports the use of the 80m distance. This is because future traffic noise levels in in the Timaru district alongside state highway 1 that have a 100 km/hr speed limit appear unlikely to exceed 57 dB LAeq(24 hour) at distances beyond 80m. This level of future received road noise is considered an acceptable level of noise exposure for sensitive receiver sites (ref. NZS6806:2010 *Acoustics – Road Traffic Noise – New and altered roads*). The approach of the submitter to impose costs of district plan noise protections on landowners and builders within these noise environments appears unreasonable, given highway traffic volumes in the Timaru district. While the NZTA 100m recommendation might be more appropriate for highways serving greater population centres, I do not consider it appropriate in the context of this district. Evidence of the limited effects of state highway noise in the Timaru district is provided in a report[2] published by NZTA contractors in 2019 which investigated the number of people across NZ affected by state highway noise. Due to the modest traffic volumes In the Timaru district it was found 2,652 people were exposed to low levels of state highway noise (LAeq(24 hour) > 50 dB) however only a small number of people were found to be affected by significant levels of state highway noise (6 people affected by noise between 64 dB and 67 dB LAeq(24 hour) with only 2 people found to be affected by highway noise > 67 dB LAeq(24 hour). While this reflects the situation at the time (2019) it does indicate only very modest noise from the state highway system is likely in the future in the Timaru district. 2. Adopting a variable noise contour approach (rather using a specified separation distance) is mentioned in the NZTA submission. I agree that this would offer the advantage of avoiding application of the NOISE-R9 PER-2 in areas experiencing noise screening (where the level of received noise would be insufficient trigger the insulation/ventilation requirement). The submitter states they expect to introduce these contours as part of the further submission process however no contours have been received (as far as the author is aware). It is considered essential any such contours proposed for inserting into the planning maps are technically robust and based on good science. As such, such contours should be peer reviewed by a non-NZTA independent noise expert. It is understood NZTA traffic noise modelling is based on the L10(18 hour) CRTN[3] noise model. It is important the noise contours are based on 18 hour traffic flows, consistent with the basis of the CRTN model. Also, when converted to LAeq(24 hour) noise levels adopted for contouring, predicted levels need to be adjusted as follows; LAeq(24 hour) = L10(18 hour) – 3 dB (ref. NZTA noise metrics tool)[4]. Previous iterations of NZTA highway noise contours have not always included these important factors. 3. Response to the request to exclude traffic noise from the specified acoustic insulation standards of PER-1.2 is addressed below re; response to requested changes to NOISE-S3 to provide a specific traffic noise acoustic insulation standard (refer row below relating to Waka Kotahi [143.119]). 4. The submitter requests '20m' setback is replaced with '50m' within the wording of PER-2.b. PER-2b provides am alternative compliance pathway via an acoustic design certificate certifying the new or altered building housing a sensitive activity is located at least 20 metres from the road <u>and</u> will receive significant line-of-sight acoustic screening due to a building, fences, or terrain. Reasons (including noise-related reasons) for the seeking an increase to 50m are not provided. Acoustic screening requirements inherent within the PER-2b compliance pathway indicate road noise effects would be reduced to acceptable levels at these screened locations, thus there seems to be no rationale to increase the setback to 50m based on received noise. 5. The submitter mentions a concern that PER-2.b does not provide for an "equivalent standard" to the other pathways in PER-2a and in PER-1. No explanation or justification is provided. Given typical traffic volumes along state highways in the Timaru district, it is considered that highway noise received at locations screened by "*a solid building, fence, wall or landform that completely blocks the line-of-sight from all parts of all windows and doors to all parts of any road surface*" (PER-2b) would readily comply with the road noise 'exemption level' of 57 dB LAeq(1h) set out in PER-2a. It is therefore considered there is a good measure of equivalence between compliance pathways provided within PER-2a and PER-2b. It is unclear what the submitter is referring to regarding "equivalent standard" between PER-2a and PER-1 given these two permitted activity standards deal with separate noise matters and do not represent comparable compliance pathways.
KiwiRail [187.77]	Seeks that the rule is amended to apply within 100m (rather than 40m) of the railway line, because noise and vibration can create adverse health and amenity effects, and an impact on the amenity of residents of a building. The submitter also seeks that PER-1 is amended to apply to an alteration to an existing building, PER-1.2 amended to add "*excluding acoustic insulation installed to address rail noise*"; and PER-2.b amended to require a 50m rather than 20m setback. Note - the submitter also seeks the inclusion of a new condition which requires compliance with a new standard (NOISE-S7) – this is separately addressed below).	The submitter seeks amendment to provide a specific rule clause for habitable rooms in a new building or altered building within 100m of the rail corridor. NOISE-R9 currently requires acoustic insulation and ventilation for habitable rooms located any site within 40m of the railway line as the area within 40m of the railway line is considered likely to receive whole-day noise exposure levels beyond those normally acceptable for noise sensitive uses. Assessing transportation noise effects within road or rail corridors needs to be assessed on a 24 hour basis, thus it is noise from daily movements which need to be taken into account (rather than average noise levels over periods of one hour which seems to be the preferred approach of the submitter). While extending the application of NOISE-R9 to apply to within 100m may be appropriate for some busy rail routes (with frequent daily train movements) however the South Island Main Trunk railway line is not a busy line with few movements per day. This is confirmed in the following diagram[5] which shows (using proportionate line thickness) how freight tonnages drop significantly for rail activity south of Christchurch; 

[1] See; https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/environment-and-s ibration/road-traffic-noise-calculator/

[2] See' *National Land Transport (Road) Noise Map 2019 Project Report* Prepared by AECOM New Zealand , for NZ

[3] UK Dept of Transport method '*Calculation of Road Traffic Noise*'.

[4] See; https://www.nzta.govt.nz/roads-and-rail/highways-information-portal/technical-disciplines/environment-and-s ibration/noise-metrics-tool/

[5] See; https://www.transport.govt.nz/statistics-and-insights/freight-and-logistics/sheet/figs-rai

		This figure shows NZ Rail freight tonnages as published within "*Aotearoa New Zealand's surface freight task – road and rail*" by *Ia Ara Aotearoa* Transporting New Zealand, November 2021. Given the limited number of daily rail movements (including infrequent passenger trains) there is no indication that rail noise levels received beyond 40m from the railway line would be sufficient to require the acoustic protection provided by NOISE-R9. The submitter also seeks the inclusion of a new condition which requires compliance with a new vibration standard (NOISE-S7) – this is separately addressed below within the response to KiwiRail [187.80].
Te Rūnanga o Ngāi Tahu [185.53]	Considers the potential noise risk could be much lower than indicated in the Background Report and therefore the rules could be excessive. The submitter seeks that the rule is reviewed by engaging an acoustic expert to assess the generated noise, vehicle speeds and times it is generated on the state highway and railway networks and based on that assessment re- assess if the rules are protecting human health at their current setbacks (noting main concern appears to be Māori Purpose Zone). They specifically refer to the MHA Stage 2 Report (p. 26) and the comment in it that the noise insulation against busy roads is acceptable in principle however some aspects need to be confirmed and clarified prior to implementing any specific recommendation within the new proposed plan. The submitter states that the general, 7-year- old national guidance that is not Timaru specific may restrict the ability for iwi to develop their own land.	Given the nature and scale of noise effects on people described in my Stage 1 Noise Report[6] and the Stage 2 Noise Report[7] I consider that the protection provided by NOISE-R9 and NOISE-S3 are reasonably necessary in accordance with Council's duties under the RMA, albeit imposing certain costs and restraints on the development of the district. I consider the controls are reasonably necessary to not only to protect people from adverse effects but also to help ensure the long term sustainability of the road and rail network for the benefit of all who travel to or from Timaru or pass through the district including those industries and commercial undertakings in the Timaru district reliant on freight movements. The provisions outlined in NOISE-R9 and NOISE-S3 are considered consistent with the Council's obligations to manage the effects of noise under RMA s.31(1)d. I therefore recommend the measures outlined within the notified version of NOISE-R9 and NOISE-S3 therefore be retained, with modifications as recommended elsewhere in this document.

[6] MHA 2018 report " *District Plan Review - Topic 11: Noise And Vibration - Stage 1 Report*" Available at: https://www.timaru.govt.nz/__data/assets/pdf_file/0012/669864/Malcom-Hunt-Associates-2018-Stage-1-Report-Noise-and-Vibration.pdf

[7] MHA 2018 report "*District Plan Review, Topic 11: Noise and Vibration, Stage 2 Report Recommendations For Managing Reverse Sensitivity Effects*". Available at: https://www.timaru.govt.nz/__data/assets/pdf_file/0011/669863/Malcom-Hunt-Associates-2018-Review-Of-Timaru-District-Plan-Stage-2-Report-FINAL.pdf

<table>
<tr>
<td>Kāinga Ora [229.59]</td>
<td>Seeks deletion of the application of the rule to sites within specified distances from the railway line and State Highways.</td>
<td>This submitter's submission (at para 8(c) of submission 229) "....recognises the need to ensure residential units and other buildings containing sensitive activities provide a pleasant and healthy environment that is not subject to excess noise" however the submitter requests NOISE-S3 be amended to <u>remove</u> any requirement for acoustic insulation within new or altered habitable rooms housing noise sensitive activities located in proximal distance to state highways or rail corridors. I do not support this amendment as NOISE-S3 provides an important and necessary function within the Proposed District Plan to not only ensure adequate acoustic protection of future residents in areas affected by significant highway or rail noise, but because the request, if granted, would remove a key mechanism to protect highway and rail infrastructure from future potential reverse sensitivity noise effects. For the reasons set out within my Stage 1 Noise Report and the Stage 2 Noise Report I do not recommend accepting this submitter's request to amend NOISE-S3 to remove any requirement for acoustic insulation within new or altered habitable rooms housing noise sensitive activities located in proximal distance to state highways or rail corridors.</td>
</tr>
<tr>
<td>Waka Kotahi [143.119]</td>
<td>NOISE-S3: Submitter is concerned with the approach proposed and seek that the standard is amended to relate to the resulting noise inside of a habitable space, as the submitter considers that this is a more effects based approach. Further it states that vibration and outdoor noise have not been recognised within this standard, which are additional factors that could have an impact on human health unless reverse sensitivity is appropriately addressed. The submitter seeks that:

• road-traffic is removed from NOISE-S3.1;

• a new section is inserted requiring internal levels in habitable rooms of 40 dB LAeq(24h), external levels of 57 dB LAeq(24h) in outdoor living spaces, and within 20m of a state highway vibration limit of 0.3 mm/s vw95, with compliance to be demonstrated by design certificate.</td>
<td>The submitter seeks a new 'stand alone' highway section NOISE- S3 requiring;

(a) Acoustic insulation based on an internal traffic noise levels in habitable rooms of not more than 40 dB LAeq(24h); and
(b) Limiting traffic noise to 57 dB LAeq(24h) in outdoor living spaces, and
(c) Requiring new and altered habitable rooms within 20m of the state highway to be isolated from traffic-induced road vibration to comply with a vibration limit of 0.3 mm/s vw95.

These items are addressed as follows;

(a) The 'indoor sound level' type insulation rule preferred by the submitter over the $D_{tr,2m,nT,w} + C_{tr}$ method set out in NOISE-S3 is not recommended to be adopted as it is considered technically inferior due to disadvantaging users of the rule and not supporting the needs of Council's in assessing or checking compliance. These duties of Council are enhanced as NOISE-S3 is based on and references relevant international ISO standards, a point missing from the submitter's proposal.

Council has specific enforcement and monitoring functions that do not appear to have been considered by the submitter whose aims focus on transport matters. Checking or enforcing an 'indoor sound level' type acoustic performance standards of the type preferred by the submitter may appear straightforward however these types of indoor sound level standards are not easily enforceable by Councils and have been rejected elsewhere for this and other reasons. The submitter implies compliance with the indoor noise limit only need to be 'demonstrated' by a design certificate which I consider falls short of the requirement for good rule-making which should, in my view, allow for field checks and compliance assessment once buildings are constructed and occupied. By way of contrast, it is notable there are specific ISO standards guiding on the field measurement of $D_{tr,2m,nT,w} + C_{tr,}$ the insulation unit referred to in NOISE-S3.

There are other, more substantive deficiencies with the 'indoor sound level' method requested for specifying acoustic insulation. Firstly, there are difficulties with the 'indoor sound level' approach when plan users such as architects and designers are designing the acoustic insulation - what level of outdoor traffic noise they should be designing against? Once the building is constructed, there are significant obstacles for Council's when attempting to check compliance by measuring the level of indoor sound due to highway traffic passing the site. This is because the outdoor noise environment (particularly in urban areas) comprises a range of sounds, not just traffic noise. It is this mix of outdoor sounds that enter into the test room that will be picked up in the measurements and which contaminate the results (which are supposed to indicate the indoor level of traffic noise only, free from other sounds). The extra sound from non-traffic sources may cause non-compliance yet the correct amount of acoustic insulation against traffic noise may have been installed in the building. A valid question arises when testing takes place which is "on which day should the indoor sound levels be checked?". In reality it is virtually impossible to confirm compliance with insulation standards based on indoor sound levels using measurements taken within rooms. These types of indoor sound level performance standards cannot be field checked by Council's relying on the provisions of any relevant NZ acoustic standard. NOISE-S3 acoustic insulation requirements can be readily checked using the widely adopted ISO 140-Part 5 field test method. Acoustic insulation rules based on ISO standards are widely adopted as they offer certainty and validity within the test process. Importantly, the ISO field test method is the only type of insulation rule recommended within a relevant NZ Std (NZS6806:2010 Acoustics – Traffic Noise – Noise From New & Altered Roads) which is quoted as follows;

5.2.3.3 In circumstances where it is necessary to assess the acoustic insulation performance of the building, field tests of the standardised level difference shall be performed using ISO 140-5.

C5.2.3.3 Field testing using ISO 140-5 can be time consuming and costly. An approximate estimate of the standardised level difference using $D_{nT,w} + C_{tr}$ rating can be obtained by examining the sound level difference between simultaneous indoor and outdoor measurements (excluding any influence of non-traffic related sources).

Acoustic insulation rules based on indoor decibel limits of the type requested by this submitter appear to have the advantage of simplicity but are in fact technically bereft when considering Council's role in checking and enforcing acoustic insulation standards. In addition, without specifying the traffic noise sound spectrum (i.e. frequency content) there is no certainty provided regarding control of low frequency sound received within the receiving room.</td>
</tr>
</table>

		The submitter requests the insulation performance standard be 'effects based'. In my view, the submitter's preferred 'indoor sound level' method and the notified wording of NOISE-S3 can both be considered 'effects based'. (b) The submitter requests that noise within <u>outdoor</u> living areas be addressed. Noise from state highways received within outdoor living areas around buildings is considered of lesser importance as this is a daytime amenity issue only. Compared to important effects such as sleep disruption, traffic noise experienced outdoors during daytime hours has little or no consequences for human health and is not usually controlled within district plans. There are no recommendations for limits on traffic noise received in outdoor living areas within NZS6806:2010 or any other NZ Standard dealing with transportation noise. Levels of noise received outdoors should only be considered in terms of how building occupants may be affected within the building. For these reasons, no recommendation is made to impose limits on highway noise received in in outdoor living spaces. (c) The submitter requests buildings containing habitable rooms within 20m of the state highway to be physically isolated from traffic-induced road vibration, or otherwise designed and treated, so that traffic induced vibrations in the room comply with a vibration limit of 0.3 mm/s vw95. This is similar to issue raised in response (below) to KiwiRail [187.80]. The proposed vibration limit equates to 'Class C' of Norwegian Standard NS 8176.E:2017 - *Vibration and shock — Measurement of vibration in buildings from land-based transport, vibration classification and guidance to evaluation of effects on human beings*. Appendix B of that Standard gives guidance classification of dwellings in relation to their sensitivity to vibration. Class C: Corresponds to the recommended limit value for vibration in new residential buildings and in connection with the "*planning and building of new transport infrastructures*"[8]. In other words, the submitter is requesting building owners and developers mitigate vibration experienced in buildings from passing traffic on state highways to meet a standard intended to be used to ensure the design and construction of new roads does not cause vibration problems for nearby sensitive uses. Information available on the Waka Kotahi website[9] states that that significant vibration issues mostly occur where there is a defect in the road surface, or the road is in a deteriorated condition (i.e., a road with holes, abrupt changes in surface levels etc). Therefore, with well-maintained roads vibration should not become an issue of concern unless dwellings are very close (in the order of 2m) from the traffic lane. I am not aware of the specific road maintenance requirements which apply to the roads which Waka Kotahi is responsible for across the Timaru district however, I would expect that typical maintenance of their assets to remedy surface defects and road deterioration would likely result in the avoidance of reverse sensitivity effects. Without a specific maintenance policy related to road conditions there is no guarantee for applicants that go to the expense of vibration-isolation (or for Waka Kotahi seeking to avoid reverse sensitivity effects) that the vibration level limit will not be exceeded at some future point. For these reasons, I do not recommend adopting the vibration limit for new habitable rooms as requested by the submitter. In summary, for the reasons outlined above, it is considered the notified wording of NOISE-S3 (amended as per recommendations) will function well and will be effective and efficient in meeting Council's duties to manage the effects of reverse sensitivity effects of highway noise in the district.
KiwiRail [187.78]	NOISE-S3: Considers that for rail noise, the requirement to achieve a minimum internal noise level for habitable rooms allows for a more flexible, room-specific approach based on exposure to the noise source. The submitter states that the external to internal noise reduction (which takes a more blanket approach) could result in the over-designing of buildings and under-designing of more exposed buildings. Seeks amendment to provide a specific rule clause for habitable rooms in a new building or altered building within 100m of the rail corridor, requiring that indoor noise levels resulting from the railway not exceeding 35 dB LAeq(1h); or that minimum construction requirements are met. *The text is set out in full in the submission at page 13, line 74.*	I consider the notified wording of NOISE-S3 offers a workable and effective approach that has been accepted into many district plans around New Zealand. Being based on ISO Standards it is also consistent with international best practice. For these reasons and the other reasons outlined above in response to Waka Kotahi [143.119] I recommend that the submitter's proposals for NOISE-S3 be rejected. Amendments to require acoustic insulation of habitable rooms in a new building or altered building within 100m of the rail corridor has been addressed above in the response to KiwiRail [187.77].
Kāinga Ora [229.59]	Seeks deletion of the application of the standard to sites within specified distances from the railway line and State Highways.	The submitter's proposal is not recommended to be accepted as this would serve no useful RMA purpose and conflict with Council's obligations to manage the effects of noise under RMA s.31(1)d. The reasons for adopting reverse sensitivity noise protection measures alongside highway and rail corridors are set out in my Stage 2 Report "Recommendations For Managing Reverse Sensitivity Effects".
Waka Kotahi [143.120]	NOISE-S4: seeks amendments to recognise and provide for thermal comfort and cooling requirements for all habitable rooms. The changes sought are to amend condition 1 to apply it to "*<u>all habitable rooms</u>*" rather than "*any study or bedroom*", to add "*sounds levels <u>and temperatures</u>…*" to condition 2, and a further sub-clause to condition 2 as	1. The submitter requests artificial ventilation systems service all types of habitable rooms which qualify under NOISE-S3.1. As notified, NOISE-S4.1 only applies to "any study or bedroom". For most types of habitable rooms it is considered during daytime, open windows would not be likely to undermine functions carried out within these rooms, particularly having regard to the moderate Timaru climate and the likely limited periods during which windows are opened for comfort purposes. Ventilation is only proposed for the rooms within which quiet conditions are needed for study or, during night times, to provide an adequate sleeping environment. For many types of occupied habitable rooms, noticeable levels of noise within habitable rooms is acceptable based on NZS 2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors*. This Standard has the stated aim of 'ensuring healthy, comfortable and

[8] "*A Review of the Adoption of International Vibration Standards in New Zealand*" by James Whitlock, 2010. Published in New Zealand Acoustics Vol. 24 / # 2

[9] Frequently asked questions about noise and vibration | Waka Kotahi NZ Transport Agency (nzta.govt.nz)

	follows: "*and maintain a temperature that does not exceed 25°C*".	productive environments for the occupants and end users'. Under this Standard Recommended daytime noise levels within kitchens and living areas can be LAeq 45 to 50 dB with other habitable rooms such as offices and cafeterias having recommended indoor noise levels up to LAeq 50 to 55 dB. Depending on the daytime functions of a habitable room, it is considered outdoor noise from road traffic, rail pass-by noise, port noise or noise from the range of urban activities taking place in town centres would not be seriously impacted and can take place with windows open for ventilation. Within habitable rooms not required under NOISE-S4 to be fitted with a ventilation system, indoor health and amenity effects of outdoor noise are considered to be likely adequately controlled by methods compliant with the ventilation requirements of the New Zealand Building Code, such as openable windows or mechanical ventilation systems where these are fitted as the means of complying with the NZ Building Code. The proposal to require artificial ventilation into all types of habitable rooms qualifying under NOISE-S3 is therefore not supported as it is not considered necessary. 2. This submitter requests NOISE-S4 also include a requirement for the ventilation system to include a cooling function to avoid indoor temperatures above 25 degrees. For comfort reasons, the submitter is concerned occupants experiencing temperatures exceeding 25 degrees indoors would likely open windows, allowing the ingress of outdoor noise and thus undermining the advantages of acoustic insulation. While cooling functions may be necessary in warmer climates, it may not be necessarily in cooler climates. **APPENDIX C** to this report sets out a discussion based on relevant reports (including a cost estimate) which, in conclusion, neither supports or opposes the provision of cooling within alternative ventilation systems where these is required to be installed under NOISE-S4 (which only applies to sleeping rooms and study's).
KiwiRail [187.79]	NOISE-S4: Seeks amendments to align the standard with relief sought elsewhere in its submission, and to ensure ventilation provides controllable cooling and heating to maintain an appropriate room temperature. The other changes sought are: 1. *The requirements of ~~minimum external to internal noise reduction levels in~~ NOISE-S3 must be achieved at the same time as the ventilation requirements of the New Zealand Building Code. An alternative means of ventilation must be provided within any habitable room study or bedroom unless ...* 2. *Ventilation systems where installed must ~~generate sound levels not exceeding~~: ...* a. *provide cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C;* b. *not generate more than 35 dB LAeq(30s) when measured 1 metre away from any grille or diffuser;*	I accept that the insertion of the words "requirements of" within NOISE-S4.1 would improve readability. For the reasons set out above in response to Waka Kotahi [143.120], I disagree with inserting the words "habitable room" within NOISE-S4.1 as the ventilation requirements are intended only to apply to bedrooms and study's. For the reasons set out above in response to Waka Kotahi [143.120], I am neutral whether the words "*provide cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C;*" should be included within NOISE-S4.2. I accept the removal of the words "generate sound levels not exceeding" and insertion of "*not generate more than*" within NOISE-S4.2 and NOISE-S4.2b would improve readability. For the above reasons NOISE-S4 wording is recommended to be amended as follows; **NOISE-S4 Ventilation requirements** 1. The requirements of ~~minimum external to internal noise reduction levels in~~ NOISE-S3 must be achieved at the same time as the ventilation requirements of the New Zealand Building Code. An alternative means of ventilation must be provided within any study or bedroom unless an acoustic design certificate signed by a suitably qualified acoustic engineer is provided that states the design of any bedroom or any study as proposed will comply with the NOISE-S3 acoustic insulation standards with windows open. 2. Ventilation systems where installed must ~~generate sound levels not exceeding~~: a. Not generate more than 35 dB LAeq(30s) when measured 1 metre away from any grille or diffuser; and b. provide an adjustable airflow rate of up to at least 6 air changes per hour. Note: This standard applies in addition to, and does not affect the requirements of, the Building Act 2004.
Fonterra [165]	Seek that a Noise Control Boundary is applied to the Clandeboye site - the extent is set out in Attachment D to the submission - that a new rule is applied within the NCB which sets noise limits for noise within the manufacturing site at or beyond the boundary of the NCB - NOISE-R9 be applied within the proposed NCB	I have been previously involved advising Council regarding a proposal for a Clandeboye Noise Control Boundary (NCB) located in the rural area surrounding the Fonterra Clandeboye manufacturing site, as far back as 2018. My deliberations have taken into account the NCB proposal originally explained within a memo from Marshall Day Acoustics dated 2018 and subsequent memo's from Fonterra's acoustic consultants and, more recently, the relevant parts of the Fonterra submission. I have recently undertaken discussions with Fonterra's acoustic consultant Mr Rob Hay. The NCB proposal put forward by the submitter (Attachment D to the Fonterra submission) allows for additional noise generation from possible future expansion of the site which will result in noise emissions exceeding noise emission limits currently imposed as resource consent conditions. I have learned from Fonterra's expert that increased noise enabled by the NCB proposal (if approved) will not increase noise received at non-Fonterra owned dwellings, except for the dwelling at 110 Donehue Road. Mr Hay has informed me the proposed NCB closely mirrors the noise footprint of existing site noise emissions permitted under the current consent. I understand this is particularly so around the east, south, and west sides of the site, however further information is sought (below) on this matter. In addition, as I outline below, I hold concerns around the effects of noise increases in the wider area if the NCB were approved at the location proposed (noting a NCB located closer to the plant in some areas would reduce the areas affected by these increases). I note the requested wording for the proposed noise rule states noise limits are to apply "*when measured at or beyond the Noise Control Boundary*". Currently, GRUZ noise limits are assessed "*Within the notional boundary of a building used for a noise sensitive activity*" (ref. Table 24). While noise assessment in rural areas is typically assessed at the notional boundary, I support the proposal for noise from the Clandeboye manufacturing site to be measured at or beyond the NCB as this provides certainty as to the geographical extent of the area within which higher noise emissions are permitted. However, as set out below, approval of the NCB does enable noise from the Clandeboye site to exceed the PDP permitted activity noise standard over wide areas beyond the NCB and further information has been requested to ensure any decision to approve the NCB proposal is made within the light of this information. The extent of areas affected by noise compliant with existing resource consents will also inform this assessment. In terms of reverse sensitivity effects on Fonterra's operations at Clandeboye, the proposal includes a request that any habitable room in a new building used for a noise sensitive activity, or an alteration to an existing building that changes its use to a noise sensitive activity located within the NCB be required to be acoustically insulated per NOISE-R9 (which has associated room ventilation requirements). I consider this has merit as an important mitigation measure to protect Fonterra's existing and proposed expanded operations. As below, some uncertainty exists in exactly which acoustic insulation standard is requested to apply within the NCB and clarity is requested on

		this. While I am generally supportive of the requested NCB and associated planning amendments, I consider further information is needed to confirm my position. I have listed these matters below. I consider information on these matters should, if possible, be brought forward in the evidence by Fonterra's noise expert to the hearing. In the interests of providing a unified position at the hearing, I will also be seeking to discuss these matters beforehand with Fonterra's noise expert. 1. I consider an important factor in assessing the requested NCB will be the provision of information setting out a comparison of maximum allowable noise permitted by the NCB (at its proposed location) alongside maximum noise currently imposed as consent conditions. I consider it important this information be set out within expert noise evidence to be provided at the hearing. A diagram showing indicative contour lines of 'existing' and 'proposed' maximum allowable noise emissions would be particularly useful in this regard. I do not propose these be adopted into any planning requirement but would be useful for the current assessment. The information should confirm (or otherwise) the submitter's position that the NCB proposal (if approved) will not increase noise received at non-Fonterra owned dwellings, except for the dwelling at 110 Donehue Road. 2. As above, approving the NCB (as proposed) will permit noise from the Clandeboye site to be received in areas beyond the NCB location at levels 5 dB higher than the equivalent applicable Table 24 daytime and night time noise limits. This is also 5 dB higher than noise standards for permitted activities in the rural zone set out within the operative district plan. I consider it important that information be provided to the hearing which sets out the geographic area over which the 5 dB excess will be experienced. I do not think this needs to incorporated into any district plan requirement, however I consider the panel should be advised as to the extent of the area within which maximum Clandeboye noise emissions are likely to exceed the daytime and night time permitted activity noise standards for the GRUZ. As above, the extent of areas affected by noise compliant with existing resource consents may also inform this assessment. 3. It is noted, the NCB proposal does not include a lowered 'evening' noise limit applicable between 7pm and 10pm adopted elsewhere in the PDP (this matter is addressed in section 10.1 of my Stage 1 noise report). Adopting an evening noise limit between 7pm and 10pm is recommended within NZS6802:2008 and is seen as best practice in most district plans in NZ. Information is sought on likely noise effects on people outdoors around their dwellings in the evenings affected by noise from Clandeboye site activities, compared to rural areas unaffected by the NCB proposal. 4. Fonterra's submission includes a request that NOISE-R9 be amended so that it applies to any habitable room in a new building used for a noise sensitive activity, or an alteration to an existing building that changes its use to a noise sensitive activity located within the NCB. NOISE-R9 sets out a requirement for acoustic insulation (and associated room ventilation requirements) within noisy environments and is supported as an important mitigation measure should any new (or altered dwellings) be located within the NCB. However, NOISE-R9 refers to acoustic insulation standard NOISE-S3 which sets out both a 'moderate' and 'advanced' acoustic insulation standard (NOISE-S3.1 requires Dtr,2m,nT,w + Ctr of not less than 35 dB whereas NOISE-S3.2 requires a standard not less than 30 dB). Clarification is sought as to which standard (S3.1 or S3.2) should apply or indeed if these standards should apply within different areas within the NCB?
Foodstuffs [193.8]	NOISE-R9: Considers that the rule should apply to residential dwellings adjacent to the existing Pak 'n Save supermarket within the Local Centre Zone. The submitter states that an acoustic assessment commissioned by TDC displays that the supermarket creates a high noise environment and the establishment of residential dwellings adjacent to the supermarket causes potential for reverse sensitivity effects on the supermarket if the dwellings are not adequately insulated. It therefore seeks that the rule is extended to apply to "*Any site within the Medium Density Residential Zone at 18A Hobbs Street within 40m of the boundary of the adjacent Local Centre Zone*."	I have previously visited these sites and investigated this reverse sensitivity noise issue on behalf of Council. I agree that granting resource consent 101.2021.79.1enabling residential use of 18, 18A, and 20 Hobbs Street and the subsequent the re-zoning of this land to Medium Density Residential does result in increased risks of reverse sensitivity noise effects for the supermarket operation on the LCZ, however Conditions attached to resource consent 101.2021.79.1 require fencing and significant acoustic insulation of any new dwellings located within 18A Hobbs Street. A copy of the noise-related conditions attached to 101.2021.79.1 are attached to this report as **APPENDIX D**. I consider the potential for future reverse sensitivity noise effects will be appropriately managed via acoustic design of new dwellings (including construction of a noise barrier fence within 18A Hobbs Street) as set out within conditions attached to 101.2021.79.1 (attached to this report as **APPENDIX D**) . These controls and fencing requirements are considered adequate provided supermarket noise emissions remain reasonable (see response below to Foodstuffs 193.9. In my view, there is no need to 'double up' on acoustic insulation requirements for new dwellings at 18A Hobbs Street which may arise if the requested phrase were inserted into NOISE-R9 as requested. Even if there were important noise effects reasons to approve these words being added to NOISE-R9, this alone would be insufficient to achieve the planning outcome sought. This is because no specific standard of insulation has been requested. To achieve the submitter's aims the requested words would need to be also added to either NOISE-S3.1 ('Moderate" standard of acoustic insulation) or NOISE-S3.2 ("Advanced" standard of acoustic insulation). Overall, given the need to avoid confusion around which applicable acoustic insulation standards apply, the existence of a practical site-specific set of acoustic controls for new sensitive uses establishing at 18A Hobbs Street (as per **APPENDIX D**) and the lack of clarity of the consequences of inserting the selected words, I do not support amending NOISE-R9 to include "*Any site within the Medium Density Residential Zone at 18A Hobbs Street within 40m of the boundary of the adjacent Local Centre Zone*".
Foodstuffs [193.9]	Table 24 – seeks that Medium Density Residential Zone at 18A Hobbs Street within 40m of the boundary of the adjacent Local Centre Zone is added to Row 4. The Proposed Plan changes the zoning of 18A Hobbs Street (formerly the location of the Timaru Tavern) from Commercial Zone under the ODP to Medium Density Residential Zone (MDRZ). Consequently the location of the	As above (Foodstuffs 193.8) I consider there is potential for reverse sensitivity noise effects due to supermarket operations (complying with the Table 24 LCZ noise limits) being received residential sites established within the re-zoned MDRZ land at 18A Hobbs Street. has been effectively dealt with via conditions of consent governing the development of the residential subdivision. The issue raised by the submitter is possible non-compliance with Table 24 noise limits for activities taking place within the Local Centre Zone (supermarket) noise is received within the adjacent MDRZ at 18A Hobbs Street (and within the 10m access strip).. I understand from Ms White that MDRZ is the zoning proposed under the PDP, but that she has recommended in Hearing B that it be zoned LCZ). As this 10m wide strip of land will essentially form a 10m wide buffer from the main supermarket site, I

	Local Centre Zone / MDRZ boundary has moved much closer to the supermarket. This represents a significant change in the operating environment for the supermarket with the potential for reverse sensitivity effects likely to lead to the operator needing to undertake significant noise control, having to constrain activities, or both. From an operational perspective, Foodstuffs is very concerned about this. Based on an acoustic assessment commissioned by TDC the day-to-day operation of supermarket creates a high noise environment due to operation of fixed plant and delivery and service vehicles. These operations cannot comply with the noise limits applicable at the Local Centre Zone / MDRZ boundary because the boundary between these zones has moved closer to the supermarket. The amendment proposed by Foodstuffs would ensure that existing operations of the supermarket can continue as a permitted activity under the PDP.	recommend the exemption sought only apply within the closest 30m within the site at 18A Hobbs Street. I consider noise effects for occupants of 18A Hobbs Street to be acceptable when maximum LCZ permitted noise limits comply at distances not greater than 30m within the site at 18A Hobbs Street. As I consider potential adverse noise effects of elevated noise received at residences of the adjacent MDRZ site will be adequately mitigated, I consider an acceptable noise outcome would result if the exemption sought from Table 24 LCZ noise limits for noise received within the closest 30m strip of land within 18A Hobbs Street that lies adjacent to the supermarket site is approved. I therefore recommend Table 24 be amended as follows; 4. Within any part of a site in the following zones: a. Neighbourhood Centre Zone b. Local Centre Zone c. Mixed Use Zone d. Medium Density Residential Zone at 18A Hobbs Street within 30m of the boundary of the adjacent Local Centre Zone.
KiwiRail [187.80]	Seeks that a new standard relating to indoor railway vibration is added to the Noise Chapter in the PDP. The submitter states that the standard sought is designed to protect the rail corridor from reverse sensitivity effects and provide an appropriate level of amenity for occupants that neighbour the rail corridor. *The standard is set out in full in the submission (new NOISE-S7, page 14 of submission, line 3)*	The submitter seeks a new standard (NOISE-S7) requiring sensitive sites located closer than 60 metres from the "boundary of a railway network" to mitigate railway vibration levels so as not to exceed a certain stated level of vibration measured at the receiving room. The issue is similar to the issues discussed above at item (3) in response to highway vibration (Waka Kotahi [143.119]). I have identified several issues which, in combination, do not support approving a new rail vibration standard as sought. These are; a) The proposed vibration limit equates to 'Class C' of Norwegian Standard NS 8176.E:2017 - *Vibration and shock — Measurement of vibration in buildings from land-based transport, vibration classification and guidance to evaluation of effects on human beings*. The Standard states this is a suitable vibration standard for new residential buildings to be used in connection with the "*planning and building of new transport infrastructures*" . In other words, the submitter is requesting building owners and developers mitigate vibration experienced in buildings from passing rail traffic to meet a standard intended to be used to ensure the design and construction of new rail tracks does not cause vibration problems for nearby sensitive uses. b) A major concern is the cost of mitigation. To address ground vibration, it is very difficult and expensive to isolate a residential building from the ground given the structural and seismic requirements applying under the NZ Building Code. Wording proposed by the submitter for NOISE-S7 includes only one mitigation option (which only applies to single storey dwellings with concrete slab floors). It seems counter-intuitive that this one option would be suitable for all single storey dwellings (with concrete slab floors) located within 60 metres of the rail boundary. It would normally be expected that compliance for dwellings located further from the rail line (but within the 60m distance) would require a lesser standard of engineering mitigation compared to new dwellings located close to the rail boundary. c) No evidence is provided within this submission to support rail-related vibration issues currently causing adverse effects to activities sensitive to noise in the Timaru district that would justify the proposed vibration standard. d) It is well known rail vibration is more efficiently mitigated via measures adopted at source. Vibration levels generated by rail movements are mostly caused by the wheel/track interaction. Over time, surfaces can degrade and misalign which generates higher levels of vibration. I am not aware of any requirement for KiwiRail to maintain track conditions or controls over the condition of rolling stock which would avoid increases rail vibration levels over time. Without adequate vibration control and/or maintenance policy by the rail operator, there is no guarantee for applicants that go to the expense of vibration-isolation that the stated vibration limit will not be exceeded at some future point. Thus, in terms of equity, if vibration controls affecting sensitive activities were adopted into the district plan, then there should be a corresponding vibration control and/or maintenance policy for the rail operator. e) Mitigation costs are a significant issue. Without altogether avoiding noise sensitive development (e.g. housing) within 60m of the rail corridor, designing to manage vibration solely at the receiver would impose significant costs on the development of land for residential purposes. An unwanted outcome could be 'sterilising' corridors of land adjacent to rail alignment due to high costs in mitigating rail vibration received with in sensitive buildings.
Hort NZ [245.97, 245.98]	The submitter seeks that a specific rule is included in the PDP for managing noise associated with frost fans; with a further rule applying to residential activity within 300m of a frost fan, requiring the provision of acoustic insulation to avoid reverse sensitivity effects (or the addition of "Residential activity within 300m of a frost fan" to NOISE-R9 and NOISE-S3 Acoustic insulation.)	I have experience with measuring and assessing noise from frost fan operations in various rural areas in both the North and South Island and have previously advised council's on suitable noise rule regimes for frost fans. I note frost fan noise provisions are included in only some district plans, presumably due to differential climate and cropping factors. I note frost fan noise rules are included in the Ashburton District Plan but do not appear within the district plans for the Waimate, McKenzie or Waitaki districts. I provide the following advice on submissions received regarding noise from frost fans, however I recommend these should only be included if the panel consider that frost fans are, or likely will be, installed to protect crops in the Timaru district. An important consideration is that frost fans installed within proximal distance to rural dwellings often experience difficulty complying with night time noise limits applying in rural zones. For this reason, where frost fan noise rules are included within district plans, the main effect is to provide a conditional exemption from the normally applying night time permitted noise standard. Should the Panel be persuaded of the need to provide for noise from frost fan operations, I generally agree with the submitter's wording set out below. The requested provisions are similar to those adopted into other district plans. The requested night time noise limit of LAeq(15mins) 55dB applying at rural dwellings (or boundaries with non-rural zones) is considered adequate to protect human health and amenity given this sound will occur under frost-like conditions during night time with occupants

		unlikely to sleep with open windows. This noise limit is consistent with frost fan noise limits approved elsewhere. Consistent with other district plan frost fan noise rules and in order to deal with cumulative noise effects of frost fan operations, I recommend that in addition to the above, the maximum noise levels should not exceed LAeq(15 mins) at 300 metres. I consider this recommended provision, together with the restrictions on the location, use and testing of frost fans requested by the submitter to be consistent with the 'best practical option' required to be adopted under RMA s.16 (duty to avoid unreasonable noise). In considering the requested wording I have recommended minor amendments to ensure consistency with terminology and acoustic standards referred to elsewhere in the plan; **NOISE-R13 Operation of frost fan in Rural zones** Activity status: PER Where: 1. Noise from the frost fan shall not exceed LAeq(15mins) 55dB when measured ~~at or~~ at a distance of 300 metres or within the notional boundary of ~~any existing residential activity~~ building used for a noise sensitive activity on a site in different ownership or at the boundary of any non-rural zone. ~~No adjustment for special audible characteristics shall be applied to measured or calculated noise levels~~ ~~2. Frost fans must not be located within 300m of a residential activity on a separate site in different ownership or a zone boundary~~ 2~~3~~. Frost fans are only to be used for protection of crops from frost from bud break to harvest 3~~4~~. Frost fans are only operated when the air at canopy height is 2^0C or less 4~~5~~. Operation for maintenance shall only take place between 8am and 6pm Monday to Friday except in urgent unforeseen situations. 5~~6~~. Evidence of installation of a frost fan meeting this standard shall be provided to Council including certification from an appropriately qualified and experienced acoustic engineer that the noise limits ~~s~~ in 1 (above) ~~are~~ is met and providing the location of the frost fan. 6~~7~~. Records shall be kept stating the date, temperature, times and length of use of each frost fan and made available to Council on request. Records may include telemetry records. Although a planning matter, I generally agree with the noise-related matters proposed by the submitter as assessment matters that would apply when consent is required, should compliance not be achieved with the above permitted noise standard. The submitter is also concerned regarding reverse sensitivity noise effects when noise sensitive activities (such as rural dwellings) establish within 300m of an existing frost fan. I agree this is a matter to be addressed, should the Panel approve frost fans controls be introduced into the Timaru district plan. The submitter requests the words "*Residential activity within 300m of a frost fan*" be added to situations where acoustic insulation is required under NOISE-R9 and NOISE-S3. I agree with this request as the proposed acoustic insulation requirements of NOISE-R9 and NOISE-S3 would be effective in protecting occupants of new buildings housing noise sensitive activities located within 100-300m of an existing frost fan. I recommend the 'advanced' acoustic insulation standard of NOISE-S3.1 is considered necessary. Thus, I recommend adding the words *"Noise sensitive activities within 100-300m of a frost fan"* to NOISE-S3.1 ('Advanced" standard of acoustic insulation). For new noise sensitive activities within 100m of a frost fan, I do not consider that there is a suitably protective insulation standard within the NOISE Chapter to address frost fan noise expected within this distance of a frost fan. I therefore consider that noise sensitive activities thin 100m should not be permitted (noting that this still allows for consideration on a case-by-case basis through a resource consent process.) I do not consider it necessary to also require ventilation to be provided to insulated rooms, as required by NOISE-S4 Ventilation requirements. This is because frost fans only operate at night under frosty conditions, a time when extra ventilation due to open windows is highly unlikely to be necessary or desired by room occupants. It is therefore recommended that the words "*Except where habitable rooms requiring acoustic insulation are located within 300m of an existing frost fan ....*" be added at the commencement of NOISE-S4.1.
NZ Frost Fans [255.9]	The submitter considers that a frost fan specific suite of provisions should be included in the noise chapter. *Please refer to the submission for the detail of the rules sought.*	This submitter is similarly concerned that there are no special provisions governing noise from frost fans, a noise source the submitter considers should be controlled by a source specific noise rule , with an accompanying reverse sensitivity noise protection (insulation) rule as described above in relation to the Hort NZ submission [245.97, 245.98]. Should the Panel be persuaded that it is reasonably necessary to provide for frost fan noise, this submitters concerns are considered to be adequately dealt with by adopting the recommendations set out above in relation to the Hort NZ [245.97, 245.98].
Southern Proteins [140.19], Barkers [179.23] and others	General Industrial Zone (GIZ) The submitters seek that an in-zone limit is not applied within the GIZ (i.e. GIZ is removed from Table 24), on the basis that noise limits are appropriate along the zone boundary with sensitive zones, or at the notional boundary of noise sensitive activities in other zones, but are not appropriate within the zone itself.	The submitters are concerned site-to-site noise limits in the GIZ will adversely affect the efficient operation of permitted activities taking place within the GIZ. As per Table 24, the LAeq(15 min) site-to-site noise limit applying to permitted activities within the GIZ is set at LAeq(15 min) 65 dB received within other GIZ sites. NZS6802:2008 recommends inter-zone site-to-site noise limits should apply. Clause 8.6.6 of this Standard states "*As a guideline for the protection of the amenity values within heavy industrial zones, that is, intra-zonal noise limits, limits of up to 75 dB LAeq(15 min) may be set within an area or zone to enable the area or zone objectives to be fulfilled*". NZS6802:2008 goes on to give an example whereby administration activities associated with a light industrial activity might require protection from an adjoining heavy industrial site. GIZ-P1 and GIZ-P2 refer to "compatible" activities on adjacent sites in the GIZ. I consider applying site-to-site noise limits to permitted activities within the GIZ are important for maintaining the compatibility sought within policies for GIZ.

<table>
<tr><td></td><td></td><td>To address, at least in part, submitter concerns regarding intra-zone site-to-site noise limits within the GIZ prescribed in Table 24, I recommend two types of amendments to this table. These are;

a) Rather than fully exempt compliance with the GIZ site-to-site noise limits of Table 24 I consider the issue can be resolved by increasing allowable noise by 10 dB to LAeq(15 min) 75 dB, the maximum recommended by NZS6802:2008. I also recommend amending Table 24 to remove the site-to-site LAmax limit as compliance with this type of limit is not considered essential for providing site-to-site noise compatibility between sites sought by GIZ-P1 and GIZ-P2; and
b) Compliance with intra-zone site-to-site noise limits within the GIZ should not be required along common boundaries of adjacent GIZ sites under the same ownership. I consider noise effects in these situations are better managed internally, not involving the district plan. An exemption is recommended for these situations.

The above recommendations can be achieved by;

1. Removing the 3.d in its entirety from Table 24 3;
2. Adding a new row (row 5) to Table 24 as follows;

<table>
<tr><td>5.
Within any part of a site in the General Industrial Zone, excluding;
a. Noise from an adjacent site in the General Industrial Zone held under common ownership.</td><td>7.00am – 10.00pm

10.00pm – 7.00am</td><td>75 dB $L_{Aeq\ (15\ min)}$

75 dB $L_{Aeq\ (15\ min)}$</td></tr>
</table>
</td></tr>
<tr><td>Hort NZ [245.100, 245.101]</td><td>General Rural Zone (GRUZ)

The submitter considers that 55dBLAeq is an appropriate noise limit for the GRUZ, to reflect the nature of the receiving environment, which is different to a Residential Zone. It seeks that the GRUZ is deleted from Row 1 of Table 24, and included instead in Row 2. This results in a 5dB increase in the noise limits applying.</td><td>It is considered appropriate to limit noise from daytime activities in the GRUZ to 50 dB LAeq(15 min) the notional boundary to sensitive receivers as opposed to the submitter's request to include GRUZ to the list of zones to which a 55 dB daytime limit applies. The submitter is concerned about restrictions on permitted activities taking place in the GRUZ due to the 50 dB daytime limit however it is important to note NOISE-R1 exempts "activities of a limited duration required for normal seasonal agricultural, horticultural and forestry activities, such as harvesting".

The GRUZ zone accommodates a range of permitted uses, not all of which generate significant noise. Conflicts may occur between rural residential activities and other permitted land uses in rural areas. In terms of noise, the plan provides reasonable levels of amenity protection immediately around sensitive activities. Setting the daytime noise limit of LAeq(15 min) 50 dB around sensitive sites provides this basic amenity protection whilst enabling rural activities to affect areas to much higher levels provided these activities are reasonably buffered to sensitive sites. It is notable the current operative district plan sets a daytime noise limit of 50 dB L10 which is comparable to the LAeq(15 min) 50 dB limit currently proposed for rural zones.

The proposal to enable higher daytime noise limits (LAeq(15 min) 55 dB) applying to non-exempt permitted activities in the GRUZ is not recommended to be adopted as the 50 dB limit within the notional boundary is considered reasonably necessary to provide adequate amenity protection for residential uses that are permitted under GRUZ-R4 and GRUZ-R5.</td></tr>
<tr><td>G. D. M. [38.2]

22 The Terrace [202.3]</td><td>Seek that the Port Outer Noise Control Boundary overlay is removed from 12, 14 and 22 The Terrace. Considers that the NCB appears to be based on property boundaries rather than being based on scientific acoustic modelling. One submitter particularly notes that 20 The Terrace is not included and considers that topography and the presence of structures on the north side of The Terrace also act as a noise barrier between the site and the Port.</td><td>Port predicted port noise contours predicted using NZS6809:1999 by Primeport's consultant[10] have in some areas been "cadastralised" to run along property boundaries which is a widely accepted practice to ensure the plan provisions relating to port noise are efficiently applied with certainty and clarity in urban areas. Contour lines passing through small sites can lead to uncertainty and difficulty in establishing where acoustic protection measures need to be applied. By adopting property boundaries for the noise boundary location there is no doubt whether (or not) the acoustic mitigation measures apply to any given site. This approach is not usually considered necessary for contour lines traversing zones with large lot sizes such as within Open Space zones or rural zones.

One submitter seeks that 20 The Terrace should be removed from the contour due to acoustic screening by terrain and the presence of structures on the north side of The Terrace. I have reviewed the consultant report setting out how port noise levels have been predicted. There is no reason to suggest the usual algorithms used in the modelling to predict acoustic screening are faulty.

The submitter provides no justifiable, noise-related reasons why Port Outer Noise Control Boundary overlay should be removed from 12, 14 and 22 The Terrace which are shown to lie within the Outer Port Noise Boundary within the port computer based noise predictions provided by port companies consultant.</td></tr>
</table>

[10] See; https://www.timaru.govt.nz/__data/assets/pdf_file/0005/669866/Primeport-AES-2022-Noise-Report.pdf

APPENDIX B - QUALIFICATIONS AND EXPERIENCE

1. My name is Malcolm James Hunt. I am the Principal of Malcolm Hunt Associates, an environmental consultancy firm based in Wellington specialising in environmental noise.

2. I hold a Bachelor of Science Degree from Victoria University and a Master of Mechanical Engineering Degree specialising in Acoustics from the University of Canterbury where I completed a thesis dissertation on transportation noise and acoustics. I hold other qualifications with respect to the Environmental Health Officer Qualification Regulations 1975, and I also hold a Royal Society of Health Diploma in Noise Control.

3. I have been a member of various national and international acoustic standards committees, and expert working groups regarding environmental acoustics and noise. I have been on a number of past New Zealand Standards committees for acoustics, culminating in 2010 being awarded a Standards New Zealand Meritorious Award for involvement in New Zealand acoustic standards. I have acted as a noise expert in many Resource Consent Hearings, District Plan Hearings, Environment Court, High Court Hearings and Boards of Inquiry.

4. I have been involved with the measurement, prediction and assessment of noise effects of numerous developments over the last 30+ years including recreational facilities and educational projects, also involving transportation noise (airports, heliports, road and rail), building acoustics, and industrial noise control. These projects have involved measurement and assessment of various sources of environmental noise as well as the design and implementation of mitigation measures to address the effects of such noise. I am familiar with techniques used to predict noise and assess the impact of environmental noise in a residential setting, including within rural areas. I have also investigated vehicle noise from a range of construction projects such as supermarkets and shopping centres as well as traffic noise associated with State Highways and local roading projects.

APPENDIX C – NOISE-S4 Addition of a Cooling Requirement

Introduction

I have been asked by the reporting planner to comment on the request by Waka Kotahi [143.120] to incorporate a requirement for air cooling within NOISE-S4 – *Ventilation Requirements*. I set out below some comments I consider relevant as well as extracts from several relevant reports on this matter. In summary, I neither support nor oppose adding a requirement for a cooling function to the NOISE-S4 specification of performance for the required ventilation systems. I acknowledge that technical issues around ventilating habitable rooms is beyond my core area of expertise, however below I set out some relevant information for the panel's consideration.

The Issue

Waka Kotahi's request [143.120] seeks to amend NOISE-S4 to include a requirement for the ventilation system to include a cooling function so that indoor temperatures above 25 degrees can be avoided. The submitter is concerned occupants experiencing temperatures exceeding 25 degrees indoors would likely open windows for comfort reasons. The concern is this would allow the ingress of outdoor noise and thus undermine the advantages of acoustic insulation. To provide a cooling effect, this will basically require a 'heat pump' to be installed, whereas without a cooling function, just a 'fresh air' supply is needed to meet the requirements of NOISE-S4. Most fresh air (only) systems include 'heat recovery' which is a simple device which transfers thermal energy between in the inlet and outlet so that incoming air is more or less the same temperature as outgoing air. Thus, costs are largely due to a fan and duct work. Examples are HRV type home ventilation systems commonly found in NZ.

Costs

Regarding costs of heat pumps installed as part of acoustic/ventilation requirements, I've found a guide to costs (in 2013 dollars) with/without heat pumps sufficient for two types of typical new NZ dwellings in *NZTA Building Acoustic Mitigation Case Study*[11] Prepared for New Zealand Transport Agency (Client) by Beca Ltd 2013

4.2 Mechanical Ventilation Costs

Table 2 outlines the costs associated with the two different ventilation systems. With the additional cost of the heat pump, system 1 is significantly more expensive than system 2.

Table 2 – Mechanical Ventilation Costs (2013)

System	Single Storey	Double Storey
1. Heat Recovery System (2 ac / hr) + Heat Pump	$7,850	$11,250
2. Heat Recovery System (15 ac / hr)	$5,900	$5,250

The 'Heat Recovery System' (only) operates up to a higher air volume (15 'air changes per hour') due to higher airflows required to maintain a comfortable indoor temperature under warm climatic conditions found in northern NZ, whereas the 'Heat Recovery + Heat Pump' operates at much lower air flows to maintain comfortable temperatures under warm climatic conditions. The double storey costs of installation of a heat recovery system in a two storey dwelling is higher because of the need for a separate heat pump for each storey.

Need For Cooling Based on Timaru Climate

Regarding the need for cooling given the Timaru climate, I quote the following extract from a report *Ventilation Systems Installed for Road-Traffic Noise Mitigation* Prepared for NZ Transport Agency by Beca Ltd 2014;

> *Cooler climates such as in the lower North Island and the coastal and southern parts of the South Island where the peak temperature generally falls below 23oC (5% of the NIWA weather data) is unlikely to require active cooling. The expected peak indoor temperature for domestic dwellings in this scenario and condition is between 25°C and 27°C.*

Thus, Beca's engineers who have specifically investigated the need for 'active cooling' within ventilation systems associated with road traffic noise mitigation did not consider it necessary to provide reasonably comfortable indoor conditions for "coastal and southern parts of the South Island" which I have taken to include the Timaru district. I have also found a similar statement in NZTA's *State highway guide to acoustic treatment of buildings*[12] which states:

- The system must provide cooling that is controllable by the occupant and can maintain the temperature at no greater than 25°C. [the above requirement can be omitted for cooler regions such as the lower North Island and coastal and southern parts of the South Island]

[11] See: https://www.nzta.govt.nz/assets/Highways-Information-Portal/Technical-disciplines/Noise-and-vibration/Research-and-information/Other-research/NZ1-8305016-Building-Acoustic-Mitigation-Case-Study.pdf

[12] See: https://www.nzta.govt.nz/assets/resources/state-highway-guide-to-acoustic-treatment-of-buildings/NZTA-Acoustic-Treatment-Guide-v1.0.pdf

Also of interest is how other district plan's deal with the issue of incorporating cooling within ventilation systems installed as part of acoustic insulation requirements. A 2020 NZTA report by AES (*NZTA Ventilation Specification Review - Review of current literature and District Plan rules*) analyses various NZ district plans in terms of acoustic insulation requirements. The study identified 121 relevant rules. The largest subset of rules related to noise sensitive activities establishing in noise generating zones containing business, industrial and commercial activity. In the order of 40 of the rules appeared in this context. Aircraft and traffic noise provisions were also common (25 and 28 rules respectively). Rules relating to noise sensitive activities establishing near rail corridors, ports and specific industrial facilities such as dairy processing plants and electricity generation made up the balance of the rules.

Of the 121 rules, only 19 acoustic insulation rules were identified as having a ventilation requirement which specified cooling provisions, with the majority of these providing a control so that internal temperatures do not exceed 25°C (the exception being care centres, libraries and classrooms in Auckland where the rule allows up to 27°C). Apart from this reference to Auckland, no breakdown is provided as to which districts require a cooling function. Thus, this review is of limited value when considering the Timaru situation however it appears some district plans do require a cooling function and this appears more prevalent in the north of the country.

APPENDIX D - Noise-Related Conditions Of Consent - Subdivision and Land Use Consent No. 101.2021.79.1

22. In accordance with section 221 of the Resource Management Act 1991, the following shall be registered as a consent notice on the record of titles for Lots 2 to 13 to be complied with on a continuing basis with the following text:

    1. That any residential unit constructed on Lots 2 to 13 shall achieve a level of acoustic insulation such that airborne and impact sound on the site is reduced to no greater than:

        a) 35 dBA LAeq (15 min) in the interior of habitable rooms 2200 to 0700 hours;

        b) 40 dBA LAeq (15 min) in the interior of habitable rooms 0700 to 2200 hours;

    2. If windows are required to be closed to achieve the indoor design sound levels in 1 (a) and (b) above, then a means of ventilation shall be required to service the dwelling. The ventilation system shall not generate sound levels that exceed:

        a) 35 dBA LAeq (30s) in bedrooms;

        b) 40 dBA LAeq (30s) in the interior of other habitable rooms;

    3. At the time of application for a Building Consent for a new dwelling, the landowner shall provide certification from a suitably qualified and experienced person to Timaru District Council to confirm that the specified noise levels will be met with the acoustic design of the residential unit and the ventilation system(s) (if any) to be installed; or

    4. Upon completion and application for a Code of Compliance for a residential unit, certification from a suitably qualified and experienced person shall be provided to the Council to confirm that the specified noise levels have been met with the acoustic design and construction of the residential unit and the ventilation system(s) (if any).

    5. Where the specified noise levels have not been achieved, additional measures shall be adopted and implemented in accordance with recommendations from a qualified acoustic engineer until certification under condition 4 can be provided.

23. Prior to certification pursuant to section 224(c) of the Act, the consent holder shall install an acoustic fence along the boundary between Lot 1 and Right of Way 4 to a minimum height of 2 metres