

**BEFORE THE HEARINGS PANEL
APPOINTED BY WAITAKI DISTRICT COUNCIL**

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of submissions on the Proposed Waitaki District Plan

SUBMITTER New Zealand Defence Force (Submitter 189)

**STATEMENT OF EVIDENCE OF DARRAN HUMPHESON
ON BEHALF OF THE NEW ZEALAND DEFENCE FORCE (NOISE)
8 October 2026**

INTRODUCTION

QUALIFICATIONS AND EXPERIENCE

- 1 My full name is Darran Humpheson. I am a Technical Director of Acoustics at Tonkin & Taylor Limited (**T+T**). I provide this acoustic evidence on behalf of the New Zealand Defence Force (**NZDF**).
- 2 I hold a Bachelor of Science degree with Honours in Applied Physics and a Master of Science degree in Environmental Acoustics. I am a Member of the Acoustical Society of New Zealand and a Member of the United Kingdom's Institute of Acoustics. I am a New Zealand representative on ISO/TC 43/SC 1 "Noise" and a member of the Joint Standards Australia/Standards New Zealand Committee AV-001 Acoustics. I am also a practising commissioner under the Making Good Decisions programme.
- 3 I have worked in acoustics since 1991. My previous roles include Technical Director positions with AECOM, Bureau Veritas and RPS Group plc, and Head of the Royal Air Force's Noise and Vibration Division.
- 4 I have extensive experience assessing military aviation, weapons and training noise. I have provided acoustic advice and expert evidence for NZDF on temporary military training activities (**TMTA**) in a number of district plan reviews. This has included evidence on the technical basis for the alternative separation distance and peak noise controls applying to weapons firing and explosives, and standards applying to vehicle, plant and stationary equipment noise.

CODE OF CONDUCT

- 5 Although this is a Council hearing, I confirm that I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 and have complied with it in preparing this evidence. The matters addressed are within my area of expertise, except where I identify reliance on another witness. I have not omitted material facts known to me that might alter or detract from the opinions expressed.

SCOPE OF EVIDENCE

- 6 I have been asked to provide acoustic evidence concerning NZDF's submission on the TMTA provisions in the Proposed Waitaki District Plan (**PDP**). My evidence focuses on the noise standards sought for TMTA and responds to the

observations in the Marshall Day Acoustics memorandum appended to the section 42A report for the Noise chapter.

- 7 In preparing this evidence, I have reviewed:
 - a NZDF's submission, including submission points 189.50 and 189.51 and Attachment 1 containing proposed amendments to NOISE-R8; and
 - b the section 42A report for the Noise chapter dated 21 September 2026, including the Marshall Day Acoustics memorandum.
- 8 My evidence addresses the following matters:
 - a the nature and acoustic characteristics of TMTA noise;
 - b the reasons for activity specific TMTA noise standards; and
 - c the specific observations made by Marshall Day Acoustics.

EXECUTIVE SUMMARY

- 9 TMTA are temporary, activity specific and may involve a combination of impulsive sources, moving vehicles, earthmoving equipment, temporarily stationary vehicles, generators and pumps. The character and duration of these sources differ from those associated with an established industrial or commercial activity operating from a fixed site. In my opinion, those differences justify a tailored rule rather than unqualified reliance on the PDP's general zone noise limits.
- 10 Marshall Day Acoustics raises four matters in its memorandum in the section 42A report concerning the relief sought by NZDF: the notice period; the noise limits applying to non-impulsive TMTA sources; the proposed daytime and night-time noise assessment locations; and the activity status applying where the permitted activity standards are not achieved.
- 11 The five-working-day notice period is an administrative notification requirement rather than an approval or certification process. While larger exercises may be planned well in advance, the detailed arrangements for some TMTA may need to be confirmed over shorter timeframes because of operational requirements, land and landowner availability, and the availability of personnel and equipment. In my opinion, five working days provides Council with reasonable advance information while retaining the operational flexibility needed to plan TMTA. The technical protection is provided by the permitted activity noise limits and separation distances, not by an extended notice period.

- 12 NZDF's requested approach to NOISE-R8 PER-2 applies one set of limits to all TMTA noise sources other than weapons firing and explosives: 55 dB LAeq(15 min) between 7.00 am and 7.00 pm, and 45 dB LAeq(15 min) and 75 dB LAFmax between 7.00 pm and 7.00 am. These limits apply to the combined contribution of all relevant TMTA sources, other than weapons firing and explosives, not just to fixed sources.
- 13 The PER-2 limits are numerically 5 dB higher than the corresponding general residential zone limits in NOISE-S1. However, PER-2 expressly requires compliance over a relatively short 15-minute assessment period and applies its lower limits from 7.00 pm. By comparison, the lower night-time limits in NOISE-S1 do not commence until 10.00 pm. PER-2 therefore provides additional protection during the evening period between 7.00 pm and 10.00 pm, while allowing for a short-term and moderate change in acoustic amenity during a temporary activity.
- 14 The temporary duration of TMTA is important when considering those effects. Unlike an established activity that may generate noise on an ongoing or recurring basis, TMTA are limited under TEMP-R5 to no more than 31 consecutive days in a calendar year, excluding set-up and pack-down. In my opinion, the proposed PER-2 limits, when considered together with that limited duration, the 15-minute assessment period and the lower limits applying from 7.00 pm, provide an appropriate level of protection for residential receivers.
- 15 The different daytime and night-time assessment locations are deliberate and effects based. The daytime controls protect outdoor amenity at a notional or site boundary. At night, the principal concern is the sound level incident on a noise sensitive building, including the potential for sleep disturbance. Assessment 1 metre from the façade therefore more directly represents the relevant night-time exposure.
- 16 I express no planning opinion on whether controlled or restricted discretionary activity status is preferable where the permitted standards are not achieved. However, any matters of control or discretion should be confined to the actual noise effects, the extent of non-compliance and communication with nearby residents.

TEMPORARY MILITARY TRAINING ACTIVITIES

- 17 TMTA can range from classroom or office based training to field exercises involving vehicles, temporary infrastructure, pumps, generators, earthmoving equipment, helicopters and, in some cases, weapons firing or explosives. Not every activity uses every source, and many exercises do not include impulsive noise.
- 18 TMTA may take place in different environments to provide operational realism. They are limited in duration, and noise generating activities may occur intermittently within the overall activity period. The Temporary Activities section 42A report recommends a limit of 31 consecutive days, excluding set-up and pack-down, which is consistent with treating TMTA as temporary rather than permanent land use.
- 19 The principal acoustic categories are:
 - a weapons firing and explosives, which produce short duration, high amplitude impulsive noise with a significant low frequency component;
 - b mobile plant and vehicles, which generally produce intermittent noise that moves around the training area;
 - c fixed or temporarily stationary plant, such as generators and pumps, which can operate for longer periods but can usually be managed through selection, siting and screening; and
 - d helicopter take-offs and landings, which are dealt with separately through the temporary activity and aircraft provisions.

TECHNICAL BASIS FOR ACTIVITY SPECIFIC STANDARDS

- 20 Weapons firing and explosions require a different assessment approach from other sources of environmental noise. NZS 6802:2008 *Acoustics – Environmental noise* provides for a 5 dB adjustment where sound within its scope has a confirmed special audible characteristic, including noticeable impulsiveness. However, clause 1.2 excludes impulsive sounds such as gunfire and blasting from the scope of the Standard.
- 21 Accordingly, it would not be appropriate to assess TMTA weapons firing or explosions using an LAeq rating level with a 5 dB impulsiveness adjustment. The use of C-weighted peak sound pressure levels (**LCpeak**), together with alternative minimum separation distances, provides an activity-specific method

that better reflects the acoustic characteristics of these high-energy impulsive sources.

- 22 The LCpeak metric is therefore materially different from the LAeq and LAFmax metrics used to assess other sources of environmental noise, including other TMTA noise sources. LCpeak directly characterises the instantaneous peak sound pressure associated with weapons firing and explosions, whereas LAeq describes sound energy averaged over a specified period and LAFmax is determined using the Fast time weighting.
- 23 For non-impulsive sources, LAeq(15 min) provides a practical measure of the sound exposure during a representative operating period. It avoids the need to determine a much longer period average where the source may move, change operating mode or be present at a particular receiver only intermittently. LAFmax is included at night to manage individual events that may affect sleep.
- 24 A general zone standard is usually framed for an activity established in a zone and may apply on a recurring or ongoing basis. TMTA are temporary and may include several source types within one exercise. In my opinion, the combination of temporary duration, operational variability and source character means that directly applying the general standards does not necessarily provide the clearest or most proportionate control.

Weapons firing and explosives

- 25 The proposed controls retain two alternative compliance pathways. The first is compliance with a minimum separation distance from a building containing a noise sensitive activity. The second is compliance with an LCpeak limit where the separation distance cannot be achieved.
- 26 The separation distance pathway is useful because it can be applied during activity planning without specialist acoustic input or compliance monitoring. The alternative peak limits provide flexibility where topography, built form, weapon type or other site conditions mean the relevant limit can still be achieved at a shorter distance.
- 27 The proposed daytime controls are a 500 metre separation distance or 95 dB LCpeak. The proposed night-time controls are a 1,250 metre separation distance or 85 dB LCpeak. These controls are based on a conservative upper-end TMTA

weapon source and are intended to avoid reliance on the substantially louder weapons that are used only on dedicated ranges rather than for off-base TMTA.

- 28 Consistent with NZDF's objective of achieving a nationally consistent framework for managing TMTA noise, the two-tier approach has been incorporated into, or accepted through the review of, a number of district plans¹.

Other TMTA noise sources

- 29 Earlier versions of NZDF's TMTA provisions separated mobile and fixed sources. Mobile sources were subject to limits informed by NZS 6803:1999 *Acoustics – Construction Noise* because personnel carriers, trucks and earthmoving equipment have operating characteristics similar to construction plant. Fixed sources were subject to limits more closely aligned with ordinary environmental noise controls.
- 30 Following experience in recent district plan hearings, NZDF simplified that approach. A TMTA may involve a vehicle moving around the site, then remaining stationary while operating; generators and pumps may operate concurrently; and it may be difficult to separate the contribution of each source for compliance purposes. The former distinction could therefore introduce uncertainty without a corresponding acoustic benefit.
- 31 NZDF's updated provisions apply one standard to all TMTA noise other than weapons firing and explosives. The daytime limit of 55 dB LAeq(15 min) is based on the former fixed source limit and is therefore more conservative than the former daytime mobile source limits. The night-time limits remain 45 dB LAeq(15 min) and 75 dB LAFmax.

RESPONSE TO MARSHALL DAY ACOUSTICS

- 32 Marshall Day Acoustics raises four principal matters concerning the relief sought by NZDF: the notice period; the noise limits applying to non-impulsive TMTA sources; the proposed daytime and night-time noise assessment locations; and the activity status applying where the permitted activity standards are not achieved.

¹ Including Selwyn, Ōpōtiki, Invercargill, Waikato and Waitomo.

Notice period

- 33 The section 42A report states that NZDF's reason for seeking a reduction in the notice period from ten to five working days is unclear and considers ten working days would provide Council more time to consider the activity and provide feedback.
- 34 The notice requirement is not a technical approval or certification process. Compliance is established through the permitted activity standards themselves. While some larger exercises are planned well in advance, the detailed arrangements for other TMTA may need to be confirmed over relatively short timeframes. This can reflect changing operational and training requirements, the availability of suitable land, confirmation of landowner access, and the availability of personnel and equipment. A requirement to provide ten working days' notice could therefore unnecessarily constrain activities that are otherwise able to comply fully with the applicable noise standards. Five working days provides Council with reasonable advance information about the activity, including the applicable separation distances or predicted levels, while retaining the flexibility necessary for the planning of TMTA.
- 35 I do not consider there to be an acoustic benefit from requiring a further five working days where the activity will comply with the permitted noise standards. If Council feedback reveals a factual error or potential non-compliance, that issue remains capable of being addressed before the activity starts. I therefore support a consistent five-working-day notice period in NOISE-R8 and TEMP-R5.

Application of NOISE-R8 PER-2

- 36 Marshall Day Acoustics considers that the proposed NOISE-R8 PER-2 would allow TMTA to generate more noise in a residential zone than other activities and does not consider this appropriate or necessary.
- 37 The notified NOISE-S1 daytime limit for residential zones is 50 dB LAeq, whereas NZDF seeks a daytime limit of 55 dB LAeq(15 min) for TMTA. The proposed night-time limits of 45 dB LAeq(15 min) and 75 dB LAFmax are also 5 dB higher than the corresponding NOISE-S1 residential-zone limits of 40 dB LAeq and 70 dB LAFmax.
- 38 However, the relevant time periods also differ. Under NOISE-S1, daytime extends from 7.00 am to 10.00 pm, whereas the lower PER-2 limits apply from

7.00 pm. Within PER-2, the applicable LAeq limit therefore reduces from 55 dB to 45 dB at 7.00 pm, and a 75 dB LAFmax limit applies from that time. By comparison, the lower NOISE-S1 residential-zone limits do not apply until 10.00 pm. PER-2 therefore provides additional protection during the evening period between 7.00 pm and 10.00 pm, notwithstanding that its numerical night-time limits are 5 dB higher than those applying under NOISE-S1 after 10.00 pm.

- 39 The proposed PER-2 limits allow for a short-term and moderate change in acoustic amenity at residential receivers. The extent of that change will depend on the existing sound environment, receiver expectations and awareness of the activity, and the nature and duration of the TMTA activity. In my opinion, 55 dB LAeq(15 min) represents a moderate daytime noise level and provides a direct control over the sound level experienced during a representative 15-minute period.
- 40 The proposed limit is 5 dB higher than the general daytime residential zone limit but remains 15 dB lower than the 70 dB LAeq daytime construction noise limit in NOISE-R6. I do not rely solely on that comparison, as construction and TMTA are different activities. However, it provides useful context that the proposed limit sits between the general standard for ongoing activities and the higher level accepted for temporary construction activity.
- 41 The use of a 15-minute assessment period in PER-2 is also important. A short assessment period controls the noise during a representative period of the activity and limits the extent to which discrete periods of higher noise can be averaged with quieter periods. NOISE-S1 does not specify an assessment duration for its LAeq limits, whereas PER-2 expressly requires compliance over 15 minutes. Assessment under NOISE-S1 would otherwise rely on the applicable assessment procedures in NZS 6802:2008, including its provisions relating to the duration of the sound under investigation². PER-2 therefore provides a clear and relatively short timeframe against which the actual noise from a TMTA must be assessed.

² NZS 6802:2008 provides for a duration adjustment where the sound under investigation is present for only part of the prescribed time frame. The adjustment may be up to 5 dB where the sound is present for less than 30% of that period.

- 42 The temporary and limited duration of TMTA is relevant when considering the resulting noise effect. Unlike an established activity that may generate noise on an ongoing or recurring basis, TMTA are limited under TEMP-R5 to no more than 31 consecutive days in a calendar year, excluding set-up and pack-down.
- 43 I also note that the PER-2 limits would apply to the combined contribution of all relevant TMTA sources, other than weapons firing and explosives, rather than only to fixed noise sources as described by Marshall Day Acoustics. The limits therefore control the overall noise received from the activity, including the combined contribution of vehicles, mobile and temporarily stationary plant, generators and other equipment.
- 44 In my opinion, the proposed PER-2 limits, when considered together with the temporary duration of TMTA, the short assessment period and the lower limits applying from 7.00 pm, provide an appropriate level of protection for residential receivers. The limits allow for a short-term and moderate change in acoustic amenity without permitting unrestricted noise. I therefore consider it reasonable for the activity specific TMTA rule to apply numerical limits that are 5 dB higher than the corresponding general residential zone limits.

Assessment locations

- 45 Marshall Day Acoustics considers that using different daytime and night-time assessment positions adds unnecessary complexity and notes that assessment 1 metre from a façade is otherwise unusual in the PDP.
- 46 The distinction is effects based. During the day, the relevant consideration includes outdoor amenity. Assessment at the notional boundary of a building containing a noise sensitive activity in a rural zone, or at the site boundary of a site containing a noise sensitive activity in any other zone, addresses the sound environment across the part of a site where outdoor amenity would ordinarily be expected.
- 47 At night, the principal acoustic concern is noise incident on the façade of the building where people may be sleeping. A 1 metre façade position directly represents that incident level and avoids the result being controlled by the size or geometry of the site rather than the exposure of the building containing the noise sensitive activity. The accompanying note confirms that no façade correction is applied, so the numerical limit is unambiguous.

- 48 I acknowledge that direct compliance measurement within private property may not always be possible. However, the same issue may arise where access is required to measure at a notional boundary. Restricted access does not make the standard unworkable. Compliance may be assessed by attended measurement from an accessible location with an appropriate sound propagation correction, by prediction using source data and separation distance, or by measurement undertaken with the agreement of the property owner. The rule defines the assessment position; it does not require the sound level meter to be physically placed at that point in every case.

Activity status where permitted standards are not met

- 49 The section 42A report recommends restricted discretionary rather than controlled activity status. The choice of activity status is primarily a planning matter.
- 50 From an acoustic perspective, the effects requiring assessment are capable of being clearly identified. They are the nature and magnitude of the noise, the extent and duration of non-compliance, the sensitivity and use of affected receivers, feasible mitigation, and communication with nearby residents. Whether expressed as matters of control or discretion, the assessment should remain confined to those matters rather than the broader general noise policy matters that may be unrelated to a temporary military activity.

CONCLUSIONS

- 51 TMTA warrant specific noise controls because the activities are temporary, operationally variable and may combine source types that do not fit neatly within general zone noise provisions.
- 52 I consider that the NOISE-R8 PER-2 limits, when considered together with the temporary duration of TMTA, the 15-minute assessment period and the lower limits applying from 7.00 pm, appropriately manage noise effects at residential receivers.
- 53 I do not agree that the proposed assessment locations create unnecessary complexity. They address the relevant effect in each period: outdoor amenity during the day and incident sound at buildings containing noise sensitive activities at night.

- 54 Overall, I consider that the standards sought by NZDF provide a clear, practical and technically appropriate framework for managing TMTA noise while protecting nearby noise sensitive activities. The approach is consistent with NZDF's objective of achieving a nationally consistent framework.

Darran Humpheson

8 October 2026