CM-2: Draft noise and vibration metrics standard

1. This is a submission in relation to the CM-2: Draft noise and vibration metrics standard.

2. We are private individuals who are currently being significantly negatively impacted by the impulsive sound from gunfire noise of a shooting club. The noise of this club is being assessed in a way that we believe is not based on best practise standards internationally and that the draft Standards as currently worded will perpetuate this incorrect measurement standard for impulsive noise. As a result of New Zealand currently not taking on board international best practise in relation to the assessment of impulsive gunfire noise, we believe there is a significant health and wellness issue for residents that live in proximity to activities that have this type of noise. The Draft noise and vibration metrics standard offers an opportunity to ensure clarity on measurements specific to impulsive noise to be incorporated.

3. The purpose of the submission is to address the issue that we believe the draft standard in relation to the measurement and assessment of impulsive sound such as gunfire and blasting, which are characterised as a peak sound level (with the descriptor L_{peak}) is not being properly assessed and measured by applying a rating level expressed in L_{eq} (for a continuous steady sound) or L_{max} in NZS 6802:2008 as implied in paragraph 4 of the draft standard.

4. District Plan noise rules are set through reference to New Zealand Standard NZS 6802:2008 “Acoustics - Environmental Noise” or earlier version of this standard. Guidance within this standard states that is not intended to address shooting noise – this is clearly noted where the standard states “…impulsive sounds (such as gunfire and blasting), requires special techniques that are generally outside the scope of this
standard.". It is generally accepted that noise from impulsive sounds such as gunfire are likely to provoke greater annoyance than assessment against typical District Plan rules would indicate. The appropriate way to control noise from gunfire is to provide a limit that is suitable for the nature of the noise, such as LAFmax or LZpeak / LCPeak.

5. We understand that it is generally recognised that the character of gunshots (being both loud and impulsive) requires a different set of noise controls to that applied to other sources of environmental noise. The same is true of other sources of impulsive noise (e.g. bird scaring devices) and these are also provided with specific noise rules. To this extent, the standards should specifically reference noise from shooting ranges in recognition of the character of the noise source and the history of enforcement action taken over other shooting ranges throughout New Zealand.

6. In relation to impulsive sound, paragraphs 3 and 4 of the draft standards appear to be in conflict. This is because for impulsive sound such as gunfire or blasting (impulsive sound being transient sound having a peak level a very short duration, typically less than 100 milliseconds) should be described by the measurement of its peak level as indicated by the descriptor L_{peak} (refer clause 8.6, New Zealand Standard 6801:2008).

7. In comparison, the descriptor for a continuous steady sound is the L_{eq} which is a time average level i.e. L_{eq} is 'a different thing' from the peak level.

8. The optimal strategy for measuring impulse noise, such as that produced by firearms, has been the topic of significant discussion. Brinkmann (2000) provides an overview of the challenges, particularly the issue of impulse noise not falling squarely within acoustics, but rather under the realm of fluid dynamics, gas dynamics, and shock waves. Applied to rifles (for example), this is due to the rapid expansion of gas into the atmosphere when the projectile leaves the muzzle which forms a spherical and often supersonic pressure wave.

9. In order to assess potential auditory risk and associated nuisance factors, multiple essential parameters must be measured. These include peak overpressure, rise time, time-duration, impulse noise spectrum, and impulse noise energy (Brinkmann, 2000). Some of these properties are easier to measure than others, and the technical challenges have been well summarized by Rasmussen et al. (2009).

10. Due to the complexities outlined above and our personal experiences of gunfire and its associated significant impact, we have requested advise from both the Canadian and Australian Standards Authorities in relation to noise emissions specific to impulsive sound from gunfire or blasting, and both these organisations have confirmed the following: that ISO 17201-3 confirms that ISO 9613-2 is not directly applicable to shooting noise, i.e., clause 5.2 states:

11. “It should be noted that ISO 9613-2 neither applies to shooting sound, nor accounts for changes in sound pressure time history during propagation. It therefore cannot yield results for time-weighted metrics such as LF,max. ISO 9613-2 does not adequately account for meteorological effects on sound propagation over distances greater than 1 km. Furthermore, the use of ISO 9613-2 is not recommended if the spectrum at the reception point is dominated by frequencies below 100 Hz.”

12. Advise from Canada continues to confirm that for shooting ranges the ISO has 5 published standards, and one standard under development.
• ISO 17201-1:2005 Acoustics -- Noise from shooting ranges -- Part 1: Determination of muzzle blast by measurement
• ISO 17201-2:2006 Acoustics -- Noise from shooting ranges -- Part 2: Estimation of muzzle blast and projectile sound by calculation
• ISO 17201-3:2010 Acoustics -- Noise from shooting ranges -- Part 3: Guidelines for sound propagation calculations
• ISO 17201-4:2006 Acoustics -- Noise from shooting ranges -- Part 4: Prediction of projectile sound
• ISO 17201-5:2010 Acoustics -- Noise from shooting ranges -- Part 5: Noise management

13. Our submission is that the New Zealand Planning Standards should follow international best practise and be consistent with the interpretations adopted in both Australia and Canada in relation to impulsive noise from gunfire.

14. The assessment and determination of the rating level (as expressed in $L_{eq}$ with adjustments for duration and special audible characteristics) and $L_{\text{MAX}}$ in New Zealand Standard 6802:2008 will only be applicable and relevant if the type of sound is generally within the scope of NZS 6801:2008 and NZS 6802:2008.

15. Impulsive sound (gunfire and blasting) should be considered as being outside the scope of NZS 6802:2008 (refer clause 1.2 NZS 6802:2008).

16. We believe that the current drafting of the draft New Zealand standard may result in a possible interpretation that gun clubs in New Zealand are subject to the assessment criteria requiring the calculation of a rating level (in $L_{eq}$) and the application of $L_{\text{MAX}}$, when international best practise indicated that these are not the correct descriptors for impulsive sound.

17. It is submitted that it would not be logical to have a plan rule or draft national standard implying that emission of impulsive sound is to be assessed in a manner consistent (per paragraph 4 of the draft standards) with section 6 Rating Level and section 7 $L_{\text{MAX}}$ in New Zealand Standard 6802:2008 Acoustics – Environment Noise – when $L_{eq}$ and $L_{\text{max}}$ are not applicable to the assessment of impulsive sound.

Outcome sought

18. We believe that the wording of clause 4 of the draft national standard (CM-2: Draft noise and vibration metrics standard) should be reconsidered in relation to international best practise and to be consistent with the approach taken in both Australia and Canada in relation to the technical aspects of noise specific to impulsive noise from gunfire.

19. We understand that the New Zealand Acoustical Society has input into the standards and we would suggest that Society members are more often than not employed by the organisations that make noise and as such we question the merit of the Acoustical Society setting standards in relation to impulsive noise from gunfire. In addition we have noted extreme inconsistency between members on opinion as to the approach to impulsive noise – as such and as previously discussed, we believe that New Zealand should therefore look to international best practise in relation to
this issue which recognises the unique situation in relation to impulse noise and gunfire and that this should guide any confirmed standards adopted in New Zealand.

20. The submitter requests to be heard in relation to this submission.

Date: 16 August 2018

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