

**Before the Hearings Panel
At Wellington City Council**

Under Schedule 1 of the Resource Management Act 1991

In the matter of the Proposed Wellington City District Plan

**Statement of evidence of Malcolm James Hunt on behalf of Wellington City
Council (Noise & Acoustics)**

Date: 3 July 2023

INTRODUCTION:

1 My full name is Malcolm Hunt. I am a self-employed noise and acoustic consultant based in Wellington.

2 I have prepared this statement of evidence on behalf of the Wellington City Council (the **Council**) in respect of technical related matters arising from the submissions and further submissions on the Proposed Wellington City District Plan (the **PDP**).

3 Specifically, this statement of evidence relates to the matters in the Noise chapter (the **Noise Chapter**) and APP4 and APP5 -Permitted Noise Standards. My statement of evidence addresses submissions related to Airport noise, Port noise, State Highway noise, helicopter noise, including at Wellington Regional Hospital, and minimum ventilation standards for habitable rooms required to be acoustically insulated against outdoor noise.

4 Submissions related to rail noise and vibration, road vibration, Temporary Military Training Activities (TMTA), live music venues, and other general noise and vibration matters have been addressed in the evidence of Sean Syman.

5 I am authorised to provide this evidence on behalf of the Council.

QUALIFICATIONS AND EXPERIENCE

6 I am an environmental noise consultant and principal of Malcolm Hunt Associates. I hold the degrees of Bachelor of Science and Master of Mechanical Engineering. I completed a thesis dissertation on environmental noise. 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. I have over 35 years' experience in the measurement and assessment of noise in the environment and matters relating to acoustic design.

- 7 I have been a member of various noise/acoustic committees including International Standards Organization (ISO technical working groups). I have been involved with a number of New Zealand Standards committees concerned with national Standards for environmental noise. I am an associate member of the New Zealand Acoustical Society.
- 8 I have been involved with the measurement, prediction and assessment of environmental noise from a range of industrial and transport-related projects and facilities such as motorways, airports, quarries, earthmoving projects and landfills. In addition, I have acted for various Councils in the development of District Plan noise rules, and conducted numerous background sound level surveys in both urban and rural areas. I have wide experience in acoustic design and noise control engineering.
- 9 I have gained a comprehensive understanding of aircraft noise issues at Wellington in a previous role I fulfilled as an independent noise consultant, advising Wellington International Airport Limited (WIAL) from about 1994 up until 2003. During that time I was involved with advising WIAL on the development of Operative District Plan aircraft noise provisions and presented evidence on WIAL's behalf at the district plan hearings and assisted WIAL during the planning appeals mediation process that took place in the late 1990s. During my time assisting WIAL I oversaw the operation of the airport noise monitoring system, including implementing a new remote sensing system at several locations around the airport. During my time assisting WIAL I regularly attended meetings of the Wellington Airport Air Noise Management Committee on behalf of WIAL.

Code of conduct

- 10 I have read the Code of Conduct for Expert Witnesses set out in the Environment Court's Practice Note 2023. I have complied with the Code of Conduct in preparing my evidence and will continue to comply with it while giving oral evidence before the Hearings Panel. My qualifications as an expert are set out above. Except where I state I rely on the evidence

of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

SUMMARY

11 My name is Malcolm Hunt.

12 I have been asked by the Council to provide expert evidence in relation to the district plan hearings on Chapter Te Oro Noise, which primarily relates to controlling and managing the effects of various sources of outdoor environmental noise on people, their health and well-being.

13 In addition, a major focus of the PDP Noise Chapter is the development and strengthening of planning measures aimed at protecting major infrastructural assets such as Wellington International Airport, the state highway network, the rail network and the Port Of Wellington from reverse sensitivity noise effects that may hinder their operation in the long term.

14 My work assisting Council with PDP noise matters is shared with a fellow expert, Mr Sean Syman. Although we have worked together in close collaboration, by agreement we have shared our work according to the following division of PDP noise topic areas;

Malcolm Hunt:

- Airport noise
- Port Noise
- State Highway Noise
- Helicopter noise, including at Wellington Regional Hospital
- Minimum ventilation standards for habitable rooms required to be acoustically insulated against outdoor noise.

Sean Syman:

- General District wide noise rules
- Venue noise
- Military noise
- NZ Fire & Emergency
- General noise matters
- Vibration (inc. for both road and rail)
- Rail noise.

INVOLVEMENT WITH THE PROPOSED PLAN

- 15 I commenced my involvement with the development of the PDP in March 2022 when I was engaged by Council to review submissions received on the non-statutory Draft District Plan (DDP) which was released for public comment in late 2021. Again, this work was conducted in collaboration with another noise expert (Miklin Halstead) with my input specifically addressing noise issues relating to Wellington International Airport (WIA) and Port of Wellington (CentrePort).
- 16 This work during 2022 involved reviewing DDP submissions received by Council in relation to these two main topic areas – aircraft and land-based noise at Wellington International Airport (WIA) and noise due to port-related activities taking place at Port of Wellington (main wharf areas adjacent to the City and at Burnham/Miramar wharf areas). Based on my research and experience, in 2022 I recommended technical amendments and enhancements to the DDP within my topic areas so that the PDP would be technically robust and incorporate appropriate feedback from submitters where this can be justified. An important focus was to more closely align with the recommendations of relevant NZ noise Standards, compared to the Operative District Plan (ODP).
- 17 Since April 2023 I have worked under the guidance of planning topic lead for the PDP Noise Chapter, Mark Ashby of 4Sight Consulting, on behalf of Wellington City Council, who has provided direction and oversight of my involvement with reviewing submissions received on

the PDP, assessing the issues raised, and making recommendations for amendments on PDP noise provisions across my topic areas identified in paragraph 14 above.

- 18 In addition to the topic areas of airport noise, port and state highway noise, I have investigated and reported below on requested improvements to the PDP ventilation of habitable rooms required under the Standards NOISE-S4 and NOISE-S5 to be acoustically insulated against outdoor noise. Following my investigations I have made recommendations for improvements to the ventilation standard NOISE-S6, as discussed below.
- 19 In carrying out my assessments I have attended several meetings with Council's in-house compliance / noise officers (Matthew Borich and Lindsay Hannah) and attended meetings with other experts representing submitters Waka Kotahi, KiwiRail, CentrePort and Wellington International Airport Limited (WIAL).
- 20 On behalf of Council I engaged a ventilation expert (Owen Brown, a Senior Mechanical Engineer at GHD Ltd) to provide expert advice relating to ventilation issues raised by submitters in relation to NOISE-S6. This specialist advice was sought as I acknowledge technical ventilation matters are outside my core areas of expertise.
- 21 In reaching my conclusions on whether the various aircraft noise standards of the PDP should be located within both or either the Noise Chapter or the WIA designation found in Part 3 of the PDP, I have relied (in part) on advice from Council's legal counsel, Nick Whittington.

NEW ZEALAND STANDARDS

- 22 In undertaking my assessments I have had regard to the recommendations of the relevant NZ Standards dealing with environmental noise. I have had a long association with the development of noise Standards in New Zealand having been involved

with several committees developing these Standards between 1994 and 2010. In 2011 I was awarded a meritorious award by Standards New Zealand for my involvement with Standards development over the years.

23 The following NZ Standards have been considered within the assessments I have undertaken in formulating my advice to Council on the PDP:

NZS6801:2008 *Acoustics – Measurement of environmental sound*

NZS6802:2008 *Acoustics – Environmental noise*

NZS6805:1992 *Airport noise management and land use planning*

NZS6807:1994 *Noise management and land use planning for helicopter landing areas*

NZS6809:1999 *Acoustics – Port noise management and land use planning.*

SCOPE OF EVIDENCE

24 Based on the division of noise topics agreed with Sean Syman outlined above at paragraph 14, my evidence below addresses noise matters raised in submissions relating to the following matters:

- a) Airport noise matters
- b) Port noise matters
- c) Noise from state highways
- d) Noise from helicopters, including helicopters visiting Wellington Regional Hospital
- e) Amendments to NOISE-S6 standards for the ventilation of habitable rooms required by the PDP to be acoustically insulated against outdoor noise.

25 I discuss each of these matters under the following headings.

AIRCRAFT NOISE MATTERS

- 26 Around 212 separate submissions points were raised by submitters in relation to airport noise matters, by far the most of any single noise topic area. It is important to note this large number of submissions points is not due to any projected increase in aircraft noise levels in the future. In fact, my June 2022 report^{1, 2} to Council noted that the number of properties potentially affected by aircraft noise in the future, at levels of Ldn 65 dB or greater, is expected to reduce by around 200 properties, compared to the number of properties forecast to receive this level of aircraft noise in the future under the ODP.
- 27 I believe the large number of submission points on airport noise are a result of a comprehensive submission by WIAL and the Board of Airline Representatives (BARNZ), and the close engagement on noise issues by submitter groups such as Guardians Of The Bay and Strathmore Residents Association. A related factor is that, by comparison with the ODP, the PDP includes an extension to the area over which reverse sensitivity measures apply – that is, out to Ldn 60 dB (the Outer Air Noise Overlay). I believe a causal factor is also the increased awareness of airport noise issues due to previous hearings regarding the main airport site designation (WIAL4), east side designation (WIAL5) and the Miramar South Area (WIAL2).
- 28 Commencing with general airport noise matters, submission points by WIAL [406.27, 406.28, 406.29 and 406.548] and Guardians of the Bay [FS44.4] identify concerns around certain aircraft noise District Plan definitions and Airport Zone noise provisions which are conflated, uncertain and could possibly lead to confusion. In addition, when

¹ *Port Noise and Airport Noise Provisions - Review of Draft District Plan Provisions, Submissions Received & Recommendations*. MHA Report ref. 14-12828-04, dated June 2022.

² The report concerns revised aircraft noise contours for use in the PDP, prepared by consultants engaged by Wellington International Airport Limited (WIAL).

investigating these matters I identified a small number of factual errors I consider are necessary to address, to ensure the proper functioning of the aircraft noise provisions of the District Plan. The issues of concern are summarised as:

Air Noise Overlay / Air Noise Boundary

29 The definition of AIR NOISE BOUNDARY in the definitions section of the PDP is confusing as it includes the term AIR NOISE OVERLAY, yet these are two completely separate functions. The Air Noise Boundary is in fact a control line used to limit cumulative aircraft noise emissions from the airport, whereas the Air Noise Overlay is used within the PDP as a means of identifying noise-affected areas for the purposes of managing reverse sensitivity noise effects.

30 To resolve this potential confusion I have recommended two separate definitions to clarify the distinctly different functions of the AIR NOISE BOUNDARY and the AIR NOISE OVERLAY, consistent with the approach of NZS 6805:1992 *Airport noise management and land use planning*. These definitions are included in Appendix A of the Noise S42A Report.

Amend APP4 (Permitted Noise Standards)

31 Table 21 of the Appendix APP4 (Permitted Noise Standards) sets out aircraft noise limits (in units Ldn) applying to operational aircraft noise. However, Table 21 is confusing as the noise limits in this table are not given effect to, due to there being no links to any district plan noise performance standard, rule or Airport designation condition.

32 A further complication is that Table 21 states noise emitted from aircraft operations within the Airport Zone must not exceed 65 dBA Ldn within the Air Noise Boundary (ANB), however this is factually incorrect. As per NZS6805:1992, only aircraft noise levels above 65 dBA Ldn are found within the ANB. The proper functioning of the ANB ensures aircraft noise levels do not exceed 65 dBA Ldn on any site beyond the ANB.

- 33 A similar mistake arises where Table 21 purports to limit noise from aircraft operations to not more than 60 dBA Ldn within the Outer Noise Control Boundary. This is incorrect on two fronts. Firstly, the PDP has no policies, objectives, rules or standards that seek to limit aircraft noise to not more than 60 dBA Ldn when measured at any specified location. While it is correct to assume the extent of the 'Outer Air Noise Overlay' is based on a modelled 60 dBA Ldn aircraft noise contour, there is no noise limit function associated with the Outer Air Noise Overlay. I consider the concept and use of the term 'Outer Noise Control Boundary' is ineffective and confusing.
- 34 In summary, Table 21 is recommended to be removed in its entirety from APP4 noise performance standards. With Table 21 deleted it is important to recognise cumulative aircraft noise emitted by aircraft operating at WIA will remain suitably controlled to a maximum of 65 dBA Ldn at the Air Noise Boundary under Designation condition 23. Thus, the removal of Table 21 will have no consequential effect but will help avoid confusion when interpreting district plan noise controls over operational aircraft noise.
- 35 As a consequence of removing Table 21, I have a concern this will result in removal of the following 'notes' attached to the bottom of Table 21 in APP4.

Note:

Aircraft [noise](#) will be measured in accordance with *NZS 6805:1992 Airport [noise](#) management and land use planning* and calculated as a 90-day rolling average. All terminology must have the meaning that may be used or defined in the context of *NZS6805:1992 Airport [noise](#) management and land use planning*.

The level of [noise](#) from aircraft operations, for comparison with L_{dn} 65 dBA, is calculated from the total amount of [noise](#) energy produced by each aircraft event (landing or take-off) over a period of 90 days. This method of control does not directly control individual aircraft events, but does so indirectly by taking into account their contribution to the amount of [noise](#) generated in a 24 hour period.

- 36 I consider these notes are important as they specify NZS6805:1992 must be followed and provide useful explanations helpful for plan users. For these reasons, I recommended the above two notes be retained and inserted at the bottom of NOISE-R13.1.

Clarifying Terminology

- 37 The Airport Noise Management Plan is a document with an important function for managing aircraft noise effects. This management plan is correctly referred to in NOISE-S3 and within the WIAL designation as the 'ANMP' however the introduction to the Airport Zone refers in two places to this plan as the 'NMP'. I have recommended the abbreviation 'NMP' be amended to 'ANMP' in the three places where this occurs.
- 38 WIAL seeks deletion of the defined term Air Noise Overlay, to be replaced by a new definition of Air Noise Boundary and 60dB Ldn Noise Boundary. As noted above, I have already recommended that the Air Noise Boundary be defined separately from of Air Noise Overlay.
- 39 The Air Noise Boundary has an important function and WIAL's submission is supported on this aspect however, as noted above, there is no standard or rule in the PDP which limits aircraft noise at the "60dB Ldn Noise Boundary". On this basis I do not support the inclusion of this term within the PDP.
- 40 In discussion with WIAL prior to preparation of this report, WIAL indicated its acceptance that the National Planning Standards require the use of an overlay for managing effects such as reverse sensitivity aircraft noise effects.

Noise Chapter Objectives

- 41 As part of an overall framework of new and amended provisions sought by WIAL, this submitter proposes two new objectives (which WIAL calls NOISE-O3 and NOISE-O4) specific to protecting the Airport from reverse sensitivity effects. These proposed objectives seek to protect against reverse sensitivity, and also seek to remedy or mitigate the adverse effects of Airport noise.

42 In examining this proposal, I consider the two existing objectives NOISE-O1 and NOISE-O2 strike a natural balance, as together these objectives as currently worded protect both amenity values, including peoples' health and well-being, as well as protecting existing and authorised activities that generate high levels of noise. On this basis I consider the Noise Chapter objectives do not require amendment to include reference to a specific source of noise such as the Airport (or any other specific noise source).

Noise Chapter Policies

43 WIAL [406.418, 406.419, 406.420] seeks deletion of NOISE-P1 or amendment of this policy to relate only to 'land-based' noise emanating from the airport noise. This submission point is supported by BARNZ and opposed by Guardians of the Bay. The request to amend NOISE-P1 to refer to land-based noise only is related to WIAL's proposal [submission point 406.405] to introduce two new policies (which WIAL terms NOISE-P7 and NOISE-P8) specific to managing noise sensitive activities within the Inner and Outer Air Noise Overlays to protect against reverse sensitivity effects. These two proposed policies seek to discourage or avoid the establishment or intensification noise sensitive activities (P7); and require insulation and mechanical ventilation in new or altered buildings containing noise sensitive activities (P8). WIAL's proposed amendments would also delete the current reference to the Air Noise Overlay from NOISE-P6.

44 However, I note the approach of the Noise chapter is not to unduly restrict urban development within areas affected by aircraft noise. I support the approach of the Noise chapter which consider the purpose and principles of the RMA are best served by allowing residential and

other activities to generally remain permitted throughout urban areas affected by noise generated by aircraft using the airport³.

45 I consider the proposed P6 and P7 noise policies are not necessary given acoustic insulation requirements for new or altered habitable rooms (and accompanying ventilation requirements) as set out in NOISE-S4, S5 and S6 which I consider are likely to be effective in minimising reverse sensitivity noise effects on airport operations. In addition, the following amendments proposed in the s.42A planners report will assist such that the new policies are not necessary:

- a) Amending the headline text of NOISE-P4 to be “Acoustic treatment and provision of alternative ventilation for buildings housing noise sensitive activities”.
- b) Amending point 7 in policy P4 to clarify that it applies to both the inner and outer air noise overlays. I consider the above recommended changes to the definition of air noise overlay will provide greater clarity in the implementation of the PDP methods to mitigate adverse effects of aircraft noise, including reverse sensitivity effects on airport operations.
- c) Extensive changes to Standard NOISE-S6 (Ventilation requirements) which will enhance the effectiveness of acoustic insulation standards NOISE-S4 and NOISE-S5.

46 WIAL seeks either deletion of NOISE-P4 in its entirety, or amendment to address WIAL’s concern that the focus of this policy is the buildings containing noise sensitive activities rather than noise sensitive activities that are to be acoustically treated. While KiwiRail and Kāinga Ora and Guardians of the Bay also oppose WIAL’s requested amendment, I

³ The only intensification controls are those under the 'restricted discretionary' provisions of NOISE R3.3 which I support as a reasonable approach to dealing with urban intensification within aircraft noise affected areas.

recommend the title of NOISE-P4 be amended to reflect that the protection of new noise sensitive activities via treatment of buildings and provision of alternative ventilation that is the subject of the policy.

47 Also, in response to the above recommended amendment to the PDP definitions, I recommend NOISE-P4 be amended so that the term “Air Noise Overlay” also refers to the “Inner Air Noise Overlay” and the “Outer Air Noise Overlay”. This responds to submissions from Yvonne Weeber [340.81], SPRA [371.2], and Guardians of the Bay [452.37].

48 In relation to NOISE-P6 I support amendments to the text to separately refer to restricting noise sensitive development in High and Moderate Noise Areas; and where buildings housing noise sensitive activities in high and moderate noise areas do not meet ventilation and acoustic insulation standards. I also support the addition of an explanation to P6 worded as follows “*High and Moderate Noise Areas are listed in NOISE-R3.1 and NOISE-R3.2. The relevant acoustic insulation and ventilation standards are NOISE-S4, NOISE-S5 and NOISE-S6*” as this will provide clearer guidance on the rules and standards relevant to NOISE-P6.

Noise Chapter Standards

49 WIAL [at submission points 406.411, 406.412] seeks two new standards be added to the Noise Chapter (termed by WIAL as NOISE-S16 and NOISE-S17) to provide alternative standards for acoustic treatment and ventilation specifically for Noise Sensitive Activities within the Air Noise Boundary or within what WIAL term the 60 dB Ldn Noise Boundary.

50 Apart from my objection to not describing the areas of application as the Inner Air Noise Overlay and Outer Air Noise Overlay, I do not support these alternative standards for acoustic treatment and ventilation proposed by WIAL as I consider the suggested approach to be technically questionable and serve no RMA purpose over and above that achieved by the integrated approach to acoustic insulation and ventilation set out within NOISE-S4, NOISE-S5 and NOISE-S6.

- 51 Dealing firstly with ventilation, in my view NOISE-S6 amended as proposed (see paragraphs 99 to 110 below) will deliver a superior and improved ventilation standard for habitable rooms that will be more effective in providing thermal comfort and indoor living conditions for occupants while providing improved protection from outdoor noise due to avoiding the need to use openable windows for temperature control and comfort.
- 52 Regarding WIAL's proposed approach to specifying acoustic insulation within its proposed standards NOISE-S16 and NOISE-S17, I consider these include major drawbacks as the specification of acoustic insulation is based on "*Ldn levels of aircraft noise measured indoors*"⁴. This approach of using indoor Ldn levels (measured in dBA) has been investigated and rejected during the earlier DDP investigations I undertook into appropriate methods for specifying acoustic insulation requirements within PDP plan rules and standards.
- 53 The problem in using an indoor A-weighted sound limit as a means of specifying acoustic insulation standards for buildings (i.e. the 'Indoor dBA' method) is that this approach does not require building claddings, glazing, wall linings, etc to achieve any specified degree of acoustic protection across the audible sound spectrum. Most habitable buildings in New Zealand are generally ineffective in reducing outdoor low frequency sound. Because the A-frequency weighting sound level is heavily weighted towards sound occurring in the mid- and high-frequency range, exterior walls or other building elements could be quite lightweight in design and yet achieve the required reduction in outdoor sound as these building elements only need to be effective at reducing sound occurring within the mid and high frequency range to satisfy dBA indoor sound limit.

⁴ In the discussion that follows, I refer to this method as the 'indoor dBA' method.

- 54 I am aware some experts have attempted to deal with the inadequacies of specifying acoustic insulation using an indoor dBA limit by requiring compliance to be achieved based on a specified sound spectrum of outdoor sound. This has some effect on ensuring the adequate insulation performance in the low frequency region, however there are no standardised guidelines on how the outdoor spectrum is to be specified and what values are to be assumed. In the case of Wellington Airport, the outdoor aircraft sound spectrum affecting (say) a building within close proximity to the runway, would be vastly different to the outdoor sound spectrum affecting a building located near the outer edge of the Outer Air Noise Boundary.
- 55 Section 4.3 (page 20) of my advice to Council in 2022 on the DDP stated insulation standards based on indoor sound levels measured using dBA are *“technically deficient as they deliver imprecise outcomes, especially around protecting room occupants from elevated levels of low frequency sounds from outdoor sources”*.
- 56 I consider best practice is to specify minimum acoustic insulation standards for habitable rooms using the “Standardised Level Difference” method which adopts the metric $D_{tr,2m,nT,w} + C_{tr}$ as defined within ISO 717-1:2020 *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation* as is already adopted within the ODP (and within many other district plans in New Zealand) where acoustic insulation is required within new or altered habitable rooms located within port noise affected areas and central city and centres in Wellington.
- 57 The “Standardised Level Difference” or $D_{tr,2m,nT,w} + C_{tr}$ approach adopted in NOISE-S4 and NOISE-S5 is based on specifying the minimum sound insulation level of the external building envelope (of habitable rooms) which is set at a level which ensures indoor sound (due to outdoor sources) will be acceptable for noise sensitive activities such as sleeping. The $D_{tr,2m,nT,w} + C_{tr}$ method for specifying the acoustic rating of the external building envelope has been adopted within PDP district-

wide insulation standards NOISE-S4 (Acoustic Insulation – High Noise Areas) and at a 5 dB lesser standard within NOISE-S5 (Acoustic Insulation – Moderate Noise Areas) which apply within a range of High and Moderate noise areas (as listed within NOISE-R3.1 and NOISE-R3.2).

58 The use of ‘indoor dBA’ to specify acoustic insulation against aircraft noise in the ODP is not unusual, as this approach is found in other district plans. However, this does not necessarily mean this method is fit for purpose. I believe the prevalence of specifying acoustic insulation of buildings using the defunct ‘indoor dBA’ method has arisen out of a lack of focus on reliable outcomes in terms of indoor noise effects by planners, Council staff and those in decision-making roles. Because outdoor sound limits specified using the dBA unit function well and are the normal approach when setting outdoor sound limits, many people think that the use of indoor dBA limits should also function well when applied to specifying acoustic insulation standards for rooms housing activities sensitive to noise. For those who have studied this issue and for the reasons set out above, the outcome for the indoor environment when acoustic insulation is specified using ‘indoor dBA’ limits is far from certain.

59 One of the main advantages of the Dtr,2m,nT,w + Ctr method is that a compliance pathway for complying with acoustic insulation in standards NOISE-S4 and NOISE-S5 can be established by complying with tables of acceptable construction materials for the external building envelope of habitable rooms. In the PDP, these minimum construction standards are found within Table I and Table II located within the last two pages of the Noise chapter. When followed, these construction tables provide a compliance pathway that will achieve the desired level of indoor acoustic protection without the need for a specialist acoustic design report. This approach to specifying the acoustic insulation of habitable rooms is not able to be adopted when acoustic insulation is prescribed using the ‘indoor dBA’ approach as each design situation requires the indoor dBA level to be calculated using a bespoke acoustic design process.

- 60 A further disadvantage in continuing with the ODP approach of using an 'indoor dBA' approach to specifying acoustic insulation against outdoor aircraft noise, is that there are no district plan maps or published reports that plan users can rely on to define the level of outdoor aircraft noise affecting the room or building for which an acoustic design report is required. Council staff have developed a work around⁵ to assist plan users in this regard, however I feel the lack of published maps or reports that provide reliable estimates of the levels of outdoor aircraft noise in affected areas is a major drawback of the 'indoor dBA' method for specifying acoustic insulation against aircraft noise.
- 61 One of the main advantages for Council and others of adopting acoustic insulation based on the $D_{tr,2m,nT,w} + C_{tr}$ is that insulation requirements can be checked and tested in the field by adopting the procedures set out within relevant international Standards⁶. In contrast, there are no NZ or international standards that provide guidance on methods to be used to ascertain compliance with indoor aircraft noise levels based on achieving certain maximum indoor A-weighted sound levels.
- 62 A further reason to support adopting acoustic insulation standards against outdoor aircraft noise based on the $D_{tr,2m,nT,w} + C_{tr}$ method, is that this approach is consistent with that already adopted within the ODP (acoustic insulation requirements within new or altered habitable rooms located within port noise affected areas and central city and centres zones) and is consistent with insulation requirements set out within the PDP at NOISE-S4 and NOISE-S5 which apply within the following areas (as listed within recommended amendments to NOISE-P4):

⁵ The work around involved Council developing a map which highlighted properties affected by aircraft noise inside the ANB in 1 dB increments. This map enabled Council officers to check the accuracy of assumed the outdoor aircraft noise levels adopted within insulation calculations set out within acoustic design reports.

⁶ For example, ISO 16283-3:2016 *Acoustics — Field measurement of sound insulation in buildings and of building elements — Part 3: Façade sound insulation*.

- City Centre Zone;
- Courtenay Place Noise Area;
- Waterfront Zone;
- Neighbourhood Centre Zone;
- Local Centre Zone;
- Metropolitan Centre Zone;
- Mixed Use Zone;
- General Industrial Zone;
- Outer Port Noise Overlay;
- Identified corridors adjacent to the State Highways and railway networks.

63 In my discussions with Council noise staff, I believe that standardising requirements for acoustic insulation applying to the Inner Air Noise Overlay and Outer Air Noise Overlay with insulation requirements of NOISE-S4 and NOISE-S5 which apply within all the above listed zones and areas, will assist Council officers processing and checking acoustic design certificates and when checking compliance with NOISE-S4 and NOISE-S5.

64 For the above reasons I therefore oppose the adoption of NOISE-S16 and NOISE-S17 as requested by WIAL as I consider the approach to specifying insulation against outdoor aircraft noise within those requested standards to be technically inferior compared to standards adopted within NOISE-S4 and NOISE-S5, whereby the outdoor-to-indoor sound insulation level is prescribed using methods recommended within ISO 717-1:2020 *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation* (as specified within NOISE-S4(3) and NOISE-S5(2)).

Duplication of Noise Chapter Standards Within Noise-Related Airport Designation Conditions

- 65 A major theme of the WIAL submissions on the Noise chapter is that WIAL considers it inappropriate and inefficient to replicate the aircraft noise management obligations of the Airport Designations WIAL2, WIAL4 and WIAL5 within the Noise chapter, and seeks that Noise Standards NOISE-S3 [406.440], and NOISE-S8 through to NOISE-S13 [406.448, 406.449, 406.450, 406.451, 406.452, 406.453] are deleted. In addition, WIAL seek that the remaining standards (NOISE-S4, S5, S14, S15) are either deleted or amended to remove any reference to Airport and aircraft-related noise management as they consider these matters are already adequately controlled by designation conditions [406.441, 406.442, 401.443, 406.444, 406.445, 406.446, 406.454, 406.455, 406.456, 406.457, 406.458, 406.459].
- 66 On this matter, Guardians of the Bay oppose these submission points, while BARNZ supports WIAL’s submissions on these matters.
- 67 While I acknowledge this is a quasi-legal and planning matter, I offer the following noise expert comments on this matter based on my involvement with airport noise issues at Wellington International Airport and other airports in New Zealand.
- 68 In my experience, it is important for Council to act in an enforcement capacity for key noise standards where there is a clear breach of the noise standards by a third party. In this respect I consider the following noise standards should be retained within the Noise chapter;

NOISE-S3	Noise management plans
NOISE-S8	Hours of aircraft operation
NOISE-S10	Engine testing noise
NOISE-S11	Noise from ground power units and auxiliary power units (Main site)
NOISE-S12	Noise from ground power units and auxiliary power units (East Side)
NOISE-S14	Land based noise
NOISE-S15	Miramar South Precinct noise

69 I support retention of the above standards within the Noise chapter as I consider it an important function of Council under RMA s.31(a) to be able to act to enforce noise standards against third parties where there is a clear breach of the standards. According to my discussions with Council noise officers, this has occurred previously in relation to Council taking action to prosecute a breach of the night time curfew by a specific aircraft operator, however I acknowledge this will have taken place at a time prior to the district plan containing a designation applying to Wellington International Airport. Nevertheless, given the close physical relationship between the airport and the surrounding residential community, which is largely unique with NZ, I consider there may be times the Council needs to act expeditiously to enforce the above noise standards without relying on the airport itself acting to address the breach.

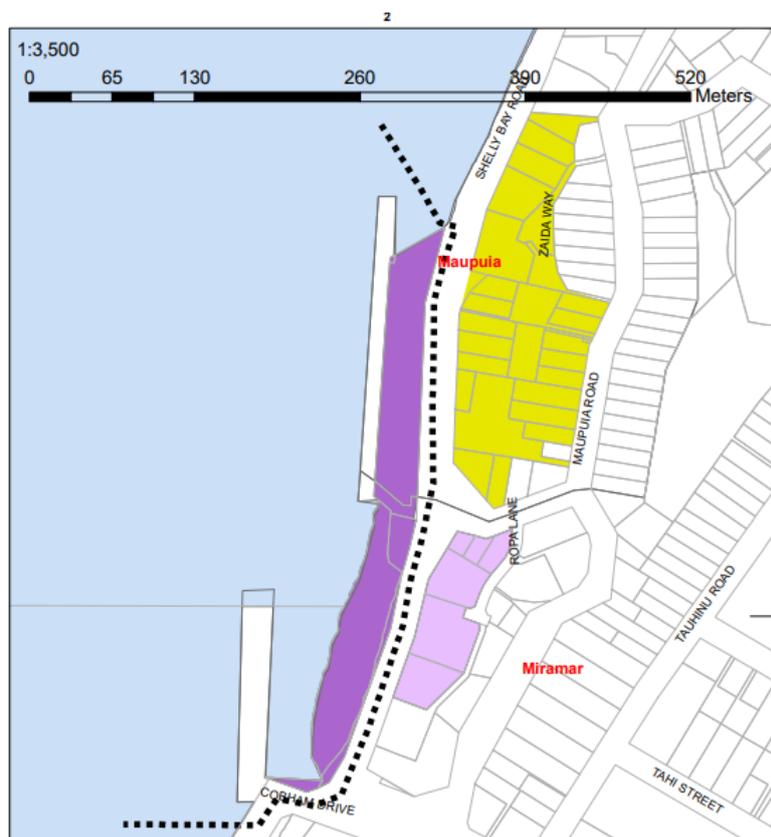
70 Regarding retaining NOISE-S3 within the Noise chapter (as far as this Standard applies to airport noise) I consider Council should retain a role in checking and ensuring the full range of noise matters required to be addressed within the Aircraft Noise Management Plan (ANMP) are included in the plan each time a new or revised plan is issued. I base my opinion on this matter on the close relationship between the airport and the surrounding community and the important role the ANMP has in ensuring the community are able to bring forward and discuss noise matters of concern to them.

71 Where noise standards are recommended to be removed so that noise controls only exist in the designations (that is, NOISE-S9 and S13) I support the advice of Council's legal advisor to insert, within NOISE-R13, additional requirements to comply with specific noise conditions attached to designations WIAL2 (Miramar South Area - Conditions 10 and 11 and Conditions 14 to 18), WIAL4 (Airport Main Site Area - Conditions 23 to 27, and Conditions 29 to 31) and WIAL5 (Airport East Side Area - Conditions 31 and 33 and Conditions 34 and 35 and Condition 37). I consider there is an advantage in managing airport noise effects by setting out these additional requirements within NOISE-R13 as Council

will be able to act, if necessary, based on a breach of the plan, rather than take action against WIAL for breach of a designation condition by a third party.

PORT NOISE

72 A port noise control line exists for the main port area north of the City centre. This is an existing feature of the ODP and has been carried through to the PDP. A similar port noise control line exists in the ODP in relation to the wharf area beside the Miramar cutting (Burnham Wharf). This is shown in the following diagram based on Map 55 of the ODP:



Affected Areas

- Inner Port Noise Affected Area - Central Area
- Inner Port Noise Affected Area - Suburban Centre
- Outer Port Noise Affected Area- Suburban Centre
- Outer Port Noise Affected Area- Outer Residential
- Port noise control lines

- 73 Unfortunately, the above port noise control line for Burnham Wharf was inadvertently left out of the mapping of port noise control lines for the PDP. Subject to the following paragraph, I recommend that the above port noise control line be added to the PDP maps in the same position and location as shown in Map 55 of the ODP.
- 74 CentrePort Limited submission point 402.23 states *“the location of the Port Noise Control Line at Burnham, if reinstated, should be determined on the basis of updated noise modelling which CentrePort currently has underway”*. No additional information has been provided by CentrePort at the time of preparing this evidence, however this information may be able to submitted in evidence to the hearing. If so, I would expect any revised contour to be submitted within a supporting report outlining the basis of the re-predicted levels of port noise undertaken in accordance with the recommendations of NZS6809:1999 *Acoustics – Port noise management and land use planning*.
- 75 Noise-R12 deals with port noise and sets out the permitted activity standard requires compliance with NOISE-S1 and APP4. APP4 contains Table 20 which sets out limits on noise emitted from port activities within the Port Zone. CentrePort [at submission point 402.136] supports NOISE-R12 subject to amendments in relation to Table 20 of APP4 which contains some typographical errors such that the quoted limits do not exactly match the noise limit recommendations of NZS 6809:1999. I recommend Table 20 of APP4 be amended as follows so that it fully conforms with the noise limit recommendations of NZS6809:1999:

Table 20 – APP4:	Port Noise emitted from activities within the Port Zone must not exceed the following limits	
At any point on land at, or beyond the Port Noise Control Line: noise From port related activities must not exceed these levels	Any 5 consecutive Day-night (24-hour period)s	Any 24 hour period Night (10pm – 7am)
	65 dBA Ldn (5-day)	68 dBALdn
	68 dBA Ldn (1-day)	60 dB LAeq (9 hr)
		65 dB LAeq (15 min) 85 dB LAFmax

76 Note, accepting this amendment to APP4 does not have the effect of allowing an increase in port noise emissions over that provided for in the ODP.

STATE HIGHWAY NOISE

77 Waka Kotahi (at submission point 370.5) considers the operative district plan does not contain sufficient provisions to manage noise and vibration effects on new noise sensitive activities establishing alongside state highways and is concerned that the PDP needs to manage the risks of intensification occurring alongside state highways. This submitter seeks amendment to NOISE-R3.1 to also require compliance with NOISE-S6 which has been raised by other submitters. I have recommended this amendment be accepted as it is important that acoustic insulation requirements be met at the same time as requiring measures to ensure satisfactory alternative means of ventilation within acoustically insulated habitable rooms.

78 Waka Kotahi [at submission points 370.220, 370.221] also seeks amendment to NOISE-R3.2 to extend application of this rule from 80m, to a distance of 100m from the State Highway. As alternative relief, the submitter seeks that the plan maps incorporate Waka Kotahi noise contours. Having regard to the relatively high traffic volumes carried on the state highway network and the ensuing noise emissions, I support extending noise insulation requirements of NOISE-R3.2 out to 100m from the state highway designation boundary. However, I consider highways with vehicle speed limits <70 km/hour would, in my assessment, not be likely to cause adverse future highway noise effects beyond 40m from the highway.

79 These restricted areas of traffic noise effects is not only due to lower noise emissions from highways with lower speed limits, but also the fact that, in Wellington, the portions of the state highway network with lower speed limits typically have significant buildings and structures built close to the road, acting to acoustically screen more distant receiver sites, with

the result that adverse noise effects are only likely to be experienced within a corridor 40m each side of the highway designation.

80 On this basis, I recommend that, as a permitted activity, new or altered habitable rooms, meeting NOISE-R3.2 acoustic insulation and the ventilation requirements of NOISE-S6, be allowed when located >40m and <100m from any part of a State Highway. However, as noted above, this need only apply where the posted speed limit of that part of the highway is above 70 km/hour.

81 The Waka Kotahi submission mentions the possible use of actual traffic noise contours within the planning maps rather than the use of setback distances. Using actual contours of predicted traffic noise is supported, as this would ensure the acoustic treatment (& ventilation) requirements within NOISE-S4, S5 and S6 are applied appropriate to the actual levels of future highway noise effect expected within affected areas alongside state highways in Wellington.

82 I have assessed potential benefits of using highway noise contours in preference to the current approach of using distance setbacks as:

- a) The use of noise contours will, in some areas, substantially reduce the area subject to acoustic attenuation requirements, as the screening effects of terrain will be taken into account in the contour location. Where acoustic screening occurs, the contour location will be closer to the highway (lesser area within which NOISE-S4 and S5 will apply); and
- b) Because the highway noise contours will take into account all relevant traffic parameters including vehicle speed, there would be no need to limit NOISE-S5 (moderate insulation standard applying between 40m to 100m from the highway) to highways with a speed limit of less than a 70 km/hr. This would be one of the wording amendments necessary should the mapping of highway noise contours be adopted for indicating areas where noise mitigation measures need to apply.

83 While I consider mapped highway contours to be the preferred method for the PDP to implement mitigation of reverse sensitivity effects of highway noise within NOISE-S4 and S5, there needs to a robust technical basis to these contours. Currently, no noise contour information has been provided by Waka Kothi to support this approach. Should these contours be submitted in evidence (in the appropriate electronic format) I recommend:

- a) The contours be provided for mapping of both high noise areas (Noise-S4) and moderate noise areas (NOISE-S5); and
- b) The contours be accompanied by a suitable technical report setting out the modelling parameters and any assumptions made within the modelling. The report should discuss the expected range of any uncertainty or errors in the modelling and how these are handled on an impartial basis.

84 A further highway noise matter has arisen in relation to amendments recommended to address submission point 266.125 from Wellington City Council officers seeking to address errors and omissions that occur in both NOISE-S4.4 and S5.4. Additional words to address these submitter concerns involve clarifying what is meant by the term 'Reasonable maximum use scenario' when calculating whether outdoor noise levels are limited in scale, such that they qualify for an exemption to the acoustic insulation requirements of NOISE-S4 and NOISE-S5. For traffic noise, the 'Reasonable maximum use scenario' has been set at *"The current day measured or predicted road traffic noise level LAeq (24 h) plus 2 dB"*.

85 This +2 dB allowance for future traffic noise differs from the requested "plus 3 dB" set out within the Waka Kotahi submission. The reason for recommending only a +2 dB increase over current traffic noise levels is that the +3 dB increase is equivalent to the noise generated by a 100% increase in current traffic flows which is considered unlikely within the life of the district plan. As I consider this level of traffic growth is overly

optimistic, I have recommended an increase of +2 dB over current state highway traffic noise levels experienced in Wellington. This would equate to around 80% growth in road traffic volumes over the life of the plan which is assessed as a more reasonable estimate of increases in traffic volumes likely to occur in Wellington over the life of the district plan.

HELICOPTER NOISE

86 A number of submissions deal with the issue of noise from helicopter operations. New Zealand Agricultural Aviation Association (NZAAA) at submission point 40.7 seeks amendments so that intermittent use of helicopter landing areas by agricultural aircraft for the purposes of agricultural aviation are provided for. Having examined the issue, I consider no resource management reason has been established for new rules related to agricultural aviation, as sought by NZAAA. I note general exemptions are listed in the introductory section of the Noise chapter which exempt aircraft being operated above 500 feet (152m) over rural areas whilst landing areas themselves (involving noise sources such as helicopters used for agricultural purposes) would be exempt under item 7 as follows:

7. Rural activities, including, agricultural vehicles, machinery or equipment used on a seasonal or intermittent basis in the Rural Zones”.

87 On this basis I do not recommend any amendments to the Noise chapter to provide for intermittent use of helicopter landing areas by agricultural aircraft.

88 Submitter Paul Van Houtte [submission point 92.2] sought amendments so that helicopter landing noise from commercial activity is not permitted at the waterfront, on the basis this compromises amenity values and pedestrian enjoyment. This submission point was opposed by Wellington Helicopters [FS5.5] as they maintain helicopters have operated at the Queens Wharf in excess of 30 years and any restriction

on operation or noise would have a severe negative impact on Wellington Helicopters' business.

89 I understand that helicopter use on the Outer "T" of Queens Wharf is beyond scope as this area, being a wharf over coastal water, lies outside of the Wellington City District Plan jurisdiction. It is therefore beyond the Council's jurisdiction to make a finding on this matter.

90 Yvonne Weeber [submission point 340.86] seeks amendment to NOISE-R4 to make helicopter take-off and landing within the Airport's East Side Area designation a non-complying or prohibited activity. A similar submission point was made by Guardians of the Bay [submission points 340.86, 452.31, FS44.92]. I consider there is no need to recommend the requested decision as East Side Area designation condition 34 specifies that: *"There shall be no aircraft engine testing, take-off or landing on land within the ESA Designation"*.

91 Submitter S. Dunn [288.13, 288.14] seeks enforceable noise limits or measures on aircraft idling on the rooftop of the regional hospital in Newtown. I note the PDP permits helicopter landing noise within the Airport Zone and Hospital Zone, with no compliance restrictions. In all other zones helicopter landing noise is permitted, subject to compliance with the recommended limits and noise management provisions as set out in NZS6807:1994 *Noise Management and Land Use Planning for Helicopter Landing Areas*.

92 The Hospital is subject to its own special purpose zone and chapter in the PDP. In that zone "hospital activities" are a Permitted Activity. The definition of hospital activity includes: *"h. helicopter facilities, including helicopter take-off, landing and associated service facilities"*. I also note the following general exemption, listed in the introductory section of the Noise chapter: *"The following activities are exempt from the rules and standards contained in this chapter. ... 2. Aircraft used in emergencies or as air ambulances"*. Thus, I do not support the imposition of enforceable

noise limits or measures on aircraft visiting the rooftop of the regional hospital.

93 I note there are two helicopter landing areas on the roof of Wellington Regional Hospital. I understand the northern most pad was developed most recently in 2009 (which NZ Civil Aviation documents refer to as *Wellington Hospital Heliport – NZWK (North)*). I further understand on some occasions there are multiple helicopters arriving simultaneously with helicopters landed (and idling) at the same time. Many of these movements occur during night time hours.

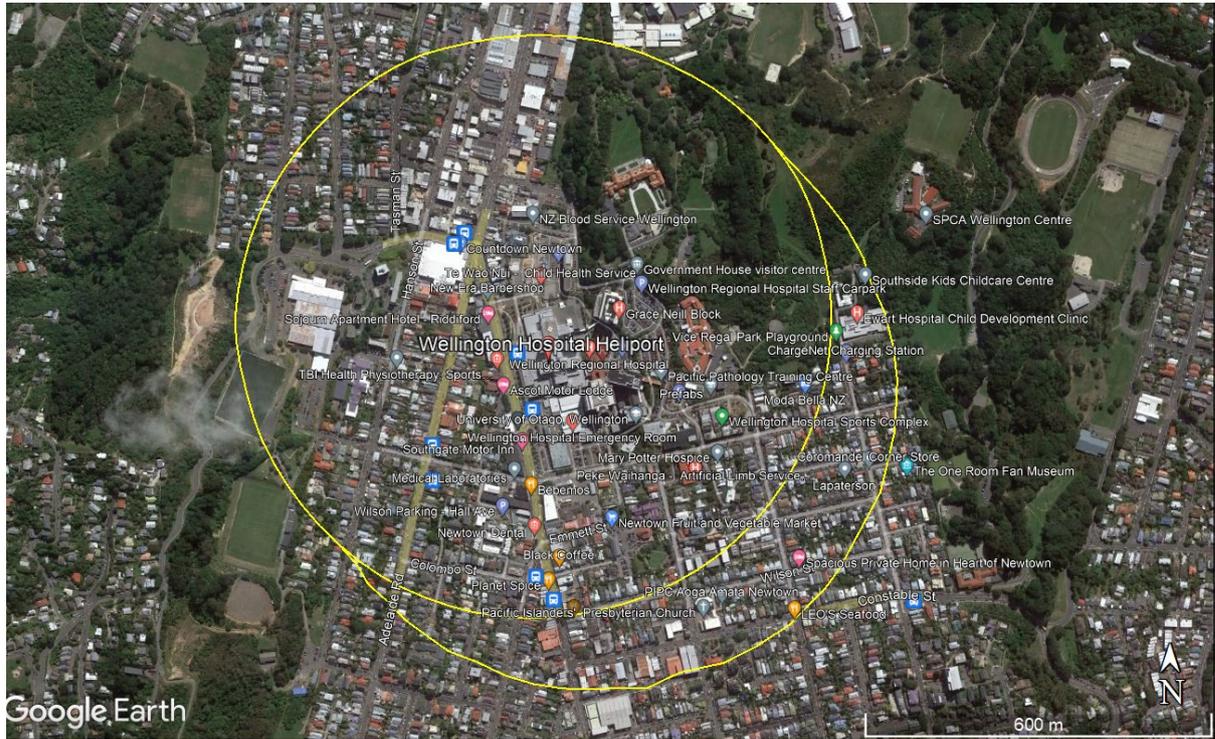
94 When a district plan seeks to control noise effects associated with helicopter landing areas, the National Planning Standards require the adoption of NZ Standard NZS 6807:1994 *“Noise Management and Land Use Planning for Helicopter Landing Areas”*. However, as I note above, it would not be appropriate to apply helicopter noise emission limits on movements associated with flights to/from the Hospital for critical health emergencies by using NZS6807:1994 or any other noise standard. However, while no noise limit is contemplated, I recommend the PDP include some form of mitigation given the RMA places a duty on Council under RMA s.31(1)(d) to manage the *“...control of the emission of noise and the mitigation of the effects of noise”*.

95 I recommend mitigation in the form of an ‘advisory only’ noise overlay be included in district plan maps of the area surrounding the hospital. I recommend an advisory noise overlay be included in the PDP in the form of a 500 metre **Heli Noise Effects Advisory Overlay** (HNEAO) to act as an advisory for people living in the area or contemplating moving into the area.

96 The function of the overlay is to signal the presence of helicopter noise which, when received in the nearby area, could cause significant temporary noise effects such as sleep disturbance and cause difficulty when communicating outdoors. Thus, the function of the HNEAO is to warn current and intending residents regarding what to expect regarding

helicopter noise when living within approximately 500 metres of Wellington Regional Hospital.

97 I recommend the following “500 metre Heli Noise Effects Advisory Overlay” (HNEAO) be included in the PDP shown as follows:



98 I recommend the proposed HNEAO be a SINGLE line drawn around BOTH of the above 500m circles which are centred on the location of the two hospital helipads.

99 Under the National Planning Standards an ‘Overlay’ has the assigned function of “spatially identifying distinctive values, risks or other factors which require management in a different manner from underlying zone provisions”. I consider the proposed HNEAO fits comfortably within this definition.

100 Although the submitter did not specifically seek any change to mapping, I consider that a noise advisory overlay of the type recommended above is the most practicable relief in the circumstances.

VENTILATION OF HABITABLE ROOMS

- 101 A number of submitters have raised the issue of the adequacy of the ventilation standard NOISE-S6 as notified.
- 102 Paragraph 4.69 of the WIAL submission questions the appropriateness or otherwise of the proposed mechanical ventilation standards set out in NOISE-S6 and states these standards “*require further consideration*”. Specifically, WIAL seeks to ensure that the ventilation standards do not create an untenable internal living environment for occupants of noise sensitive activities, and that operation of the requisite ventilation is affordable for residents and/or tenants to operate.
- 103 Submitter Waka Kotahi at submission point 370.232 seeks NOISE-S6 be amended so that “*The ventilation system must be adequate to provide thermal comfort so that residents have a free choice not to open windows*”.
- 104 KiwiRail Holdings Limited at submission point 408.113 seeks amendment to NOISE-S6 “*..to ensure habitable rooms achieve an appropriate level of comfort and amenity for occupants*”.
- 105 I have taken into account submitter comments and given careful consideration to alternative wording for NOISE-S6 provided by the above submitters which I consider offer considerable benefits over ventilation requirements within the ODP. However, in considering amendments to NOISE-S6 I recognise affordability issues and the need for practical and workable ventilation standards.
- 106 In developing improvements to NOISE-S6 I have taken note of inadequacies in the ODP ventilation requirements. On behalf of Council, I engaged Mr Owen Brown, a Senior Mechanical Engineer at GHD Ltd) to provide expert advice relating to ventilation issues raised by submitters in relation to NOISE-S6. In consultation with Mr Brown we agreed the existing ODP ventilation provisions applying to rooms requiring to be

acoustically insulated are too narrowly focussed on simply providing an alternative source of fresh air and did not include any requirement for thermal heating or cooling of the habitable room (mitigating against occupants using opening windows in order to maintain comfort).

107 In addition, the existing ODP ventilation provisions have no requirement for a room 'flush' function (to avoid the need to open windows or doors to clear the room of built-up odours or heat when entering the room following the room being closed up).

108 Lastly, it is noted the ODP ventilation provisions do not include any indoor noise performance standard applying to the operation of the ventilation system to ensure the operation of the system does not itself cause a noise nuisance within the habitable room.

109 Thus, under Mr Brown's guidance, I undertook a review of the submitter ventilation proposals in order to develop new minimum ventilation requirements to provide, at reasonable cost, a comfortable indoor environment across a wide range of conditions so that windows do not need to be opened (or at least kept closed as much as possible).

110 An overriding consideration was that, as a minimum, the external to internal noise reduction levels in NOISE-S4 and NOISE-S5 must be achieved at the same time as the ventilation requirements of the New Zealand Building Code (NZBC). This mandatory requirement is recommended for all types of habitable rooms, whether or not the room has openable windows sufficient in area to meet the minimum ventilation requirements of the NZBC.

111 With input from Mr Brown, we agreed to the following for upgrading NOISE-S6 :

- a) A slightly higher minimum room ventilation rate of 3 room air changes per hour should apply (NZBC minimum equates to around 2 air changes per hour); and

- b) The room is to be provided with cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C; and
- c) The ventilation system installed in compliance with (a) and (b) above must not generate noise at levels greater than 35 dB LAeq(30s) when measured 1 metre from any grille or diffuser.

112 In addition, Mr Brown advised that while a 'room flushing' function is important for maintaining comfort and amenity for room occupants, this is best provided by mechanical means within rooms that are designed to be served by a full mechanical ventilation system. Within these types of habitable rooms the recommended ventilation standard provides for room flushing by a system that is adjustable by the occupant in increments up to six air changes per hour.

113 It was further agreed that this 'high flow' ventilation requirement for room flushing can be relaxed where the habitable room is provided with windows openable to the outside and sufficient in area to meet the minimum ventilation requirements of the NZBC. The engineer advised that, where such rooms meet the NZBC ventilation standard using openable windows, these rooms can be effectively and more economically flushed using openable windows rather than by mechanical means. An underlying assumption is that room flushing would be needed only for short time periods and would mainly occur during daytime hours.

114 With Mr Brown's input, I recommend that, where openable windows are used to highly vent a habitable room, effects of elevated indoor noise due to outdoor noise entering the room during flushing events would be mostly brief in nature and not be likely to affect sleep or cause awakening.

115 Mr Brown has advised that if the design of ventilation system does not have to achieve six air changes per hour, it would be more economical

to purchase and install, compared to a full mechanical system capable of ventilating the room at the higher rate.

116 A further refinement I recommend is to relax the requirement for the ventilation system to not generate more than 35 dB when measured at 1 metre. It is recommended this limit not apply for ventilation flow rates exceeding 3 air changes per hour. This recommendation is based on the above assumption that these higher ventilation rates would only be needed for short periods and mainly occur during daytime hours. The main reason for this relaxation of the ventilation noise standard is the advice I received regarding extra costs associated with larger fans and duct sizes (and therefore system costs of the ventilation system) necessary in order to achieve the 35 dB noise limit at higher air flow rates.

117 The recommended amended NOISE-S6 ventilation requirements are attached as Appendix A to the s.42A planning report. I consider these amendments to be a reasonable compromise between the highest ventilation standards recommended by submitters and a minimum ventilation standard that provides, at reasonable cost, a comfortable indoor environment across a wide range of conditions, so that windows do not need to be opened (or at least kept closed as much as possible).

SUMMARY

118 The evidence set out above is based on my experience, research and investigations into noise matters raised within submissions to the PDP within the following topic areas:

- Airport noise
- Port Noise
- State Highway Noise
- Helicopter noise, including at Wellington Regional Hospital

- Minimum ventilation standards for habitable rooms required to be acoustically insulated against outdoor noise.

119 In preparing this evidence I have had regard to the recommendations of the relevant NZ Standards, noise guidelines and best practices I am aware of. My recommendations within the above topic areas are set out in detail within the amendments to the Noise chapter set out within Appendix A to the s.42A report.

Date: 3/07/2023



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