MARSHALL DAY Acoustics

101 TOTARA ROAD, WHENUAPAI AIRCRAFT NOISE MEMO

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84 Symonds Street
PO Box 5811
Victoria Street West
Auckland 1142 New Zealand
T: +64 9 379 7822 F: +64 9 309 3540
www.marshallday.com

Project: **101 TOTARA ROAD**

Prepared for: **Neil Construction Limited**
PO Box 8751
Symonds St
Auckland 1150

Attention: **Matt Ashworth**

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1.0 INTRODUCTION

Neil Construction Ltd (NCL) has asked Marshall Day Acoustics Ltd (MDA) to provide acoustic advice regarding the proposed Whenuapai residential development.

The proposal relates to sites addressed 101, 105 – 107 Totara Road, and 9 McKean Road, Whenuapai as shown in Figure 1.

Figure 1: Location of proposed residential development

NCL propose to subdivide the combined site to accommodate 244 residential lots. The subdivision plan is shown in Figure 2 below.

Figure 2: Proposed residential subdivision plan

The site is currently zoned *Future Urban* and is located near the Whenuapai Airbase. The Whenuapai Airbase Aircraft Noise Overlay does not extend over the subject site. However, we note that substantial acoustic monitoring and reporting was undertaken as part of (recently withdrawn) Plan Change 5 and Variation 1 to Plan Change 5. The Whenuapai Airbase Engine Testing Noise Overlay (proposed under Variation 1) provides updated noise contours reflective of the current acoustic situation. These contours can be found in Appendix B and do extend over the subject site. Whilst this has no statutory weight, the information provides the latest engine testing noise contours updated by the Minister of Defence.

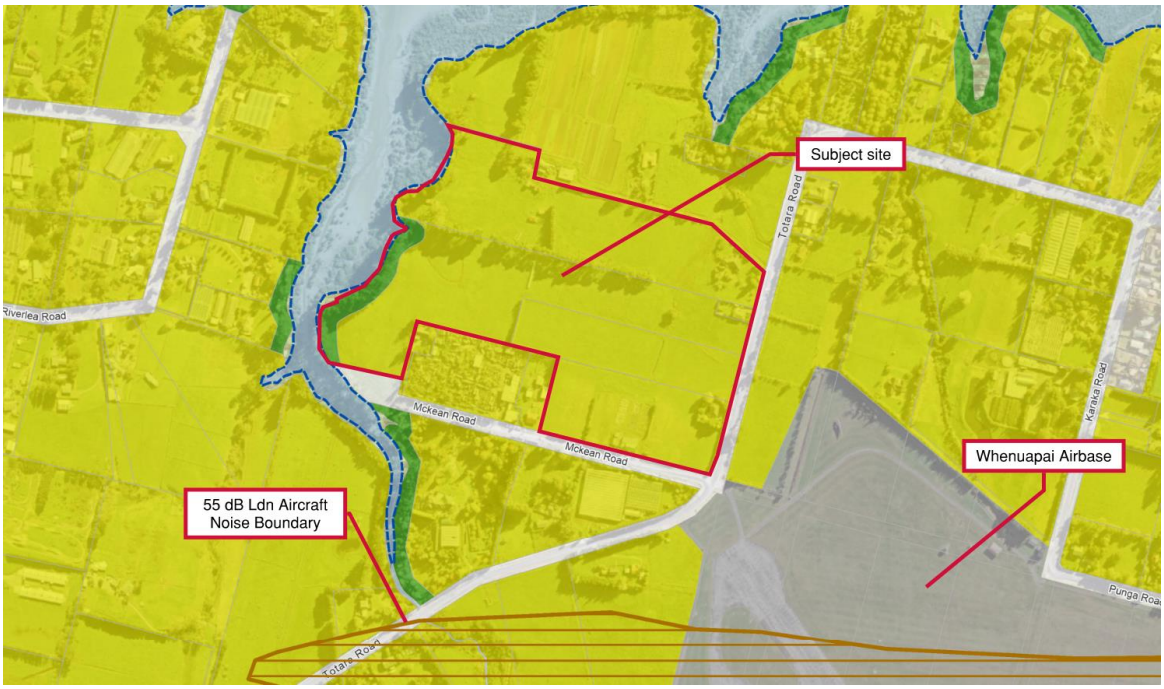
We have been asked by NCL to summarise the Whenuapai Airbase noise related planning standards that may apply to parts of the proposed residential development and to identify the impact of this on the residential buildings. To this end, we have considered the potential impact of the Engine Testing Noise Overlay and the related Plan Change 5 provisions.

2.0 NOISE PLANNING STANDARDS

2.1 Future Urban Zone (AUP Chapter E25)

The site is zoned *Future Urban Zone* in the AUP. The surrounding neighbours are also zoned *Future Urban Zone*. Whenuapai Airbase is located to the south-east of the site. The subject site is not affected by the Whenuapai Airbase Aircraft Noise Overlay. It is anticipated the Future Urban Zone will eventually be rezoned and the new zone provisions will then apply.

Figure 3: Subject site location



The maximum noise permitted for the *Future Urban Zone* (measured within the notional boundary) is given in Rule E25.6.3:

- 55 dB L_{Aeq} Monday to Saturday 0700 – 2200hrs
  Sunday 0900 – 1800hrs
- 45 dB L_{Aeq} At all other times
  75 dB L_{AFmax}

The AUP applies no noise rules for internal acoustic amenity in this zone.

2.2 Plan Change 5 Whenuapai Airbase Engine Testing Noise Contours

NCL has asked MDA to address the impact of potential future planning standards relating to Whenuapai Airbase engine testing noise contours proposed in Plan Change 5 Variation 1 (PC5 Var1)[1].

Plan Change 5 was withdrawn on 16 June 2022, nonetheless NCL has asked that we address the proposed provisions in PC5 Var1 with respect to the proposed development. These provisions are not operative therefore this summary is provided as supplementary information only.

PC5 Var1 did not include the subject site, but the same engine testing noise provisions may eventually be sought in this area. If the PC5 Var1 provisions were implemented in this area, many of the proposed residential lots will sit within the engine testing noise contours.

Figure 4 below shows an indicative overlay of the engine testing noise contours and the proposed residential sub-division. We do not have a digital copy of the engine testing noise contours at this stage therefore Figure 4 is indicative only.

Figure 4: PC 5 Var1 Engine Testing Noise Contours relative to the site

We estimate that 3-5 lots in the proposed subdivision would be affected by the 65 dB L_{dn} contour. Most of the lots would be between the 57 and 65 dB L_{dn} contour but many lots in the northwestern part of the site would be outside the contours.

The proposed provisions relating to the engine testing noise contours in PC5 Var1 set out the following restrictions:

- New activities sensitive to aircraft noise within the 65 dB L_{dn} noise boundary would be prohibited;
- New activities sensitive to aircraft noise between the 57 and 65 dB L_{dn} contour, would be subject to an acoustic insulation and ventilation standard, and activities that do not meet this standard would be non-complying.

[1] Engine testing contours presented in Tonkin and Taylor report "*Whenuapai Airbase – Engine Testing Noise Contours Plan Change 5*" dated March 2021.

The acoustic and ventilation requirements were as follows:

I616.6.10 Development within the aircraft engine testing noise boundaries

1. *Between the 57 dB L_{dn} and 65 dB L_{dn} noise boundaries as shown on Whenuapai 3 Precinct Plan 3, new activities sensitive to noise and alterations and additions to existing buildings accommodating activities sensitive to aircraft noise must provide sound attenuation and related ventilation and/or air conditioning measures:*

   a. *To ensure the internal noise environment of habitable rooms does not exceed a maximum noise level of 40 dB L_{dn};*

   b. *That are certified to the council's satisfaction as being able to meet the Standard I616.6.10(1)(a) by a person suitably qualified and experienced in acoustics prior to its construction; and*

   c. *So that the related ventilation and/or air conditioning system(s) satisfies the requirements of New Zealand Building Code Rule G4 with all external doors of the building and all windows of the habitable rooms closed.*

In the following section of this report, we provide some indicative constructions that may be required to achieve the above performance standard.

3.0 INDICATIVE ACOUSTIC INSULATION MEASURES

The acoustic insulation standard I616.6.10 requires buildings to be designed to ensure an internal noise environment in habitable rooms of not greater than 40 dB L_{dn} based on the outdoor aircraft noise defined at the site by the aircraft and engine testing noise boundaries.

Chapter J of AUP defines habitable rooms as follows:

> *Habitable room*
>
> *Any room in a building used for a residential nesting table activity and in a care centre or healthcare facility with an overnight stay facility, excluding laundry, bathroom, toilet or any room used solely as an entrance hall, passageway, garage, or other space of a specialised nature occupied neither frequently nor for extended periods.*

For proposed residential sites within the PC5 Var1 engine testing boundaries, the outdoor noise levels range from 57 to 64 dB L_{dn}. To achieve an indoor level of 40 dB L_{dn} a noise reduction of 17 to 24 dB would be required.

We have calculated the sound insulation performance for a generic top floor corner bedroom of standard lightweight building construction exposed to aircraft engine testing noise. Our calculations show the internal criterion of 40 dB L_{dn} can be achieved without additional acoustic insulation treatment.

The standard building construction used in our calculations is listed in Table 1. Other acoustically equivalent or superior constructions would also be suitable.

Table 1: Typical standard facade construction

Façade Element	Suitable Construction Details (or approved acoustically equivalent)
Glazing:	6 mm standard glass/12 mm air gap/6 mm standard glass
Wall:	Weatherboard on 45 x 90mm timber studs, with 10mm standard plasterboard and sound absorptive material[1] in the cavity.
Roof:	Pitched roof with corrugate longrun roofing (minimum 0.55mm thick) on timber with a ceiling lining of one layer of 10mm standard plasterboard and sound absorptive material[1] in the cavity.

1) Sound absorptive material such as R2.4 Pink Batts, Autex Greenstuff or approved equivalent.

This information is indicative only as compliance for a given dwelling would depend on the geometry and specific construction of the habitable spaces therefore each building design would need to be assessed individually. Also, ventilation measures are required under standard I616.6.10. MDA is not able to advise on ventilation measures.

4.0 CONCLUSION

In the current AUP, the site is zoned *Future Urban Zone* and is outside of the Whenuapai Airbase Aircraft Noise Overlay. This means the site does not require specific acoustic treatment.

If the same Whenuapai Airbase engine testing noise provisions as PC5 Var1 are sought in this area, then the following may apply:

- No houses or other noise sensitive activities may be developed within the 65 dB L_{dn} engine testing contour.
  - There may be 3 - 5 lots shown in the current layout that would be affected by this. Due to the resolution of the contour drawings it is difficult to confirm the exact contour location. A digital copy of the contours has been requested from NZDF to inform the subsequent design
- New houses within the 57 – 65 dB L_{dn} engine testing contour are likely to meet the acoustic standards with typical building construction and mechanical ventilation.
- For the remainder of the lots that outside the 57 dB L_{dn} engine testing contour, no acoustic insulation standards apply.

APPENDIX A GLOSSARY OF TERMINOLOGY

A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 mPa i.e. dB = 20 x log(P/Pr)
Ldn	The A-weighted day night noise level which is calculated from the 24 hour LAeq with a 10 dB penalty applied to the night-time (2200-0700 hours) LAeq. Ldn is a measure of the cumulative noise exposure over time.
LAeq(t)	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
LAmax	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Noise	A sound that is unwanted by, or distracting to, the receiver.

APPENDIX B TONKIN + TAYLOR ENGINE TESTING NOISE CONTOURS