NZDF Consultation Update

Part IV: Consultation of the MfE fast-track consenting application form requires the applicant to:

- *Detail all consultation undertaken with relevant government ministries and departments.*

As detailed within the application, the applicant has initiated correspondence with the Ministry of Defence via email. The email included a letter outlining the proposed development and highlighting that it does not constrain the activities of the NZDF by including measures to protect its interests. The applicant has also shared that they are agreeable to the registration of no-complaint covenants on the titles of all proposed residential lots in the development.

NZDF responded by stating that it believes residential development is incompatible with the levels of engine testing that will be occurring on the airbase.

The applicant has an on-going relationship with the NZDF and is committed to working together to ensure the appropriate measures are in place to protect the NZDF activities. Of particular note, the applicant is open to providing measures that address the following key aspects:

- Noise
- Lighting and Glare
- Bird Strike
- Structure and Obstacle Heights

An Acoustic Memo prepared by Marshall Day Acoustics was provided with the application. This memo outlines the noise planning standards, Plan Change 5 Whenuapai Airbase Engine Testing Noise Contours and indicative acoustic insulation measures within the PC5 Var 1 engine testing noise boundaries. The site is not located within the Airspace Restriction Designation 4310 or the Aircraft Noise Overlay that would require New Zealand Defence Force ('**NZDF**') approval under designation 4311 for any land use or subdivision.

We note that substantial acoustic monitoring and reporting was undertaken as part of (recently withdrawn) Plan Change 5 and Variation 1 to Plan Change 5.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 Plan Change 5 Variation 1) provides updated noise contours reflective of the current acoustic situation. Whilst this has no statutory weight, the information provides the latest engine testing noise contours updated by the Minister of Defence.

The engine testing noise modelling showed that the substantial majority of the site is located within the 57db contour, and a small portion of the site may be within the 65db noise contour. The new houses within the 57-65db area will meet the acoustic standards with typical building construction and mechanical ventilation. The applicant has proposed consent notices to ensure that appropriate acoustic insulation is incorporated within the design of dwellings and habitable living areas. Any engine testing noise-related effects can be effectively mitigated.

The applicant received an email from NZDF on 21 November 2022. The following contour maps were attached:

- The Ldn contours (which have already been provided to Neil Group and Auckland Council).

- The B757HP contour which is the noise environment as experienced during a high power B757 engine test on Taxiway Juliet (i.e. the “worst case” scenario)

Ldn Contours:

Tonkin+Taylor

CLIENT	NEW ZEALAND DEFENCE FORCE
PROJECT	BASE AUCKLAND – ENGINE TESTING CONTOURS
TITLE	ENGINE TESTING CONTOURS (LDN) – NEIL GROUP LAND ASSESSMENT
Drawn	10.11.22 DAHU

Worst Case Scenario:

Tonkin+Taylor

CLIENT	NEW ZEALAND DEFENCE FORCE
PROJECT	BASE AUCKLAND – ENGINE TESTING CONTOURS
TITLE	B757 HIGH POWER ENGINE RUN (HEADING SE) – NEIL GROUP LAND ASSESSMENT
Drawn	10.11.22 DAHU

Whilst this information is appreciated and understood, we note that it is incorrect to assess the noise effects and form a view on the proposal based on the worst-case contours (which cover the entire site) given that Ldn is the widely accepted and appropriate way to measure and assess noise. The Ldn methodology has been accepted by NZDF previously and agreed upon as the correct methodology by NZDF's acoustic consultants (Tonkin and Taylor), the applicant's acoustic consultant (Marshall Day) and Auckland Councils Acoustic Consultant (Acousafe).

The Auckland Unitary Plan generally relies on a 7-day rolling average for engine testing noise and Auckland International Airport uses a similar determinant. The New Zealand Standard NZS 6805:1992 'Airport Noise Management and Land Use Planning' is used to assess and rate aircraft noise in the vicinity of airports (including aerodromes / airfields). This standard does not specifically exclude nor include engine testing noise when assessing the overall level of airport noise. Rather it is focused on the noise generated by aircraft from 'start of roll', when inflight and when an aircraft lands and departs the runway. NZS 6805:1992 is relevant since it provides guidance on the use of the day / night sound level (Ldn) and the averaging of aircraft activity.

For engine testing, a busy 7-day period is typically preferred and has been used elsewhere in New Zealand, for example at Christchurch International Airport. This is based on a rolling period of 7 days and reflects that engine testing can vary from day to day and can occur on weekends. In contrast to operational flying, if a longer period were to be used, it would tend to average out short term 'peaks' in engine testing activity. This 7-day period is then used to calculate a representative 24-hour period.

Section 4.1.1 of the Marshall Day Acoustics report dated 14 April 2021 (attached to the application) notes:

It has generally been agreed by the acousticians involved that an assessment period of 7 days on appropriate for engine testing at the Airbase, however, the activity is so variable it is difficult to select a representative amount of engine testing over 7 days for assessment. The options include the historical worst case (from a limited sample), the hypothetical worst case, or some other more frequently occurring level of activity (e.g. occurs more than 5% of the time).

We have reviewed the NZDF Tonkin and Taylor Engine Testing Noise Contours Report dated March 2021. This report confirms that the averaging approach is the appropriate way to measure noise and consider noise effects. To support the appropriateness of this methodology, relevant extracts from three independent acoustic technical documents are provided below:

Tonkin and Taylor, Whenuapai Airbase – Engine Testing Noise Contours, Plan Change 5
Prepared for: New Zealand Defence Force
Date: March 2021

4 Land use planning – aircraft noise

4.1 NZS 6805:1992

New Zealand Standard NZS 6805:1992 'Airport Noise Management and Land Use Planning' is used to assess and rate aircraft noise in the vicinity of airports (including aerodromes / airfields). This standard does not specifically exclude nor include engine testing noise when assessing the overall level of airport noise. Rather it is focused on the noise generated by aircraft from 'start of roll', when inflight and when an aircraft lands and departs the runway. NZS 6805:1992 is relevant to this assessment since it provides guidance on the use of the day / night sound level (Ldn) and the averaging of aircraft activity.

The Ldn parameter is the day / night average energy level and it has a 10 dB weighting for any aircraft noise events which occur during the period 2200-0700 hrs. Ldn is widely used to assess environmental noise from other sources as well as aircraft noise and has been used to establish reasonable noise thresholds for determining community response to noise from aircraft operations (take-off and landing movements) and other sources of environmental noise. The Ldn 10 dB weighting recognises that night-time noise can be more disturbing than noise that occurs during the day, and that noise at night can result in adverse health effects due to loss of sleep. The Ldn weighting means that, for example, a 5-minute night-time engine test would be equivalent to 10 similar tests conducted during the day.

To account for the variation in activity that may occur at an airport, NZS 6805 recommends that a busy three-month (90 day) period is used to determine the typical level of aircraft movements that may occur over a busy 24-hour day. This averaging period reflects the normal convention that at commercial airports, the busy summer period (December, January, and February) is when aircraft movements are at their greatest. If the same averaging duration were applied to engine testing then the consequence would be a significant underestimation of the true noise effects as engine testing is more sporadic / infrequent. For engine testing, a busy 7-day period is typically preferred and has been used elsewhere in New Zealand, for example at Christchurch International Airport. This is based on a rolling period of 7 days and reflects that engine testing can vary from day to day and can occur on weekends. In contrast to operational flying, if a longer period were to be used, it would tend to average out short term 'peaks' in engine testing activity. This 7-day period is then used to calculate a representative 24-hour period.

Unlike a commercial operator, NZDF aircraft requirements will vary from week to week and there will be periods of low activity in contrast to periods of higher activity, especially if there are deployments, preparation for military training, search and rescue or humanitarian requirements (see graphs in Section 6.2). This variation can result in a significant difference in the aircraft noise environment from day to day and from week to week. While this variation may not affect the aircraft noise contours based on a 90-day assessment period, a 7-day assessment period for engine testing noise can result in multiple scenarios being developed as the frequency of engine testing can vary much more than flight movements. When developing engine testing contours for land use planning purposes this 7-day period must therefore allow for a worst case, or at least a busy scenario in a similar manner to that required by NZS 6805 for airnoise (i.e. busy 24-hour day average).

Marshall Day Acoustics, Whenuapai Engine Testing, Noise Logging and Analysis
Prepared by:Laurel Smith
Dated: 4 April 2021

4.1 Engine Testing Noise Contours

4.1.1 Modelling Issues

Acoustic consultants have had difficulty arriving at an appropriate set of engine testing noise contours for a number of reasons.

- The original PC5 modelling by Malcolm Hunt Associates was based on a sample of engine testing records that was too small to represent the actual variability of the activity, plus night-time engine testing was not included.
- Details of engine testing events have been poorly recorded and are inherently inaccurate.
- Engine testing take place at multiple locations which adds to the variability of the activity. Also, there are options to move testing away from the Airbase boundaries to reduce noise emissions.
- Planned fleet changes at the Airbase will reduce the amount of required engine testing within the next five years. Specifically, the P-3 aircraft, which is a significant contributor to engine testing noise, will be decommissioned by 2023 and its replacement will be based elsewhere.
- It has generally been agreed by the acousticians involved that an assessment period of 7 days is appropriate for engine testing at the Airbase, however the activity is so variable it is difficult to select a representative amount of engine testing over 7 days for assessment. The options include the historical worst case (from a limited sample), the hypothetical worst case, or some other more frequently occurring level of activity (e.g. occurs more than 5% of the time).

4.1.3 Tonkin and Taylor Contours 2021

More recently NZDF has provided a revised report by Tonkin and Taylor '*Whenuapai Airbase – Engine Testing Noise Contours*' dated March 2021. The modelling inputs and assumptions have been refined further following two weeks of in-field testing undertaken by Tonkin and Taylor in November 2019. The contours are generally based on the Scenario 1: All Aircraft Noisy Week Scenario discussed above but with the addition of 20% more testing. The Tonkin and Taylor contours are included in Appendix E.

The latest Tonkin and Taylor contours are just slightly larger than the previous Scenario 1 contours (dated 27 February 2020). As there is only a small difference, we can apply the same conclusion as above that the latest modelled contours are a reasonable representation of the current worst-case week. The results of long-term monitoring presented in this report demonstrate that this level of noise exposure is not experienced every week. Also, as discussed above, once the P-3 is decommissioned, we expect the engine testing noise exposure would decrease appreciably.

5.0 CONCLUSION

The long term in-field monitoring data presented in this report represents the most extensive monitoring results of engine testing noise from the Whenuapai Airbase available to date. The data provides a true record of actual noise emissions, testing times and durations for a ten-month period and therefore provides the most reliable information regarding the actual engine testing noise levels currently received at the two monitoring sites.

Site 1 on Totara Road is affected by high noise levels from engine testing on taxiway Juliet from time to time but overall, the noise exposure levels are generally suitable for residential activity.

Site 2 on Kauri Road experiences higher average noise exposure levels than Site 1 as taxiway Foxtrot is used more extensively than taxiway Juliet for engine testing. The proposed Plan Change 5 provisions of the Auckland Unitary Plan would enable residential development for noise levels below 65 dB L_{dn}. The monitoring results show that currently the daily noise exposure at the property boundary closest to Taxiway Foxtrot is below 65 dB L_{dn} on 93% of days and the 7-day noise exposure is below 65 dB L_{dn} on 96% of weeks.

We consider that the Tonkin and Taylor noise contours dated March 2021 are a reasonable representation of the current worst-case week of engine testing noise. When the P-3 aircraft is decommissioned, the worst case 7-day noise exposure is predicted to decrease. We consider that the Tonkin and Taylor noise contours for the B757 and C130 Noisy Week Scenario (dated 13 March 2020) are a reasonable representation of this future situation.

Acousafe, Peer Review, NZDF Engine Testing Noise Proposal, Noise Controls Whenuapai Precinct
Prepared By: Nigel Lloyd, Director of Acoustic Services
Date: 14 September 2017

Noise Standards

The appropriate noise Standards are discussed in Section 2 of the Report. We recommend that, where practical, the noise requirements in the Precinct be made compatible with other provisions of the District Plan.

Rule D24.6.1 (for North Shore Airport, Kaipara Flats and Whenuapai) provides a maximum noise level for habitable rooms of 40 dB L_{dn}. It is sensible to also use this criterion for the engine testing noise. The Auckland Unitary Plan (**AUP**) generally relies on a 7 day rolling average for engine testing noise and Auckland International Airport uses a similar determinant.

We set out Rule D24.6.1 as follows:

(1) The following activities:

- D24.4.1(A1) New activities sensitive to aircraft noise; and
- D24.4.1(A3) Alterations or 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 40dB L_{dn};

(b) that are certified by a person suitably qualified and experienced in acoustics to the Council's satisfaction 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.

We agree with the Report that the engine testing noise should be assessed using a 7 day rolling average and that, otherwise, the 2008 versions of NZS 6801 and NZS 6802 are the appropriate Standards to rely upon.

Methodology

The methodology adopted by the Report is set out in Sections 4, 5 and 6.

These Sections describe the aircraft, the assumptions that have been made, the differences between the available noise information and the actual engine testing activities at Whenuapai and the precautions that have been taken. The sound data used provides some inherent safety factors.

The report reasonably adopts the 7 day rolling average L_{dn} taken from the actual worst case in Appendix B (between 9-15 June inclusive) to calculate the engine noise. This represents an actual scenario and while it may be exceeded from time to time, there will be many 7 day durations when the engine testing noise is less. The actual prediction of the noise also introduces safety factors into the process. Overall, we consider that the contours that are established in Figure 13 are reasonable.

One important consideration is that the base avoids undertaking night-time testing, where-ever it can, thus removing significant sleep interference issues. We would note that without night-time activity the L_{dn} is the same as $L_{Aeq\ (24\ hours)}$.

We support Council's response to the engine testing, which is to zone land within the 65 dB L_{dn} engine testing contour (and parts of the 57 dB L_{dn} contour) to non-residential and to zone the balance of land between the 57 dB L_{dn} contour and the 65 dB L_{dn} contour to Residential Single House Zone (also see below for Sinton Road). The noise insulation requirements for these dwellings are to be consistent with the D24.6.1 rule requirements; for maximum internal noise limits and ventilation and/or air conditioning. This zoning will limit the numbers of people exposed to the noise compared to zoning the land as Residential Mixed Urban, for example.

The 57 dB L_{dn} contour is used because a building which is ventilated with narrowly opened windows (or windows ajar) have been shown to achieve a

Based on the above, we consider that any engine testing noise-related effects can be effectively managed to retain a sufficient level of residential amenity and this is discussed in more depth in the effects section of this application.