

**APPENDIX B - MARSHALL DAY REPORT**

CONSULTANT ADVICE

<b>Project:</b>	Te Kowhai Airpark	<b>Document No.:</b>	Ca 002 r01
<b>To:</b>	NZTE	<b>Date:</b>	8 October 2018
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<b>CC:</b>			
<b>Subject:</b>	Proposed Airport Control Noise Boundaries		

**INTRODUCTION**

MDA has prepared future airport noise contours for Te Kowhai Airfield generally in accordance with New Zealand Standard NZS 6805:1992 "Airport Noise Management and Land Use Planning". It is recommended that these contours form the basis for revised Airpark Noise Control Boundaries in the Proposed Waikato District Plan.

This document sets out the noise model inputs and assumptions behind the future noise contours and the recommended airport noise and land use controls.

**NOISE MODEL INPUTS AND ASSUMPTIONS**

Future noise contours have been calculated using the Integrated Noise Model (INM) version 7d for a future operating scenario prepared by NZTE. The noise contours are based on the  $L_{dn}$  noise metric. This metric is the sum of the sound energy from all aircraft noise events averaged over 24 hours. The night weighting means that noise events that occur between 10pm and 7am are "weighted" or penalised with an additional 10 decibels. For input to the noise model, an 'average day' of movements is calculated based on forecast future movements during the busiest three months of the year. The modelled contours for Te Kowhai Airfield are based on the following assumptions:

**Table 1: Runway Assumptions**

Runway Length	Current length 983 m
Runway Usage	65% Runway 23 35% Runway 05
Taxiways	As per proposed Airpark taxiways

The aircraft movements included in the model are listed in Table 2.

**Table 2: Future Aircraft Movements in Noise Contour Calculation**

User Category	Aircraft Type	Busy Average Day Movements		
		Arrivals and Departures	Touch and Goes <sup>1</sup>	Total
High Use Commercial (crop-dusting/parachute)	Cessna 206	16.0	0.0	16.0
Moderate Use Commercial (flight school)	Generic variable pitch propeller aircraft <sup>2</sup>	10.0	4.3	14.2
Hobby Flight Training	Generic fixed pitch propeller aircraft	3.0	1.3	4.3
Private Residents	Generic variable pitch propeller aircraft <sup>2</sup>	14.8	6.4	21.2
Itinerant	Generic variable pitch propeller aircraft <sup>2</sup>	10.0	4.3	14.2
<b>Busy Average Day Total</b>		<b>53.8</b>	<b>16.2</b>	<b>70.0</b>
<b>Annualised Busy Average Day</b>		<b>19,632</b>	<b>5,906</b>	<b>25,538</b>

1 This figure is the total movements (i.e. two movements are included for a touch and go)

2 This generic aircraft type also covers smaller twin piston engine propeller aircraft

All of the movements in the model occur during the day time (7am – 10pm) however this does not prevent operations from occurring between 10pm and 7am. A movement at night time is equivalent to 10 day time movements so in practice if movements do take place at night these would just use up more of the noise budget.

The flight tracks used in the model are shown in the attached Figure 2. It has been assumed that arrival and departure tracks are straight in and out aligned with the runway centreline. We have been advised that circuit tracks are left hand for Runway 23 and right hand for Runway 05 and generally follow the ground track shown in Figure 2.

Aircraft taxiing movements have also been included in the calculated noise contours. The proposed taxiways around the Airpark have been included in the model as taxi tracks and these are shown in the attached Figure 2. It has been assumed that only private resident aircraft would use the Airpark taxiways and all other aircraft would use the taxiway adjacent to the runway. As the Airpark taxiways lead to private residences, the distribution of taxiing movements on the taxiways will depend on the frequency of flying carried out by individual residents. To allow for this unknown distribution of taxiing movements we have applied a safety factor of 1.5. For each private resident aircraft movement in the model there is one taxiing movement adjacent to the runway and 1.5 taxiing movements on the Airpark taxiways (evenly distributed).

## CALCULATED NOISE CONTOURS AND RECOMMENDED NOISE CONTROL BOUNDARIES

The 55 and 65 dB  $L_{dn}$  noise contours for the future operating scenario described above are shown in attached Figure 1. It is recommended that these contours are smoothed out and form the basis for the Air Noise Boundary (65 dB  $L_{dn}$ ) and the Outer Control Boundary (55 dB  $L_{dn}$ ) in the Waikato District Plan. Figure 3 shows the recommended boundaries based on smoothed out contours from Figure 1. The Outer Control Boundary has been extended out to the Airpark Zone boundary to the south to provide for taxiing within the zone and to limit the noise at the zone boundary rather than within the Airpark.

Figure 4 provides the future  $L_{dn}$  contours in two decibel increments to be used for acoustic insulation design purposes. It is recommended that this figure is included in Appendix 1 Section 3.

## RECOMMENDED NOISE CONTROLS (CHAPTER 27)

NZS 6805 recommends that noise from aircraft operations is limited to the levels defined by the noise boundaries and that noise sensitive land use is restricted within the noise boundaries.

The Proposed District Plan (PDP) includes Rule 27.2.7 which controls noise from aircraft on taxiways within Te Kowhai Airpark. It is recommended that this rule is replaced with the following:

### 27.2.7 Noise – Aircraft Operations

Noise from aircraft operations in ALL PRECINCTS, including aircraft movements on taxiways, shall not exceed 55 dB  $L_{dn}$  outside the Outer Control Boundary and 65 dB  $L_{dn}$  outside the Air Noise Boundary as shown in the Planning Maps. These limits do not apply inside the Te Kowhai Airpark Zone. For the purpose of this control aircraft noise shall be assessed in accordance with NZS 6805:1992 “*Airport Noise Management and Land Use Planning*” and logarithmically averaged over a three month period. For the purposes of this rule aircraft operations shall include aircraft taking-off, landing, taxiing and flying on circuit flight paths. The following operations are excluded from the calculation of noise for compliance with the noise limits:

- Aircraft engine testing and maintenance
- Aircraft landing or taking off in an emergency
- Emergency flights required to rescue persons from life threatening situations or to transport patients, human vital organs or medical personnel in a medical emergency
- Flights required to meet the needs of a national or civil defence emergency declared under the Civil Defence Emergency Management Act 2002
- Aircraft using the airfield due to unforeseen circumstances as an essential alternative to landing at a scheduled airport elsewhere
- Aircraft undertaking firefighting duties
- Air Shows (for one air show per year)

Aircraft movements shall be recorded monthly and once the total movements in the busiest three month period reaches 4,500, noise contours for the purpose of assessing compliance with Rule 27.2.7 shall be calculated once every three years. When the calculated noise levels are within one decibel of the limit, noise contours for the purpose of assessing compliance with Rule 27.2.7 shall be calculated annually and verified with infield monitoring once every three years.

## RECOMMENDED LAND USE CONTROLS (CHAPTERS 22 AND 24)

The PDP includes acoustic performance standards for new dwellings built inside the Te Kowhai Airfield Outer Control Boundary which applies in the Rural and Village zones. It is recommended these be modified to align with the recommendations of NZS 6805. NZS 6805 recommends the following land use planning criteria:

### Inside the ANB (>65 dB L<sub>dn</sub>):

- New noise sensitive uses (including residential) should be prohibited;
- Existing residential buildings and subsequent alterations should have appropriate sound insulation;

### Between the ANB and the OCB (55 - 65 dB L<sub>dn</sub>):

- New noise sensitive uses (including residential) should be prohibited unless a District Plan permits such use subject to appropriate sound insulation; and
- Alterations or additions to existing noise sensitive uses (including residential) should include appropriate sound insulation.

Ideally to provide the Airfield with the best level of protection from reverse sensitivity, new noise sensitive development inside both the Air Noise Boundary and the Outer Control Boundary should be prohibited. An alternative method that provides less protection but is less onerous on neighbouring landowners is to permit new noise sensitive development subject to acoustic insulation between the Outer Control Boundary and the Air Noise Boundary and to apply a Non-Complying activity status to new noise sensitive development inside the Air Noise Boundary.

## ACOUSTIC INSULATION (APPENDIX 1)

Appendix 1 Section 3 sets out acoustic insulation performance standards that apply to new noise sensitive activities developed within the Te Kowhai Airpark Outer Control Boundary and Noise Buffer.

Inside the Outer Control Boundary the design criterion of 40 dB L<sub>dn</sub> is reasonable and appropriate and the octave band adjustments are appropriate for the types of aircraft operating at Te Kowhai Airpark. It is also appropriate to require a ventilation system and the associated acoustic criteria are reasonable. It would be appropriate to include a map showing the noise contours in two decibel increments in order to identify the outdoor design levels on affected properties. It is recommended that Figure 4 be included in Appendix 1 Section 3 for this purpose.

It is recommended that the Noise Buffer and associated acoustic standards be removed if the revised Airpark Noise Control Boundaries are accepted. The revised boundaries include noise from taxiing aircraft therefore the Noise Buffer becomes unnecessary.



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**Map Legend**

**Noise Contour**

- 55 dB Ldn
- 65 dB Ldn

**Figure 1 - Te Kowhai Airpark Predicted Future Noise Contours for Aircraft Operations**



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**Map Legend**

**Flight Tracks**

- Arrival
- Departure
- Touch and Go
- Taxi

**Figure 2 - Te Kowhai Airfield Noise Model Flight Tracks**





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**Map Legend**

**Noise Control Boundaries**

- Outer Control Boundary (55 dB Ldn)
- Air Noise Boundary (65 dB Ldn)

**Figure 3 - Proposed Te Kowhai Airpark Noise Control Boundaries**



**Map Legend**

**Future Noise Contour**

	55 dB Ldn
	57 dB Ldn
	59 dB Ldn
	61 dB Ldn
	63 dB Ldn
	65 dB Ldn
	67 dB Ldn
	69 dB Ldn

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**Figure 4 - Te Kowhai Airpark Future Noise Contours for Acoustic Insulation**