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PROJECT: **Paraparaumu Airport Noise
Monitoring 2008**

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has carried out aircraft noise monitoring at two locations between September and December 2008 for the purpose of measuring daily L_{dn} noise levels from aircraft activity at Paraparaumu Airport. Measurement results at the two sites demonstrate compliance with the noise boundaries in the Kapiti Coast District Plan. This report summarises the measurement procedures and findings.

2.0 NOISE PERFORMANCE STANDARD

The Kapiti Coast District Plan contains airport noise boundaries which define limits for noise from aircraft operations at Paraparaumu Airport. The rules state that noise from aircraft operations shall not exceed 65 dBA L_{dn} outside the Air Noise Boundary. Although a rule for the Outer Control Boundary is not specified, noise should not exceed 55 dBA L_{dn} outside the OCB.

Plan Change 73 introduces revised airport noise boundaries with which noise from aircraft operations shall comply. The existing District Plan noise boundaries and the revised, but yet to be implemented PC73, boundaries are shown in Figures 2 and 3 in Appendix B. The PC73 contours shown in Figure 3 are those from the Council Decision, which are under appeal at the time of writing therefore these are included for reference only.

3.0 MEASUREMENT LOCATIONS

The monitoring station was operated at each of the two selected sites for approximately 5 – 6 weeks consecutively. The measurement locations which are shown in the figure below were selected by MDA using the following criteria:

- Proximity to airport noise boundaries (i.e. one location near the 65 and one location further out near the 55)
- Background noise environment must generally not be affected by sources other than aircraft (i.e. not next to busy road)
- Likelihood that the aircraft noise exposure would be representative of what the community experiences
- Safety for airborne aircraft (as advised by the airport manager for the on-airport location)

The station operated at Location 1 from 23 September to 29 October 2008 and at Location 2 from 29 October until 9 December 2008. Photos of the station at each location are included in Appendix C.

In relation to the District Plan Noise Boundaries, Location 1 is within the Air Noise Boundary and Location 2 is outside the Outer Control Boundary. The noise limits at these boundaries are 65 and 55 dBA L_{dn} respectively.



Figure 1 Noise Monitoring Locations

Location 1 was selected to be near the 65 dBA L_{dn} boundary but also near to affected dwellings. It was considered that locating the monitoring station near to the Helipro hanger would be inappropriate due to safety concerns with airborne aircraft but also due to possible interference effects from the hanger and other buildings.

4.0 MONITORING SYSTEM

The monitoring system consists of a Bruel and Kjaer 2250 noise logger and outdoor microphone kit. The system operates 24 hours a day and continuously records the one second L_{eq} noise level. When a noise event meets a set combination of parameters including level and duration then the event is identified as a possible aircraft event. The logger then records the actual sound of each identified event onto a sound file that can be played back during analysis. This is important as often a sound source other than aircraft can exceed the threshold such as a lawn mower driving past, or a gust of wind. Where the system detects and records high noise levels, listening to the sound file allows accurate verification of whether or not the noise is aircraft related.

5.0 MEASUREMENT RESULTS

The recorded data for each day has been analysed to exclude events that weren't aircraft. A total of 29 whole days and 5 partial days were recorded at Location 1. At Location 2 at total of 24 whole days and 2 partial days were recorded. Tables 1 and 2 summarise the measurement results.

Table 1 Measured Aircraft Activity at Location 1

	Minimum	Maximum	Average
Number of measured aircraft noise events per day	2	114	41
Duration of measured aircraft noise per day	6 minutes	280 minutes	97 minutes
Daily L_{dn} noise level	33 dBA	57 dBA	50 dBA

Table 2 Measured Aircraft Activity at Location 2

	Minimum	Maximum	Average
Number of measured aircraft noise events per day	3	159	76
Duration of measured aircraft noise per day	4 minutes	180 minutes	62 minutes
Daily L_{dn} noise level	34 dBA	53 dBA	45 dBA

6.0 CONCLUSION

The monitoring results show that daily noise levels from aircraft operations at Location 1 were always below 65 dBA L_{dn} and therefore in compliance with the District Plan noise limit.

The results from Location 2 show that daily aircraft noise levels were always below 55 dBA L_{dn} . The average level over the measurement period was 45 dBA L_{dn} which is 10 decibels below that 55 dBA limit at the OCB. Therefore this is a strong indicator that the average noise from aircraft operations does not exceed 55 dBA L_{dn} outside the OCB.

It is also noted that both the maximum and average monitored noise levels comply with the noise boundaries proposed under Plan Change 73.

APPENDIX A GLOSSARY OF TERMINOLOGY

dB(A)	A measurement of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
L_{eq}	The time averaged sound level (on a logarithmic/energy basis) over the measurement period (normally A-weighted).
L_{dn}	The day-night sound level which is calculated from the 24 hour L_{eq} with a 10 dBA penalty applied to the night-time (2200-0700 hours) L_{eq} (normally A-weighted).
L_{95}	The sound level which is equalled or exceeded for 95% of the measurement period. L_{95} is an indicator of the mean minimum noise level and is used in New Zealand as the descriptor for background noise (normally A-weighted).
L_{10}	The sound level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level and is used in New Zealand as the descriptor for intrusive noise (normally A-weighted).
L_{01}	The sound level which is equalled or exceeded for 1% of the measurement period (normally A-weighted).
L_{max}	The maximum sound level recorded during the measurement period (normally A-weighted).
L_{peak}	The peak instantaneous pressure level recorded during the measurement period (normally not A-weighted).
Noise	A sound that is unwanted by, or distracting to, the receiver.
NZS 6801:1991	New Zealand Standard NZS 6801:1991 " <i>Measurement of Sound</i> "
NZS 6802:1991	New Zealand Standard NZS 6802:1991 " <i>Assessment of Environmental Sound</i> ".
NZS 6803P:1984	New Zealand Standard NZS 6803P:1984 " <i>The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work</i> ".
Ambient Noise	Ambient Noise is the all-encompassing noise associated with any given environment and is usually a composite of sounds from many sources near and far.

APPENDIX B NOISE BOUNDARIES

Figure 2 Kapiti Coast District Plan Airport Noise Boundaries

Figure 3 PC73 Proposed Airport Noise Boundaries

Outer Control Boundary

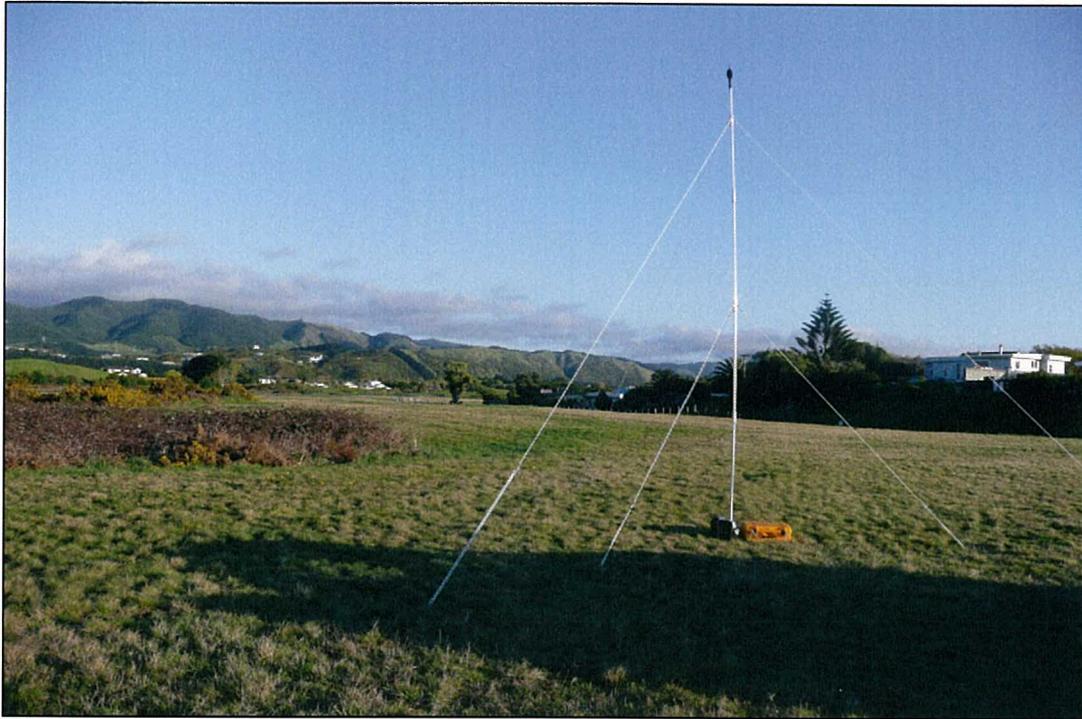
Air Noise Boundary

Location 1

Location 2

**Figure 2: Paraparaumu Airport
Kapiti Coast District Plan
Airport Noise Boundaries**

APPENDIX C PHOTOS OF MONITORING STATION



Measurement Location 1



Measurement Location 2