

Short Term Monitoring Program WA, Leeming Report

May 2013

Version Control

Version Number	Date	Detail
1.0	May 2013	Initial Release.
2.0	January 2014	Figure 5 and L90 figures updated due to technical issue.

© Airservices Australia. All rights reserved.

This report contains a summary of data collected over the specified period and is intended to convey the best information available from the NFPMS at the time. The system databases are to some extent dependent upon external sources and errors may occur. All care is taken in preparation of the report but its complete accuracy can not be guaranteed. Airservices Australia does not accept any legal liability for any losses arising from reliance upon data in this report which may be found to be inaccurate.

Deployment Purpose – Leeming, WA

Following recommendations for noise monitoring around Jandakot Airport made in the 'Review of the Perth Environmental Monitoring Units' undertaken by Airservices in 2011, Leeming was selected as a Short Term Monitoring location.

The purpose of this report is to provide a technical summary of the recorded aircraft noise and operational data collected at Leeming over a four week period.

An explanation of terms used within this report can be found in the Glossary at the end of the report.

Monitoring Period

10/11/2012 12:00am – 08/12/2012 12:00am

Environmental Monitoring Unit (EMU) Details

Location	Dimond Ct, Leeming 6149
Latitude	32°4'38.74"S
Longitude	115°52'34.46"E
EMU Altitude	135ft above mean sea level
Capture Zone	2.5km radius with 8,135ft (above ground level) height for noise data capture
Threshold Settings	55.0 dB(A) to 58.0 dB(A) depending on time of day

Location Images

Figures 1 to 3 details the location of monitors surrounding Perth Airport and the flight paths used for those operations captured by the Leeming EMU.

Figure 1 Perth Fixed Environmental Monitoring Unit Locations and the Leeming Short Term Monitoring Program Deployment Location

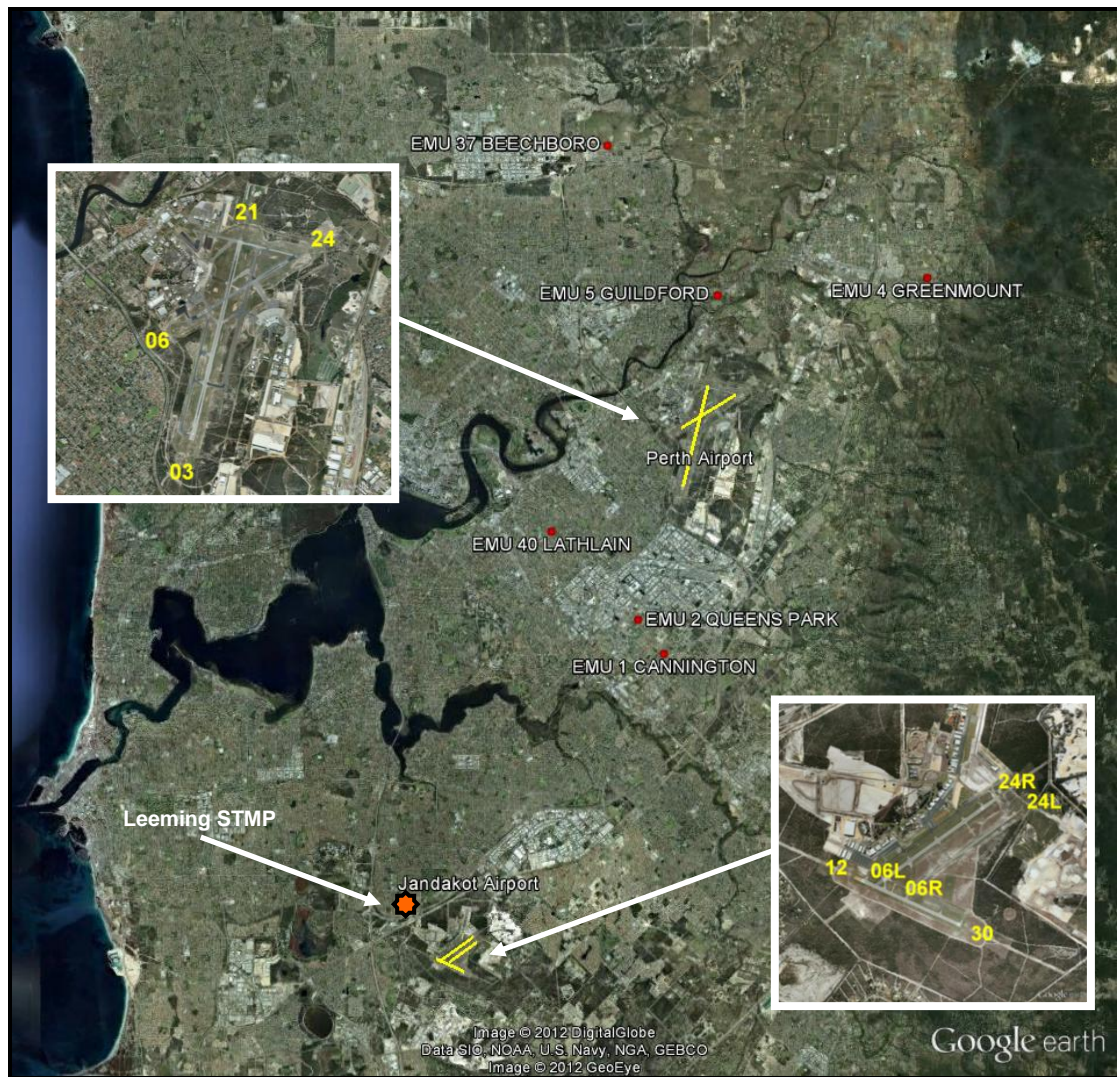


Figure 2 Total Movements Captured

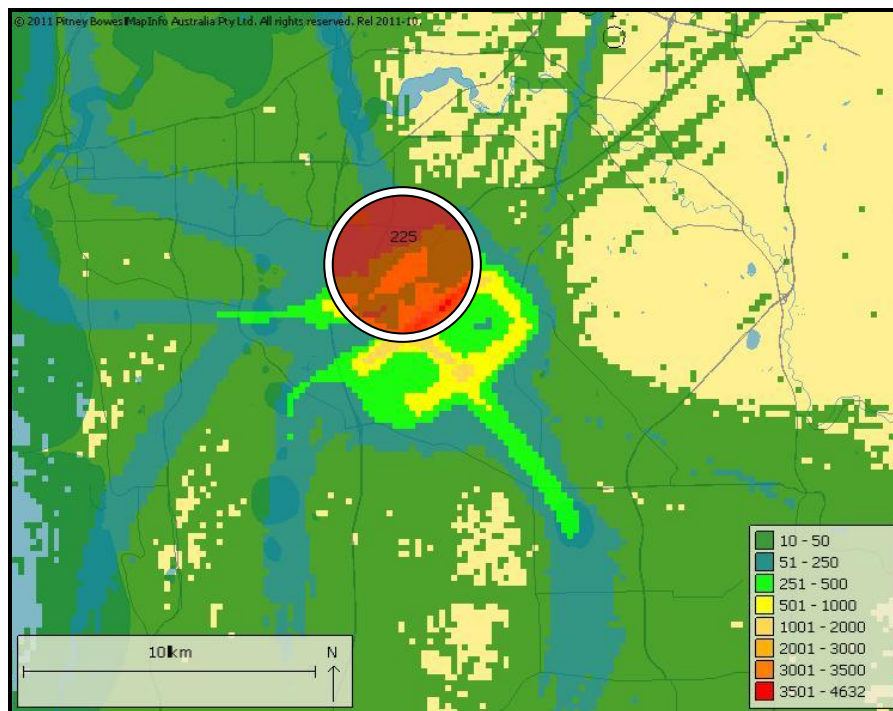


Figure 3 Jandakot Airport Movements Captured

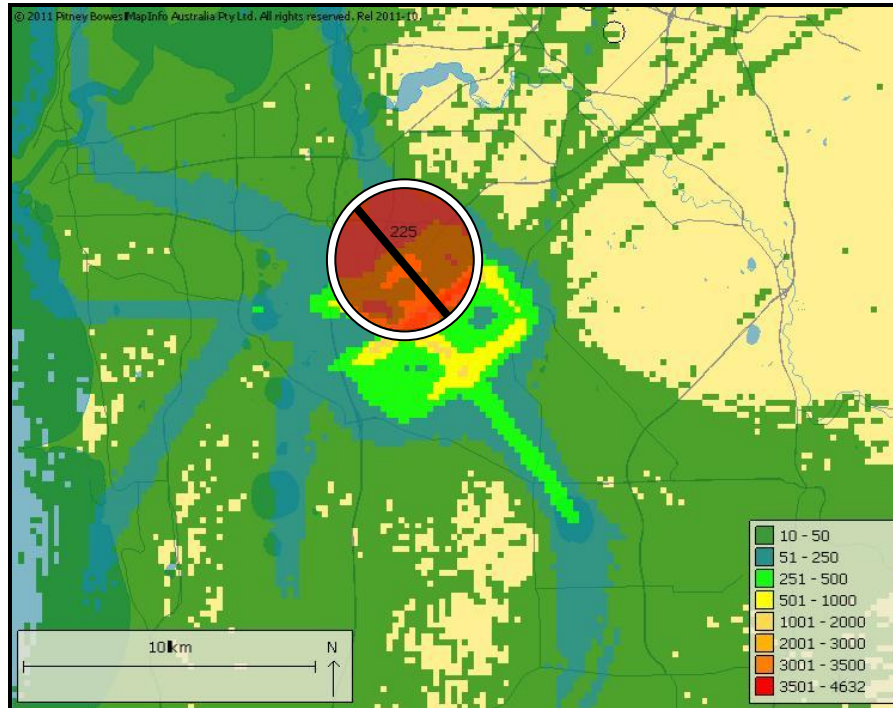
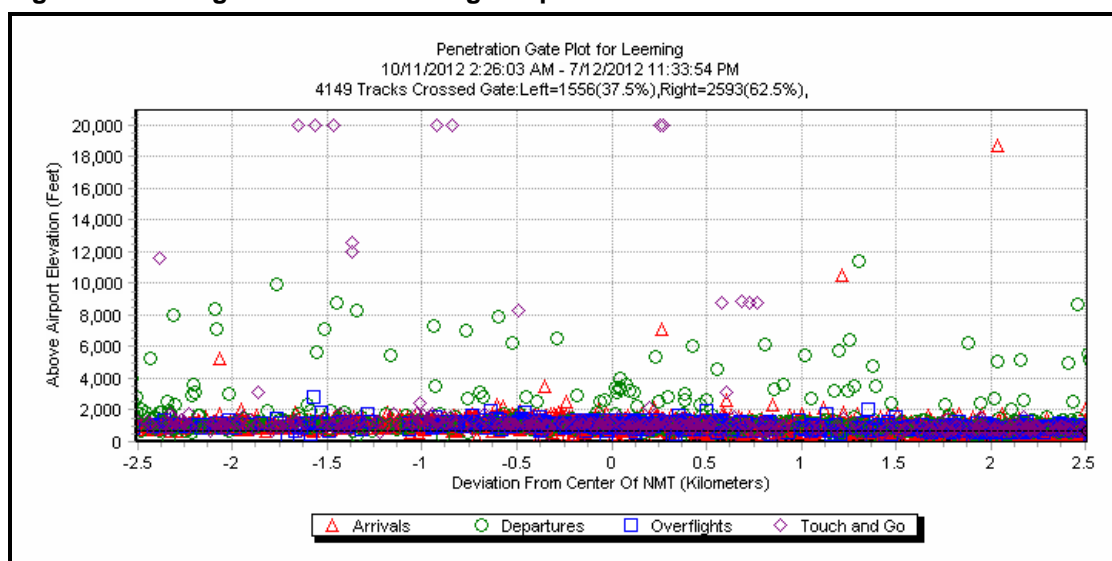


Figure 4 Leeming Movements Through Capture Zone Penetration Gate



Note: Perth Airport altitude is 67ft above mean sea level. EMU altitude is 135ft above mean sea level. The EMU altitude should be adjusted from the data shown above in order to draw conclusions about height above ground of aircraft operations.

The black line through the capture zone in Figure 3 depicts the penetration gate location for the plot shown in Figure 4. Some movements through the capture zone failed to penetrate the gate used for analysis due to their entry and exit point through the capture zone. In addition, a single operation may fly through the penetration gate on multiple occasions. Further, operations that are on climb may pass out of the correlation zone and later penetrate the gate at a higher altitude. The opposite is true for arrivals that will penetrate the gate at a higher altitude and later pass through the correlation zone.

Findings

The following tables present a summary of the operations data.

Table 1 Movement Summary (10/11/2012 12:00am – 08/12/2012 12:00am)

Type of Operation	Jandakot Airport Movements	All Movements
<i>Number of Movements Through Capture Zone*</i>	4,074	4,632
<i>Number of Correlated Noise Events (CNE)</i>	2,187	2,560
<i>Number of Individual Movements with Correlated Noise Events (CNE)</i>	1,587	1,854
<i>Correlation Summary</i>	38.95%	40.03%

* Includes all aircraft with transponder flying through area, regardless of destination/origin airport.

** May include operations that produced multiple noise events.

Correlation Summary

An evaluation of the number of aircraft operations that were matched with noise events recorded by the EMU is an important aspect of assessing performance of the noise monitoring installation. Ideally, all operations passing the EMU within a reasonable proximity will be matched to the appropriate noise event. Whilst complete matching is not expected, a lack of matches will reveal the need to investigate the reason for anomalies. A correlation summary for all movements of 40% is a reasonably low result. This result is due to the background level at Leeming being quite high during the hours of day. Whilst the noise created from the aircraft may be noticeable, they are not loud enough to create a noise event above the determined threshold settings shown below in Figure 5.

Table 2 Height (in feet, above ground level) Above The Monitor Summary

Type of Operation	Min*	Max*	Average*
<i>Departures Through Capture Zone**</i>	27	11,355	1,327
<i>Arrivals Through Capture Zone**</i>	0	18,622	890
<i>All Operations Through Capture Zone**</i>	0	19,897	1,009

* Flight tracks are susceptible to an altitude error of up to 200ft which is consistent with normal radar tolerances.

** Includes all airports within Perth Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

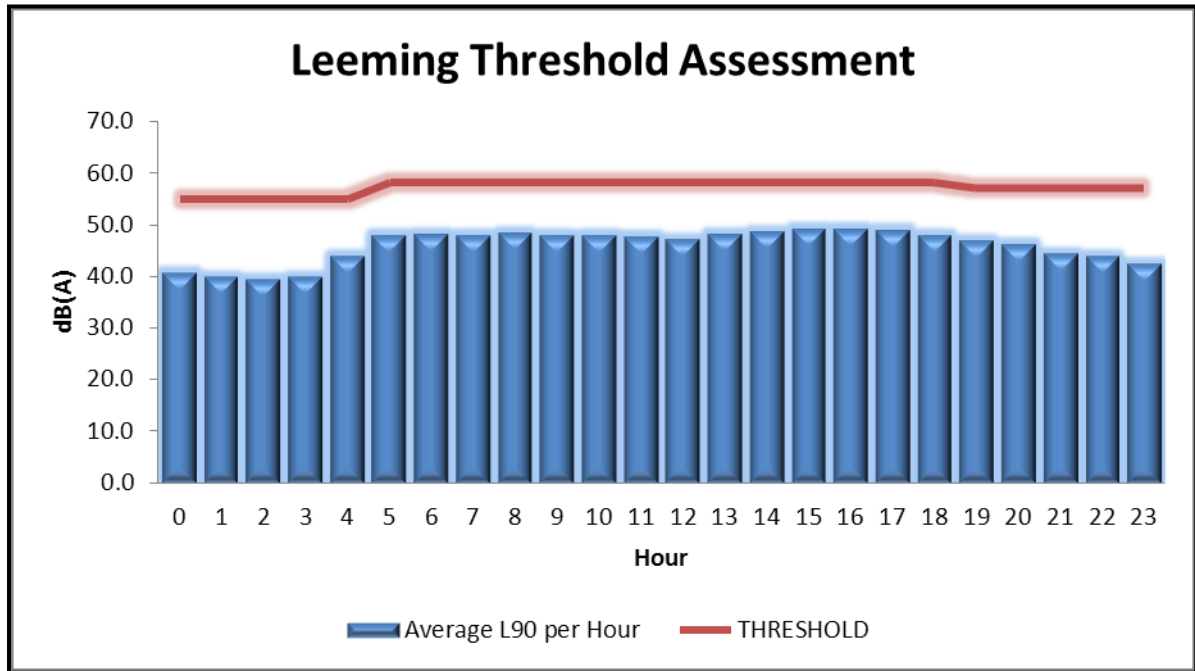
Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Jandakot</i>	64	661	898	230	2,221	4,074
<i>Perth</i>	50	20	9	6	0	85
<i>Other</i>	1	6	25	22	419	473
Grand Total	115	687	932	258	2,640	4,632

*These non-flight planned operations are generally recreational aircraft conducting private flights and will account for the very low altitudes by some aircraft.

Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the EMU. The threshold setting must be above the background noise level in order to clearly distinguish aircraft noise events from other noise sources. The result of background noise assessment and threshold settings are provided below in Figure 5.

Figure 5 Background and Threshold Assessment



Noise Summary

The following tables present a summary of the noise data for aircraft that flew through the capture zone and caused a Correlated Noise Event (CNE). Information is provided for Jandakot Airport movements that flew over the EMU, as well as all aircraft that flew over the EMU, noting that this area is affected by arrivals, departures and training flights, as shown in Figure 2 and Figure 3.

Table 4 Noise Summary

NOISE PARAMETERS	
L _{Aeq} 24 hr, dBA	55.1
L _{Aeq} (night), dBA	51.4
Background Day (L ₉₀ dBA)	47.5
Background Night (L ₉₀ dBA)	42.0

Table 5 Correlated Noise Events Summary

	Jandakot Airport Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	2,187	2,560
Number of Correlated Noise Events at night (CNE night)	104	107
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE_{xx}) day/night	CNE_{xx}	CNE_{xx}
CNE ₆₀ – day	2,012	2,370
CNE ₆₀ - night	97	99
CNE ₆₅ – day	1,084	1,277
CNE ₆₅ – night	64	66
CNE ₇₀ – day	344	402
CNE ₇₀ - night	35	36
CNE ₇₅ – day	87	100
CNE ₇₅ - night	9	9
CNE ₈₀ – day	12	14
CNE ₈₀ - night	2	2
Number of Correlated Noise Events (CNE_{xx}) per 24hr period min – max		
CNE ₆₀	8 to 118	10 to 140
CNE ₆₅	7 to 76	8 to 83
CNE ₇₀	6 to 26	7 to 28
CNE ₇₅	0 to 10	0 to 10
CNE ₈₀	0 to 6	0 to 6
Average Number of Correlated Noise Events (CNE_{xx} Ave.) day/night	CNE_{xx} Ave.	CNE_{xx} Ave.
CNE ₆₀ Ave. – day	71.86	84.64
CNE ₆₀ Ave. – night	3.46	3.54
CNE ₆₅ Ave. – day	38.71	45.61
CNE ₆₅ Ave. – night	2.29	2.36
CNE ₇₀ Ave. – day	12.29	14.36
CNE ₇₀ Ave. – night	1.25	1.29
CNE ₇₅ Ave. – day	3.11	3.57
CNE ₇₅ Ave. – night	0.32	0.32
CNE ₈₀ Ave. – day	0.43	0.50
CNE ₈₀ Ave. – night	0.07	0.07

Note: Day period is from 6:00am to 11:00pm. Night period is 11:00pm to 6:00am.

Short Term Monitoring Program

Table 6 LAmox Summary

Min dB(A)	Max dB(A)	Average dB(A)
55.0	94.6*	66.0

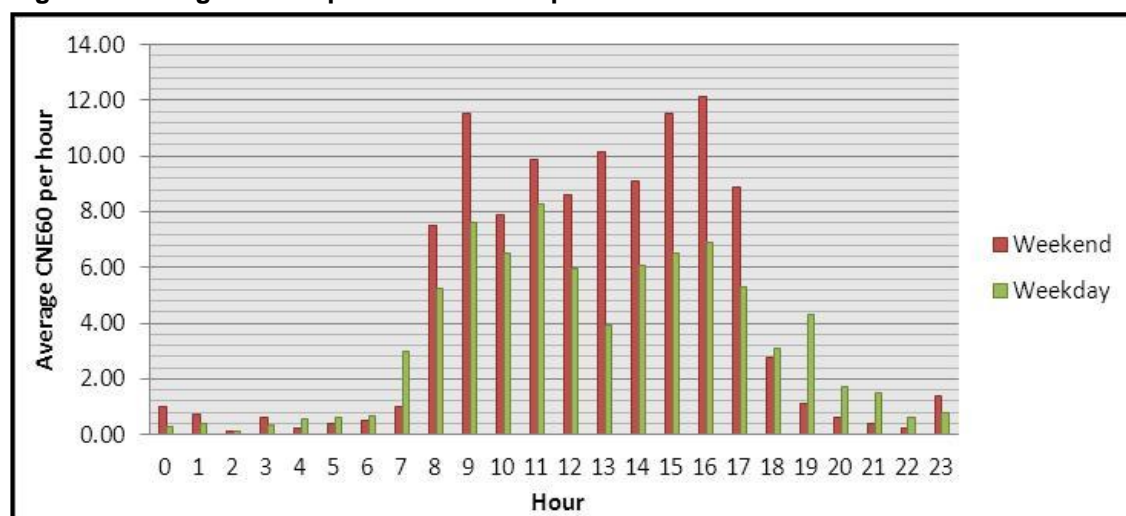
Note: Summary for operations that passed through the correlation zone (2.5km radius with 8,135ft height AGL)
 *Correlated Noise Events of 117.2 dB(A) and 101.2 dB(A) existed during the reporting period. Further investigation determined these were not aircraft noise events.

CNE60 Count by Hour

A large number of noise events were between 60dB(A) and 70dB(A). Therefore further investigation was undertaken on the number of correlated noise events that exceed 60dB(A) to reveal patterns and determine what time of the day the majority of these events occurred.

Figure 6 presents daily average number of noise events 60dB(A) or above (CNE₆₀) broken down on an hourly basis.

Figure 6 Average CNE60 per Hour for All Operations



The highest number of CNE₆₀ in any one hour throughout the reporting period was 32 on 21st November 2012 between 11am and 12pm.

Aircraft Noise Levels

Table 7 presents the top 10 noisiest aircraft types captured by the noise monitor during the reporting period. Table 8 shows the 10 most correlated aircraft types that flew over the noise monitor.

Table 7 Top 10 Average Aircraft Noise Levels (LAmox) at the Leeming EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmox dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Beechcraft 1900 (T)	Jandakot	D	24R	1	81.7	81.7	1
Fokker 100 (J)	Perth	D	21	1	78.2	78.2	1
Fairchild Metroliner (T)	Jandakot	D	12	1	77.8	77.8	1
Cessna C441 (T)	Jandakot	A	24R	3	76.9	94.6	3
Cessna C404 (P)	Jandakot	A	Unknown	1	76.3	76.3	1
Robinson R44 (H)	Perth	D	H	1	76.2	76.2	1
Air Tractor AT8T (T)	Jandakot	D	Unknown	1	76.1	76.1	1
Fairchild Metroliner (T)	Jandakot	A	30	1	75.6	75.6	1
Air Tractor AT8T (T)	Jandakot	A	Unknown	1	75.5	75.5	1
Air Tractor AT8T (T)	Jandakot	T	Unknown	1	74.3	74.3	1

Table 8 Top 10 Most Correlated Aircraft Types Over the Leeming EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAm _{ax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Unknown (U)	Jandakot	A	24R	357	65.3	78.0	42
Unknown (U)	Unknown	O	Unknown	190	65.2	77.6	21
Unknown (U)	Jandakot	A	Unknown	171	66.3	81.5	18
Unknown (H)	Jandakot	A	H	124	65.6	87.6	21
Unknown (U)	Jandakot	A	12	106	65.8	78.6	31
Unknown (U)	Jandakot	A	24L	100	65.1	79.6	11
Pilatus PC12 (T)	Jandakot	A	24R	94	67.0	77.8	9
Unknown (U)	Jandakot	T	12	73	64.6	73.5	42
Unknown (U)	Jandakot	D	Unknown	69	65.8	79.6	11
Unknown (U)	Jandakot	T	24R	63	64.2	69.8	8

Aircraft Category: Jet (J), Turboprop (T), Propeller (P), Helicopter (H), Unknown (U)

Conclusions

Following recommendations made in 'Review of the Perth Environmental Monitoring Units', Short Term Monitoring was conducted at Leeming during the period of 10th November to 8th December 2012. Leeming is located to the north of Jandakot Airport.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 60dB(A) in one day was 49. On November 21st during the period of 11am and 12pm, 32 events exceeding 60dB(A) occurred, this was the greatest number in one hour during the period. Residents in the area of Leeming were exposed to a correlated noise events exceeding 75dB(A) during the hours of day and night. There were 99 correlated noise events above 60dB(A) that occurred during the hours of night. The average LAm_{ax} during the reporting period was 66.0dB(A), with a max level of 94.6dB(A) and minimum level of 55.0dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 9:00am to 1:00pm and on weekends in the period of 9:00am to 5:00pm.

A review of Tables 7 and 8 indicates the most frequent and loudest aircraft types to pass over Leeming are General Aviation aircraft operating to and from Jandakot Airport. There are a high number of non-flight planned operations that depart or arrive at Jandakot, for this reason the most frequent correlated aircraft types were dominated by Unknown movements.

The correlation summary of 40% is a reasonably low result. Whilst the noise created from aircraft may be noticeable, majority of operations flying nearby are not loud enough to create a noise event above the determined threshold settings.

Due to the distinctive flight paths and distance from Jandakot Airport, it is not expected the ratio of arrival and departure flights over Leeming will change due to seasonal variation over a twelve month period.

Further Information

Further information about Airservices noise monitoring program is available on the Airservices website, including reports of the noise and operational data collected by the Noise and Flight Path Monitoring System, as well as fact sheets about topics related to aircraft noise. The website is available at:

<http://www.airservicesaustralia.com/aircraftnoise/>

Contact us

To lodge a complaint or make an enquiry about aircraft operations, you can

- go to WebTrak (www.airservicesaustralia.com/aircraftnoise/webtrak/)
- use our online form (www.airservicesaustralia.com/aircraftnoise/about-making-a-complaint/)
- telephone 1800 802 584 (freecall) or 1300 302 240 (local call –Sydney)
- fax (02) 9556 6641 or
- write to, Noise Complaints and Information Service, PO Box 211, Mascot NSW 1460.

Glossary of Terms

A	Arrivals
AGL	Above Ground Level
Background noise level (L90)	The sound level in dB(A) that is exceeded 90% of the time
CNE	Correlated noise events - noise events which are matched with aircraft movements
CNExx	Correlated noise events that are equal or greater than the noise level XX dB(A)
D	Departures
Day	6:00am to 11:00pm
EMU	Environmental Monitoring Unit
H	Helicopters
Jet	Jet aircraft
LAeq	Continuous equivalent noise level over a time period
LAeq 24hr	Continuous equivalent noise level over a 24 hour period
LAeq night	Continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am)
LAmx	Maximum sound level in dB(A)
Local	Operation that departs and arrives at the same airport. Local movements include circuits and training flights.
Movement	An aircraft operation, such as a take-off or landing
Nxx	Average daily number of correlated noise events equal to or greater than XX dB(A)
Night	11:00pm to 6:00am
NFPMS	Noise and Flight Path Monitoring System
Noise Event	A noise that exceeds the threshold sound level for longer than the threshold time that is set
Non-Jet	Non-jet aircraft
O	Overflight i.e. an aircraft movement that flew over the area but did not arrive or depart from the airport of concern
T	Local Operation (Departure & Arrival)

Note:

For further information on the metrics used in this report refer to Australian Standard 1055.1–1997 “Acoustics – Description and measurement of environmental noise”.

Airservices welcomes comments about this report. Please contact us via e-mail at community.relations@airservicesaustralia.com if you would like to provide feedback.