

# **Short Term Monitoring Program NSW, Concord Report**

February 2013

## Version Control

Version Number	Date	Detail
1.0	February 2013	Initial Release.
2.0	May 2013	Updated EMU Height. Updated table 2 for minimum, maximum and average heights. Updated formatting for table 2, figure 5 and table 4.
3.0	January 2014	Figure 5 and L90 values updated due to technical issue.

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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 – Concord, NSW**

Following recommendations made in the 'Review of the Sydney Environmental Monitoring Units' undertaken by Airservices in 2012, Concord was selected as a Short Term Monitoring Location.

Jet departures off the north/south runway 34 Left traverse the suburb of Concord.

The purpose of this report is to provide a technical summary of the recorded aircraft noise and operational data collected at Concord 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**

22/10/2012 12:00pm – 19/11/2012 12:00pm

### **Environmental Monitoring Unit (EMU) Details**

Location	Stanley Street, Concord 2137
Latitude	33°51'52.88"S
Longitude	151°6'28.08"E
Capture Zone	2.5km radius with 8,021ft (above ground level) height for noise data capture
EMU Altitude	44ft above mean sea level
Threshold Settings	56.0 dB(A) to 59.0 dB(A) depending on time of day

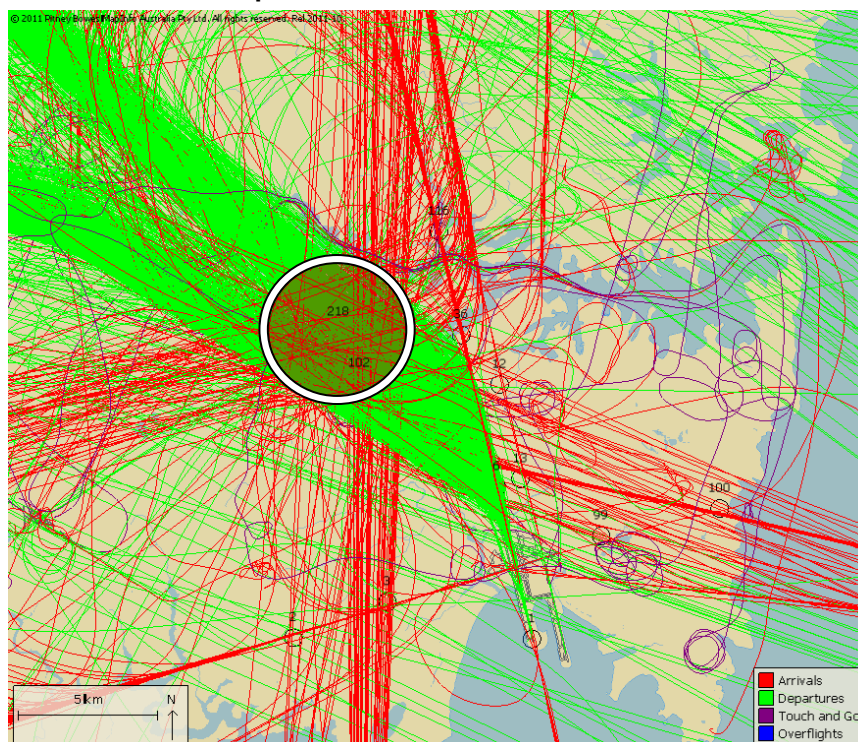
### **Location Images**

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

**Figure 1 Sydney Fixed Environmental Monitoring Unit Locations and the Concord Short Term Monitoring Program Deployment Location**

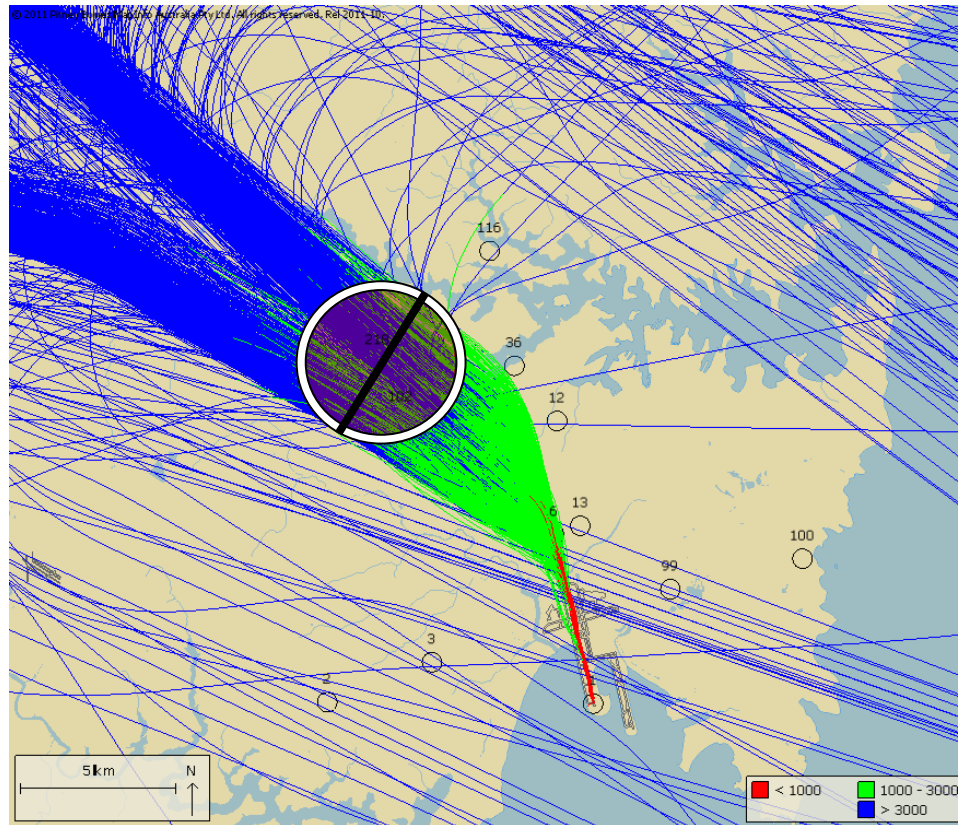


**Figure 2 Total Movements Captured**

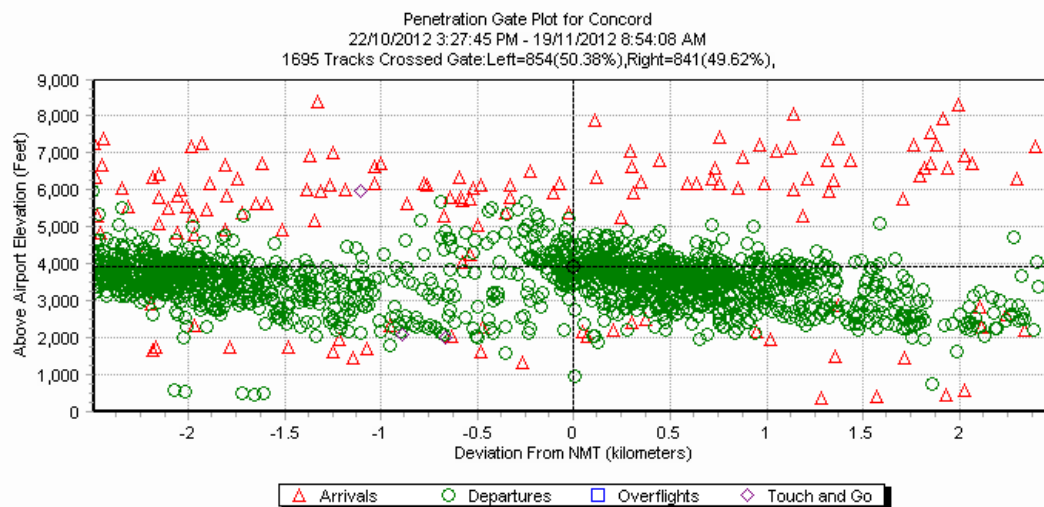




**Figure 3 Sydney Airport Jet Runway 34 Left Departures**



**Figure 4 Concord Movements Through Capture Zone Penetration Gate**



Note: Sydney Airport altitude is 21ft above mean sea level. EMU altitude is 44ft 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

**Table 1 Movement Summary (22/10/2012 12:00pm – 19/11/2012 12:00pm)**

Type of Operation	Jet Runway 34L Departures	All Movements
<i>Number of Movements Through Capture Zone*</i>	1,509	1,755
<i>Number of Movements with Correlated Noise Events (CNE)</i>	1,165	1,213
<i>Correlation Summary</i>	77.20%	69.12%

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

**Table 2 Height Above The Monitor Summary**

Type of Operation	Min*	Max*	Average*
<i>Departures Through Capture Zone**</i>	447	12,051	3,518
<i>Arrivals Through Capture Zone**</i>	357	8,385	5,179
<i>All Operations Through Capture Zone**</i>	357	12,051	3,658

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

\*\* Includes all airports within Sydney Basin.

Figure 4 shows jet departures typically fly at an altitude of 2,000 to 6,000 feet.

**Table 3 Captured Movements Breakdown By Airport and Aircraft Category**

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Sydney</i>	1656	64	0	4	0	<b>1724</b>
<i>Bankstown</i>	0	1	1	3	4	<b>9</b>
<i>Other</i>	0	0	1	17	4	<b>22</b>
<b>Grand Total</b>	<b>1656</b>	<b>65</b>	<b>2</b>	<b>24</b>	<b>8</b>	<b>1755</b>

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

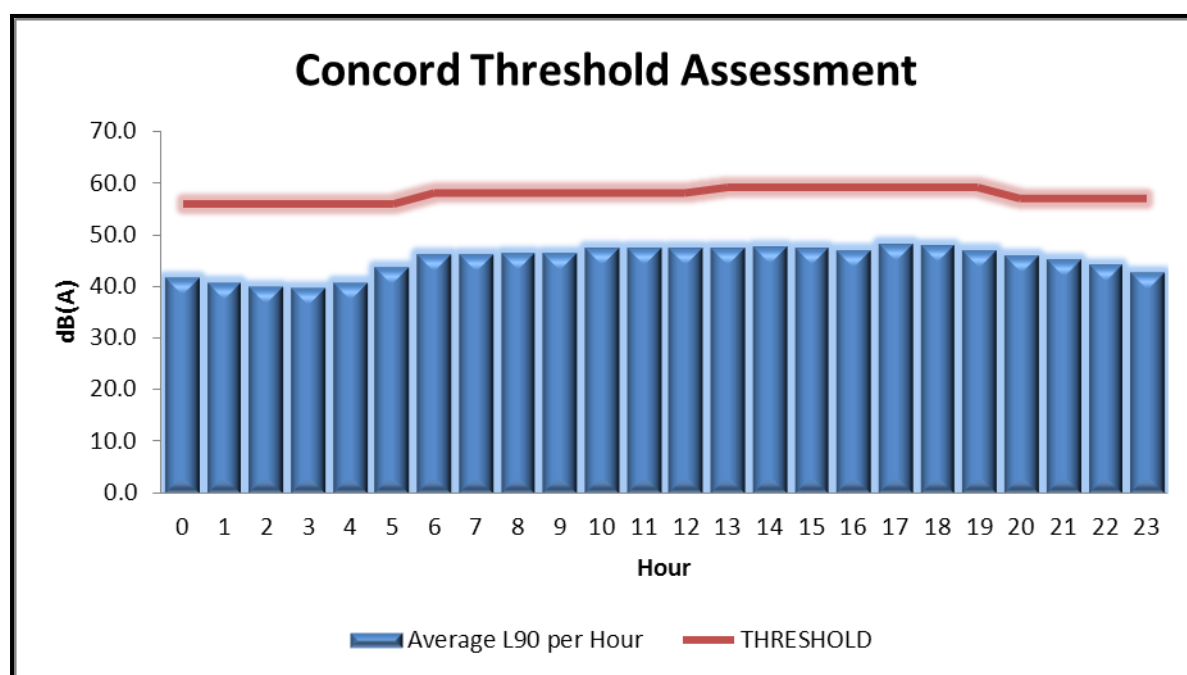
## Correlation Summary

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. The correlation results for the Concord EMU are shown in Table 1. A correlation summary for all movements of 69% is a reasonable result considering the diversity of flight paths over the monitor.

## Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the noise monitor. 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 those jet aircraft that flew over the EMU and departed off Runway 34 Left, 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 <sub>Aeq</sub> 24 hr, dBA	55.9
L <sub>Aeq</sub> (night), dBA	46.7
Background Day (L <sub>90</sub> dBA)	46.7
Background Night (L <sub>90</sub> dBA)	41.2

**Table 5 Correlated Noise Events Summary**

	Jet Runway 34L Departures	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	1165	1213
Number of Correlated Noise Events at night (CNE night)	0	15
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE <sub>xx</sub> ) day/night	CNE <sub>xx</sub>	CNE <sub>xx</sub>
CNE <sub>60</sub> – day	1164	1195
CNE <sub>60</sub> – night	0	14
CNE <sub>65</sub> – day	1069	1083
CNE <sub>65</sub> – night	0	7
CNE <sub>70</sub> – day	630	638
CNE <sub>70</sub> – night	0	0
CNE <sub>75</sub> – day	150	154
CNE <sub>75</sub> – night	0	0
CNE <sub>80</sub> – day	13	13
CNE <sub>80</sub> – night	0	0
Number of Correlated Noise Events (CNE <sub>xx</sub> ) per 24hr period min – max		
CNE <sub>60</sub>	0 to 88	1 to 90
CNE <sub>65</sub>	0 to 83	0 to 83
CNE <sub>70</sub>	0 to 57	0 to 57
CNE <sub>75</sub>	0 to 17	0 to 17
CNE <sub>80</sub>	0 to 2	0 to 2
Average Number of Correlated Noise Events (CNE <sub>xx</sub> Ave.) day/night	CNE <sub>xx</sub> Ave.	CNE <sub>xx</sub> Ave.
CNE <sub>60</sub> Ave. – day	41.57	42.68
CNE <sub>60</sub> Ave. – night	0.00	0.50
CNE <sub>65</sub> Ave. – day	38.18	38.68
CNE <sub>65</sub> Ave. – night	0.00	0.25
CNE <sub>70</sub> Ave. – day	22.50	22.79
CNE <sub>70</sub> Ave. – night	0.00	0.00
CNE <sub>75</sub> Ave. – day	5.36	5.50
CNE <sub>75</sub> Ave. – night	0.00	0.00
CNE <sub>80</sub> Ave. – day	0.46	0.46
CNE <sub>80</sub> Ave. – night	0.00	0.00

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



**Table 6 LMax Summary**

Min dB(A)	Max dB(A)	Average dB(A)
57.4	84.3	70.3

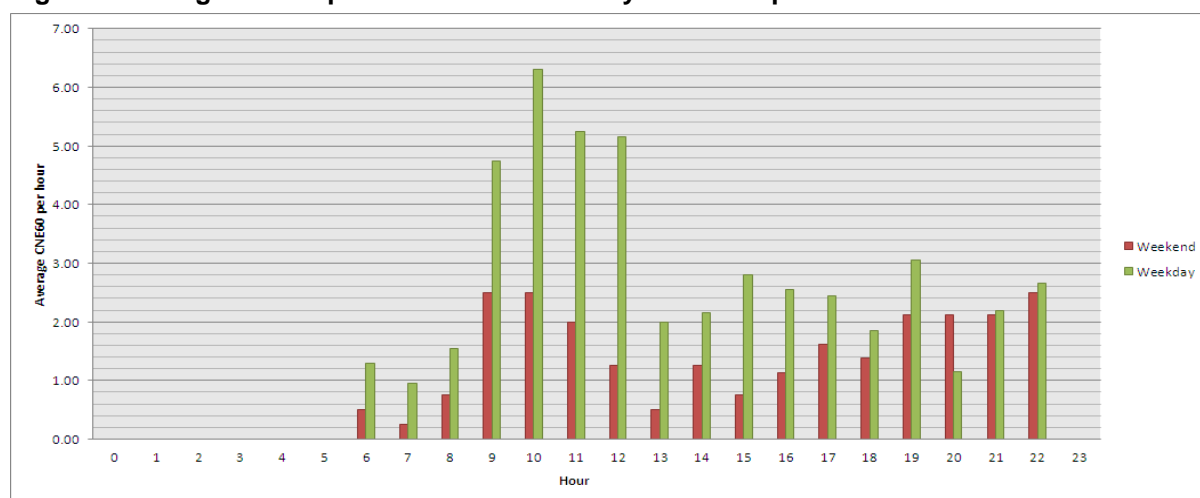
Note: Summary for operations that passed through the correlation zone (2.5km radius with 8,021ft height AGL)

## 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 5 presents daily average number of noise events 60dB(A) or above (CNE<sub>60</sub>) broken down on an hourly basis.

**Figure 6 Average CNE60 per Hour for Jet Runway 34 Left Departures**



The highest number of CNE<sub>60</sub> in any one hour throughout the reporting period was 16 on the 5<sup>th</sup> November 2012 between 10am and 11am.

## 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 (LMax) at the Concord EMU**

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LMax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Airbus A340-500	Sydney	D	34L	3	76.3	77.7	1
Robinson R44	Sydney	T	H	1	75.5	75.5	1
Cessna 404 Titan	Bankstown	T	29R	3	75.4	78.3	3
Unknown Helicopter	Parramatta Heliport	D	H	1	74.6	74.6	1
Boeing 747-800	Sydney	D	34L	2	74.5	75.3	1
Airbus A340-600	Sydney	D	34L	30	74.0	80.5	3
Boeing 747-400	Sydney	D	34L	133	73.7	84.3	11
McDonnell Douglas MD-11	Sydney	D	34L	29	73.3	79.4	3
Airbus A330-300	Sydney	D	34L	172	72.4	80.2	15
AgustaWestland AW139	RPA Hospital	A	H	1	72.2	72.2	1

**Table 8 Top 10 Most Correlated Aircraft Types Over the Concord EMU**

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LMax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Boeing 737-800	Sydney	D	34L	222	67.9	83.3	22
Airbus A330-300	Sydney	D	34L	172	72.4	80.2	15
Airbus A330-200	Sydney	D	34L	160	71.4	82.0	16
Boeing 747-400	Sydney	D	34L	133	73.7	84.3	11
Airbus A320	Sydney	D	34L	91	66.9	76.4	9
Airbus A380	Sydney	D	34L	70	71.5	82.8	6
Boeing 777-300	Sydney	D	34L	59	69.6	75.9	5
Boeing 777-200	Sydney	D	34L	50	70.6	75.6	5
Boeing 767-300	Sydney	D	34L	32	69.9	79.7	3
Airbus A340-600	Sydney	D	34L	30	74.0	80.5	3

## Conclusions

Following recommendations made in 'Review of the Sydney Environmental Monitoring Units', Short Term Monitoring was conducted at Concord during the period of 22<sup>nd</sup> October to 19<sup>th</sup> November 2012. It was determined the most common aircraft movements to traverse the Concord community are jet departures operating from Sydney Airport. There were very few non-Sydney Airport movements that flew through the capture zone during the reporting period; these were predominately helicopter aircraft.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 60dB(A) in one day was 90. On November 5<sup>th</sup>, 16 events exceeding 60dB(A) occurred during 10am and 11am, this was the greatest number in one hour during the period. Residents in the area of Concord were exposed to noise events exceeding 75dB(A) during the hours of day. There were 14 correlated noise events above 60dB(A) that occurred during the hours of night. The average LMax during the reporting period was 70.3dB(A), with a max level of 84.3 dB(A) and minimum level of 57.4 dB(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 periods of 9:00am to 12:00pm and 7:00pm to 11:00pm.

A review of Tables 7 and 8 indicates the most frequent and generally loudest common aircraft types to pass over Concord are Regular Public Transport (RPT) aircraft operating from Sydney Airport. Three helicopters created stand alone noise events during the reporting period placing them in the top 10 average aircraft noise levels. The Airbus A340-600, Airbus A330-300 and Boeing 747-400 feature in both the loudest average aircraft noise levels and most frequent aircraft types to fly over the Concord EMU.

The correlation summary is reasonable for this monitor considering the diversity and average height of the flight paths over the monitor.

Due to the distinctive flight paths and distance from Sydney Airport, it is not expected the ratio of arrival and departure flights over Concord from Sydney Airport 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/](http://www.airservicesaustralia.com/aircraftnoise/webtrak/))
- use our online form ([www.airservicesaustralia.com/aircraftnoise/about-making-a-complaint/](http://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](mailto:community.relations@airservicesaustralia.com) if you would like to provide feedback.