

Short Term Monitoring Program NSW, La Perouse Report

February 2013

Version Control

Version Number	Date	Detail
1.0	February 2013	Initial Release.
2.0	May 2013	Updated formatting for table 2.
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 – La Perouse, NSW

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

Jet and turboprop departures off the north/south runway 16 Left traverse the suburb of La Perouse.

The purpose of this report is to provide a technical summary of the recorded aircraft noise and operational data collected at La Perouse 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	Henry Head Lane, La Perouse 2036
Latitude	33°59'44.44"S
Longitude	151°14'26.80"E
EMU Altitude	16ft above mean sea level
Capture Zone	2.5km radius with 6,567ft (above ground level) height for noise data capture
Threshold Settings	56.0 dB(A) to 58.0 dB(A) depending on time of day

Location Images

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

Figure 1 Sydney Fixed Environmental Monitoring Unit Locations and the La Perouse Short Term Monitoring Program Deployment Location



Figure 2 Total Movements Captured

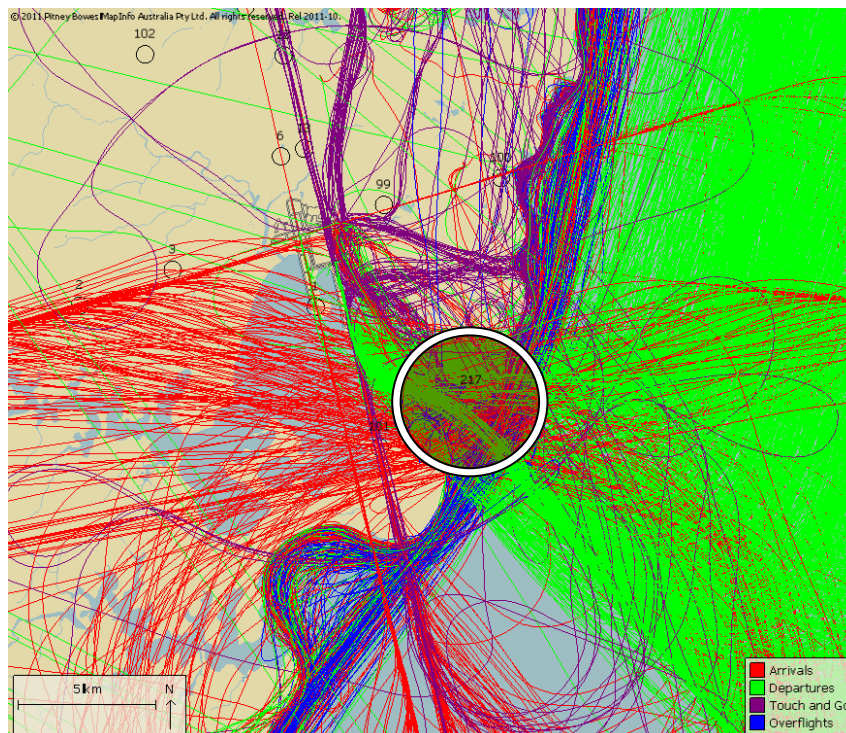


Figure 3 Sydney Airport Jet Runway 16 Left Departures

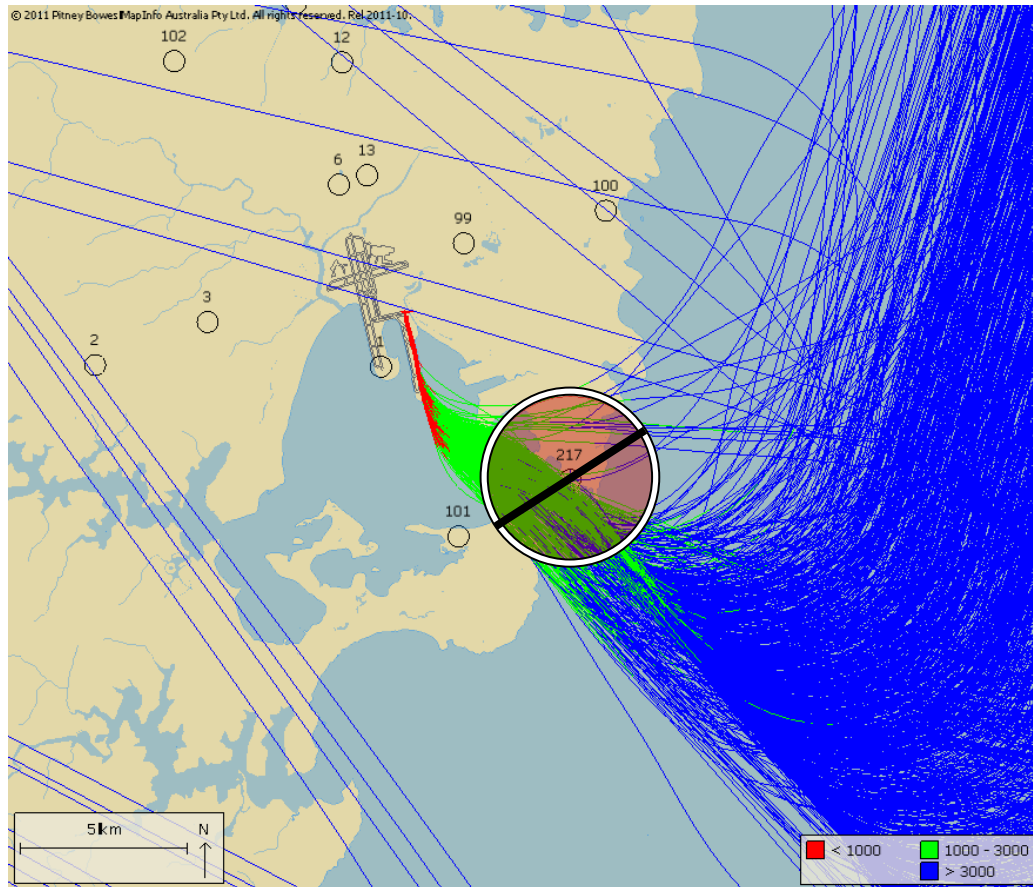
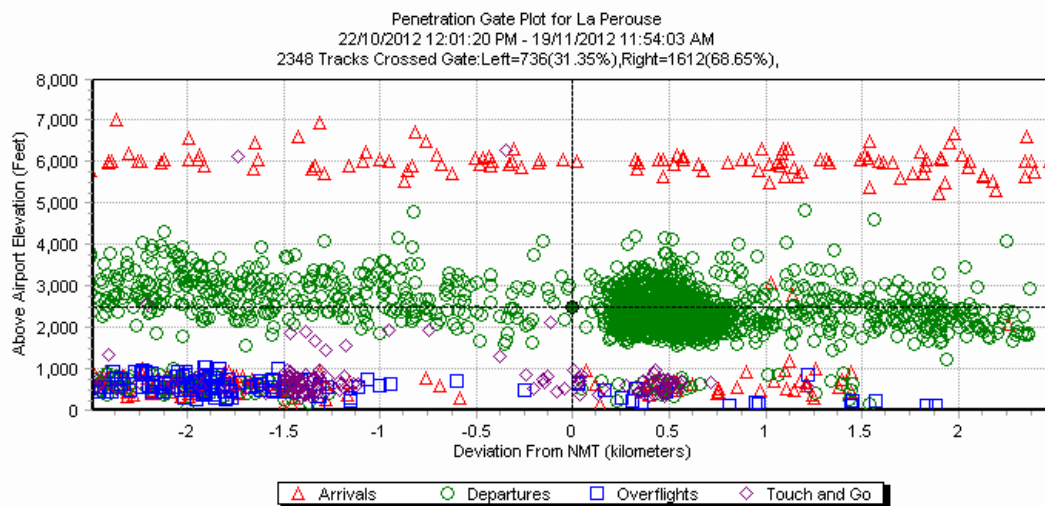


Figure 4 La Perouse Movements Through Capture Zone Penetration Gate



Note: Sydney Airport altitude is 21ft above mean sea level. EMU altitude is 16ft 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 (22/10/2012 12:00pm – 19/11/2012 12:00pm)

Type of Operation	Jet Runway 16L Departures	All Movements
<i>Number of Movements Through Capture Zone*</i>	1,382	2,487
<i>Number of Movements with Correlated Noise Events (CNE)</i>	1,311	1,873
<i>Correlation Summary</i>	94.86%	75.31%

* 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>	33	4,790	2,344
<i>Arrivals Through Capture Zone**</i>	51	7,023	3,340
<i>All Operations Through Capture Zone**</i>	33	7,023	2,254

* 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 that jet departures typically fly at an altitude of 1,500 to 4,000 feet, whilst arrivals are at 5,500 to 6,500 feet.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
<i>Sydney</i>	1,471	609	1	107	0	2,188
<i>Unknown</i>	0	0	0	5	125	130
<i>Bankstown</i>	0	0	25	2	37	64
<i>Other</i>	0	0	25	8	72	105
Grand Total	1,471	609	51	122	234	2,487

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

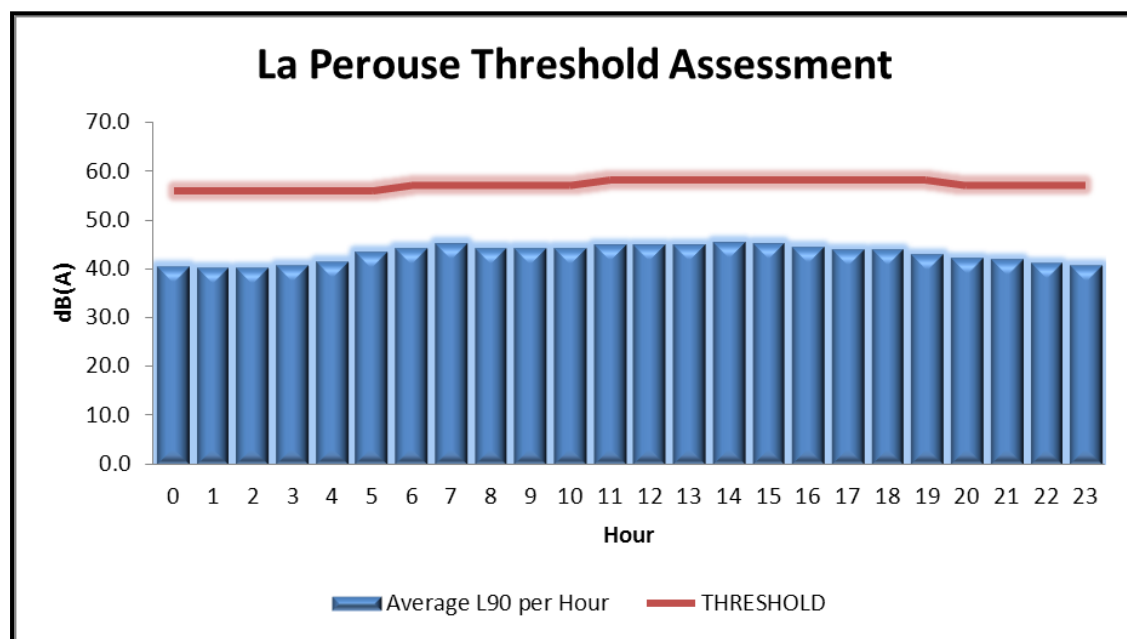
Correlation Summary

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 La Perouse EMU are shown in Table 1. A correlation summary of 95% for jet departures off runway 16 Left is a very good result for a short term monitor. Due to the 299 General Aviation aircraft flying up and down the coast and the quieter arriving aircraft captured within the correlation zone, a correlation summary for all movements of 75% is a good result.

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 noise monitor and departed off Runway 16 Left, as well as all aircraft that flew over the noise monitor, 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	54.4
L _{Aeq} (night), dBA	48.5
Background Day (L ₉₀ dBA)	43.9
Background Night (L ₉₀ dBA)	41.0

Table 5 Correlated Noise Events Summary

	Jet Runway 16L Departures	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	1311	1873
Number of Correlated Noise Events at night (CNE night)	0	4
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	1307	1838
CNE ₆₀ - night	0	4
CNE ₆₅ – day	1263	1570
CNE ₆₅ – night	0	2
CNE ₇₀ – day	1084	1130
CNE ₇₀ - night	0	1
CNE ₇₅ – day	120	133
CNE ₇₅ - night	0	1
CNE ₈₀ – day	1	5
CNE ₈₀ - night	0	1
Number of Correlated Noise Events (CNE _{xx}) per 24hr period min – max		
CNE ₆₀	0 to 106	5 to 136
CNE ₆₅	0 to 104	3 to 120
CNE ₇₀	0 to 95	2 to 96
CNE ₇₅	0 to 18	0 to 18
CNE ₈₀	0 to 1	0 to 2
Average Number of Correlated Noise Events (CNE _{xx} Ave.) day/night	CNE _{xx} Ave.	CNE _{xx} Ave.
CNE ₆₀ Ave. – day	46.68	65.64
CNE ₆₀ Ave. – night	0.00	0.14
CNE ₆₅ Ave. – day	45.11	56.07
CNE ₆₅ Ave. – night	0.00	0.07
CNE ₇₀ Ave. – day	38.71	40.36
CNE ₇₀ Ave. – night	0.00	0.04
CNE ₇₅ Ave. – day	4.29	4.75
CNE ₇₅ Ave. – night	0.00	0.04
CNE ₈₀ Ave. – day	0.04	0.18
CNE ₈₀ Ave. – night	0.00	0.04

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

Table 6 LAmix Summary

Min dB(A)	Max dB(A)	Average dB(A)
57.0	84.0	70.0

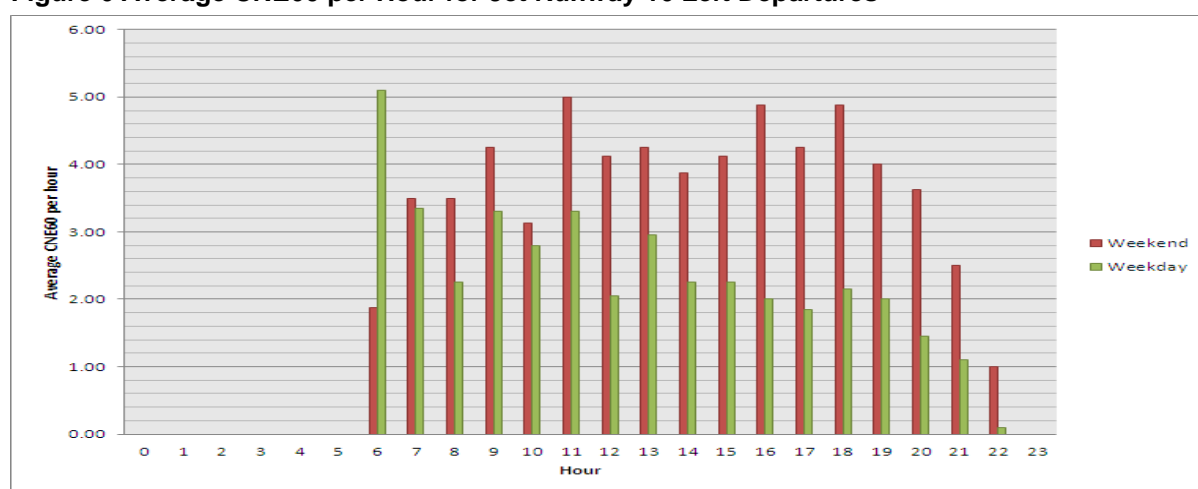
Note: Summary for operations that passed through the correlation zone (2.5km radius with 6,567ft height AGL)

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 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 Jet Runway 16 Left Departures



The highest number of CNE₆₀ in any one hour throughout the reporting period was 16 on both the 31st October 2012 between 1pm and 2pm and the 17th November 2012 between 6pm and 7pm.

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 (LAmix) at the La Perouse EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmix dB(A)		Highest No. CNE in One Day
					Average	Maximum	
AgustaWestland AW139	RPA Hospital	A	H	1	80.1	80.1	1
Boeing 767-300	Sydney	D	16R	1	79.2	79.2	1
McDonnell Douglas MD-11	Sydney	D	16L	1	78.9	78.9	1
Airbus A330-200	Sydney	D	16L	1	77.7	77.7	1
Boeing 757-200	Sydney	D	16L	4	76.9	79.8	1
Airbus A330-300	Sydney	D	16L	4	75.4	76.0	1
Unknown	Richmond	A	-	1	75.0	75.0	1
Boeing 737-400	Sydney	D	16L	35	73.9	78.3	6
Unknown	Victoria Barracks	A	-	1	73.3	73.3	1
Boeing 767-300	Sydney	D	16L	97	73.3	78.8	10

Table 8 Top 10 Most Correlated Aircraft Types Over the La Perouse EMU

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	L _{max} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Boeing 737-800	Sydney	D	16L	646	71.7	84.0	50
Airbus A320	Sydney	D	16L	389	72.7	78.9	33
Dash 8-300	Sydney	D	16L	111	65.5	82.4	13
Boeing 767-300	Sydney	D	16L	97	73.3	78.8	10
Saab 340	Sydney	D	16L	91	65.8	77.7	11
Dash 8-400	Sydney	D	16L	84	65.5	73.1	7
Embraer E190	Sydney	D	16L	51	64.7	74.6	7
Unknown	-	O	-	43	66.9	82.0	22
Jetstream Super 32	Sydney	D	16L	42	64.5	69.3	4
Boeing 737-400	Sydney	D	16L	35	73.9	78.3	6

Conclusions

Following recommendations made in 'Review of the Sydney Environmental Monitoring Units', Short Term Monitoring was conducted at La Perouse during the period of 22nd October to 19th November 2012. It was determined the most common aircraft movements to traverse the La Perouse community are jet departures operating from Sydney Airport. In comparison there were few non-Sydney Airport movements that flew through the capture zone during the reporting period; whilst majority of these operations do not have flight planned information it can be assumed they were predominately helicopter aircraft.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 60dB(A) in one day was 136. On October 31st between 1pm and 2pm and November 17th between 6pm and 7pm, 16 events exceeding 60dB(A) occurred, this was the greatest number in one hour during the period. Residents in the area of La Perouse were exposed to noise events exceeding 75dB(A) during the hours of day and night. There were 4 correlated noise events above 60dB(A) during the reporting period that occurred during the hours of night. The average L_{max} during the reporting period was 70.0dB(A), with a max level of 84.0 dB(A) and minimum level of 57.0 dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 6:00am to 12:00pm and on weekends in the period of 11:00am to 7:00pm.

A review of Tables 3 and 4 indicates the most frequent and generally loudest common aircraft types to pass over La Perouse are Regular Public Transport (RPT) aircraft operating from Sydney Airport. A single AgustaWestland AW139 (helicopter) operating to the Royal Prince Alfred Hospital created a noise event that placed it as the loudest aircraft on average. The Boeing 737-400 and Boeing 767-300 feature in both the loudest average aircraft noise levels and most frequent aircraft types to fly over the La Perouse EMU.

A correlation summary of 95% for jet departures off runway 16 Left is a very good result for a short term monitor. Due to the 299 General Aviation aircraft flying up and down the coast and the quieter arriving aircraft captured within the correlation zone, a correlation summary for all movements of 75% is a good result.

Due to the distinctive flight paths and distance from Sydney Airport, it is not expected the ratio of arrival and departure flights over La Perouse 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/)
- 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.