Short Term Monitoring Program

Georges Hall Report, NSW

connecting australian aviation

Change Summary

Version 1: 10 Dec 2013		
Section/ Clause	**Summary**	**NRFC**

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1. Deployment Details

1.1 Deployment Purpose

Short term noise monitoring was conducted at Georges Hall following recommendations made by the community.

The noise monitor was located to the north of Bankstown airport. During the reporting period the area was predominately traversed by Bankstown circuit movements Due to the distinctive flight paths and distance from Bankstown Airport, it is not expected the ratio of arrival and departure flights over Georges Hall will change due to seasonal variation over a twelve month period.

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

1.2 Deployment Monitoring Period

05/08/2013 12:00am – 02/09/2013 12:00am

1.3 Noise Monitoring Terminal (NMT) Details

Location	Private Residence, Georges Hall, NSW 2198
Latitude	33°54'43.71"S
Longitude	150°59'2.88"E
NMT Altitude	82ft above mean sea level
Capture Zone	2.5km radius with 8,000ft (above ground level) height for noise data capture
Threshold Settings	56.0 dB(A) to 63.0 dB(A) depending on time of day

2. Location Images

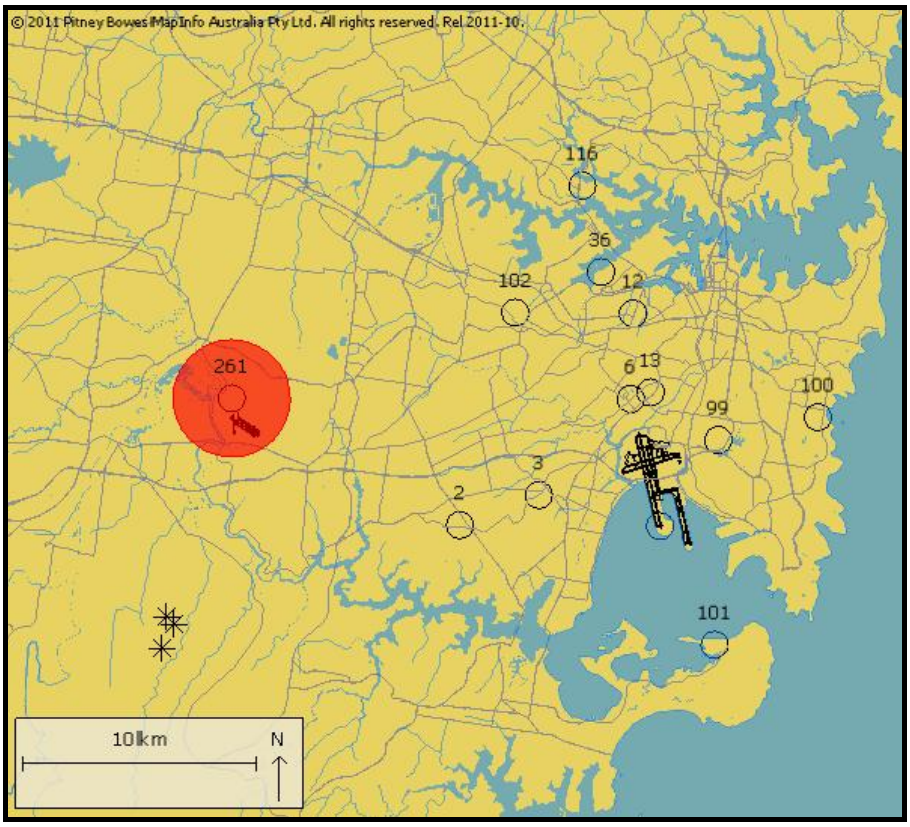

Figure 1: Sydney Fixed NMT Location and the Georges Hall Short Term Monitoring Program Deployment Location

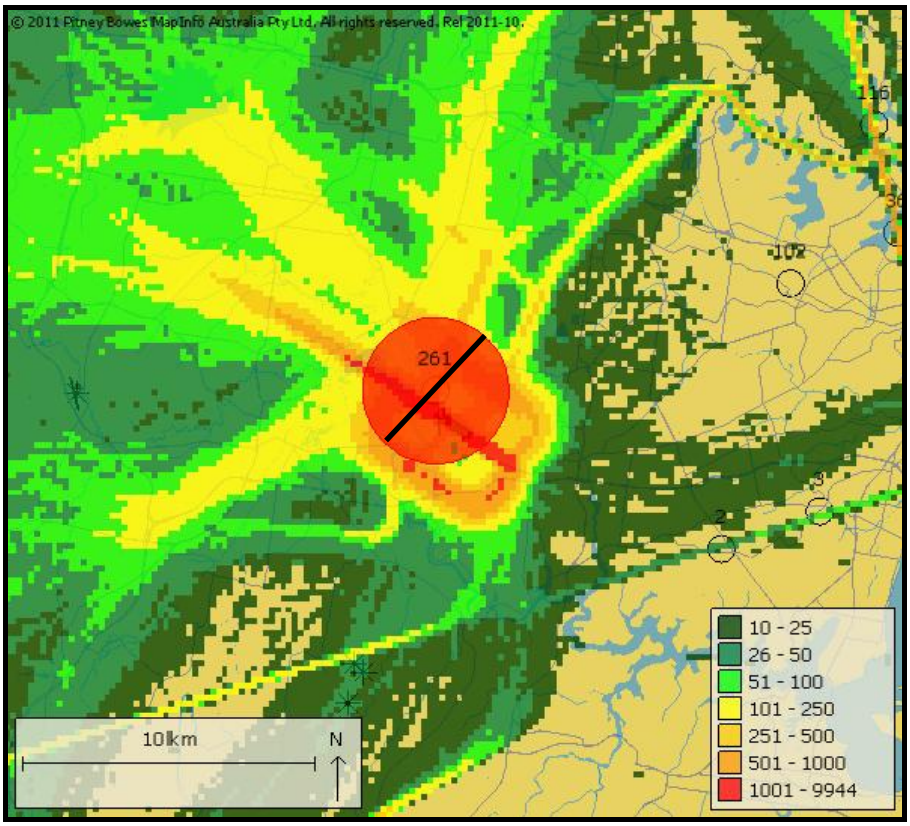

Figure 2: Total Movements Captured Track Density

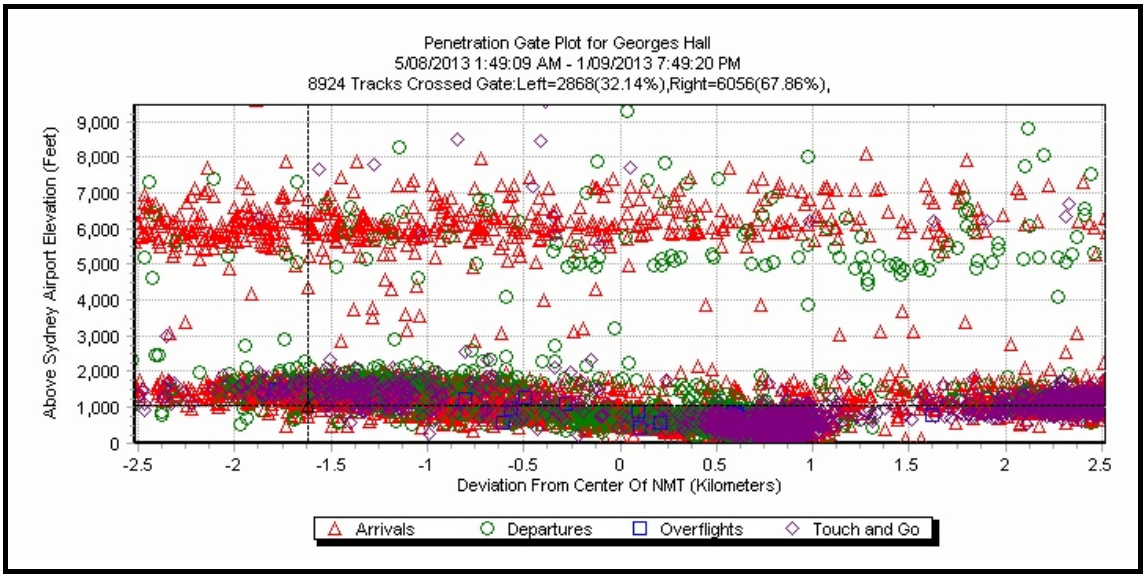

Figure 3: Georges Hall Movements Through Capture Zone Penetration Gate

Note: Sydney Airport is 21ft above mean sea level. Bankstown Airport is 29ft above mean sea level. NMT altitude is 82ft above mean sea level. The NMT altitude should be adjusted from the data shown above in order to draw conclusions about height above ground of aircraft operations.

The black line though the capture zone in Figure 2 is a penetration gate, which was crossed by all the flights shown in Figure 3. Some movements within the capture zone are not shown as they did not cross the penetration gate. Some flights may cross the penetration gate more than once, at different altitudes. This may happen, for example, if a flight passes through the penetration gate at a low altitude soon after take off, then again after having climbed to a higher altitude.

3. Deployment Findings

The following tables present a summary of the operations data.

Table 1 Movement Summary (05/08/2013 12:00am – 02/09/2013 12:00am)

Type of Operation	Bankstown Airport Movements	All Movements
Number of Movements Through Capture Zone*	8,679	9,944
Number of Correlated Noise Events (CNE)	3,653	3,908
Number of Movements with Correlated Noise Events (CNE)	3,092	3,322
Correlation Summary	35.63%	33.41%

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

Note: ** May include operations that produced multiple noise events.

3.1 Correlation Summary

An evaluation of the number of aircraft operations were matched with noise events recorded by the NMT. This is an important aspect of assessing performance of the noise monitoring installation. Ideally, all operations passing the NMT 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 33% is considered to be a low result, based on reviews of fixed noise monitoring terminals nationally.

3.2 Movement Analysis

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

Type of Operation	Min*	Max*	Average*
Departures Through Capture Zone**	0	9,223	926
Arrivals Through Capture Zone**	0	12,068	1,656
All Operations Through Capture Zone**	0	12,240	1,331

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

Note: ** Includes all airports within Sydney Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
Bankstown	94	298	1,146	119	7,022	8,679
Sydney	604	291	3	44	0	942
Other	1	0	5	44	273	323
Grand Total	**699**	**589**	**1,154**	**207**	**7,295**	**9,944**

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

3.3 Background Noise Levels and Threshold Settings

At the monitoring site, background noise levels are first assessed to determine the appropriate threshold settings for the NMT. 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 4.

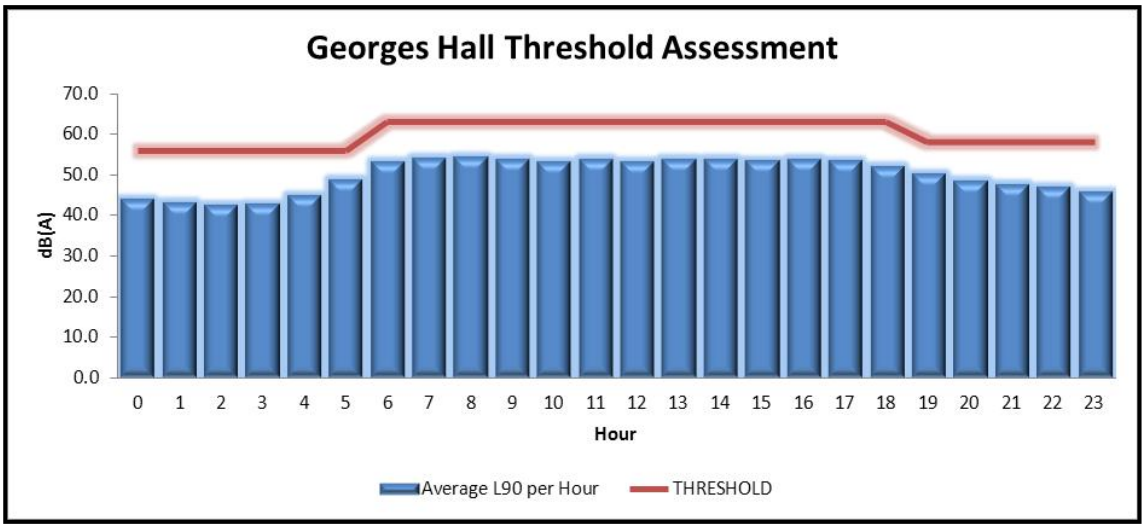

Figure 4: Background and Threshold Assessment

4. Noise Level 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 Bankstown Airport movements that flew over the NMT, as well as all aircraft that flew over the NMT, noting that this area is affected by arrivals, departures and training flights, as shown in Figure 2.

Table 4 Noise Summary

Noise Parameters	Noise Level (dB(A))
LAeq 24 hr, dB(A)	58.4
LAeq (night), dB(A)	52.2
Background Day (L90 dB(A))	52.5
Background Night (L90 dB(A))	44.6

Table 5 Correlated Noise Events Summary

	Bankstown Airport Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	3,653	3,908
Number of Correlated Noise Events at night (CNE night)	172	182
Operational Days	28	28
Number of Correlated Noise Events (CNExx) day/night	**CNExx**	**CNExx**
CNE_{60} – day	N/A	N/A
CNE_{60} - night	N/A	N/A
CNE_{65} – day	3,134	3,332
CNE_{65} – night	90	94
CNE_{70} – day	1,269	1,364
CNE_{70} - night	13	14
CNE_{75} – day	232	251
CNE_{75} - night	1	1
CNE_{80} – day	46	54
CNE_{80}- night	0	0

Number of Correlated Noise Events (CNExx) per 24hr period min – max	Bankstown Airport Movements	All Aircraft
CNE_{60}	N/A	N/A
CNE_{65}	58 to 173	66 to 177
CNE_{70}	26 to 81	30 to 85
CNE_{75}	1 to 23	1 to 24
CNE_{80}	0 to 5	0 to 6
Average Number of Correlated Noise Events (CNExx Ave.) day/night	**CNExx Ave.**	**CNExx Ave.**
CNE_{60} Ave. – day	N/A	N/A
CNE_{60} Ave. – night	N/A	N/A
CNE_{65} Ave. – day	111.93	119.00
CNE_{65} Ave. – night	3.21	3.36
CNE_{70} Ave. – day	45.32	48.71
CNE_{70} Ave. – night	0.46	0.50
CNE_{75} Ave. – day	8.29	8.96
CNE_{75} Ave. – night	0.04	0.04
CNE_{80} Ave. – day	1.64	1.93
CNE_{80} Ave. – night	0.00	0.00

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

Note: The count of CNE60 events are not applicable due to the threshold settings of 56-63dB(A) as depicted in Figure 4.

Table 6 LAmax Summary

Min dB(A)	Max dB(A)	Average dB(A)
57.5	98.5	68.9

Note: Summary for operations that passed through the correlation zone (2.5km radius with 8,000ft height AGL)

4.1 CNE Count by Hour

A large number of noise events occurred between 70dB(A) and 75dB(A). Therefore further investigation was undertaken on the number of correlated noise events that exceed 70dB(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 70dB(A) or above (CNE_{70}) broken down on an hourly basis.

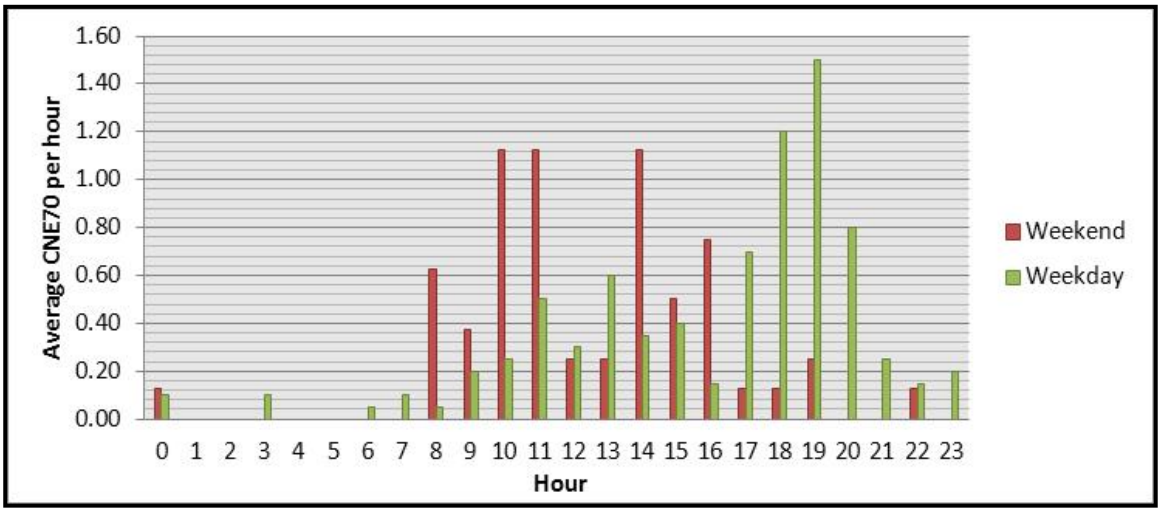

Figure 5: Average CNE70 per Hour for All Operations

The highest number of CNE70 in any one hour throughout the reporting period was 10. This occurred between 6pm and 7pm on July 25th.

5. Aircraft Noise Levels

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

Table 7 Top 10 Average Aircraft Noise Levels (LAmax) at the Georges Hall Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Unknown	Camden	D	06	1	80.8	80.8	1
Bell 429 (H)	Sydney	D	H	1	80.0	80.0	1
Cessna 210 (P)	Bankstown	D	29R	6	79.4	81.8	1
Britten-Norman Islander (P)	Bankstown	D	29R	1	78.9	78.9	1
Britten-Norman Islander (P)	Bankstown	D	Unknown	1	78.8	78.8	1
Cessna 210 (P)	Bankstown	D	Unknown	1	78.8	78.8	1
Cessna 210 (P)	Bankstown	T	29C	1	78.6	78.6	1
Cessna 210 (P)	Bankstown	T	29R	2	77.5	78.0	1
Britten-Norman Islander (P)	Bankstown	D	29C	1	77.3	77.3	1
GippsAero GA8 Airvan (P)	Bankstown	D	29R	1	77.0	77.0	1

Table 8 Top 10 Most Correlated Aircraft Types Over the Georges Hall Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Unknown (U)	Bankstown	A	Unknown	444	69.8	91.8	44
Unknown (U)	Bankstown	D	Unknown	335	69.7	79.1	25
Unknown (U)	Bankstown	D	29R	299	69.7	83.8	20
Unknown (U)	Bankstown	T	29L	288	68.5	81.8	32
Unknown (U)	Bankstown	A	29R	237	69.7	83.2	18
Unknown (U)	Bankstown	A	29L	190	69.1	84.3	22
Unknown (U)	Bankstown	T	29R	168	69.4	83.5	15
Unknown (H)	Bankstown	A	H	119	68.3	82.4	15
Piper PA-31 Navajo (P)	Bankstown	D	29C	115	71.9	83.7	8
Unknown (U)	Bankstown	D	29C	93	70.4	82.6	7

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

Note: **Operation Type:** Arrival (A), Departure (D), Local Operation (T), Overflight (O)

6. Conclusions

Short term noise monitoring was conducted in Georges Hall during the period of 5th August to 2nd September 2013. This followed recommendations made by the community. The most common aircraft movements to traverse Georges Hall are Bankstown Airport movements.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 70dB(A) in one day was 85.

The highest number of CNE70 in any one hour throughout the reporting period was 10. This occurred between 6pm and 7pm on July 25th. Residents in the area of Georges Hall were exposed to a correlated noise events exceeding 70dB(A) during the day and night. There were 94 correlated noise events above 65dB(A) that occurred during the hours of night. The average correlated LAmax during the reporting period was 68.9dB(A), with a max level of 98.5dB(A) and minimum level of 57.5dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 6:00pm to 8:00pm and the weekend hours of 10:00am to 12:00pm and 2:00pm to 3:00pm.

A review of Tables 7 and 8 indicates the most frequent and loudest aircraft types to pass over Georges Hall are General Aviation aircraft operating to and from Bankstown Airport. Non-flight planned operations captured in the NFPMS are assigned as “Unknown” as there is no call sign or aircraft type information associated with them. As shown in Table 8 there was a high number of non-flight planned operations that departed or arrived at Bankstown during the reporting period.

The correlation summary of 33% for all movements is considered a low result based on reviews of fixed noise monitoring terminals nationally. Whilst the noise created by these operations maybe noticeable to the human ear, they do not meet the correlation parameters for the monitor.

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

7. 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/

8. 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 ACT 1460.

9. 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
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)
LAmax	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
NMT	Noise Monitoring Terminal
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”.

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