

Short Term Monitoring Program

Googong Report, ACT

Change Summary

Version 1: 1 Nov 2013		
Section/ Clause	Summary	NRFC

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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.

1. Deployment Details

1.1 Deployment Purpose

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

The noise monitor was located to the south of Canberra airport. During the reporting period the area was predominately traversed by Runway 35 arrivals. Due to the distinctive flight paths and distance from Canberra Airport, it is not expected the ratio of arrival and departure flights over Googong 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 Googong 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

22/07/2013 12:00am – 19/08/2013 12:00am

1.3 Noise Monitoring Terminal (NMT) Details

Location	Private Residence, Googong, ACT 2620
Latitude	35°27'26.32"S
Longitude	149°11'34.54"E
NMT Altitude	2,572ft above mean sea level
Capture Zone	2.5km radius with 8,000ft (above ground level) height for noise data capture
Threshold Settings	55.0 dB(A) to 56.0 dB(A) depending on time of day

2. Location Images

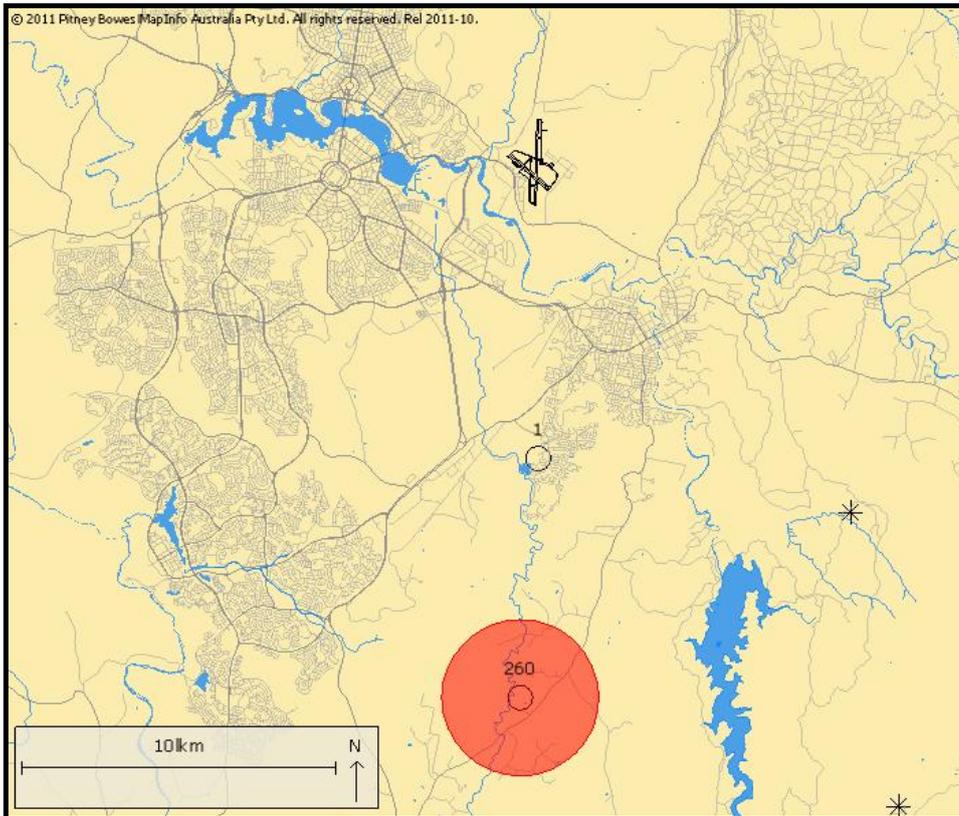


Figure 1: Canberra Fixed NMT Location and the Googong Short Term Monitoring Program Deployment Location

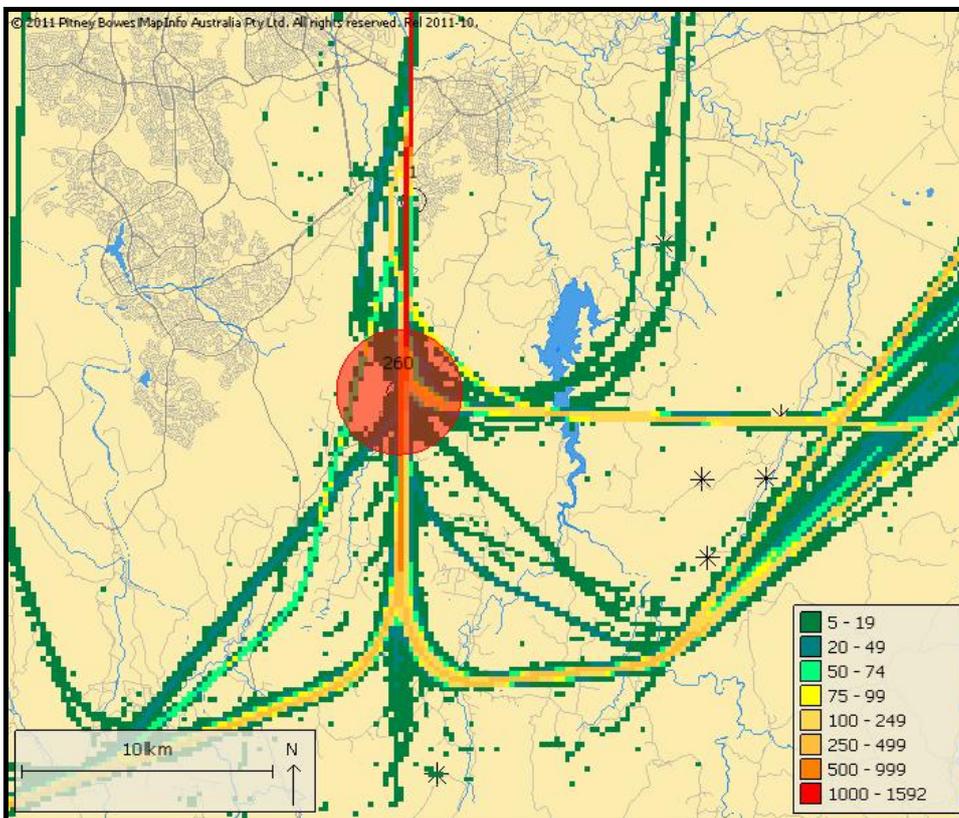


Figure 2: Total Movements Captured Track Density

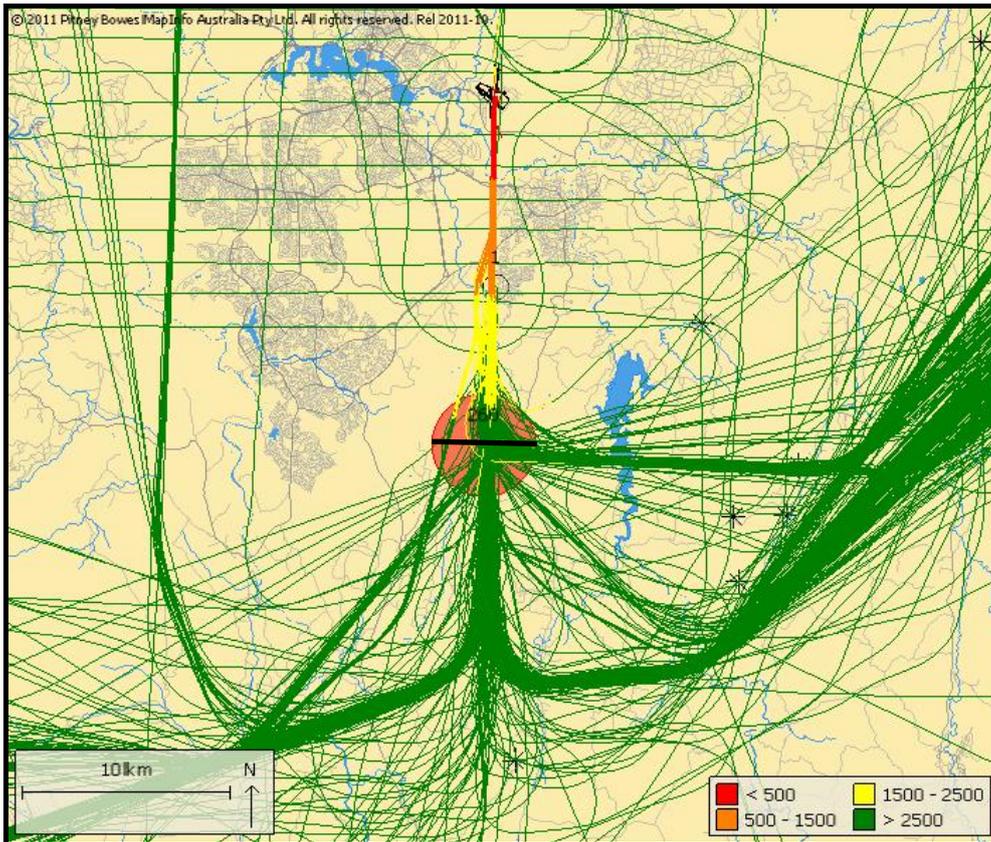


Figure 3: Canberra Airport Runway 35 Arrival Movements Captured

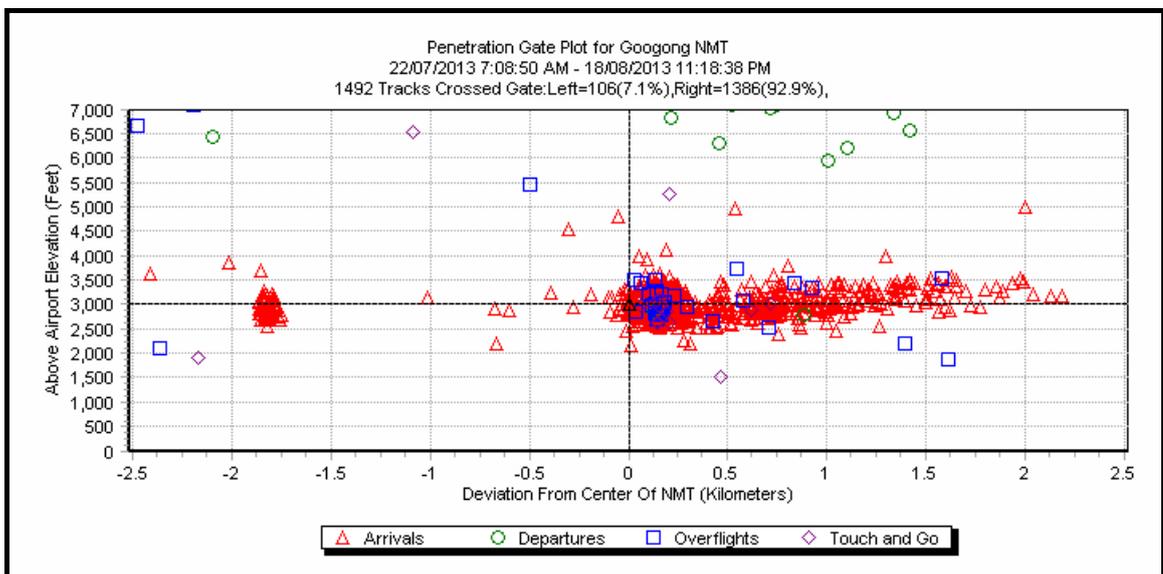


Figure 4: Googong Movements Through Capture Zone Penetration Gate

Note: Canberra Airport is 1,886ft above mean sea level. NMT altitude is 2,572ft 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 through the capture zone in Figure 3 is a penetration gate, which was crossed by all the flights shown in Figure 4. 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 (22/07/2013 12:00am – 19/08/2013 12:00am)

Type of Operation	Runway 35 Arrival Movements	All Movements
Number of Movements Through Capture Zone*	1,504	1,592
Number of Correlated Noise Events (CNE)	1,295	1,359
Number of Movements with Correlated Noise Events (CNE)	1,289	1,347
Correlation Summary	85.70%	84.61%

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 85% is considered to be a good 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**	2,096	9,179	6,399
Arrivals Through Capture Zone**	1,418	4,315	2,324
All Operations Through Capture Zone**	827	9,179	2,414

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 Canberra Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
Canberra	931	598	28	0	0	1,557
Other	6	6	6	17	0	35
Grand Total	937	604	34	17	0	1,592

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 5.

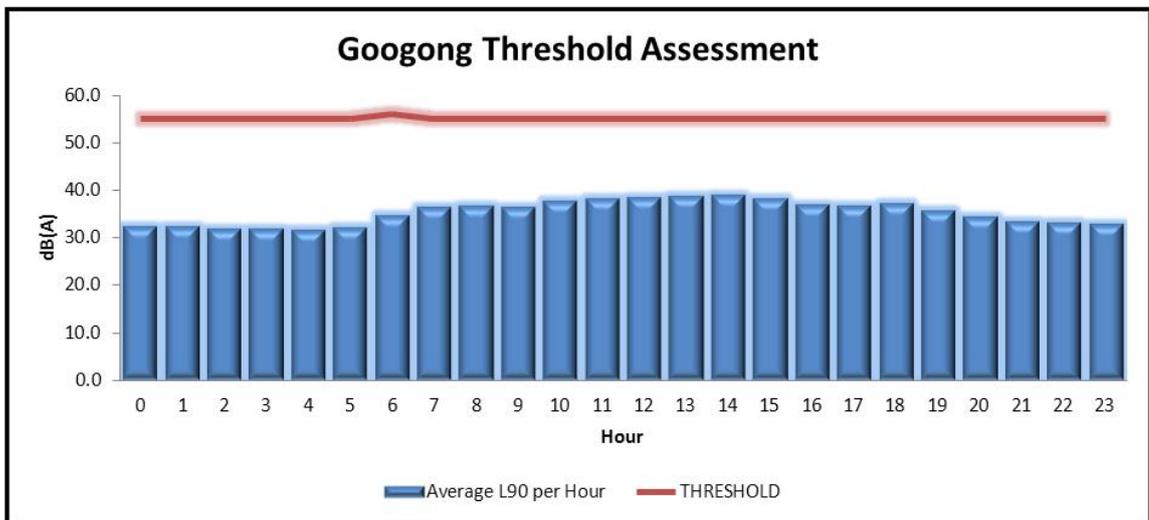


Figure 5: Background and Threshold Assessment

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 Canberra Runway 35 arrival 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 and Figure 3.

Table 4 Noise Summary

Noise Parameters	Noise Level (dB(A))
LAeq 24 hr, dB(A)	50.4
LAeq (night), dB(A)	44.6
Background Day (L90 dB(A))	36.6
Background Night (L90 dB(A))	31.9

Table 5 Correlated Noise Events Summary

	Runway 35 Arrival Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	1,295	1,359
Number of Correlated Noise Events at night (CNE night)	10	11
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	1,264	1,320
CNE ₆₀ - night	10	10
CNE ₆₅ – day	993	1,021
CNE ₆₅ – night	6	6
CNE ₇₀ – day	227	241
CNE ₇₀ - night	0	0
CNE ₇₅ – day	15	20
CNE ₇₅ - night	0	0
CNE ₈₀ – day	2	2
CNE ₈₀ - night	0	0

Number of Correlated Noise Events (CNExx) per 24hr period min – max	Runway 35 Arrival Movements	All Aircraft
CNE ₆₀	2 to 63	11 to 65
CNE ₆₅	2 to 58	7 to 59
CNE ₇₀	0 to 21	0 to 22
CNE ₇₅	0 to 2	0 to 2
CNE ₈₀	0 to 1	0 to 1
Average Number of Correlated Noise Events (CNExx Ave.) day/night	CNExx Ave.	CNExx Ave.
CNE ₆₀ Ave. – day	45.14	47.14
CNE ₆₀ Ave. – night	0.36	0.36
CNE ₆₅ Ave. – day	35.46	36.46
CNE ₆₅ Ave. – night	0.21	0.21
CNE ₇₀ Ave. – day	8.11	8.61
CNE ₇₀ Ave. – night	0.00	0.00
CNE ₇₅ Ave. – day	0.54	0.71
CNE ₇₅ Ave. – night	0.00	0.00
CNE ₈₀ Ave. – day	0.07	0.07
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.

Table 6 L_{Amax} Summary

Min dB(A)	Max dB(A)	Average dB(A)
56.8	90.5	67.0

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 60dB(A) and 70B(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 (CNE_{60}) broken down on an hourly basis.

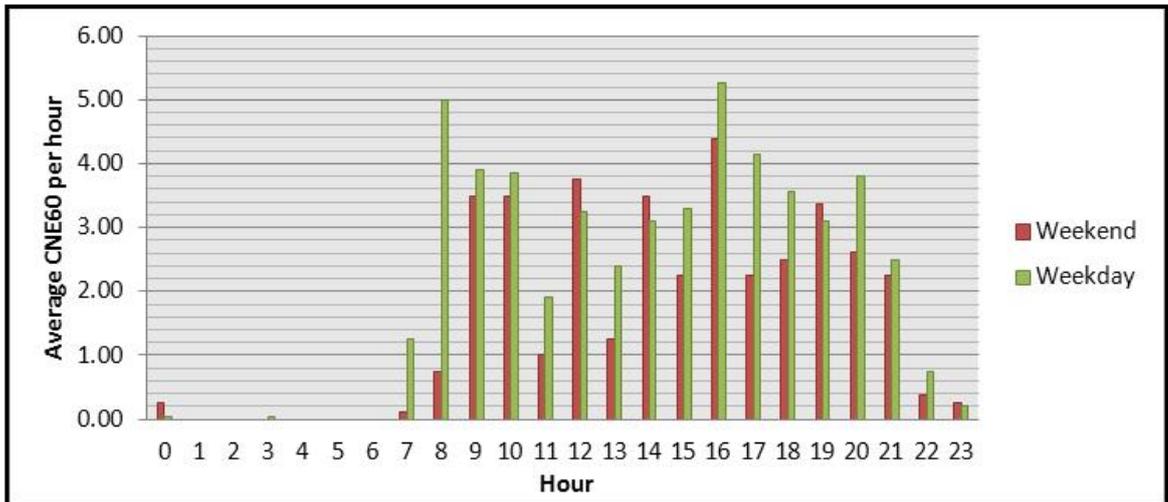


Figure 6: Average CNE60 per Hour for All Operations

The highest number of CNE60 in any one hour throughout the reporting period was 9. This occurred between 4pm and 5pm on August 6th and between 8am and 9am on August 12th.

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 Googong Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Bell 412 (H)	Canberra Hospital	A	H	1	78.6	78.6	1
Bell 412 (H)	Unknown	O	Unknown	1	77.2	77.2	1
Boeing C-17 Globemaster III (J)	Canberra	A	35	1	75.6	75.6	1
Airbus A330-200 (J)	Canberra	A	35	1	75.2	75.2	1
MH-60 Seahawk (H)	Nowra	O	Unknown	1	72.3	72.3	1
Boeing 737 AEW&C (J)	Williamtown	O	Unknown	3	72.0	77.6	1
MRH-90 Taipan (H)	Nowra	O	Unknown	3	71.9	74.3	1
Boeing 737 (J)	Canberra	A	17	1	70.8	70.8	1
AgustaWestland AW139 (H)	Canberra Hospital	A	Unknown	1	70.6	70.6	1
Cessna 525B Citation CJ3 (J)	Bankstown	O	Unknown	1	70.5	70.5	1
Airbus A330-200 (J)	Amberley	O	Unknown	1	70.5	70.5	1

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

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
deHavilland Dash 8 400 (T)	Canberra	A	35	289	65.0	71.9	15
Boeing 737-400 (J)	Canberra	A	35	233	69.6	74.9	13
Embraer E-190 (J)	Canberra	A	35	223	67.9	77.3	14
Boeing 737-800 (J)	Canberra	A	35	209	68.5	75.7	15
ATR 72-600 (T)	Canberra	A	35	153	66.0	83.5	10
ATR 72-500 (T)	Canberra	A	35	35	66.5	71.5	8
Bombardier Challenger 600 (J)	Canberra	A	35	33	65.0	90.5	4
deHavilland Dash 8 300 (T)	Canberra	A	35	20	66.4	71.5	3
Beechcraft Super King Air (T)	Canberra	A	35	20	63.1	66.9	2
Boeing 737 (J)	Canberra	A	35	15	67.9	72.5	2
Jetstream 32 (J)	Canberra	A	35	15	64.7	67.9	2

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)

Note: 11 Aircraft in each table due to equal 10th Loudest and Most Frequent Aircraft Type.

6. Conclusions

Short term noise monitoring was conducted in Googong during the period of 22nd July to 18th August 2013. This followed recommendations made by the community. The most common aircraft movements to traverse the Googong are Canberra Regular Public Transport (RPT) Runway 35 arrivals.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 70dB(A) in one day was 22.

The highest number of CNE60 in any one hour throughout the reporting period was 9. This occurred between 4pm and 5pm on August 6th and between 8am and 9am on August 12th. Residents in the area of Googong were exposed to a correlated noise events exceeding 75dB(A) during the day. There were 10 correlated noise events above 60dB(A) that occurred during the hours of night. The average correlated L_{Amax} during the reporting period was 67.0dB(A), with a max level of 90.5dB(A) and minimum level of 56.8dB(A) recorded.

Noise events above 60dB(A) were most common in the weekday hours of 8:00am to 9:00am and both the weekday and weekend hours of 4:00pm to 5:00pm.

A review of Tables 7 and 8 indicates the loudest movements residents of Googong experience are one off military operations and Canberra Hospital helicopter events. The most frequent correlated movements are Canberra Airport Runway 35 arrivals.

The correlation summary of 85% for all movements is considered a good result based on reviews of fixed noise monitoring terminals nationally. During the reporting period Canberra Runway 35 arrivals had a correlation summary of 86%.

Due to the distinctive flight paths and distance from Canberra Airport, it is not expected the ratio of arrival and departure flights over Googong 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)
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
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.