Short Term Monitoring Program

Palm Beach Report, QLD

connecting australian aviation

Change Summary

Version 1: 18 Dec 2013		
Section/ Clause	**Summary**	**NRFC**

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1. Deployment Details

1.1 Deployment Purpose

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

The noise monitor was located to the north of Gold Coast airport. During the reporting period the area was traversed by Runway 14 arrivals. Due to the distinctive flight paths and distance from Gold Coast Airport, it is not expected the ratio of arrival and departure flights over Palm Beach 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 Palm Beach during September 2013.

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

01/09/2013 12:00am – 01/10/2013 12:00am

1.3 Noise Monitoring Terminal (NMT) Details

Location	Private Residence, Palm Beach, QLD 4221
Latitude	28°06'36.25"S
Longitude	153°27'49.17"E
NMT Altitude	30ft 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 59.0 dB(A) depending on time of day

2. Location Images

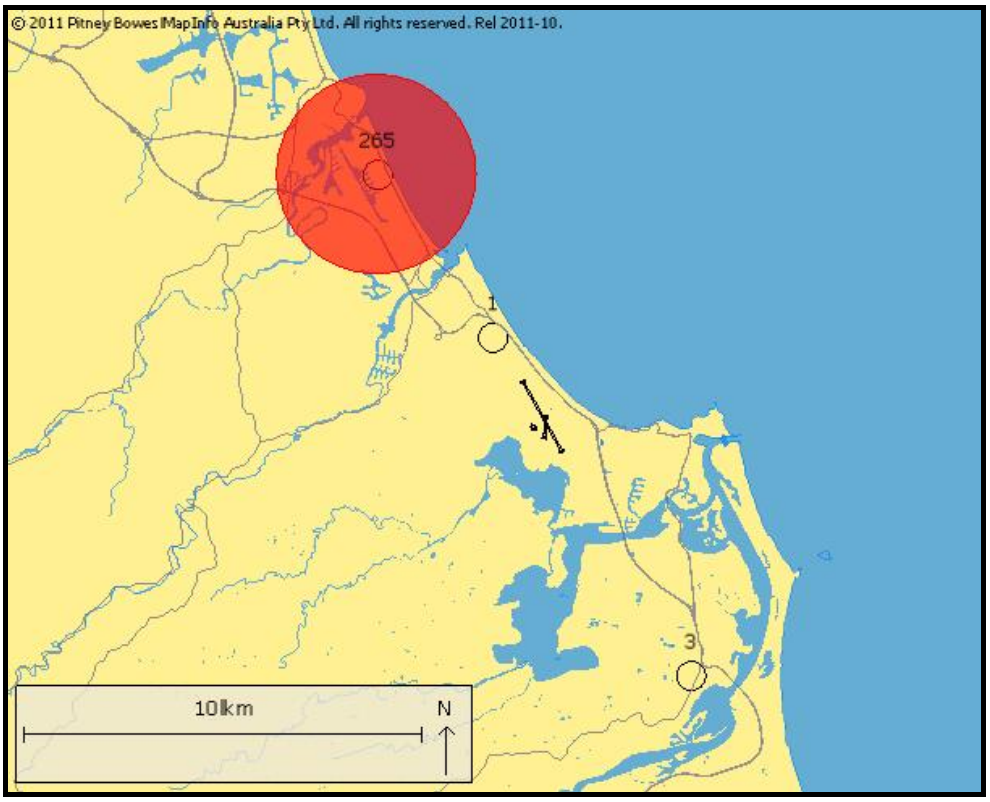

Figure 1: Gold Coast Fixed NMT Location and the Palm Beach Short Term Monitoring Program Deployment Location

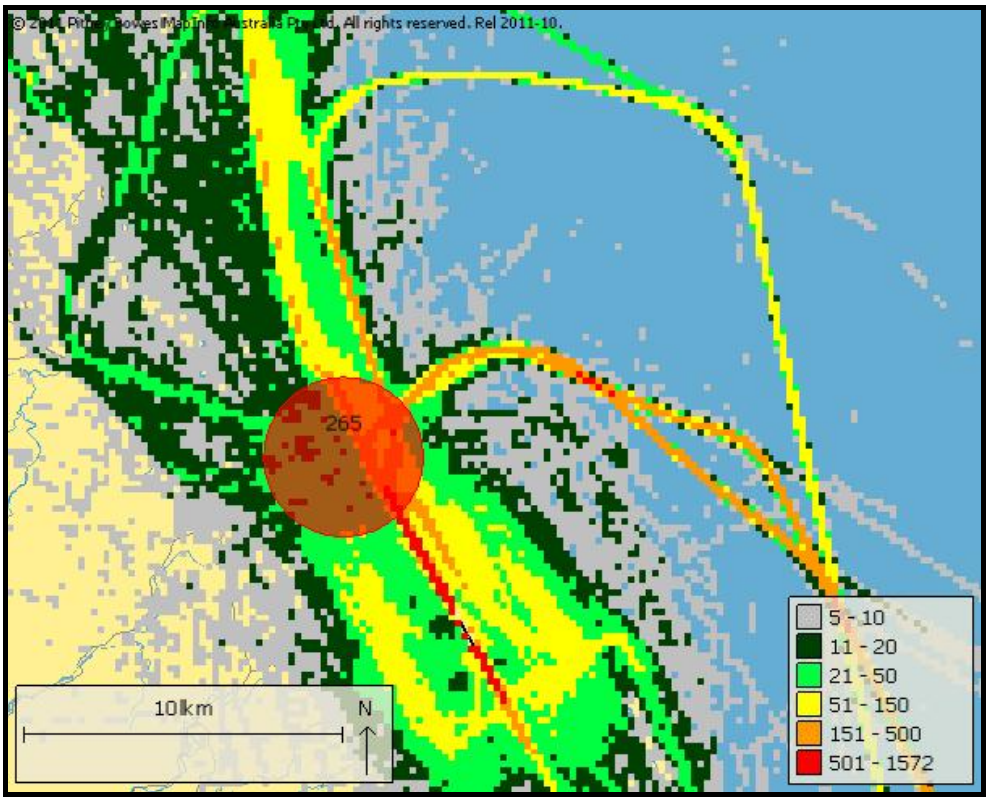

Figure 2: Total Movements Captured Track Density

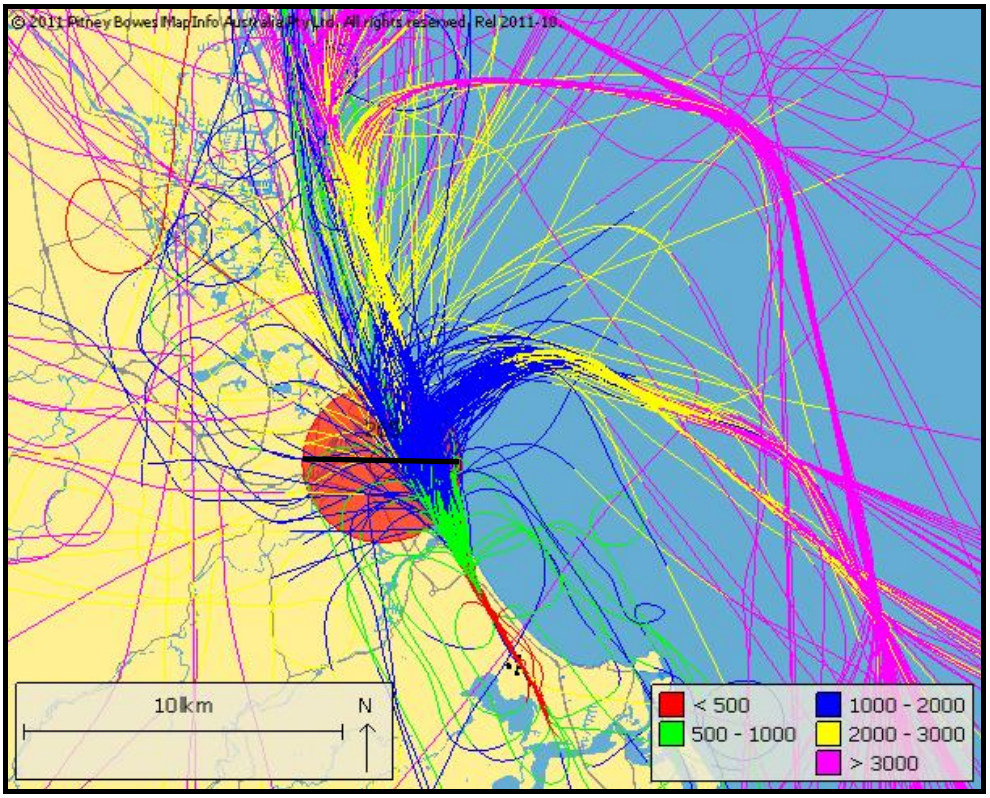

Figure 3: Gold Coast Airport Runway 14 Arrival Movements Captured

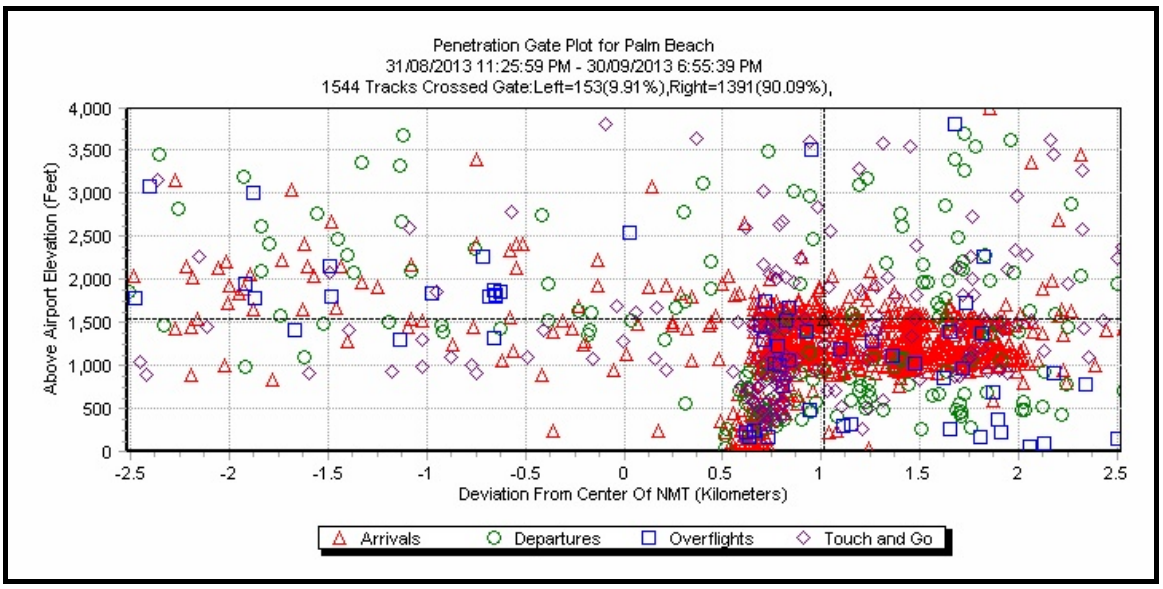

Figure 4: Palm Beach Movements Through Capture Zone Penetration Gate

Note: Gold Coast Airport is 21ft above mean sea level. NMT altitude is 30ft 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 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 (01/09/2013 12:00am – 01/10/2013 12:00am)

Type of Operation	Runway 14 Arrival Movements	All Movements
Number of Movements Through Capture Zone*	1,147	2,393
Number of Correlated Noise Events (CNE)	727	1,377
Number of Movements with Correlated Noise Events (CNE)	639	1,058
Correlation Summary	55.71%	44.21%

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

Airservices analyses noise events and aircraft movements within the capture zone. 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 44% 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	Max*	Average*
Departures Through Capture Zone**	6,601	1,677
Arrivals Through Capture Zone**	6,712	1,282
All Operations Through Capture Zone**	10,301	1,531

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 Gold Coast Basin.

Table 3 Captured Movements Breakdown By Airport and Aircraft Category

Airport	Jet	Turboprop	Light Propeller	Helicopter	Unknown*	Grand Total
Gold Coast	794	101	368	117	0	1,380
Other	10	3	68	50	61	192
Grand Total	**804**	**104**	**436**	**167**	**61**	**1,572**

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.

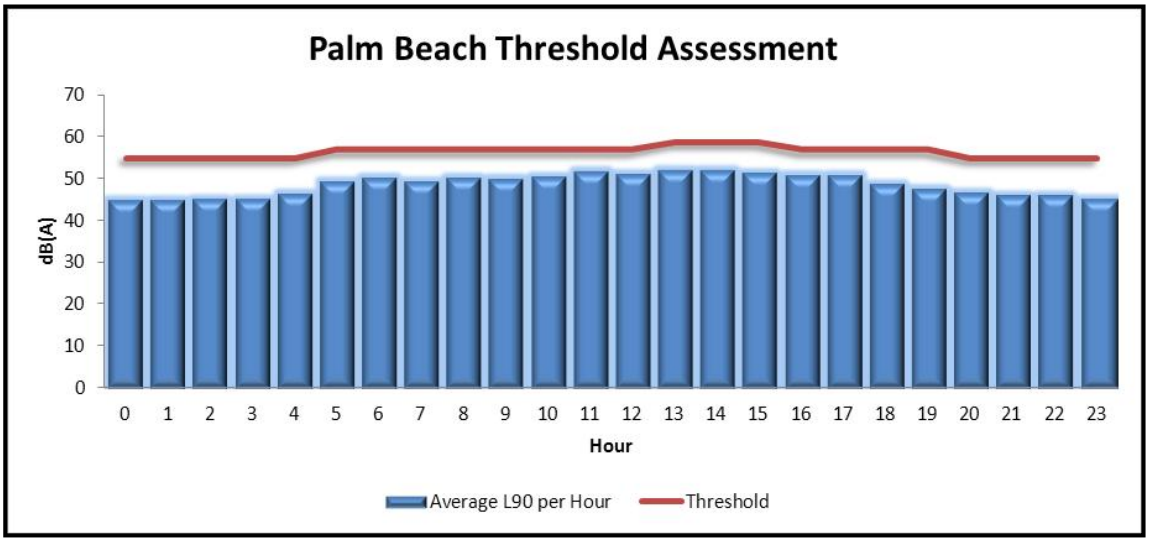

Figure 5: Background and Threshold Assessment

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 Gold Coast Runway 14 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)	55.2
LAeq (night), dB(A)	51.7
Background Day (L90 dB(A))	49.7
Background Night (L90 dB(A))	45.7

Table 5 Correlated Noise Events Summary

	Runway 14 Arrival Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	727	1,377
Number of Correlated Noise Events at night (CNE night)	0	26
Operational Days	30	30
Number of Correlated Noise Events (CNExx) day/night	**CNExx**	**CNExx**
CNE_{60} – day	509	1,012
CNE_{60} - night	0	11
CNE_{65} – day	246	427
CNE_{65} – night	0	5
CNE_{70} – day	32	85
CNE_{70} - night	0	2
CNE_{75} – day	8	19
CNE_{75} - night	0	0
CNE_{80} – day	1	4
CNE_{80}- night	0	0

Number of Correlated Noise Events (CNExx) per 24hr period min – max	Runway 14 Arrival Movements	All Aircraft
CNE_{60}	0 to 58	8 to 84
CNE_{65}	0 to 27	2 to 41
CNE_{70}	0 to 5	0 to 8
CNE_{75}	0 to 2	0 to 3
CNE_{80}	0 to 1	0 to 2
Average Number of Correlated Noise Events (CNExx Ave.) day/night	**CNExx Ave.**	**CNExx Ave.**
CNE_{60} Ave. – day	16.97	33.73
CNE_{60} Ave. – night	0.00	0.37
CNE_{65} Ave. – day	8.20	14.23
CNE_{65} Ave. – night	0.00	0.17
CNE_{70} Ave. – day	1.07	2.83
CNE_{70} Ave. – night	0.00	0.07
CNE_{75} Ave. – day	0.27	0.63
CNE_{75} Ave. – night	0.00	0.00
CNE_{80} Ave. – day	0.03	0.13
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 LAmax Summary

Min dB(A)	Max dB(A)	Average dB(A)
55.1	86.4	63.1

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.

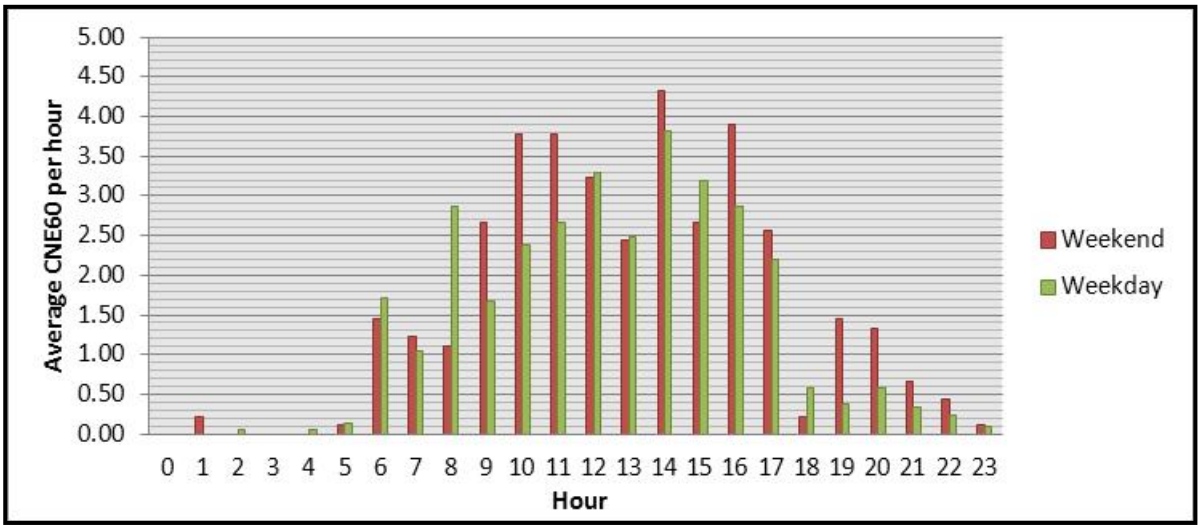

Figure 6: Average CNE60 per Hour for All Operations

The highest number of CNE60 in any one hour throughout the reporting period was 17. This occurred between 2pm and 3pm on September 3rd.

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 Palm Beach Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
SAAB 340 (T)	Gold Coast	D	32	1	76.6	76.6	1
Lake LA-4-200 Buccaneer (P)	Gold Coast	A	32	1	75.0	75.0	1
Piper PA-32 (P)	Gold Coast	D	32	1	73.4	73.4	1
Robinson R66 (H)	Gold Coast	A	H	1	72.9	72.9	1
Robinson R22 (H)	Gold Coast	A	H	2	72.7	86.4	1
Hawker Siddeley HS-125-400 (J)	Gold Coast	T	14	1	72.4	72.4	1
Robinson R44 (H)	Tyagarah	D	H	2	72.2	78.1	2
Bell 412 (H)	Gold Coast	A	H	11	71.8	81.8	2
Embraer 170 (J)	Gold Coast	A	14	2	71.7	77.9	1
Cessna C210 (P)	Gold Coast	D	14	1	70.8	70.8	1

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

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	LAmax dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Airbus A320 (J)	Gold Coast	A	14	255	61.6	73.9	28
Boeing 737-800 (J)	Gold Coast	A	14	230	64.6	81.0	22
Airbus A321 (J)	Gold Coast	A	14	49	63.7	70.9	6
Unknown (H)	Southport	A	H	48	63.1	79.1	8
Eurocopter EC-635 (H)	Southport	A	H	45	62.9	74.5	7
Cessna C172 (P)	Gold Coast	T	14	40	62.5	70.8	10
Unknown	Southport	A	Unknown	33	63.5	70.8	5
Eurocopter EC-120 (H)	Gold Coast	T	H	33	62.3	70.7	17
Embraer 190 (J)	Gold Coast	A	14	31	59.9	70.0	5
Airbus A330-200 (J)	Gold Coast	A	14	26	62.7	70.6	3

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)

Conclusions

Short term noise monitoring was conducted in Palm Beach during the period of September 1st to October 1st 2013. This followed recommendations made by the community. The most common aircraft movements to traverse the Palm Beach are Gold Coast Regular Public Transport (RPT) Runway 14 arrivals.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 70dB(A) in one day was 8.

The highest number of CNE60 in any one hour throughout the reporting period was 17. This occurred between 2pm and 3pm on September 3rd. Residents in the area of Palm Beach were exposed to correlated noise events exceeding 75dB(A) during the day. There was 26 correlated noise events above 60dB(A) that occurred during the hours of night. The average correlated LAmax during the reporting period was 63.1dB(A), with a max level of 86.4dB(A) and minimum level of 55.1dB(A) recorded.

Correlated noise events above 65dB(A) were most common during the weekday hours and weekend hours of 2:00pm to 3:00pm.

A review of Table 8 indicates that generally the most frequently correlated movements residents of Palm Beach experience are Runway 14 arrivals.

The correlation summary of 44% for all movements is considered a low result based on reviews of fixed noise monitoring terminals nationally. During the reporting period Gold Coast Runway 14 arrivals had a correlation summary of 56%.

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

6. 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/

7. 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.

8. 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.