

Short Term Monitoring Program

Tweed Heads Report, NSW

Change Summary

Version 2: 14 Jan 2014		
Section/ Clause	Summary	NRFC
Table 3	Comment added.	
Figure 5 and Table 4	L90 figures 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.

1. Deployment Details

1.1 Deployment Purpose

Short term noise monitoring was conducted at Tweed Heads following the need to relocate the existing Environmental Monitoring Unit (EMU) after asbestos was identified at the original location.

Tweed Heads is located to the south of Gold Coast airport. During the reporting period the suburb was predominately traversed by Runway 14 departures.

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

30/04/2013 12:00am – 28/05/2013 12:00am

1.3 Noise Monitoring Terminal (NMT) Details

Location	Colonial Tweed Holiday and Home Park, Tweed Heads South, NSW 2486
Latitude	28°11'38.40"S
Longitude	153°31'19.02"E
NMT Altitude	26ft above mean sea level
Capture Zone	2.5km radius with 8,000ft (above ground level) height for noise data capture
Threshold Settings	54.0 dB(A) to 56.0 dB(A) depending on time of day

2. Location Images

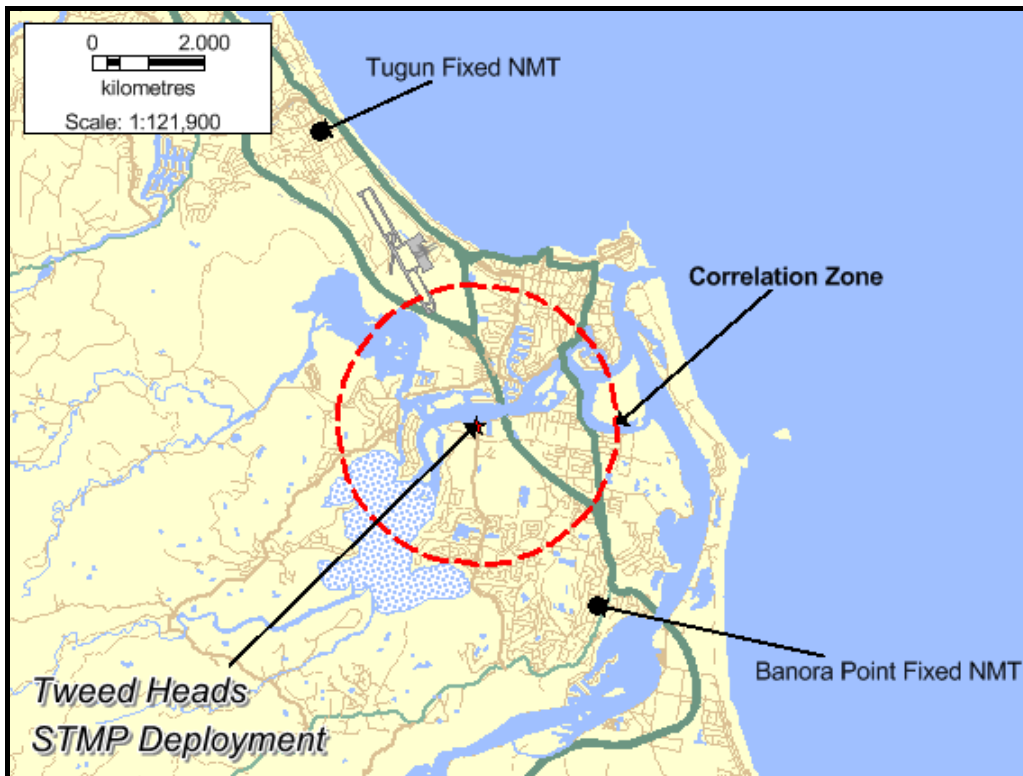


Figure 1: Gold Coast Fixed NMT Locations and the Tweed Heads Short Term Monitoring Program Deployment Location

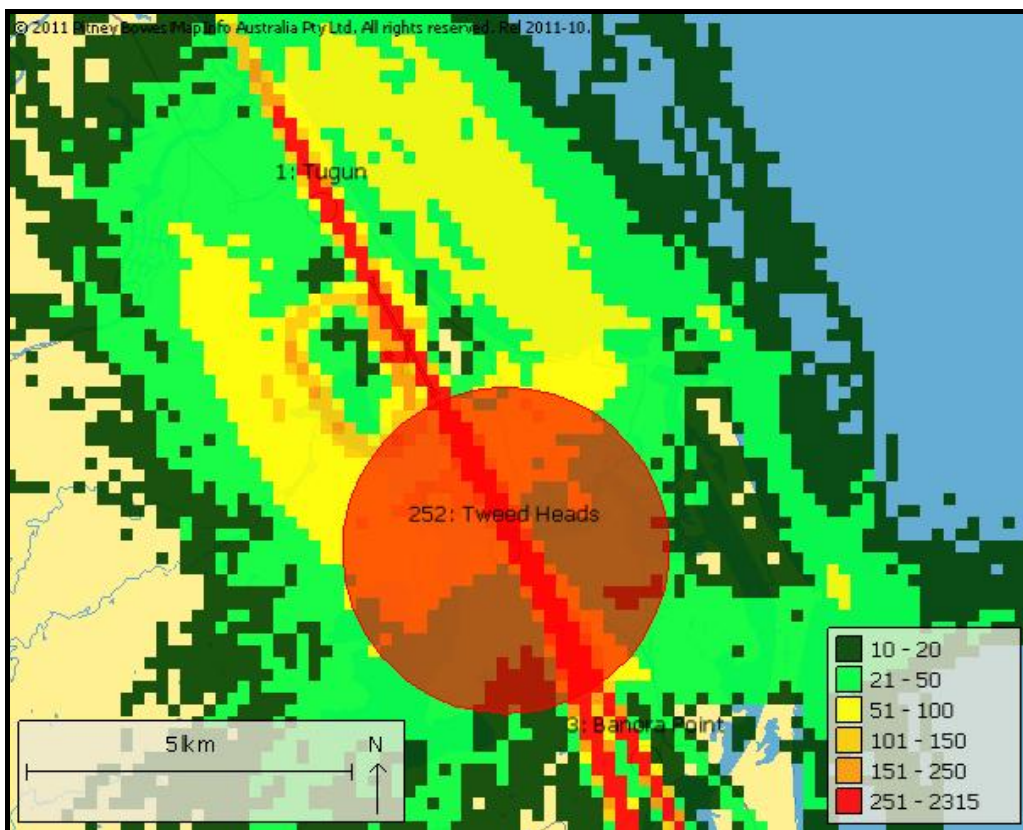


Figure 2: Total Movements Captured Track Density

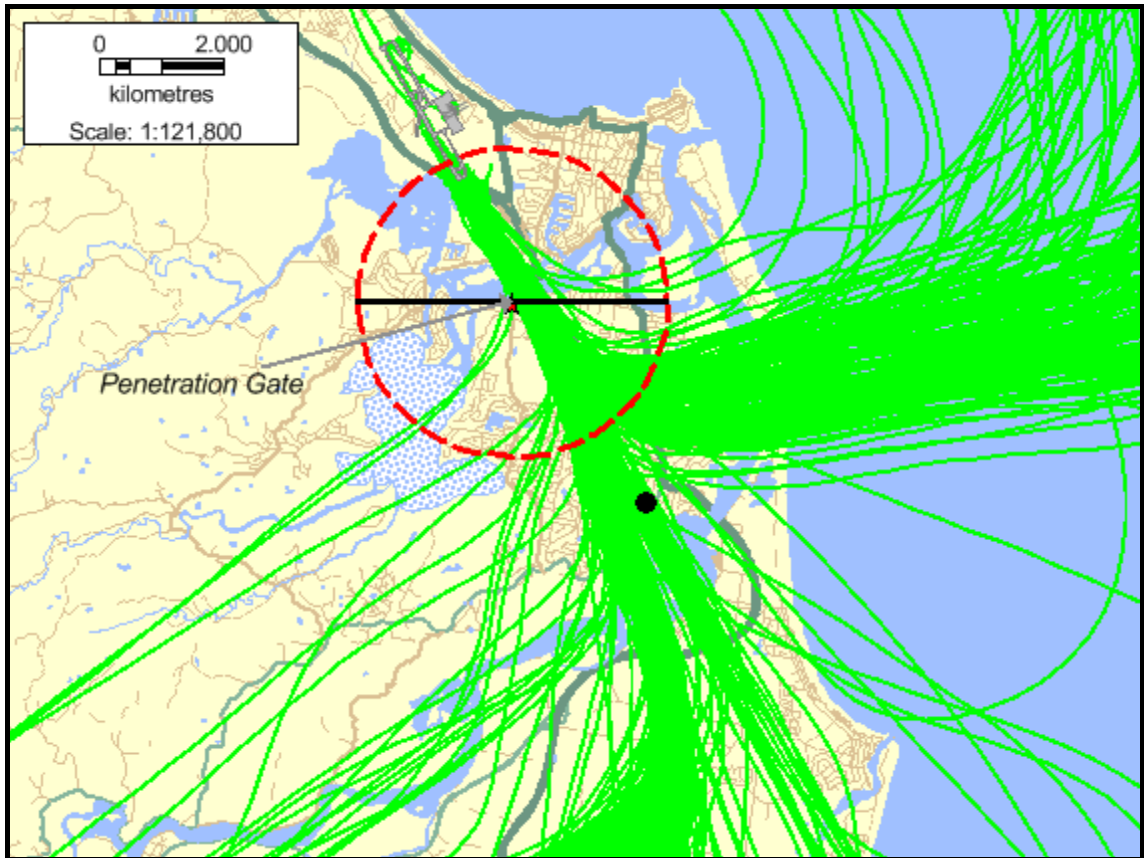


Figure 3: Gold Coast Airport Runway 14 Jet Departure Movements Captured

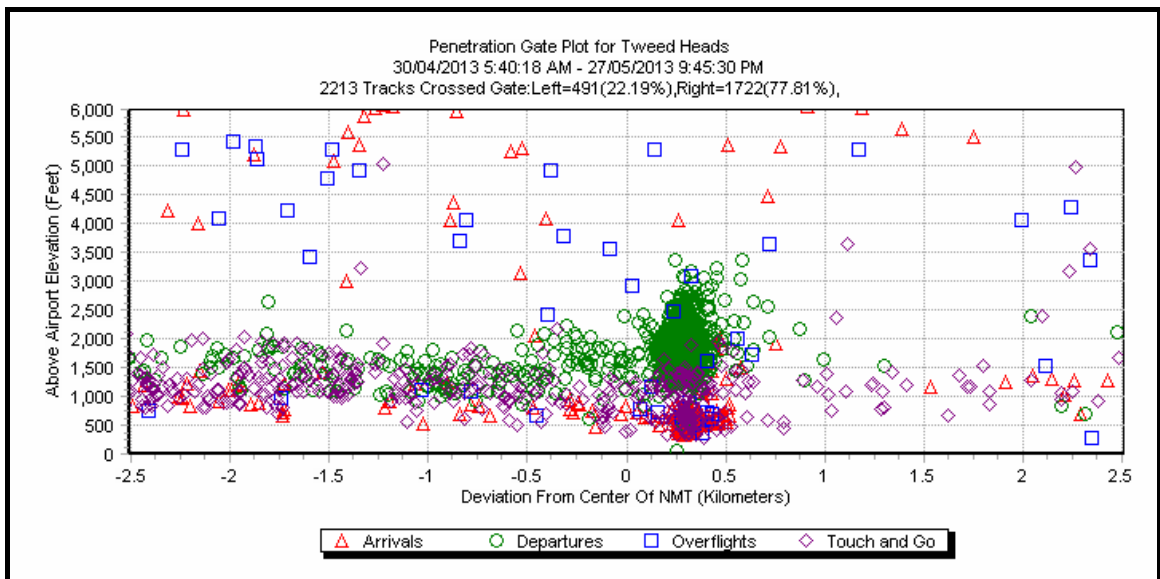


Figure 4: Tweed Heads Movements Through Capture Zone Penetration Gate

Note: Gold Coast Airport is 21ft above mean sea level. NMT altitude is 26ft 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 (30/04/2013 12:00am – 28/05/2013 12:00am)

Type of Operation	Runway 14 Jet Departure Movements	All Movements
Number of Movements Through Capture Zone*	1,103	2,315
Number of Correlated Noise Events (CNE)	1,114	2,038
Number of Movements with Correlated Noise Events (CNE)	1,102	1,854
Correlation Summary	99.91%	80.09%

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 80% 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**	49	10,236	1,799
Arrivals Through Capture Zone**	328	8,106	1,129
All Operations Through Capture Zone**	49	10,236	1,804

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	1,338	133	665	132	5	2,273
Archerfield**	0	0	13	0	1	14
Other	3	0	12	6	7	28
Grand Total	1,341	133	690	138	13	2,315

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

Note: **A small number of operations that used Gold Coast for training purposes departed and arrived at Archerfield aerodrome.

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.

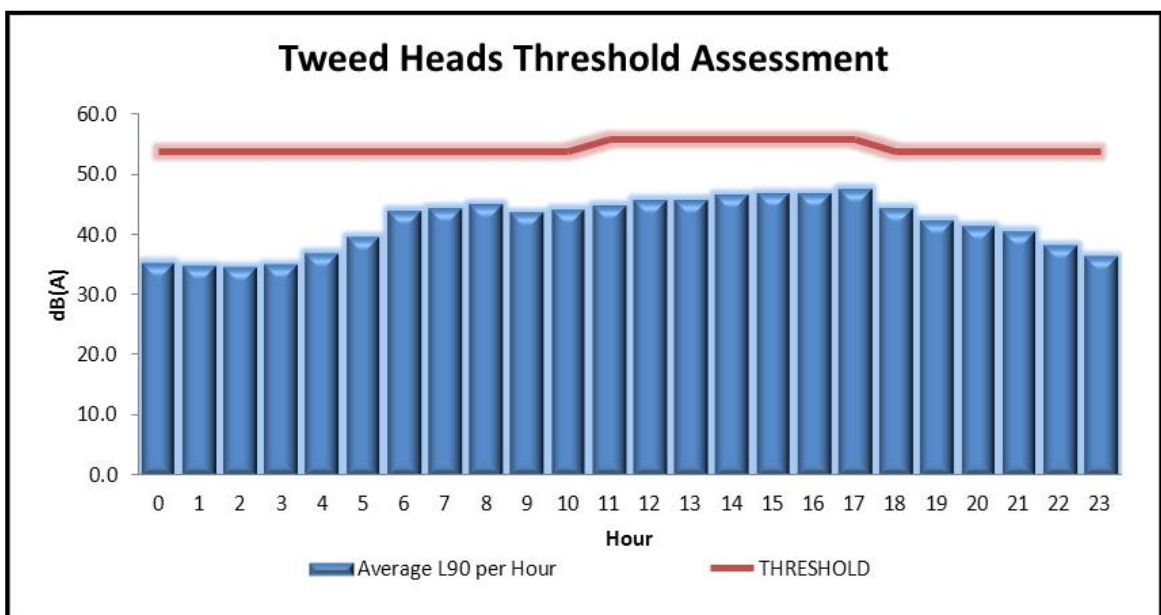


Figure 5: Background and Threshold Assessment

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 jet departure 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)	57.2
LAeq (night), dB(A)	43.9
Background Day (L90 dB(A))	44.3
Background Night (L90 dB(A))	36.2

Table 5 Correlated Noise Events Summary

	Runway 14 Jet Departure Movements	All Aircraft
Total number of Correlated Noise Events (CNE 24hr)	1,114	2,038
Number of Correlated Noise Events at night (CNE night)	2	4
Operational Days	28.0	28.0
Number of Correlated Noise Events (CNE _{xx}) day/night	CNE _{xx}	CNE _{xx}
CNE ₆₀ – day	1,108	1,838
CNE ₆₀ - night	2	4
CNE ₆₅ – day	1,106	1,617
CNE ₆₅ – night	2	2
CNE ₇₀ – day	1,086	1,416
CNE ₇₀ - night	2	2
CNE ₇₅ – day	1,052	1,229
CNE ₇₅ - night	1	1
CNE ₈₀ – day	499	514
CNE ₈₀ - night	0	0

Number of Correlated Noise Events (CNE_{xx}) per 24hr period min – max	Runway 14 Jet Departure Movements	All Aircraft
CNE ₆₀	5 to 60	52 to 82
CNE ₆₅	5 to 60	46 to 69
CNE ₇₀	5 to 58	42 to 62
CNE ₇₅	5 to 56	25 to 57
CNE ₈₀	2 to 29	3 to 29
Average Number of Correlated Noise Events (CNE_{xx} Ave.) day/night	CNE_{xx} Ave.	CNE_{xx} Ave.
CNE ₆₀ Ave. – day	39.57	65.64
CNE ₆₀ Ave. – night	0.07	0.14
CNE ₆₅ Ave. – day	39.50	57.75
CNE ₆₅ Ave. – night	0.07	0.07
CNE ₇₀ Ave. – day	38.79	50.57
CNE ₇₀ Ave. – night	0.07	0.07
CNE ₇₅ Ave. – day	37.57	43.89
CNE ₇₅ Ave. – night	0.04	0.04
CNE ₈₀ Ave. – day	17.82	18.36
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 LA_{max} Summary

Min dB(A)	Max dB(A)	Average dB(A)
54.1	88.8	73.7

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 75B(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 6 presents daily average number of noise events 70dB(A) or above (CNE₇₀) broken down on an hourly basis.

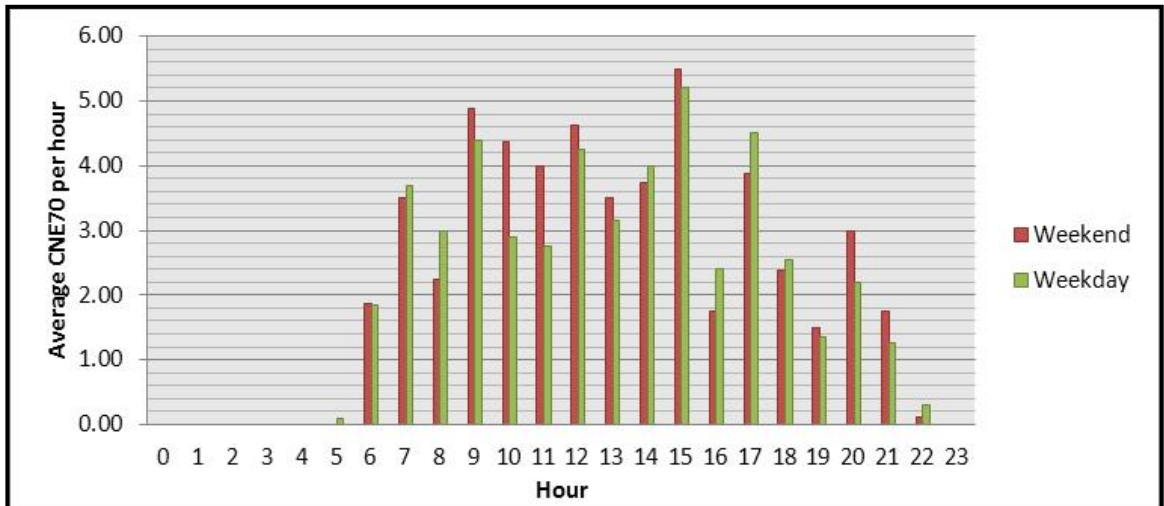


Figure 6: Average CNE70 per Hour for All Operations

The highest number of CNE70 in any one hour throughout the reporting period was 8. This occurred between 2pm and 3pm on May 14th and May 23rd, 3pm and 4pm on May 2nd and 5pm to 6pm on May 20th.

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 (L_{Amax}) at the Tweed Heads Noise Monitoring Terminal

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	L _{Amax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Boeing 777-200 (J)	Gold Coast	D	14	15	84.9	88.6	1
Airbus A330-300 (J)	Gold Coast	D	14	15	84.0	88.8	1
Airbus A330-200 (J)	Gold Coast	D	14	32	83.6	88.7	2
Airbus A321 (J)	Gold Coast	D	14	59	80.6	82.8	3
Boeing 737-800 (J)	Gold Coast	D	14	412	80.5	84.6	21
Airbus A320 (J)	Gold Coast	T	32	1	80.4	80.4	1
Dassault Falcon 20 (J)	Gold Coast	D	14	4	80.1	83.5	2
Unknown (U)	Gold Coast	D	14	2	80.0	81.0	1
Embraer E-190 (J)	Gold Coast	D	14	44	79.8	82.2	4
C-17 Globemaster III (J)	Amberley	O	Unknown	1	79.6	79.6	1

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

Aircraft Type	Airport	Operation Type	Runway	No. Correlated Noise Events	L _{Amax} dB(A)		Highest No. CNE in One Day
					Average	Maximum	
Airbus A320 (J)	Gold Coast	D	14	452	78.4	83.4	23
Boeing 737-800 (J)	Gold Coast	D	14	412	80.5	84.6	21
Cessna C172 (P)	Gold Coast	T	14	127	61.1	71.6	19
Airbus A320 (J)	Gold Coast	A	32	96	74.2	77.1	16
Boeing 737-800 (J)	Gold Coast	A	32	80	78.2	80.8	11
Airbus A321 (J)	Gold Coast	D	14	59	80.6	82.8	3
Embraer E-190 (J)	Gold Coast	D	14	44	79.8	82.2	4
Piper PA-31 Navajo (P)	Gold Coast	T	14	43	68.0	80.4	7
Cessna 208 Caravan (T)	Gold Coast	D	14	32	60.7	72.7	3
Airbus A330-200 (J)	Gold Coast	D	14	32	83.6	88.7	2

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

6. Conclusions

Short term noise monitoring was conducted in Tweed Heads during the period of 30th April to 28th May 2013. This followed the need to relocate the existing Environmental Monitoring Unit due the discovery of Asbestos at the original site. It was determined the most common aircraft movements to traverse the Tweed Heads community are Gold Coast Regular Public Transport (RPT) jet departures off Runway 14.

Throughout the reporting period the highest number of correlated aircraft noise events exceeding 70dB(A) in one day was 62. Between 2pm and 3pm on May 14th and May 23rd, 3pm and 4pm on May 2nd and 5pm to 6pm on May 20th, 8 events exceeding 70dB(A) occurred. This was the greatest number of CNE70 in one hour during the period. Residents in the area of Tweed Heads were exposed to a correlated noise events exceeding 75dB(A) during the hours of day and night. There were 4 correlated noise events above 60dB(A) that occurred during the hours of night. The average L_{Amax} during the reporting period was 73.7dB(A), with a max level of 88.8dB(A) and minimum level of 54.1dB(A) recorded.

Noise events above 70dB(A) were most common in the weekday and weekend hours of 3:00pm to 4:00pm.

A review of Tables 7 and 8 indicates the loudest and most frequent movements residents of Tweed Heads experience are Runway 14 departures from Gold Coast airport. The Boeing 737-800 departing off Runway 14 is the second most frequent correlated aircraft to traverse Tweed Heads and on average is the fifth loudest aircraft type. Other jet aircraft departing from Runway 14 to feature in both tables are the Airbus A321, Airbus A330-200 and Embraer 190.

The correlation summary of 80.09% for all movements is considered a good result based on reviews of fixed noise monitoring terminals nationally. During the reporting period Gold Coast Runway 14 jet departures had a correlation summary of 99.91%.

Due to the distinctive flight paths and distance from Gold Coast Airport, it is not expected the ratio of arrival and departure flights over Tweed Heads will change due to seasonal variation over a twelve month period. It is recommend the Colonial Tweed Holiday and Home Park be considered as a replacement for the decommissioned Tweed Heads Environmental Monitoring Unit.

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 NSW 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
CNE _{xx}	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
LA _{eq}	Continuous equivalent noise level over a time period
LA _{eq} 24hr	Continuous equivalent noise level over a 24 hour period
LA _{eq} night	Continuous equivalent noise level over the night time period (hours of 11:00pm to 6:00am)
LA _{max}	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
N _{xx}	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.