AIRSERVICES AUSTRALIA

Sydney Airport

N462 Australian Noise Exposure Index

1 January to 31 March 2009

REPORT No: EO 09-202

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Contents

List of Tables

List of Figures

Sydney Airport
N462 Australian Noise Exposure Index
1 January to 31 March 2009

1. Introduction

1.1 Background

In accordance with recommendation 21 of the Proponent's Statement for the Long Term Operating Plan (LTOP) at Sydney Airport, Airservices Australia has prepared an Australian Noise Exposure Index (ANEI) for the period 1 January 2009 to 31 March 2009 inclusive (Reference Number N462).

1.2 Airport Layout

Sydney Airport has three runways. Runway 07/25 (2529m long and 45m wide), Runway 16R/34L (3962m long and 45m wide) and Runway 16L/34R (2438m long and 45m wide). The runway end coordinates and elevations, Aerodrome Reference Point coordinates, elevation data and displaced threshold information for Sydney Airport were obtained from airport data held by Airservices Australia and are shown in Table 1.1.

Table 1.1 Sydney Airport Runway Data

Location	Latitude (WGS84)	Longitude (WGS84)	Elevation AHD (m)	Displaced Landing Threshold (m)
Aerodrome Reference Point	33 56 45.6S	151 10 37.6E	6.4	
Runway End 07	33 56 37.5S	151 09 49.1E	5.3	0m
Runway End 25	33 56 15.1S	151 11 23.8E	6.0	340m
Runway End 16R	33 55 45.7S	151 10 17.8E	2.1	85m
Runway End 34L	33 57 51.4S	151 10 50.4E	4.1	0m
Runway End 16L	33 56 58.6S	151 11 17.9E	4.5	230m
Runway End 34R	33 58 19.0S	151 11 38.1E	3.1	38m

The airport average temperature and humidity were obtained from Bureau of Meteorology data. The temperature and humidity shown in Table 1.2 are an average taken over the period of the ANEI.

Table 1.2 Sydney Airport Meteorological Data

Airport Average Temperature	23.1 °C
Airport Average Humidity	66.2 %

2. The Integrated Noise Model (INM)

The Integrated Noise Model version 7.0 (INM 7.0) developed by the US Federal Aviation Administration (FAA) as a means of evaluating the impact of aircraft noise was used to model the noise contours for the period 1 January to 31 March 2009 for Sydney Airport.

The

2.1 INM Terrain Data

The INM program can import and use terrain elevation data for use in calculating noise metrics. The terrain data is set out in a grid format and includes elevation in feet above mean sea level. The INM interpolates this data to prepare the ground contours for presentation at the required interval. The terrain contours included in Attachment C are a graphical representation of ground contours prepared by the INM program. They indicate the areas to the north, east and west of the airport are higher than that of the airport, which has had the effect of increasing the extent of the length and width of the ANEI contours in these areas.

2.2 Changes Incorporated in INM Version 7.0

INM 7.0 has incorporated changes relating to aircraft noise/performance for commercial aircraft therefore caution should exercised when comparing ANEI studies that were prepared using earlier versions of the INM program.

3. Methodology Used in the Development of the ANEI

3.1 Introduction

The development of the ANEI consisted of the following stages:

i) collection and verification of the required data;

ii) preparation of the data as INM input files;

iii) running of the model; and,

iv) preparation and verification of model's output.

3.2 Collection and verification of the required data

Runway and associated airport data were obtained from airport data held by Airservices Australia. Aircraft movement data were obtained directly from the Airservices Australia Noise and Flight Path Monitoring System (NFPMS). The total number of movement records from the unadjusted NFPMS data for the study period is shown in Table 3.1.

Flyover movements were checked using the NFPMS to determine whether any of these aircraft had made an arrival or departure at Sydney Airport. The records that could not be described as a movement at Sydney Airport were then excluded from the original NFPMS data.

Table 3.1 NFPMS Aircraft Movements

Operation	Movements
Arrivals	34,733
Departures	34,730
General (Arrival and Departure)	540
Total	**70,003**

The NFPMS movements shown above were corrected to ensure the total number of departures and arrivals movements were equal. Movement data derived from Airservices Australia's published 'Movements at Australian Airports' for Sydney Airport for the period of 1 January to 31 March 2009 and the daily average aircraft movements for this period are shown in Table 3.2. The NFPMS movements were then factored to the Avcharges recorded number of aircraft movements and the daily average number of movements was calculated.

Table 3.2 Avcharges Recorded Movements

Period	Movements
1 January to 31 March 2009	70,018
Daily Average during this period	778

The flight tracks used in the model were determined from the NFPMS. Track plots from the NFPMS were used to identify the major flight paths associated with aircraft movements to and from the airport. Representative periods were selected between 1 January and 30 March 2009.

A nominal backbone track for all the major flight paths was identified by means of geographic coordinates along the length of the track and from NFPMS track plots. The corresponding spread of the track was also determined from the NFPMS plots. These tracks

were entered into the INM as 'point type' tracks. Each 'nominal backbone track' was prepared with subsidiary tracks that provided a realistic lateral spread of traffic along the nominal tracks.

A small number of tracks that are mainly used by turbo-propeller and other propeller aircraft departing from Runway 07 for the north-west and Runway 25 for the east were not spread due to the small variations in their dispersal and the minimal number of movements that occur on these routes. In those cases a single nominal track was determined from the NFPMS.

3.3 Preparation of INM input file

The aircraft movement data extracted from the NFPMS were organised into:

- aircraft types and the associated operation (departure or arrival);
- the runway used; and,
- the time of day or night.

For the purposes of modelling and using the Australian Noise Exposure Forecast (ANEF) metric, night is considered to be between the hours of 7:00pm and 7:00am and carries a weighting of 4.

Terrain around the airport was also taken into account. Terrain data for the Sydney region was compiled in accordance with the INM User's Guide into a format suitable to be read by INM 7.0. The terrain data was aligned to the Aerodrome Reference Point (ARP) and incorporated by INM when calculating the ANEI contours.

The use of terrain data changes the shape of the ANEI contours when compared to a flat ground model. Variances in ground elevation change the distance between the aircraft and the ground, hence the calculated aircraft noise levels at each grid point on the ground.

The types of aircraft that operated at Sydney Airport were assigned to 34 representative aircraft types that are contained within the INM database and are shown in Table 3.3. Where possible, the actual aircraft type was matched to its INM counterpart. However, in cases where a particular aircraft type had a small number of movements, it was grouped with a major INM type or INM substitute.

In order to model helicopters, two helicopter profiles were developed. Their profiles were based on the single engine Bell 206 LongRanger and twin engine Eurocopter AS355F Ecureuil 2. All helicopters that operate at Sydney airport were then assigned to a type depending on the number of engines. In addition, all helicopters were modelled as arriving to or departing from the Helipad that is located south of the threshold of Runway 25.

The aircraft types were assigned to representative tracks based on the type of aircraft (jet, turbo-propeller, engine propeller or helicopter) and the general cardinal direction from Sydney Airport of the destination or originating airport. This was further refined by determining the way-points associated with the major routes. As stated previously, the tracks were prepared as point type tracks, the location of which, and lateral spread, being determined from the NFPMS data for each ANEI prepared for Sydney airport.

Table 3.3 Aircraft Types Used by INM for ANEI N462

INM Type	Aircraft
717200	Boeing B717-200
727EM2	Boeing B727-200 fitted with hushkitting
737N17	Boeing B737-200 fitted with hushkitting
737300	Boeing B737-300
737400	Boeing B737-400
737700	Boeing B737-700
737800	Boeing B737-800
74720B	Represents B747-200 and B747-300
747400	Boeing B747-400 and Airbus A380
757PW	Boeing B757-200
767300	Boeing B767-300
767JT9	Represents B767-200 movements
777200	Boeing B777-200
777300	Boeing B777-300
A300	Airbus Industries A300
A320	Airbus Industries A320
A330	Airbus Industries A330
A340	Airbus Industries A340
BAE300	Represents BAe146 aircraft
BEC58P	Represents GA twin piston-engine aircraft
CL601	Represents Canadair CL601 Challenger aircraft
CNA441	Represents GA twin turbine-engine aircraft
DC930	Represents DC9 aircraft
DHC6	Represents Twin Otter and similar aircraft
DHC830	Represents Dash 8, FK50 type aircraft
GASEPF	Represents GA single engine fixed pitch propeller aircraft.
GASEPV	Represents GA single engine variable pitch propeller and/or turbine aircraft
GV	Represents Embraer 170 aircraft
JPATS	Represents Pilatus PC-12 and other single engine turbo-prop aircraft
LEAR35	Represents other small business type jets
MD11GE	Represents DC10 and MD11 type aircraft
SF340	Saab 340
AS355F	Represents Eurocopter AS355 Ecureuil 2 and all twin engine helicopters
B206L	Represents Bell 206 LongRanger and all single engine helicopters

Each operation associated with a particular runway and direction was assigned to a specific track. Where there was more than one track associated with a particular route, the percentage of operations was proportioned, based on the data obtained from the NFPMS. In the majority of cases the percentage of aircraft operations allocated to the backbone tracks and their subsidiary tracks were generally the default percentages set by the INM.

The average daily movements for each aircraft type by runway, time of day and type of operation are shown in Attachment A.

3.4 Running of the Model

The INM was run using standard noise profile data for each of the aircraft types. The parameters used for the ANEF metric were:

Day multiplier	1.0
Night multiplier	4.0

The evening multiplier is included as part of the night period (7:00pm to 7:00am) and is not modelled separately under the ANEF process.

3.5 Preparation and verification of the model output.

The ANEI contours produced by the INM were plotted using a GIS software package onto a base map. The contours produced for the 1 January to 31 March 2009 ANEI (N462) are consistent with flight tracks and the aircraft operations for the period and the use of terrain data.

Table 3.4 shows the average daily aircraft movements for the 1 January to 31 March 2009 ANEI (N462) compared to the same period for the previous year - the 1 January to 31 March 2008 ANEI (N457).

Table 3.4 Comparison of Average Daily Movements

ANEI Study	Period	Average Daily Aircraft Movements
N457	1 January to 31 March 2008	822
N462	1 January to 31 March 2009	778

4. Comparison of the 2009 ANEI (N462) with the 2008 ANEI (N457)

The 1 January to 31 March 2009 ANEI (N462) contours for Sydney Airport are shown in Attachment D. In addition, a plot of the ANEI contours (N462) with terrain contours is included as Attachment C. For comparison purposes, the 1 January to 31 March 2008 ANEI (N457) for Sydney Airport has been included as Attachment E.

ANEI N462 (1 January to 31 March 2009) was prepared with INM 7.0 and ANEI N457 (1 January to 31 March 2008) was prepared with INM 7.0. Both studies used terrain data during the calculation of their contours.

4.1 Comparison of ANEI N462 with ANEI N457

The changes evident in the contours for ANEI N462, when compared with the contours for ANEI N457, are consistent with the changes in aircraft types, movement numbers, runway usage, night movements and aircraft flight path use during the two periods.

Table 4.1 shows a comparison of average daily arrival and departure movements by runway for ANEI N462 and ANEI N457. This comparison provides the basis for evaluation of the ANEI N462 contours. When INM disperses the movements assigned for each aircraft type from the nominated 'nominal backbone track' to its subsidiary tracks, there are sometimes slight differences between the reported number of arrivals and departures for that aircraft type, runway or INM study due to rounding.

In accordance with a directive from the Civil Aviation Safety Authority (CASA) issued in 2003 Sydney Airport Corporation Limited (SACL) was to construct a Runway End Safety Area (RESA) for Runway 25 by 3 May 2009 in order to comply with the International Civil Aviation Organization (ICAO) requirements. To maintain safe operations on Runway 25 after the May 2009 and prior to the construction of the RESA, SACL obtained approval from CASA for a temporary RESA which incorporated 97 metres of the existing western end of Runway 25. Additionally, SACL restricted aircraft arrivals on Runway 07 to those times when weather conditions operationally required its use (SACL Draft Major Development Plan – Runway Safety Enhancement Runway 25 - Runway End Safety Area, Sydney Airport). Work began on the permanent RESA on 15 January 2009.

This work has resulted in Runway 25 not being available and Runway 07 only being available for limited numbers of departures. The reduction in the number of movements on Runway 07/25 is reflected in the 1 January – 31 March 2009 ANEI.

Table 4.1 Comparison of Average Daily Runway Movement

Runway	ANEI N462 (1 January - 31 March 2009)			ANEI N457 (1 January - 31 March 2008)		
	Arrivals	Departures	Totals	Arrivals	Departures	Totals
07	0.00	0.15	**0.15**	42.20	1.45	**43.65**
16L	67.16	61.02	**128.18**	64.07	67.50	**131.57**
16R	111.62	132.54	**244.16**	97.94	156.59	**254.53**
25	0.00	0.00	**0.00**	11.25	5.45	**16.70**
34L	149.06	83.83	**232.89**	121.45	79.49	**200.94**
34R	51.45	101.68	**153.13**	63.19	89.58	**152.77**
Helipad	9.64	9.64	**19.28**	10.75	10.75	**21.50**
Total	**388.93**	**388.86**	**777.79**	**410.85**	**410.81**	**821.66**

North-West of the Airport

Average daily departures from Runway 34L have increased by 4.34 movements from the ANEI N457 figures. The 'north-west bump' in the 20 ANEI contour associated with departures using the Richmond SID and the Katoomba SID has shown a corresponding increase in its extent.

Long-haul jet aircraft departing from Runway 34L for destinations in the USA were split between those following the Richmond Two SID and those aircraft maintaining runway heading before turning east. The proportion of aircraft on each track was determined from analysis of NFPMS data prepared for the INM. Table 4.2 shows a comparison of departures that maintained runway heading and those that tracked via the Richmond Two SID.

Table 4.2 Comparison of Average Daily Long Haul Departures from Runway 34L

Runway 34L US Departures	**ANEI N462 (1 January - 30 March 2009)**		**ANEI N457 (1 January - 30 March 2008)**	
	Movements	% of USA Departures	Movements	% of USA Departures
Maintain Runway Heading	2.82	73%	2.12	62%
RICHMOND TWO SID	1.04	27%	1.29	38%
Total	**3.86**		**3.41**	

North of the Airport

Average daily arrivals on Runway 16R have increased by 13.68 movements from the ANEI N457 figures. The ANEI contours associated with these arrivals have also shown a corresponding increase in extent.

Average daily arrivals on Runway 16L increased by 3.09 movements from the ANEI N457 figures and the ANEI contours associated with arrivals to Runway 16L have shown a corresponding increase in their extent.

East of the Airport

There were no arrivals on Runway 25 during this period. Average daily departures from Runway 07 decreased by 1.30 and departures from Runway 34R increased by 12.10 movements from the ANEI N457.

The contours associated with arrivals to Runway 25 and departures from Runway 07 have shown a corresponding decrease in extent.

The contours associated with departures from Runway 34R have increased as a result of the increase in departures from this runway.

West of the Airport

There were no arrivals on Runway 07 and departures from Runway 25 during this period and the ANEI contours reflect this.

South of the Airport

Average daily departures from Runway 16L have decreased by 6.48 movements from ANEI N457 and the ANEI contours associated with these departures from Runway 16L has shown a corresponding increase.

Average daily arrivals on Runway 34R have decreased by 11.74 movements from ANEI N457. The contours associated with arrivals to Runway 34R have shown a corresponding decrease in extent.

Average daily departures from Runway 16R have decreased by 24.05 movements from ANEI N457. Average daily arrivals on Runway 34L have increased by 27.61 movements from ANEI N457. The ANEI contours associated with departures from Runway 16R have shown corresponding decreases in their extent and the ANEI contours associated with arrivals to Runway 34L have increased accordingly.

4.2 Comparison of Runway Use

Table 4.3 shows a comparison of runway usage in the 1 January to 31 March 2009 ANEI (N462) to the 1 January to 31 March 2008 ANEI (N457).

Table 4.3 Runway Use Comparison

Runway	ANEI N462 (1 January - 30 March 2009)		ANEI N457 (1 January - 30 March 2008)	
	N462 Arrivals %	N462 Departures %	N457 Arrivals %	N457 Departures %
07	0.0	0.0	5.1	0.2
16L	8.6	7.8	7.8	8.2
16R	14.4	17.0	11.9	19.1
25	0.0	0.0	1.4	0.7
34L	19.2	10.8	14.8	9.7
34R	6.6	13.1	7.7	10.9
Helipad	1.2	1.2	1.3	1.3

Note: Numbers represent percentage of total movements for the respective period of the ANEI and have been rounded to one decimal place.

Figures 4.1a and 4.1b depict this comparison for arrivals and departures respectively.

Figure 4.1a Runway Use Comparison - Arrivals

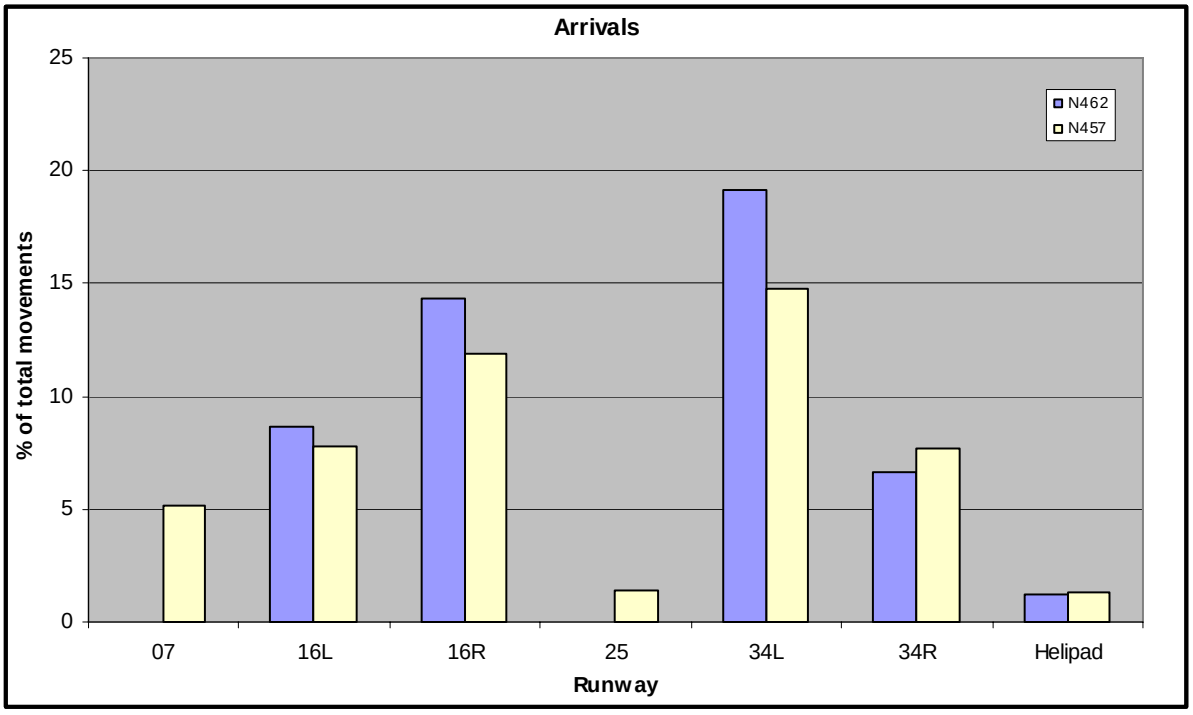


Figure 4.1b Runway Use Comparison - Departures

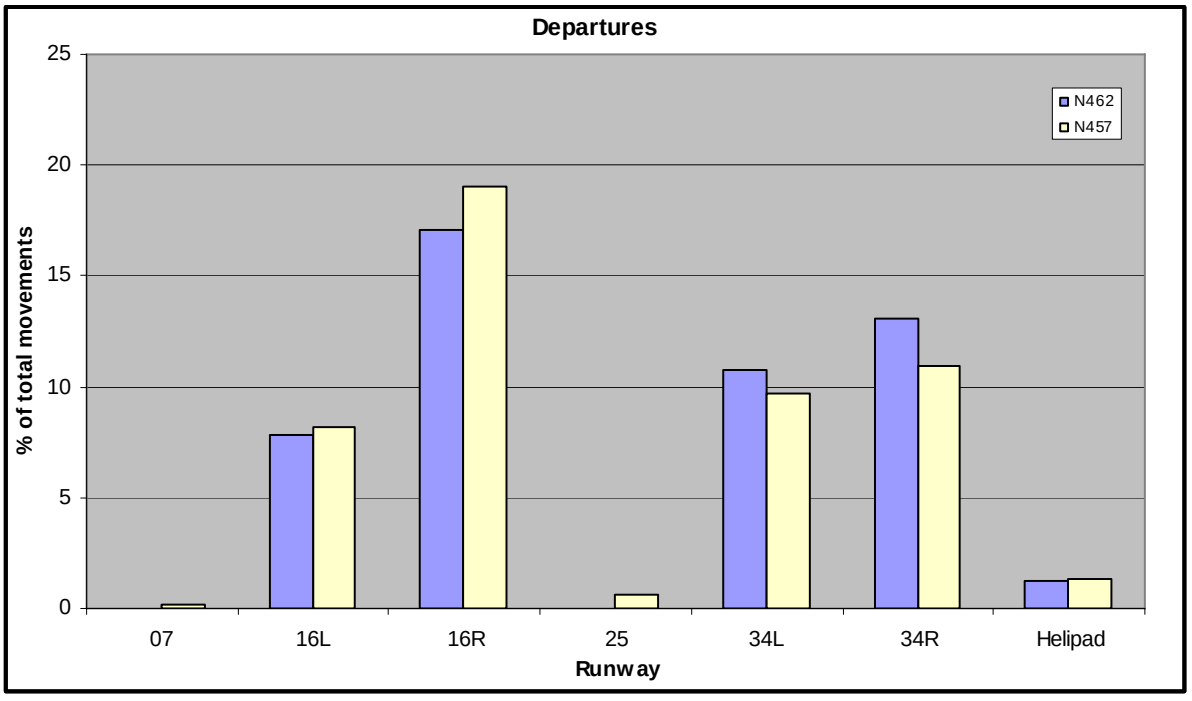


Table 4.4 details the proportion of aircraft movements to the north, south, east and west of Sydney Airport for ANEI N462 compared with ANEI N457. In calculating the proportion of aircraft movements, helicopter operations were not included.

Table 4.4 Runway End Impact Comparison

Direction	Operation		ANEI N462	ANEI N457
	Arrival Runway	Departure Runway	%	%
North	16L and 16R	34L	34.6	30.2
South	34L and 34R	16L and 16R	52.0	51.1
East	25	07 and 34R	13.4	12.8
West	07	25	0.0	6.0

4.3 Comparison of Population Counts

The estimated population within each of the contours of the 1 January to 31 March 2009 ANEI (N462) and the 1 January to 31 March 2008 ANEI (N457) is shown in Table 4.5. These population estimates are based on the Australian Bureau of Statistics 2006 Census of Population and Housing data and have been rounded to the nearest 100.

Table 4.5 Comparison of Total Population Estimates within each ANEI Contour.

ANEI	Period	>=20	>=25	>=30	>=35	>=40
N457	1 January to 31 March 2008	88,000	23,000	3,200	400	0
N462	1 January to 31 March 2009	79,800	19,400	2,800	400	0

A more detailed listing of the number of people within the various ANEI contours is shown by suburb for ANEI N462 and ANEI N457 in Attachment B. Notes and methodology specific to the suburbs and contour population counts are also included in Attachment B.

5. Number of Aircraft Noise Events Above 70dB(A) Noise Map

5.1 Introduction

'Number Above' (Nxx) noise maps are an approach which, while technically less rigorous than the ANEI, provide additional information on aircraft noise in a form that is more easily understood by the community. The contours provide a visual depiction that shows the number of noise events during a given period that are louder than a selected threshold level. The N70 Aircraft Noise Map for Sydney Airport shows for all areas around the airport how many aircraft noise events louder than 70 dB(A) there were, on a daily average, during the period from 1 January to 31 March 2009 ANEI (N462).

70 dB(A) is generally considered to be the external sound level below which no difficulty with reliable communication from radio, television or conversational speech in a typical room with windows open is expected. (Reference - Department of Transport and Regional Services, 2000, *Expanding Ways to Describe and Assess Aircraft Noise,* pp23-35).

5.2 Methodology used in the Development of the N70 Aircraft Noise Map

The N70 aircraft noise map was prepared using the same input files as those for the ANEI contours and was prepared by running the Time-Above (TA) metric, which is a standard metric within the INM 7.0, to produce a detailed grid output file. It is important to note that the TA metric, unlike the ANEF metric, does not use any night weighting in the calculations.

The detailed grid output file was then modified using propriety software and then imported into a GIS software package for plotting onto a base map.

5.3 Analysis of the N70 Aircraft Noise Map

The N70 map prepared for Sydney Airport is shown in Attachment F – Sydney Airport N462 N70 Aircraft Noise Map - 1 January to 31 March 2009.

The map output is consistent with the patterns that would be expected given the position of the flight paths and the number and types of aircraft using the flight paths modelled in the 1 January to 31 March 2009 ANEI (N462).

The N70 aircraft noise map provides information on the total number of aircraft noise events that exceeded 70 dB(A) in a grid area that were likely to have interfered with conversation, sleeping and listening to the radio or television inside a house with the windows open. However, it is important to note several limitations with the N70 aircraft noise maps. These include:

- Unlike the ANEI computations, 'Number Above' metrics are based on a large INM grid format have so far had limited use in formal noise assessment documents in Australia and they are therefore not tested or verified. The figures that may be derived from the N70 aircraft noise maps are therefore purely indicative.
- The INM does not provide users with a direct way of computing a 'Number Above' chart, unlike the ANEI and TA contours. It is only possible to derive 'Number Above' values on a rectangular grid, which is then processed for importing into the GIS software package. The accuracy of the N70 contours shown in Attachment F is therefore at best plus or minus 500 metres, the distance between grid points used by INM in the calculations. In addition, the superimposed contours may have incurred errors in the transformation from INM coordinates to the map coordinates that were used in the preparation of the N70 chart.

Attachment A

ANEI N462 Average Daily Aircraft Movements by Runway

Table A1 Average Daily Movements by Runway

Runway	Aircraft Type	Arrivals			Departure			Total
		Day	Night	Total	Day	Night	Total	
07	737800	0.00	0.00	0.00	0.01	0.00	0.01	0.01
07	A320	0.00	0.00	0.00	0.06	0.00	0.06	0.06
07	DHC6	0.00	0.00	0.00	0.03	0.01	0.04	0.04
07	LEAR35	0.00	0.00	0.00	0.03	0.01	0.04	0.04
07		0.00	0.00	0.00	0.13	0.02	0.15	0.15
								0.00
16L	717200	0.02	0.01	0.03	0.04	0.02	0.07	0.10
16L	727EM2	0.02	0.22	0.24	0.01	0.00	0.01	0.25
16L	737300	0.29	0.21	0.50	0.07	0.02	0.09	0.59
16L	737400	1.37	0.39	1.76	1.53	0.44	1.98	3.74
16L	737700	3.30	0.65	3.95	3.65	0.80	4.46	8.41
16L	737800	12.53	3.20	15.73	12.86	3.94	16.80	32.53
16L	737N17	0.11	0.00	0.11	0.01	0.00	0.01	0.12
16L	747400	0.00	0.00	0.00	0.07	0.00	0.07	0.07
16L	757PW	0.11	0.03	0.14	0.00	0.00	0.00	0.14
16L	767300	5.38	1.23	6.61	4.37	1.78	6.15	12.76
16L	767JT9	0.14	0.00	0.14	0.00	0.00	0.00	0.14
16L	777200	0.00	0.00	0.00	0.01	0.00	0.01	0.01
16L	777300	0.00	0.00	0.00	0.03	0.01	0.04	0.04
16L	A320	8.58	1.56	10.14	8.28	1.35	9.63	19.77
16L	A330	0.07	0.00	0.07	0.09	0.02	0.11	0.18
16L	BAE300	0.01	0.04	0.06	0.01	0.00	0.01	0.07
16L	BEC58P	0.07	0.14	0.21	0.08	0.03	0.11	0.32
16L	CL601	0.02	0.01	0.03	0.00	0.02	0.02	0.05
16L	CNA441	0.04	0.01	0.06	0.01	0.00	0.01	0.07
16L	DHC6	3.32	1.37	4.69	3.97	0.57	4.54	9.23
16L	DHC830	10.27	0.54	10.81	7.03	1.33	8.35	19.16
16L	GASEPF	0.02	0.00	0.02	0.02	0.02	0.03	0.05
16L	GASEPV	0.02	0.00	0.02	0.00	0.00	0.00	0.02
16L	GV	3.07	0.35	3.42	2.88	0.56	3.44	6.86
16L	JPATS	0.06	0.00	0.06	0.04	0.00	0.04	0.10
16L	LEAR35	0.91	0.07	0.97	0.68	0.13	0.81	1.78
16L	SF340	6.87	0.52	7.39	3.79	0.44	4.23	11.62
16L		56.59	10.57	67.16	49.52	11.49	61.02	128.18

Runway	Aircraft Type	Arrivals			Departure			Total
		Day	Night	Total	Day	Night	Total	
16R	717200	0.04	0.02	0.07	0.03	0.03	0.07	0.14
16R	727EM2	0.00	0.03	0.03	0.01	0.30	0.31	0.34
16R	737300	0.03	0.31	0.34	0.24	0.62	0.86	1.20
16R	737400	3.87	0.87	4.75	4.16	0.93	5.09	9.84
16R	737700	4.04	2.15	6.19	4.47	1.97	6.44	12.63
16R	737800	18.06	6.53	24.59	19.74	6.05	25.78	50.37
16R	737N17	0.04	0.00	0.04	0.14	0.02	0.16	0.20
16R	74720B	0.07	0.01	0.08	0.03	0.03	0.05	0.13
16R	747400	7.33	2.79	10.12	9.71	0.81	10.52	20.64
16R	757PW	0.02	0.01	0.03	0.16	0.00	0.16	0.19
16R	767300	9.09	3.43	12.52	11.33	3.28	14.61	27.13
16R	767JT9	0.09	0.00	0.09	0.24	0.00	0.24	0.33
16R	777200	0.43	0.33	0.76	0.58	0.20	0.79	1.55
16R	777300	3.11	1.59	4.70	3.06	1.86	4.92	9.62
16R	A300	0.00	0.00	0.00	0.00	0.02	0.02	0.02
16R	A320	4.92	2.21	7.14	7.88	1.06	8.94	16.08
16R	A330	7.15	2.31	9.46	7.82	2.20	10.02	19.48
16R	A340	1.85	0.67	2.52	2.25	0.45	2.70	5.22
16R	BAE300	0.01	0.29	0.30	0.03	2.24	2.28	2.58
16R	BEC58P	0.03	0.23	0.27	0.08	0.57	0.65	0.92
16R	CL601	0.18	0.06	0.23	0.17	0.07	0.24	0.47
16R	CNA441	0.10	0.01	0.11	0.13	0.02	0.15	0.26
16R	DC930	0.01	0.00	0.01	0.00	0.00	0.00	0.01
16R	DHC6	1.34	0.90	2.23	1.83	2.66	4.49	6.72
16R	DHC830	7.62	0.53	8.16	9.54	1.76	11.30	19.46
16R	GASEPF	0.01	0.00	0.01	0.02	0.00	0.02	0.03
16R	GASEPV	0.06	0.00	0.06	0.07	0.00	0.07	0.13
16R	GV	4.37	1.02	5.39	4.76	1.16	5.92	11.31
16R	JPATS	0.02	0.00	0.02	0.04	0.00	0.04	0.06
16R	LEAR35	0.82	0.20	1.02	1.06	0.56	1.62	2.64
16R	MD11GE	0.50	0.17	0.66	0.09	0.60	0.68	1.34
16R	SF340	9.06	0.66	9.73	10.03	3.35	13.38	23.11
16R		84.28	27.34	111.62	99.71	32.83	132.54	244.16
								0.00
25								0.00

Runway	Aircraft Type	Arrivals			Departure			Total
		Day	Night	Total	Day	Night	Total	
34L	717200	0.01	0.01	0.02	0.00	0.00	0.00	0.02
34L	727EM2	0.01	0.21	0.22	0.03	0.24	0.28	0.50
34L	737300	0.10	0.51	0.61	0.06	0.12	0.18	0.79
34L	737400	4.68	1.34	6.02	1.56	0.24	1.80	7.82
34L	737700	6.20	2.97	9.16	2.90	0.84	3.74	12.90
34L	737800	23.36	8.74	32.10	8.94	2.17	11.11	43.21
34L	737N17	0.12	0.01	0.13	0.17	0.00	0.17	0.30
34L	74720B	0.07	0.04	0.11	0.08	0.05	0.13	0.24
34L	747400	8.11	3.63	11.74	10.63	0.63	11.26	23.00
34L	757PW	0.03	0.04	0.08	0.19	0.00	0.19	0.27
34L	767300	10.98	4.70	15.68	2.77	0.95	3.72	19.40
34L	767JT9	0.12	0.00	0.12	0.24	0.00	0.24	0.36
34L	777200	0.46	0.28	0.74	0.59	0.11	0.71	1.45
34L	777300	3.16	2.11	5.28	3.11	1.90	5.01	10.29
34L	A300	0.02	0.00	0.02	0.00	0.00	0.00	0.02
34L	A320	7.81	3.65	11.46	2.27	0.12	2.39	13.85
34L	A330	7.88	2.67	10.55	7.60	1.86	9.46	20.01
34L	A340	1.96	1.00	2.95	2.29	0.49	2.77	5.72
34L	BAE300	0.02	1.93	1.95	0.01	0.00	0.01	1.96
34L	BEC58P	0.08	0.32	0.40	0.11	0.05	0.16	0.56
34L	CL601	0.27	0.07	0.33	0.11	0.00	0.11	0.44
34L	CNA441	0.03	0.02	0.05	0.05	0.00	0.05	0.10
34L	DHC6	2.28	3.23	5.51	1.77	0.59	2.36	7.87
34L	DHC830	10.55	1.20	11.74	10.10	1.69	11.79	23.53
34L	GASEPF	0.01	0.00	0.01	0.02	0.00	0.02	0.03
34L	GASEPV	0.02	0.00	0.02	0.04	0.00	0.04	0.06
34L	GV	5.38	1.48	6.86	0.88	0.02	0.91	7.77
34L	JPATS	0.03	0.01	0.04	0.04	0.01	0.05	0.09
34L	LEAR35	0.97	0.71	1.68	0.42	0.08	0.49	2.17
34L	MD11GE	0.66	0.18	0.84	0.12	0.70	0.82	1.66
34L	SF340	11.38	1.24	12.62	10.47	3.40	13.88	26.50
34L		106.77	42.29	149.06	67.58	16.26	83.83	232.89

Runway	Aircraft Type	Arrivals			Departure			Total
		Day	Night	Total	Day	Night	Total	
34R	717200	0.02	0.00	0.02	0.01	0.00	0.01	0.03
34R	727EM2	0.02	0.08	0.10	0.00	0.00	0.00	0.10
34R	737300	0.25	0.07	0.32	0.28	0.36	0.64	0.96
34R	737400	1.23	0.24	1.47	4.09	1.04	5.13	6.60
34R	737700	2.79	0.29	3.08	5.96	1.77	7.73	10.81
34R	737800	9.56	1.65	11.21	23.10	6.82	29.93	41.14
34R	737N17	0.07	0.00	0.07	0.00	0.01	0.01	0.08
34R	757PW	0.08	0.02	0.10	0.00	0.00	0.00	0.10
34R	767300	4.75	0.76	5.51	12.50	3.32	15.82	21.33
34R	767JT9	0.13	0.00	0.13	0.00	0.00	0.00	0.13
34R	A320	7.09	0.52	7.61	13.64	1.69	15.33	22.94
34R	A330	0.07	0.00	0.07	0.41	0.13	0.54	0.61
34R	BEC58P	0.13	0.04	0.18	0.13	0.00	0.13	0.31
34R	CL601	0.01	0.00	0.01	0.19	0.04	0.23	0.24
34R	CNA441	0.03	0.00	0.03	0.03	0.00	0.03	0.06
34R	DC930	0.00	0.00	0.00	0.01	0.00	0.01	0.01
34R	DHC6	2.54	0.72	3.26	3.69	0.58	4.27	7.53
34R	DHC830	8.67	0.10	8.76	6.45	1.58	8.03	16.79
34R	GASEPF	0.02	0.00	0.02	0.00	0.00	0.00	0.02
34R	GASEPV	0.01	0.00	0.01	0.00	0.00	0.00	0.01
34R	GV	2.76	0.13	2.89	6.46	1.84	8.29	11.18
34R	JPATS	0.02	0.00	0.02	0.02	0.00	0.02	0.04
34R	LEAR35	0.55	0.04	0.60	1.13	0.18	1.30	1.90
34R	SF340	5.59	0.39	5.98	3.77	0.45	4.22	10.20
34R		46.40	5.05	51.45	81.86	19.82	101.68	153.13
								0.00
H	AS355F	0.68	0.15	0.83	0.72	0.11	0.83	1.66
H	B206L	8.20	0.61	8.81	8.08	0.73	8.81	17.62
H		8.88	0.76	9.64	8.80	0.84	9.64	19.28
Grand Total		302.92	86.01	388.93	307.60	81.26	388.86	777.79

Attachment B

ANEI N462 Estimated Population within each ANEI Contour by Suburb

Table B1 Comparison of Estimated Population within each ANEI Contour by Suburb

Study	Suburb		Contours (ANEF)				
	Name	Population	>=20	>=25	>=30	>=35	>=40
N457	Alexandria	5800	100	0	0	0	0
N462	Alexandria	5800	300	0	0	0	0
N457	Annandale	8300	700	100	0	0	0
N462	Annandale	8300	1100	100	0	0	0
N457	Arncliffe	8500	200	0	0	0	0
N462	Arncliffe	8500	0	0	0	0	0
N457	Banksia	2900	2100	1400	600	0	0
N457	Banksmeadow	500	0	0	0	0	0
N462	Banksmeadow	500	0	0	0	0	0
N457	Bexley	17900	7000	2800	0	0	0
N457	Botany	7500	3900	900	200	0	0
N462	Botany	7500	4900	1700	200	0	0
N457	Brighton-le-sands	7200	0	0	0	0	0
N462	Brighton-le-sands	7200	100	0	0	0	0
N457	Camperdown	6500	100	0	0	0	0
N462	Camperdown	6500	1200	0	0	0	0
N457	Daceyville	1200	800	0	0	0	0
N457	Drummoyne	10400	1900	0	0	0	0
N462	Drummoyne	10400	3300	0	0	0	0
N457	Eastlakes	6600	1700	300	0	0	0
N462	Eastlakes	6600	4000	0	0	0	0
N462	Erskineville	6500	0	0	0	0	0
N462	Haberfield	6600	0	0	0	0	0
N457	Hurstville	23300	4500	0	0	0	0
N457	Kingsford	14200	1900	0	0	0	0
N457	Kurnell	2100	1200	0	0	0	0
N462	Kurnell	2100	1100	0	0	0	0
N457	Kyeemagh	800	700	0	0	0	0
N462	Kyeemagh	800	500	0	0	0	0
N457	Leichhardt	12300	7800	2300	0	0	0
N462	Leichhardt	12300	9600	2900	0	0	0
N462	Lewisham	2800	100	0	0	0	0
N457	Lilyfield	6800	3200	0	0	0	0
N462	Lilyfield	6800	3600	0	0	0	0
N457	Marrickville	23200	10000	2800	800	0	0
N462	Marrickville	23200	10700	3300	900	0	0
N457	Mascot	8500	8500	2800	100	0	0
N462	Mascot	8500	8500	3400	0	0	0
N457	Matraville	8800	0	0	0	0	0
N462	Matraville	8800	0	0	0	0	0
N457	Newtown	13500	5600	0	0	0	0
N462	Newtown	13500	6500	0	0	0	0
N457	Pagewood	3000	0	0	0	0	0
N462	Pagewood	3000	0	0	0	0	0
N457	Penshurst	11200	800	0	0	0	0

N457	Petersham	7400	5800	1600	0	0	0
N462	Petersham	7400	6900	1900	0	0	0
N457	Randwick	25800	900	0	0	0	0
N457	Rockdale	14000	4900	2400	200	0	0
N462	Rodd Point	1200	0	0	0	0	0
N457	Rosebery	7400	1900	0	0	0	0
N462	Rosebery	7400	3400	0	0	0	0
N457	Russell Lea	5100	100	0	0	0	0
N462	Russell Lea	5100	200	0	0	0	0
N457	St Peters	2600	2600	400	100	0	0
N462	St Peters	2600	2600	500	200	0	0
N457	Stanmore	7100	5000	2700	100	0	0
N462	Stanmore	7100	6900	2900	200	0	0
N457	Sydenham	1000	1000	1000	800	300	0
N462	Sydenham	1000	1000	1000	900	300	0
N457	Tempe	3200	3100	1500	300	100	0
N462	Tempe	3200	3100	1500	400	100	0
N462	Wolli Creek	2700	0	0	0	0	0

Table B2 Comparison of Total Estimated Population within each ANEI Contour

Study	Total Suburb Population	Contours (ANEF)				
		>=20	>=25	>=30	>=35	>=40
N457	284500	88000	23000	3200	400	0
N462	193700	79800	19400	2800	400	0

Notes

1. Contour and Suburb population counts have been rounded up to the nearest 100. Contour and Suburb population Totals are calculated using the non-rounded values. The Totals are then rounded up to the nearest 100.

2. Contour and Suburb population counts and Totals with values less than fifty are rounded down to zero.

3. A Contour may overlap a Suburb but have no population under the contour. This can occur because the population distribution within a Suburb is modelled to ensure that there is no significant population in parks, reserves and industrial areas.

Data and Methodology

Suburb and contour population counts are approximations based on Census District (CD) populations from Census and Suburb Boundary information from MapInfo Australia. Populations are calculated according to the proportion of the area of overlap of a suburb/contour on a CD to the CD total area. Some editing of CD boundaries and populations was performed to accurately reflect population distribution in critical areas (close to the airport or flight paths).

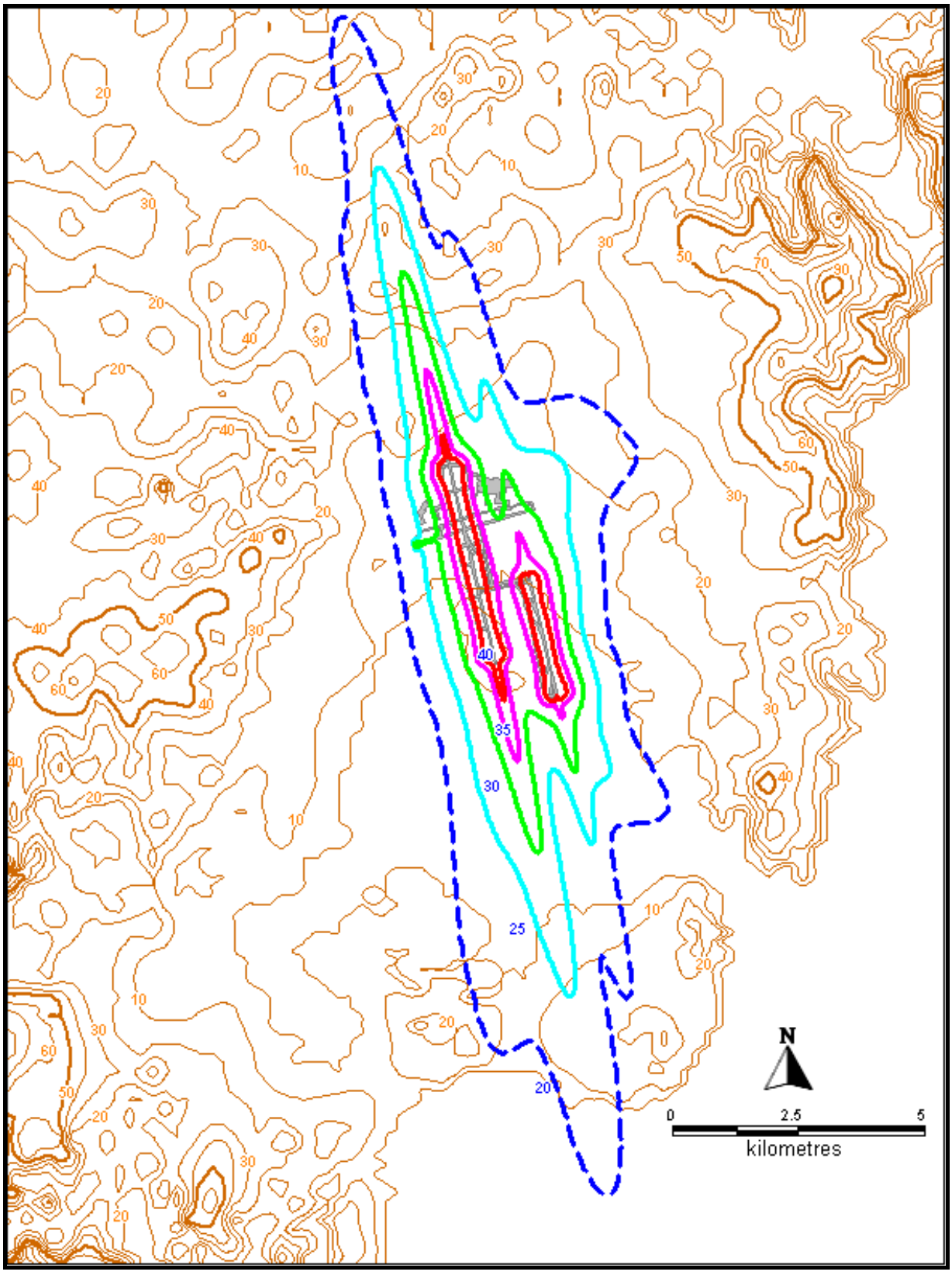
Attachment C

ANEI N462 Contours with INM Terrain Contours

Sydney Airport

1 January to 31 March 2009

Sydney Airport N462 (1 January – 31 March 2009) ANEI Contours with Terrain Data



Terrain contour height shown in metres.

Attachment D

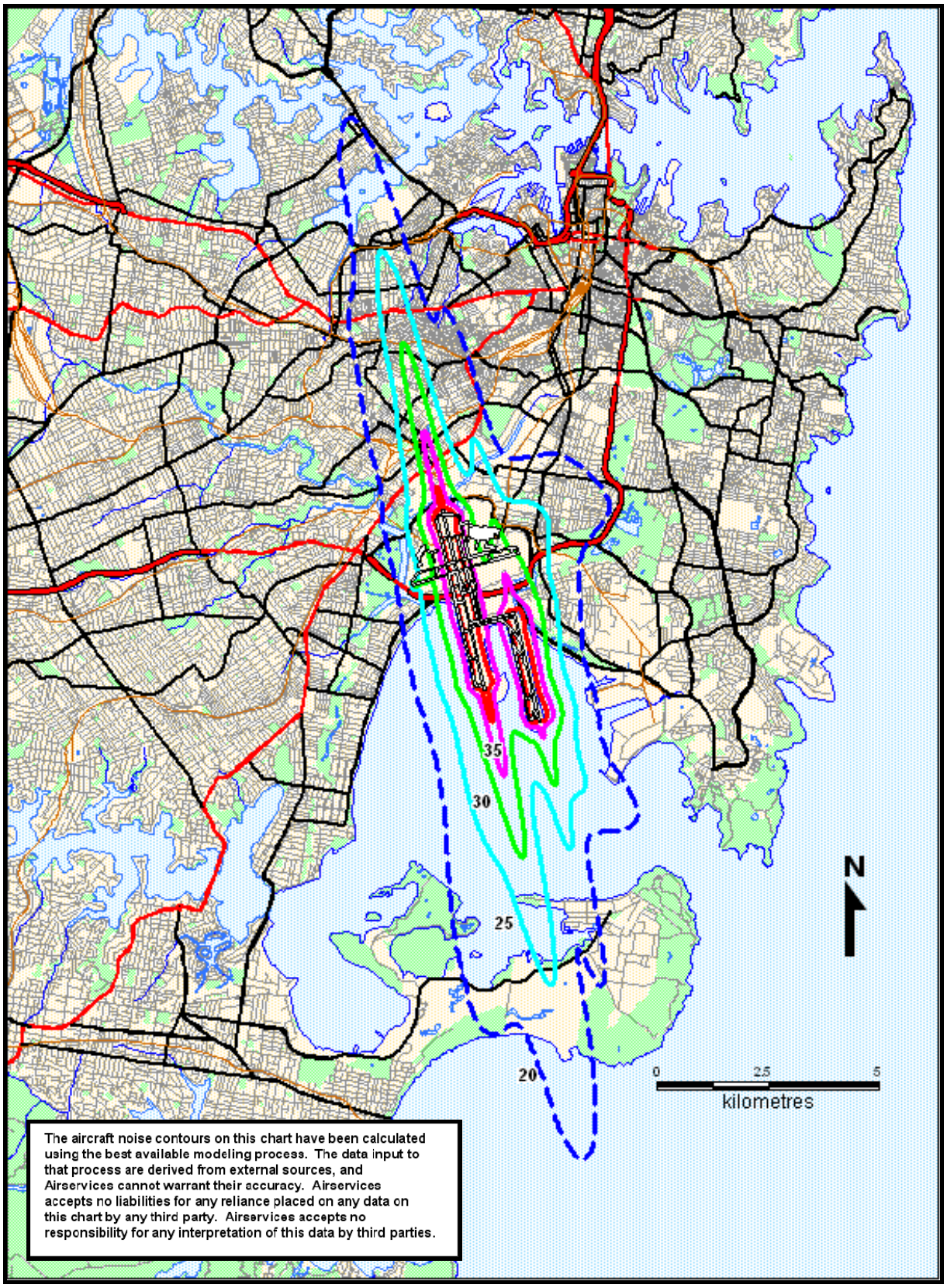
ANEI N462 Contours

Sydney Airport

1 January to 31 March 2009

The contours for ANEI N462 have been prepared using terrain data.

Sydney Airport N462 (1 January – 31 March 2009) ANEI Contours



ANEI contours modeled by INM 7.0 incorporating terrain data.

Attachment E

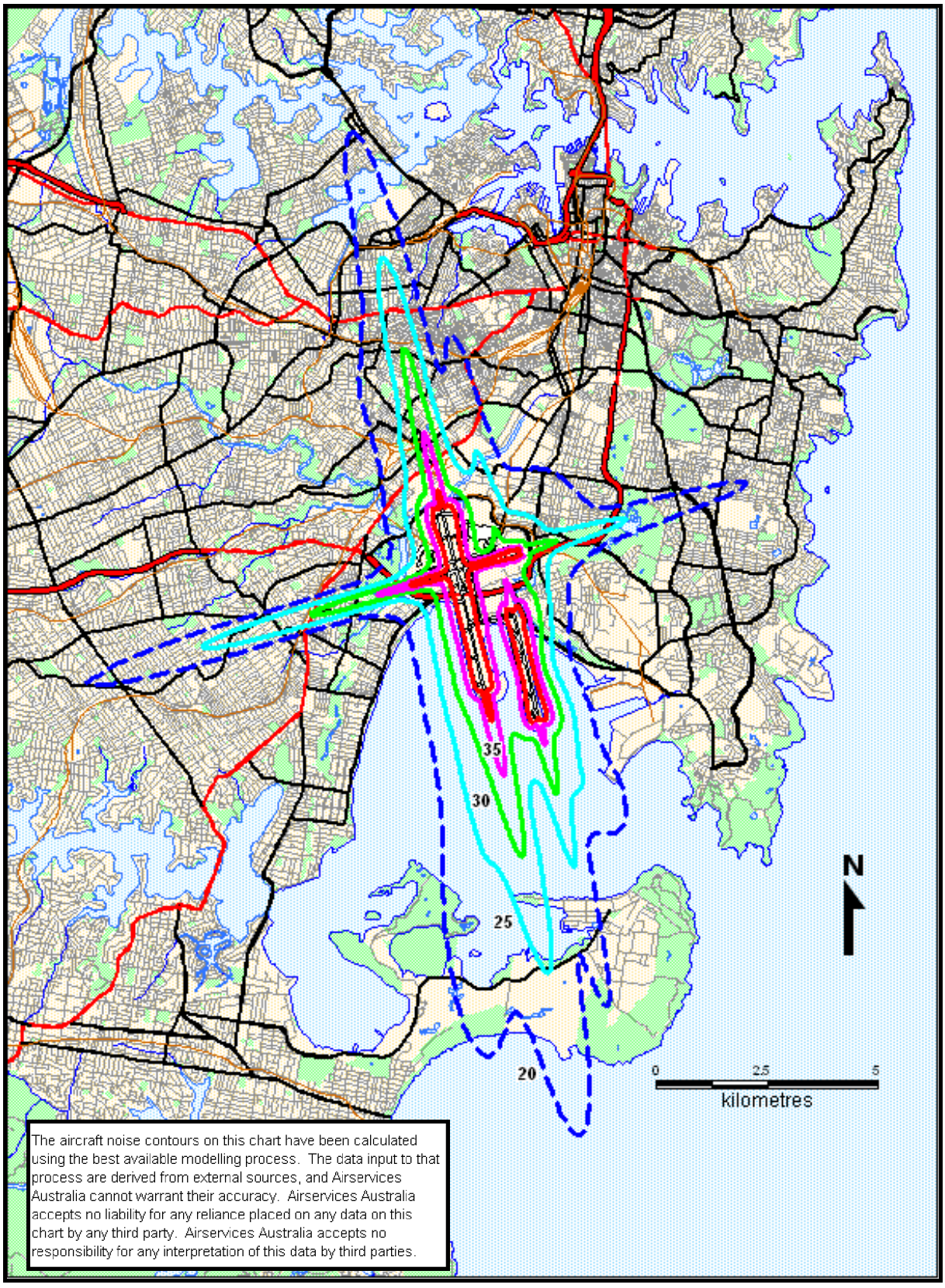
ANEI N457 Contours

Sydney Airport

1 January to 31 March 2008

The contours for ANEI N457 have been prepared using terrain data.

Sydney Airport N457 (1 January – 31 March 2008) ANEI Contours



ANEI contours modeled by INM 6.2a incorporating terrain data.

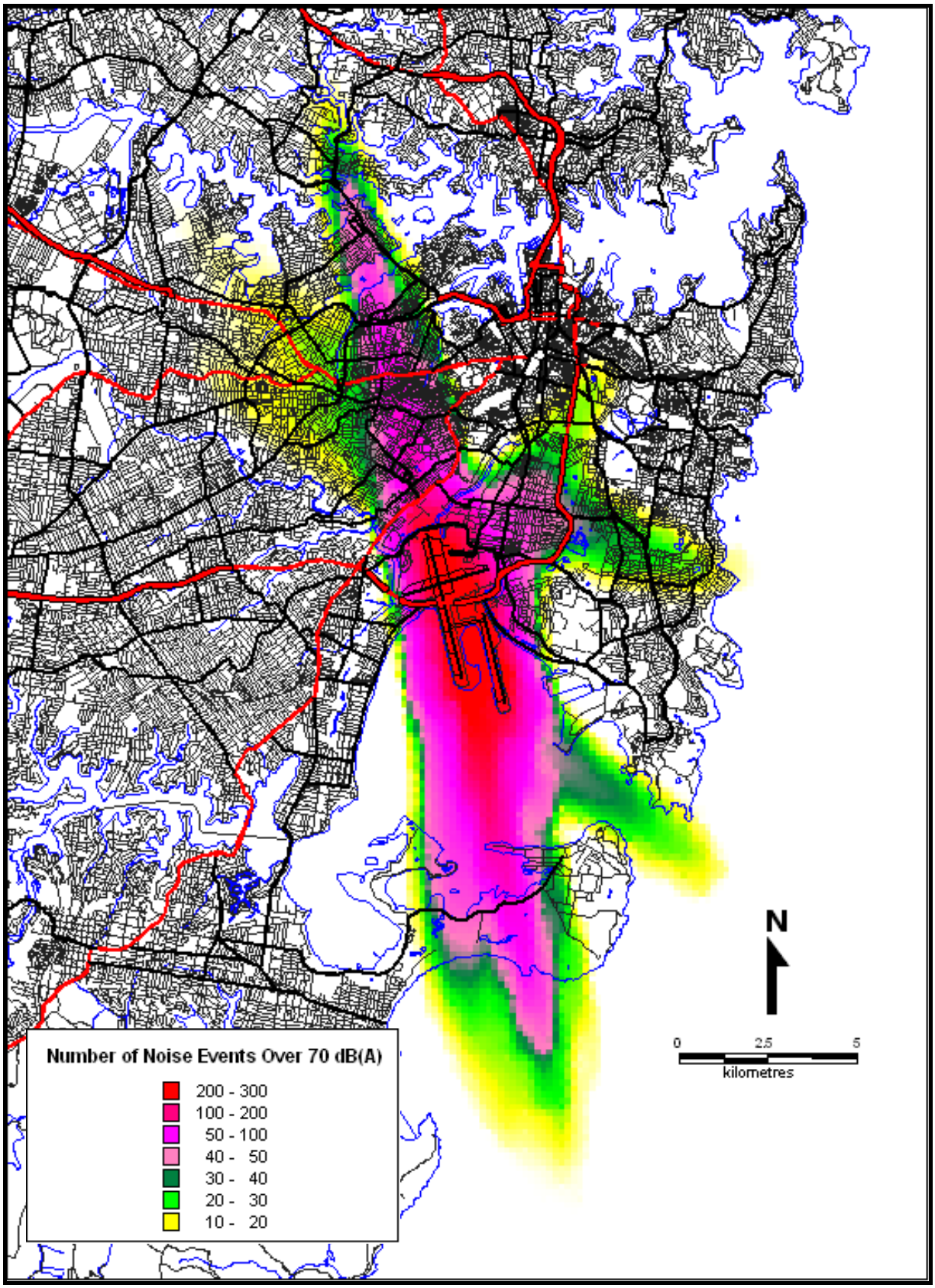
Attachment F

N462 N70 Chart

Sydney Airport

1 January to 31 March 2009

Sydney Airport N462 (1 January – 31 March 2009) N70 Chart



Daily average number of aircraft noise events louder than 70 db(A).