

**Environmental Research and Consultancy Department
Civil Aviation Authority**



ERCD REPORT 1305

Noise Action Plan Contours for Heathrow Airport 2012

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Summary

This report presents the year 2012 noise exposure contours which are required for Heathrow's Noise Action Plan and compares them with the contours for year 2011. The following noise metrics are assessed: L_{den} , L_{day} , $L_{evening}$, L_{night} and $L_{eq,6.5hr\ night}$. Trends from 2006 to 2012 are also examined.

January 2014

The authors of this report are employed by the Civil Aviation Authority. The work reported herein was carried out on behalf of Heathrow Airport Ltd.

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Population data used in this report are based on 2001 Census data (updated for 2011 and 2012) supplied by CACI Information Services.

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Glossary

ANCON	The UK civil aircraft noise contour model, developed and maintained by ERCD.
CAA	Civil Aviation Authority – the UK’s independent specialist aviation regulator.
dB	Decibel units describing sound level or changes of sound level.
dBA	Units of sound level on the A-weighted scale, which incorporates a frequency weighting approximating the characteristics of human hearing.
DfT	Department for Transport (UK Government).
END	Environmental Noise Directive.
ERCD	Environmental Research and Consultancy Department of the CAA.
ICAO	International Civil Aviation Organization.
L_{day}	Equivalent sound level of aircraft noise in dBA for the average 12-hour annual day period (0700-1900 local time).
L_{den}	Equivalent sound level of aircraft noise in dBA for the average 24-hour annual period with 5 dB weightings for L _{evening} and 10 dB weightings for L _{night} .
Leq	Equivalent sound level of aircraft noise in dBA, often called ‘equivalent continuous sound level’.
L_{eq,6.5hr night}	Equivalent sound level of aircraft noise in dBA for the average 6.5-hour night quota period (2330-0600 local time).
L_{evening}	Equivalent sound level of aircraft noise in dBA for the average 4-hour annual evening period (1900-2300 local time).
L_{night}	Equivalent sound level of aircraft noise in dBA for the average 8-hour annual night period (2300-0700 local time).
NTK	Noise and Track Keeping monitoring system. The NTK system associates radar data from air traffic control radar with related data from both fixed (permanent) and mobile noise monitors at prescribed positions on the ground.
SID	Standard Instrument Departure.

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Executive Summary

This report presents the year 2012 L_{den} , L_{day} , $L_{evening}$, L_{night} and $L_{eq,6.5hr\ night}$ noise contours that have been calculated for Heathrow Airport's Noise Action Plan.

Aircraft movements over the L_{den} period decreased by 1.5% in 2012 compared to 2011.

The results show that L_{den} areas in 2012 were slightly lower than in 2011 for the outermost contour band but largely unchanged at the higher contour bands. The area of the outermost L_{day} contour band decreased in 2012, but increased at the higher L_{day} bands. Reductions in contour band areas were generally observed for $L_{evening}$ and L_{night} . The 2012 48 dBA $L_{eq,6.5hr\ night}$ contour area expanded slightly to 42.5 km², but is well within the 55 km² contour area objective for 2011-12 set by the night flying restrictions regime.

The 2012 L_{den} , L_{day} , $L_{evening}$ and L_{night} contours show population changes that are in line with the area changes described above. However, the $L_{eq,6.5hr\ night}$ population count dropped significantly due to changes to the contour shape, with parts of the contour retracting from densely populated areas.

In terms of trends for the *outermost contour band* for each of the noise metrics, the L_{den} areas have been fairly steady since 2009, dropping back slightly in 2012 following a rise in 2011. Population and households also decreased after the rise in 2011. A similar trend is observed for L_{day} and $L_{evening}$. For L_{night} the area has declined for the second successive year, and population and households have established a downward trend which began in 2009. Despite the area increase for $L_{eq,6.5hr\ night}$ in 2012, there has been a decline in the corresponding populations and households over the past two years.

The 2012 *cumulative* areas and populations are below 2006 levels for all the noise metrics, for example the 2012 55 dBA L_{den} contour area of 216.9 km² is 11% smaller than the 2006 figure (244.7 km²), whilst the population enclosed is 4% lower.

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1 Introduction

- 1.1 This report summarises the year 2012 noise exposure contours that have been generated by the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA) for the Heathrow Airport Ltd (HAL) Noise Action Plan. Contours have been produced for the following noise metrics: L_{den} , L_{day} , $L_{evening}$, L_{night} and $L_{eq,6.5hr\ night}$.
- 1.2 The L_{den} , L_{day} , $L_{evening}$ and L_{night} contours are based on annual movement data for the 2012 calendar year, whilst the $L_{eq,6.5hr\ night}$ contour is based on data from the night quota 2012 summer and 2012-13 winter seasons combined (i.e. the period 25 March 2012 – 30 March 2013).
- 1.3 The year 2012 contours are compared with the 2011 results (**Ref 1**) to assess the changes in area, population and households enclosed by the contours. The contour trends from 2006 to 2012 are also examined.

2 Noise modelling methodology

ANCON

- 2.1 The noise contours were calculated with the UK civil aircraft noise model ANCON (version 2.3), which is developed and maintained by ERCD on behalf of the DfT. A technical description of the ANCON model can be found in R&D Report 9842 (**Ref 2**).

Flight tracks and profiles

- 2.2 The contours were modelled with the mean departure and arrival ground tracks that had been generated for the Heathrow 2012 summer Leq contours (**Ref 3**). Average flight profiles of height, speed and thrust were also based on year 2012 summer data.

Traffic data

- 2.3 The contours were calculated using movement data extracted from the Noise and Track Keeping (NTK) system, which stores radar data supplemented by daily flight plans. Breakdowns of the aircraft movements by ANCON type for the *average* 24-hour day, 12-hour day (0700-1900 local time), 4-hour evening (1900-2300 local time), 8-hour night (2300-0700 local time) and 6.5-hour night (2330-0600 local time) periods are summarised in **Appendix A**. Detailed descriptions of the ANCON aircraft types are provided in **Appendix B**.

Total movements 2006-2012

- 2.4 The annual average daily (24-hour) movements for the base year 2006 (**Ref 4**) and years 2009-2012 are summarised in **Table 2.1**. It can be seen that total movements fell in both 2009 and 2010 relative to 2006, but rose substantially in 2011 to 1% above the 2006 total, before falling back slightly in 2012.

Table 2.1 Heathrow annual average 24-hour movements: 2006 & 2009-2012

Year	Total movements	% Change relative to 2006
2006	1307.6	(n/a)
2009	1277.2	-2%
2010	1245.8	-5%
2011	1317.1	+1%
2012	1297.9	-1%

Aircraft Noise Classes 2006-2012

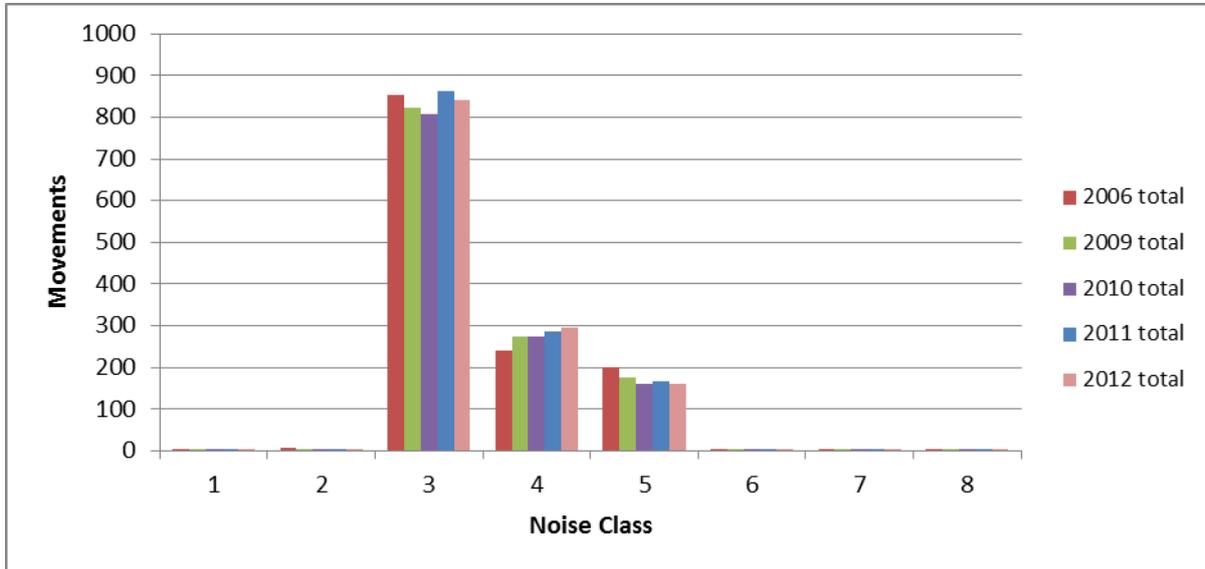
- 2.5 The 2012 traffic can be considered in terms of 'Noise Class' categories, which are ranked in ascending order of noise emission (i.e. from the quietest to the noisiest), as summarised in **Table 2.2** below:

Table 2.2 Heathrow annual average 24-hour movements by Noise Class for year 2012

Noise Class	Description	Year 2012	Percentage
1	Small propeller	0.22	0%
2	Large propeller	0.29	0%
3	Short-haul jet (e.g. Airbus A320)	841.35	65%
4	Wide-body twin (e.g. B777-200, B787)	296.63	23%
5	2 nd generation wide-body 3,4 engine (e.g. B747-400, A380)	159.31	12%
6	1 st generation wide-body 3,4 engine (e.g. B747-100)	0.02	0%
7	2 nd generation narrow-body twin (e.g. B737-200)	0.01	0%
8	1 st generation narrow-body 3,4 engine (e.g. B727)	0.09	0%
Total		1297.92	100%

- 2.6 The chart in **Figure 2.1** illustrates the breakdown of total movements by Noise Class, for the years 2006 and 2009-2012. It can be seen that virtually all movements fall within Noise Classes 3, 4 and 5.
- 2.7 Around two-thirds of movements are within Noise Class 3, i.e. short-haul Chapter 3 & 4 aircraft (e.g. Airbus A319/A320/A321). Numbers within Noise Class 3 dropped from 2006 to 2010, but increased in 2011 to a level slightly higher than in 2006, before dropping back to below the 2006 level in 2012. The Airbus A319 had the biggest increase in 2012 (+16.0 movements), although this was offset to a large extent by decreases for the Airbus A320 (-12.6).
- 2.8 The next largest grouping is Noise Class 4: modern wide-body twin-engine aircraft (e.g. Boeing 777-200/300, Boeing 787), which accounted for 23% of total movements in 2012. These have increased in frequency between 2009 and 2012.
- 2.9 The Noise Class 5 grouping, i.e. 2nd generation wide-body 3- and 4-engine aircraft (e.g. B747-400, A380), decreased in both 2009 and 2010, but movements have been relatively steady since 2010. Approximately 12% of total movements were within Noise Class 5 in 2012.

Figure 2.1 Heathrow annual average 24-hour movements by Noise Class for years 2006 and 2009-2012



Fleet mix by ICAO noise chapter

2.10 An analysis of the certification noise levels of the aircraft operating at Heathrow in the year 2012 annual period indicated that approximately 97% of the fleet were compliant with the ICAO ‘Chapter 4’ noise standard, the remainder meeting the ‘Chapter 3’ noise standard.

Runway modal splits

2.11 The contours were modelled with the actual 2012 runway modal splits, which are summarised in **Table 2.3** along with the modal splits for the previous year. In 2012, there were 3% more westerly movements over the average 24-hour (L_{den}) period compared to 2011.

Table 2.3 Heathrow average runway modal splits for 2011 and 2012

Modal split scenario	2011	2012
L_{den}	71% W / 29% E	74% W / 26% E
L_{day}	71% W / 29% E	74% W / 26% E
$L_{evening}$	72% W / 28% E	76% W / 24% E
L_{night}	72% W / 28% E	75% W / 25% E
$L_{eq,6.5hr\ night}$	73% W / 27% E	68% W / 32% E

Population database

- 2.12 Estimates were made of the numbers of people and households enclosed within the noise contours. The population data used in this report for the 2012 contours are a 2012 update of the 2001 Census supplied by CACI Limited¹. The CACI population database contains data referenced at the postcode level. Population and household numbers associated with each postcode are assigned to a single co-ordinate located at the postcode's centroid.

¹ www.caci.co.uk

3 Noise contour comparisons

- 3.1 The following Noise Action Plan contours for year 2012 are displayed in **Figures 3.1-3.5** (shown in black), overlaid onto the contours for 2011 (shown in red):
- L_{den} , from 55 to 75 dBA in 5 dB steps;
 - L_{day} , from 55 to 75 dBA in 5 dB steps;
 - $L_{evening}$, from 55 to 75 dBA in 5 dB steps;
 - L_{night} , from 50 to 70 dBA in 5 dB steps; and
 - $L_{eq,6.5hr\ night}$, 48 dBA.
- 3.2 The estimated areas, populations and households within the contours are summarised in **Tables 3.1-3.5**, along with the results for the previous year. It should be noted that all the 2012 population and household changes relative to 2011 in the tables are based on CACI figures, i.e. the 2012 and 2011 CACI population updates of the 2001 Census.
- 3.3 The statistics for L_{den} , L_{day} , $L_{evening}$ and L_{night} are presented in 5 dB contour *bands* (e.g. 55-60 dBA) in line with the requirements of the Environmental Noise Directive, and are not cumulative as is the case for the average summer day L_{eq} contours published by the DfT.
- 3.4 However, for reference purposes, the 2011 and 2012 results are also provided in *cumulative* format in **Appendix C**. In addition, a comparison between the 2006 base year and 2012 *cumulative* results is provided in **Appendix D**. All the population and household figures in these two appendices are based on updated CACI data.
- 3.5 It should be noted that percentage changes in contour area are not necessarily accompanied by similar changes in enclosed population and households because populations are unevenly distributed around the airport. Thus the population counts can be highly sensitive to changes in contour shape.
- 3.6 Changes in population counts from year to year are also influenced by the effects of the annual update to the population database. The 2012 CACI database indicated population growth in the order of 1% (from 2011) within the region bounded by the year 2012 55 dBA L_{den} contour, which is somewhat less than the 3-6% increase observed for the 2011 population update (from 2010).
- 3.7 A higher proportion of westerly movements (and thus a reduction in the proportion of easterly movements) at Heathrow also tends to cause an increase in contour area, due to: (a) the effects of the interaction of noise from the two runways and (b) the Cranford Agreement which restricts departures from Runway 09L when the

airport is operating in easterly mode. The increase in westerly movements in 2012 over the L_{den} period was 3%, so the effect on the contours was smaller than for the previous year when westerly movements increased by 5%.

L_{den}

- 3.8 For L_{den} , the area of the outermost contour band for 2012 has shown a 4% decrease from 2011 (**Table 3.1**). This can be attributed to the lower noise exposure in 2012 for the outermost contour bands of the L_{day} , $L_{evening}$ and L_{night} periods. It is noteworthy that aircraft movements decreased by 1.5% in 2012 compared to the previous year, with a 6% reduction in movements (-6.2 per 24-hour day) of the noise dominant B747-400 aircraft family. Movements of A340 aircraft also decreased in 2012, by 7.0 per 24-hour day (-12%). The B747-400 and A340 reductions were partially offset by A380 movements which increased by 4.6 (+40%) over the average 24-hour day in 2012.
- 3.9 Areas for the inner contour bands were largely unchanged from 2011. Population and household counts both decreased by 3% for the outer contour band, with some increases and decreases for the higher contour bands.
- 3.10 The 55 dBA contour lobes resulting from westerly and easterly departures turning to the north were noticeably smaller in 2012 (**Figure 3.1**). This can be attributed to significant reductions in the numbers of departures by B747-400 aircraft on the westerly WOB/BPK SIDs and the easterly BUZ/BPK SIDs.
- 3.11 In addition, the 55 dBA contour lobe associated with arrivals on Runway 09L has moved inwards due to reductions in 09L arrival movements by about 12% in 2012 compared to 2011.

L_{day}

- 3.12 The outermost 55-60 dBA band area for L_{day} reduced by 1%, but increased for the higher bands by 2-4% (**Table 3.2**). Population and household changes followed a similar pattern. Total movements in the 2012 L_{day} period fell by 2%, though movements by the noise dominant B747-400 aircraft increased by 1% from 2011.
- 3.13 The 55 dBA contour lobes due to departing aircraft turning to the north and arrivals on Runway 09L were smaller (see **Figure 3.2**) for the same reasons as described above for L_{den} . In contrast there was an extension to the 55 dBA contour immediately to the south-west of Windsor, which is associated with departures on the CPT/SAM SIDs. Movements increased by 13% on these SIDs in 2012 compared to 2011.

$L_{evening}$

- 3.14 The areas of the $L_{evening}$ contours decreased by up to 5% (**Table 3.3**). This can be attributed to the 1% reduction in traffic, and particularly to a 19% decrease in

movements of the B747-400 aircraft. Most of the contour bands also showed decreases in population counts.

- 3.15 The 55 dBA contour lobes from westerly and easterly departures turning to the north were clearly smaller in 2012 (see **Figure 3.3**), and as explained above were caused primarily by substantial reductions in movements of the B747-400 aircraft on these routes.
- 3.16 The 4% higher proportion of westerly movements over the 2012 L_{evening} period caused the contour at the eastern end (formed by westerly arrivals) to extend noticeably.

L_{night}

- 3.17 For L_{night} , an area decrease of 3% was observed for the outermost contour band (**Table 3.4**), with increases and decreases in area for the higher contour bands. There was a 2% decrease in overall L_{night} movements, with the bulk of the reductions being for arrivals. Arrival movements of the B747-400 aircraft were 19% lower in 2012 - the effects of this can be seen at the 50 dBA level (**Figure 3.4**) where the contour tips extended less far to the east and west in 2012. Population and household counts have generally moved in line with the area changes.

$L_{\text{eq},6.5\text{hr night}}$

- 3.18 The area of the 2012 48 dBA $L_{\text{eq},6.5\text{hr night}}$ contour (42.5 km²) was 3% larger than in 2011 (**Table 3.5**). This reflects the overall 2% higher average movements, which stemmed from a substantial percentage increase in departures. However, decreases in population and households of around 13-14% were observed. These population reductions resulted from changes to the contour shape; in particular, the eastern end of the contour retracted from densely populated areas (see **Figure 3.5**). There was also a large shift in easterly arrival traffic from the southern to the northern runway in 2012, which was evident at the western tip of the contour.
- 3.19 The 48 dBA $L_{\text{eq},6.5\text{hr night}}$ contour area of 42.5 km² in 2012 was well within the 55 km² contour area objective for 2011-12 that had been set by the night noise restrictions regime.

Contour trends 2006-2012

- 3.20 The area, population and household changes for the *outermost contour band* are shown graphically in **Figures 3.6-3.10** for L_{den} , L_{day} , L_{evening} , L_{night} and $L_{\text{eq},6.5\text{hr night}}$ respectively, for years 2006 to 2012 (note: the population and household trends are based on updated CACI data). The percentage of westerly and easterly movements (i.e. the runway modal split) has also been indicated by the dashed lines on the charts.

- 3.21 The L_{den} area fell from 2006 to 2009, but has stayed at a similar level since 2009 (**Figure 3.6**). The L_{den} population and households declined from 2006 through to 2009 to 2010, but increased markedly in 2011 despite the area staying almost constant. This was mainly due to the effects of the update to the population database for 2011 (see section 3.6), and also to the higher proportion of westerly movements. The L_{den} area, population and households dropped in 2012 in line with the reduction in movements. The proportion of westerly operations in 2012 increased for the second successive year.
- 3.22 There was a downward trend for the L_{day} area, population and households from 2006 through to 2010 (**Figure 3.7**). However, an increase in area in 2011 was also accompanied by a significant increase in populations and households, which to a large extent was due to the update to the population database in 2011, and also the 5% higher proportion of westerly movements. As with L_{den} , the L_{day} area, population and households fell in 2012 in line with the reduction in movements. The proportion of westerly operations in 2012 increased for the second year in a row.
- 3.23 The $L_{evening}$ area showed a short-term downward trend through to 2010, before rising slightly in 2011 and then falling back in 2012 (**Figure 3.8**). Populations and households fell significantly in 2009, but steadily increased in 2010 and 2011, before dropping back in 2012 as the area declined. The proportion of westerly operations increased again in 2012.
- 3.24 The L_{night} area stayed at a similar level from 2006 to 2010, before dropping slightly in 2011 and then again in 2012 (**Figure 3.9**). There has been a noticeable downward trend in the population and households since 2009, correcting the rise seen in 2009. As for L_{day} and $L_{evening}$ the proportion of westerly operations in 2012 increased for the second year in succession.
- 3.25 The $L_{eq,6.5hr\ night}$ area fell in 2009, increased significantly in 2010 but then dropped markedly in 2011 (**Figure 3.10**). A small area increase occurred in 2012 following a rise in movements. The population and household counts have moved in tandem with the area changes up to 2011. However in 2012 the populations fell markedly despite the area increase as parts of the contour retracted from densely populated areas of west London. This followed a decrease in the percentage of westerly arrivals (in contrast to the other time periods) and there was also a significant reduction in arrival movements by the noise dominant B747-400 aircraft.

Cumulative results (2006 vs 2012)

- 3.26 The cumulative results in **Appendix D** indicate that areas, populations and households for 2012 were below 2006 levels across all the noise metrics. For example, for L_{den} the 55 dBA contour area in 2012 was 216.9 km², 11% smaller than the 2006 area of 244.7 km². There was also a corresponding 4% reduction in population.

- 3.27 It is noteworthy that movements by the noise dominant B747-400 aircraft have decreased from 135 movements per 24-hour day in 2006 to 94 movements in 2012, a 30% reduction.
- 3.28 **Figure D1** in **Appendix D** shows a comparison diagram of the 2006 and 2012 L_{den} contours.

Table 3.1 Heathrow L_{den} area, population and household estimates by contour band for years 2011 and 2012

L_{den} contour band (dBA)	2011	2012	Change	% Change
Area (km²)				
55 – 60	142.0	136.5	-5.5	-4%
60 – 65	48.0	48.5	+0.5	+1%
65 – 70	21.0	21.0	0.0	0%
70 – 75	7.0	7.0	0.0	0%
> 75	3.9	3.9	0.0	0%
Population (x1000)				
55 – 60	562.6	545.7	-16.9	-3%
60 – 65	131.4	135.1	+3.7	+3%
65 – 70	39.9	38.8	-1.1	-3%
70 – 75	5.5	5.4	-0.1	-2%
> 75	0.1	0.1	0.0	0%
Households (x1000)				
55 – 60	245.3	238.0	-7.3	-3%
60 – 65	55.1	57.2	+2.1	+4%
65 – 70	15.7	15.3	-0.4	-3%
70 – 75	2.0	2.0	0.0	0%
> 75	0.1	< 0.1	-0.1	(n/a)

Table 3.2 Heathrow L_{day} area, population and household estimates by contour band for years 2011 and 2012

L_{day} contour band (dBA)	2011	2012	Change	% Change
Area (km²)				
55 – 60	103.4	102.7	-0.7	-1%
60 – 65	33.1	34.4	+1.3	+4%
65 – 70	16.1	16.4	+0.3	+2%
70 – 75	4.8	5.0	+0.2	+4%
> 75	2.9	3.0	+0.1	+3%
Population (x1000)				
55 – 60	330.2	321.8	-8.4	-3%
60 – 65	84.7	89.7	+5.0	+6%
65 – 70	16.1	16.7	+0.6	+4%
70 – 75	1.7	1.8	+0.1	+6%
> 75	0.0	< 0.1	0.0	(n/a)
Households (x1000)				
55 – 60	140.9	138.1	-2.8	-2%
60 – 65	34.0	36.1	+2.1	+6%
65 – 70	6.1	6.4	+0.3	+5%
70 – 75	0.7	0.7	0.0	0%
> 75	0.0	< 0.1	0.0	(n/a)

Note: 2011 and 2012 data are based on 2011 and 2012 CACI updates of the 2001 Census respectively.

Table 3.3 Heathrow L_{evening} area, population and household estimates by contour band for years 2011 and 2012

L_{evening} contour band (dBA)	2011	2012	Change	% Change
Area (km²)				
55 – 60	106.7	101.1	-5.6	-5%
60 – 65	32.8	32.5	-0.3	-1%
65 – 70	15.6	15.5	-0.1	-1%
70 – 75	4.8	4.8	0.0	0%
> 75	3.1	3.0	-0.1	-3%
Population (x1000)				
55 – 60	317.1	294.4	-22.7	-7%
60 – 65	75.3	74.0	-1.3	-2%
65 – 70	12.7	12.8	+0.1	+1%
70 – 75	1.1	1.0	-0.1	-9%
> 75	0.0	0.0	0.0	(n/a)
Households (x1000)				
55 – 60	132.3	124.2	-8.1	-6%
60 – 65	30.1	29.5	-0.6	-2%
65 – 70	4.8	4.8	0.0	0%
70 – 75	0.5	0.5	0.0	0%
> 75	0.0	0.0	0.0	(n/a)

Table 3.4 Heathrow L_{night} area, population and household estimates by contour band for years 2011 and 2012

L_{night} contour band (dBA)	2011	2012	Change	% Change
Area (km²)				
50 – 55	47.8	46.4	-1.4	-3%
55 – 60	17.6	18.2	+0.6	+3%
60 – 65	5.9	5.9	0.0	0%
65 – 70	1.8	1.7	-0.1	-6%
> 70	1.5	1.4	-0.1	-7%
Population (x1000)				
50 – 55	140.6	137.2	-3.4	-2%
55 – 60	45.6	47.5	+1.9	+4%
60 – 65	11.4	10.7	-0.7	-6%
65 – 70	1.7	1.6	-0.1	-6%
> 70	0.0	0.0	0.0	(n/a)
Households (x1000)				
50 – 55	60.7	59.2	-1.5	-2%
55 – 60	17.8	18.7	+0.9	+5%
60 – 65	4.1	3.8	-0.3	-7%
65 – 70	0.6	0.5	-0.1	-17%
> 70	0.0	0.0	0.0	(n/a)

Note: 2011 and 2012 data are based on 2011 and 2012 CACI updates of the 2001 Census respectively.

Table 3.5 Heathrow $L_{eq,6.5hr\ night}$ area, population and household estimates for years 2011 and 2012

$L_{eq,6.5hr\ night}$ contour (dBA)	2011	2012	Change	% Change
	Area (km²)			
> 48	41.1	42.5	+1.4	+3%
	Population (x1000)			
> 48	122.4	106.9	-15.5	-13%
	Households (x1000)			
> 48	49.9	42.7	-7.2	-14%

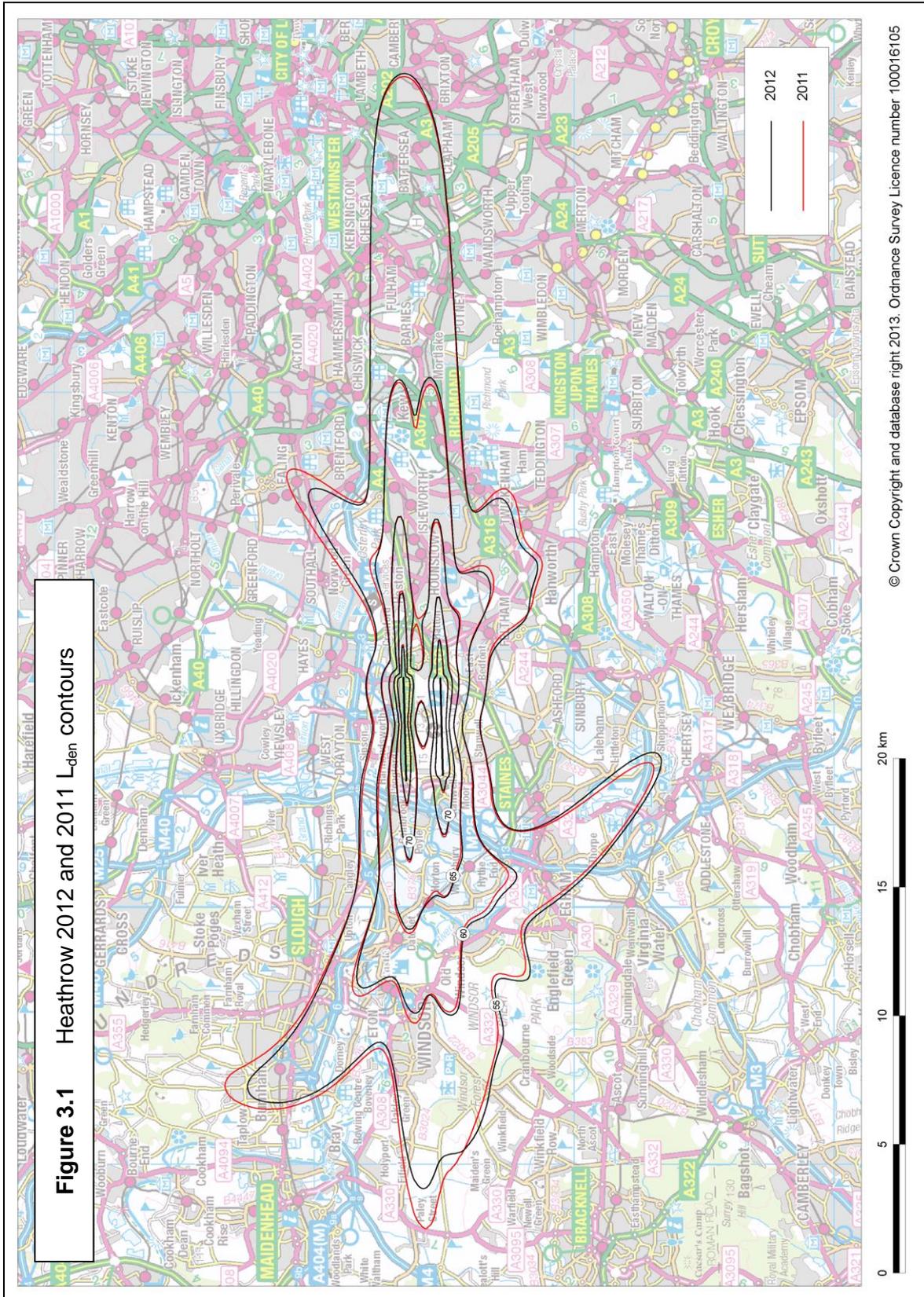
Note: 2011 and 2012 data are based on 2011 and 2012 CACI updates of the 2001 Census respectively.

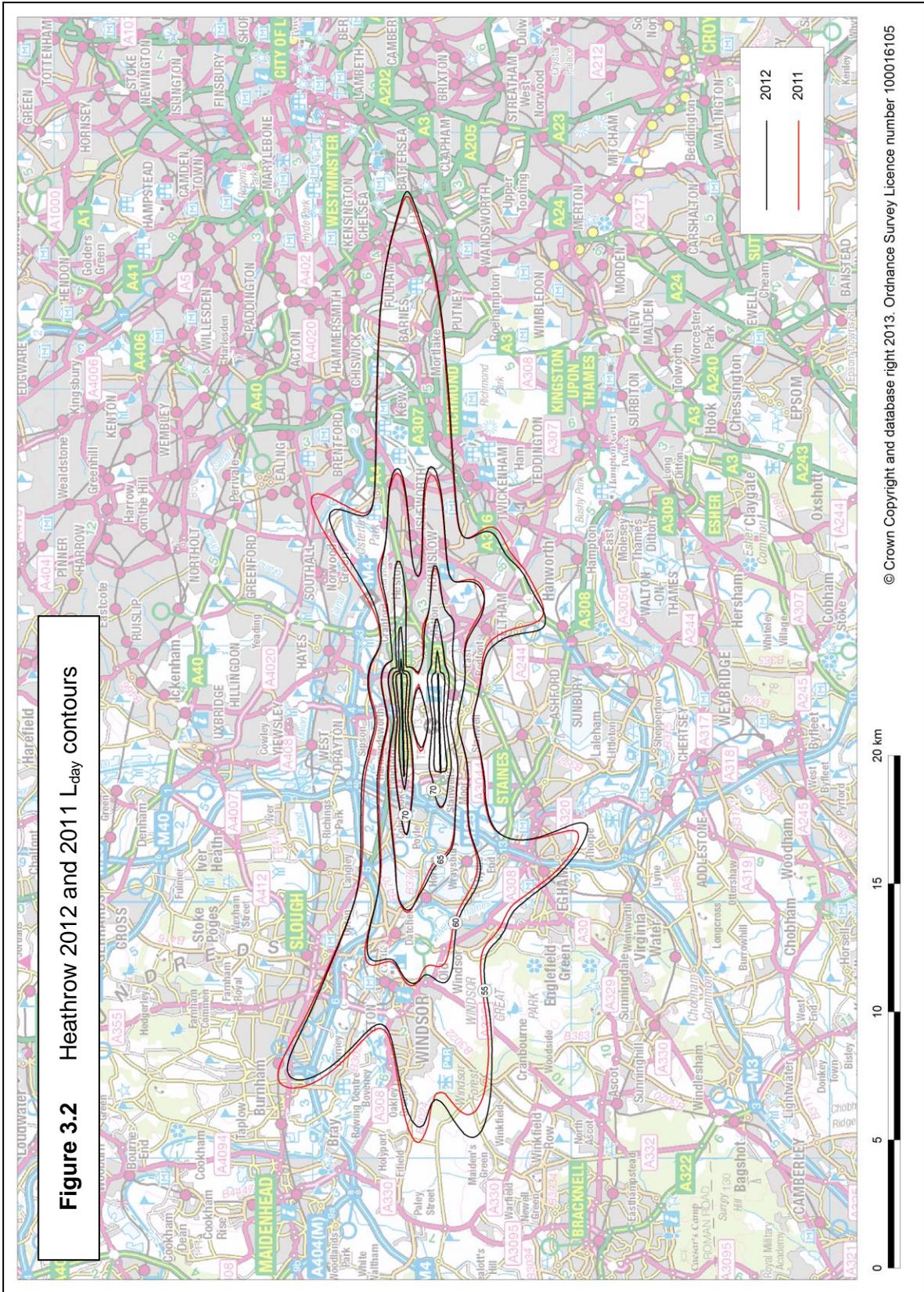
4 Conclusion

- 4.1 Year 2012 Heathrow L_{den} , L_{day} , $L_{evening}$, L_{night} and $L_{eq,6.5hr\ night}$ contours have been modelled with ANCON and comparisons made with the contours for the previous year. The trends from 2006 to 2012 have also been examined for each noise metric.
- 4.2 Aircraft movements over the 2012 L_{den} period fell by 1.5% compared to 2011.
- 4.3 The 2012 L_{den} areas were slightly lower than in 2011 for the outermost contour band but largely unchanged at the higher contour bands. The area decreased for the outermost L_{day} contour band in 2012, but areas increased at the higher L_{day} bands. Reductions in contour band areas were generally observed for $L_{evening}$ and L_{night} . The 48 dBA $L_{eq,6.5hr\ night}$ contour area expanded slightly to 42.5 km² following an increase in departure traffic, but was still well within the 55 km² contour area objective for 2011-12 set by the night flying restrictions regime.
- 4.4 The 2012 L_{den} , L_{day} , $L_{evening}$ and L_{night} contours showed population changes from 2011 that were in line with the area changes described above. However, the $L_{eq,6.5hr\ night}$ population count dropped significantly due to changes to the contour shape, which resulted in the contour retracting from densely populated areas.
- 4.5 The effect of the population update for 2012 was small, with only a 1% population increase observed in the region bounded by the 55 dBA L_{den} contour.
- 4.6 In terms of trends for the *outermost contour band* for each of the noise metrics, the L_{den} areas have been fairly steady since 2009, dropping back slightly in 2012 following a rise in 2011. Population and households also decreased after the rise in 2011. A similar trend was observed for L_{day} and $L_{evening}$. For L_{night} the area has declined for the second successive year, and population and households have established a downward trend which began in 2009. Despite the area increase in 2012 for $L_{eq,6.5hr\ night}$, the associated populations and households dropped further.
- 4.7 The 2012 *cumulative* areas and populations were below 2006 levels for all the noise metrics, for example the 2012 55 dBA L_{den} contour area of 216.9 km² was 11% smaller than the 2006 figure (244.7 km²), whilst the population enclosed was 4% lower.

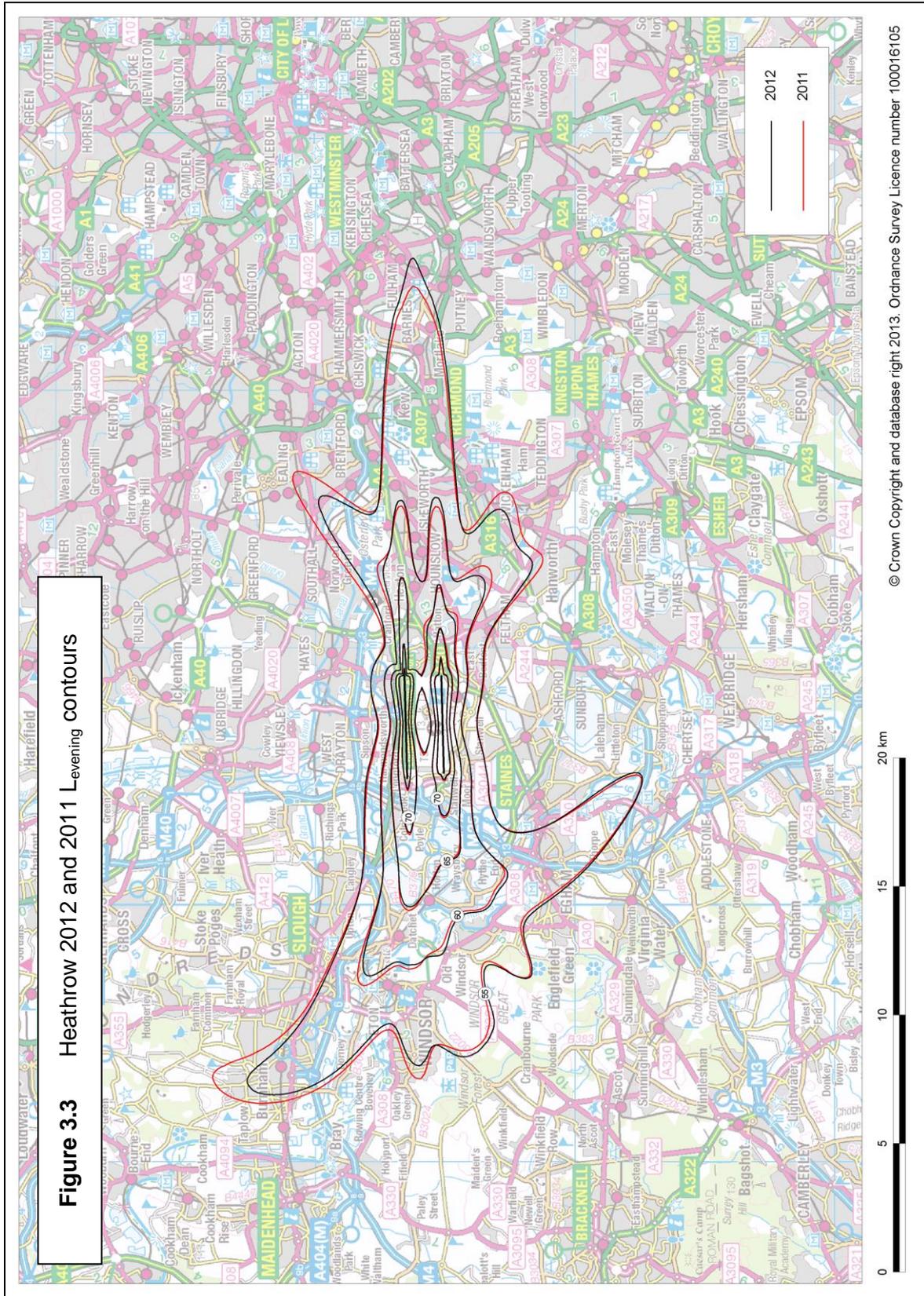
5 References

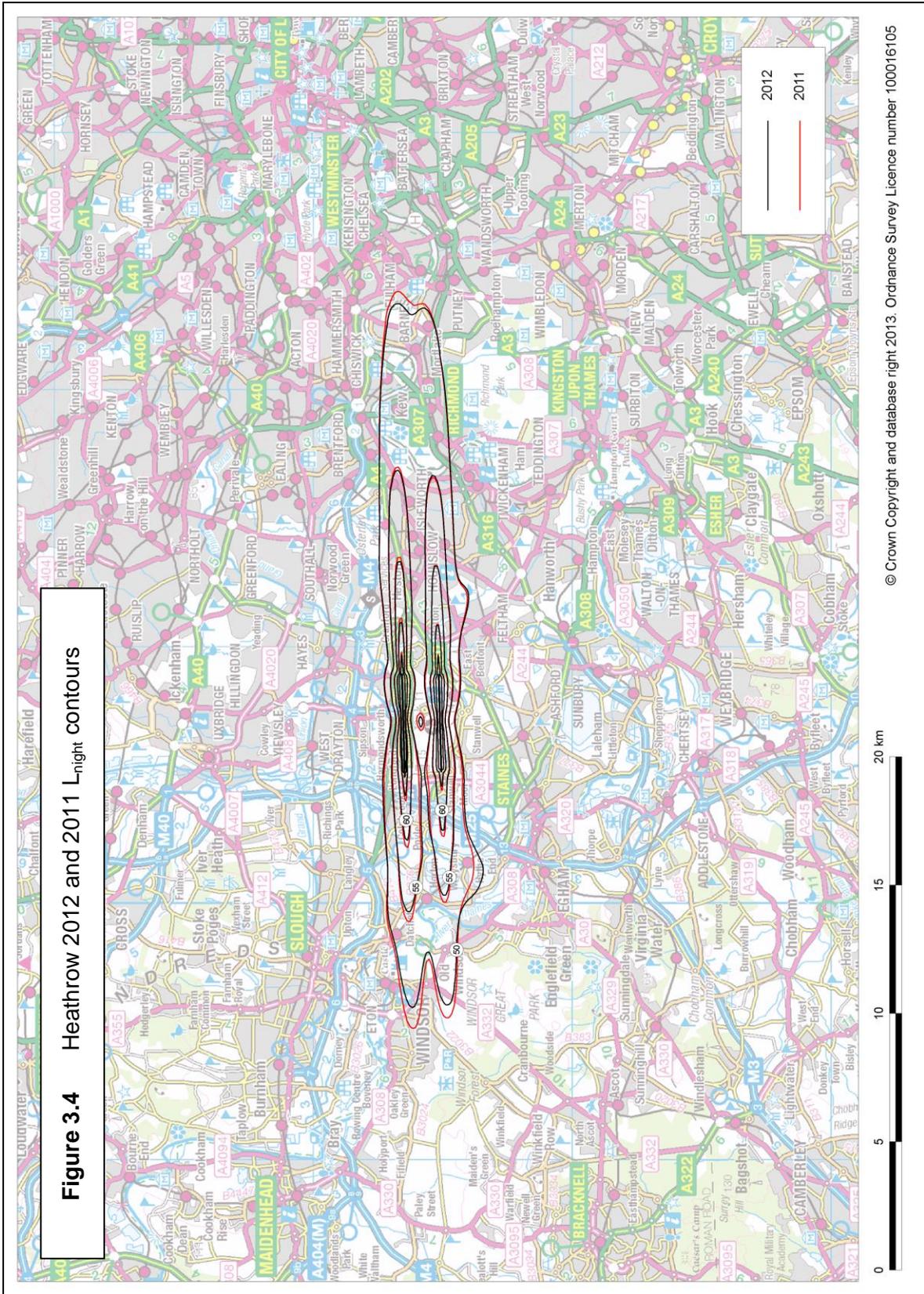
1. Lee J, Edmonds L, Patel J, Weston E
Noise Action Plan Contours for Heathrow Airport 2011
ERCD Report 1304, August 2013
2. Ollerhead J B, Rhodes D P, Viinikainen M S, Monkman D J, Woodley A C
The UK Civil Aircraft Noise Contour Model ANCON: Improvements in Version 2
R&D Report 9842, July 1999
3. Lee J, Cebrian G, Edmonds L, Patel J, Rhodes D
Noise Exposure Contours for Heathrow Airport 2012
ERCD Report 1301, September 2013
4. Monkman D J, McMahon J
London Heathrow Airport Strategic Noise Maps 2006
ERCD Report 0706, December 2007





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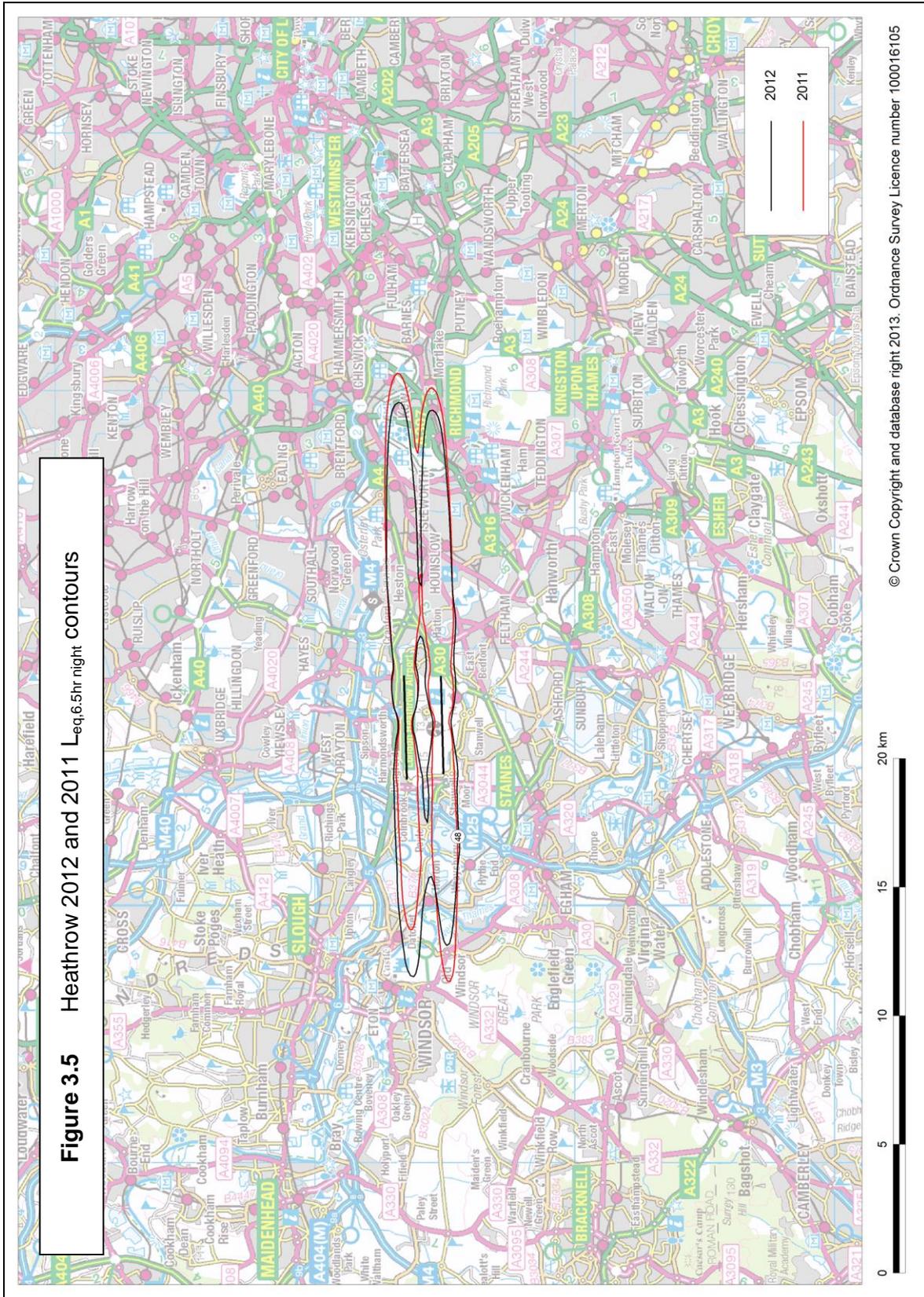


Figure 3.6 Heathrow 2006 to 2012 L_{den} 55-60 dBA contour band area, population and households trend

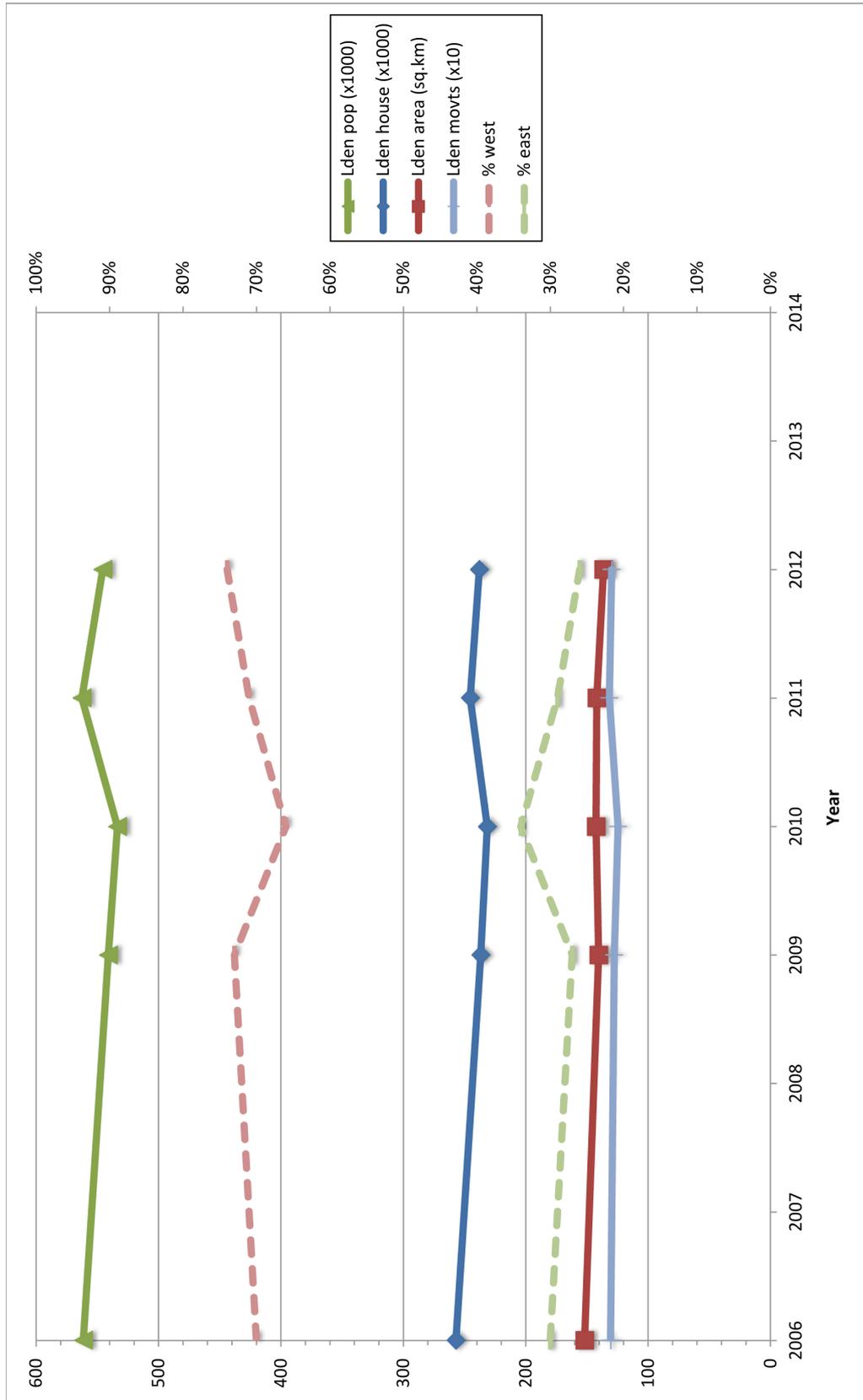


Figure 3.7 Heathrow 2006 to 2012 L_{day} 55-60 dBA contour band area, population and households trend

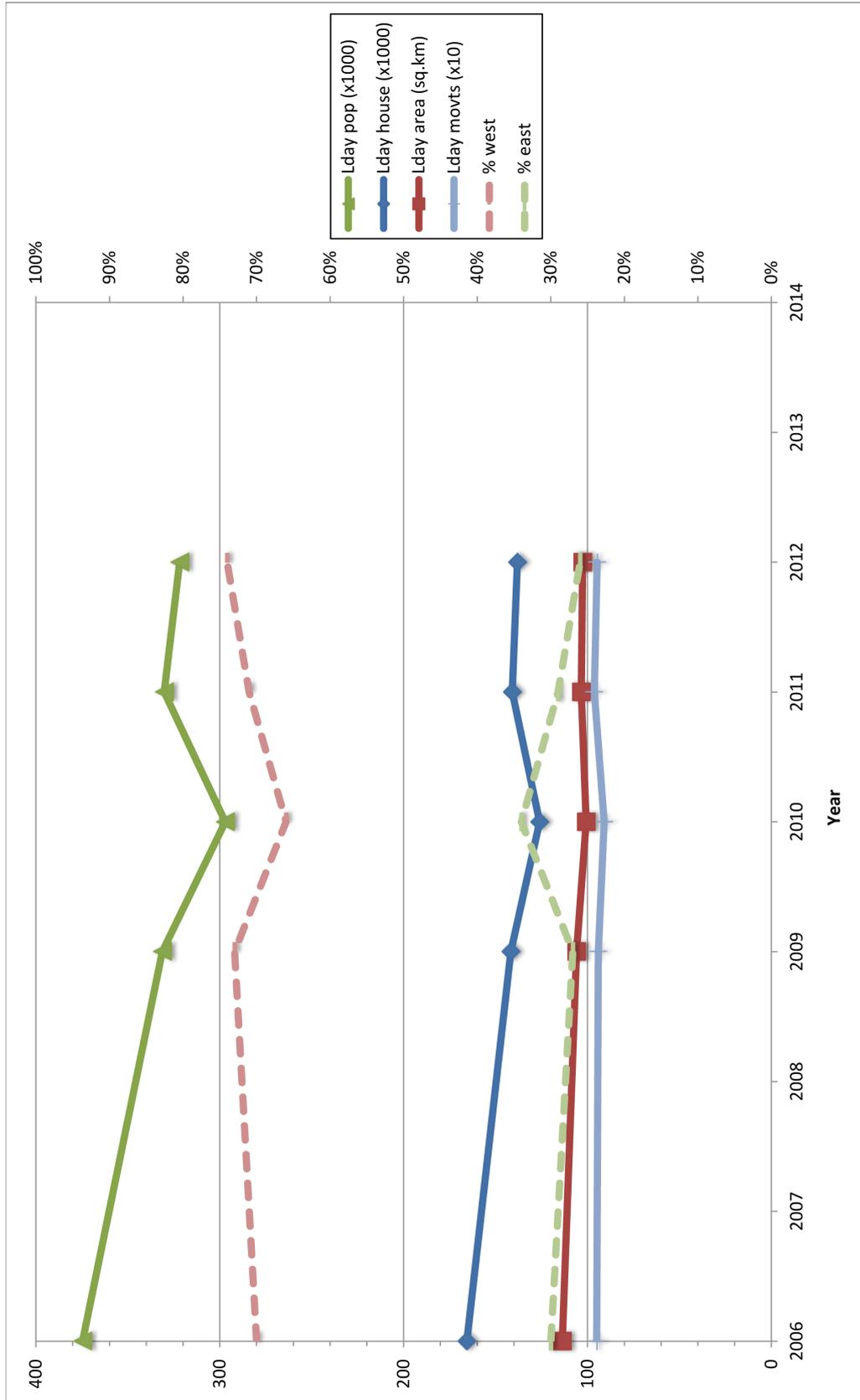


Figure 3.8 Heathrow 2006 to 2012 L_{evening} 55-60 dBA contour band area, population and households trend

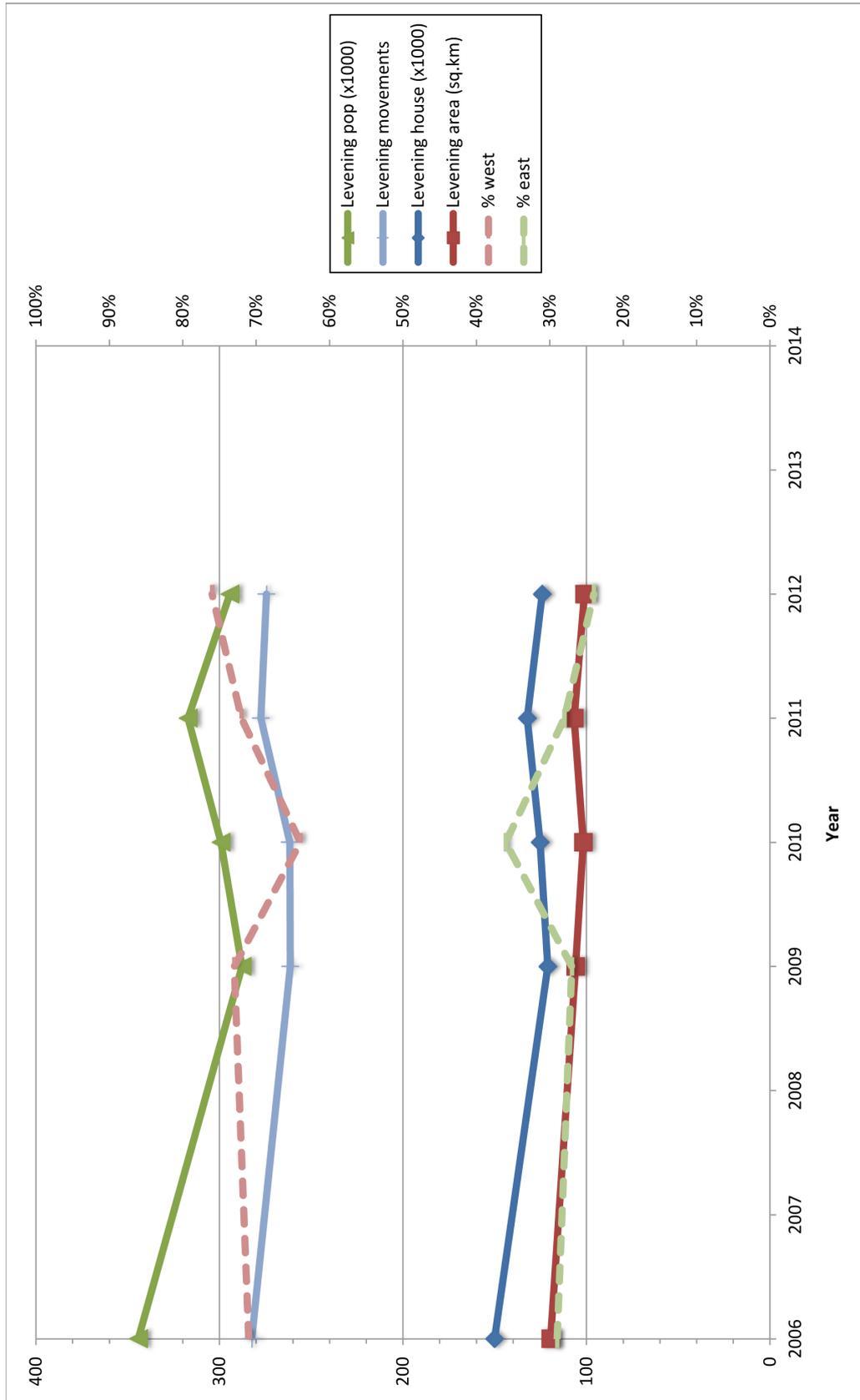


Figure 3.9 Heathrow 2006 to 2012 L_{night} 50-55 dBA contour band area, population and households trend

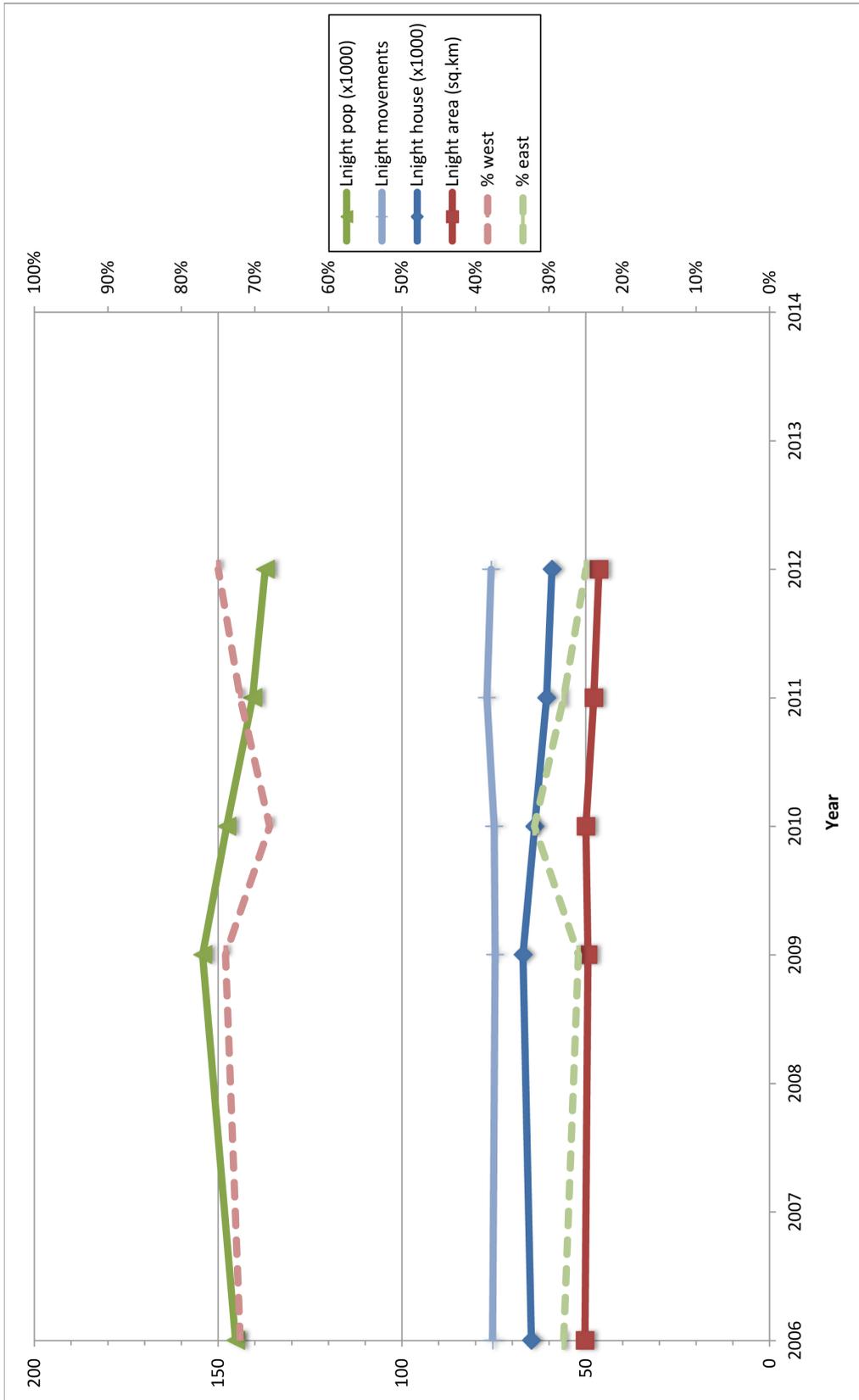
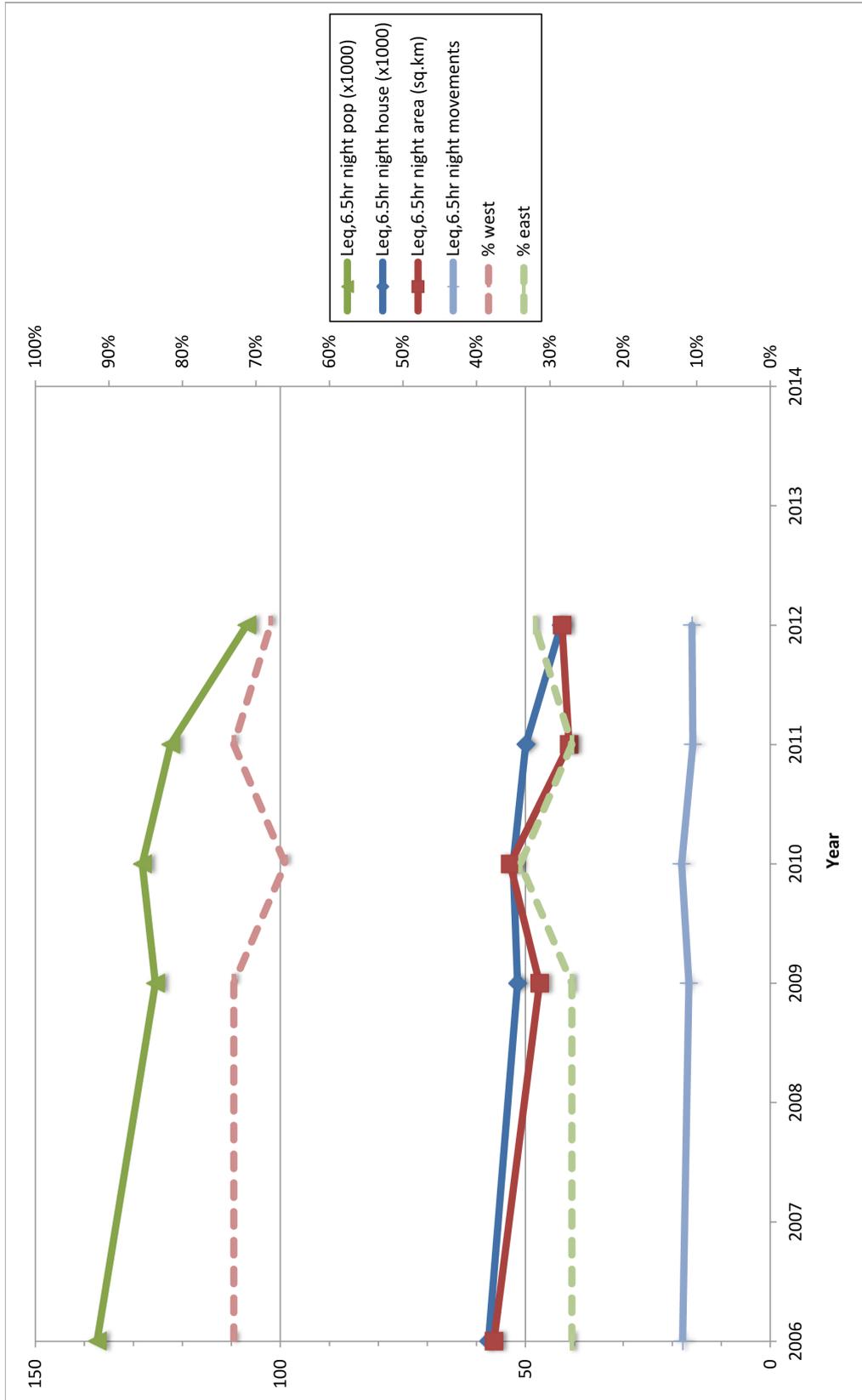


Figure 3.10 Heathrow 2006 to 2012 $L_{eq,6.5hr \text{ night } 48 \text{ dBA}}$ contour area, population and households trend



Appendix A – Traffic movements by ANCON type

Table A1 Heathrow traffic movements for the annual average 24-hour day by ANCON type for years 2011 and 2012

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
B717	1.53	1.53	3.06	0.00	0.00	0.00	-1.53	-1.53	-3.06
B727	0.04	0.04	0.08	0.04	0.04	0.08	0.00	0.00	0.00
B732	0.11	0.11	0.22	0.00	0.00	0.01	-0.11	-0.11	-0.21
B733	11.71	11.70	23.42	9.45	9.47	18.92	-2.26	-2.23	-4.50
B736	10.47	10.47	20.93	11.30	11.27	22.58	0.83	0.80	1.65
B738	12.18	12.19	24.37	12.88	12.86	25.74	0.70	0.67	1.37
B744G	5.50	5.50	11.00	4.33	4.33	8.66	-1.17	-1.17	-2.34
B744P	5.78	5.78	11.56	4.52	4.52	9.05	-1.26	-1.26	-2.51
B744R	38.78	38.82	77.60	38.14	38.13	76.27	-0.64	-0.69	-1.33
B747	0.02	0.02	0.03	0.01	0.01	0.01	-0.01	-0.01	-0.02
B747SP	0.08	0.08	0.16	0.04	0.04	0.09	-0.04	-0.04	-0.07
B753	0.22	0.22	0.44	0.27	0.27	0.53	0.05	0.05	0.09
B757C	0.67	0.67	1.34	0.67	0.67	1.33	0.00	0.00	-0.01
B757E	9.04	9.02	18.06	8.80	8.79	17.59	-0.24	-0.23	-0.47
B757P	0.69	0.68	1.37	0.19	0.19	0.38	-0.50	-0.49	-0.99
B762	0.23	0.23	0.46	0.10	0.10	0.20	-0.13	-0.13	-0.26
B763G	7.58	7.58	15.16	8.51	8.51	17.02	0.93	0.93	1.86
B763P	6.28	6.28	12.55	6.52	6.52	13.03	0.24	0.24	0.48
B763R	20.90	20.92	41.83	21.06	21.07	42.14	0.16	0.15	0.31
B764	8.31	8.30	16.61	7.98	7.97	15.95	-0.33	-0.33	-0.66
B772G	24.68	24.68	49.36	23.37	23.34	46.71	-1.31	-1.34	-2.65
B772P	5.08	5.08	10.16	4.99	4.99	9.98	-0.09	-0.09	-0.18
B772R	25.74	25.75	51.48	27.49	27.50	54.99	1.75	1.75	3.51
B773G	20.89	20.87	41.76	24.71	24.69	49.40	3.82	3.82	7.64
B773R	1.72	1.72	3.44	0.53	0.53	1.06	-1.19	-1.19	-2.38
B787	0.00	0.00	0.00	0.07	0.07	0.15	0.07	0.07	0.15
BA46	2.92	2.92	5.85	2.22	2.22	4.45	-0.70	-0.70	-1.40
CRJ	0.09	0.09	0.19	0.00	0.00	0.01	-0.09	-0.09	-0.18
CRJ700	0.25	0.25	0.50	0.01	0.01	0.02	-0.24	-0.24	-0.48
CRJ900	1.27	1.27	2.54	0.57	0.57	1.14	-0.70	-0.70	-1.40
EA30	2.28	2.29	4.57	2.15	2.15	4.29	-0.14	-0.14	-0.28
EA31	0.85	0.85	1.71	0.33	0.33	0.65	-0.52	-0.52	-1.06
EA318	1.12	1.12	2.24	1.92	1.91	3.83	0.80	0.79	1.59
EA319C	16.21	16.22	32.42	22.01	22.01	44.01	5.80	5.79	11.59
EA319V	104.64	104.65	209.29	106.90	106.82	213.72	2.26	2.17	4.43
EA320C	59.88	59.87	119.75	57.21	57.18	114.39	-2.67	-2.69	-5.36
EA320V	99.85	99.85	199.70	103.13	103.06	206.19	3.28	3.21	6.49
EA321C	20.89	20.89	41.77	17.76	17.75	35.51	-3.13	-3.14	-6.26
EA321V	49.31	49.33	98.64	46.19	46.13	92.32	-3.12	-3.20	-6.32
EA33	18.56	18.55	37.11	20.54	20.51	41.05	1.98	1.96	3.94
EA34	9.32	9.32	18.63	6.00	6.00	12.00	-3.32	-3.32	-6.63
EA346	18.72	18.72	37.44	18.54	18.56	37.10	-0.18	-0.16	-0.34
EA38GP	2.05	2.05	4.09	3.01	3.01	6.01	0.96	0.96	1.92
EA38R	3.73	3.73	7.46	5.07	5.06	10.13	1.34	1.33	2.67
ERJ	14.02	14.04	28.06	10.05	10.04	20.09	-3.97	-4.00	-7.97
ERJ170	0.20	0.20	0.39	0.06	0.06	0.12	-0.14	-0.14	-0.27
ERJ190	0.78	0.78	1.57	1.96	1.95	3.90	1.18	1.17	2.33
EXE2	0.02	0.02	0.03	0.00	0.00	0.01	-0.02	-0.02	-0.02
EXE3	2.85	2.92	5.76	2.12	2.11	4.24	-0.73	-0.81	-1.52
FK10	5.40	5.39	10.79	3.27	3.27	6.54	-2.13	-2.12	-4.25
IL62	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00
L101	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00
L4P	0.01	0.01	0.01	0.02	0.02	0.03	0.01	0.01	0.02
LTT	0.53	0.51	1.03	0.13	0.13	0.26	-0.40	-0.38	-0.77

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
MD80	4.45	4.45	8.90	1.91	1.91	3.82	-2.54	-2.54	-5.08
MD90	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
STP	0.02	0.01	0.03	0.01	0.01	0.02	-0.01	0.00	-0.01
STT	0.05	0.05	0.10	0.10	0.10	0.20	0.05	0.05	0.10
TU54	0.01	0.01	0.02	0.00	0.00	0.00	-0.01	-0.01	-0.02
Total	658.51	658.59	1317.09	649.16	648.76	1297.92	-9.35	-9.83	-19.17
							(-1.4%)	(-1.5%)	(-1.5%)

Note: totals may not sum exactly due to rounding.

Table A2 Heathrow traffic movements for the annual average 12-hour day (0700-1900 local time) by ANCON type for years 2011 and 2012

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
B717	1.38	0.82	2.20	0.00	0.00	0.00	-1.38	-0.82	-2.20
B727	0.03	0.04	0.07	0.04	0.03	0.07	0.00	-0.01	-0.01
B732	0.11	0.11	0.22	0.00	0.00	0.01	-0.11	-0.11	-0.21
B733	7.97	9.51	17.48	7.06	7.63	14.69	-0.91	-1.88	-2.79
B736	7.52	8.46	15.98	7.76	8.90	16.66	0.24	0.44	0.68
B738	9.05	10.05	19.10	9.26	10.65	19.91	0.21	0.60	0.81
B744G	3.90	4.12	8.02	3.94	3.68	7.62	0.04	-0.44	-0.40
B744P	2.76	3.44	6.21	1.92	3.07	5.00	-0.84	-0.37	-1.21
B744R	27.03	22.56	49.59	27.78	23.88	51.66	0.74	1.32	2.07
B747	0.00	0.02	0.02	0.01	0.01	0.01	0.00	-0.01	-0.01
B747SP	0.06	0.06	0.12	0.02	0.02	0.05	-0.03	-0.03	-0.07
B753	0.02	0.02	0.05	0.06	0.06	0.13	0.04	0.04	0.08
B757C	0.00	0.13	0.13	0.00	0.14	0.14	0.00	0.01	0.01
B757E	7.67	5.24	12.91	7.54	5.10	12.64	-0.13	-0.14	-0.27
B757P	0.39	0.45	0.83	0.01	0.06	0.07	-0.37	-0.39	-0.76
B762	0.13	0.12	0.25	0.07	0.07	0.13	-0.06	-0.05	-0.12
B763G	7.26	4.58	11.84	8.01	5.70	13.71	0.76	1.12	1.87
B763P	5.32	3.78	9.10	5.64	3.81	9.45	0.32	0.03	0.34
B763R	16.61	15.15	31.76	16.55	13.57	30.12	-0.06	-1.57	-1.63
B764	8.29	6.68	14.97	7.96	6.18	14.13	-0.33	-0.50	-0.83
B772G	19.07	13.92	32.99	18.04	13.59	31.63	-1.03	-0.33	-1.36
B772P	4.34	3.78	8.12	4.00	3.88	7.88	-0.34	0.10	-0.24
B772R	19.80	18.86	38.66	21.80	20.42	42.22	2.00	1.56	3.56
B773G	12.06	16.32	28.39	14.03	19.13	33.16	1.96	2.81	4.77
B773R	0.94	0.47	1.41	0.52	0.33	0.85	-0.42	-0.14	-0.56
B787	0.00	0.00	0.00	0.07	0.07	0.13	0.07	0.07	0.13
BA46	2.07	1.79	3.86	1.51	2.01	3.52	-0.56	0.22	-0.35
CRJ	0.06	0.08	0.14	0.00	0.00	0.00	-0.06	-0.08	-0.14
CRJ700	0.15	0.22	0.38	0.01	0.01	0.01	-0.15	-0.22	-0.36
CRJ900	1.12	1.25	2.37	0.46	0.56	1.03	-0.65	-0.69	-1.34
EA30	1.30	1.43	2.73	1.19	1.30	2.49	-0.11	-0.13	-0.24
EA31	0.52	0.78	1.30	0.16	0.27	0.43	-0.36	-0.51	-0.87
EA318	0.98	0.84	1.82	1.76	1.22	2.99	0.78	0.39	1.17
EA319C	11.05	10.82	21.87	15.81	14.54	30.34	4.76	3.72	8.48
EA319V	84.87	78.75	163.62	85.56	79.30	164.86	0.70	0.55	1.24
EA320C	43.45	44.89	88.34	41.25	43.07	84.32	-2.20	-1.82	-4.02
EA320V	80.02	70.79	150.81	81.33	72.83	154.16	1.31	2.03	3.34
EA321C	15.94	16.11	32.05	13.75	13.87	27.61	-2.20	-2.25	-4.44
EA321V	39.62	36.32	75.94	37.65	34.35	72.00	-1.97	-1.97	-3.94
EA33	10.43	13.37	23.80	12.35	13.20	25.55	1.92	-0.17	1.75
EA34	3.91	5.53	9.44	2.77	4.38	7.15	-1.15	-1.15	-2.29
EA346	10.61	13.46	24.07	9.49	12.64	22.12	-1.12	-0.82	-1.94
EA38GP	1.04	1.86	2.90	1.25	1.94	3.19	0.21	0.09	0.29
EA38R	1.94	0.58	2.52	2.07	1.17	3.24	0.13	0.59	0.72
ERJ	11.66	10.40	22.06	8.51	7.34	15.85	-3.15	-3.06	-6.22
ERJ170	0.15	0.14	0.28	0.03	0.05	0.08	-0.12	-0.09	-0.21
ERJ190	0.61	0.62	1.23	1.27	1.45	2.71	0.66	0.83	1.48
EXE2	0.02	0.01	0.03	0.00	0.00	0.00	-0.01	-0.01	-0.03
EXE3	2.09	1.95	4.04	1.65	1.55	3.20	-0.44	-0.40	-0.84
FK10	3.84	4.93	8.77	2.23	3.00	5.23	-1.61	-1.93	-3.54
IL62	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
L101	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
L4P	0.00	0.00	0.01	0.01	0.01	0.02	0.01	0.01	0.02
LTT	0.38	0.04	0.42	0.10	0.06	0.16	-0.28	0.02	-0.26
MD80	3.55	3.98	7.53	1.63	1.74	3.37	-1.91	-2.25	-4.16
STP	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00
STT	0.04	0.04	0.08	0.04	0.04	0.07	-0.01	0.00	-0.01
TU54	0.01	0.01	0.02	0.00	0.00	0.00	-0.01	-0.01	-0.02
Total	493.15	469.68	962.84	485.95	461.86	947.81	-7.20	-7.82	-15.03

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
							(-1.5%)	(-1.7%)	(-1.6%)

Note: totals may not sum exactly due to rounding.

Table A3 Heathrow traffic movements for the annual average 4-hour evening (1900-2300 local time) by ANCON type for years 2011 and 2012

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
B717	0.15	0.69	0.85	0.00	0.00	0.00	-0.15	-0.69	-0.85
B727	0.01	0.00	0.01	0.00	0.01	0.01	-0.01	0.01	0.00
B732	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-0.01
B733	2.51	2.17	4.68	1.80	1.82	3.62	-0.71	-0.35	-1.06
B736	2.90	2.01	4.92	3.46	2.36	5.83	0.56	0.35	0.91
B738	2.47	2.12	4.59	2.84	2.19	5.03	0.37	0.07	0.44
B744G	1.53	0.40	1.93	0.37	0.06	0.43	-1.16	-0.34	-1.50
B744P	2.80	0.34	3.14	2.25	0.50	2.74	-0.55	0.15	-0.39
B744R	11.04	1.56	12.60	9.77	1.44	11.21	-1.27	-0.12	-1.39
B747	0.01	0.00	0.01	0.00	0.00	0.00	-0.01	0.00	-0.01
B747SP	0.02	0.02	0.03	0.02	0.02	0.04	0.00	0.00	0.00
B753	0.18	0.19	0.38	0.20	0.20	0.40	0.02	0.01	0.02
B757C	0.49	0.54	1.03	0.48	0.53	1.01	0.00	-0.01	-0.02
B757E	1.26	2.77	4.03	1.19	2.57	3.76	-0.07	-0.20	-0.27
B757P	0.29	0.23	0.51	0.17	0.12	0.30	-0.11	-0.10	-0.22
B762	0.08	0.10	0.19	0.03	0.04	0.07	-0.05	-0.07	-0.12
B763G	0.31	1.61	1.92	0.45	1.61	2.06	0.14	0.00	0.14
B763P	0.85	1.56	2.41	0.81	1.34	2.15	-0.04	-0.22	-0.26
B763R	3.95	4.84	8.80	3.83	6.25	10.08	-0.12	1.41	1.29
B764	0.01	0.00	0.02	0.02	0.01	0.03	0.01	0.01	0.01
B772G	5.10	1.92	7.02	4.70	1.77	6.46	-0.40	-0.16	-0.56
B772P	0.73	0.04	0.78	0.98	0.18	1.16	0.25	0.13	0.38
B772R	5.68	1.31	6.99	5.34	1.43	6.77	-0.34	0.12	-0.22
B773G	8.40	2.52	10.92	10.24	1.89	12.12	1.84	-0.63	1.20
B773R	0.67	0.77	1.44	0.01	0.01	0.02	-0.66	-0.76	-1.42
B787	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
BA46	0.73	1.12	1.85	0.72	0.21	0.93	-0.01	-0.91	-0.92
CRJ	0.03	0.01	0.04	0.00	0.00	0.00	-0.03	-0.01	-0.04
CRJ700	0.10	0.03	0.13	0.00	0.00	0.00	-0.10	-0.03	-0.13
CRJ900	0.15	0.01	0.17	0.10	0.01	0.11	-0.05	-0.01	-0.06
EA30	0.44	0.85	1.29	0.34	0.84	1.18	-0.11	-0.01	-0.11
EA31	0.31	0.07	0.38	0.15	0.05	0.20	-0.16	-0.02	-0.18
EA318	0.14	0.28	0.42	0.15	0.69	0.84	0.01	0.41	0.42
EA319C	4.04	5.11	9.14	4.47	7.04	11.52	0.44	1.94	2.37
EA319V	17.27	25.43	42.70	19.46	26.37	45.83	2.19	0.93	3.13
EA320C	13.44	14.77	28.22	13.30	13.89	27.19	-0.14	-0.88	-1.03
EA320V	17.59	27.77	45.36	19.27	29.47	48.75	1.68	1.71	3.39
EA321C	3.66	4.63	8.28	3.13	3.76	6.89	-0.52	-0.87	-1.39
EA321V	8.44	12.60	21.04	7.04	11.18	18.22	-1.40	-1.42	-2.82
EA33	7.78	2.14	9.92	7.84	2.69	10.54	0.06	0.55	0.62
EA34	5.06	1.60	6.66	2.70	0.56	3.26	-2.36	-1.04	-3.40
EA346	7.34	0.93	8.27	8.37	1.88	10.25	1.03	0.95	1.98
EA38GP	0.98	0.19	1.17	1.56	0.97	2.53	0.58	0.79	1.37
EA38R	1.73	0.68	2.41	2.59	0.75	3.34	0.87	0.07	0.94
ERJ	2.22	3.55	5.77	1.39	2.62	4.01	-0.83	-0.93	-1.76
ERJ170	0.00	0.06	0.06	0.01	0.01	0.02	0.01	-0.05	-0.04
ERJ190	0.12	0.16	0.28	0.42	0.50	0.91	0.30	0.34	0.63
EXE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXE3	0.52	0.63	1.15	0.33	0.38	0.70	-0.19	-0.25	-0.44
FK10	1.26	0.46	1.72	0.98	0.27	1.24	-0.28	-0.20	-0.48
IL62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
L101	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-0.01
L4P	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00
LTT	0.01	0.38	0.40	0.02	0.06	0.08	0.00	-0.32	-0.32
MD80	0.84	0.47	1.32	0.26	0.17	0.43	-0.59	-0.30	-0.88
MD90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STT	0.00	0.00	0.00	0.01	0.02	0.04	0.01	0.02	0.04
Total	145.67	131.68	277.35	143.60	130.75	274.35	-2.08	-0.93	-3.00

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
							(-1.4%)	(-0.7%)	(-1.1%)

Note: totals may not sum exactly due to rounding.

Table A4 Heathrow traffic movements for the annual average 8-hour night (2300-0700 local time) by ANCON type for years 2011 and 2012

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
B717	0.00	0.02	0.02	0.00	0.00	0.00	0.00	-0.02	-0.02
B727	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01
B733	1.23	0.02	1.25	0.58	0.02	0.60	-0.65	-0.01	-0.65
B736	0.04	0.00	0.04	0.08	0.01	0.09	0.04	0.01	0.05
B738	0.66	0.02	0.68	0.78	0.02	0.80	0.12	0.00	0.12
B744G	0.07	0.98	1.05	0.01	0.60	0.61	-0.05	-0.39	-0.44
B744P	0.23	1.99	2.22	0.36	0.95	1.31	0.13	-1.04	-0.91
B744R	0.71	14.70	15.41	0.59	12.81	13.40	-0.12	-1.89	-2.01
B747SP	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-0.01
B753	0.01	0.00	0.01	0.00	0.00	0.00	-0.01	0.00	-0.01
B757C	0.18	0.00	0.18	0.18	0.00	0.18	0.00	0.00	0.00
B757E	0.10	1.01	1.12	0.07	1.12	1.19	-0.04	0.11	0.07
B757P	0.02	0.01	0.03	0.00	0.01	0.01	-0.01	0.00	-0.02
B762	0.02	0.01	0.02	0.00	0.00	0.00	-0.02	-0.01	-0.02
B763G	0.01	1.39	1.40	0.05	1.19	1.25	0.04	-0.20	-0.16
B763P	0.11	0.93	1.04	0.07	1.37	1.44	-0.04	0.43	0.40
B763R	0.34	0.93	1.27	0.68	1.25	1.93	0.34	0.32	0.66
B764	0.00	1.62	1.63	0.01	1.78	1.79	0.01	0.16	0.16
B772G	0.51	8.84	9.35	0.63	7.99	8.62	0.12	-0.85	-0.73
B772P	0.00	1.26	1.26	0.01	0.93	0.94	0.01	-0.33	-0.32
B772R	0.26	5.58	5.83	0.35	5.65	5.99	0.09	0.07	0.16
B773G	0.42	2.03	2.46	0.45	3.68	4.12	0.02	1.64	1.67
B773R	0.11	0.48	0.59	0.00	0.19	0.19	-0.11	-0.29	-0.40
B787	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01
BA46	0.13	0.01	0.14	0.00	0.00	0.00	-0.13	-0.01	-0.13
CRJ900	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EA30	0.54	0.01	0.55	0.61	0.01	0.62	0.08	0.00	0.08
EA31	0.02	0.00	0.03	0.01	0.00	0.01	-0.01	0.00	-0.01
EA318	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EA319C	1.12	0.29	1.41	1.73	0.43	2.15	0.61	0.13	0.74
EA319V	2.50	0.47	2.97	1.87	1.15	3.02	-0.63	0.68	0.05
EA320C	2.99	0.20	3.20	2.66	0.23	2.89	-0.33	0.02	-0.31
EA320V	2.24	1.28	3.52	2.53	0.76	3.29	0.29	-0.53	-0.24
EA321C	1.29	0.15	1.44	0.88	0.13	1.01	-0.41	-0.02	-0.43
EA321V	1.25	0.41	1.66	1.50	0.60	2.10	0.25	0.19	0.44
EA33	0.35	3.04	3.39	0.35	4.62	4.96	-0.01	1.58	1.57
EA34	0.35	2.18	2.53	0.54	1.05	1.59	0.19	-1.13	-0.94
EA346	0.77	4.33	5.10	0.69	4.04	4.72	-0.09	-0.29	-0.38
EA38GP	0.03	0.00	0.03	0.20	0.09	0.29	0.17	0.09	0.26
EA38R	0.07	2.46	2.53	0.40	3.13	3.54	0.34	0.67	1.01
ERJ	0.14	0.08	0.22	0.15	0.08	0.23	0.01	-0.01	0.00
ERJ170	0.05	0.00	0.05	0.01	0.01	0.02	-0.04	0.01	-0.03
ERJ190	0.06	0.00	0.06	0.28	0.00	0.28	0.22	0.00	0.22
EXE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXE3	0.24	0.34	0.58	0.14	0.19	0.33	-0.10	-0.15	-0.25
FK10	0.30	0.01	0.30	0.07	0.01	0.07	-0.23	0.00	-0.23
LTT	0.13	0.08	0.21	0.01	0.01	0.02	-0.12	-0.07	-0.19
MD80	0.06	0.00	0.06	0.02	0.00	0.02	-0.04	0.00	-0.04
STP	0.01	0.01	0.02	0.00	0.01	0.01	-0.01	0.00	0.00
STT	0.01	0.01	0.02	0.05	0.04	0.09	0.04	0.03	0.07
Total	19.68	57.22	76.90	19.61	56.14	75.76	-0.06	-1.08	-1.15
							(-0.3%)	(-1.9%)	(-1.5%)

Note: totals may not sum exactly due to rounding.

Table A5 Heathrow traffic movements for the average 6.5-hour night (2330-0600 local time) by ANCON type for years 2011 and 2012

ANCON type	2011 departs	2011 arrivals	2011 total	2012 departs	2012 arrivals	2012 total	change departs	change arrivals	change total
B717	0.00	0.01	0.01	0.00	0.00	0.00	0.00	-0.01	-0.01
B733	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01
B736	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01
B738	0.03	0.00	0.04	0.03	0.01	0.04	-0.01	0.01	0.00
B744G	0.01	0.01	0.02	0.00	0.00	0.00	-0.01	-0.01	-0.02
B744P	0.03	1.45	1.49	0.06	0.31	0.37	0.03	-1.15	-1.12
B744R	0.17	5.67	5.84	0.30	5.11	5.41	0.13	-0.55	-0.42
B757C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B757E	0.02	0.01	0.03	0.02	0.02	0.04	0.00	0.01	0.01
B762	0.01	0.00	0.01	0.00	0.00	0.00	-0.01	0.00	-0.01
B763G	0.00	0.03	0.03	0.01	0.02	0.04	0.01	0.00	0.01
B763P	0.01	0.38	0.40	0.01	0.63	0.64	0.00	0.25	0.24
B763R	0.06	0.08	0.14	0.12	0.02	0.14	0.06	-0.06	0.00
B764	0.00	0.01	0.01	0.00	0.03	0.03	0.00	0.02	0.02
B772G	0.09	0.96	1.05	0.17	0.98	1.15	0.08	0.02	0.10
B772P	0.00	0.09	0.09	0.01	0.06	0.07	0.00	-0.02	-0.02
B772R	0.06	1.50	1.56	0.14	0.95	1.09	0.08	-0.55	-0.47
B773G	0.06	0.40	0.45	0.09	1.78	1.87	0.03	1.38	1.41
B773R	0.01	0.00	0.01	0.00	0.00	0.00	-0.01	0.00	-0.01
B787	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EA30	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.01
EA31	0.01	0.00	0.02	0.00	0.00	0.00	-0.01	0.00	-0.02
EA319C	0.01	0.01	0.01	0.01	0.02	0.03	0.00	0.01	0.02
EA319V	0.02	0.11	0.13	0.04	0.25	0.29	0.02	0.14	0.16
EA320C	0.03	0.02	0.05	0.05	0.04	0.08	0.02	0.01	0.03
EA320V	0.05	0.10	0.16	0.08	0.20	0.28	0.02	0.10	0.12
EA321C	0.02	0.03	0.06	0.05	0.02	0.06	0.02	-0.01	0.01
EA321V	0.04	0.07	0.12	0.10	0.13	0.22	0.06	0.05	0.11
EA33	0.06	0.71	0.77	0.06	0.36	0.42	0.00	-0.35	-0.35
EA34	0.05	0.02	0.07	0.08	0.01	0.09	0.03	-0.01	0.02
EA346	0.12	1.01	1.13	0.12	0.94	1.05	0.00	-0.08	-0.08
EA38GP	0.01	0.00	0.01	0.03	0.00	0.03	0.02	0.00	0.01
EA38R	0.06	1.47	1.53	0.12	2.14	2.27	0.07	0.67	0.74
ERJ	0.02	0.03	0.05	0.02	0.04	0.06	0.00	0.01	0.01
ERJ190	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
EXE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EXE3	0.09	0.24	0.33	0.04	0.09	0.13	-0.05	-0.15	-0.20
FK10	0.00	0.01	0.01	0.00	0.00	0.00	0.00	-0.01	-0.01
LTT	0.07	0.05	0.12	0.01	0.00	0.01	-0.06	-0.05	-0.11
MD11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MD80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
STP	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00
STT	0.01	0.01	0.01	0.03	0.03	0.05	0.02	0.02	0.04
Total	1.25	14.50	15.75	1.80	14.20	16.00	0.55	-0.30	0.25
							(+43.8%)	(-2.1%)	(+1.6%)

Notes:

- Totals may not sum exactly due to rounding.
- The night quota period for year 2012 (summer and winter seasons combined) was 25 March 2012 to 31 March 2013.

Appendix B – ANCON type descriptions

Table B1 Description of ANCON aircraft types

ANCON Type	Type Description
B717	Boeing 717
B727	Boeing 727 (Chapter 2&3)
B732	Boeing 737-200 (Chapter 2&3)
B733	Boeing 737-300/400/500 series
B736	Boeing 737-600/700 series
B738	Boeing 737-800/900 series
B747	Boeing 747-100 & 200/300 series certificated to Chapter 3
B744G	Boeing 747-400 series with General Electric engines
B744P	Boeing 747-400 series with Pratt and Whitney engines
B744R	Boeing 747-400 series with Rolls-Royce engines
B747SP	Boeing 747SP series
B757C	Boeing 757-200 series with RB211-535C engines
B757E	Boeing 757-200 series with RB211-535E4/E4B engines
B757P	Boeing 757-200 series with Pratt and Whitney engines
B762	Boeing 767-200 series
B763G	Boeing 767-300 series with General Electric engines
B763P	Boeing 767-300 series with Pratt and Whitney engines
B763R	Boeing 767-300 series with Rolls-Royce engines
B764	Boeing 767-400 series
B772G	Boeing 777-200 series with General Electric engines
B772P	Boeing 777-200 series with Pratt and Whitney engines
B772R	Boeing 777-200 series with Rolls-Royce engines
B773G	Boeing 777-200LR/300ER series with General Electric engines
B773R	Boeing 777-300 series with Rolls-Royce engines
BA46	BAe 146/Avro RJ series
CRJ	Bombardier Regional Jet 100/200
CRJ700	Bombardier Regional Jet 700
CRJ900	Bombardier Regional Jet 900
DC87	McDonnell Douglas DC8-70 series
DC10	McDonnell Douglas DC10 series
EA30	Airbus A300 series

ANCON Type	Type Description
EA31	Airbus A310 series
EA318	Airbus A318 series
EA319C	Airbus A319 series with CFM-56 engines
EA319V	Airbus A319 series with AE-V2500 engines
EA320C	Airbus A320 series with CFM-56 engines
EA320V	Airbus A320 series with AE-V2500 engines
EA321C	Airbus A321 series with CFM-56 engines
EA321V	Airbus A321 series with AE-V2500 engines
EA33	Airbus A330 series
EA34	Airbus A340-200/300/500 series
EA346	Airbus A340-500/600
EA38GP	Airbus A380 with Engine Alliance GP7000 engines
EA38R	Airbus A380 with Rolls-Royce Trent 900 engines
ERJ	Embraer EMB135/145 series
ERJ170	Embraer E-170
ERJ190	Embraer E-190
EXE2	Chapter 2 executive jets
EXE3	Chapter 3 executive jets
FK10	Fokker 70/100 series
L101	Lockheed L1011-TriStar series
L4P	Large four-engined propeller
LTT	Large twin-turboprop
MD11	McDonnell-Douglas MD11 series
MD80	McDonnell-Douglas MD80 series
SP	Single piston
STP	Small twin-piston
STT	Small twin-turboprop
TU54	Tupolev Tu-154 series

Appendix C – 2011 and 2012 noise contour results in cumulative format

Table C1 Heathrow L_{den} area, population and household cumulative estimates for years 2011 and 2012

L _{den} contour (dBA)	2011	2012	Change	% Change
Area (km²)				
> 55	221.9	216.9	-5.0	-2%
> 60	79.9	80.4	+0.5	+1%
> 65	31.9	31.8	-0.1	0%
> 70	10.9	10.9	0.0	0%
> 75	3.9	3.9	0.0	0%
Population (x1000)				
> 55	739.5	725.0	-14.5	-2%
> 60	176.9	179.3	+2.4	+1%
> 65	45.5	44.2	-1.3	-3%
> 70	5.6	5.5	-0.1	-2%
> 75	0.1	0.1	0.0	0%
Households (x1000)				
> 55	318.2	312.5	-5.7	-2%
> 60	72.9	74.5	+1.6	+2%
> 65	17.8	17.3	-0.5	-3%
> 70	2.1	2.0	-0.1	-5%
> 75	0.1	< 0.1	-0.1	(n/a)

Table C2 Heathrow L_{day} area, population and household cumulative estimates for years 2011 and 2012

L _{day} contour (dBA)	2011	2012	Change	% Change
Area (km²)				
> 55	160.3	161.3	+1.0	+1%
> 60	56.9	58.7	+1.8	+3%
> 65	23.8	24.3	+0.5	+2%
> 70	7.7	7.9	+0.2	+3%
> 75	2.9	3.0	+0.1	+3%
Population (x1000)				
> 55	432.7	429.8	-2.9	-1%
> 60	102.5	108.2	+5.7	+6%
> 65	17.8	18.5	+0.7	+4%
> 70	1.7	1.8	+0.1	+6%
> 75	0.0	< 0.1	0.0	(n/a)
Households (x1000)				
> 55	181.7	181.2	-0.5	0%
> 60	40.8	43.2	+2.4	+6%
> 65	6.8	7.1	+0.3	+4%
> 70	0.7	0.7	0.0	0%
> 75	0.0	< 0.1	0.0	(n/a)

Note: 2011 and 2012 population data are based on 2011 and 2012 CACI updates of the 2001 Census respectively.

Table C3 Heathrow L_{evening} area, population and household cumulative estimates for years 2011 and 2012

L_{evening} contour (dBA)	2011	2012	Change	% Change
Area (km²)				
> 55	163.0	156.9	-6.1	-4%
> 60	56.3	55.8	-0.5	-1%
> 65	23.5	23.3	-0.2	-1%
> 70	7.9	7.8	-0.1	-1%
> 75	3.1	3.0	-0.1	-3%
Population (x1000)				
> 55	406.2	382.2	-24.0	-6%
> 60	89.1	87.8	-1.3	-1%
> 65	13.8	13.8	0.0	0%
> 70	1.1	1.0	-0.1	-9%
> 75	0.0	0.0	0.0	(n/a)
Households (x1000)				
> 55	167.7	158.9	-8.8	-5%
> 60	35.4	34.7	-0.7	-2%
> 65	5.3	5.2	-0.1	-2%
> 70	0.5	0.5	0.0	0%
> 75	0.0	0.0	0.0	(n/a)

Table C4 Heathrow L_{night} area, population and household cumulative estimates for years 2011 and 2012

L_{night} contour (dBA)	2011	2012	Change	% Change
Area (km²)				
> 50	74.6	73.7	-0.9	-1%
> 55	26.8	27.3	+0.5	+2%
> 60	9.2	9.1	-0.1	-1%
> 65	3.3	3.2	-0.1	-3%
> 70	1.5	1.4	-0.1	-7%
Population (x1000)				
> 50	199.3	197.0	-2.3	-1%
> 55	58.7	59.8	+1.1	+2%
> 60	13.1	12.3	-0.8	-6%
> 65	1.7	1.6	-0.1	-6%
> 70	0.0	0.0	0.0	(n/a)
Households (x1000)				
> 50	83.2	82.2	-1.0	-1%
> 55	22.5	23.0	+0.5	2%
> 60	4.7	4.4	-0.3	-6%
> 65	0.6	0.5	-0.1	-17%
> 70	0.0	0.0	0.0	(n/a)

Note: 2011 and 2012 population data are based on 2011 and 2012 CACI updates of the 2001 Census respectively.

Table C5 Heathrow $L_{eq,6.5hr\ night}$ area, population and household estimates for years 2011 and 2012

$L_{eq,6.5hr\ night}$ contour (dBA)	2011	2012	Change	% Change
	Area (km²)			
> 48	41.1	42.5	+1.4	+3%
	Population (x1000)			
> 48	122.4	106.9	-15.5	-13%
	Households (x1000)			
> 48	49.9	42.7	-7.2	-14%

Note: 2011 and 2012 population data are based on 2011 and 2012 CACI updates of the 2001 Census respectively.

Appendix D – 2006 and 2012 noise contour results in cumulative format

Table D1 Heathrow L_{den} area, population and household cumulative estimates for years 2006 and 2012

L _{den} contour (dBA)	2006	2012	Change	% Change
Area (km²)				
> 55	244.7	216.9	-27.8	-11%
> 60	92.7	80.4	-12.3	-13%
> 65	37.1	31.8	-5.3	-14%
> 70	13.7	10.9	-2.8	-20%
> 75	5.0	3.9	-1.1	-22%
Population (x1000)				
> 55	756.1	725.0	-31.1	-4%
> 60	194.6	179.3	-15.3	-8%
> 65	54.3	44.2	-10.1	-19%
> 70	9.6	5.5	-4.1	-43%
> 75	0.7	0.1	-0.6	-86%
Households (x1000)				
> 55	338.5	312.5	-26.0	-8%
> 60	81.6	74.5	-7.1	-9%
> 65	21.4	17.3	-4.1	-19%
> 70	3.5	2.0	-1.5	-43%
> 75	0.3	< 0.1	-0.3	-100%

Table D2 Heathrow L_{day} area, population and household cumulative estimates for years 2006 and 2012

L _{day} contour (dBA)	2006	2012	Change	% Change
Area (km²)				
> 55	177.7	161.3	-16.4	-9%
> 60	64.0	58.7	-5.3	-8%
> 65	27.2	24.3	-2.9	-11%
> 70	9.3	7.9	-1.4	-15%
> 75	3.5	3.0	-0.5	-14%
Population (x1000)				
> 55	485.6	429.8	-55.8	-11%
> 60	111.0	108.2	-2.8	-3%
> 65	24.1	18.5	-5.6	-23%
> 70	2.8	1.8	-1.0	-36%
> 75	0.0	< 0.1	0.0	(n/a)
Households (x1000)				
> 55	210.5	181.2	-29.3	-14%
> 60	44.9	43.2	-1.7	-4%
> 65	9.2	7.1	-2.1	-23%
> 70	1.0	0.7	-0.3	-30%
> 75	0.0	< 0.1	0.0	(n/a)

Note: 2006 and 2012 population data are based on 2006 and 2012 CACI updates of the 2001 Census respectively.

Table D3 Heathrow L_{evening} area, population and household cumulative estimates for years 2006 and 2012

L_{evening} contour (dBA)	2006	2012	Change	% Change
Area (km²)				
> 55	185.6	156.9	-28.7	-15%
> 60	66.1	55.8	-10.3	-16%
> 65	28.1	23.3	-4.8	-17%
> 70	10.0	7.8	-2.2	-22%
> 75	3.8	3.0	-0.8	-21%
Population (x1000)				
> 55	450.5	382.2	-68.3	-15%
> 60	106.3	87.8	-18.5	-17%
> 65	20.5	13.8	-6.7	-33%
> 70	2.4	1.0	-1.4	-58%
> 75	0.0	0.0	0.0	(n/a)
Households (x1000)				
> 55	192.6	158.9	-33.7	-17%
> 60	42.4	34.7	-7.7	-18%
> 65	7.9	5.2	-2.7	-34%
> 70	1.0	0.5	-0.5	-50%
> 75	0.0	0.0	0.0	(n/a)

Table D4 Heathrow L_{night} area, population and household cumulative estimates for years 2006 and 2012

L_{night} contour (dBA)	2006	2012	Change	% Change
Area (km²)				
> 50	84.4	73.7	-10.7	-13%
> 55	34.2	27.3	-6.9	-20%
> 60	11.9	9.1	-2.8	-24%
> 65	4.5	3.2	-1.3	-29%
> 70	1.8	1.4	-0.4	-22%
Population (x1000)				
> 50	207.2	197.0	-10.2	-5%
> 55	62.0	59.8	-2.2	-4%
> 60	16.3	12.3	-4.0	-25%
> 65	1.7	1.6	-0.1	-6%
> 70	0.0	0.0	0.0	(n/a)
Households (x1000)				
> 50	88.9	82.2	-6.7	-8%
> 55	24.1	23.0	-1.1	-5%
> 60	6.0	4.4	-1.6	-27%
> 65	0.6	0.5	-0.1	-17%
> 70	0.0	0.0	0.0	(n/a)

Note: 2006 and 2012 population data are based on 2006 and 2012 CACI updates of the 2001 Census respectively.

Table D5 Heathrow $L_{eq,6.5hr\ night}$ area, population and household estimates for years 2006 and 2012

$L_{eq,6.5hr\ night}$ contour (dBA)	2006	2012	Change	% Change
	Area (km²)			
> 48	56.4	42.5	-13.9	-25%
	Population (x1000)			
> 48	137.4	106.9	-30.5	-22%
	Households (x1000)			
> 48	57.5	42.7	-15.0	-26%

Notes:

- 2006 and 2012 population data are based on 2006 and 2012 CACI updates of the 2001 Census respectively.
- 2006 results are based on data recorded over the 2006 calendar year. 2012 results are based on data recorded from 25 March 2012 to 31 March 2013.

