Environmental Research and Consultancy Department
Directorate of Airspace Policy
Civil Aviation Authority

ERCD Report 0802

Noise Exposure Contours for Gatwick Airport 2007

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D Beaton
J McMahon
L E Edmonds

Prepared by the Civil Aviation Authority on behalf of the Department for Transport, London, July 2008

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Reference
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SUMMARY

This report describes the calculations of the aircraft noise exposure around London Gatwick Airport for the year 2007 and compares both the input data and the resulting contours, together with the areas and populations within the contours, with those for 2006.

Prepared by the CAA on behalf of the Department for Transport, July 2008.

The authors of this report are employed by the Civil Aviation Authority. The work reported herein was carried out on behalf of the Department for Transport.

Any views expressed are not necessarily those of the Secretary of State for Transport.

Population data used in this report are based on 2001 Census data (updated in 2005 and 2006) supplied by CACI Information Services.

EXECUTIVE SUMMARY

For every year, the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority estimates the noise exposures around the London Airports (Heathrow, Gatwick and Stansted) on behalf of the Department for Transport (DfT). The magnitude and extent of the aircraft noise around these airports are depicted on maps by *contours* of constant aircraft noise index (Leq) values. The contours are generated by a computer model validated with noise measurements, which calculates the emissions and propagation of noise from arriving and departing air traffic.

This report presents the results for London Gatwick Airport for the year 2007 and compares both the air traffic information and the noise contours with those for 2006. As for 2006, the 2007 contours shown in this report take into account the topography around Gatwick by accounting for terrain height in the modelling process.

Estimates of the populations within the 2006 contours are based on the 2001 census (updated by CACI in 2005), populations within the 2007 contours are also based on the 2001 census but updated by CACI in 2006.

The average daily aircraft movement rate during the Leq period was 2.5% higher in 2007 than in 2006. The actual modal split of runway direction in 2007 was 78% west - 22% east compared with 67% west - 33% east in 2006. The standard modal split (20 year average) in 2007 was 72% west – 28% east.

Relative to 2006, the total area within the actual 2007 terrain adjusted 57 dBA Leq (16-hour) contour increased from 46.7 square kilometres to 49.0 square kilomtres, an increase of 4.9% and the population within this contour increased from 4,500 to 4,800, an increase of 6.7%.

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1 INTRODUCTION

1.1 The amount of aircraft noise experienced by people living around London (Gatwick) Airport during the summer (mid June – mid September) of each year is estimated by the Environmental Research and Consultancy Department of the Civil Aviation Authority on behalf of the Department for Transport (DfT). The noise exposure measure is the Equivalent Continuous Sound Level, Leq (16-hour) in dBA. The background to the use of this index is explained in DORA Report 9023 (Ref 1). The method by which noise maps, or contours of Leq, are prepared using the ANCON Noise Model is described in DORA Report 9120, R&D Report 9842 and ERCD Report 0606[1] (Refs 2, 3 and 4).

1.2 This report contains small scale (1:150,000) diagrams of the 2007 Gatwick Leq contours. Contours overlaid on Ordnance Survey (OS) digital maps, or in AutoCAD DXF format, are available for download from the Department for Transport website at www.dft.gov.uk. Additionally, printed contours overlaid on OS maps to scale 1:50,000 are available for purchase from the Department for Transport, Aviation Environmental Division, Zone 1/22, Great Minster House, 76 Marsham Street, London, SW1P 4DR, telephone 020 7944 4856, e-mail address aed@dft.gsi.gov.uk.

1.3 This report provides supporting information and compares both the aircraft operations and the resulting noise contours with those for 2006 (Ref 5).

1.4 New analyses of radar and noise data were undertaken in 2007, and the calculations incorporate revised mean tracks and associated dispersions for departing aircraft, together with revised 'spurs' to model the arrival flight track dispersion. Height/speed departure and arrival profiles have also been updated for each aircraft type where the data have shown this to be necessary.

1.5 To remove the effect of year-on-year weather fluctuations on aircraft operations in order to clarify underlying trends, two sets of contours for 2007 have been generated; (i) the '*actual*' modal split and (ii) the '*standard*' modal split. In 2007 the actual modal split (for the summer period 16 June – 15 September inclusive) was 78% west - 22% east compared to 67% west - 33% east in 2006. For 2006 the standard modal split was 72% west - 28% east (based on the 20 year Leq period average 1987 to 2006 inclusive); for 2007 the standard modal split was also 72% west - 28% east (based on the 20 year Leq period average 1988 to 2007 inclusive). This report compares both actual and standard contours for 2006 and 2007.

1.6 As in 2006, the 2007 contours shown in this report take into account the topography around Gatwick by accounting for terrain height in the modelling process. This was achieved by geometrical corrections for source-receiver distance and elevation angles, other more complex effects such as lateral attenuation from uneven ground surfaces and noise screening/reflection effects due to topographical features were not taken into account. ERCD holds terrain height data[2] obtained from Ordnance Survey on a 200m by 200m grid for England and Wales. Interpolation was performed to generate height data at each of the calculation points on the 100m by 50m receiver grid for use by the ANCON noise model. This is of particular relevance on the western side of the airport around the high ground in the vicinity of Russ Hill.

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[1] ERCD Report 0606 will be published shortly.

[2] Meridian® 2 data revised 2007.

2 AIRCRAFT OPERATIONS

2.1 Flight Tracks

2.1.1 The 2007 calculations were based on updated mean tracks and track dispersions for all outbound routes from Runways 26L and 08R (see Figure 1 for route designations). These were determined from radar data extracted from the airport's Noise and Track Keeping (NTK) monitoring system for the summer of 2007. The 2007 radar data indicated that, as in preceding years, a small proportion of departures by some propeller aircraft deviated from the Standard Instrument Departure (SID) routeings and special routes and dispersions were defined for these operations. Such deviations are consistent with the rules laid down in the UK Aeronautical Information Publication (AIP) which states that certain propeller aircraft may be permitted to depart from the Noise Preferential Routes (NPRs) by Air Traffic Control.

2.1.2 There were no movements to/from the emergency Runways 26R and 08L during the 2007 16-hour summer day Leq period.

2.1.3 Radar measurements of arrival tracks between the stacks and Runways 26L and 08R confirmed that the continued use of evenly spaced 'spurs' remained a realistic method for modelling the dispersion of arrival tracks about the extended runway centre lines. The 2007 measurements showed that, within the area of interest, 99.9% of (westerly) arrivals on Runway 26L joined the extended runway centre-line from the south and 0.1% from the north. The comparable percentages for (easterly) arrivals on Runway 08R were 99.5% from the south and 0.5% from the north. The majority of aircraft joined the centre lines at distances greater than 11 kilometres from threshold – only a very small number of aircraft joined at shorter distances.

2.2 Flight Profiles and Noise Emissions

2.2.1 For 2007, the average flight profiles of height and speed versus track distance for each aircraft type were reviewed, and updated where necessary, for both departures and arrivals. For the 2007 calculations two additional aircraft types (the B757C with RB211-535C engines and the Bombardier Regional Jet 700/900) were added to the Gatwick database. Noise event levels were then determined from a database expressing SEL[3] as a function of engine power setting and slant distance to the receiver – the so-called 'noise-power-distance (NPD)' relationship. The engine power settings required for the aircraft to follow the measured average height and speed profiles were calculated from data describing aircraft performance characteristics within each of the different aircraft type categories.

2.2.2 As for the aircraft flight track and profile data, the ANCON noise database is continuously reviewed and updated with adjustments made when, and where, measurements show this to be necessary. The Gatwick NTK system comprises 5 fixed monitors (positioned approximately 6.5 kilometres from start of roll) together with a number of mobile monitors which are shared amongst the three London Airports and the CAA. These can be deployed anywhere within the NTK radar coverage area. More information about validating the CAA ANCON noise model can be found on the ERCD website at http://www.caa.co.uk/docs/68/Valid_ANCON.pdf. Following extensive noise measurements of departures from Gatwick in 2007, at 10.5, 13.5, 15, 22 and 24 kilometres from start or roll, the B737–300,-400,-500 and the A319C aircraft (see Table 1) have had their noise levels increased slightly. The

[3] Sound Exposure Level in dBA; a measure of noise event level which accounts for both the duration and intensity of noise.

B737 family increased by about 1dB at distances greater than 12 kilometres from start of roll and the A319C increased by about 0.5dB between 7 and 15 kilometres from start of roll.

2.3 Traffic Distribution by Aircraft Type and Route

2.3.1 The aircraft movements conventionally used to determine Leq are the daily averages of those which take place in the 16-hour day, 0700-2300 local time, during the 92-day period 16 June to 15 September inclusive. Table 1, which displays the distribution of movements by aircraft type, shows that the 2007 average Leq (16-hour) day movement rate was 2.5% higher than in 2006.

2.3.2 Table 2 compares the distribution of aircraft departures by route for 2006 and 2007. The percentages of use of each runway direction - the 'modal split' - for 2007 were 78% west - 22% east compared to 67% west – 33% east in 2006.

2.3.3 The table below lists the 'average summer day' movements by eight noise classes of aircraft (ranked in ascending order of noise emission, i.e. from least to most noisy) during 2006 and 2007. Table 1 and Figure 2 (at the end of the Report) state which specific aircraft types fall into which categories.

NOISE CLASS	AIRCRAFT	AVERAGE NUMBER 2006	AVERAGE NUMBER 2007	PERCENTAGE OF TOTAL 2007 MOVEMENTS	CHANGE AS PERCENTAGE OF TOTAL 2006 MOVEMENTS
	PROPELLER AIRCRAFT				
1	Small props	0.3	0.1	0.0	0.0
2	Large props	20.2	19.4	2.7	-0.1
	CHAPTER 3 JETS				
3	Short-haul	576.5	590.1	82.1	+1.9
4	Wide-body twins	88.0	95.9	13.3	+1.1
5	2nd gen wide body multis*	11.1	11.0	1.5	0.0
	LARGE CHAPTER 2/3 JETS				
6	1st gen wide-body multis*	4.9	1.6	0.2	-0.5
	2nd GENERATION TWIN JETS				
7	Narrow body twins (including Chapter 2 and hushkitted versions)	0.1	0.0	0.0	0.0
	1st GENERATION JETS				
8	Narrow body multis (including hushkitted versions)	0.3	0.5	0.1	0.0
	TOTAL MOVEMENTS	701.4	718.6	100.0**	+2.5**

* Multi-engined (3 or 4) aircraft
** May not sum exactly due to rounding

2.3.4 It can be seen from the above table that the largest percentage increase occurred in noise class 3 (short haul Chapter 3 Jets) which rose from 576.5 movements per day in 2006 to 590.1 per day in 2007. There was also an increase in movements by aircraft in noise class 4 (wide-body twins - Chapter 3 jets) but movements by aircraft in noise class 6 (large Chapter 2/3 jets) decreased from 4.9 movements per day in 2006 to 1.6 movements per day in 2007.

2.3.5 Figure 2 illustrates the changing distribution of traffic among these noise classes over the twenty-four years from 1984 to 2007[4] inclusive.

[4] The 1990 to 2007 percentages shown in Figure 2 relate to the average 16 hour Leq-day; before 1990 the percentages relate to the average 12 hour NNI-day (0700-1900 Local Time). Also, the percentages before 1992 are based on departures only, from 1992 they relate to total movements.

3 NOISE CONTOURS

3.1 'Actual' contours

3.1.1 The actual Leq contours for 2007 (i.e. those depicting actual terrain adjusted average mode Leq exposures), from 57 to 72 dBA in steps of 3dB, are overlaid on a background population map in Figure 3. In Figure 4 three of these, for 57, 63 and 69 dBA Leq, are compared with the actual contours for 2006.

3.1.2 The total areas and populations[5] enclosed by each of the contours are listed below:

Leq LEVEL dBA	AREA SQ KM		PERCENTAGE CHANGE	POPULATION 000's		PERCENTAGE CHANGE
	2006 ACTUAL	2007 ACTUAL		2006 ACTUAL (2005 CACI data)	2007 ACTUAL (2006 CACI data)	
>57	46.7	49.0	+4.9	4.5	4.8	+6.7
>60	27.2	28.3	+4.0	1.3	1.6	+23.1
>63	15.6	16.3	+4.5	0.6	0.6	*
>66	8.7	9.1	+4.6	0.3	0.3	*
>69	4.6	4.9	+6.5	<0.1	<0.1	*
>72	2.5	2.6	+4.0	<0.1	<0.1	*

* Percentage changes not shown because of the relatively low numbers and limited resolution of the estimates. (Also, percentage changes in contour areas and populations are not necessarily the same because the contours may differ in shape as well as size.)

3.1.3 Relative to 2006, the areas within the 2007 actual Leq contours have all increased ranging from a 4.0% increase at 60 and 72 dBA Leq to a 6.5% increase at 69 dBA Leq**.** These increases in area are attributable to the 2.5% increase in traffic in 2007 and the increase in departure noise levels of the B737-300, -400, -500 and A319C as stated in paragraph 2.2.2. At 57 dBA Leq, it is estimated that half of the increase is due to the increase in traffic whilst the other half is due to the increases in noise levels of the aircraft types stated above. Based on the updated 2006 CACI data the population enclosed within the 2007 57dBA Leq contour increased by 6.7% (using the earlier 2005 CACI data would have yielded an increase of 4.4%).

3.1.4 Examination of Figure 4 shows that the 57 dBA Leq contour for 2007 associated with westerly departures and arrivals is slightly longer than in 2006 reflecting the 2.5% increase in traffic, the increases in departure noise of the aircraft types stated above and the change in modal split between the two years (11% more westerly movements in 2007). Despite the change in modal split, the higher level contours are very similar in both shape and size; this is because where departure and arrival routes follow the same (or similar) ground tracks any potential differences caused by a change in modal split tend to be self cancelling.

[5] The population estimates shown in this Report are based on 2001 census data (updated by CACI Ltd in 2005 and 2006). Note also that area and population figures presented in this Report are cumulative.

3.2 **'Standard' contours**

3.2.1 In Figure 5 the standard terrain adjusted 2007 contours (57, 63 and 69 dBA Leq) are compared with those for 2006. These show what the noise exposures would have been if the 2006 and 2007 modal splits had mirrored the 20-year rolling average. The 2006 standard contours were based on the 20 year average modal split from 1987 to 2006 inclusive of 72% west - 28% east; those for 2007 were based on the 20 year average modal split from 1988 to 2007 inclusive which was also 72% west - 28% east. The associated areas and populations are displayed below:

Leq LEVEL dBA	AREA SQ KM		PERCENTAGE CHANGE	POPULATION 000's		PERCENTAGE CHANGE
	2006 STANDARD	2007 STANDARD		2006 STANDARD (2005 CACI data)	2007 STANDARD (2006 CACI data)	
>57	46.7	48.9	+4.7	4.5	4.8	+6.7
>60	27.1	28.3	+4.4	1.4	1.5	+7.1
>63	15.6	16.3	+4.5	0.6	0.6	*
>66	8.7	9.1	+4.6	0.3	0.3	*
>69	4.6	4.9	+6.5	0.1	0.1	*
>72	2.5	2.6	+4.0	<0.1	<0.1	*

* Percentage changes not shown because of the relatively low numbers and limited resolution of the estimates.

3.2.2 Relative to 2006, the area within the standard 2007 57 dBA Leq contour increased by 4.7%. Based on the 2006 CACI data the population within the standard 57 dBA Leq contour increased by 6.7% (using the earlier 2005 CACI population data would have yielded an increase of 4.4%).

3.2.3 The standard contours normally provide a clearer indication than the actual contours of 'fleet noise level' changes because they minimise the effect of any difference between the ratios of westerly to easterly operations for the two years. It can be seen from Figure 5 that the 2007 standard contours are very slightly larger than those for 2006 reflecting the 2.5% increase in traffic and the increases in departure noise of the B737-300, -400, -500 and A319C aircraft.

4 GATWICK TRAFFIC AND NOISE: HISTORICAL TRENDS

4.1 Figure 6 shows how the average mode 57 dBA Leq contours, based on actual modal splits[6], have changed since 1988 by comparison with the *total annual* aircraft movements.

4.2 From 1988 to 1993, the areas within the 57 dBA Leq contours diminished markedly and then increased slightly until 1996. From 1996 onwards the areas decreased slightly each year but levelled off between 1999 and 2000. In 2001 the area decreased by 22% relative to the previous year and in 2002 the contour area decreased by 19% relative to 2001. From 2002 to 2005 the areas increased slightly each year but decreased by 5.3% in 2006 relative to the previous year.

4.3 The population numbers within the contours generally move in line with the areas.

4.4 Aircraft movements bottomed out in 1991 (the year of the First Gulf War) and did not return to 1990 levels until 1995. From 1995 to 2000 they increased steadily. From 2000 to 2002 movements decreased, possibly as a consequence of 11th September 2001. There was little change in the total annual number of movements from 2002 to 2003 but annual movements rose steadily in both 2004 and 2005. The total annual movement figure for 2006 (263,400[7]) was 0.8% higher than that for 2005 (261,300).

4.5 The total annual movement figure for 2007 was 266,500, 1.2% higher than that for 2006.

[6] Actual modal split data are used in this figure because contours based on standard modal split are a relatively recent innovation and data prior to 1995 are not available.

[7] Total annual movement figures rounded to nearest 100.

REFERENCES

1 Critchley J B, Ollerhead J B
The Use of Leq as an Aircraft Noise Index
DORA Report 9023, September 1990

2 Ollerhead J B
The CAA Aircraft Noise Contour Model: ANCON Version 1
DORA Report 9120, November 1992

3 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, June 1999

4 Rhodes D P, Monkman D J, Woodley A C
The CAA Aircraft Noise Contour Model: ANCON Version 2.3
ERCD Report 0606 (to be published shortly)

5 Monkman D J, Rhodes D P, Deeley J, Beaton D, McMahon J
Noise Exposure Contours for Gatwick Airport 2006
ERCD Report 0702, June 2007

Table 1:

DISTRIBUTON OF GATWICK AVERAGE DAILY AIRCRAFT MOVEMENTS BY TYPE (0700-2300 LOCAL TIME, 16 JUNE – 15 SEPTEMBER)

AIRCRAFT TYPE(S)	NOISE CLASS	AVERAGE NUMBER 2006	AVERAGE NUMBER 2007	PERCENTAGE OF TOTAL 2007 MOVEMENTS	CHANGE AS PERCENTAGE OF TOTAL 2006 MOVEMENTS
Small Props	1	0.3	0.1	0.0	0.0
Large Props	2	20.2	19.4	2.7	-0.1
B737-300, 400, 500	3	196.5	201.0	28.0	+0.6
B737-600, 700	3	2.8	12.4	1.7	+1.4
B737-800, 900	3	38.4	39.0	5.4	+0.1
B757E (RB211-535E4, E4B)	3	79.2	71.3	9.9	-1.1
B757C (RB211-535C)**	3	0.0	0.3	0.0	0.0
B757P (Pratt and Whitney)	3	0.3	0.1	0.0	0.0
BAe146	3	41.5	35.9	5.0	-0.8
A319C (CFM-56)	3	112.9	134.1	18.7	+3.0
A319V (IAE-V2500)	3	8.0	1.6	0.2	-0.9
A320C (CFM-56)	3	24.9	27.6	3.8	+0.4
A320V (IAE-V2500)	3	36.3	31.1	4.3	-0.7
A321C (CFM56)	3	0.7	4.1	0.6	+0.5
A321V (IAE-V2500)	3	21.6	21.4	3.0	0.0
Business Jet (Ch 3)	3	3.8	2.8	0.4	-0.1
Bombardier Regional Jet 100/200	3	4.7	3.2	0.4	-0.2
Bombardier Regional Jet 700/900**	3	0.0	0.5	0.1	+0.1
Embraer EMB 135/145	3	0.1	0.4	0.1	0.0
F100	3	1.5	0.0	0.0	-0.2
MD80	3	2.0	1.8	0.3	0.0
MD90	3	1.3	1.5	0.2	0.0
B767-200	4	6.9	7.1	1.0	0.0
B767-300G (General Electric)	4	15.8	17.9	2.5	+0.3
B767-300P (Pratt and Whitney)	4	6.2	11.4	1.6	+0.7
B767-400	4	2.0	1.7	0.2	0.0
B777-200G (General Electric)	4	19.3	20.1	2.8	+0.1
B777-200R (Rolls Royce)	4	5.0	5.3	0.7	0.0
B777-300G (General Electric)	4	2.9	1.7	0.2	-0.2
B777-300R (Rolls Royce)	4	1.6	0.3	0.0	-0.2
A300	4	6.1	5.7	0.8	-0.1
A310	4	2.9	3.1	0.4	0.0
A330	4	19.3	21.6	3.0	+0.3
B747-400G (General Electric)	5	9.4	9.6	1.3	0.0
B747-400P (Pratt & Whitney)	5	0.1	0.9	0.1	+0.1
A340-200/300	5	1.4	0.5	0.1	-0.1
A340-500/600	5	0.1	0.0	0.0	0.0
MD11	5	0.1	0.0	0.0	0.0
B747-200, 300 (Ch 3)	6	1.4	1.4	0.2	0.0
DC10	6	3.5	0.2	0.0	-0.5
B737-200 (Ch3)	7	0.1	0.0	0.0	0.0
Tu154M*	8	0.3	0.5	0.1	0.0
TOTAL MOVEMENTS		**701.4**	**718.6**	**100.0*** **	**+2.5*** **

* In 2006 and 2007 all Chapter 3 versions.
** New types for 2007
*** May not sum exactly due to rounding

Table 2:

PERCENTAGE OF GATWICK AVERAGE DAILY AIRCRAFT DEPARTURES BY ROUTE*
(0700-2300 LOCAL TIME, 16 JUNE - 15 SEPTEMBER)

WESTERLY DEPARTURE ROUTE	PERCENTAGE OF TOTAL DEPARTURES 2006	PERCENTAGE OF TOTAL DEPARTURES 2007	CHANGE (% OF TOTAL)
LAM/CLN/BIG/DVR	28.6	32.2	+3.6
HAR/BOG	16.6	22.6	+6.0
KEN/SAM	21.5	22.7	+1.2
SFD	0.0	0.0	0.0
WIZ/TIG	0.3	0.5	+0.2
PERCENTAGE WEST	67.0	78.0	+11.0
EASTERLY DEPARTURE ROUTE	PERCENTAGE OF TOTAL DEPARTURES 2006	PERCENTAGE OF TOTAL DEPARTURES 2007	CHANGE (% OF TOTAL)
LAM	3.7	1.5	-2.2
CLN/BIG/DVR	10.6	7.3	-3.3
KEN/SAM	9.5	6.6	-2.9
SFD	9.2	6.6	-2.6
PERCENTAGE EAST	33.0	22.0	-11.0

* See Figure 1

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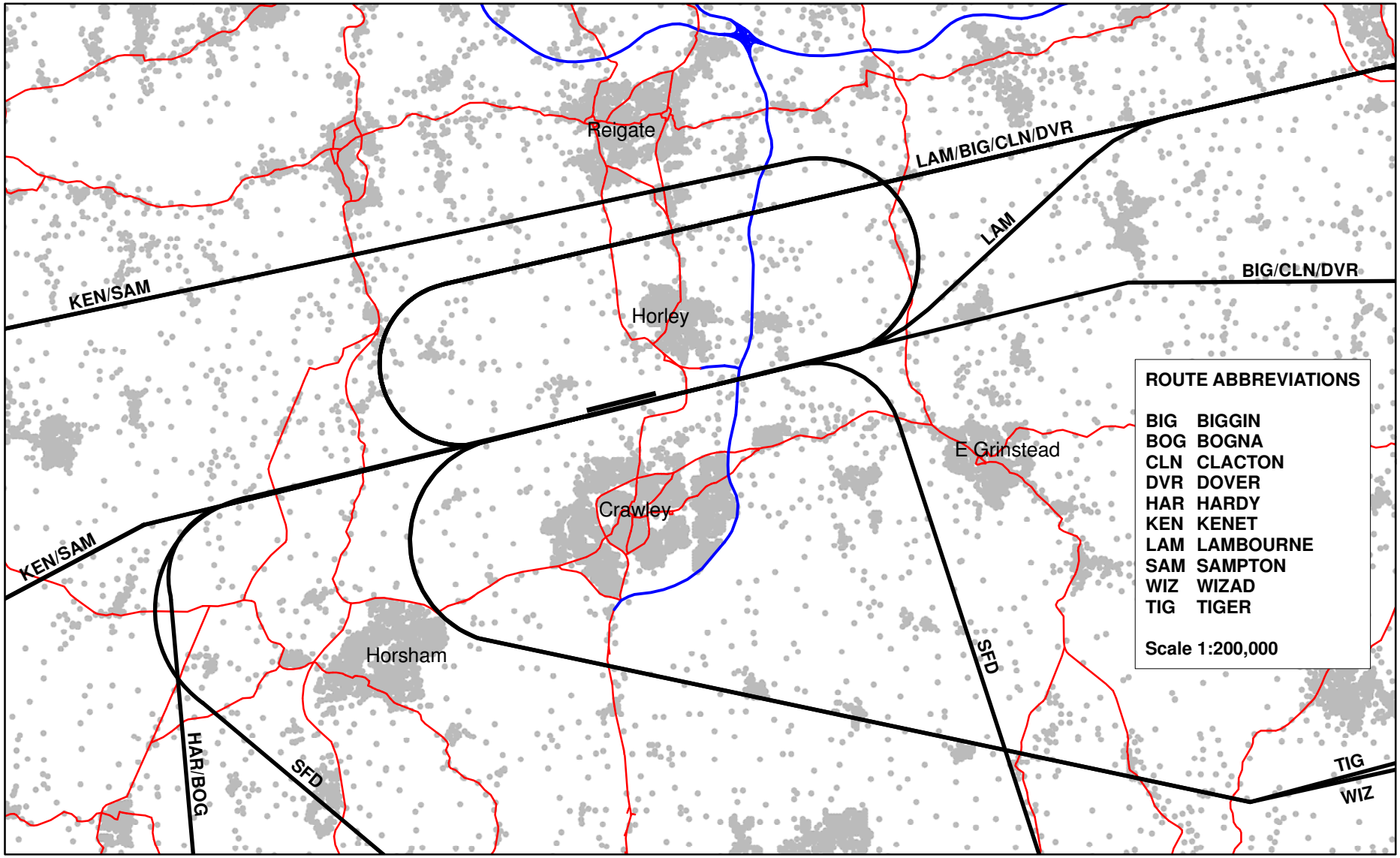

Figure 1: London Gatwick Airport Standard Instrument Departure Routes

Propeller aircraft:

1 Small props: Single and twin pistons and turboprop light, business and commuter aircraft

2 Large props: 2- & 4-propeller transports; eg SF340 BAe-ATP, ATR42, F50, HS748, Saab 2000, Electra, Hercules, Viscount, Vanguard

Chapter 3 jets:

3 Short-haul: eg A320, BAe146, B717, B737-300, B757, F100, MD80, RJ50, re-engined narrow-bodies, some business jets

4 Wide-body twins: A300, A310, A330, B767, B777

5 2nd gen. wide-body multis*: A340, MD11, B747-400

Large Chapter 2/3 jets:

6 1st gen. wide-body multis* (Chapter 2 & 3): 'Classic' 747, Tristar, DC-10, An124, IL76, IL86

2nd generation twin jets:

7 Narrow body twins (including hushkitted versions): eg F28, BAC1-11, DC-9, B737-200, Tu134, other business jets

1st generation jets: (including hushkitted versions)

8 eg Trident, B707, DC-8, B727, IL62, Tu154

* Multi = 3- or 4- engined aircraft

Figure 2: Noise Class of Gatwick aircraft 1984 - 2007

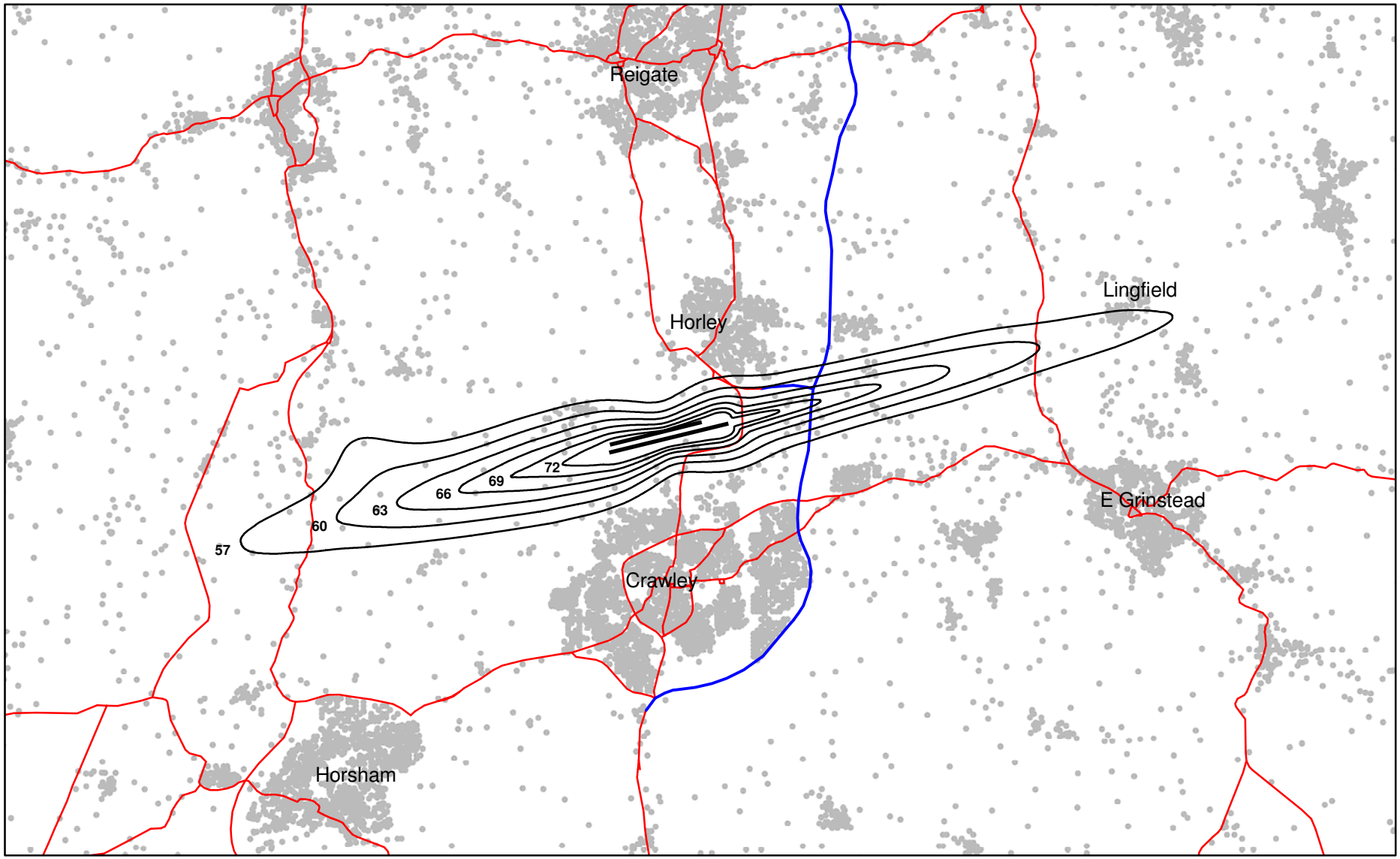

Figure 3: Gatwick actual 2007 average mode (78% west - 22% east) terrain adjusted 16hr Leq on population map

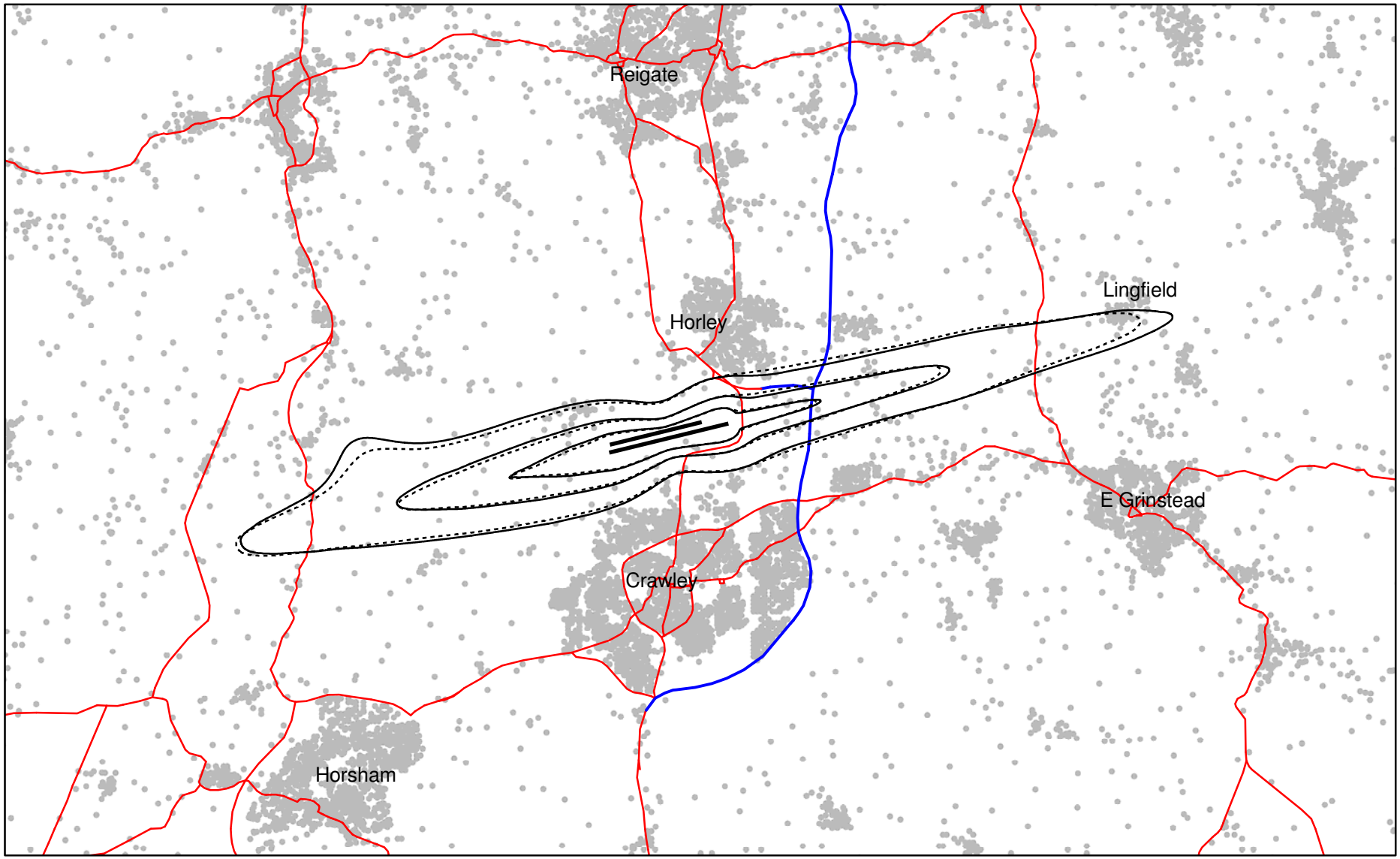

Figure 4: Gatwick actual 57, 63 and 69 Leq contours - 2006 dotted (67% west - 33% east) - 2007 solid (78% west - 22% east)

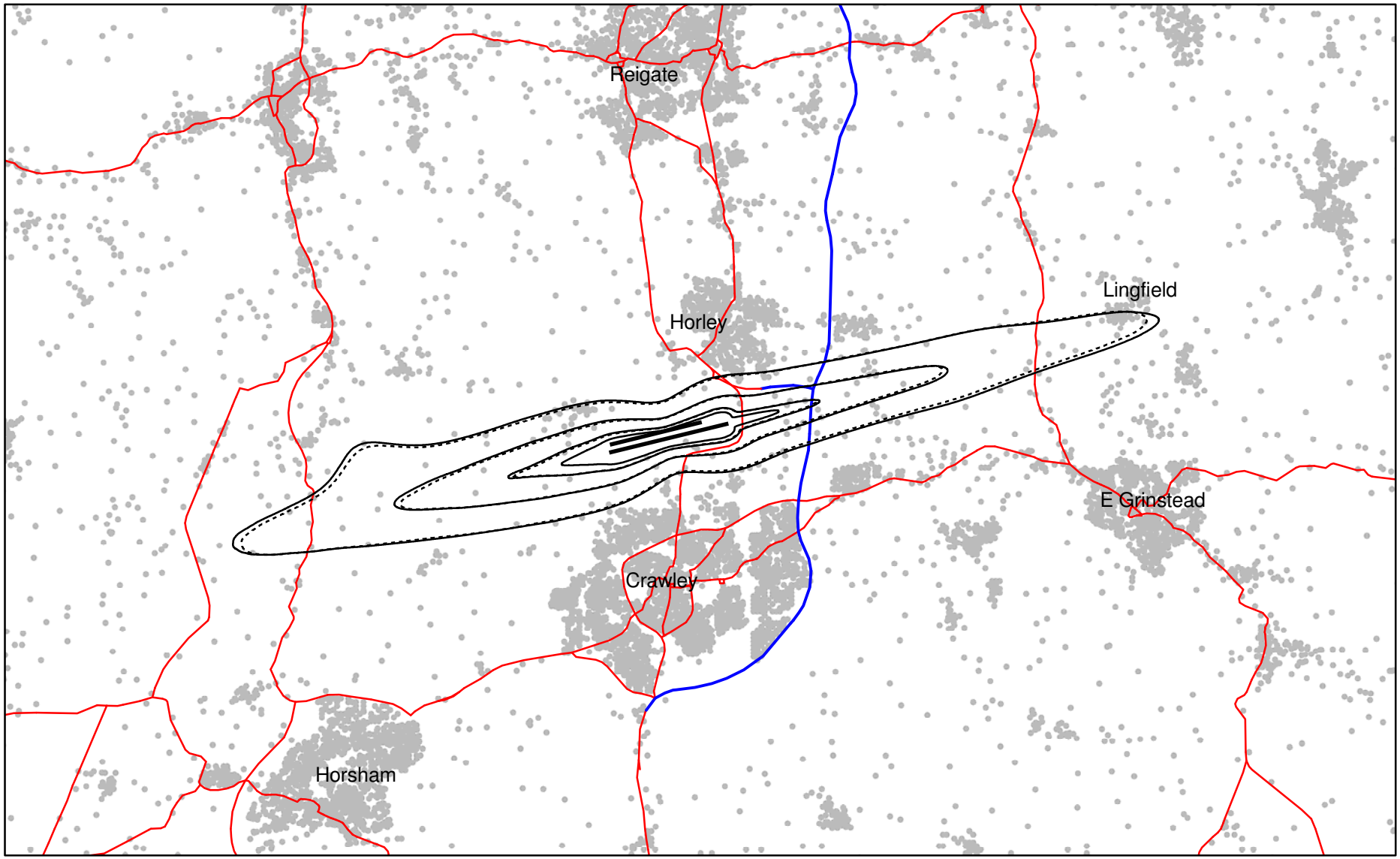

Figure 5: Gatwick standard 57, 63 and 69 Leq contours - 2006 dotted (72% west - 28% east) - 2007 solid (72% west - 28% east)

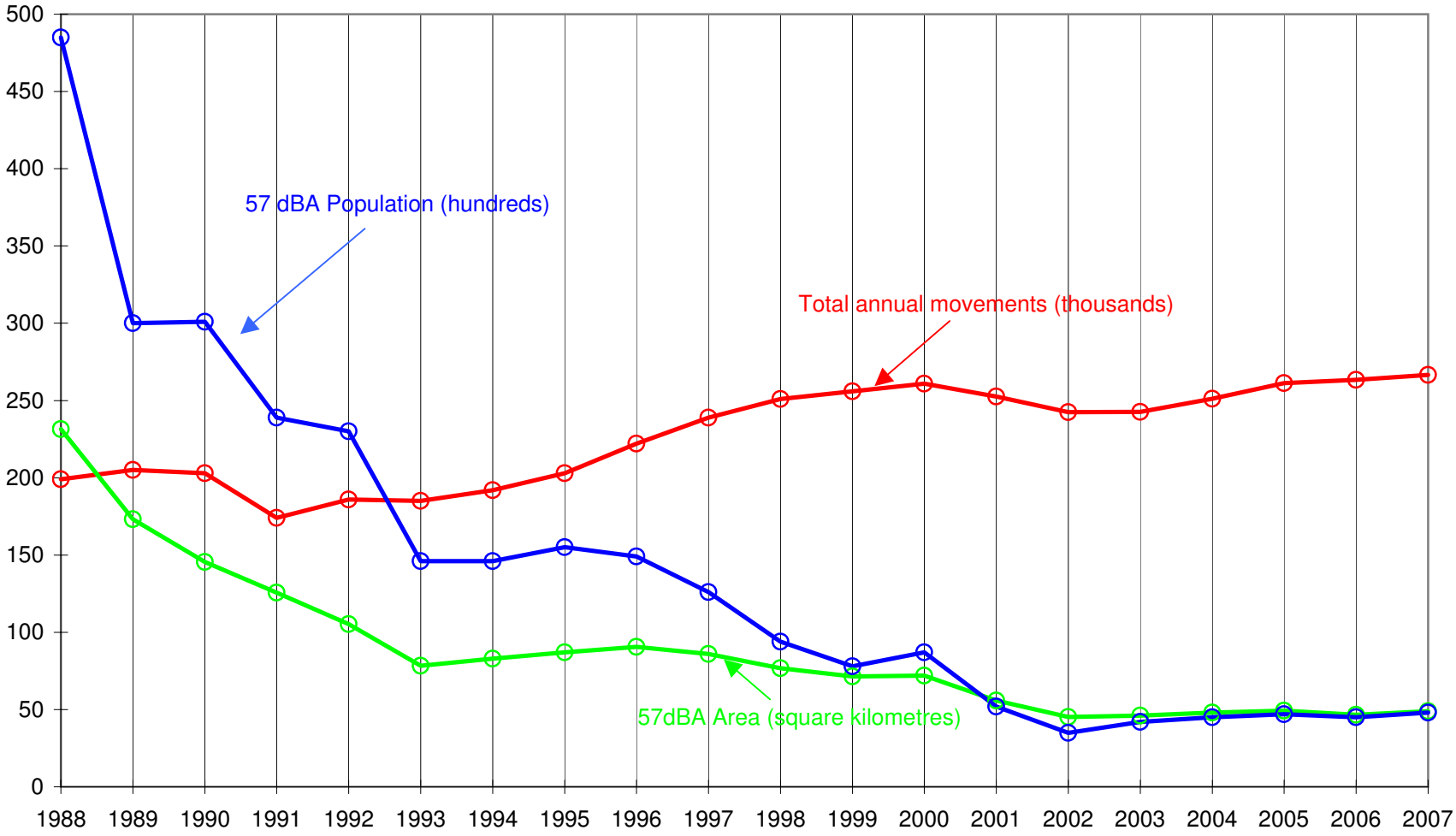

Figure 6: Gatwick traffic and noise 1988 - 2007