

Guidance Note for Heathrow Airport 2017 Noise Contours Report

The guide is provided to assist the reader of the report: *Heathrow Airport 2017 Summer Noise Contours and Noise Action Plan Contours* (ERCD Report 1801). The report presents the 2017 noise exposure contours that were generated by the Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority (CAA).

A layout of the main noise data figures and tables is provided further below. For a glossary of terms see Page 193 of the report.

Headlines

- This report covers Summer Leq contours and annual Noise Action Plan contours for 2017, as well as a broad range of supplementary metrics, including number above contours, overflight track density diagrams and single mode contours. Much of this content was developed in response to community requests.
- The Leq 16hr 57dBA area was 93.2 km² (p. 23, actual modal split), the smallest area since tracking started in 1988. Similarly, the 2017 Lden 55dBA had an area of 182.3 km², 26% smaller than in 2006, the first year of Environmental Noise Directive mapping (p. 161).
- Summer night contours in 2017 were approximately 10% smaller in area than in 2016 (p. 27). This decrease was mainly due to storm disruption in June 2016 that caused flight delays and around 140 late running departures that month.
- In general contour areas were smaller in 2017 than in 2016, mainly due to the ongoing introduction of quieter aircraft types including B787, A320neo and A350, and noise reductions in the ANCON modelling of B747 and certain A380 following expanded noise monitoring.
- Over the year, 2017 had an 81/19 (west/east) modal split, while 2016 had 70/30 (p. 21, Table 4). Because increased westerlies increase noise levels over heavily populated west London, this meant increased population figures inside the smaller Lden contours (p. 35, Table 16). However, during the two summers, the modal splits were similar at 84/16 (2017) and 86/14 (2016), so this meant that population and household reduction figures more closely followed contour area decreases (p. 23, Table 5).

Scope of Report

As with the 2016 report, this report brings together two formerly-separate reports:

- The 2017 average summer 16-hour day and 8-hour night Leq contours. The 16-hour day contours have been reported at Heathrow since 1974.
- The 2017 Strategic Noise Mapping contours (L_{day} , $L_{evening}$, L_{night} , and L_{den}) are required every five years for the EU Environmental Noise Directive (END) though Heathrow reports them every year and has done since 2009. Heathrow's new Noise Action Plan (NAP) for the period 2019-2023 is based on the 2016 noise mapping. The $L_{6.5hr\ night}$ is used by Government for reviewing night restrictions.

The report includes analysis of a wide range of supplementary metrics – some reported in previous years, some presented last year for the first time. A full list of the figures and tables in the report is contained in the tables at the end of this guide.

- Trends in contour area, houses and population since 2006 (p. 91-95).
- Change diagrams (L_{den} and L_{night} , day N65 and N70, and night N60) showing changes between two different years (2016/2017 and 2006/2017) (~p. 98-118).
- Overflight contours (average summer day and night) (p. 30, 70, 74, 78 and 82)

- Track density diagrams (2006, 2016 and 2017, average summer day and night, with 2 different angles of view) (~p. 71-85)
- Westerly and Easterly Single mode contours – summer $L_{\text{day 16hr}}$ and $L_{\text{night 8hr}}$, whole year L_{night} and N70 (16hr day), 2006 and 2017. (p. 25-29, 65-69, 104-115)
- Pie charts of the route distributions – arrival and departure for L_{den} and L_{night} periods for the years 2006 through 2016. (p. 144-146)

Other Key Points to Note

2017 compared with 2016

- Total annual aircraft movements in 2017 were 0.2% higher than in 2016 (p. 18). Note that the average daily aircraft movements are used to calculate the noise contours and in 2017 these were 0.5% higher because 2016 was a leap year. (p. 130-131)
- While average evening flights decreased 0.7%, the average night flights changed by less than 0.1% (p. 126-129).
- The areas of the 2017 L_{den} contours were typically 4 to 8% less than for 2016. This can be attributed to increases in the numbers of quieter, newer aircraft such as B787, A320neo and A350. (p. 35)
- The percentage figures for changes in population and households within the contours were a mix of increases and decreases from +13% to -3%. (Table 15 p. 35)

Lmax validation

- A Lmax validation of the ANCON model has been undertaken using measured data from 2017 and 2006. A key result was that the model for the Airbus A319/320/321 family of aircraft with certain engines needed a 1-2 decibel increase in Lmax and this impacted previously reported 2006 and 2016 N70, N65 and N60 contours. This is described in detail in Appendix E.
- The outcome is that the N-contours are larger and encompass more people, but the reduction trends remain the same.

Trends, changes and wind effects.

- Many figures compare pairs of years, either 2016 and 2017 or 2006 and 2017. To understand the patterns of change over the past decade, look at the trends plots in Figures B19 – B23 (p. 91-95). Also see the discussion on p. 37-40.
- Over the decade, despite up to around 20% reductions in contour area, changes in population and households within contours were much smaller, around 8% or less or sometimes actual increases. This was due to the increase of new households in noise affected areas. See Table C14 (p 161) and Figure B24 (p. 96).
- Wind predominance and the resulting westerly-easterly (W-E) modal usage can impact the area, population and houses within the contours. North-south (N-S) runway splits can also skew the results. These effects can be compensated for in the noise change maps by re-calculating contours from different years using the same N-S and W-E modal split (e.g. see p. 96-97).
- Change diagrams show the differences in a noise metric between two sample years. For example, Figure B26 (p. 98) compares the L_{den} in 2006 and 2017 (see discussion on p. 42) and indicates that approximately 95% of the area is quieter than in 2006. This should not be interpreted as necessarily indicating a linear trend.
- Tables C8a through C8i contain the route distributions for arrivals and departures for the years 2006 and 2009-2017. This information is displayed graphically in pie charts on Pages 144-146. Arrivals are presented for the L_{den} and L_{night} periods and show the proportions on each of the four runway options, namely 09L, 09R, 27L and 27R. Departures are further divided by

easterly (09L/09R) and westerly operations (27L/27R) and show the proportion of flights using the 6 SIDs – BPK, BUZ, CPT, DET, MID and SAM.

- The CAA uses the CACI population database which is slightly different to the Office of National Statistics (June 2015) data used by DEFRA for the EU END reporting (which includes road and rail noise). (See p. 31 and 158).

Figures and Tables	Noise Metrics								
	Year and Information	Leq 16hr summer day				Leq 8hr summer night			
West-east runway usage		Actual 84/16	Standard 79/21	Westerly 100/0	Easterly 0/100	Actual 81/19	Standard 79/21	Westerly 100/0	Easterly 0/100
2016 and 2017: Contours	Figures	B3 p. 63	B4 p. 64			B7 p. 67			
2006 and 2017: Contours	Figures			B5 p. 65	B6 p. 66			B8 p. 68	B9 p. 69
2016 and 2017: area, population, houses (cumulative)	Tables:	5 p. 23	6 p. 24			9 p. 27			
2006 and 2017: area, population, houses (cumulative)	Tables:			7 p. 25	8 p.26			10 p. 28	11 p. 29
2016 and 2016: Overflights Contours (48.5 deg)	Figures	B10 p. 70				B12 p. 78			
Overflight track density diagrams (2006, 2016, 2017) 48.5 deg	Figures	B10a-c p.71-73				B12a-c p. 79-81			
2016 and 2016: Overflights Contours (60 deg)	Figures	B11 p. 74				B13 p. 82			
Overflight track density diagrams (2006, 2016, 2017) 60 deg	Figures	B11a-c p. 75-77				B13a-c p. 83-85			

Year and Information		Annual Route Distribution
2006 – 2017	Table C8	p. 134 - 143
	Pie Charts	p. 144-146

Noise Action Plan Contours and Supplementary Metrics – Whole calendar year										
Year and Information		L _{day} 07-19h	L _{evening} 19-23h	L _{night} 23-07h	L _{den}	L _{den} 2006 N/S & W/E (70/30)	L _{6.5hrs} night	N65 16h day	N70 16h day	N60 8h night
2016 and 2017: Contours	Figures:	B14 p. 86	B15 p. 87	B16 p. 88	B17 p. 89		B18 p. 90			
2016 and 2017: area, population, houses (cumulative)	Tables:	12 p. 32	13 p. 33	14 p. 34	15 p. 35		16 p. 36			
Change in levels between 2016 and 2017	Figures:			B31 p. 103	B28 (¹⁵ 72/28) p. 100			B36 p. 108	B41 p. 113	B46 p. 118
2006 and 2017: Contours	Figures:			B29 p. 101	B24 p. 96	B25 p. 97		B34 p. 106	B37 p. 109	B44 p. 116
2006 and 2017: area, population, houses (cumulative)	Tables:	C11 p. 160	C12 p. 160	C13 p. 161	C14 p. 161	C16 p. 163	C15 p. 162	20 p. 47	21 p. 49	25 p. 53
Change in levels between 2006 and 2017	Figures:			B30 (72/28) p. 102	B26 (70/30) p. 98	B27 p. 99		B35 p. 107	B39 p. 111	B45 p. 1175
2006 and '09-'17 Trends: area, population, houses	Figures:	B19 p. 91	B20 p. 92	B21 p. 93	B22 p. 94		B23 p. 95			



Year and Information		L _{night} 23-07h					N70 16h day			
West-east runway usage		Actual splits	2006 night split (72/28%)	2016 night split (70/30%)	Westerly 100/0	Easterly 0/100	Actual splits	2006 Day split 70/30	Westerly 100/0	Easterly 0/100
2006 and 2017: Contours	Figures:	B29 p. 101			B32 p. 104	B33 p. 105	B37 p. 109	B38 p. 110	B42 p. 114	B43 p. 115
2006 and 2017: area, population, houses (cumulative)	Tables:	C18 p. 160			18 p. 45	19 p. 46	21 p. 49	22 p. 50	23 p. 51	24 p. 52
Change in levels bet 2006 and 2017	Figures:		B30 p. 102				B39 p. 111	B40 p. 112		
Change in levels bet 2016 and 2017	Figures:			B31 p. 103			B41 p. 113			