

Reader's guide for the Heathrow Airport 2018 Noise Contours Report

The guide is provided to assist the reader of the report: *Heathrow Airport 2018 Summer Noise Contours and Noise Action Plan Contours* (ERCD Report 1901). The report presents the 2018 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 171 of the report.

Headlines

- This report covers Summer Leq contours and annual Noise Action Plan contours for 2018, 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 86.8 km² (p. 23, actual modal split), the smallest area since tracking started in 1988. Similarly, the 2018 Lden 55dBA had an area of 176.8 km², 27.7% smaller than in 2006, the first year of Environmental Noise Directive mapping (p. 164). The continual improvements in aircraft technology of the fleet has been the main driver of these noise reductions.
- Summer night time Leq 8hr contours in 2018 were approximately 3% larger in area than in 2017 (p. 27). This increase was mainly due to there being 6% more night flights in 2018.
- Otherwise, in general, contour areas were smaller in 2018 than in 2017 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, 2018 had a 65/35 (west/east) modal split, while 2017 had a 81/19 split (p 21, Table 4). Increased easterlies decrease noise levels over heavily populated west London, this meant the decreases in population and household figures (~13%) were greater than the 3-5% reduction in Lden contour areas (p. 35, Table 15).

Scope of Report

As with the 2017 and 2016 reports, this report brings together two formerly-separate reports:

- The 2018 average summer 16-hour day and 8-hour night Leq contours. The 16-hour day contours have been reported at Heathrow since the 1980's.
- The 2018 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 since 2009. Heathrow's new Noise Action Plan (NAP) for the period 2019-2023 is based on the 2016 noise mapping. The $L_{6.5hr\ night}$ are used by Government for reviewing night restrictions.

The report includes analysis of a wide range of supplementary metrics. A full list of the figures and tables in the report is contained in the tables at the end of this reader's guide.

- Trends in contour area, houses and population since 2006 (p. 92-96).
- Change diagrams (L_{den} and L_{night} , day N65 and N70, and night N60) showing changes between two different years (2018/2017 and 2018/2006) (~p. 99-118).
- Overflight contours (average summer day and night) (p. 30, 71, 75, 79 and 83)
- Track density diagrams (2006, 2017 and 2018, average summer day and night, with 2 different angles of view) (~p. 72-86)

- 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 2018. (p. 25-29, 66-70, ~105-116)
- Pie charts of the route distributions – arrival and departure for L_{den} and L_{night} periods for the years 2006 through 2016. (p. 146-148)

Other Key Points to Note

2018 compared with 2017

- Total annual aircraft movements in 2018 were 0.4% higher than in 2017 (p. 17).
- While evening flights increased 2%, the average night flights increased by 5% (p. 127-130).
- The areas of the 2018 L_{den} contours were 3 to 6% less than for 2017. 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 decreases from -4% to -23%. (Table 15 p. 35) due to the increase in proportion of easterly winds moving approach noise away from west London.

Trends, changes and wind effects

- Many figures compare pairs of years, either 2018 and 2017 or 2018 and 2006. To understand the patterns of change over the past decade, look at the trends plots in Figures B19 – B23 (p. 92-96). Also see the discussion on p. 37-40.
- Since 2006, despite up to around 28% reductions in contour area, reductions in population and households within contours were much smaller, around 6-25%. This was due to the increase of new households in noise affected areas. See Table C14 (p 164) and Figure B24 (p. 97). If the new dwellings had not encroached on noise impacted areas, the reduction in population and homes in the 55 L_{den} contour would have been 30%.
- 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. 97-98).
- Change diagrams show the differences in a noise metric between two sample years. For example, Figure B26 (p. 99) compares the L_{den} in 2018 and 2006 (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 2009-2018. This information is displayed graphically in pie charts on Pages 146-148. Arrivals are presented for the L_{den} and L_{night} periods show the proportions on each of the four runway options namely, 09L, 09R, 27L and 27R. Departures are further divided by westerly (09L/09R) and easterly 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 data used by DEFRA for the EU END reporting (which includes road and rail noise).

| Figures and Tables | Noise Metrics | | | | | | | | |
|---|----------------------|---------------------|----------------|----------------|----------------|----------------------|----------------|----------------|----------------|
| | Year and Information | Leq 16hr summer day | | | | Leq 8hr summer night | | | |
| West-east runway usage | | Actual 78/22 | Standard 79/21 | Westerly 100/0 | Easterly 0/100 | Actual 80/20 | Standard 79/21 | Westerly 100/0 | Easterly 0/100 |
| 2018 and 2017: Contours | Figures | B3 p. 64 | B4 p. 65 | | | B7 p. 68 | | | |
| 2018 and 2006: Contours | Figures | | | B5 p. 66 | B6 p. 67 | | | B8 p. 69 | B9 p. 70 |
| 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 |
| 2018 and 2017: Overflights Contours (48.5 deg) | Figures | B10 p. 71 | | | | B12 p. 79 | | | |
| Overflight track density diagrams (2006, 2017, 2018) 48.5 deg | Figures | B10a-c p.72-74 | | | | B12a-c p. 80-82 | | | |
| 2018 and 2017: Overflights Contours (60 deg) | Figures | B11 p. 75 | | | | B13 p. 83 | | | |
| Overflight track density diagrams (2006, 2017, 2018) 60 deg | Figures | B11a-c p. 76-78 | | | | B13a-c p. 84-86 | | | |

| Year and Information | | Annual Route Distribution |
|----------------------|-------------|---------------------------|
| 2006 – 2018 | Table C8a-k | p. 135 - 145 |
| | Pie Charts | p. 146-148 |

| 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 |
| 2018 and 2017: Contours | Figures: | B14 p. 87 | B15 p. 88 | B16 p. 89 | B17 p. 90 | | B18 p. 91 | | | |
| 2018 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 2018 and 2017 | Figures: | | | B31 p. 104 | B28 p. 101 | | | B36 p. 109 | B41 p. 114 | B46 p. 119 |
| 2018 and 2006: Contours | Figures: | | | B29 p. 102 | B24 p. 97 | B25 p. 98 | | B34 p. 107 | B37 p. 110 | B44 p. 117 |
| 2006 and 2018: area, population, houses (cumulative) | Tables: | C11 p. 163 | C12 p. 163 | C13 p. 164 | C14 p. 164 | C16 p. 166 | C15 p. 165 | 20 p. 48 | 21 p. 50 | 25 p. 54 |
| Change in levels between 2018 and 2006 | Figures: | | | B30 (72/28) p. 103 | B26 (70/30) p. 99 | B27 p. 100 | | B35 p. 108 | B39 p. 112 | B45 p. 118 |
| 2006 and '09-'18 Trends: area, population, houses | Figures: | B19 p. 92 | B20 p. 93 | B21 p. 94 | B22 p. 95 | | B23 p. 96 | | | |



| 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 |
| 2018 and 2006: Contours | Figures: | B29 p. 102 | | | B32 p. 105 | B33 p. 106 | B37 p. 110 | B38 p. 111 | B42 p. 115 | B43 p. 116 |
| 2018 and 2006: area, population, houses (cumulative) | Tables: | C18 p. 160 | | | 18 p. 46 | 19 p. 47 | 21 p. 50 | 22 p. 51 | 23 p. 52 | 24 p. 53 |
| Change in levels bet 2018 and 2006 | Figures: | | B30 p. 103 | | | | B39 p. 112 | B40 p. 113 | | |
| Change in levels bet 2018 and 2017 | Figures: | | | B31 p. 104 | | | B41 p. 114 | | | |