Heathrow Noise and Community Forum

Area Based Noise Modelling and Reporting

CNG presentation

28 May 2025

Context

ICAO recognises the importance of non-acoustic factors in understanding annoyance in relation to aviation noise. Its research has found;

- average noise metrics such as Laeq (used in webTAG) only account for 30% of aviation noise's impact
- other non-acoustic factors such as public trust and the impact of airspace change are key factors

Community noise information reports are an essential tool for;

- building trust between Heathrow and its communities
- understanding the impact of change over time

Given the importance of option appraisal analysis in Airspace Modernisation it will be critically important to

- create an accurate baseline (to evaluate changes against)
- be able to project and predict the impact of proposed changes

Established structure of Community Noise Information Reports (CIRs)

A reporting structure was set up after the 2014 PBN trials to identify the cause of noise impacts and understand adverse community responses in areas that had been affected by the introduction of new flight technologies and change more generally. The format was agreed between Heathrow, Andersen Acoustics and HCNF members.

These reports created noise baseline comparisons, containing valuable detailed information to explain the noise environment. Critically changes over a ~5-year period were modelled and compared.

The reports were well received by communities. They enabled changes over time to be tracked and understood, using a combination of noise modelling and measurement. Key changes assessed included;

- Route usage
- Fleet changes
- Gate analysis – including changes in flight heights, concentration
- Time of day

Future reports should build on this information base. The established CIR structure is set out in the next slide.

Introduction

At the request of local residents, Heathrow Airport Ltd installed a temporary noise monitor to the east of the Neilson Recreation Ground in East Molesey between 24th January 2018 and the 15th October 2018. This report presents an analysis of operational and noise data over this period.

The report is structured using a template developed by Anderson Acoustics working with members of the Heathrow Community Noise Forum (HCNF) Working Group for Monitoring & Verification. It is set out as:

- **Section 2 – Key Findings** are presented.
- **Section 3 – Background & Methodology** provides an overview of how the airport operates, noise and how the data (both operations and noise) have been analysed.
- **Section 4 – Flight track data** presents analysis of the flight tracks and operations above East Molesey including routes, proximity, spatial distribution, height and aircraft types. As flight track data has been collected for many years in the airport's noise and track-keeping (NTK) system, analysis has compared the noise monitoring period with an equivalent period in 2013.
- **Section 5 – Noise Monitor Data** presents an analysis of aircraft noise events and overall community noise levels as measured at the noise monitor. Noise data is analysed only for the monitoring period. Comparison with a historic period is not possible as monitoring has not taken place at the same location previously.
- **Section 6 – Noise Modelling** This section presents noise levels derived from noise modelling. Aircraft noise models have been generated for easterly and westerly days for the summer periods of both 2013 and 2017 using AEDT. Previous reports have been based on Heathrow's verified noise model using INM. This software has recently been superseded by AEDT.
- **Section 7 – Appendices** will present large scale versions of all of noise modelling results and provides greater detail on noise terminology around how sound is described, how aircraft noise is measured and how differences of sound level relate to human perception.

It should be noted that this report is intended to describe noise exposure rather than the impact of that exposure - we cannot judge how each individual will respond. The report describes exposure and differences therein (as applicable) of aircraft using a variety of both operations and noise related metrics.

Whilst this report is a comprehensive analysis, it is not intended to be exhaustive. Should there be any questions or comments arising from the data presented herein, these should be addressed to the Heathrow Community Noise Forum (HCNF) for additional analysis.

The Latest Shepperton Report

The latest community noise monitoring report covering Shepperton is very different from the previously adopted CIR format.

It contains useful information and gives a noise snapshot but does not track changes over time.

It also contains non-LHR aircraft which is useful and this should be continued.

Shepperton is impacted by departure routes on both modes of operation and is also overflown by aircraft stacking but falls outside of the 54dB Laeq contour.

On a technical note, the noise monitor thresholds chosen seem very high with a 15 second required event duration over 60dB. Previous CIR reporting was not limited in this way (see next slide). While CAA/ERCD report 0406 suggests a typical 5 second event duration for monitor set up.

Data needed to understand noisy environments

(examples from Anderson's Chertsey CIR)

What are the range of noise events experienced? How long are they and which aircraft cause the events?

1 Introduction | 2 Key Findings | 3 Methodology | 4 Flight Track Data | 5 Noise Monitor Data | 6 Noise in the Wider Area | 7 Appendices

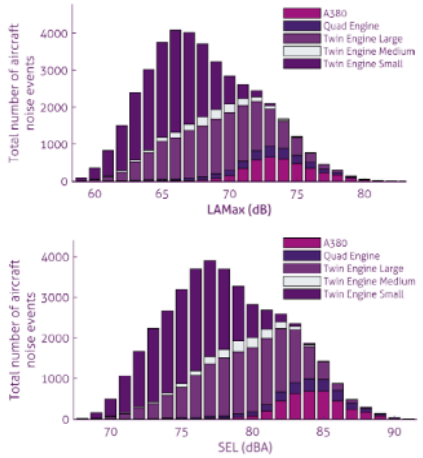
What was the range of L_{Amax} and SEL noise levels from aircraft events?

- The figures to the right present the range of L_{Amax} (top) and SEL (bottom) noise levels for all aircraft noise events measured at the Chertsey monitor during the monitoring period. An explanation of metrics is given on Page 10.
- The table below presents the average* L_{Amax} and SEL for each aircraft type group.
- The average L_{Amax} of all aircraft events is 68.6dB. The distribution of L_{Amax} is dependent on aircraft size with the larger aircraft generally recording louder events.

Aircraft group	Average L_{Amax}	Average SEL, dBA
A380	74.1	84.5
Quad engine	72.9	83.8
Twin engine large	69.8	79.9
Twin engine medium	68.2	78.7
Twin engine small	66.1	76.1

- As this analysis considers ALL events measured at this monitor regardless of distance or route these results cannot be used to compare the relative noise levels of aircraft types. An analysis of aircraft type noise levels is presented on Page 32.
- For non-aircraft related events, the mean L_{Amax} is 66.6dB reaching a maximum of 98dB.

* **Note: throughout this report, unless otherwise stated, the arithmetic mean is calculated.**



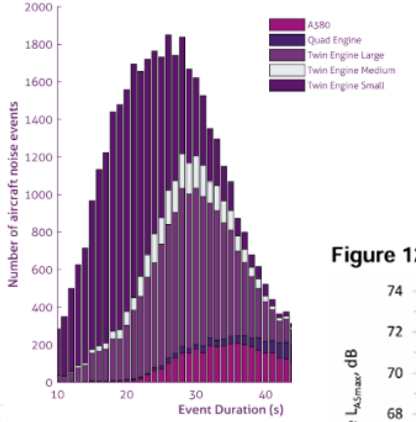
29

1 Introduction | 2 Key Findings | 3 Methodology | 4 Flight Track Data | 5 Noise Monitor Data | 6 Noise in the Wider Area | 7 Appendices

How does the duration of an aircraft event vary?

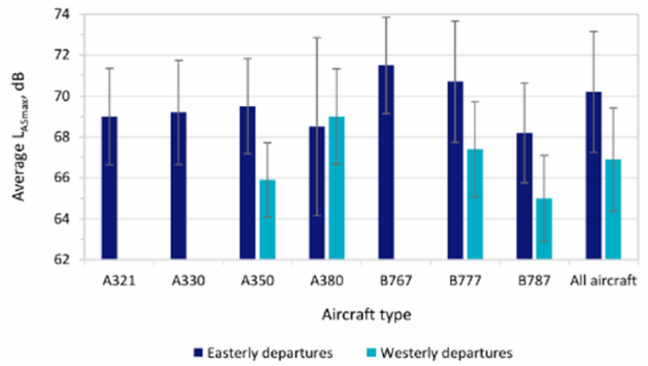
- The duration of an event (as defined for the purposes of this comparison only) is the time for which the noise level exceeds the event threshold level, which, in this case is 57.8dBA.
- In addition, events are only recorded if the duration is longer than 10s to prevent impulsive sounds which are not characteristic of aircraft noise being recorded or to prevent shorter duration transient events such as cars or lorries being captured.
- The average duration of **all measured aircraft events** was 28 seconds. The duration is largely dependent on the noise level of the event with the average event duration of the quad engine aircraft, predominantly B747-400s, being around 45 seconds while the duration of the smaller twin engine aircraft is 23 seconds.
- The >60 seconds category includes all events with durations more than 60 seconds, which are most likely to be due to one event combining with another (e.g. one of which may not necessarily be an aircraft event).

Aircraft group	Average noise event duration (seconds)
A380	36.2
Quad engine aircraft	45.0
Twin engine - large	29.8
Twin engine - medium	29.2
Twin engine - small	22.5



30

Figure 12 Average measured L_{ASmax} levels by aircraft type and runway direction



In comparison the Shepperton Report has one graphic on noise levels

Conclusions and Recommendations

As Heathrow moves into Stage 3 of Airspace Modernisation - and especially in evaluating the impact of ‘Do Minimum’ scenarios compared to more radical change options (so that all proposed changes can be assessed and justified as required by the Treasury Green Book) it will be critically important to understand the impact of projected aviation changes against the 2019 and current noise base lines.

Noise modelling for different options will be an essential tool in decision making, especially in lower airspace. In order to engage the public properly and build trust the scope of this - and validation methodologies - should be explained agreed before further option development and analysis is undertaken.

It will be very important to understand the effect of any proposed changes on single mode, overall average and respite/modal alternation bases. These methodologies should be reflected in AM Option Appraisal, consultation material and Stage 3 shortlisting and decision making.

In the context AM Methods and Metrics, the NACF should discuss the format and purpose of future CIRs and have input regarding what should be included in these reports.

Key results from CIR’s and AM noise modelling should be presented and discussed at the NACF.