



# A quieter Heathrow

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# Foreword by Colin Matthews

Heathrow Airport connects the UK to the world. As the UK's only international hub airport, Heathrow links the UK both to our established trading partners and to the world's emerging economic powerhouses. Without those connections, we risk losing the global race for growth.

As well as bringing huge benefits to the UK, an airport of the size and importance of Heathrow has downsides for people living nearby – in particular, the challenge of aircraft noise.

At Heathrow, we are at the forefront of international efforts to tackle aircraft noise. Airlines are rewarded for flying quieter planes, and penalised when they do not. New procedures for aircraft landing which reduce the noise experienced under the flight path have been pioneered.

As a result, even though the number of planes using the airport has gone up, and Heathrow is now operating at full capacity, fewer people are affected by noise from Heathrow today than at any time since the 1970s<sup>1</sup>.

But despite these efforts, noise remains an issue. We are committed to addressing it, balanced alongside the need to safeguard the connectivity that Heathrow provides. Ultimately, and quite rightly, it will be the Government that decides where this balance lies.

The Aviation Policy Framework<sup>2</sup> published by the Government in March recognises that noise is the primary concern of local communities near airports and sets out the Government's aspiration "to strike a fair balance between the negative impacts of noise... and the positive economic impacts of flights"<sup>3</sup>. Heathrow supports the Government's overall policy on aviation which is "to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise".

Noise is a difficult issue, and as the Airports Commission recognises in its initial consultation paper, "there is no firm consensus on the way to measure the noise impacts of aviation"<sup>4</sup>. We welcome the Airports Commission consulting on this important issue, and look forward to working with them, and continuing to work with local communities around Heathrow.

We have strongly argued that each option for creating new hub capacity should be assessed on its merits. In the case of Heathrow, we recognise that the effect of aircraft noise is one of the challenges. If Heathrow is to grow, a comprehensive package of measures to tackle noise will need to be put forward at the appropriate time. Before the Airports Commission reports in the summer of 2015, we will need to be able to demonstrate that Heathrow can grow quietly. There will not be a choice between more flights or less noise – we will need to deliver both.

This document sets out an important series of steps that can be taken now to reduce aircraft noise, while safeguarding the connectivity and growth that Heathrow currently provides. We look forward to working with airlines, NATS, policy makers and local communities to deliver them.



**Colin Matthews**  
Chief Executive, Heathrow

<sup>1</sup> Based on CAA 57 decibel leq contour data presented to T5 Inquiry and supplemented by ERCD Report 1201 Noise Exposure Contours for Heathrow Airport 2011

<sup>2</sup> Department for Transport Policy Paper Aviation Policy Framework 22 March 2013

<sup>3</sup> Para 3.3, *ibid*

<sup>4</sup> Guidance Document 01: Submitting evidence and proposals to the Airports Commission, February 2013.

# 1. Executive summary

Heathrow Airport is the UK's gateway to the world and delivers significant benefits for the UK. But there are downsides too, including the impact of noise on local residents.

Heathrow is already at the forefront of international management of aircraft noise but there are further steps that Heathrow can and should take now to tackle aircraft noise. This document sets out the actions we will take to support the Government's policy objective "to limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise"<sup>5</sup> around Heathrow.



## Quieter planes

As aircraft and engine technology improve and planes become quieter, Heathrow will work to ensure that residents continue to share in the benefits of quieter aircraft.

We will:

- continue to provide a strong financial incentive for airlines to use the quietest planes currently available through the use of variable landing charges;
- publish a quarterly 'Fly Quiet' league table to benchmark how quiet individual airline fleets are and how quietly they are flown. We will set minimum performance standards and we will continue to work with airlines to improve performance and to recognise excellence; and
- continue to support the development of quieter aircraft through engagement with airlines and manufacturers in the UK and internationally.

## Quieter operating procedures

We will work with the CAA, NATS and airlines to explore and employ smarter operating procedures to reduce the noise impact of aircraft on residents.

We will:

- take full advantage of opportunities to manage airspace differently, working with local communities to identify changes that could benefit them. We will continue to trial new airspace management procedures to test the concept of providing predictable periods of respite from early morning arrivals and for some of our departure routes. We will review the results with a view to introducing the changes permanently if communities value them and they are operationally feasible;
- take steps to better understand the noise and operational impacts of ending the practice of 'westerly preference' through a study we have commissioned from NATS; and
- propose a significant increase in fines for aircraft that exceed the airport's departure noise limits at night and invest the funds in local community projects.

## Noise mitigation and land-use planning

Heathrow offers help with noise mitigation to schools and over 40,000 homes around Heathrow, for example insulating against noise by upgrading the windows in the house. In addition, we campaign for local planning authorities to do more to use their powers to tackle the issue of noise.

We will build on these efforts by:

- piloting new approaches to noise insulation during 2013, seeking to understand the local community views on these. From 2014, we plan to launch a 'Quieter Homes' programme incorporating the lessons from the pilot; and
- pressing the Government to provide guidance on planning around airports, to restrict noise sensitive development in high noise areas. Given the current absence of clear national policy, we will engage with local authorities on local planning strategy to ensure a more coherent and consistent approach.

## Operating restrictions

Improvements in technology, quieter operating procedures, noise mitigation and land-use planning all offer the prospect of important progress on noise. In addition, and where required, we will consider operating restrictions to address the problem of noise.

We will:

- tackle the local disturbance that can be caused by night flights, taking steps to reduce the number of aircraft that depart Heathrow late after 11pm at night, and to incentivise the quietest aircraft to operate early morning arrivals before 6am; and
- take steps to phase out the noisiest aircraft operating at Heathrow.

## Working with local communities

Heathrow will engage openly and constructively with local communities to understand their concerns and to provide accessible information and an on-going dialogue.

We will:

- aim to continually improve our global ranking for community engagement on aircraft noise, benchmarked by independent analysis. We will achieve this by:
  - improving our communications to provide timely, relevant information including daily web updates and the use of computer animations;
  - extending our outreach programme, running regular meetings with communities around the airport to explain how we are managing noise at Heathrow; and
  - launching a new social media service to keep people updated on unscheduled changes to operations which impact on noise.
- continue to improve the timely handling of complaints about noise from residents, building on existing investment we have made in this area.
- produce proposals for the 'independent regulation' of noise to help build trust in the management of noise at Heathrow.



<sup>5</sup> Department for Transport Policy Paper: Aviation Policy Framework 22 March 2013, Para 3.12





## 2. Introduction

### 2.1 A balanced approach to aircraft noise

Heathrow Airport is the UK's gateway to the world. By connecting the UK with overseas markets, Heathrow enables business travellers to reach customers in countries around the world. It supports trade. It attracts foreign investment into the UK. And it brings overseas visitors to our shores. As the world's leading international hub airport, Heathrow provides the UK with global connectivity – and the competitive advantage that comes with that.

But for all the benefits that Heathrow's connectivity brings, there are some downsides too. In particular, communities in the vicinity of the airport are affected by noise from aircraft arriving at or departing from Heathrow.

No operational airport is free from noise. There are steps that Heathrow can and will take to tackle aircraft noise, enhanced by an effective combination of incentives and penalties.

The challenge facing Heathrow is how we can minimise the annoyance and disturbance suffered by some local residents as a result of aircraft noise, while at the same time continuing to maximise the social and economic benefits that the airport delivers to the local community and the country as a whole.

This is not our responsibility alone. Heathrow operates within a regulatory framework set by policy makers, who have their own role to play in tackling noise. The Government's policy on noise was set out in March with the publication of the Aviation Policy Framework. We fully support this framework and regard it as a foundation on which Heathrow's actions can be based. We often go above and beyond the requirements set by Government, and are committed to working with them and with local communities to address the noise issue.

### 2.2 Meeting the noise challenge

Heathrow has already made significant progress in addressing the noise challenge. Improvements in aviation technology mean that aircraft are quieter today than they were in past decades. At the same time, Heathrow has been at the forefront of international efforts to tackle aircraft noise. The strict noise limits at Heathrow are influencing manufacturers to build quieter aircraft, and research commissioned by Heathrow shows that airlines generally use their quietest aircraft more on Heathrow routes – around 15% more<sup>6</sup>. As a result, according to the Civil Aviation Authority, the number of people affected by aviation noise at Heathrow<sup>7</sup> fell by three-fifths between 1988 and 2010, and the total area affected by noise shrank by two-thirds – even as the number of planes using the airport rose.

Nonetheless, aircraft noise remains an issue for local communities – and Heathrow is working to address it. Continued improvements in technology, quieter operating procedures, new noise controls and investment by Heathrow all offer scope for further action and further improvements.

This document sets out our approach on multiple fronts to tackling aircraft noise while safeguarding the social and economic benefits that Heathrow provides.



<sup>6</sup> Analysis conducted for Heathrow

<sup>7</sup> The population that falls within the 57 decibel leq summer noise contour





## 3. Understanding the noise challenge

### 3.1 Heathrow and the local community

Heathrow Airport is an integral part of the local community in West London and the Thames Valley. Over 76,000 people<sup>8,9</sup> are employed at Heathrow with a further 114,000 jobs<sup>9</sup> in the local community supported by the airport, representing more than one in five of all jobs in the area. Thanks to the connectivity that the airport provides, the economic landscape of the surrounding region has been reshaped, with large global employers locating their offices close to the airport, pumping investment into the region and creating jobs. Without Heathrow, the jobs, skills and investment that the airport currently supports would disappear.

Nonetheless, proximity to the world's leading international hub airport carries downsides as well as benefits. The problem of aircraft noise is real, serious, and needs to be addressed.

In this chapter, we set out the key principles for understanding the noise challenge – why it matters, and how to measure it.

### 3.2 Why aircraft noise matters

Noise can have a significant and disruptive effect on everyday life. Whether it is noise from traffic and railways, noisy neighbours, noise from bars and restaurants, or noise from aircraft, it represents a real and sometimes serious problem. It can interfere with enjoyment of leisure time, it can disrupt conversations, and it can disturb sleep. There is also evidence of a relationship between sustained exposure to high levels of road, rail and aircraft noise and effects on health.

For these reasons, and as set out in its Aviation Policy Framework, the Government researches the impact of all types of noise on local communities, and establishes appropriate forms of regulation which balance the interests of those affected by noise alongside those of the wider economy and community.

The responsibility for addressing noise rests not only with Government, but with business too. Companies whose activities generate noise have a social responsibility not just to comply with regulations on noise, but to work with the community to understand their concerns and to work hard to address them. That is why Heathrow is devoting resources and technical capabilities to better understanding the challenge of aircraft noise and to taking new steps to address it.



<sup>8,9</sup> Heathrow Related Employment – Optimal Economics September 2011



# 3. Understanding the noise challenge

## 3.3 Measuring and describing noise

Measuring noise and describing its impacts is an inherently complex process. Some individuals find noise more disruptive than others. Some types of noise have a greater impact on people than others. And the nature and severity of the impact can vary from person to person. Any attempt to define and measure noise therefore has limitations, and cannot fully capture the spectrum of personal experiences of noise. Nonetheless, seeking to quantify noise is an essential foundation stone for any effort to address the noise challenge.

Heathrow operates within a framework<sup>10</sup> agreed by governments across Europe which seeks to define common thresholds at which noise starts to become an annoyance. In setting these thresholds, European governments interpret an extensive body of research on the effects that different levels of noise can have on people.

There are many ways to describe noise. Some definitions are based on noise levels at a specific time, some are based on maximum or peak levels that people experience, and others are based on averaging noise over a defined period.

The impact of individual flights is often explained using the maximum noise level of an aircraft. However the impact of one aircraft is not the same as the impact of many. Overall noise impact is often described using an average level of noise which is presented in the form of a noise exposure contour. These contours enable the

geographic area and population exposed to particular noise levels to be reported and tracked over time.

Governments within Europe map the areas affected by noise using noise exposure contours. In this document, we refer to two different measures – Lden and Leq – which represent different approaches for defining noise exposure contours.

The UK government uses an average noise measure known as the “57 decibel summer Leq contour” which is the average noise level resulting from operations between 7am and 11pm across the summer period when airports are likely to be at their busiest. Past Government research concluded<sup>11</sup> that 57 decibels marks the threshold above which ‘significant community annoyance’ begins. We agree with the Government that “not all people within this contour will experience significant adverse effects from aircraft noise”<sup>12</sup>. We also acknowledge that this does not mean that no-one outside of this contour will consider themselves annoyed by aircraft noise.

Lden is the preferred European measure, and stands for the level of noise during the day, evening and night. The measurement includes an additional weighting for noise during the evening and at night when it can be more disturbing. Lden measures from transport and industry above an average level of 55 decibels over a 24 hour period are known as the ‘55dB Lden’. EU research<sup>13</sup> indicates that between 10-28% of the population exposed to noise levels greater than 55dB Lden contours could be ‘highly annoyed’.

## 3.4 Limitations of noise measurements

The methods for describing noise set out in section 3.3 are not perfect.

They are helpful for policy-makers who need to measure and understand average, area-wide changes in noise exposure. They also allow historic trends to be monitored – at Heathrow, for example, noise maps go back to the early 1970s. Providing “historic continuity”<sup>14</sup> is given by the Government as a reason for continuing with the 57dB Leq measure.

Understandably, however, most people struggle to understand how the concept of ‘average noise over a day’ relates to their own individual experience. Communities around Heathrow regularly feedback that these contours need to be supplemented with more meaningful information including, for example: the total number of flights over a particular location, the time of day of those flights, and the noise level of the loudest flight.

So while there is an important role for noise exposure contours, they do not represent the only word on the issue.

## 3.5 Heathrow’s approach to measuring noise impacts

In addressing the noise challenge, it is essential to balance the problem of noise alongside other important considerations such as the economic value that an airport creates. To do this, it is important to establish as robust an evidence base as possible – enabling policy makers and airport operators to make objective judgements about how best to balance competing objectives.



Nonetheless, this approach has limitations, and we must not rely on this alone. That is why we also recognise the importance of talking and listening to local communities, seeking to understand their direct experience of noise, and to ensure that our approach to noise management takes account of this.

In the next chapter, we set out the current evidence relating to Heathrow’s noise impact. In subsequent chapters, we set out how we manage noise – including how we work with local communities to understand and take account of their concerns.

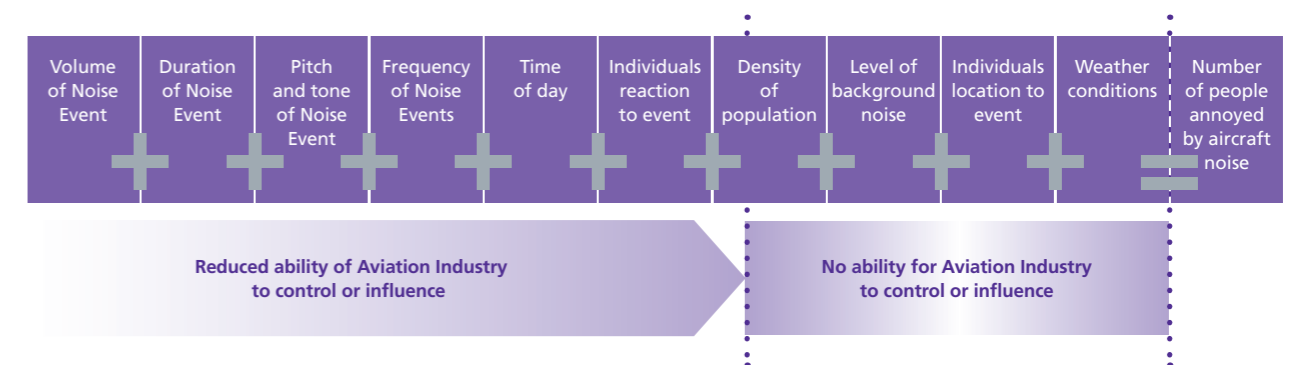


Figure 3.1 The Noise Challenge in reducing the number of people affected by aircraft noise – Sustainable Aviation Noise Road Map April 2013

<sup>12</sup> Department for Transport Policy Paper: Aviation Policy Framework 22 March 2013 Para 3.17

<sup>13</sup> EEA Technical Report no.11/2010 and Position Paper on dose response relationship between transportation noise and annoyance, European Commission Feb 2002

<sup>14</sup> Department for Transport Policy Paper: Aviation Policy Framework 22, March 2013 Para 3.15

<sup>10</sup> Environmental Noise Directive 2002/49  
<sup>11</sup> DR Report 8402 UK Aircraft Noise Index Study 1985





## 4. Heathrow's noise impact

### 4.1 Noise at Heathrow in context

Heathrow is the UK's only international hub airport, handling nearly 70 million passengers a year, and connecting the UK to 183 destinations around the world in 90 different countries<sup>15</sup>. Like other major international hubs handling millions of passengers each year, aircraft noise is a significant issue for some local residents living nearby.

In this chapter, we examine the scale of the noise challenge at Heathrow, including how it compares to other sources of noise in London, how it compares to other airports internationally, and how it is changing.

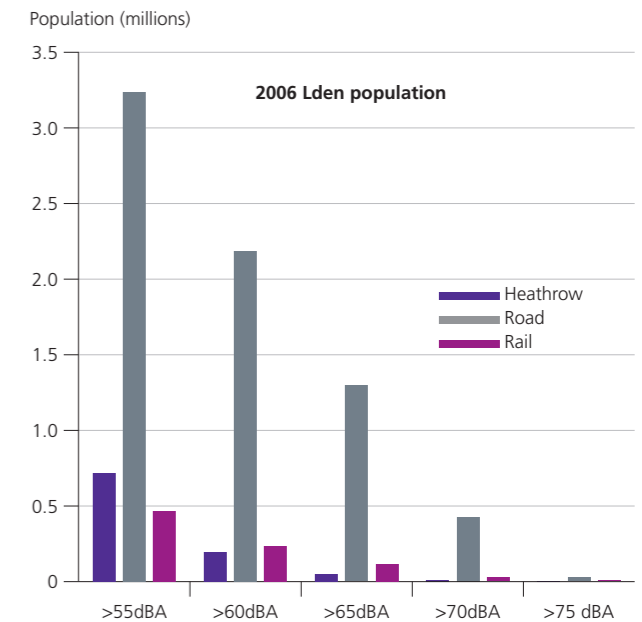
The Government asks the operators of all major airports to produce noise action plans in response to the strategic noise maps provided by the CAA<sup>16</sup>.

Figure 4.1 opposite shows the absolute number of residents exposed to noise over 55 decibels. For comparison purposes, the number of residents exposed to noise from road and rail are also shown. This shows that within London around four times as many people are exposed to traffic noise above that level as they are to aircraft noise. This is not to downplay the impacts of aircraft noise: we recognise that they are significant. However it is important to put it in context alongside the many other sources of noise that exist in any big city.

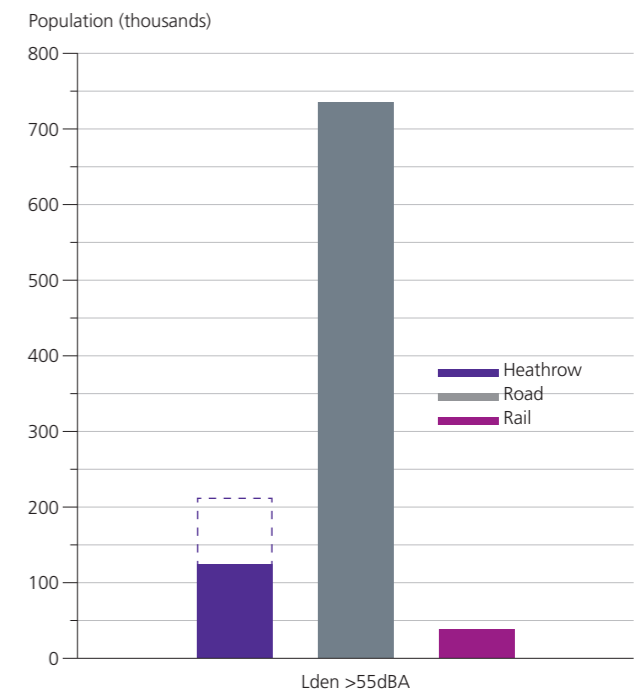
European research<sup>17</sup> shows that around 6% of people are 'highly annoyed' by road traffic at that level, while a higher proportion – between 10-28% – are highly annoyed by aircraft. This shows that noise from aircraft is seen as more disturbing. The debate as to the reasons for this is on-going but some researchers think that one reason for this is that while road traffic noise tends to be more constant and to fade into the background, aircraft noise is more noticeable at the particular moment that an aircraft passes overhead.

As noise levels increase, the percentage of the population likely to become 'highly annoyed' by noise also increases. Using the European research it is possible to calculate the total number of people that are likely to fall into this category for a given transport source. This is illustrated in figure 4.2 which shows that between three to seven times more Londoners are likely to be highly annoyed by road noise than people around Heathrow are by aircraft noise.

The latest research suggests that people's reaction to noise in general has changed in recent years. We tend to be more annoyed by a given level of noise now than we were 20 or more years ago. The Government refers to this trend in the Aviation Policy Framework although they also note that "there are still large uncertainties around the precise change in relationship between annoyance and the exposure to aircraft noise"<sup>18</sup>.



**Figure 4.1 The population within London exposed to noise above 55 decibels from different forms of transport<sup>19</sup>**



**Figure 4.2 Number of Londoners and people around Heathrow highly annoyed by noise source based on 2006 Strategic Noise Mapping<sup>20</sup>**

<sup>15</sup> Source: 2012 data from Heathrow passenger database, BOSS

<sup>16</sup> Environmental Noise (England) Regulations 2006 SI (2006) 2238

<sup>17</sup> EEA Technical Report no.11/2010

<sup>18</sup> Department for Transport Policy Paper: Aviation Policy Framework 22, March 2013 Para 3.14

<sup>19</sup> Heathrow Airport Environmental Noise Directive Noise Action Plan 2010-2015 (adopted by DEFRA in May 2011).

<sup>20</sup> Number of Londoners highly annoyed by road and rail noise compared with numbers of people around Heathrow highly annoyed by aircraft noise.



# 4. Heathrow's noise impact

## 4.2 Heathrow is getting quieter

Heathrow today is significantly quieter than it was four decades ago.

Since the early 1970s, when the jet age began, both the area and the number of people within Heathrow's noise footprint have fallen around tenfold<sup>21</sup>. This is despite the fact that during the same period the number of aircraft using Heathrow each year has nearly doubled and the number of dwellings within the footprint has also increased significantly. The fall in population within each contour has continued in recent years, as the newest generation of aircraft like the A380 'superjumbo' have started to enter service with airlines. We expect this trend to continue in future.

Figure 4.3 below shows the change in the area and population within Heathrow's 57 decibel contour (Leq) over the last four decades. As outlined in the previous section, this is the level of noise at which the UK Government has concluded<sup>22</sup> that significant community annoyance from aircraft noise starts. This does not mean that people living outside this contour are not bothered by aircraft noise. Nor does it mean that everyone living within it is. We use the Leq measure because more extensive historical data exists for Leq than the preferred Lden measure, for which Europe first agreed to start producing noise maps in 2005. Using the Lden measure, the area within that noise footprint has also fallen, by nearly 10% between 2006 and 2011<sup>23</sup>. This reflects the retirement of older aircraft and their replacement by newer, quieter aircraft.

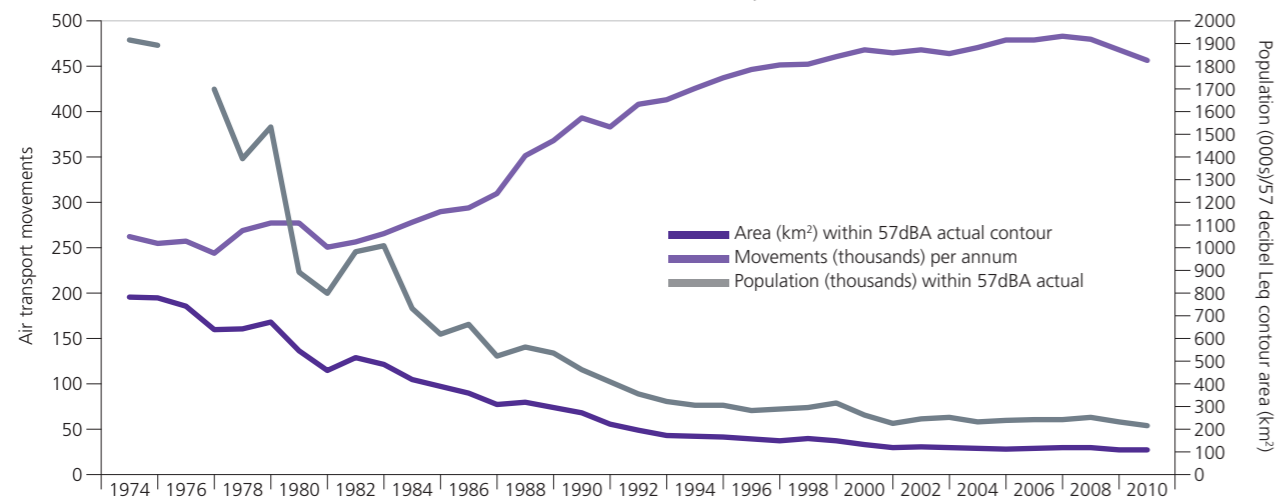


Figure 4.3 Area and population within the 57 decibel contour around Heathrow<sup>24</sup>

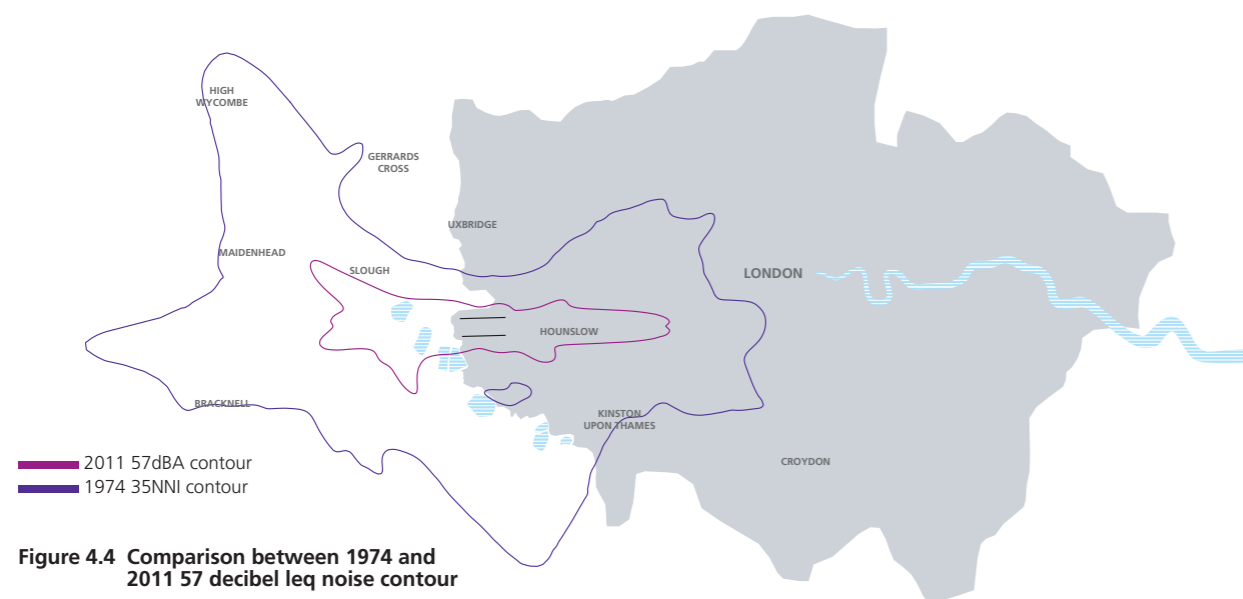


Figure 4.4 Comparison between 1974 and 2011 57 decibel leq noise contour

<sup>21</sup> Based on CAA data presented to T5 Inquiry and supplemented by ERCD Report 1201 Noise Exposure Contours for Heathrow Airport 2011  
<sup>22</sup> DR Report 8402 UK Aircraft Noise Index Study 1985

<sup>23</sup> ERCD Report 1304  
<sup>24</sup> Based on CAA data presented to T5 Inquiry and supplemented by ERCD Report 1201 Noise Exposure Contours for Heathrow Airport 2011

## 4.3 Noise at Heathrow compared with other global airports

While it has been well reported that noise from aircraft using Heathrow affect more people than any other EU airport, Heathrow is not unique around the world in being located relatively close to the centre of the city it serves. This has significant benefits for residents who are able to reach the airport quickly and conveniently, but also has downsides in terms of the number of residents exposed to aircraft noise.

The number of people affected by noise at Heathrow is very similar to large US airports like New York's JFK or Los Angeles' LAX which have developed in a similar way to Heathrow and are relatively close to their respective city centres. Figure 4.5 compares Heathrow to three major US airports, using the Federal Aviation Authority's (FAA) standard threshold of 65 dBA DNL<sup>25</sup>. DNL is an alternative way of measuring noise averaged over different times of day and night, and is the measurement preferred by the FAA. CNEL is the acronym for Community Noise Equivalent Level and is used at Los Angeles. Similar to the EU Lden metric it is calculated for a complete 24-hour period and adds a weighing of 5dB added between 7pm and 10pm and 10dB for the nighttime hours of 10pm to 7am.

While noise exposure around Heathrow is comparable to many other leading global airports, Heathrow's hub airport counterparts in Amsterdam, Frankfurt and Paris do benefit from lower levels of the population exposed to the same levels of noise. There are several different reasons for this, in addition to ones of simple geography, the location of the airport in relation to the city and to the sea, and the direction of prevailing winds. The French Government took a decision at the start of the jet age to build a new airport in a sparsely populated area outside Paris – an option that is available to the UK Government but which would have the consequences identified by the House of Commons Select Committee<sup>26</sup> i.e. it would necessitate the closure of Heathrow and result in a devastating economic impact on west London. Frankfurt's population is a tenth of that of London so it is not surprising that far fewer residents are affected by the airport. In addition, Heathrow currently has more large aircraft flying into it than any other EU airport and its accessible location mean that more residents fall within the airport's noise footprint.

Airport	Noise exposure contour	Population
Los Angeles LAX	65dBA DNL	>40,000
New York JFK	65dBA DNL	36,000
Miami MIA	65dBA DNL	38,862
London Heathrow LHR	65Lden	42,000

Figure 4.5 Population exposed to comparable noise levels around Heathrow and a selection of major US airports

## 4.4. The effect of aircraft noise on the property market

In considering the impact of aircraft noise on local communities, one important piece of evidence is the impact on property prices. During 2012, Heathrow commissioned a study from leading property consultancy CBRE to analyse house price and sales data around Heathrow and to compare this to the London-wide picture. The research<sup>27</sup> confirmed that there is little evidence that aircraft noise has a negative impact on the property market around Heathrow.

The research found that:

- recent houses prices (since 1995) in areas close to Heathrow have moved in line with overall London-wide trends;
- properties change hands around Heathrow at comparable levels to the rest of London; and
- 7 out of 10 residents in areas affected by noise have lived in their homes less than 10 years, with 1 in 3 of those less than 5 years.

Additionally CAA figures show that there are 16% more homes now than in 1991 within the 57 decibel Leq noise contour around Heathrow. It is unlikely that these properties would have been developed if there was not a market to sell or rent them.

This research demonstrates that the area around Heathrow remains popular, with little impact on the willingness of people to move into the area, nor on the ability of residents to find buyers when they choose to sell their house.

This is consistent with other research<sup>28</sup>, which shows that it is very difficult to isolate the effects of noise from the many other factors that influence price, including the general affluence of a neighbourhood, proximity to amenities and green space, and proximity to transport links. While there may be a slight negative impact on property prices close to airports, the presence of an airport can also add value, given the employment opportunities and connectivity it brings. For house prices in West London and the Thames Valley, it is likely that the benefits Heathrow brings in terms of connectivity and employment offset the impact of aircraft noise<sup>29</sup>.

<sup>25</sup> Web based research conducted by Heathrow  
<sup>26</sup> House of Commons Transport Committee, Aviation Strategy, First report of session 2013-14 Vol para 65  
<sup>27</sup> Research commissioned by Heathrow.  
<sup>28</sup> Acoustics Bulletin Volume 37, Number 6, Nov/Dec 2012  
<sup>29</sup> Research commissioned by Heathrow.





## 5. How Heathrow is tackling aircraft noise

### 5.1 Our commitments

Heathrow Airport is committed to tackling the challenge of aircraft noise, while at the same time continuing to safeguard the connectivity and economic benefits that the airport provides.

In this chapter, we outline the steps that we are already taking to address aircraft noise – highlighting the most significant commitments in our current Noise Action Plan<sup>30</sup>, and making a number of new ones.

Heathrow takes its responsibility to tackle noise seriously. It is a responsibility that we share with Government, and, where appropriate, this chapter sets our commitments in the context of the regulatory framework in which we operate.

Our commitments fall under the following five headings:

#### A. Quieter planes

As aircraft and engine technology improves and planes become quieter, we will continue to work to ensure that residents share in the benefits.

#### B. Quieter operating procedures

We will explore and employ smarter operating procedures to reduce the noise impact on residents, including providing more predictable periods of relief from aircraft noise or changes to flight approaches.

#### C. Noise mitigation and land-use planning

Over 40,000 homes around Heathrow are eligible for noise insulation, funded by Heathrow. In areas closest to the airport where residents do not feel that noise insulation offers a sufficient solution to their issues, we provide financial support for residents who wish to move. We will campaign for local planning authorities to do more to play their role in tackling noise in the planning of new buildings, including homes, schools and hospitals.

#### D. Operating restrictions

Improvements in technology, quieter operating procedures, noise mitigation and land-use planning all offer the prospect of important additional progress on noise but we will also consider operating restrictions to address the problem of noise. Where permissible, these may include restrictions on common types of aircraft at certain times.

#### E. Working with local communities

Underpinning all of our work to tackle aircraft noise, Heathrow is committed to engaging openly and constructively with local communities to understand their concerns and to provide accessible information and an on-going dialogue.



Our commitments have been developed within the framework set out in the International Civil Aviation Organisation's (ICAO) *Balanced Approach to Aircraft Noise Management*<sup>31</sup>. The first four headings above correspond to the four steps towards tackling noise which the 'balanced approach' represents as the global approach to tackling noise adopted by governments around the world in recognition of the shared challenge of noise. The UK Government recently confirmed its support for the 'balanced approach' in its Aviation Policy Framework<sup>32</sup>.

Sustainable Aviation – the UK aviation industry coalition involving UK airlines, manufacturers, airports and air traffic controllers – published a *Noise Road-Map*<sup>33</sup> in April 2013. That report sets out in detail what the UK industry has achieved to date in each area of the steps and the further changes that are likely to 2050. In this chapter, we have drawn on the detailed evidence in that report and further information can be found at [www.sustainableaviation.co.uk](http://www.sustainableaviation.co.uk)

<sup>30</sup> Heathrow Airport Environmental Noise Directive Noise Action Plan 2010-2015, December 2010

<sup>31</sup> ICAO The Balanced Approach to Aircraft Noise Management, revised 2007  
<sup>32</sup> Department for Transport Policy Paper Aviation Policy Framework 22, March 2013 Para 3.7

<sup>33</sup> Sustainable Aviation Noise Road Map April 2013



# 5. How Heathrow is tackling aircraft noise

## Quieter planes

A

### Our commitments

As aircraft and engine technology improves and planes become quieter, Heathrow will work to ensure that residents continue to share in the benefits of quieter aircraft.

We will:

- Continue to provide a strong financial incentive for airlines to use the quietest planes currently available, including in the early morning period, through the use of variable landing charges.
- Publish a regular 'Fly Quiet' league table to benchmark how quiet individual airline fleets are and how quietly they are flown. The programme will set minimum performance standards and we will continue to work with airlines to improve performance and to recognise excellence.
- Continue to support the development of quieter aircraft through engagement with airlines and manufacturers in the UK and internationally.

### A.1. Aircraft are getting quieter

Aircraft today are significantly quieter than they were in past decades. Compared with the first jet aircraft, there has been a 75% reduction in the noise people perceive<sup>34</sup>. Improvements are set to continue in future and the aviation industry has set challenging goals to continue to further reduce noise.

These changes have been delivered through improvements in aircraft – for example through the use of lighter, composite materials – but particularly through quieter engines. Engines have traditionally been the main source of noise and have improved to such a degree that when modern aircraft land the noise caused purely by the aircraft moving through the sky is almost as important as the noise produced by the engines themselves.

One of the main changes in engine technology has been the development of what are known as engines with 'higher bypass ratio' (BPR). These engines look much bigger as they use much bigger fans.

This allows them to cut the speed at which the air needs to move through the engine to move the plane forwards. As a consequence they make significantly less noise.

New aircraft entering service today like the A380 superjumbo and the Boeing 787 Dreamliner are significantly quieter than the aircraft they are replacing and continue this trend of quieter technology.

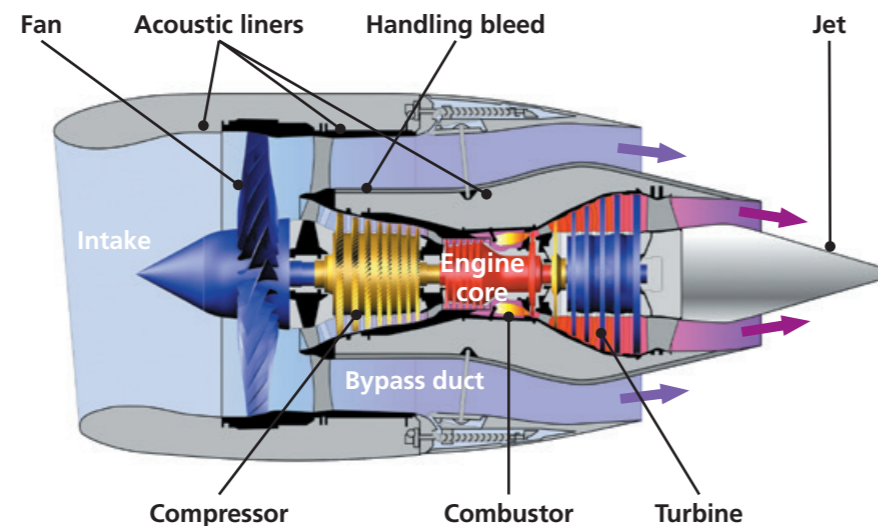


Figure A.1 Features of the Jet Engine that influence noise

### Case study: Airbus A380

The A380 sets a new benchmark in reducing aviation noise for very large aircraft. The aircraft uses a range of technologies to reduce its noise impact, including:

- increased engine bypass ratios;
- special acoustic liners in the engines;
- advances in aircraft and engine component design;
- reduced aircraft weight; and
- improved aircraft performance.

As a result, the noise footprint of the A380 is significantly reduced compared to its nearest competitor.

Heathrow has played a key role in enabling local residents to share in the reductions in aircraft noise that the A380 delivers. Following input from key airlines operating at Heathrow, the A380 was specifically designed to meet one of the quietest noise categories. Because airlines value the ability to operate at Heathrow during the day and night, and Heathrow's standards are directly driving the development of quieter aircraft.

*"The A380 generates at least 50 per cent less noise than its nearest competitor at take-off and on landing, the A380 meets the most stringent noise rules at any international airport, namely London's Heathrow airport – QC2 for departures and QC0.5 for arrivals."*

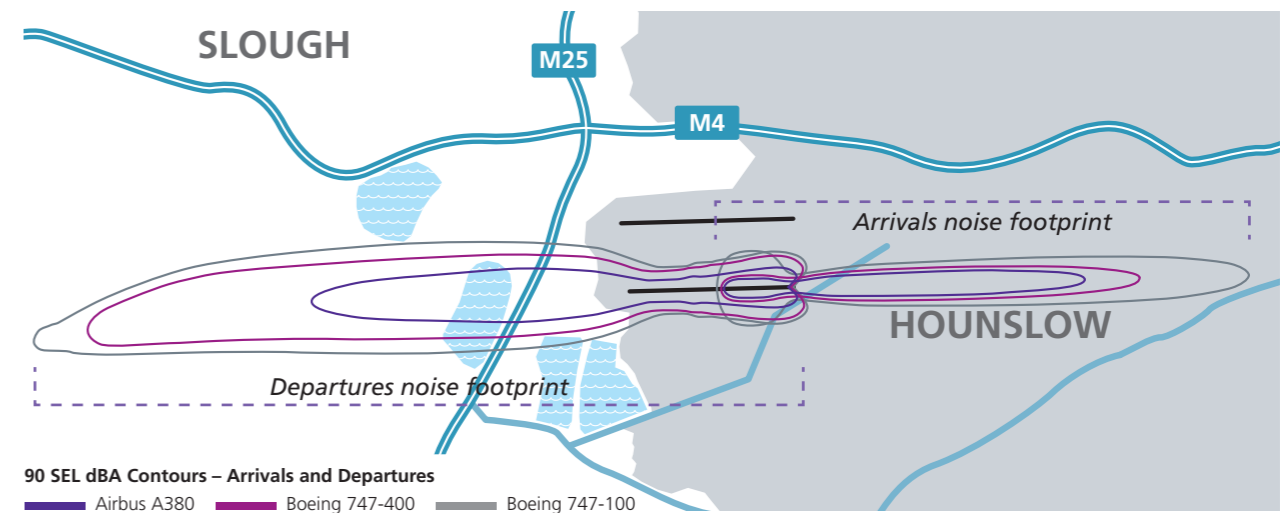


*This is of major benefit both to A380 operators who have more flexibility to operate night-time flights, and to airports, since passenger capacity will be increased while limiting the impact of noise on the surrounding communities."* Airbus

*"The noise performance of an aircraft is one of a number of important issues in conversations between Emirates and aircraft and well as engine manufacturers, with noise standards playing an important role in driving technological improvements. Our operation of five daily A380 services to London Heathrow from our hub in Dubai reflects both making the best use of available capacity and being aware of the sensitivities about noise around the airport."* Emirates

A study on operational performance of the A380 was commissioned as part of Heathrow's Noise Action Plan. The study – 'Noise Data for the First Three Years of Scheduled Airbus A380 Operations at London Heathrow Airport' – was carried out by ERCD and is available on [www.heathrowairport.com/noise](http://www.heathrowairport.com/noise) (ERCD report 1106).

### The comparative sound exposure levels (SEL) of aircraft types using Heathrow (based on the 90 decibel SEL)



<sup>34</sup> ICAO 2010 Environment Report Resulting from a reduction of 15 decibels for departing aircraft and 12 decibels for landing aircraft



## 5. How Heathrow is tackling aircraft noise

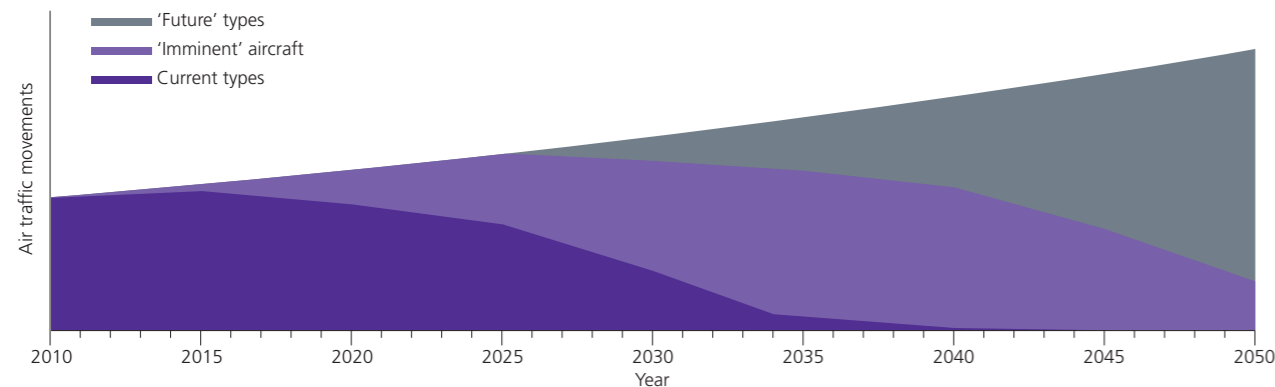


Figure A.2 Projected roll-out of new aircraft types in the UK from 2010 to 2050

### A.2. Aircraft will continue to get quieter

Improvements in technology have already delivered substantial reductions in noise from aircraft. Over the coming decades, as technology improves further, and as airlines modernise their fleets and roll out a new generation of quiet aircraft, those improvements will continue still further. The UK government plays an important role in setting the standards for new technology by influencing international negotiations at ICAO. Earlier in 2013 a new noise standard was agreed for aircraft entering service from 2017.

Sustainable Aviation's *Noise Road-Map*<sup>35</sup> shows that new aircraft will become an increasingly significant proportion of the aircraft operating at UK airports over the next 10 to 15 years.

At a European level, governments and companies like Rolls Royce and Airbus have set out a long-term vision for aviation called *Flightpath 2050*<sup>36</sup>. This sets a goal to cut the noise of new aircraft in 2050 by 65% compared to 2000.

### A.3. What we are doing at Heathrow

Tough noise management practices at Heathrow have played a key role in driving developments in quieter aircraft technology. Limits and restrictions in force at Heathrow, and in particular those that apply to flights at night, are seen by aircraft and engine manufacturers as important tests for new aircraft to meet over and above those required internationally. For example, as shown in the case study in this section, the Airbus A380 was designed specifically to fall into one of the quietest categories for aircraft operating at night at Heathrow.

Since the late 1990s, Heathrow has provided a financial incentive for airlines to use the quietest aircraft through the application of variable landing charges. Our landing fees promote the use of 'best in class' aircraft. With 96% of the aircraft now using Heathrow falling into the quietest international noise category, we updated our charging system in 2011 to further differentiate between aircraft within this category. This introduced a differential of ten times between the noisiest and quietest aircraft.

We want airlines to do still more to modernise their fleets and fly quieter planes at Heathrow. That is why, we are launching a new 'Fly Quiet Programme' this summer to benchmark how quietly different airlines fly their fleets at Heathrow. The programme will include the quarterly publishing of a league table to allow us to work with airlines and to recognise excellence and continuous improvement.

Noise limits and noise charges are not the only driver for using new technology at Heathrow: Heathrow routes are generally very competitive and attract large numbers of premium fare-paying passengers. As a result, airlines will tend to use their newest and quietest aircraft on Heathrow routes.

As a result of these factors, the aircraft that airlines use at Heathrow are on average around 15% quieter<sup>37</sup> than the total global fleets of those airlines. The deployment of A380 superjumbos is a good example of this. The A380 entered commercial service in 2007 and is significantly quieter than the Boeing 747 – 400 aircraft they often replace – despite having 25% more seats. There are more A380 services at Heathrow than at any other European hub.

### Case study: Boeing 787 Dreamliner

The Boeing 787 *Dreamliner* represents a new generation of aircraft design with regard to improving efficiency and reducing the amount of noise experienced by local communities. To achieve this, the *Dreamliner* uses a number of features, including:

- lighter aircraft design (increased uses of composites to reduce weight and improve performance);
- new engines from GE or UK-made Rolls Royce Trent 1000 engines which are 15% more efficient than the first generation Trent series that entered service in 1995;
- redesigned engine cowlings and wingtips, designed to smooth noise-making turbulent air;
- special liners and materials to absorb noise around the engine; and
- the noise footprint is some 60% smaller than today's similarly-sized aircraft, meaning the number of residents exposed to noise will be significantly reduced.

So far 66 *Dreamliners* have been ordered by UK airlines. The majority of these aircraft will be operated into and out of Heathrow in addition to others from airlines such as Qatar Airways that commenced operating Heathrow's first regular *Dreamliner* service last year.

The *Dreamliner's* innovations are being implemented in other parts of the Boeing fleet to reduce noise with the new 747-8 having adopted the engine cowling design first used on the *Dreamliner*.



<sup>35</sup> Sustainable Aviation: Road Map for Aviation April 2013

<sup>36</sup> European Commission Flightpath 2050, Europe's Vision for Aviation 2011

<sup>37</sup> Analysis conducted for Heathrow



# 5. How Heathrow is tackling aircraft noise

## Quieter operating procedures

B

### Our commitments

We will work with the CAA, NATS and airlines to explore and employ smarter operating procedures to reduce the noise impact of aircraft on residents.

We will:

- Take full advantage of opportunities to manage airspace differently, working with local communities to identify changes that could benefit them. We will continue to trial new airspace management procedures to test the concept of providing predictable periods of respite from early morning arrivals and for some of our departure routes. We will review the results with a view to introducing the changes permanently if communities value them and they are operationally feasible.
- Take steps to better understand the noise and operational impacts of ending the practice of 'westerly preference' through a study we have commissioned from NATS.
- Propose a significant increase in fines for aircraft that exceed the airport's departure noise limits at night and invest the funds in local community projects.

### B.1. Smarter operating procedures to reduce noise

Efforts to reduce the impact of aircraft noise on local communities do not depend simply on improvements in technology. How and where aircraft are flown can also make a significant difference.

Airports, airlines and air traffic controllers around the world employ many procedures to limit noise in this way – in fact the UK has been at the forefront of developing a number of these. There are three broad categories of operating procedures:

- procedures that **make individual aircraft quieter**, for example by changing the thrust settings for an aircraft
- procedures that **mean that aircraft are higher**, and therefore quieter, when they fly over communities (known as 'vertical noise mitigation')
- procedures that **route aircraft differently**, for example to avoid more populated areas or to share noise between different communities (known as 'horizontal noise mitigation').

There are trade-offs to be made with all these procedures both with noise and with emissions. For example, reducing noise in one area may increase noise for others and therefore this would need to be reviewed carefully.



### B.2. Overview of quieter operating procedures

There is a wide variety of different ways in which airports can change their operating procedures to reduce the impact of noise. The table below summarises the kinds of practices that are possible, both when aircraft are taking off and when they are landing.

	Making individual aircraft quieter	Aircraft flying higher	Routing aircraft differently
ARRIVALS	<ul style="list-style-type: none"> <li>• Low power, low drag</li> <li>• Delayed deployment of landing gear</li> <li>• Managed approach speed</li> <li>• Avoiding reverse thrust on landing</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous descents</li> <li>• Displaced threshold</li> <li>• Steeper approaches</li> <li>• Segmented steeper approaches</li> </ul>	<ul style="list-style-type: none"> <li>• Curved approaches</li> <li>• Adjusted joining point</li> <li>• Runway alternation</li> <li>• Defined Standard Arrivals Routes (STARS)</li> <li>• Runway directional preference</li> </ul>
DEPARTURES	<ul style="list-style-type: none"> <li>• Changes to how planes vary their engine thrust and/or climb profile and flap settings in order to reduce noise on departure<sup>38</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Continuous climb</li> </ul>	<ul style="list-style-type: none"> <li>• Defined standard instrument departures (SIDs)</li> <li>• Off-set SID departures</li> <li>• Runway alternation</li> <li>• Noise preferential routes (NPRs)</li> <li>• Runway directional preference</li> </ul>

Figure B.1 Summary of operational procedures

Some of these techniques, like Continuous Descent Approach, are well established. Others, such as steeper approaches, are more innovative but present operational challenges. Sustainable Aviation's Noise Road-Map concludes that, taken together, a combination of these techniques could reduce noise from landing aircraft by one to five decibels at various points along the arrivals flight path.

### B.3. What we are doing at Heathrow

Heathrow has many years' experience of applying some of these techniques, but there is more that we can do to further develop and test some of the newer, more innovative procedures, particularly related to steeper approaches and flight paths.

A range of operational practices are already used at Heathrow. Some of these have been introduced by the Government, and some are a result of voluntary initiatives by the airport, airlines and NATS working together. More recently, the aviation industry has increasingly been engaging with local community groups around the airport to involve them in trialling new procedures. The key procedures in place at Heathrow are summarised below:

- **Continuous Descent Approaches** – The use of Continuous Descent Approaches was pioneered by the UK aviation industry, with a particular focus on reducing noise at Heathrow. The approach involves aircraft maintaining a steady angle of approach when landing at the airport, as opposed to stepped approaches which involve prolonged periods of level flight. Continuous Descent Approaches reduce noise because they require less engine thrust and keep the aircraft higher for longer.
- **Runway alternation** – A number of procedures are used at Heathrow to provide local communities with periods of time without flights overhead by spreading noise around the airport in a more predictable pattern. Runway alternation is one of these. For most of the day, one of Heathrow's runways is used for landings and the other for take-offs. The runway that is being used for landings switches over half way through the day at 3pm. This means that people living under the 'final approach' that aircraft use to land at the airport will have either a morning or an afternoon/evening without planes flying overhead. Alternation was first introduced in the 1970s and is currently operated on westerly operations.
- **Noise Preferential Routes** – When planes are taking off they follow Noise Preferential Routes (NPRs). These are 3km wide tracks in the sky, designated by the Government to route aircraft away from more densely populated areas as far as possible. Heathrow, NATS and airlines have worked together to stick as closely to those routes as possible. That effort, together with ever improving navigation equipment on planes, means that Heathrow's airlines' performance in sticking to these routes is very high.

<sup>38</sup> Known as Noise Abatement Departure Procedures (NADP)



## 5. How Heathrow is tackling aircraft noise

In addition to existing techniques, we are committed to fully exploring opportunities to manage airspace differently, working alongside local communities to identify practices that could benefit them.

- **Periods of relief from noise** – During 2013 we will continue working jointly with the Heathrow Association for the Control of Aircraft Noise (HACAN) to trial new procedures that might provide predictable periods of relief from early morning arrivals noise and on some of our departure routes. (See case study below for more information).



- **Steeper approaches** – Slightly steeper approaches for arriving aircraft are another possibility. They have the advantage that planes are higher for longer and therefore potentially quieter over local communities. Following initial tests by British Airways and Airbus of the feasibility of slightly steeper approaches at Heathrow, we are currently exploring next steps. (See case study opposite for more information).
- **Displaced thresholds** – Displacing the runway threshold means moving the point that aircraft take-off or land to a point on the runway other than the physical beginning or end of it. For arrivals, moving the threshold further down the runway would keep aircraft higher for longer over built-up areas. Over the past decade a number of studies have been conducted into the feasibility of displacing the runway thresholds at Heathrow. One of the key findings is that displacement would require significant infrastructure changes to taxiways. Since any changes to taxiways may have capacity implications, a detailed study would need to be conducted. We are committed to exploring operational opportunities to reduce noise impacts. The number of complexities and costs associated with implementing displaced thresholds means that 2020 would be the earliest this measure could be implemented.

### Case study: Working with local communities to agree new aircraft routes

Flights in the early morning are a source of disturbance for many residents living in areas across London and to the west of Heathrow.

In response to these concerns, Heathrow worked with HACAN, British Airways and NATS to develop a trial to provide communities with definite periods of relief from early morning aircraft noise. This was achieved by introducing zones which were avoided by aircraft at the most sensitive time of the day.

The trial ran from November 2012 to March 2013. During this time a number of joint public meetings with HACAN were held to raise awareness of the trial and

collate feedback from residents. A full analysis of flight track data to test the impacts – both negative and positive – for particular communities as a result of this trial was carried out. We will be sharing the results with interested stakeholders and will then consider next steps.

By working collaboratively on trials like this, we can explore creative ways of providing relief from aircraft noise. Very often a relatively small adjustment in terms of the flight path can have a big impact on those living underneath it. We are continuing to work with HACAN and other resident groups to develop new trials in 2013 including exploring opportunities to route departing aircraft differently to provide periods of relief.

### Case study: Steeper approaches

The problem of aircraft noise is greatest when planes are landing or taking off – the point at which they fly closest to homes and other buildings occupied by local people. One way of tackling this is to explore ways of keeping aircraft higher for longer, reducing the noise experienced by residents. One such technique being tested is the use of steeper approaches for aircraft when landing.

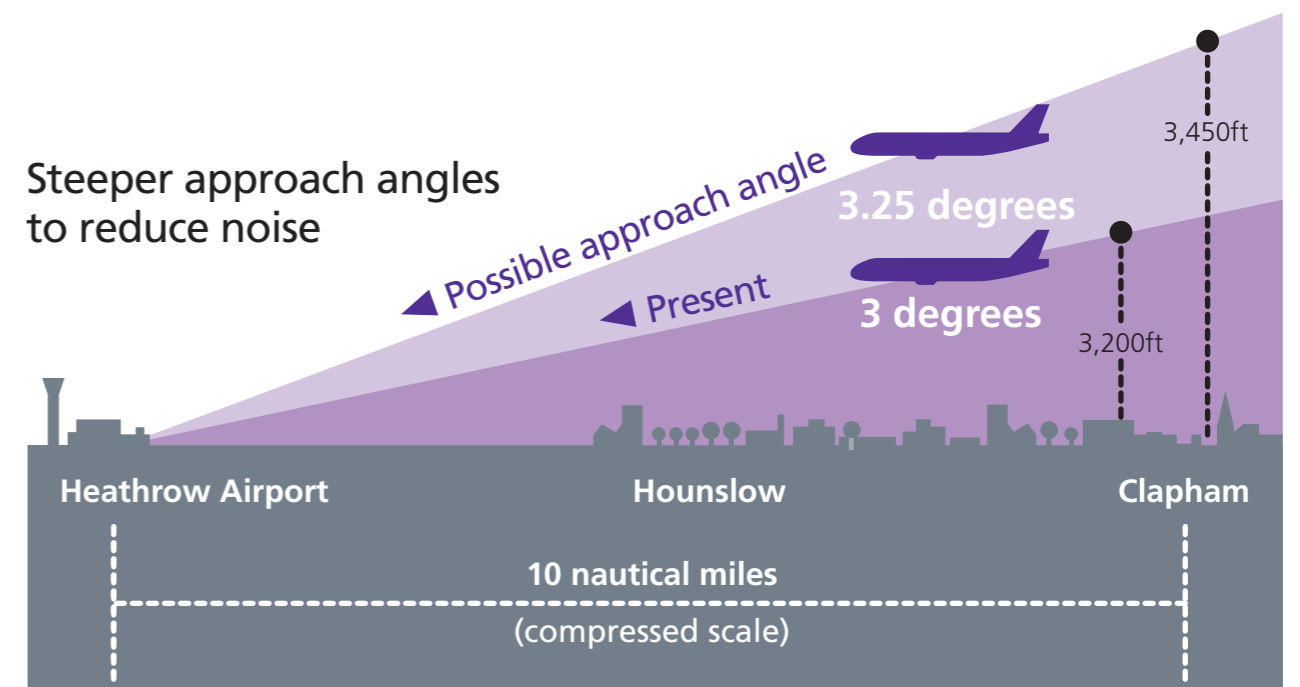
When landing, planes approach most airports at an angle of 3 degrees. Some of the steeper approaches used at other airports – for example London City – are a result of obstacle clearance requirements. These airports are used by entirely different aircraft fleet mixes which precludes the angle being used at most international airports, including Heathrow. We believe an angle of 3.25 degrees could be possible in the short to medium term and have been working closely with the industry including BA and NATS to determine the feasibility of steeper approaches. We have recommended a trial to the Government and the CAA, the organisation that ultimately would need to approve any changes, to fully assess the operational implications and changes in noise.



Evidence suggests that that some residents may benefit from reduced noise as a result of steeper approach angles, while others may experience an increase in noise due to adjustments to flap and landing gear deployment.

A trial would allow us to fully assess the potential benefits of steeper approaches.

### Steeper approach angles to reduce noise





# 5. How Heathrow is tackling aircraft noise

## Noise mitigation and land-use planning

### Our commitments

Heathrow offers help with noise mitigation to schools and over 40,000 homes around Heathrow – for example, insulating against noise by upgrading all the windows in a house. In addition, we campaign for local planning authorities to do more to use their powers to tackle issue of noise.

We will build on these efforts by:

- Piloting new approaches to noise insulation during 2013, seeking to understand the local community views on these. From 2014, we plan to launch a 'Quieter Homes' programme incorporating the lessons from the pilot.
- Pressing the Government to provide guidance on planning around airports, to restrict noise sensitive development in high noise areas. Given the current absence of clear national policy, we will engage with local authorities on local planning strategy to ensure a more coherent and consistent approach.

### C.1. The role of mitigation schemes and land-use planning in tackling aircraft noise

Despite the major cuts in noise that have been delivered by new aircraft technology and operating practices, there are still homes in the noise footprints of most major airports in the world. For residents living in these properties, mitigation schemes and land-use planning can play an important role in reducing the impact of noise – for example, through noise insulation paid for by the airport, financial assistance with relocating to 'quieter' areas or restrictions on developments like houses or schools in the noisiest areas.



### C.2. Noise mitigation schemes around the world

Most major airports around the world offer schemes to insulate houses and other public buildings like schools or hospitals that are affected by noise from the airport. Some also purchase houses in the noisiest areas close to the airport, or offer people financial assistance to move out. A few, like New York's JFK focus primarily on insulating school buildings rather than homes<sup>39</sup>.

It would be wrong to assume that aircraft noise around the world is an identical problem for different communities, or that each of these communities wants



the same remedy for noise. Many noise mitigation schemes, including those in the US and at some of the main European hubs, receive all, or a significant percentage, of their funding from national or local governments. In some countries this is funded through levies on airline tickets. In the UK, Air Passenger Duty (APD) raises £3bn a year but this is not used towards insulation schemes.

The UK Government provides guidance on the noise schemes that airports should offer<sup>40</sup>. The guidance is high-level. It specifies the noise levels above which mitigation should be offered but does not specify in detail what should be provided. Typically compensation is offered at a lower noise exposure level where people are newly affected by noise.

### C.3. International experience of land-use planning to reduce noise

Land-use planning can play a potentially important role in reducing the impact of aircraft noise by restricting certain types of developments near airports like houses and schools. But experience around the world has been mixed.

France has been one of the more successful countries. Major airports like Paris's Charles de Gaulle, the country's hub airport, produce noise exposure plans which set out clearly what type of development is permitted at different levels of noise.

Government authorities around the world have also designated many of the areas close to the airport for

business and industrial developments which are less sensitive to noise but also help to maximise the economic benefits of the airport.

Responsibility for land-use planning in the UK rests primarily with local authorities. Guidance to local authorities on residential developments close to airports has historically been provided through 'PPG24' but it has not always been well enforced. This is supported by evidence on property development around Heathrow. CAA figures show that there are 16 per cent more homes now than in 1991 within the 57 decibel leq noise contour around Heathrow. This means that the progress by the aviation industry in introducing new planes and procedures to shrink the noise contour has not been matched by progress in limiting noise sensitive developments near the airport. More people are affected by noise than would be the case if the planning system had been better enforced.

This situation is now compounded by the fact that new national guidance has been introduced which is less explicit about where development can be built. To address this, we are pressing the Government to provide guidance on planning around airports and working with local authorities to help them understand the noise implications of permitting development in certain areas. We will work with local authorities to push the development of less noise sensitive buildings – such as industrial and business parks – in areas close to the airport.

<sup>40</sup> Department for Transport Policy Paper Aviation Policy Framework 22, March 2013 Paras 3.36 - 3.41

<sup>39</sup> www.panyini.gov/airports/jfk-school-soundproofing



## 5. How Heathrow is tackling aircraft noise

### C.4. What we are doing at Heathrow

Heathrow currently offers a range of noise mitigation schemes that meet or exceed Government guidance – and we continue to examine how these might be changed to better meet the needs of the local community.

School children play inside adobe building



Our current schemes include:

- in total over 40,000 homes and 69 community buildings including schools around Heathrow are eligible for noise insulation;
- in the areas closest to the airport we offer to provide noise insulation for all the windows in a house;
- we offer financial support with the costs of moving house for residents closest to the airport, if that is what they choose;
- in areas affected primarily by noise at night, we provide insulation for bedrooms; and
- we typically offer to cover the whole cost of secondary glazing, or 50% of the cost of double glazing, at an average cost of £4,000 per household.

Our noise schemes have been introduced at different times over the last 20 years and as a result are now complex and also overlap in some areas. We recognise

there is room to improve them. During 2011, we consulted local communities on a range of possible improvements<sup>41</sup>. We also researched what noise schemes are offered by other big airports around the world. We are now piloting a new approach, described in more detail below.

### C.5. Piloting a new approach to noise mitigation

In January 2013, we launched<sup>42</sup> a pilot to test a number of new aspects of noise mitigation. We have already written to several hundred homeowners to ask if they would like to take part in the trial this year. Once we have feedback from them as to what works and what does not, we plan to launch completely new noise schemes from 2014.

The key changes that we are piloting include:

- using an expert, independent noise assessor to measure noise levels in homes and to advise on the best package of measures for that particular property;
- a sliding level of financial contribution by the airport: in the houses closest to the runways we will pay 100% of the costs, further away will pay 50% or 25%; and
- a wider choice of suppliers to install insulation and a wider choice of products.

For schools, as well as traditional double glazing provided through the Community Buildings Insulation Scheme, we are exploring ways to provide alternative solutions for schools to assist with outside learning. One approach could be the provision of 'adobe' buildings in school grounds. This has proved successful for one of Heathrow's local schools which we provided funding towards (see case study and photos on these pages) and we are looking at whether we can adopt this approach with other schools around the airport.

### C.6. Possible future approaches to noise mitigation

The most generous noise schemes in the world have been introduced as part of policy approval by Governments for new airport capacity. Similar trade-offs will need to be examined by the Airports Commission and the UK Government before any decision could be taken on expanding hub airport capacity in this country. The Aviation Policy Framework states that "any potential proposals for new airport development projects... would need to consider tailored compensation schemes"<sup>43</sup>. Heathrow accepts that if policy approval for expansion at the airport was to be granted, an enhanced noise mitigation scheme would need to be introduced.

<sup>42</sup> Quieter Homes Initiative, January 2013

<sup>43</sup> Department for Transport Policy Paper Aviation Policy Framework 22, March 2013 Para 3.40

Case study:

### Creative Solutions to Noise in Schools

#### Hounslow Heath School Adobe building

Hounslow Heath Infants' school playground is directly under the flight path of Heathrow's southern runway. The school has benefitted from Heathrow's scheme to insulate and ventilate classrooms. However children playing or being taught lessons outside can regularly be disturbed by aircraft coming into land at the airport. The Headteacher was keen to find a solution that would enable outside learning without the interruption from aircraft. In response, the school has had a series of igloo-like adobe buildings constructed in their grounds which Heathrow helped to finance.

Adobe buildings are an invention of Californian architect Nader Khalili developed in 1984 in response to a NASA call for designs for human settlements on the Moon and Mars. They are often used to provide emergency shelters but the benefits have spread further afield. The structure,

which is made from long tubes filled with soil, gives a sense of being outside because it has no doors but reduces the noise from overhead aircraft significantly. Inside the main dome, classes of up to 30 can be seated, and supports the delivery of the school's new Earth Curriculum, which is based on real learning experiences, mainly in the outdoor learning environment.

Headteacher Kathryn Harper-Quinn said "We are delighted with the impact adobe buildings are having on the types of learning experiences we can now provide for the children outside. They reduce the impact of the aircraft noise by allowing children and staff to be heard during outdoor lessons and provide protection for the children during playtimes."

Heathrow is looking at how it could adopt this approach with other schools around Heathrow.

Adobe building at Hounslow Heath Infants' school





## 5. How Heathrow is tackling aircraft noise

### Operating restrictions

# D

#### Our commitments

**Improvements in technology, quieter operating procedures, noise mitigation and land-use planning all offer the prospect of important progress on noise. In addition, and where required, we will consider operating restrictions to address the problem of noise.**

We will:

- Tackle the local disturbance that can be caused by night flights, taking steps to reduce the number of aircraft that depart Heathrow late after 11pm at night, and to incentivise airlines to operate the quietest aircraft for early morning arrivals before 6am.
- Take steps to phase out the noisiest aircraft<sup>44</sup> operating at Heathrow.

#### D.1. The role for operating restrictions

Taken together, improvements in technology, quieter operating procedures, noise mitigation schemes and land-use planning all make an important contribution to tackling aircraft noise. And as technology improves, and innovative new operational procedures are developed, the issue of noise will be addressed still further.

Nonetheless, these steps can never eliminate noise entirely. In instances where those steps have been exhausted, and where noise remains a significant problem for local communities, there is a role for operating restrictions.

In considering the role for operating restrictions, it is important to balance the potential for reduced noise against the benefits to the wider economy and community provided by aviation connectivity and jobs. It is entirely appropriate that this balance is decided upon by Government.



#### D.2. Night flights

Around the world, operating restrictions are most frequently used when the risk of disturbance is highest – during the night, and during the late evening and early morning. Flights at these times are especially controversial because of their potential impact on sleep.

To address residents' concerns, the Government consults on night flights every five years and determines how many aircraft are allowed between 11.30pm and 6am at Heathrow, Gatwick and Stansted. It also determines how quiet these aircraft need to be. At Heathrow, the current limits allow 5800 movements per year<sup>45</sup>.

Around 80% of these flights at Heathrow are between 4.30am and 6am, with on average around 16 aircraft arriving each day between those hours<sup>46</sup>. All of these services are long haul and around half of them are from South East Asia where the time difference makes this a very attractive arrival time for business people wanting to



<sup>44</sup> Known as 'Marginally Compliant Chapter 3 Aircraft'.

<sup>45</sup> Department for Transport Night Flying Restrictions at Heathrow, Gatwick and Stansted March 2012

<sup>46</sup> Source: 2012 data from Heathrow passenger database, BOSS

work the next day, and also for onward connections. Early morning long-haul arrivals are an important part of operations at an international hub airport like Heathrow.

These flights are important for airlines and for the UK economy to connect to an increasingly important part of the globe. In a 2011 study for Heathrow and British Airways, Oxford Economics calculated that flights between 11.30pm and 6am generated £342m of economic<sup>47</sup> benefit annually for the UK economy and sustained 6,600 jobs.

We believe that the current night flights regime is satisfactory and in our response to the Government's Night Flights Consultation in April 2013 Heathrow has recommended that the current limits remain unchanged pending the outcome of the Airport's Commission's work.

A further issue is late running departures at the end of the day, after the last flight is scheduled to depart at 10.40pm. If an aircraft is delayed for operational or technical reasons and needs to leave after 11.30pm, it must request specific permission from the airport and explain why. On average, in 2012 55 flights per month left after 11.30pm. When there is widespread disruption, for example when the weather is very bad, the Government can choose to allow more flights to leave after 11.30pm. During 2012, 25 night flights were given Government dispensation.

#### D.3. What we are doing at Heathrow

At Heathrow, we recognise that for all the benefits to Heathrow's connectivity that these flights bring, aircraft noise generated by early morning or late-running flights can be very disruptive for local communities.

Heathrow has already taken a number of steps to reduce and mitigate the impacts of night flights, balancing these against the social and economic benefits that night flights offer, but we recognise there is more we can do. We are therefore committed to taking steps to make them as quiet as possible.

Heathrow has a voluntary ban in place for arrivals scheduled to land between 4.30am and 6am, not to touch down before 4.30am. In addition departures are not scheduled between 11pm and 6am.

Heathrow has some of the toughest noise restrictions in the world, which have resulted in important benefits for residents in terms of reduced noise. For example, aircraft flying in and out of Heathrow are on average 15% quieter than the other planes flying in the fleets of the same airlines which land at other world airports.



As a result of the rules and incentives in place at Heathrow, airlines are increasingly using their newest and quietest planes on early morning routes. For example, Qantas, Singapore Airlines and Malaysian Airlines have all replaced their noisier Boeing 747 – 400s with the A380 that has a 40% smaller noise footprint. Cathay Pacific has also changed to quieter Boeing 777 aircraft. British Airways will start to take delivery of A380s from summer 2013 and we expect some of those to be used on its early morning flights. The use of quieter aircraft at night means the average noise per night movement has already fallen by 20% and this trend is set to continue. We will continue to use landing charges to provide an additional incentive for the use of the quietest planes at night.

To tackle late-running departures, we are focused on working with our airline customers and air traffic control to reduce delays at the airport and to reduce the numbers of aircraft that leave late at the end of the day.

We are seeking a voluntary ban of the noisiest aircraft operating at Heathrow (known as Marginally Compliant Aircraft). Working with the airlines our ambition is to stop the operation of these by 2015. If this cannot be achieved through voluntary means, an option is to formally ban these under EU Directive 2002/30. However this route is lengthy and would take at least five years to achieve.

To provide relief from early morning arrival noise, we worked with HACAN on trials for new operational practices for different areas in London<sup>48</sup>. We will also provide greater predictability on relief by working with NATS and airlines on improving adherence to the published runway usage schedule for early morning flights.

<sup>47</sup> The Economic Value of Night Flights, Oxford Economics 2011

<sup>48</sup> Early Morning Noise Respite Trail November 2012-March 2013



## 5. How Heathrow is tackling aircraft noise

### Working with local communities

# E

#### Our commitments

**Heathrow will engage openly and constructively with local communities to understand their concerns and to provide accessible information and an on-going dialogue.**

We will:

- Aim to continually improve our global ranking for community engagement on aircraft noise, benchmarked by independent analysis. We will achieve this by:
  - improving our communications to provide timely, relevant information including daily web updates, and the use of computer animations;
  - extending our outreach programme, running regular meetings with communities around the airport to explain how we are managing noise at Heathrow; and
- launching a new social media service to keep people updated on unscheduled changes to operations which impact on noise.
- Continue to improve the timely handling of complaints about noise from residents via the dedicated inquiry line, building on existing investment we have made in this area.
- Produce proposals for the 'independent regulation' of noise to help build trust in the management of noise at Heathrow.

#### E.1. Why talking and listening to residents matters

For communities affected by aircraft noise, effective engagement with the airport operator is an essential component of tackling the problem – helping communities to understand the challenge of aircraft noise better and what is being done to address it, and providing residents with the opportunity to actively shape the policies and procedures that are put in place to tackle it.

In its Aviation Policy Framework, the Government emphasises the importance of collaboration between the aviation industry and local stakeholders. Heathrow agrees that local stakeholders have the experience and expertise to identify solutions tailored to their specific circumstances and endorses the Government's view that "good relations depends on local people feeling that engagement processes are effective, that noise impact data are credible and accessible and that the airport is honest about its local impacts and is willing to challenge its own performance"<sup>49</sup>.

In talking and listening to our local residents, Heathrow needs to achieve the following things:

- **Accessible communications** – Talking and listening to residents means that communities must have access to good quality information in order that they can

understand the patterns of aircraft noise in their local area, what is being done to tackle it, and how they can seek support. It is a source of considerable frustration for residents when information about noise is poorly communicated or inaccessible.

- **The opportunity to shape noise management** – It is important for local communities not only to have access to information about noise, but also to have the opportunity to shape how it is managed. There is a wide variety of different policies and procedures that can be adopted to manage aircraft noise, each of which affects local communities in different ways. Communities are entitled to be consulted on the choices that are made in managing noise, and airport operators and Government should take account of community views when deciding on the optimal approach to noise management.
- **Effective handling of complaints** – Where residents are adversely affected by noise, they are entitled to raise their complaint directly with the airport, and to have it handled quickly and professionally. This is important not only because residents are entitled to have their voices heard, but also because complaints monitoring provides airports with important insight into community concerns which can be used to inform noise management policies.

#### E.2. What we are doing at Heathrow

Heathrow is committed to engaging openly and constructively with local communities to understand their concerns and to provide accessible information and an on-going dialogue. We have been actively working with local communities for many years, leading to a number of changes in our approach to managing noise around the airport. But, we recognise that there is more we can do to improve this work.



We aim to continually improve our global ranking for community engagement on aircraft noise, benchmarked by independent analysis. We are currently taking a number of steps to achieve this including:

- **Accessible communications**

- Making a number of significant improvements to how we communicate with communities in the most accessible way possible, in particular by improving how we use our website;
- Launching a new "My Neighbourhood" section on the website which we will launch in 2013, and will supplement our existing system called Webtrak. "My Neighbourhood" will enable the public to find out what air traffic is like in the vicinity of their home, how noise has changed over time, what noise levels they can expect, how it changes during the day/week, and respite times;
- Overhauling our website content, making better use of graphics and animation to provide accessible, simple and engaging information; and
- Launching a new social media service to keep people updated on unscheduled changes to operations which impact on noise.

- **The opportunity to shape noise management**

- Continuing to consult with local communities in order to better understand their concerns about noise and to provide them with the opportunity to shape the decisions we make on noise management;
- Holding more regular engagement meetings with residents and local stakeholders, including airport tours with the opportunity to meet staff working on noise management; and
- Working collaboratively with groups representing local residents to enable local residents to provide more input into the way we manage noise. For example, we have recently worked with HACAN on our early morning arrivals trial in order to look jointly at solutions to the noise issue.

- **Effective handling of complaints**

- Improving our process for handling noise complaints. Our target is to respond to at least 95% of all enquiries within five working days of receipt, and we are taking steps to bring our complaints handling up to this standard. Our ambition is to provide residents with a personal service that is quick, friendly and helpful, with transparency on how people can get in touch with us and the service they can expect from a dedicated inquiry and complaints team.

We recognise that we need to do more to give communities confidence that we are managing aircraft noise in the most effective way possible. While our efforts to improve how we engage with communities represent an important component in building trust, we also understand that residents value an independent voice in managing and measuring noise. To assist this, we will produce proposals for consideration by policy makers for a new system of independent regulation of noise to help build trust in the management of noise at Heathrow.



<sup>49</sup> Department for Transport Policy Paper Aviation Policy Framework 22, March 2013 Para 4.10



## 6. Glossary of terms

**Airbus A320** – Small two engine aircraft, predominantly used for short-haul domestic and European flights. Typically carries 120-130 passengers.

**Airbus A380** – Large four engine aircraft, used for long haul and intercontinental travel. The largest passenger aircraft in service. Typically carries more than 500 passengers.

**Airports Commission** – Set up by the Government in 2012 as a means of deciding the future of airport capacity in the South East of England. The Commission has been tasked with discovering if capacity is needed, and if it is needed, where that capacity should go. The Commission is made up of seven members, chaired by Sir Howard Davies.

**Balanced Approach** – This initiative has been agreed by governments globally and is an approach to aircraft noise that takes into account the needs and requirements of residents as well as the interests of the aviation industry.

**Boeing 747** – Large four engine aircraft, used for long haul and intercontinental travel, nicknamed the 'jumbo jet'. Typically carries between 300-400 passengers.

**Boeing 777** – Large two engine aircraft, used for long haul and intercontinental travel. Typically carries 300-400 passengers.

**Boeing 787** – The newest aircraft to be operated at Heathrow. Medium sized two engine aircraft, which is 60% quieter than the aircraft that it replaces. A very long range aircraft, it carries around 250 passengers.

**Civil Aviation Authority** – The CAA is the regulatory authority for aviation in the UK, creating and enforcing rules and regulations for aircraft, airports and airlines.

**Decibel** – A unit of measurement for sound and noise.

**DNL** – DNL is a way of displaying noise average over a period. DNL represents noise over a 24 hour period giving a day and night measurement.

**Engine bypass ratio** – the ratio of the amount of air that passes around the outside of the combustion chambers of an aircraft gas turbine to that passing through them.

**Heathrow Association for the Control of Aircraft Noise (HACAN)** – is a campaigning organisation which represents people living under Heathrow flight paths, highlighting concerns about issues such as noise and pollution.

**Hub airport** – A hub airport is an airport where local passengers combine with transfer passengers to allow airlines to operate flights to destinations that could not be supported by local demand alone.

**Lden** – Lden is the preferred European measure of noise, and stands for the level of noise during the day, evening and night. The day, evening, night level, Lden is a logarithmic composite of the Lday, Levening, and Lnight levels but with 5dB(A) being added to the Levening value and 10dB(A) being added to the Lnight value.

**NATS** – The primary air traffic control provider in the UK. Before being privatised, the organisation was known as National Air Traffic Services.

**Noise exposure contours** – A noise contour is a line on a map that represents equal levels of noise exposure. Aircraft noise maps, which show lines joining points of equal noise, are a powerful tool for illustrating the impact of aircraft noise around airports. The Environmental Research and Consultancy Department (ERCD) of the Civil Aviation Authority developed the UK civil aircraft noise contour model, ANCON, which calculates the contours from data describing aircraft movements, routes, noise generation and sound propagation. The number of annual flights, aircraft types and flight tracks are critical inputs to the contour model.

**Noise mitigation** – A set of strategies to reduce noise pollution or to reduce the impact of that noise.

**Noise Preferential Routes (NPRs)** – Departure routes set by the Government in the 1960s. Aircraft leaving Heathrow have to follow NPRs up to an altitude of 4000 ft

**Quieter Homes programme** – Pilot scheme that will run throughout 2013. Under the pilot, residents are offered customised noise insulation plans based on an assessment by an independent noise appraisal expert. A wider range of products and suppliers has been offered.

**Runway alternation** – At Heathrow during periods of westerly operations, one runway is used by landing aircraft between 7am and 3pm and the other for departures. Arrivals and departures then switch to the other runway from 3pm to the last departure. The pattern alternates on a weekly basis. For example one week, flights will land on the southern runway in the morning and the northern runway in the afternoon. The following week flights will land on the northern runway in the morning and the southern runway in the afternoon. There is also a runway alternation pattern for flights during the night.

**Sound Exposure Level (SEL)** – The level generated by a single aircraft at the monitoring point. This normalised to a 1 second burst of sound and takes account of the duration of the sound as well as its intensity.

**Summer Leq** – equivalent sound level of aircraft noise in dBA, often called equivalent continuous sound level. For conventional historical contours this is based on the daily average movements that take place in the 16 hour period (0700- 2300 LT) during the 92 day period 16 June to 15 September inclusive.

**Variable landing charges** – Heathrow's landing charges are varied according to how noisy aircraft are. This is to encourage airlines to use their quietest aircraft. For example, the noisiest type of aircraft operating at Heathrow pay ten times more than the quietest aircraft.

**Westerly preference** – Usually aircraft land and take-off into the wind. A westerly preference is operated at Heathrow which means that during periods of light easterly winds (up to 5 knots), aircraft will often continue to land in a westerly direction making their final approach over London. The westerly preference was introduced in the 1960s to reduce numbers of aircraft taking off in an easterly direction over London, i.e. over the most heavily populated side of the airport.