

SASIG RESPONSE

AIRPORTS COMMISSION DISCUSSION PAPER - ‘NOISE’

Introduction

- 1 SASIG – the Strategic Aviation Special Interest Group of the Local Government Association – represents its membership of Local Authorities with an interest in strategic aviation issues.
- 2 These Local Authorities neighbour or contain an airport, forming the only major alliance in the country that brings together communities comprising airport users and non-users, airport and airline staff, and encompassing all political parties. This gives SASIG an authoritative voice on airport policy that no other group can claim.
- 3 SASIG welcomes this opportunity to respond to the Airports Commission’s Discussion Paper (No. 5) – ‘Noise’. This submission follows the headings used in the Discussion Paper; the questions posed by the Commission are detailed at **Annex A (pg.13)** where those that are addressed in this response are indicated.

Executive Summary

- 4 As set out in submissions SASIG has already supplied to the Commission, assessment of existing, and any new, aviation capacity must be predicated on an improved economic assessment such that a comprehensive, agreed methodology for calculating the economic value – in its fullest context, yields robust output for capturing the assessed economic gain.
- 5 In the context of aviation noise, such an improved economic methodology would inform the extent to which economic benefits can be maximised as it would have taken account of:
 - compulsory purchase of properties, along with the associated loss of community;
 - opportunity costs of sterilised land, i.e. reduced or zero development potential due to noise impacts;
 - mitigation & compensation payments for noise impacts; and
 - social cost of noise-induced health and welfare impacts.
- 6 This makes aviation noise impacts an integral element of looking at the UK aviation industry – not an after-thought to simply be dealt with through mitigation and compensation.
- 7 A greater understanding of the community response to aviation noise is an essential prerequisite for an improved aviation noise management and reduction regime. We recommend that the Government resource annual studies in order to inform, educate, advise and report this relationship, supplying robust annual surveys capable of supporting policy-making.

- 8 In this context, the 'Government' should at least include the Department for Transport (DfT), Department for Environment, Food & Rural Affairs (Defra), Department for Communities and Local Government (DCLG) and Department of Health (DoH). In addition, an appropriate way in which to involve the Research Councils and academic institutions should be considered.
- 9 At minimum, liaison with other Government Departments – Business, Innovation & Skills (BIS), Department of Work & Pensions (DWP) and HM Treasury (HMT) - is needed on the social and economic costs of aviation noise.
- 10 The metrics used to describe noise impacts on which noise management policy is founded must more accurately cover the affected populations, and illustrate the burden of aircraft noise. SASIG welcomes acceptance by the Government and the Commission that more people are annoyed by lower levels of aircraft noise than was previously understood to be the case.¹
- 11 Noise representation and analysis must be based on use of the ‘worst mode’ operations, as people hear each individual event and reply when questioned about their response to noise on the basis of the most disturbing, intrusive, disruptive events. Beneficial features such as regular, predictable periods of respite, operational techniques such as alternation of runway usage, etc. are valuable; however, they do not adequately address the negative impacts on people of aviation noise exposure.
- 12 Additional research is supplied for the Commission that shows the way in which levels of aircraft noise annoyance are underestimated by the current assessment process for airspace change processes; and the aims of the Government’s social response project, ANASE, that remain unaddressed.
- 13 Additional research is also supplied in the form of a recently published paper that may be valuable for progressing the debate about the monetisation of noise impacts, as well as showing how the ANASE study assists with this.
- 14 The advantage of LAeq noise contours in terms of the ability to make historical comparisons should not be lost, i.e. data for LAeq contours should continue to be collected and presented.
- 15 However, the 57dB LAeq metric should have reduced prominence in policy-making on the basis of the acceptance that more people are annoyed by aviation noise at lower noise levels than was previously understood¹, and the fact that people do not experience noise in an averaged manner.
- 16 Additional metrics and means of illustration should be applied in policy-making. For instance, ‘number above’, ‘frequency’ and ‘location specific’ measurements are useful as they reflect the fact that the number of flights is a factor in the annoyance response of the population affected adversely by aviation noise, along with a means of illustrating the aviation noise burden at given locations.

¹ ‘Draft Aviation Policy Framework’ (DAPF), July 2012, Annex D - par.s D.5 & D.6, pg. 91 & 92.
‘Aviation Policy Framework’ (APF), March 2013, par. 3.14, pg.57, par.s 3.17 & 3.19, pg.58.
Airports Commission Discussion Paper – ‘Noise’, July 2013, par. 3.47, pg. 27, par.4.16, pg.33.

- 17 Alongside improving description and presentation of aviation noise, incentives and disincentives must be improved and applied in the form of higher landing charges, and more generous mitigation and compensation schemes.
- 18 ‘Noise efficiency’ scores should not be used in the noise debate. These scores could be used to compare activity at different airports, however, they do not inform comparisons of noise burden because: (i) they are based on the flawed 57dB LAeq metric; (ii) they incorporate numbers of passengers, which varies with load factor and type of aircraft but does not accurately represent numbers of flights, which is the vital element; and (iii) they do not take into account either the population spread, nor the ambient noise levels, around an airport – both important considerations when assessing aviation noise.
- 19 Although omitted from the Discussion Paper, ground noise – i.e. on-airport noise such as engine testing, is a specific element of aviation noise requiring appropriate measures to reduce its burden.
- 20 Flightpaths should not be moved from the existing noise preferential routes (NPRs) without full consultation of the communities affected. Whether concentration on specific paths within NPRs or dispersal routes across NPRs is preferable will vary between airport locations and between NPRs. These operational measures should be determined locally, for each airport, in accordance with the communities affected. It must be recognised that different policies will be needed at different airports.
- 21 Where there is local preference for any particular system, the providers of air traffic control and airspace management should be required to facilitate implementation.
- 22 An effective ‘noise envelope’ is one that reduces actual noise impacts, thus any application of this concept must be in a manner that reduces the actual noise burden experienced by communities, not simply in a manner that tracks upwards with increasing activity in the absence of a meaningful improvement in the noise climate.
- 23 Another issue omitted from the Discussion Paper is that of noise from helicopters, despite the need for tailored regulation and policy: statutory noise controls; bespoke modelling, covering the affected populations; UK-wide monitoring; incentives to phase out ‘noisier’ helicopters; and local regulations to be established through heliport consultative groups to reduce impacts on communities.
- 24 Ultimately, where clear gaps have been identified in the evidence needed to inform policy-making, not only should these gaps be filled, but in the meantime there should be a presumption in favour of the precautionary approach, applied relevant to each situation, in order to account for this lack of information.

Glossary

dB(A)	‘A’ weighted decibel – decibel being a measure of sound pressure. The weighting is a system of adjustment applied to sound of different frequencies to take account of the way the sensitivity of the human ear varies with sound frequency.
L _{Aeq, 16h}	A measure of long-term, average noise exposure, shorthand for ‘equivalent continuous noise level’; measured during a 16-hour ‘day’, 07:00 to 23:00. In relation to aircraft noise, it is the level of a steady sound which, if heard continuously over a particular period of time, would contain the same total sound energy as all the aircraft noise events over that same time period.
L _{Amax}	The simplest measure of a noise event such as the over-flight of an aircraft is the maximum sound level that occurred during the event, measured in decibels (dB(A)). As the name implies, it is the highest sound level that occurred during the over-flight. The greater the value, the greater the risk of disturbance or intrusion.
L _{den}	A weighted average of sound levels during the day, evening and night (defined in European Directive 2002/49/EC - ‘Environmental Noise Directive’ (END)).

Further research

- 25 In response to the Commission’s invitation for additional evidence or research that should be taken account of, SASIG recommends use of

- ‘New evidence on aircraft noise annoyance’²;

and draws the Commission’s attention to a recently published paper:

- ‘A comparison of hedonic price and stated preference methods to derive monetary values for aircraft noise disturbance and annoyance’³;

‘New evidence on aircraft noise annoyance’

- 26 “This paper presents evidence that there is a useful correlation between the aircraft annoyance studies reported in ... European Environment Agency (EEA) report and the UK Government’s ANASE study. Both sets of studies have found a significant shift in that aircraft noise now causes annoyance at lower levels than it did previously.”² (pg.1)
- 27 It is encouraging to see the Commission’s acceptance¹ of this finding, however, more needs to be done to embed this in aviation policy.

² ‘New evidence on aircraft noise annoyance’, Oct. 2011, Mike Rickaby, Environmental Protection Officer, Hillingdon LB.

European Environment Agency (2010) ‘Good practice guide on noise exposure and potential health effects’, EEA Technical Report No11/2010.

ANASE: ‘Attitudes to Noise from Aviation Sources in England’, Department for Transport (DfT), 2007.

³ ‘A comparison of hedonic price and stated preference methods to derive monetary values for aircraft noise disturbance and annoyance’, Blanco Matos, Joan Carles; Flindell, Ian; Le Masurier, Paul; and Pownall, Chris (2013), Transportation Research Part D Transport and Environment, vol. 20, pg.40-47.

- 28 Up to date social response data relating to aviation noise annoyance is needed in order to reflect current public attitudes; aircraft fleet mixes; aircraft noise characteristics; and quantity, time of day - and night, altitude, predictability and frequency of flights.
- 29 The analysis in this additional paper makes use of the European Environment Agency's 'Good practice guide on noise exposure and potential health effects'² – a technical report produced to assist policy makers and competent authorities understand and fulfil the action planning requirements of the 'Environmental Noise Directive' (END; 2002/49/EC).
- 30 EU and UK aircraft noise annoyance models are compared, using the L_{DEN} metric. This comparison illustrates:
- the way in which levels of aircraft noise annoyance are underestimated by the current assessment process for airspace change proposals (CAP 725)⁴; and
 - the similarity in conclusion of studies carried out in Europe since 1990 and ANASE² – that more people are more annoyed by lower levels of aircraft noise than previously.
- 31 ANASE, along with the post-1990 European studies covered in the EEA Good Practice Guide, support policy-making on the basis that the onset of community annoyance is at lower noise levels than currently applied in policy.
- 32 The paper also concludes that further objectives of the ANASE² study remain to be addressed: the suitability of LAeq, 16h as an indicator of community annoyance; the importance of the quantity of flights; the relative importance of different times of day; and determining willingness to pay to reduce annoyance from aircraft noise.

'A comparison of hedonic price and stated preference methods to derive monetary values for aircraft noise disturbance and annoyance'

- 33 The Commission is also alerted to this paper that may well have been published since the Commission's 'Noise' Discussion Paper, for consideration to determine its value in terms of monetising aircraft noise disturbance and annoyance.

Description/abstract: "This paper compares the hedonic prices and stated preference methods for determining monetary values of aircraft noise disturbance and annoyance used in cost-benefit analyses of proposed development. The data suggests that neither method is entirely satisfactory on its own, but there are strong positive correlations between the two methods suggesting sufficient underlying similarities to justify the use of combined methods in the future. These findings are important because the two methods normally yield different results in absolute terms and economists have consequently and un-necessarily been constrained to choose between them."

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⁴ CAP725: Civil Aviation Authority (CAA) 'Guidance on the application of the airspace change process', 2007.

- 34 Due to this paper having been recently published, it has not yet been fully appraised. However, we understand this paper sets out how ‘stated preference’ valuations derived in ANASE are of use in the context within which the study questions were asked, and proposes areas for further research to continue to move the debate forward.

Monetising noise impacts

- 35 In support of moving the debate forward, SASIG commends the monetisation of noise impacts as this is necessary for a comprehensive, robust analysis of aviation developments, to capture the greatest economic gain in light of having fully evaluated the associated costs and benefits.
- 36 Greater use of social-cost benefit analysis (SCBA) and social return on investment (SROI) evaluations will help development in the field of monetising noise impacts.
- 37 SASIG calls upon the Airports Commission to embed an improved economic assessment of aviation that incorporates the community costs – social, economic, and environmental - of aviation noise impacts.

Developing application of noise metrics in policy-making

- 38 The Commission has recognised the need to address uncertainties in the relationship between annoyance and exposure to aircraft noise; our comments on the measures set out in the Discussion Paper are supplied below.

Alternative measures for noise exposure

Equivalent Continuous Sound Level - LAeq

- 39 Although the Government stated in its Aviation Policy Framework that the flawed 57 dB LAeq, 16h will be retained for the purpose of marking the daytime onset of significant community annoyance, SASIG considers this flawed metric should only be retained for the purpose of historical comparisons, and that we move actively away from this policy approach.
- 40 It is disingenuous to use this flawed metric in comparisons suggesting that affected populations are experiencing an adequately improved noise climate on the basis that over time the ground areas covered by the contour, and thus the numbers of people in those areas, have decreased. Since the affected populations are not wholly represented by the area enclosed in the 57 dB LAeq, 16h contour, the affected populations are cannot be said to be experiencing an adequately improved noise climate.
- 41 It is no wonder that the technical nature of these averaged contours means they do not necessarily help a person considering buying a house near an airport to understand the typical noise that would be experienced. This is notwithstanding the fact that averaged contours do not relate to, nor illustrate, the way in which noise impacts are experienced.

Number Above (N), or Frequency, contours

- 42 Incorporation of frequency contours into routine assessments is supported by SASIG, as the quantity of flights has a direct influence on the way in which aircraft noise exposure negatively impacts on people.
- 43 SASIG supports the Commission's recognition that averaged contours can consist of any combination of flights between a small quantity of very loud events, and a large quantity of less noisy events. This reiterates the value of Number Above or Frequency contours as additional metrics to illustrate noise impacts.
- 44 As discussed in 'New evidence on aircraft noise annoyance',² the ANASE results suggest that under-prediction of annoyance is likely where the quantity of aircraft is increasing significantly.
- 45 Although frequency contours do not describe the duration of a noise event, information about the quantity of noise events, exceeding specified noise levels, which will be experienced in each location is valuable. This is a form of information that is likely to be more easily understood by communities.
- 46 The positive experience of supplying frequency contours, in the form of N70 values (the number of events that have a maximum external level of 70dB(A) or more), for the purpose of communicating and discussing the aviation noise impacts produced at Sydney Airport shows this metric can add value.
- 47 However, use of such frequency contours should not focus on any one upper noise limit alone, as this would mask the cumulative effects of all flights. Hence a range of frequency data need be supplied, starting, for instance, at 50dB LA_{max}, clearly illustrating the number of events in each banding, and thus revealing the overall cumulative impact.

'Noise efficiency'

- 48 SASIG does not support application of the efficiency metric for noise burden assessment.
- 49 We agree these measures show the productivity of an airport but they do not inform or describe the associated noise climate.
- 50 Nor does the 57dB LAeq contour.
- 51 The suggested efficiency measures are of use when looking at levels of activity across the aviation industry without increasing the population within the flawed 57dB LAeq contour. However that does not improve the noise burden.
- 52 To a large degree this is due to incorporation of the flawed 57dB LAeq contour, but is also due to use of 'numbers of passengers'; 'numbers of flights' is more meaningful for the assessment of noise impacts.
- 53 The desired value of comparing airports with similar efficiency scores is undermined by the fact that the spread of population around an airport is not accurately included in the efficiency score.

- 54 Also, the ambient noise levels of areas around airports will vary; quieter more rural areas are likely to be more affected by aircraft noise than noisier more urban areas.
- 55 The ‘noise efficiency’ measure is suitable for describing change as the aviation industry grows but is not suitable for describing the noise burden. A measure showing the number of flights in relation to people adversely affected by aviation noise could be a descriptor to develop, but this must not be based on the flawed 57dB LAeq contour, and must be accompanied by other factors to drive improvements in the noise climate, not simply describe it.
- 56 The noise burden remains the same in situations of lower passenger throughput where the number of flights remains the same, and worsens where the numbers of flights increases.
- 57 Using passenger numbers provides a description of airport/airline efficiency but cannot be extrapolated to illustrate the noise burden.
- 58 A change in the ranking obscures what the change is: size of contour, number of flights or passenger throughput.
- 59 Ultimately, the suggested ‘noise efficiency’ measure yields illogical comparisons and should not be used to inform consideration of aviation noise.

Location specific measurement

- 60 In order for there to be value in the use of L_{MAX} histograms to support illustration of noise exposure at a given location, such illustrations must be supplied with comprehensive, and comprehensible, explanation and discussion. In cases of missing, incomplete, non-interpreted and erroneous information, this value will not be realised.

Mitigation – significant improvements needed

- 61 Variable landing charges are not set at a sufficiently high level to be effective incentives for the use of less noisy aircraft, and this situation must be remedied.

Planning policy

- 62 It remains to be seen what the effect will be of the removal of stand-alone planning policy guidance on noise⁵, used to guide location selection in terms of the noise-sensitive nature of development proposals. As Local Plans are finalised and applied to development proposals, their application and strength will be tested in terms of whether or not the process is sufficient for securing appropriate locations for noise-sensitive development.

⁵ Planning Policy Guidance Note 24: Noise (PPG24) – removed as part of planning reform from which the ‘National Planning Policy Framework’ (NPPF) resulted. Some Local Plans now incorporate PPG24.

Ground noise

- 63 The Commission does not discuss the matter of ground noise, however, it is a particular form of aviation’s noise burden that requires specific measures be put in place to reduce its impacts. Good practice should be shared for the building of noise bunds and physical screening on-airport, around areas where engine-testing is carried out, for instance.

Concentration and dispersal

- 64 SASIG recommends that airport operators actively involve the communities around their airports to determine community preferences for ‘concentrated’ or ‘dispersed’ models of operation. This should cover use of runways, approach and departure flight characteristics/techniques, flightpaths, altitudes, and stacks. As the Commission states, this requires a judgement about concentration of aviation noise over fewer people, or dispersal of operations covering more people.⁶

‘Noise envelope’

- 65 The main considerations for deriving a ‘noise envelope’ are:
- the definition and extent of the ‘envelope’;
 - the need for the ‘envelope’ to provide an improving noise climate, resulting in an actual reduction of the noise burden experienced by overflown communities;
 - greater understanding of the community response to noise and application of this in policy;
 - the incorporation of a range of metrics: for instance, Lden (used in the European Environmental Noise Directive (END)); L_{MAX} (maximum noise of each flight); L₉₀ (background noise); and ‘n’ (number of flights);
 - recognition that the quantity and frequency of events is as important a feature as sound levels resulting from aviation activity;
 - inclusion of on-airport activities resulting in ‘ground noise’;
 - effective monitoring and enforcement;
 - the need for the Government to have challenged and verified the projected technological and operational improvements in advance of basing any ‘envelope’ on such projections; and
 - once verified, technological and operational improvements must be embedded and accepted as normal practice prior to growth being sanctioned, in order that the noise burden is not increased.

⁶ Airports Commission Discussion Paper – ‘Noise, July 2013, par. 5.17, pg.44.

- 66 For any ‘noise envelope’ to be effective in terms of minimising and reducing noise impacts from aviation, it must be accepted that a less noisy aircraft remains a noisy aircraft and each audible experience of an aircraft can be the cause of disturbance, annoyance and stress. The gains achieved within the aviation industry from the production of less noisy aircraft over the past few decades have been overwhelmed by the increase in the number of flights over the same time period. This reinforces the need for meaningful movement limits to be a feature of any ‘noise envelope’.
- 67 In order to develop an effective ‘noise envelope’, more resource must be put into social survey research in order to assess the community response to aviation noise. The conditions at, and communities around, each airport must be considered on a case-by-case basis. The different noise characteristics and sound levels from different aircraft and helicopters must also be considered.
- 68 If appropriately developed and applied, an advantageous role of a ‘noise envelope’ could be the setting of the maximum noise levels a community would expect to experience. A ‘noise envelope’ could also be a route through which to achieve the progressive reduction and potential phase-out of night flights where residents are overflown at night.
- 69 A ‘noise envelope’ relating to an increased level of activity at a point in the future should be supplemented with interim ‘envelopes’ to indicate how activity and noise levels will be limited in the intervening period.

Compensation

- 70 In light of the acceptance that people are more annoyed at lower noise thresholds than was previously the case, UK aviation noise compensation schemes must urgently be improved.
- 71 The inadequacy of the UK schemes is highlighted by comparison with others around the world being more generous in terms of the threshold applied, the area covered, and the percentage of costs covered.
- 72 The ‘polluter pays principle’ should be applied in the form of a tax included in ticket purchases; should airline operators wish to pay this or pass it on to consumers is for their determination.
- 73 Financial compensation should be forthcoming from airport and/or airline operators to account for the extra costs being absorbed at present by building companies, and property purchasers, due to the need for provision of sound insulation and ventilation.
- 74 The current process for parties to claim compensation for the physical development of airports is the Land Compensation Act, through which payments are made when the development is brought into use. This has worked well for road and rail developments, however, in relation to airports, there can be a long delay between land being taken for development and that development coming into use. The compensation process must be improved to address this unreasonable delay.

- 75 It must be embedded as common practice that compensation is tied to activity levels at airports not physical infrastructure. The experience at Stansted Airport where payment has not been forthcoming despite activity levels having increased illustrates the inappropriateness of setting infrastructure as the trigger for compensation, as opposed to activity levels.
- 76 Compensation claims must be settled and payment supplied in advance of the noise-producing activity becoming operational. The experience of claimants around Manchester Airport waiting 9-10 years before receiving payment for noise compensation claims must not be repeated (the second runway at Manchester Airport opened in February 2001; compensation payment settlement was eventually reached in July 2010, with payments then following).

Helicopters

- 77 It is a matter of some concern that the Commission's Discussion Paper does not make any reference at all to noise from helicopters. The insubstantial regulation of helicopter noise at the present time does not negate the need to address the impact produced by use of such craft.
- 78 Management of noise from helicopters needs to be developed to cover both single-engine and multi-engine craft, using licensed heliports, airports and private, unlicensed sites.
- 79 The issues associated with helicopter noise are set out below, including the need for tailored regulation and policy.

Statutory noise controls are needed for helicopters

- 80 There are noise and safety issues associated with helicopter flights; regulations are in place regarding safety, however, there are few controls over noise.
- 81 The main safety regulations regarding helicopters are incorporated within the Rules of the Air Regulations (2007), which form part of the Air Navigation Orders (2009).
- 82 Within controlled airspace around airports, helicopters are required to comply with Air Traffic Control (ATC). There are specific restrictions for helicopters flying in the London and London City Control Zones. Single-engine helicopters are required to fly along designated routes; multi-engine helicopters can travel on more direct routes.
- 83 Helicopters flown according to the 'Rules of the Air' are given immunity from controls in relation to noise under the Civil Aviation Act 1982, the Air Navigation Regulations and the Environmental Protection Act 1990.
- 84 All civilian helicopters are required to meet international noise certification standards (ICAO). However there are no statutory instruments that restrict the operational noise limit of helicopters.

Bespoke modelling is required covering the affected populations

- 85 The characteristics of helicopter noise include unpredictability, and the difficulty of modelling due to the rotation and waves created by the helicopter blades.
- 86 The CAA Aviation Related Environmental Enquiries (AREE) department provides a focal point for receiving and responding to aviation related noise & environmental issues. Complaints received by the CAA are broadly concerned with noise from helicopters over-flying, taking off and landing. Complaints are received not only from residents near heliports, but also from residents further away.

UK-wide monitoring of helicopters is required

- 87 Currently, the Civil Aviation Authority (CAA) only monitors helicopter movements in London. In order to understand and quantify the impacts of helicopters in the UK, it is necessary to undertake more effective monitoring of helicopter movements across the UK and not just in the London Control Zone.

The Government should use incentives to phase out 'noisier' helicopters

- 88 In order to encourage newer and less noisy types of helicopters it is necessary to reduce the noise standard from 81 dB(A). In general, in seeking to reduce the number of older and noisier helicopters, the Government could use incentive/disincentive schemes to encourage phasing out of these helicopters.
- 89 The Battersea Heliport is subject to restrictions on the number of helicopter movements per day and per year; and for movements of helicopters that do not meet a local noise standard of 81dB(A) at a distance of 150 metres from the take-off position. These restrictions are, however, ineffective for addressing current and future noise issues, due to the fact that most commercial helicopters using Battersea already fall within an approved list.
- 90 Given that helicopter noise has different characteristics and can affect a wide range of communities, close to heliports and further away, the Government should address helicopter noise through specific policies rather than within the general context of reducing noise from aviation.

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Heliport consultative groups can establish local regulations to reduce impacts on communities

- 91 The London Helicopter Consultative Group (LHCG) was established to address residents' concerns about helicopter activity over London. This provided an opportunity for residents to voice concerns with the heliport operator. The outcomes from these groups included a local flying policy for Battersea Heliport.
- 92 In the absence of national noise regulations for helicopters, local policies, developed in consultation with communities, can be one way of establishing regulations for heliports that reduce the noise impacts from helicopter activity.
- 93 The Department for Transport (DfT) should seek to use evidence from various groups, including the London Helicopter Consultative Group (LHCG), in the development of national guidance to address helicopter noise.

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**Airports Commission Discussion Paper – ‘Noise’: questions posed & answered**

Sections in underlined, italicised text indicate topics covered in the SASIG response.

**Chapter 2 – How does noise affect people?** (par.2.37 & 2.38, pg. 16)

Recent research has led to a better understanding of the impacts of noise pollution from various sources, though further research in some areas is still needed. A number of causal links between noise exposure and health effects, such as hypertension, have been fairly well established. Studies have also shown noise to lead to cognitive impairment in children, and reduced productivity. These impacts can result from noise in workplaces and schools, and sleep disturbance.

The Commission is interested in views on these issues.\* In particular we would like to invite submissions which shed light on any other relevant evidence or research that the Commission should be aware of. Chapter 4 considers further the techniques which can be used to quantify the impacts

\* What is noise? How many people are affected by transport noise? How many people are affected by aviation noise? What are the effects of noise? Annoyance. Sleep disturbance. Hypertension. Hearing loss. Mental health. Cognitive impairment in children. Productivity. Areas of tranquillity.

**Chapter 3 - Measuring aviation noise** (par. 3.55, pg. 28)

In responding to the issues\* raised in this chapter, submissions may wish to consider the following questions:

- What is the most appropriate methodology to assess and compare different airport noise footprints?

For example:

- What metrics or assessment methods would an appropriate ‘scorecard’ be based on?
- To what extent is it appropriate to use multiple metrics, and would there be any issues of contradiction if this were to occur?
- Are there additional relevant metrics to those discussed in this chapter which the Commission should be aware of?
- What baseline should any noise assessment be based on? Should an assessment be based on absolute noise levels, or on changes relative to the existing noise environment?
- How should we characterise a noise environment currently unaffected by aircraft noise?

\* The science of sound. Quantifying the noise from a single aircraft event. Longer period noise exposure: Equivalent Continuous Sound Level; Number Above (N), or Frequency, Contours; Person Events Index and Average Exposure Indicator; Relevant ‘noise efficiency’ of airports; location-specific measurement. Choosing between long-term noise exposure metrics.



**Chapter 4 – Quantifying noise effects** (par.4.40, pg. 38)

The Commission is interested in receiving views on all the issues\* raised in this chapter, but in particular on whether the approaches here summarised are a fair representation of the current evidence base on the quantification of noise impacts and effects. In addition the Commission is also keen to receive views on the following questions:

- How could the methods described in this chapter be improved to better reflect noise impacts and effects?
- Is monetising noise impacts and effects a sensible approach? If so, which monetisation methods described here hold the most credibility, or are most pertinent to noise and its various effects?
- Are there any specific thresholds that significantly alter the nature of noise assessment, e.g. a level or intermittency of noise beyond which the impact or effect significantly changes in nature? Quantifying noise effects
- To what extent does introducing noise at a previously unaffected area represent more or less of an impact than increasing noise in already affected areas?

\* How noise is assessed: Day-time noise: early studies – The Wilson Committee and the Noise and Number Index; Schultz Curve, Day-time noise: current measures. Night noise. Monetising noise impacts. Revealed preference valuation. Monetising health impacts. Monetising sleep impacts. Productivity and learning impacts.

**Chapter 5 – Mitigation** (par.5.44, pg. 50)

This chapter has described various methods and possible options for the mitigation of noise\*, as well as the regulatory regimes which operate at the international, European and UK levels. The Commission would be interested to receive views on additional mitigation methods that may be effective or worth consideration, but in particular responses that focus on the following questions:

- To what extent is the use of a noise envelope approach appropriate, and which metrics could be used effectively in this regard?
- To what extent should noise concentration and noise dispersal (as described in paragraph 5.17) be used in the UK? Where and how could these techniques be deployed most effectively?
- What constitutes best practice for noise compensation schemes abroad and how do these compare to current UK practice? What noise assessments could be effectively utilised when designing compensation arrangements?

\* The Noise Mitigation Framework – The International Civil Aviation Organisation's (ICAO) 'Balanced Approach'. Reduction of noise at source through technological improvements. Mitigation through land use planning. Mitigation through operational procedures. Mitigation through operational restrictions. Landing charges. Operating restrictions. Noise envelopes. Independent Noise Regulator. Compensation

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