
Cheshire East Site Allocations and Development Policies Document

Aircraft Noise Policy
Background Paper

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1 Introduction

1.1 The Cheshire East Local Plan

Cheshire East Council is currently developing a Local Plan. The first part of this process, the Local Plan Strategy, sets out the overall planning strategy for the borough to 2030 and was adopted by the Council in July 2017.

The Council is progressing with the second part of its Local Plan, the Site Allocations and Development Policies Documents (SADPD). It will include a number of non-strategic site allocations and a suite of development management policies. It is intended to replace the remaining saved policies of the local plans prepared by the former three district councils which existed prior to local government re-organisation.

In preparing Policy ENV 13 and this associated supporting Background Report, careful account has been taken of the feedback received about the emerging SADPD. The Council consulted on a First Draft SADPD during September and October 2018. It highlighted that the Council intended to include a new aircraft noise policy, ENV 13, within the Plan to make sure that development proposals potentially affected by such noise provide an appropriate level of amenity and well-being for residents/users. Views were invited on a draft methodology, published alongside the First Draft Plan, which explained the way in which the policy was intended to be prepared. Appendix A contains the draft methodology, and Appendix B contains a summary of the feedback received to it. The Council published the SADPD for representations during August and September 2019, accompanied by an initial version of this Background Paper which had been informed by the feedback received to the First Draft SADPD and the draft methodology. This revised version of the Background Paper and the revisions to policy ENV 13 that it recommends have been informed by the feedback received to the Publication Draft SADPD in 2019. Appendix C contains a summary of this feedback.

Manchester International Airport (MIA) is situated at the northern edge of the Cheshire East and the noise from departing and approaching aircraft affects an area of the borough to the south west of its runways.

This report explains how Policy ENV13 (Aircraft noise) has been derived, providing appropriate evidence to justify this policy.

1.2 Manchester International Airport

MIA is the third busiest airport in the UK and consists of two runways, three passenger terminals, a cargo centre and an aircraft maintenance area. In 2017, the airport handled around 28 million passengers and over 200,000 flights to more than 200 different destinations. In its 2016

Sustainable Development Plan [1], Manchester Airport highlights that it has significant capacity and the flexibility to grow further and reports have shown that it could potentially achieve a throughput of up to 55 million passengers per year if its two runways are used to their full potential.

Cheshire East is situated to the south, west and north-west of the airport. Whilst this area is predominately rural it does have a number of populated areas such as Mobberley, Knutsford and Ashley. These areas are either directly under or close to the flight paths, and therefore are affected by noise from both departing and approaching aircraft.

1.3 Noise

Noise is a key concern for residents and communities located near airports and the various flight paths for both departing and arriving aircraft. The main ways that noise from aircraft affects people is via annoyance and sleep disturbance. The World Health Organization (WHO) evidence review on noise annoyance 2000-2014 [2] described the complex annoyance response to noise as comprising of three main elements:

- An often repeated disturbance due to noise (repeated disturbance of intended activities e.g. communicating with other persons, listening to TV or music, reading, working, sleep), often combined with behavioural responses in order to minimise disturbance.
- An attitudinal response (anger about the disturbance and negative evaluation of the noise source)
- A cognitive response (a distressful insight that one cannot do much about this unwanted situation).

Trying to objectively measure annoyance is problematical since it is a subjective response that will vary from person to person. It is for this reason that all studies into annoyance, especially in relation to aircraft noise, have been by self-rated responses to survey questions. The Civil Aviation Authority has commissioned a number of such studies and these are discussed later in this document.

1.4 Effects of Manchester International Airport

Today aircraft are much quieter than they were 20 to 40 years ago and advances in technology are continually reducing the overall noise from aircraft. However, this should be taken in context as the number of flights has increased at the same time. The International Civil Aviation Organisation (ICAO) has established international standards regarding aircraft noise, which have helped to reduce overall noise made by individual aircraft. Through the noise standards the ICAO has established a certification system, which classifies aircraft noise into different 'Chapters'. The Chapters set a maximum acceptable noise

levels for aircraft. Over the years this has resulted in noisier aircraft being prohibited from using UK airports.

This reduction in noise from aircraft has generally resulted in fewer people and communities that live within the vicinity of airports, being exposed to higher noise. According to the Manchester Airport Sustainable Development Plan 2016 [1] which states:

“In 2005 there were 32,550 people living within the 57 dB L_{Aeq} noise contour (average summer 24-hour period). By 2014 this number had fallen to 25,200 because the area of the 57 dB L_{Aeq} noise contour had reduced. Compared to 2003, the area of the 57 dB L_{Aeq} noise contour has fallen by nearly 10 km² during the day and 2 km² at night.”

The latest Manchester Airport Noise Action Plan (2019-2023) reports a similar situation:

“Despite significant growth in passenger numbers between 2006 and 2016, the data indicates noise impacts have remained broadly unchanged. Using the latest government noise indicator (54 dB $L_{Aeq,16-hour}$), the results show a small reduction in the number of people affected by aircraft operations over the same ten-year period.”

Using the night noise level that informs the airport’s agreed night-time noise limit (60 dB L_{Aeq}) the results show that since 2006, there has been a small reduction in the number of people affected”.

2 Literature Review

In formulating the draft aircraft noise policy, a large number of documents have been reviewed. These are listed in Appendix D with a brief overview of their content. For convenience the documents have been split into two categories; the first category covers legislation, planning policy and guidance, planning decisions and planning consultations. The second category considers guidance and studies into the effects of aircraft noise on humans, and documents which recommend limit values for certain situations. Documents are listed in reverse chronological order based on the year of publication, and the order that the documents appear does not imply prominence.

3 Legislation

3.1 The Airports (Noise-related Operating Restrictions) (England and Wales) Regulations 2018

The Airports (Noise-related Operating Restrictions) (England and Wales) Regulations 2018 came into force on 23 July 2018.

The regulations designate “competent authorities” for the purposes of EU Regulation 598/2014 (“regulation 598”) which establishes the rules and procedures on the introduction of noise-related operating restrictions at major airports (over 50,000 civil aircraft movements per year) within a “balanced approach” to noise management, as promoted by the International Civil Aviation Organisation (ICAO).

There are four principal elements to the balanced approach, set out in hierarchy from most desirable to least desirable:

- the reduction of noise at source
- land-use planning and management
- noise abatement operational procedures
- operating restrictions

After the reduction of noise at source, which is addressed through airport Noise Action Plans, the second element in the ‘balanced approach’ to noise management is land-use planning and management.

The ICAO recommends that zones around airports associated with different noise levels are defined, and criteria for the appropriate use of such land, taking account of ICAO guidance, are established.

As explained later in this document, the zone around Manchester Airport, which is subject to daytime aircraft noise levels over 63 dB LAeq,16hour (07:00-23:00), is where significant adverse noise effects can be expected. Preventing noise sensitive development in this zone would reduce the likelihood that the third (new noise abatement operational procedures) or fourth (operating restrictions) elements of the approach, which are less desirable, will be required. It should be noted that under the regulations, ‘operating restrictions’ may only be adopted if no other measures are appropriate to address the noise problem.

4 National planning policy

4.1 National Planning Policy Framework

The National Planning Policy Framework [3] (NPPF), which was initially published in March 2012 and was most recently revised in February 2019, sets out the Government's planning policies for England and how these are expected to be applied. In respect of noise the Framework states that in general terms planning policies and decisions should contribute to and enhance the natural and local environment by *“preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability”*.

Specifically, section 180 of the NPPF [3] states that:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁰; [...]”.

Footnote ⁶⁰ associated with the above quotation from the NPPF [3] directs the reader to the ‘*Explanatory Note to the Noise Policy Statement for England*’ [4] which provides further guidance on significant adverse impacts on health and the quality of life.

4.2 Noise Policy Statement for England

The aims of the Noise Policy Statement for England [4] are:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;*
- mitigate and minimise adverse impacts on health and quality of life; and*
- where possible, contribute to the improvement of health and quality of life”.*

The ‘*Explanatory Note*’ to the NPSE sets out three established toxicology concepts that can be applied to noise impacts, which are detailed below:

- **No Observed Effect Level (NOEL)** - this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.
- **Lowest Observed Adverse Effect Level (LOAEL)** – this is the level above which adverse effects on health and quality of life can be detected.
- **Significant Observed Adverse Effect Level (SOAEL)** – this is the level above which significant adverse effects on health and quality of life occur.

Recently, the concept of an Unacceptable Adverse Effect Level (UAEL) – the level at which the noise levels can cause unacceptable changes in behaviour as well as both psychological and physiological effects – has been adopted by some in the acoustics and planning professions. This extension to the above scale is not defined within the NPSE [4], although

reference to unacceptable adverse effects is made in Planning Practice Guidance: Noise [5] as detailed below.

4.3 Planning practice guidance: Noise

On 6th March 2014 the Ministry of Housing, Communities & Local Government published online guidance on how planning can manage potential noise impacts in new development [5].

This guidance notes that “[...] local planning authorities working with local communities and business may decide to develop and include in their Local Plans specific standards to apply to various forms of proposed development and locations in their area”. The guidance also provides a useful table which summarises the noise exposure hierarchy, based on the likely average response.

Table 1 Noise exposure hierarchy, based on the likely average noise exposure.

Perception	Examples of outcomes	Increasing effect level	Action
Not noticeable	No effect.	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			

Perception	Examples of outcomes	Increasing effect level	Action
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

4.4 Aviation Policy Framework

The 'Aviation Policy Framework' (APF) [6] sets out the Government's extant policy to allow the aviation sector to continue to make a significant contribution to economic growth across the country. It provided a baseline for the Airports Commission to take into account on important issues such as aircraft noise and climate change. It sets out the Government's objectives on the issues which will challenge and support the development of aviation across the UK.

In respect of noise, the policy states that Government recognises that noise is the primary concern of local communities near airports, and that it wishes to strike a fair balance between the negative impacts of noise (on health, amenity (quality of life) and productivity) and the positive economic impacts of flights. The Government's overall policy on aviation noise is to "limit and, where possible, reduce the number of people in the UK significantly affected by aircraft noise, as part of a policy of sharing benefits of noise reduction with industry".

The policy states that Government will continue to use the 57 dB $L_{Aeq,16\text{-hour}}$ contour as the average level of daytime aircraft noise marking the approximate 'onset of significant community annoyance'. This terminology creates confusion, with some equating it to the onset of 'significant adverse effects on health and quality of life' as described in

the NPSE [4] - i.e. interpreting it as the SOAEL. This issue was discussed in the decision notice to an appeal made by London City Airport [7] (which was recalled by the Secretaries' of State), in which the Inspector clarified that the origin of the 57 dB $L_{Aeq,16-hour}$ value is the ANIS report [8] which equates this noise level with the onset of significant community annoyance:

“The use of the term ‘significant’ in the NPSE (2010) [4] relates to ‘significant adverse effects on health and quality of life’. The SOAEL, which is the level above which significant adverse effects occur is set at a threshold of 63dB LAeq 16-hour. This is not the same as the ‘onset of significant community annoyance’, which is a term that derived from the development of government air noise policy following the ANIS report (1985) [8] and which is set at a threshold of 57dB LAeq 16-hour. One relates to ‘health and quality of life’ and the other to ‘community annoyance’”.

The Inspector is clear therefore that 57 dB $L_{Aeq,16-hour}$ does not represent the SOAEL in the context of the NPSE [4] and NPPF [3].

Finally, it should be noted that the APF [6] was drafted prior to the CAA Survey of noise attitudes 2014: Aircraft [9] (SoNA14) and therefore did not benefit from the conclusions reached by SoNA14, one of which is that for a given noise exposure a higher proportion of respondents was found to be highly annoyed in 2014 than during the surveys for ANIS [8] which were undertaken in 1982. This indicates that attitudes to aircraft noise around have changed over time.

4.5 Consultation Response on UK Airspace Policy

The ‘Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace’ [11] was presented to Parliament in October 2017. The introduction sets out the importance of the aviation industry and the case that it is essential that the UK’s airspace is modernised. The report states that following analysis of the consultation responses the Government will implement a range of proposals. In respect of noise these include:

- Important changes to aviation noise compensation policy, to improve fairness and transparency
- The creation of an Independent Commission on Civil Aviation Noise (ICCAN) - an important step to rebuild the trust lost in industry by communities. The body will help ensure that the noise impacts of airspace changes are properly considered and give communities a greater stake in noise management. In order to ensure appropriate measures are being taken to address aviation noise issues, a review of ICCAN within two years of set-up will include further consideration of statutory powers for the body.

- New metrics and appraisal guidance to assess noise impacts and their impacts on health and quality of life. In particular this will ensure noise impacts are considered much further away from airports than at present.

The report expresses the Government's view that that the degree of annoyance (based on % of respondents highly annoyed) previously occurring at 57 dB $L_{Aeq,16-hour}$, now occurs at 54 dB $L_{Aeq,16-hour}$. The report also acknowledges the evidence that some adverse effects of annoyance can be seen to occur down to 51 dB $L_{Aeq,16-hour}$. In response to this, the Government state:

“So that the potential adverse effects of an airspace change can be properly assessed, for the purpose of informing decisions on airspace design and use, we will set a LOAEL at 51 dB $L_{Aeq,16 hr}$ for daytime, and based on feedback and further discussion with CAA we are making one minor change to the LOAEL night metric to be 45dB $L_{Aeq,8hr}$ rather than L_{night} to be consistent with the daytime metric.”

4.6 Towards an Aviation Strategy ('Next Steps')

The Government is currently developing an Aviation Strategy that will set out the long-term direction for aviation policy to 2050 and beyond. In a position paper titled 'Beyond the horizon - The future of UK aviation - Next steps towards an Aviation Strategy' [10] ('Next Steps') published in April 2018, the aim of the strategy is expressed as “[t]o achieve a safe, secure and sustainable aviation sector that meets the needs of consumers and of a global, outward-looking Britain”. The 'Next Steps' paper [10] sets out six objectives for the strategy, including supporting growth while tackling environmental impacts.

The 'Next Steps' paper [10] states that at the local level, aviation noise is the key environmental concern and the Government will consider whether the right regulations, controls and incentives are in place to ensure the sector continues to address noise impacts. It advocates that communities share in the economic benefits of airport growth, and that adverse impacts are mitigated where possible. It notes that despite quieter aircraft, the Survey of Noise Attitudes 2014 [9] shows that people are now more sensitive to aviation noise than was previously the case. Policy options that will be explored include setting noise targets, strengthening noise controls and enforcement, enhancing compensation and the use of other types of mitigation where noise reduction is not possible.

4.7 Aviation 2050 - The future of UK aviation - A consultation

Further to the 'next steps' position paper [10] above that was published in April 2018 and which set out some of the specific issues to be considered as part of the policy development process, a subsequent

document which forms part of the government's final consultation on the policy proposals for the Aviation Strategy was Presented to Parliament in December 2018 [31].

Of particular interest in relation to noise, this document articulates the Government's intentions to propose new measures to improve noise insulation schemes for existing properties, particularly where noise exposure may increase in the short term or to mitigate against sleep disturbance. Specific measures include proposals to:

- to extend the noise insulation policy threshold [for **free** noise insulation provided to home owners] beyond the current 63 dB $L_{Aeq,16hr}$ contour to 60 dB $L_{Aeq,16hr}$.
- for airspace changes which lead to significantly increased overflight, to set a new minimum threshold of an increase of 3 dB L_{Aeq} , which leaves a household in the 54 dB $L_{Aeq,16hr}$ contour or above as a new eligibility criterion for **assistance** with noise insulation.

The paper [31] states that “*avoiding people being exposed to aircraft noise in the first place is preferable to taking action through mitigation*”. However it also states that “[t]he CAA’s forecasts show that the number of people exposed to levels of noise with potential health costs will continue to grow despite aircraft noise reducing. However, given the government’s priority to provide new homes, it is unrealistic to expect that new homes will not be built in areas affected by aircraft noise to some extent”.

To address this, the paper proposes two new measures for people moving near to airports:

- developing tailored guidance for housebuilding in noise sensitive areas near airports
- improving flight path information for prospective home buyers so that they can make better informed decisions

However, at this time, the detail of these measures has not been published.

5 Local planning policies

This section reviews the local planning policies for noise sensitive development implemented by other local planning authorities which are, to varying degrees, also affected by aircraft noise. Some of these policies are relatively recent, and take into account many contemporary planning guidance, policy and decisions, whilst others are older and do not.

5.1 Stockport

Policy SIE-3 of the Stockport Core Strategy which covers the period from its adoption until 2026 notes that constraints will be placed upon development in some parts of the borough so as to avoid unacceptable levels of noise from aircraft using Manchester Airport.

In respect of dwellings, the policy sets out the following advice:

Noise Level	Policy
Daytime: greater than 72 L_{eq} or Night-time: greater than 66 L_{eq}	Planning permission will be refused for new dwellings and conversions to residential accommodation will only be permitted provided that the proposal incorporates noise attenuation measures that would result in a night-time noise level within the building (with windows closed) of less than 35 dB(A) L_{eq} .
Daytime: between 66 and 72 L_{eq} or Night-time: between 60 and 66 L_{eq} , or regularly over 82dB $L_{A_{Max}}$ (Slow) several times in an hour	Permission will not be granted for new dwellings unless material considerations indicate otherwise (in such cases conditions will be imposed to ensure a commensurate level of protection against noise within the dwelling). Conversions to residential accommodation will be permitted but the requirement for protection against noise within the dwelling will be the same as that for any new dwellings.
Daytime: between 57 and 66 L_{eq} or Night-time: between 48 and 60 L_{eq}	Planning permission for new dwellings will be granted subject to other planning policies and to conditions (where appropriate) to ensure an adequate level of protection against noise in dwellings.

Planning permission for other noise sensitive development under the flight path to Manchester Airport, will only be granted where it has been demonstrated that the proposed development would not be subject to unacceptable levels of aircraft noise

5.2 London Borough of Hounslow

Volume One of the 'The London Borough of Hounslow Local Plan 2015-2030' states that:

“Key policy requirements set out in the London Plan in relation to the borough and the draft Hounslow Local Plan include:

- ...Strongly opposing any further expansion of Heathrow Airport that involves an increase in the number of aircraft movements*
- Identification of the Heathrow Opportunity Area as an area to accommodate significant new housing and employment growth. The potential of this aspect will be dependent on the outcome of decisions to be made on the future function of Heathrow Airport...*”

Part of the spatial strategy includes proactively planning “those areas surrounding Heathrow Airport to secure positive economic, environmental and social benefits and environment mitigation”.

Specifically, policy EQ5-Noise seeks to: “*reduce the impact of noise from aviation, transport and noise generating uses, and require the location and design of new development to have considered the impact of noise, and mitigation of these impacts, on new users and surrounding uses according to their sensitivity*”.

In relation to developments near Heathrow, the council:

- Acknowledges that noise from Heathrow Airport’s operations calls for land-use planning to have a role in reducing noise, as set out in the Government’s Aviation Policy Framework. The council has a role in ensuring noise nuisance is not exacerbated by placing sensitive uses outside of higher noise contours. Noise contour mapping shows those parts of the borough affected by aircraft noise, rising from 57 dB $L_{Aeq,16-hour}$ to 72 dB $L_{Aeq,16-hour}$. Consistent with the ICAO Balanced Approach and advice from the airport operator, noise sensitive development should be located outside the 69 dB $L_{Aeq,16-hour}$ contour, and in the case of family housing and non-residential noise-sensitive development, also outside of the 63 dB $L_{Aeq,16-hour}$.
- The borough considers that the 69 dB $L_{Aeq,16-hour}$ contour represents a Significant Observed Adverse Effect Level (SOAEL). As such, residential developments within this area are not permitted.
- Establishes a presumption against family housing between the 69 and 63 dB $L_{Aeq,16-hour}$ contours, whilst other smaller one bed and studio housing will only be accepted in this noise band where high levels of sound insulation and ventilation are provided. It also establishes a presumption against non-residential noise sensitive development in this zone.
- States that between the 63 and 57 dB $L_{Aeq,16-hour}$ contours, all new built development, including residential extensions, should have high levels of sound attenuation and acoustically treated ventilation.

5.3 London Borough of Hillingdon

The London Borough of Hillingdon Local Plan Part 1 was adopted in 2012. Aircraft noise from Heathrow severely affects some areas of this London Borough.

Policy SO23 seeks to “develop and implement a strategy for the Heathrow Opportunity Area, in order to ensure that local people benefit from economic and employment growth and social and environmental improvements including reductions in noise and poor air quality”.

However, the plan does not mention aviation noise and development separately from the standard considerations of noise for developments.

5.4 Borough of Spelthorne

The Borough of Spelthorne 'Core Strategy and Policies Development Plan Document' was adopted in 2009 and deals with the period up to 2026. The north of the Borough has areas suffering high levels of noise from Heathrow Airport. There are links beyond adjacent authorities to those in London, across the area of influence of Heathrow Airport and the wider South East.

Policy EN11: Development and Noise sets out the Council's general approach to minimising the adverse impact of noise by locating noise sensitive development away from sources of high noise, including Heathrow. The policy involves:

- refusing new residential development where aircraft noise levels are at or exceed 66 dB $L_{Aeq,16-hour}$ noise contour; except in the case of the one-for-one replacement of dwellings;
- requiring appropriate attenuation measures for development between 60 and 65 dB $L_{Aeq,16-hour}$.

Policy EN12: Noise from Heathrow Airport sets out the measures to minimise the impact of noise from Heathrow Airport on surrounding areas. These include:

- maintenance of the use of noise preferential routes,
- controls on flying at night that will achieve a progressive improvement in the night noise climate, including a limit on the total number of flights at night, and maintenance of existing controls on ground noise.

5.5 Crawley

The 'Crawley 2030: Crawley Borough Local Plan 2015-2030' was adopted in 2015. Gatwick Airport is located within the borough to the north of the town – the land between the town and the airport is heavily constrained by noise and safeguarded for, potentially, the future development of the airport.

In relation to developments near Gatwick Airport Policy CH9 states that:

“Proposals which do not create or are able to adequately mitigate visual/noise intrusion are generally supported. This area has an important role in maintaining the separation of the distinct identity of Gatwick Airport from Crawley and the valuable recreational links from the northern neighbourhoods of Crawley into the countryside. B Use Class development may be suitable within this area”.

The need to safeguard land for a potential second runway at Gatwick Airport, together with the noise contours associated with both a single and potential two runway scenario, further limits the potential for additional housing in the northern parts of the borough.

Policy ENV11 in relation to development and noise states that: *“Proposals that would expose future users of the development to unacceptable noise levels will not be permitted. For transport sources, the Unacceptable Adverse Effect is considered to occur where noise exposure is above 66 dB $L_{Aeq,16-hour}$ (57 dB $L_{Aeq,8-hour}$ at night)”*.

5.6 Reigate and Banstead



Development Management Plan (Regulation 19) Airport Noise sets out Reigate and Banstead’s approach to developing sub-clause 4 of *“Policy DES9 : Pollution and contaminated land”* which considers aircraft noise and the requirements of the National Planning Policy Framework.

Policy DES9 is contained within the Reigate & Banstead Local Plan Development Management Plan which was adopted in September 2019, and is set out below:

“Policy DES9: Pollution and contaminated land

The policy applies borough-wide, although particular attention should be paid within the following designated areas:

- *Air Quality Management Areas*
- *Noise contours associated with Gatwick Airport*

1. For all types of development, across the Borough:

a. Development will only be permitted where it can be demonstrated that (on its own or cumulatively) it will not result in a significant adverse or unacceptable impact on the natural or built environment (including sensitive habitats); amenity; or health and safety due to fumes, smoke, steam, dust, noise, vibration, smell, light or any other form of air, land, water or soil pollution. Where there would be potential adverse effects from pollution and adequate mitigation cannot be provided, development will not normally be permitted. This includes pollution from construction and pollution predicted to arise during the life of the development. Particular attention should be paid to development within Air Quality Management Areas.

b. New development will not normally be permitted where existing fumes, smoke, steam, dust, noise, vibration, smell, light or any other form of air, land, water or soil pollution are unacceptable and there is no reasonable prospect that these can be mitigated

against to satisfactory levels. This is particularly relevant for sensitive development such as residential.

c. Where a site is known to be contaminated, or where there is a reasonable possibility of contamination, appropriate investigation, and where necessary mitigation and/or remediation will be required.

d. Measures to reduce air pollution will be encouraged.

2. Within areas of poor air quality (as defined by the presence of Air Quality Management Areas) development must be designed to minimise the occupants' or users' exposure to air pollution, both internally and externally.

3. In areas near Gatwick Airport, residential development will be permitted where it can be demonstrated that the noise levels will not have a significant adverse effect on the proposed development. Proposals for residential development on sites falling within the 57 dB LAeq (07:00 to 23:00) or 48 dB LAeq (23:00 to 07:00) noise contours for Gatwick Airport must:

a. Be accompanied by a full noise impact assessment.

b. Demonstrate that, through satisfactory design, mitigation and/or attenuation measures, future occupants would not be subject to unacceptable noise disturbance both within buildings and externally."

5.7 Uttlesford

The Uttlesford District Council Local Plan was adopted in 2005. The Plan sets out limits on the physical extent of Stansted Airport. It is to be seen as an airport in the countryside. Policy S4- Stansted Airport Boundary Provision is made for development directly related to or associated with Stansted Airport to be located within the boundaries of the airport. Industrial and commercial development unrelated to the airport will not be permitted on the site.

Policy ENV10: Noise sensitive development and disturbance from aircraft aims to ensure that wherever practicable, noise sensitive developments are separated from major sources of noise such as road, rail and air transport and certain types of industrial development. The policy states that: *"Housing and other noise sensitive development will not be permitted if the occupants would experience significant noise disturbance. This will be assessed by using the appropriate noise contour for the type of development and will take into account mitigation by design and sound proofing features"*.

5.8 Luton

The 'Luton Local Plan 2011-2031' was adopted in 2017.

At section 11.63 in relation to policy approach, the local plan states that: “[t]he planning authority should prevent both new and existing development from contributing to or being put at unacceptable risk from or being adversely affected by unacceptable levels [...] of noise pollution [...] (NPPF paragraph 109)”. It does not however, set out any specific criteria in relation to residential or other noise sensitive development affected by aircraft noise.

5.9 Birmingham

The 'Birmingham Development Plan 2031' was adopted in 2017. The plan mentions that major planned improvements to the City's national and international accessibility will be brought about by the continued expansion of Birmingham Airport. It does not mention aviation noise as a separate matter.

5.10 Bristol

Policy BCS23 in the current 'Bristol Development Framework Core Strategy' states that development should be sited and designated in a way as to avoid adversely impacting upon the environmental amenity including noise. It does not mention aviation noise as a separate matter.

The 'Bristol Local Plan' is currently being reviewed, and the 'Draft Policies and Development Allocations – Consultation (March 2019)' states in relation to development sensitive to pollution - agent of change:

“In areas of existing noise or other types of pollution, new development sensitive to the effects of that pollution should include measures to mitigate the impact of the existing pollution on future occupiers.

New development sensitive to pollution will not be permitted where the presence of that sensitive development could threaten the ongoing viability of existing uses that are considered desirable for reasons of economic or wider social need, such as music venues and industrial uses, through the imposition of undue operational constraints”.

5.11 Biggin Hill

The Bromley Unitary Development Plan (UDP) sets out the land-use policy framework under the provisions of the Town and Country Planning Act 1990 as interpreted in the Town and Country Planning (Development Plan Regulations) 1999. UDP Policy BH8: Noise-sensitive development set out below sets out requirements for noise sensitive development near Biggin Hill Airport:

“Policy BH8: Noise-sensitive development

In considering planning applications for new noise-sensitive development at, or in the vicinity of, Biggin Hill Airport, the Council will apply the recognised Noise Exposure Categories (NECs), set out in PPG24, in respect of Airborne noise, when assessing the acceptability of the proposal.

12.20 Aircraft noise can affect areas and noise-sensitive development under the flight path for some distance from the Airport. The degree of disturbance is related to people’s perception of noise, the volume and character of noise, the frequency of aircraft movements and the ambient background noise. PPG24 recommends that greater emphasis be given to noise from aircraft as a material consideration in determining planning applications because of its potentially adverse effects on health and local amenity. This is likely to restrict the location of certain noise-sensitive uses, such as housing.

12.21 To complement the UDP and to establish a noise envelope associated with the Airport, the Council commissioned a study of the noise environment around Biggin Hill Airport. The Airborne aircraft noise contours, as shown on the Proposals Map will be used to determine the Noise Exposure Category (as defined in PPG24) within which any proposed noise-sensitive development site falls, until the year 2010.”

It is noted that this particular policy is older and refers to planning guidance (PPG24) which has now been withdrawn and replaced by the NPPF [3].

5.12 London Borough of Southwark

In November 2019 the London Borough of Southwark published amended Technical Guidance for Noise [35] to, amongst other aims, ensure consistency in the approach to dealing with noise and planning in Southwark.

With respect to noise levels in external private residential amenity areas, it states that the following standard should be achieved:

“50dB L Aeq, 16hr[†] .

† Daytime - 16 hours between 07:00-23:00hrs.

Where this is not possible to achieve despite implementing all reasonable mitigation measures, the standard can be relaxed by 5dB so that the sound level in private gardens and balconies does not exceed 55dB L_{Aeq} 16hr .

*In very high noise areas where the less stringent standard of 55dB $L_{Aeq,16hr}$ cannot reasonably be achieved, **with careful design it should be achieved in some parts of the amenity space***

It also states:

“If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended. External amenity areas such as balconies and gardens should be protected from noise as far as is reasonably practicable. The following mitigation measures should be considered:

- *Building design, location and layout to shield amenity areas or place them away from noise sources where possible*
- *Use of acoustic fencing with a gap-free joining system and a minimum density of 12Kg/m (or solid blockwork walls) to gardens*
- *Use of high, solid and imperforate balustrades to balconies and terraces*
- *Use of Class A acoustic absorption (suitable for outdoor areas) on balcony undersides and soffits*
- *Enclosure of balconies and terraces to form ‘winter gardens’*

6 Effects of Aircraft Noise

6.1 Introduction

Noise can have a significant effect on both the health and environment of individuals and communities living near airports or under the flight paths. The effects of aircraft noise exposure include annoyance and sleep disturbance [12]. There is also evidence that exposure to aviation noise can have a negative effect on children’s performance on tests of episodic memory [13] can impair reading and oral comprehension, and result in poorer performance on standardized assessment tests [14].

The body of literature in this area is substantial, and findings have evolved over time. This section therefore focusses on providing an overview of the most important contemporary studies in this area, rather than providing an exhaustive summary of all of the documents included in the literature review.

6.2 Survey of Noise Attitudes 2014

In February 2017, the Civil Aviation Authority (CAA) published the results of the Survey of Noise Attitudes 2014: Aircraft (SoNA14) [9]. This report gave updated evidence on attitudes to aviation noise around airports in England (including Manchester Airport) and how this relates to the UK aircraft noise exposure indices.

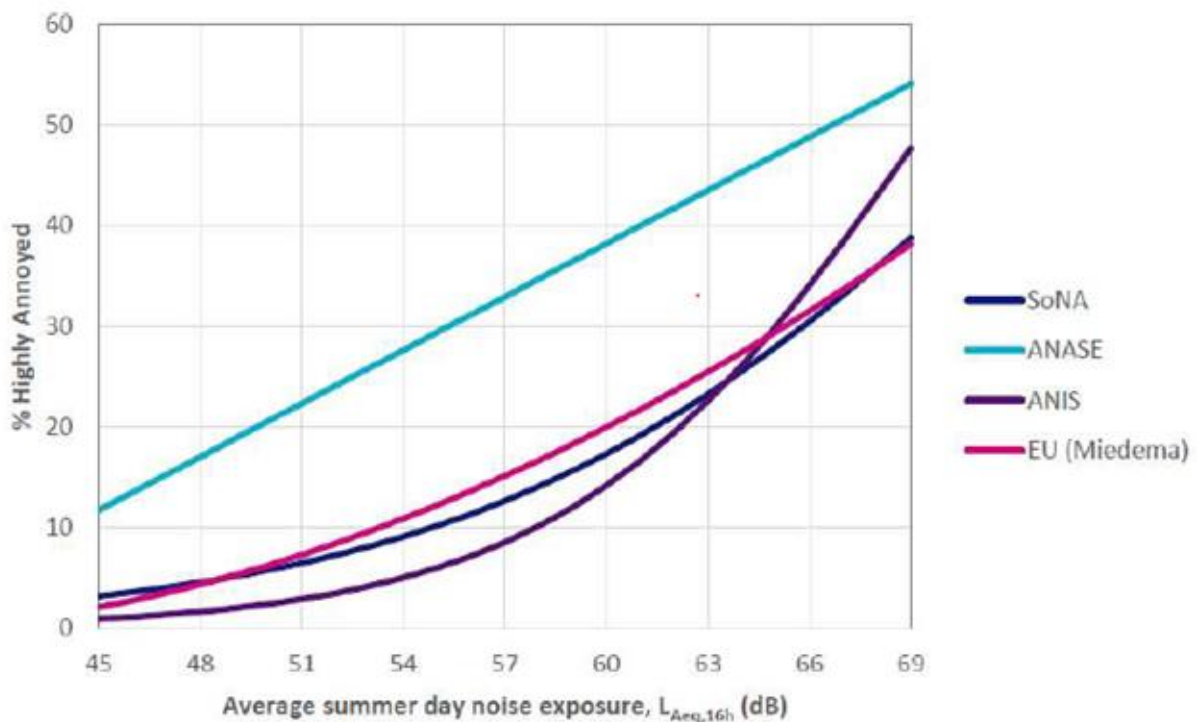
SoNA14 states that “*The current UK civil aircraft noise exposure index, $L_{Aeq,16h}$ was adopted in 1990, based on an aircraft noise attitude survey*

undertaken in 1982 and reported as the UK Aircraft Noise Index Study (ANIS) in 1985. Contours of equal noise exposure, rather like geographical height contours, are plotted around an airport, along with estimates of the area and population contained within the contours. The 57 dB $L_{Aeq,16-hour}$ contour was chosen as the threshold of community annoyance because it 'indicated a marked increase in some reported measures of disturbance', with 63 and 69 dB $L_{Aeq,16-hour}$ representing medium and high annoyance and subsequently incorporated into planning policy guidance".

One of the overall aims of the SoNA14 [9] was to determine if attitudes to noise had changed since the previous report.

A key finding in the later report is that the same percentage (9%) of respondents quoted by the Aircraft Noise Index Study (ANIS) [8] to be highly annoyed at 57 dB $L_{Aeq,16-hour}$ now occurs at 54 dB $L_{Aeq,16-hour}$. This indicates that people may be becoming more sensitive to noise since the ANIS study was undertaken in 1985. The dose-effect curve for the percentage of people highly annoyed at different average summer day noise exposures ($L_{Aeq,16-hour}$) derived from the SoNA14 [9] data was found to be quite similar to the Miedema dose-response function set out in the European Commission position paper on dose response relationships between transportation noise and annoyance [15], as shown in figure 1 below.

Figure 1 Comparison of % highly annoyed for SoNA (2014), ANASE (2007), ANIS (1982) and EU Miedema



Source: Aircraft Noise and Annoyance: Recent Findings. CAP 1588 [16]

In 2018, the CAA published a report which reviewed recent research relating to aircraft noise and annoyance [16]. It concludes that there has been a change in annoyance responses over the last 30 years and people are now more likely to be annoyed at lower noise levels, but that there remain questions around whether this is due to changes in survey methods and/or non-acoustic factors rather than a shift in attitudes towards aircraft noise.

6.3 ICCAN Review of the Survey of Noise Attitudes 2014

The Independent Commission on Civil Aviation Noise (ICCAN) was established in early 2019 to bring an independent perspective to the issues and discussions on aviation noise.

One of the first tasks that ICCAN has undertaken is a review of the SoNA14 [9] study that is described in the section above. This became a priority for ICCAN due to the number of issues regarding the SoNA14 [9] methodology and results that have been raised and debated between community groups, government and airports since its publication in 2017. To address decreasing stakeholder confidence in the findings of SoNA14 [9], the Independent Commission on Civil Aviation Noise undertook a review of the study, the results of which were published in December 2019 [34]. This review focused on six issues:

- The use of clustered sampling in the 51-54 dB LAeq,16h noise contour band, which some critics argue did not include households under a Noise Preferential Route to the east of Heathrow, and therefore the selected samples are not fully representative.
- The usefulness of the SoNA14 [9] study in relation to determining a suitable value for the Lowest Observable Adverse Effect Level (LOAEL) has also been questioned, given that:
 - no samples were taken in areas subject to noise levels below 51 dB LAeq,16-hours, and,
 - 7% of respondents in the 51-54 dB LAeq,16hr noise band were highly annoyed.
- The 'change effect' is not explored by SoNA14 [9]. Change effect is when, for a given noise level, communities show an increased annoyance response near airports with recent high-rate change (airport operational volatility) compared to communities near airports with little or no recent change (effectively steady-state operations). This may present an issue since many situations where the noise dose-effect curve derived from the SoNA14 [9] study might be used to estimate the percentage of highly annoyed persons are associated with high-rate change (airport operational volatility) – such as when undertaking environmental assessments for a new runway. The 'change effect' is not thought to persist indefinitely, and is likely to subsist within 2 years after which annoyance responses will return to steady-state levels. SoNA14

[9] was conducted at one point in time, during which there were some changes to operations at Heathrow and other airports that featured in the study. However SoNA14 [9] only provides a 'snapshot' of attitudes in that period, and as such could not measure before/after a change as would be required to quantify the change effect.

- Critics suggest that LAeq, 16h is not the most appropriate metric to use when sampling for surveys like SoNA14 [9]. Noise metrics is an area that SoNA14 [9] looked into, and it acknowledges the merit in considering greater use of the N> metrics 'as supplemental indicators to help portray noise exposure. However, for now all government policy and the vast majority of UK scientific studies are expressed in terms of LAeq,16-hours and LAeq,8-hours for average mode summertime operations.
- The WHO 'Environmental Noise Guidelines for the European Region' [12] report (considered in the next section of this paper) issued strong recommendations that aircraft noise should be reduced to levels below 45 dB Lden, and 40 dB Lnight (see Glossary) for night noise exposure. This drew significant attention because of the differences between its findings and the conclusions derived from SoNA14 [9], and there have since been many critics of both the WHO WHO 'Environmental Noise Guidelines for the European Region' [12] and SoNA14 [9] and there has been lively academic debate as to the reasons for the difference in findings, with differences in interview and sampling methods being put forward as the most likely reasons, together with criticism of the approach taken by the WHO on striking a balance between adverse noise effects of airports and their beneficial effects on jobs, convenience and economy being 'based on the idealistic assumption that nobody should ever be exposed to noise levels which endanger complete individual well-being or quality of life, and, as such, it is useless for general regulatory purposes'.
- SoNA's wider uses and how it is being used to inform decision making was also explored by ICCAN.

The ICCAN review concluded that SoNA14 [9] sought to follow best practice in the methodology within its budgetary constraints, but that opinion on many issues is still divided; not just by community groups but also academics, acousticians and health experts. The ICCAN review not set out to conduct a full and critical review of the methodology used, the analysis of, or the conclusions drawn from SoNA, and instead chooses to make recommendations for moving forward:

- ICCAN recommends that a new, regular attitudinal survey towards aviation noise is begun, with the first of the series conducted before the end of 2021.

- ICCAN recommends that this new survey is run and analysed independent of Government, regulators and industry.
- ICCAN will look into a sustainable solution to funding the surveys, involving government and industry.
- ICCAN recommends that lessons learned from SoNA are used to make improvements for the new attitudinal survey. ICCAN's review identified some areas where it would be beneficial to explore whether methodological improvements could be made for future attitudinal surveys of aviation noise.
- ICCAN will run a development study to explore the best way to implement improvements for the new attitudinal survey.

6.4 World Health Organization

6.4.1 Guidelines for Community Noise

The World Health Organization, WHO document 'Guidelines for Community Noise' [17] sets guideline values for community noise in specific environments. The guidelines state that the critical effect of noise in a dwelling is on sleep, annoyance and speech interference. To avoid sleep disturbance, indoor guideline values for bedrooms are 30 dB $L_{Aeq, 8-hour}$ for continuous noise and 45 dB L_{AMax} for a single sound event.

At night, sound pressure levels at the outside facades of the living space should not exceed 45 dB $L_{Aeq, 8-hour}$ and 60 dB L_{AMax} , so that people may sleep with bedroom windows open. To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB $L_{Aeq, 16-hour}$ for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB $L_{Aeq 16-hour}$.

With regards to aircraft noise studies and statistics on the effects of chronic exposure to aircraft noise on children have found:

- consistent evidence that noise exposure harms cognitive performance,
- consistent association with impaired well-being and motivation to a slightly more limited extent and,
- moderate evidence of effects on blood pressure and catecholamine hormone secretion.

It should be noted that these guidelines [17] do not provide specific levels for aircraft noise. In addition, the recommended levels have not been adopted by the UK Government in aircraft noise policy, and as such may best be considered as thresholds above which it may be appropriate to provide noise mitigation.

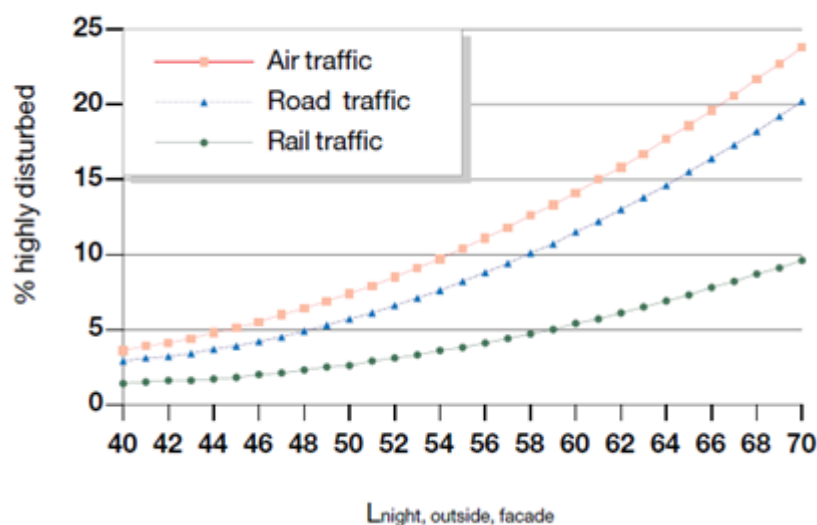
6.4.2 Night Noise Guidelines for Europe (NNG)

The WHO published the 'Night Noise Guidelines for Europe' [18] in 2009. These consider the scientific evidence on the thresholds of night noise exposure indicated by $L_{\text{night, outside}}$ as defined in the Environmental Noise Directive (2002/49/EC), and conclude that 40 dB $L_{\text{night, outside}}$ should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. An $L_{\text{night, outside}}$ value of 55 dB is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach. These guidelines are applicable to the Member States of the European Region, and may be considered as an extension to, as well as an update of, the previous WHO 'Guidelines for community noise' (1999).

In relation to aircraft noise the NNG presents a relationship between the SEL and L_{Amax} indices¹, enabling derivation of the L_{Amax} noise level from SEL measurements of noise events.

Data reported from research on effects of night-time noise on health and well-being presented curves of sleep disturbance from rail, road and aircraft noise which were derived based on self-reported sleep disturbance investigated by means of questionnaires. The data indicated that the derived curves of sleep disturbance from aircraft noise presents the largest variation compared to rail and road traffic curves. The results are reproduced in figure 2.

Figure 2 High sleep disturbance by noise at night. Source: European Commission, 2004



¹ This relationship is derived from ground-based measurements by Ollerhead et al. (1992). The following relationship was found; $SEL = 23.9 + 0.81 \times L_{\text{Amax}}$

6.4.3 Environmental Noise Guidelines for the European Region

In 2018, the WHO published further 'Environmental Noise Guidelines for the European Region' [12], which recommended a level of 45 dB L_{den} (which equates to approximately 43.5 dB $L_{Aeq,16-hour}$) as being associated with a benchmark of 10% of the population being highly annoyed by aircraft noise, and 40 dB $L_{eq,8-hour}$ (L_{night}) as being the level above which is associated with the a benchmark of 11.3% of the population being highly sleep-disturbed (%HSD) based on self-reported sleep-disturbance . This figure has been calculated using the regression model quoted in the 'Environmental Noise Guidelines for the European Region' ($\%HSD = 16.79 - 0.9293 \times L_{night} + 0.0198 \times L_{night}^2$), which returns higher levels of %HSD than the relationship set out in the 'Night Noise Guidelines for Europe' [18]. It should be noted that the 2018 guidelines are based on a different noise metric (L_{den}) for the annoyance dose-effect relationship than used in the UK, and the guidelines note that the annoyance studies considered for aircraft noise exhibited a high degree of heterogeneity. In response to this the guidance recommends that 'data and exposure-response curves derived in a local context should be applied whenever possible to assess the specific relationship between noise and annoyance in a given situation'. On this basis it is considered more appropriate to use values derived from the SoNA14 [9] study which included Manchester Airport than the benchmark thresholds in the 'Environmental Noise Guidelines for the European Region' [12].

6.5 The RANCH Project

The RANCH project was a cross-national epidemiologic study to examine exposure-effect relationships between noise exposure and reading comprehension. The study looked at the effects of both aircraft noise and road traffic noise on 2,010 children aged 9–10 years from 89 schools around Amsterdam Schiphol, Madrid Barajas, and London Heathrow airports.

The authors of the study report in the American Journal of Epidemiology [14] that aircraft noise exposure at school was linearly associated with impaired reading comprehension (after adjustment for other variables) and aircraft noise exposure at home was highly correlated with aircraft noise exposure at school and demonstrated a similar linear association with impaired reading comprehension. The findings were consistent across the three countries, which varied with respect to a range of socio-economic and environmental variables, thus offering robust evidence of a direct exposure-effect relation between aircraft noise and reading comprehension. The noise metric used for the study was the $L_{Aeq,16-hour}$ outdoor level, and a 20 dB increase in aircraft noise was found to be associated with an 8-month difference in reading age in the United Kingdom results.

A longitudinal study of the UK based RANCH cohorts conducted six years later [19] (involving 461 children then aged 15-16 who attended schools around Heathrow airport) showed that aircraft noise exposure at primary school was associated with a significant increase in noise annoyance and with a non-significant decrease in reading comprehension. This suggests that chronic (long term) aircraft noise exposure may impair reading comprehension. The authors speculate that the relatively small sample size of 461 children that took part in the follow up study from the original sample of 1355 in the UK may not be large enough to detect a statistically significant correlation.

The survey data from the RANCH project has also been analysed in respect of children's performance on tests of episodic memory. In an article in the Noise Health journal [13] Matheson et al. demonstrate that aircraft noise is associated with an impairment of recognition memory in a linear exposure-effect relationship.

7 Acoustic design

7.1 Sound insulation

Within reason, a building can be constructed to prevent aircraft noise ingress into sensitive rooms. The two main transmission paths by which aircraft noise enters a building are through ventilation paths (typically partly open windows in traditional housing stock) and through the roof/facades.

Sound insulation tests conducted by Napier University for the Department for Environment, Food and Rural Affairs [20] indicates that open windows reduce aircraft noise levels from outside to inside by 14-19 dB. To achieve higher levels of noise mitigation windows must be closed and the ventilation paths must be acoustically attenuated.

Building constructions typically involve concrete, masonry, timber, steel, aluminium, zinc, plasterboard, thermal insulation materials and glazing. The generalised term 'heavyweight' is used for concrete, masonry and heavy structural steel elements, whilst 'lightweight' is used to refer to timber, glass, plasterboard, metal cladding panels, insulation materials and lightweight metal elements such as drywall channels and studs.

In practice high levels of sound insulation can be difficult to achieve, particularly if the incident noise has a strong low frequency component and the building materials are lightweight (as is typical for roof constructions). As external noise levels increase, increasing attention must be paid to the materials, detailing and workmanship, and thus the risk of the construction failing to adequately prevent noise ingress increases. Therefore there is a practical limit to the degree of sound insulation that large scale housing developments can achieve given cost and workmanship constraints.

In relation to designing buildings affected by aircraft noise, BS8233:2014 [21] states “[w]here it appears that sound insulation treatment is necessary, noise exposure data should be obtained by on-site noise measurements, taking account of wind direction and runway usage. The survey duration of on-site measurements should be sufficient to take account of the various permutations of runway use that can occur, as certain flight paths might only be used under certain wind direction conditions. Where treatment of the building envelope is required to achieve internal design standards then site-specific measurements should be recorded, including provision for the frequency content of the noise (predominantly low frequency noise). It should be noted that for a jet aircraft the frequency content of noise when landing is generally different from that when departing. Typically, landing jet aircraft produce relatively higher levels of high-frequency noise and departing jet aircraft produce relatively higher levels of low-frequency noise”.

BS 8233:2014 [21] also provides guideline internal ambient noise levels for rooms within specific types of buildings. For dwelling houses, flats and rooms in residential use it recommends that the internal noise levels do not exceed the following guideline levels set out in table 2 below.

Table 2 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16-hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16-hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16-hour}$	30dB $L_{Aeq,8-hour}$

The Standard also notes that regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance, and that a guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night.

BS 8233:2014 [21] also provides guidance on ambient noise levels in a number of non-domestic buildings such as offices and places of worship. Health Technical Memorandum 08-01: Acoustics [22] published by the Department of Health provide guidance on internal noise levels for healthcare facilities. Acceptable noise levels in schools and school nurseries are set out in Building Bulletin 93 [23].

7.2 Ventilation and overheating

The combined effects of closed windows, good levels of building sound insulation, high standards for airtightness and enhanced thermal insulation can lead to other adverse health and wellbeing effects due to overheating and poor indoor air quality (for which CO₂ concentrations over 1,000 parts per million is a marker) [32].

The Acoustics, Ventilation and Overheating Residential Design Guide (AVO) recently published by the Association of Noise Consultants [33] sets out a framework for reconciling the competing demands of sound insulation and ventilation, to achieve both thermal and acoustic comfort in buildings. Of 122 planning applications that were studied by the AVO working group, 85% required closed windows for reasonable noise conditions and open windows for reasonable thermal conditions. The result is residential accommodation in which the occupants may choose either acoustic comfort or indoor air quality and thermal comfort, but not achieve both simultaneously. This poses health and wellbeing risks for occupants. It is therefore critical that noise, ventilation and overheating are considered together and that assessments are based on the same assumptions around windows being open or closed.

7.3 Outdoor amenity space

Whilst it is possible to reduce aircraft noise ingress to a building, in most situations it is not feasible to reduce the level of aircraft noise in unenclosed outdoor areas.

In addition to internal noise levels, BS 8233:2014 [21] also provides guidance on noise control around residential buildings. In respect of external amenity areas for residential developments it states that for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that *“the external noise does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ ”*.

However, the standard also notes that:

“In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

The position set out in planning practice guidance on noise [5] differs slightly, and states that *“[i]f external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended”*.

Both planning practice guidance on noise [5] and ProPG [24] are however closely aligned in the situation where, despite following a good acoustic design process, adverse noise impacts on external amenity

spaces remain they may be partially offset if the residents of those dwellings have access to²:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;
- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance).

The proposed aircraft noise policy should therefore require consideration of the noise levels in external amenity spaces, especially if they are an intrinsic part of the overall design. At high noise levels, whilst the measures set out in the bullet points above may partially off-set adverse noise impacts, increasing external noise levels will reduce the benefits of traditional outdoor spaces such as gardens.

When considering how external amenity spaces may be enjoyed, it may be useful to note that:

- to protect the majority of people from being seriously annoyed during the daytime, the WHO recommends that sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB $L_{Aeq,16-hour}$ for a steady, continuous noise [17].
- at noise levels above 57 dB(A) two people situated 1m apart would need to raise their voices for reliable speech communication (refer to Table 7 of BS 8233:2014 [21]),
- at a noise level of 60 dB(A) reliable speech communication may be conducted with raised voices distances of up to 1.4m (interpolated from the values provided in Table 7 of BS 8233:2014 [21]),
- at a noise level of 62 dB(A) the separation distance at which reliable speech communication may be conducted with raised voices is 1m (refer to Table 7 of BS 8233:2014 [21]), and,
- Manchester Airport is currently restricted to 61 aircraft movements per hour (approximately one per minute).

² Bullet points from online [Planning Practice Guidance on Noise](#) [5].

7.4 ProPG: Planning & Noise: Professional Practice Guidance on Planning & Noise: New Residential Development

The Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH) have jointly produced guidance on the acoustic design for new residential development [35], which aims to protect future residents from the harmful effects of noise. This document draws from the guidance considered in sections 7.1 to 7.3, as well as other relevant sources.

The document notes that there is an increasing risk of adverse effect from noise at sites subject to indicative noise levels of 50 dB $L_{Aeq,16\text{-hours}}$ during the day or 40 dB $L_{Aeq,8\text{-hours}}$ at night. Where there is a risk of adverse effects from noise, it recommends that a 'full assessment' (also known as a 'Stage 2' assessment) be undertaken, incorporating the following four key elements:

- Element 1 – Good Acoustic Design Process
- Element 2 – Internal Noise Level Guidelines
- Element 3 – External Amenity Area Noise Assessment
- Element 4 – Assessment of Other Relevant Issues

The guidance states that following a good acoustic design process is an implicit part of achieving good design, and that it is imperative that acoustic design is considered at an early stage of the development control process. A good acoustic design process should take an integrated approach to achieve optimal acoustic conditions, both internally (inside noise-sensitive parts of the building(s)) and externally (in spaces to be used for amenity purposes). It notes that good acoustic design should be without design compromises that will adversely affect living conditions and the quality of life of the inhabitants, and in relation to sound insulation:

“Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design”.

In respect of 'Element 2 - Internal Noise Level' guidelines, the document states that suitable guidance can be found in “BS8233:2014: *Guidance on sound insulation and noise reduction for buildings*” [21] as referenced above.

On 'Element 3 – External Amenity Area Noise Assessment' the document sets out five points that the External Amenity Area Noise Assessment should cover, and confirms that *“to comply with policy*

guidance any amenity space must have an acoustic environment so that it can be enjoyed as intended”.

The fourth and final element of the full assessment is an 'Assessment of Other Relevant Issues'. This element should identify and consider how national and local planning, noise policies, the magnitude and extent of compliance with ProPG [35] and any unintended adverse consequences are addressed within a particular planning proposal.

8 Aircraft noise thresholds

In accordance with the NPPF [3] the aircraft noise policy should mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life. It is therefore necessary to establish the level of aircraft noise above which adverse effects on health and quality of life can be detected (the 'LOAEL') and a higher level above which significant adverse effects on health and quality of life occur (the 'SOAEL').

8.1 Possible Options for the SOAEL and the LOAEL in Support of the NPSE

In 2013, DEFRA commissioned research into 'Possible Options for the SOAEL and the LOAEL in Support of the NPSE' [25]. The aim of this report was to explore possible options for identifying a noise level for SOAEL and LOAEL for different noise sources. The report does state that:

“The approach adopted in deriving possible LOAEL and SOAEL values for transportation noise sources and effects including sleep and annoyance are based on exposure-response relationships that have been identified in the report as having sufficient evidence to provide a robust relationship. These relationships refer to community responses over the long term and therefore may not be relevant for assessing either noise impacts on individuals or the short term responses where there is an abrupt change in exposure.”

Ultimately, the report recommends a range of noise levels for aircraft for both the LOAEL and the SOAEL in Table 9.3 on page 61 of the report see figure 3. The recommended range of levels for aircraft is for the LOAEL is from 50 to 54 dB $L_{Aeq,16-hour}$ and for the SOAEL starting at 58 to 62 dB $L_{Aeq,16-hour}$. The middle of the SOAEL range is 60 dB $L_{Aeq,16-hour}$. No night-time values are given.

8.2 Planning decisions

8.2.1 Harman Technology Site – Appeal ref: APP/R0660/W/15/3027388

This case related to a proposal for mixed use development, including new dwellings, over a 23 ha site to the north-west end of Mobberley. The determinative issue leading to the dismissal of the appeal was the significant harm to the living environment for future residential occupiers of the site as a result of the noise from aircraft departing and approaching Manchester International Airport.

It was not disputed that internal noise levels could achieve the relevant standard. However it was noted by the Inspector that this would be a 'sealed box' solution, something that should be seen as a last resort, dependant on not being able to open windows and enjoy the benefits of village life. The key issue was the failure to achieve an acceptable external noise level. Despite proposed mitigation it was concluded by the Inspector that the objective to achieve a level below 57 dB $L_{Aeq,16-hour}$ day time noise level could not be met. The Inspector considered that the mitigation proposed would not be effective and as such significant adverse effects on quality of life would not be avoided.

8.2.2 London City Airport, Hartmann Road, Royal Docks, London E16 2PX – Ref: APP/G5750/W/15/3035673

This appeal considered the noise level at which insulation grants should be offered to local residents in connection with the proposed expansion of London City Airport. The Inspector considered the noise levels set out in the APF and the airport's provision of a noise insulation scheme at a level of 57 dB $L_{Aeq,16-hour}$ was considered acceptable. The Inspector considered LOAEL and SOAEL values to be 54 dB $L_{Aeq,16-hour}$ and 63 dB $L_{Aeq,16-hour}$ respectively.

The Inspector also takes the opportunity to clarify the three different uses of the word 'significant' in legislation and policy:

"The use of the term 'significant' in the NPSE (2010) [4] relates to 'significant adverse effects on health and quality of life'. The SOAEL, which is the level above which significant adverse effects occur, is set at a threshold of 63dB LAeq 16-hour. This is not the same as the 'onset of significant community annoyance', which is a term that derived from the development of government air noise policy following the ANIS report (1985) [8] and which is set at a threshold of 57dB LAeq 16-hour. One relates to 'health and quality of life' and the other to 'community annoyance'".

The inspector goes on to state that: *both of these uses of the expression 'significant' are also quite separate from 'likely significant effects' of a development on the environment, which would include humans and*

derives from the original European Union (EU) Environmental Impact Assessment Directive in the 1980s”.

8.2.3 Northern Runway, Heathrow Airport APP/R5510/A/14/2225774

This appeal considered the noise level at which insulation grants should be provided due to runway alterations. This appeal considered appropriate LOAEL and SOAEL values, which in this case were identified by the Inspector to be 54 dB $L_{Aeq,16-hour}$ and 63 dB $L_{Aeq,16-hour}$ respectively (as set out in paragraph 1063 of the decision notice [26]).

8.3 Airports Commission Final Report

This report [27] has been produced to consider three options to assess the case for increase in capacity of a London airport including the implications on noise. Of the options assessed, the report recommends the Northwest Runway option at Heathrow, but it also recommends making significant changes to management of noise to minimise effects to local communities:

- A clear ‘noise envelope’ should be agreed and the airport should be legally bound to stay within these limits. This has to be designed to reflect different local noise priorities. Capping noise levels ensures that the airport and airlines must become more noise efficient if the airport is to grow.
- The third runway expansion at Heathrow would be balanced by a ban on all scheduled night flights between 23:30 to 06:00, which is feasible since the airport daytime capacity would be increased.
- Community compensation of £700 million on noise insulation and support for schools would be a priority.
- Government introduction of a noise charge or levy at major UK airports to ensure that airport users may more to compensate local communities.
- Creation of an independent aviation noise authority, with a statutory right to be consulted on flight paths and other operating procedures.
- Enabling aircraft to remain at a higher altitude as they approach airport boundary would be an effective measure to reduce noise impacts on local communities.

The report also proposes a methodology on how to assess aircraft noise. Based on the responses to the ‘Discussion Paper 05: Aviation Noise’, it was concluded that focusing solely on any single metric would be unlikely to provide a rounded view of the potential impact(s) and thus a ‘noise scorecard’ approach was proposed. The metrics included in the noise scorecard are:

- Day noise level ($L_{Aeq,16-hour}$ 07:00-23:00) and night noise ($L_{Aeq,8-hour}$ 23:00-07:00) looking not only at the 57 dB(A) used by the

Government as its key metric, but also down to the lower 54 dB(A) during the day and the 48 dB(A) at night, and up to 72 dB(A) in both cases

- The European 24-hour period L_{den} covering the 55 dB(A) limit used by the European Commission to assess aviation noise and additional levels up to 75 dB(A)
- N70 contours for the daytime, capturing the population affected during the day by overflights whose noise impacts exceed 70 dB(A), and N60 contours for the night-time.

Reporting the number of people within the noise contours or group of contours together with a points-based system of individual aircraft in relation to their noise impacts also helps to set out a 'noise envelope' target or restriction. As an example, the report uses the agreement on second runway of Manchester Airport where the report presented the area and population contained within its daytime and night-time 60 dB $L_{Aeq,8-hour}$ contour and guarantees that the areas will not be larger than in 2001. While Stansted Airport, planning conditions restrict annual air transport movements to 264,000, passenger numbers to 35 million passengers per year and the area within the 57 dB $L_{Aeq,16-hour}$ contour to 33.9 km².

8.4 Proposed thresholds

8.4.1 External noise levels

After reviewing the information set out in this report, it is considered that the most appropriate metric to use for the setting of noise thresholds for the daytime is the summertime $L_{Aeq,16-hour}$ (taken to be 07:00 to 23:00) and for the night time is the summertime $L_{Aeq,8-hour}$ (taken to be 23:00 to 07:00), despite the EU having adopted the compound day-evening-night metric L_{den} for dose-effect relationships. This is because daytime and night-time noise exposure can clearly lead to quite different reactions in people (principally daytime annoyance and night-time sleep disturbance) and the weightings applied to L_{den} for the evening and night periods are not without criticism [8]. Therefore, it is considered better to remain consistent with current UK practice and define day and night noise exposure separately using the L_{Aeq} metric which shows a good correlation with community annoyance and sleep disturbance [28]. For rough conversions around larger UK airports with some night flights, L_{den} is numerically around 1.5 dB higher than the corresponding $L_{Aeq,16-hour}$ [9].

The use of a scorecard approach utilising multiple metrics as per the Airports Commission: Final Report [27] has been considered, but while the supplementary metrics N60 and N70 provide some guide to the likely maximum sound levels in existing housing stock which traditionally rely upon open windows for summertime ventilation, they are not considered a good basis for assessing acceptability or the design of noise mitigation in new development. BS 8233:2014 [21] recommends that noise levels to

use as a design basis should be established through means of a noise survey at the proposed location of the development, under appropriate operating conditions.

For residential dwellings and other land uses where occupants are expected to sleep, rest, or use the intrinsic external amenity space provided in the development it is recommended that a daytime aircraft noise LOAEL of 54 dB $L_{Aeq,16\text{-hours}}$ be adopted as contemporary evidence suggests that this is the onset of significant community annoyance.

At night, there is comparatively little available guidance on night-time noise other than the 40 dB L_{night} (equivalent to an annual average 40 dB $L_{Aeq,8\text{-hour}}$) recommendation in the 2018 WHO guidelines [12] and the WHO 'Night Noise Guidelines for Europe' [18], and the 45 dB $L_{Aeq,8\text{-hour}}$ LOAEL that the Government has stated it will adopt in respect of criteria for the Secretary of State calling-in planning decisions in the 'Consultation Response on UK Airspace Policy' [11]. Whilst sleep disturbance effects are apparent at 40 dB L_{night} , the 'National Noise Incidence Study 2000/2001' [29] indicates that more than 67% of the UK population are regularly exposed to night-time noise levels (from all transport sources) above this threshold, and the published aircraft noise contours do not extend down to this level. These factors make it difficult to adopt 40 dB $L_{Aeq,8\text{-hour}}$ as the LOAEL for this policy. Instead a level of 48 dB $L_{Aeq,8\text{-hour}}$ is recommended; this is the lowest night-time noise contour currently published by Manchester International Airport so the spatial extent that this policy applies to can be easily determined, and based on the Napier University research [20] is at the upper end of the range of noise levels (14-19 dB) that can be attenuated by an open window (48 dB external level – 30 dB target internal level for bedrooms at night = 18 dB attenuation required from outside to inside). Therefore at aircraft levels above 48 dB $L_{Aeq,8\text{-hour}}$, residential developments will almost certainly require mitigation to be included in the design to meet the target internal noise levels set out in BS 8233:2014 [21]. In the future it may be appropriate to reduce this to 45 dB $L_{Aeq,8\text{-hour}}$ in line with the LOAEL that Government has stated it will adopt as criteria for call-in by the Secretary of State, if appropriate contours are published by Manchester Airport.

Based on current evidence and policy it is recommended that 63 dB $L_{Aeq,16\text{-hour}}$ be adopted as the SOAEL. The SOAEL value of 63 dB $L_{Aeq,16\text{-hour}}$ has been adopted in recent decisions ([26] and [7]) relating to appeals recovered by the Secretary of State.

However, it is recommended that the SOAEL value be kept under review and the policy be flexible in regard to future changes and emerging evidence. In particular it is noted that in the 'Aviation 2050 – The future of UK aviation' consultation response the Government proposes to extend the noise insulation policy threshold to a lower value of 60 dB $L_{Aeq,16\text{-hour}}$. Since the purpose of noise insulation policies are to avoid significant

adverse noise effects to surrounding communities, the implication is that such effects may occur at noise levels above 60 dB $L_{Aeq,16\text{-hours}}$. Based on the SoNA 14 study the percentage of the population expected to be highly annoyed by aircraft noise at 60 dB $L_{Aeq,16\text{-hours}}$ is 17% and at 63 dB $L_{Aeq,16\text{-hours}}$ is 23%.

It is noted that whilst indoor noise levels may be adequately controlled by building design when external noise levels are between the LOAEL and SOAEL values, it has not been proven that noise levels in traditional intrinsic external amenity spaces can be fully mitigated as noise levels approach the SOAEL.

Attenuating aircraft noise in outdoor areas by more than 5 dB is likely to be technically challenging. This represents a particular difficulty for developments with traditional intrinsic outdoor space (e.g. gardens and patios) in situations where the unmitigated daytime aircraft noise levels exceed 60 dB $L_{Aeq,16\text{-hour}}$. Development proposals should be resisted in these circumstances unless the applicant can demonstrate that the noise levels will be mitigated such that a reasonable proportion of the outdoor space may be enjoyed as intended, and that any residual adverse effects are at least partially offset (e.g. by providing a relatively quiet, protected, nearby external amenity space).

All other applications involving external amenity space at noise levels above the LOAEL should be required to demonstrate that they achieve the lowest practicable levels [21] and that the spaces can be enjoyed as intended [5]. No night-time SOAEL is recommended, since it is unlikely that people will be using external amenity space at night and there is limited evidence to support the selection of a SOAEL value. Instead it is recommended that internal noise levels within bedrooms at night be capped to the thresholds in BS 8233:2014 [21] as set out below.

8.4.2 Internal noise levels

Where external noise levels fall between the LOAEL and the SOAEL the advice in NPSE [4] is that effects should be mitigated and reduced to a minimum. It therefore follows that the aircraft noise policy should set out some expectation of the degree of mitigation required.

For residential buildings, hotels, and rooms for residential purposes it is recommended that the guideline indoor ambient noise levels in BS 8233:2014 [21] are adopted. Schools and nursery schools should achieve the internal noise levels set out in BB93: Acoustic design of schools - performance standards [23] and healthcare facilities should achieve the internal noise levels recommended in Health Technical Memorandum 08-01: Acoustics [22]. Advice on suitable internal noise levels for other noise sensitive development may be found in BS 8233:2014 [21] and several other institutions publish guidance which is relevant:

- Building Research Establishment Ltd (BREEAM)
- Chartered Institute of Building Services Engineers
- British Council for Offices

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Appendix A – Draft methodology for consultation



Cheshire East Local Plan Strategy Site Allocations and Development Policies Document

Cheshire East Council

Methodology for Development of Aircraft Noise Policy

17 August 2018

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Appendix A. Proposed Reference List

1. Introduction

1.1 Purpose of this report

Cheshire East Council is currently developing their Site Allocations and Development Policies Document (SADPD), which will form Part Two of the Cheshire East Local Plan. Part One of the Cheshire East Local Plan comprises the Local Plan Strategy, which was adopted on 27 July 2017. A number of policies from previous Local Plans (developed by predecessor local authorities to the current Cheshire East Council) have been saved for continued use until the SADPD has been adopted. One such policy is T18 from Macclesfield Borough Local Plan (2004) which sets out how the council will control new development in areas affected by aircraft noise from Manchester Airport.

Since the adoption of Policy T18 in 2004, there have been many changes to the planning policy system, including the publication of new documents relating to both noise and aviation policy, as well as advances in the understanding of aircraft noise impacts. A 2017 public consultation on the Cheshire East Council's SADPD Issues Paper identified that the inclusion of development policies relating to Manchester Airport was supported and that the Local Plan Policies Map should be informed by the Manchester Airport noise contours. In addition, noise from Manchester Airport was cited as a development constraint to some local areas.

This document presents the methodology setting out how Policy T18 will be reviewed to ensure that the latest evidence on noise impacts is taken into account to produce an updated policy which will be consistent with UK Government planning policy. In light of a number of currently emerging documents that will be expected to play a role in the policy development, this proposed policy development methodology will be included in the first draft SADPD. This will allow public consultation on the methodology to be taken into account, along with the latest relevant guidance documents, in the development of the final policy.

1.2 The aviation industry and noise

The Government's Airports National Policy Statement (ANPS) (2018) acknowledges that the construction and use of airport infrastructure has the potential to affect people's health, wellbeing and quality of life. Infrastructure can have direct impacts on health because of noise and vibration, amongst other environmental issues such as traffic, air quality and emissions, light pollution, community severance, dust, odour, polluting water, hazardous waste and pests. Whilst focussing on airport expansion in the south east of England, the ANPS provides some relevant information applicable to aviation noise at other locations. It states that:

'The impact of noise from airport expansion is a key concern for communities affected, and the Government takes this issue very seriously. High exposure to noise is an annoyance, can disturb sleep, and can also affect people's health. Aircraft operations are by far the largest source of noise emissions from an airport,.....'

However, the Government also recognises that the aviation sector provides significant benefits for local and global economies, including social benefits such as mobility and enhanced connectivity.

The ANPS is currently suspended pending review following a Court of Appeal judgement that it is unlawful since it failed to take into account the Government's commitment to the Paris Agreement on climate change. However, the Court of Appeal agreed with the conclusions of the High Court that the challenges relating to the operation of the Habitats Directive and the Strategic Environmental Assessment Directive, which included noise issues, failed at appeal. It therefore follows that those parts of the ANPS which relate to noise were found to be sound.

The Government's Aviation Policy Framework (APF) (2013) states that aviation benefits the UK economy through its direct contribution to gross domestic product (GDP) and employment, and by facilitating trade and investment, manufacturing supply chains, skills development and tourism. Aviation also brings many wider benefits to society and individuals, including travel for leisure and visiting family and friends.

In the APF, the Government fully recognises the International Civil Aviation Organisation (ICAO) Assembly 'balanced approach' principle to aircraft noise management:

'The 'balanced approach' consists of identifying the noise problem at an airport and then assessing the cost-effectiveness of the various measures available to reduce noise through the exploration of four principal elements, which are:

- *reduction at source (quieter aircraft);*
- *land-use planning and management;*
- *noise abatement operational procedures (optimising how aircraft are flown and the routes they follow to limit the noise impacts); and*
- *operating restrictions (preventing certain (noisier) types of aircraft from flying either at all or at certain times).'*

Local authority planning policy has a key role to play in the second element of the 'balanced approach', by influencing land-use planning and management decisions. This report sets out the methodology that Cheshire East Council will use to formulate a planning policy to balance the potential aircraft noise adverse impacts associated with operations at Manchester Airport against the various benefits that changes in land use and new development could bring to the local area.

2. Planning Policy Context

2.1 National Planning Policy Framework

The development of Policy T18 took into account Planning Policy Guidance Note 24: Planning and Noise (PPG24), which provided guidance on how the planning system could be used to minimise the adverse impact of noise without placing unreasonable restrictions on development. It outlined the main considerations which local planning authorities should take into account when determining planning applications for development which will either generate noise or be exposed to existing noise sources. The value of 57 dB $L_{Aeq, 16\text{ hr}}$ cited by T18 is used in PPG 24 as one of the defining noise levels for the Noise Exposure Categories (NEC) applicable to new dwellings which may be affected by air noise. PPG24 was superseded by the publication of the National Planning Policy Framework (NPPF), first adopted in March 2012.

The NPPF, which has been revised in July 2018, sets out the Government's planning policies for England and how these are expected to be applied. The NPPF sets out the Government's requirements for the planning system, and is a material consideration in planning decisions. In respect to noise, the NPPF states that planning policies and decisions should ensure that new development is appropriate for its location. The likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development should be taken into account. Planning policies should aim to:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;...*

Paragraph 182 of the NPPF draws specific attention to the need to ensure that new development is compatible with existing businesses and community facilities and sets out the 'agent of change' principle:

'Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established.'

The AWP points out that the NPPF does not rule out noise-sensitive development in locations that experience aircraft noise.

2.2 Noise Policy Statement for England

For what constitutes a significant adverse impact, the NPPF refers to the Noise Policy Statement for England.

The Noise Policy Statement for England (NPSE), 2010 provides explanation of the term 'significant adverse impact' from the NPPF. The document also defines the meanings of the terms No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL).

2.3 Planning Practice Guidance

Additional guidance to the NPPF is set out in Planning Practice Guidance (PPG), which sets out how planning can manage potential noise impacts in new development. It advises that planning authorities should take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

PPG states that these potential effects should be evaluated by comparison with the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

2.4 Aviation Policy Framework

The Aviation Policy Framework (2013) (APF) sets out the Government's high-level objectives and policy on aviation. The Government recognises that noise is the primary concern of local communities near airports and states that its impact is to be taken seriously. Chapter 3 of the document covers noise and other local environmental impacts. The APF sets out an overall policy objective in relation to aviation noise, which is consistent with the NPSE:

'...to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise'.

The document also states that the Government's policy on aviation noise fully recognises international approaches and European law as well as the ICAO 'balanced approach' as set out by Resolution A33-7.

The AWP confirms that a noise level of 57dB $L_{Aeq\ 16\ hrs}$ as an average level of daytime aircraft noise is treated as marking the onset of significant community annoyance. However, it recognises the limitations of using a single parameter and encourages the use of alternative measures to reflect how aircraft noise is experienced in different localities.

The AWP also refers to the NPPF, reiterating that planning policies and decisions should ensure that new development is appropriate for its location. In particular, the effects of noise (and other forms of pollution) on health, the natural environment and general amenity are taken into account. The AWP acknowledges that there can be good economic or social reasons for noise-sensitive developments to be located in areas affected by aircraft noise. However, it states that:

'reflecting Government noise policy, the NPPF is quite clear that the planning system should prevent new development being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution. Local planning authorities therefore have a responsibility to ensure that the land use element of the balanced approach is implemented in the context of their local plan policies, including any on noise.'

3. Aircraft Noise Impacts

3.1 Introduction

Historically, the study of aircraft noise impacts has focussed on establishing relationships between aircraft noise exposure and effects such as sleep disturbance and community annoyance. The 1982 Aircraft Noise Index Study (ANIS) (CAA, 1982) was responsible for the adoption of the 57 dB $L_{Aeq, 16 \text{ hr}}$ parameter as the onset of significant community annoyance. However, more recent studies, including the ANASE study (Attitudes to Noise from Aviation Sources in England) published in 2007, and the more recent Survey of Noise Attitudes (SoNA) 2014: Aircraft study suggest that attitudes to aircraft noise may have changed over time.

Recent years have also seen an increase in the strength of the evidence linking environmental noise exposure (road, rail, airport and industrial noise) to health. The health impacts of environmental noise are now widely acknowledged. A number of reviews of noise-induced health effects have been published (for example, WHO 2011), which highlight potential impacts on cardio-vascular disease, cognitive impairment, sleep disturbance and annoyance.

WHO is currently in the process of developing the WHO Environmental Noise Guidelines for the European Region as a regional update to the WHO Guidelines for Community Noise. The Guidelines will include a review of evidence on the health effects of environmental noise to incorporate significant research carried out in the last years. The health outcomes for which the evidence will be systematically reviewed include: sleep disturbance, annoyance, cognitive impairment, mental health and wellbeing, cardiovascular diseases, hearing impairment and tinnitus and adverse birth outcomes.

The guidelines will assess several environmental noise sources such as aircraft, rail, road, wind turbines and personal electronic devices. The document will also consider specific settings such as residences, hospitals, educational settings and public venues. In addition, the guidelines will review the evidence on health benefits from noise mitigation and interventions to decrease noise levels. The guidelines are currently expected to be published by the end of 2018.

With respect specifically to aviation noise, the health impact analysis (HIA) study (published by the Department for Transport, 2018) undertaken to support the ANPS, found commonality between key health issues and those recognised within previous HIA studies on airports. These included noise impacts from additional aircraft flights and ground movement, leading to significant health impacts, as well as air quality impacts and socio-economic benefits and adverse impacts.

Aircraft noise effects on health were reviewed in 2015 as part of the Airports Commission work, and published alongside their Final Report (2015). This review summarised the strength of evidence for aircraft noise effects on cardiovascular health, sleep disturbance, annoyance, psychological well-being and effects on children's cognition and learning. It stated that aircraft noise negatively influences health if the exposure is long-term and exceeds certain levels and concluded that:

'The health effects of environmental noise are diverse, serious, and because of widespread exposure, very prevalent (Basner et al, 2014). For populations around airports, aircraft noise exposure can be chronic. Evidence is increasing to support preventive measures such as insulation, policy, guidelines, and limit values.'

3.2 Receptors

The focus of aircraft noise impact evaluation has historically been the local residential population. However, current good practice suggests that environmental noise (and therefore aircraft noise) has the potential to affect a wider variety of receptors (Institute of Environmental Management and Assessment, 2014).

The HIA undertaken to support the ANPS indicates that several studies have demonstrated that aircraft noise exposure at school has detrimental impacts on children's reading comprehension or memory skills, and is associated with impaired reading comprehension. Schools and other educational establishments are therefore considered to be key receptors for aircraft noise.

The NPPF states that new development should be integrated effectively with existing businesses and community facilities. Various types of community facilities have the potential to experience aircraft noise effects, such as hospitals, places of worship and places for recreation.

It is recognised that aircraft noise may have the potential to affect other types of receptors, including ecological receptors (for example protected species), and built environment receptors such as listed buildings. These receptors would not be considered specifically by the aircraft noise policy, but will be protected by other relevant policies within the SADPD.

3.3 Noise Descriptors

The L_{Aeq} parameter is widely used to describe environmental noise as it is influenced by not only the noise level of a noise source, but also the frequency of occurrence and duration of the noise events. With respect to aircraft noise, the $L_{Aeq\ 16\ hours}$ was identified as the key indicator for community annoyance by the 1982 ANIS report (CAA, 1982), and is used by the AWP. A range of other parameters have also been used to describe and assess aircraft noise, especially during night-time periods, including L_{Amax} , Single Event Level, and number of 'noisy' events. Noise maps for major airports required by The Environmental Noise (England) Regulations 2006 (which transpose EC Directive 2002/49/EC into UK law) use the L_{Aeq} based parameters L_{day} , $L_{evening}$, L_{night} and L_{den} .

The Airports Commission Final Report (2015) responded to the outcome of a consultation on its discussion paper on aviation noise which concluded that focussing solely on any single noise parameter would be unlikely to provide a rounded view of the potential aircraft noise impacts. The Commission developed and used a noise scorecard comprising the following metrics:

- day noise (L_{Aeq16h} 7:00am-11:00pm) and night noise (L_{Aeq8h} 11:00pm-7:00am), looking not only at the 57 dB level used by the government as its key metric, but also down to the lower 54 dB level during the day and the 48 dB level at night, and up to 72 dB in both cases;
- the European 24 hour L_{den} measure, which puts more weight on noise that occurs in the evening or the night than the daytime, covering the 55 dB level used by the European Commission to assess aviation noise and additional levels up to 75 dB; and
- N70 contours for the daytime, capturing the population affected during the day by overflights whose noise impacts exceed 70 dB, and N60 contours for the night-time.

In the AWP, the Government recognises that people do not experience noise in an averaged manner and that the value of the L_{Aeq} indicator does not necessarily reflect all aspects of the perception of aircraft noise. For this reason, they recommend that average noise contours should not be the only measure used when airports seek to explain how locations under flight paths are affected by aircraft noise. Instead the Government encourages the use of alternative measures which better reflect how aircraft noise is experienced in different localities.

4. Proposed Methodology

4.1 Policy aims

The aim of the new Aircraft Noise Policy will be to implement the land-use planning and management aspect of the 'balanced approach' to the management of aircraft noise. The policy will ensure that development proposals at locations potentially affected by significant aircraft noise will be evaluated to establish whether an appropriate level of amenity and wellbeing for residents/users can be achieved without recourse to operating restrictions for Manchester Airport, in line with the intent of The Airports (Noise-related Operating Restrictions) (England and Wales) Regulations 2018 which states that operating restrictions should only be adopted if no other measures are appropriate to address the noise problem.

The policy will be compliant with the Government policy documents outlined in chapter 2 of this report, and will take into account other relevant legislation and policy, such as UK airspace policy. The policy will also be based on the latest understanding of aircraft noise impacts, including those on human health and wellbeing. To this end, the receptors/land-uses to be covered by the policy will not be restricted to residential developments, but will incorporate a range of noise sensitive uses including hospitals, schools, places of worship and recreation.

Consideration will be given to using a range of noise parameters to ensure that a fully rounded view of potential noise impacts is taken into account. These noise parameters will be used to define LOAEL and SOAEL levels for a range of potentially noise sensitive land uses. Taking into account the public consultation responses that advocated the use of the Manchester Airport noise contours to inform the Local Plan Policies Map, the policy will recognise that these contours are regularly updated.

The policy will provide guidance to developers on appropriate forms of land use in areas close to the airport and its flight paths, and also provide assurance to local communities and Manchester Airport itself that the introduction of any new noise sensitive developments will incorporate suitable mitigation to ensure an appropriate level of health and wellbeing for residents/users.

The policy will focus on noise from aircraft operations during arrival and departure. However, airports generate noise from a range of other sources, such as:

- Ground noise; (noise generated by aircraft during taxiing and ground running of engines and other aircraft systems (such as auxiliary power units), and noise generated by vehicles and plant servicing aircraft on the ground.
- Land access noise: noise generated by vehicles travelling on the local road/rail network and accessing the airport. This includes vehicle movements associated with passengers, staff and other activities undertaken at the airport. Noise effects can also be associated with car parking facilities.
- Industrial noise: noise generated by industrial or commercial noise sources such as air conditioning, heating and ventilation units, power generators etc.
- Construction: development and maintenance activities at airports can generate construction noise e.g. from the use of construction plant and machinery.

The policy does not propose to cover these noise sources, as they are more localised or are adequately controlled by other policies within the SADPD.

4.2 Literature review

Prior to the development of the Aircraft Noise Policy, a literature review will be conducted to compile the relevant UK planning policies and legislation, the latest evidence on aircraft noise impacts, and the up-to-date aircraft noise assessment techniques. In addition, aircraft noise policies from local authorities near the ten largest airports in the UK will be reviewed, to establish best practice in this area.

The literature review will cover the following areas:

1. **Legislation** – covering aspects of aviation, and well as the control of noise emissions.
2. **National policies on aviation and planning** – in addition to the policies outlined in chapter 2, consideration will be given to UK airspace policy.
3. **Other national Government issued documents** – such as the Airports Commission work and the Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace (2017). Whilst not constituting formal government policies, these documents have been used to inform Government position on relevant issues.
4. **Acoustics industry guidance** – this will include documents from international bodies such as the World Health Organisation (WHO), and national bodies such as the Institute of Environmental Management and Assessment. In addition, guidelines on noise criteria (including LOAELS and SOAELS) for different noise sensitive land uses will be reviewed.
5. **Local policies from other local authorities affected by aircraft noise** – the Local Plans from local authorities in close proximity to the largest ten UK airports will be reviewed, to establish best practice. The date and status of the policy (whether or not it has undergone public examination) will be considered.
6. **Peer reviewed literature concerning the impacts of aircraft noise, particularly those on human health** – this will be a selective study which focuses on reviews assessing the strength of the evidence for aircraft noise health effects. Large-scale epidemiological field studies of aircraft noise exposure and studies that have been conducted within the United Kingdom, will be used where possible. Priority will be given to peer reviewed literature published in academic journals. This should not be considered an exhaustive review.
7. **Manchester Airport documents** – Manchester Airport is currently consulting on their draft Noise Action Plan 2019-2023, with a view to publishing a final version in autumn 2018, for adoption by DEFRA in 2019. The current Noise Action Plan 2013-2018 will also be reviewed along with the 2012-2018 Night Noise Policy.
8. **Aviation industry documents** – aviation industry bodies such as the Airport Operators Association (AoA) and Sustainable Aviation (UK coalition of airports, airlines, aerospace manufacturers, and air traffic management providers) have published a range of relevant documents setting out their position on various aspects of aviation noise issues. For example, the AoA position paper on aviation strategy argues for improved planning policy guidance on development near airports.

The proposed list of documents to be reviewed is included as Appendix A of this Methodology document. In formulating the policy, the overarching approach will be to give weight to the different categories of document in the order listed above. However, there may be occasions where alterations to this approach are necessary to take into account other factors, such as the date of a document.

4.3 Consultation

By publishing this Methodology document along with the draft SADPD, comment is invited from stakeholders regarding the proposed methodology. In particular, nominations for additional documents to be considered for inclusion in the literature review are invited. In addition, in accordance with the AWP, stakeholder views are sought regarding the types of noise parameters to be used in the policy. Should the policy be based upon the established $L_{Aeq\ 16\ hr\ daytime}$ and $L_{Aeq\ 8\ hr\ nighttime}$ approach, take into account the noise mapping parameters L_{day} , $L_{evening}$, L_{night} , and L_{den} , and/or the balanced scorecard approach used by the Airports Commission?

Stakeholder views on which receptors/land uses should be covered by the policy would also be welcomed, as the policy should reflect local circumstances. Residential properties, offices, hospitals and schools are commonly acknowledged as noise sensitive, however, the Institute of Environmental Management and Assessment 2014 Guidelines for Environmental Noise Impact Assessment detail additional noise-sensitive receptor types, including:

- places of worship;
- open-air amenities;

- cemeteries;
- farms and kennels;
- retail premises; and
- some commercial and industrial installations.

Appendix A. Proposed Reference List

Airports Commission, 2015. Airports Commission: Final Report. (AC, 2015)

Airports Commission, 2015. Aircraft noise effects on health. Prepared for the Airports Commission. Queen Mary University of London. May 2015 (AC, 2015).

Airport Operators Association AOA, 2014. Sustainable Airports. Improving the Environmental Impact of the UK's Global Gateways. (AOA, 2014).

Airport Operators Association AOA (2017). Aviation Strategy Paper. Shaping the UK Aviation Strategy for Sustainable Aviation Growth.

British Standards Institution, 2014. BS8233:2014 Guidance on sound insulation and noise reduction for buildings. London, BSI

Civil Aviation Authority (CAA), 2018. Aircraft Noise and Annoyance: Recent Findings. CAP 1588. (CAA, 2018)

Civil Aviation Authority (CAA) 1980. Aircraft noise and sleep disturbance: final report. DORA Report, 808. (CAA, 1980)

Civil Aviation Authority (CAA), 1982. Brooker, P., J. Critchley, and D. Monkman. UK Aircraft Noise Index Study (ANIS). Published in 1986. (CAA 1982)

Civil Aviation Authority (CAA), 2017. Survey of noise attitudes 2014: Aircraft. CAP 1506. 2017. February 2017. (CAA, 2017).

Department for Communities and Local Government (DCLG), 2018. National Planning Policy Framework NPPF. (DCLG, 2012).

Department for Education and Education Funding Agency, 2015. Acoustic design of schools: performance standards. Building bulletin 93. London: The Stationery Office.

Department for Environment Food and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England, NPSE. (DEFRA, 2010).

Department for Transport (DfT), 2018. Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England. (DfT, 2018).

Department for Transport (DfT), 2018. Health Impact Analysis. Shortlisted Schemes for Airports National Policy Statement. (DfT, 2018).

Department for Transport (DfT), 2017. Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace. October 2017. (DfT, 2017).

European Commission, 2002. Environmental Noise Directive 2002/49/EC. (END, 2002).

HM Government, 2018. Beyond the horizon. The future of UK aviation. Next steps towards an Aviation Strategy. April 2018. (HM Government, 2018)

Her Majesty's Stationery Office (HMSO), 2012. Civil Aviation Act, CAA 2012. (CAA, 2012).

Her Majesty's Stationery Office (HMSO) 1990. Environmental Protection Act 1990 Part III

Institute of Acoustics and the Association of Noise Consultants, 2014. Acoustics of Schools: a design guide. St Albans

Institute of Environmental Management and Assessment, 2014. Guidelines for Environmental Noise Impact Assessment

International Civil Aviation Organization (ICAO), 2007. Guidance on the Balanced Approach to Aircraft Noise Management, ICAO Doc 9829. (ICAO, 2007)

MVA Consultancy, 2007. Attitudes to Noise from Aviation Sources in England (ANASE). Prepared for Department for Transport in association with John Bates Services, Flindell I. and RPS. (MVA, 2007)

Secretary of State for Transport, 2013. Aviation Policy Framework (APF). March 2013. (APF, 2013)

Statutory Instruments 2006 No. 2238. Environmental protection, England. The Environmental noise (England) Regulations 2006. (END, 2006)

World Health Organisation (WHO), 1999. Guidelines for Community Noise. (WHO, 1999).

World Health Organisation (WHO), 2009. Night Noise Guidelines for Europe. (WHO, 1999).

Appendix B – Responses to First Draft SADPD 2018

Consultee	Consultation point	Summary of issue
Brian Chaplin 1154976 FDR2962	ENV 13	<p>As drafted this policy is not nearly strong enough. It must set out to do more than 'evaluate aircraft noise in relation to amenity and well-being'. Nor is an appropriate level of noise defined. Given the woeful failings of Manchester Airport [please identify the culprit] to introduce effective Noise Action Plans for the past decade, CEC needs to limit development in noise zones as specified nationally. The policy appears to deal with the symptoms rather than the cause</p>
Mr Martyn Read (ID: 1187553) FDR3016	ENV 13	<p>Whilst it is acknowledged that it is important to appropriately assess locations potentially affected by significant aircraft noise, our Client has concerns about how policy ENV 13 does not provide clarity but alternatively invites comments on the methodology to be used.</p> <p>The report produced by Jacobs in August 2018 (Background SADPD Evidence Base Ref - FD15) doesn't provide robust conclusions, but invites consultation on the proposed methodology.</p> <p>The decision not to propose allocated sites for housing sites in Mobberley, based on the potential impact of aircraft noise, without presenting robust conclusions from an aircraft noise assessment questions the soundness of the plan.</p> <p>In addition, it is unclear how the strong demand for open market housing in Mobberley and Knutsford, with the apparent Aircraft noise issue, is reflected in the proposed policy.</p> <p>Accordingly, the final paragraph of the Policy should be revised to remove invitation to provide views on the methodology and replaced with wording outlining that the sites specific reports will be considered to assess the suitability of development proposals.</p> <p>file:///ce-userdata/CEHomeDrive\$/AS934M/Downloads/1187553%20-%20Martin%20Read.pdf</p>

Consultee	Consultation point	Summary of issue
<p>Dani Fiumicelli (ID: 1187494) , Temple Group Ltd</p> <p>FDR2928</p>	<p>ENV 13</p>	<p>This is a response to the consultation on the document Cheshire East Local Plan Strategy, Site Allocations and Development Policies Document, Cheshire East Council, Methodology for Development of Aircraft Noise Policy, 17 August 2018 published as part of the development of the Cheshire East Council (CEC) Site Allocations and Development Policies Document (SADPD)</p> <p>Policy ENV 13 – Aircraft Noise, which will form Part Two of the Cheshire East Local Plan.</p> <p>It is understood that this policy applies to the aircraft noise in the context of noise sensitive development and does not cover aircraft noise in regarding developments or changes in operations at Manchester International Airport.</p> <p>This response represents my own views but is being submitted following my involvement with several noise sensitive development projects in the Cheshire East Council district at locations affected by noise from aircraft using Manchester International Airport.</p> <p>After a brief section on general matters this response follows the order and numbering of the consultation document.</p> <p>1.1 General</p> <p>The introduction to the Methodology for Development of Aircraft Noise Policy highlights that the reasons for the proposed revision are that since the introduction of CEC policy T18 regarding aircraft noise and residential development there have been many changes to the planning policy system, including the publication of new documents relating to both noise and aviation policy, as well as advances in the understanding of aircraft noise impacts. As the second paragraph in section 3.1 of the document describes, this is not unique to aircraft noise as the same applies to all other forms of noise. Given that road and rail noise are far more prevalent and affect a much greater proportion of the council's district it would seem appropriate that these sources should also be considered as a wider review of all the noise policy aspects of the local plan.</p>

Consultee	Consultation point	Summary of issue
		<p>1.2 The aviation industry and noise</p> <p>Here the ICAO balanced approach to aviation noise is mentioned and the draft methodology document states that local authority planning policy has a key role to play in the second element of the 'balanced approach', by influencing land-use planning and management decisions. It would be useful if Policy ENV 13 were to expand on the second element of the ICAO balanced approach to reference the advice on land use planning in ICAO guidance DOC 9184, Part 2 Edition NO. 3</p> <p>Dated 27/3/09. This advice can be summarised as not solely to “discourage or prevent” noise sensitive development in areas affected by aircraft noise, but is more nuanced in suggesting that whilst there are locations that are just too noisy where noise sensitive development etc. should be prevented undue to unacceptable effects or on health and quality of life, there are other locations affected by less aircraft noise that can be developed for noise sensitive uses etc. provided adequate mitigation e.g. noise insulation, is provided to avoid significant adverse effects and minimise and mitigate adverse effects. This approach is reflected in the land use section of the Aviation Policy Framework (APF) which recognises that there can be good reasons why people will</p> <p>want to live in areas affected by aircraft noise and that this is permissible provided suitable mitigation is provided. Consequently, the proposed policy should not solely look to “discourage or prevent” noise sensitive development in areas affected by aircraft noise as this would be excessive if no consideration is given to the degree of aircraft noise and/or the potential mitigation that could be included in a scheme to prevent unacceptable and avoid significant effects¹.</p> <p>2.1 National Planning Policy Framework</p> <p>Here the Agent of Change Principle is highlighted. However, this is not a new concept as from at least 1994, PPG 24 paragraph 12 said:</p> <p>“Local planning authorities should consider carefully in each case whether proposals for new noise-sensitive</p>

Consultee	Consultation point	Summary of issue
		<p>development would be incompatible with existing activities.”</p> <p>And paragraph 123 of the previous version of version of the NPPF covered the issue as well.</p> <p>Therefore, the inclusion of specific reference to the ‘Agent of Change’ principle in the revised NPPF amounts to a change of emphasis rather than the introduction of an alien and entirely novel concept. Given the safeguarding of airports via the Aviation Policy Statement (APF) and the exclusion of aircraft from civil and statutory nuisance law under the Civil Aviation Act 1982 s.76(1) or s.77(2)</p> <p>There already is a substantial degree of protection for airports and aircraft against imposition of legal controls against noise, and it would seem excessive and contrary to the principles in paragraph 183 of the revised NPPF to replicate this protection in the local plan.</p> <p>2.2 Noise Policy Statement for England (NPSE)</p> <p>The policy ENV 13 ought to take account that the NPSE seeks to balance the negative effects of noise with the positive benefits of development, and assimilate the following elements of the Policy</p> <p>Statement that:</p> <ul style="list-style-type: none"> • “noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications.” • “There is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focussing solely on the noise impact without taking into account other related factors.” • “The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on

Consultee	Consultation point	Summary of issue
		<p>health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur”</p> <p>2.3 Planning Practice Guidance (PPG)</p> <p>The Policy ENV 13 should recognise that the PPG supplements the NPSE and NPPF policy by defining what are No Observed Adverse Effect (NOEL), Significant Observed Adverse Effects (SOAEL) and Unacceptable Adverse Effects (UAELs) i.e. these terms have specific meaning in the context noise policy and not their normal colloquial connotation.</p> <p>Furthermore, the policy should acknowledge that whilst the PPG advises that Local Planning authorities can develop and include in their Local Plans specific noise standards to apply to various forms of proposed development and locations in their area. Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed i.e. Policy ENV 13 should leave room for the exercise of informed discretion.</p> <p>3. Aircraft Noise Impacts</p> <p>3.1 Introduction</p> <p>The second paragraph describes how the World Health Organisation (WHO) is publishing new guidelines on noise (due in October 2018). These new guidelines have now been published. The policy should note that these guidelines (as most other standards etc.) are not formulated under or endorsed by noise policy or guidance in the UK nor do they reflect the political, economic, social, environmental and historical factors that influence planning and noise policy and guidance in the UK. This is because policy and guidance are not prescriptive as to the method by which the likely response to noise associated with a development is to be determined</p> <p>2 . Instead the PPG identifies factors that might need to be considered when making a judgment. Although the NPSE, NPPF and PPG has adopted two categories of effect from the WHO Guidelines, and then added to</p>

Consultee	Consultation point	Summary of issue
		<p>them a category or level not derived from the Guidelines, namely the "significant observed adverse effect level". They did not adopt or incorporate more from these Guidelines, or any other standard. Accordingly, the NPSE, NPPF and PPG do not adopt or incorporate the specific advice in the WHO's Guidelines or any other standard about what noise levels might be appropriate in the circumstances. Further, the NPSE, NPPF and PPG do not treat the WHO Guidelines or any standard as setting any specific noise threshold that must apply. Instead the decision maker can form their own judgment in the context of the proposed scheme and the site in question and in the light of the technical evidence provided</p> <p>3. Notwithstanding that British Standards are technical guidance for noise experts and the WHO Guidelines are international noise guidance, neither was drafted with the same objectives as planning policy nor are intended to have the same formal role and effect as development plans. Local Planning Authorities ought to be wary of approaching such documents legalistically i.e. as binding them in a manner akin to a contract and should treat them broadly as documents produced by organisations seeking to offer technical advice and guidance</p> <p>4. However, it is necessary to understand them sufficiently to enable them to be considered correctly and more leeway should be given to Local Planning Authorities regarding their meaning and application than would be the case with planning or other policy. This means that care should be taken to ensure that the policy ENV 13 does not elevate the existing or recently published WHO guidelines as immutable limits that must be complied with in every case, not least because they represent the onset of effects i.e. are broadly equivalent to NOELs or LOAELs which policy permits rather than representing SOAELs that policy states should be avoided or prevented.</p> <p>3.3 Noise Descriptors</p> <p>The new policy is to apply to proposed noise sensitive development consequently the Airports' commissions noise score card approach is of limited value as it was formulated to allow comparison of different airport development options rather than evaluation of impacts of aircraft noise on a specific proposed noise sensitive development. For example, knowing that airport option (A) has a greater number of persons affected by noise assessed using the LAeq,t, Lden,N70 and N60 noise descriptors than airport option (B) allows for a relatively</p>

Consultee	Consultation point	Summary of issue
		<p>straightforward decision on which choice has the worst impacts. But knowing the same for a proposed noise sensitive development site is not as helpful, for example;</p> <ul style="list-style-type: none"> • Understanding the day time LAeq,16 hr noise levels affecting a site is useful as these values can be derived from the noise contours produced annually by the airport and compared with specific advice regarding the annoyance due to aircraft noise from recent studies in the UK e.g. CAP 1506/SONA 2014 (which included the area around Manchester Airport). In addition, the night time LAeq,8 hr noise metric can be compared with advice in regard to sleep disturbance and is less likely to mask changes in night time airport noise than the Lden metric, which although it has a 10 decibel penalty at night can still be less sensitive to noise changes at night than the LAeq, 8 hr as it time averages over the full 24 hours rather than just the night period • Lden contours are only produced every 5 years by the airport and therefore rapidly go out of date, and the CAP 1506/SONA 2014 study showed Lden had a worse correlation with subjective response than LAeq,T. • There are no established thresholds of impact for the N70 and N60 metrics against which to weigh these values and contours of these descriptors are not produced by the airport. In addition, the CAP 1506/SONA 2014 study showed these metrics had a worse correlation with subjective response than LAeq,T. <p>Regarding noise sensitive residential development, the most effective descriptors for effects of aircraft noise are day time LAeq,16 hr and night LAeq,8 hr for overall annoyance and sleep disturbance respectively, which can be derived from the airport noise contours. In order to assess the impacts on sleep of peak noise levels from individual aircraft movements, these metrics should be supplemented by site surveys of LAm_{ax} values and number of events at night (covering both westerly and easterly modes of operation of the airport as departure and approach LAm_{ax} values are likely to be different).</p> <p>4.2 Literature review</p> <p>In addition to the sources listed in the proposed methodology the following additional references are suggested.</p>

Consultee	Consultation point	Summary of issue
		<p>1. Secretary of State decisions made regarding planning inquiries where the principle issue has been the question of aviation noise; and what levels can be regarded as representing LOAEL, SOAEL and UAEL. For example, The “Cranford Appeal” issued on the 2nd February 2017 (APP/R5510/A/14/2225774) and The London City Airport Development Programme Appeal issued on the 26th July 2016 (APP/G5750/W/15/3035673). The clarification of policy and guidance by the Secretary of State in these decisions provides helpful insight regarding LOAEL, SOAEL and UAEL values for aircraft noise.</p> <p>2. The ProPG jointly published by the Chartered Institute of Environmental Health, The Institute of Acoustics and the Association of Noise Consultants in May 2017. This supports the implementation of policy and guidance regarding noise and planning and noise sensitive development</p> <p>3. ANASE Non-SP Peer review: CAA and Bureau Veritas, October 2007 – explains why you can’t rely on this study.</p> <p>4. CAP1506c SoNA 2014 peer review - explains why you can rely on this study.</p> <p>5. A Review of “Aircraft noise and cardiovascular disease near Heathrow Airport in London: small area study. Stephen Stansfeld, , Colin Grimwood, Bernard Berry (file:///C:/Users/User/Downloads/13318_ReviewofSAHSUstudy_Stansfeld_Grimwood_Berry_Final.pdf) - highlights how effectively the only peer reviewed epidemiological field study of aircraft noise exposure and health in the UK adds to the body of evidence that aircraft noise can affect health, but concludes that the “magnitude of the size of the reported effect is likely to be subject to error”.</p> <p>6. WHO Environmental Noise Guidelines for the European Region: A Systematic Review of Transport Noise Interventions and Their Impacts on Health; Alan Lex Brown and Irene van Kamp 2, Int. J. Environ. Res. Public Health 2017, 14, 873; doi:10.3390/ijerph14080873 – confirms that noise mitigation i.e. sound insulation, moderates adverse responses to aircraft noise.</p> <p>7. Health Statistics for the areas around the airport – because noise and health studies and the recent WHO Guidelines develop odds ratios or other means of predicting the likely change in a health effect from the</p>

Consultee	Consultation point	Summary of issue
		<p>baseline in an unexposed population. Correctly interpreting information from studies on the effects of aircraft noise on health in a local plan policy context will be dependent on establishing the local baseline for the various health effects considered.</p> <p>https://cheshireeast-consult.objective.co.uk/portal/planning/cs/sadpd/firstdraft?pointId=s1534935627362#ID-5044611-POLICY-ENV-13</p>
<p>Tatton Group 1187474 FDR2892</p>	<p>ENV 13</p>	<p>It is concerning that detailed draft wording of this policy has not been provided through the draft SADPD and instead comment is only sought on the methodology document. Whilst Tatton reserve the right to comment on the draft policy wording, the opportunity to comment on the proposed methodology document is welcomed. In responding to the particular questions raised within this section, we would respond as follows: The Agent of Change Principle in paragraph 182 of the revised NPPF is highlighted. Given the exclusion of aircraft from civil and statutory nuisance law under the Civil Aviation Act 1982 s.76(1) or s.77(2), there is already a substantial degree of protection for airports and aircraft against imposition of legal controls against noise, and it would be excessive and contrary to the principles in paragraph 183 of the revised NPPF to replicate this protection in the local plan. The methodology/policy should recognise that the Government's Noise Policy Statement for England seeks to balance the negative effects of noise with the positive benefits of development, for example it specifically states that noise should not be considered in isolation from the social and economic benefits of a scheme, and that less than ideal, but still acceptable conditions, are allowed. The policy should recognise that whilst the PPG advises that Local Planning authorities can develop and include in their Local Plans specific noise standards to apply to various forms of proposed development and locations in their area, it should also that in doing so care should be taken to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed. In using guidelines and standards e.g. WHO guidelines and British Standards, to develop the policy it should be recognised that none of those referenced in the proposed methodology are formulated under or endorsed by noise policy or guidance in the UK nor do they reflect the political, economic, social, environmental and historical factors that influence planning and noise policy and guidance in the UK. Neither were they drafted with the same objectives as planning policy nor are intended to have the same formal role and effect as development plans. In addition to this, there is case law stating that decision makers should be particularly wary of approaching</p>

Consultee	Consultation point	Summary of issue
		<p>such documents legalistically i.e. as binding them in a manner akin to a contract, and should treat them broadly as documents produced by organizations seeking to offer technical advice and guidance. Moreover, whilst it is necessary to understand them sufficiently to enable them to be considered correctly more leeway should be given to the decision-maker regarding their meaning and application than would be the case with planning or other policy. This means that care should be taken to ensure that the policy coming out of this process does not elevate the current or soon to be published WHO guidelines etc. as immutable limits that must be complied with, not least because they represent the onset of effects i.e. broadly equivalent to NOELs or LOAELs which policy permits rather than representing SOAELs that policy states should be avoided or prevented. The new policy is to apply to proposed noise sensitive development consequently the Airports Commission's noise score card approach is of limited value as it was formulated to allow comparison of different airport development options rather than evaluation of impacts of aircraft noise on a specific proposed noise sensitive development. For example, knowing that airport option (A) has a greater number of persons affected by noise assessed using the LAeq,t, Lden, N70 and N60 noise descriptors than airport option (B) allows for a straightforward decision on the which choice has the worst impacts. But knowing the same for a proposed noise sensitive development site is not as helpful. In relation to noise sensitive residential development, the most effective descriptors for aircraft noise are LAeq, 16 hr and LAeq,8 hr for overall annoyance and sleep disturbance respectively, which can be derived from the airport noise contours, supplemented by site surveys of LAm_{ax} peak noise values at night (covering both westerly and easterly modes of operation of the airport as departure and approach LAm_{ax} values are likely to be different). The reference to the ICAO balanced approach should include the advice on land use planning in ICAO guidance DOC 9184, Part 2 Edition NO. 3 Dated 27/3/09. This advice can be summarised as not solely to "discourage or prevent" noise sensitive development in areas affected by aircraft noise, but is more nuanced in suggesting that whilst there are locations that are just too noisy where noise sensitive development etc. should be prevented, there are other locations affected by less aircraft noise that can be developed for housing etc. provided adequate mitigation e.g. noise insulation, is provided to avoid significant effects. In addition to the sources listed in the proposed methodology the following additional references are suggested.</p> <ul style="list-style-type: none"> • Secretary of State decisions made regarding planning inquiries where the principle issue has been the question of aviation noise; and what levels can be regarded as representing LOAEL, SOAEL and UAEL. For

Consultee	Consultation point	Summary of issue
		<p>example, The “Cranford Appeal” issued on the 2nd February 2017 (APP/R5510/A/14/2225774) and The London City Airport Development Programme Appeal issued on the 26th July 2016 (APP/G5750/W/15/3035673). The clarification of policy and guidance by the Secretary of State in these decisions provides helpful insight regarding LOAEL, SOAEL and UAEL values for aircraft noise.</p> <ul style="list-style-type: none"> • The ProPG jointly published by the Chartered Institute of Environmental Health, The Institute of Acoustics and the Association of Noise Consultants in May 2017. This provides clarification of policy and guidance regarding noise and planning and noise sensitive development • ANASE Non-SP Peer review: CAA and Bureau Veritas, October 2007 – explains why you can’t rely on this study. • CAP1506c SoNA 2014 peer review - explains why you can rely on this study. • A Review of “Aircraft noise and cardiovascular disease near Heathrow Airport in London: small area study. Stephen Stansfeld, Colin Grimwood, Bernard Berry - highlights how effectively the only peer reviewed epidemiological field study of aircraft noise exposure and health in the UK adds to the body of evidence that aircraft noise can affect health, but concludes that the “magnitude of the size of the reported effect is likely to be subject to error”. • WHO Environmental Noise Guidelines for the European Region: A Systematic Review of Transport Noise Interventions and Their Impacts on Health; Alan Lex Brown and Irene van Kamp 2, Int. J. Environ. Res. Public Health 2017, 14, 873; doi:10.3390/ijerph14080873 – confirms that noise mitigation i.e. sound insulation, moderates adverse responses to aircraft noise. <p>Health Statistics for the areas around the airport – because noise and health studies develop odds ratios or other means of predicting the likely change in a health effect from the baseline in an unexposed population. Correctly interpreting information from studies on the effects of aircraft noise on health in a local plan policy context will be dependent on establishing the local baseline for the various health effects considered. In summary it is concerning that the detailed draft wording of this policy has not been provided through the draft</p>

Consultee	Consultation point	Summary of issue
		<p>SADPD and instead comment is only sought on the methodology document. Nevertheless, there are clearly significant issues with the proposed methodology set out within the SADPD and it will be important for these to be corrected prior to the drafting of any policy.+ Appendix</p>
<p>Louise Morrisey (ID: 719710) , Peel Land and Property Group Management Ltd</p>	<p>ENV13</p>	<p>There is as yet no draft of this policy to comment on, but the related commentary confirms that because of aircraft movements over the borough associated with take-off and landing at MIA, particularly in the Mobberley and Knutsford areas, the council intends to include a policy in SADPD dealing with the effects of aircraft noise.</p> <p>The commentary goes onto confirm that the policy will seek to make sure that development proposals at locations potentially affected by significant aircraft noise are appropriately evaluated so that an appropriate level of amenity and well-being can be achieved for future residents/users.</p> <p>To support work on the drafting of the policy, and presumably so as to ensure that any related noise levels and related impacts fully satisfy relevant policy and industry standards on the same, the council has published a methodology, 'Methodology for Development of Aircraft Noise Policy', alongside the SADPD which explains the way in which this policy is intended to be prepared.</p> <p>Building on this the council confirm that it will welcome the views of representors on the proposed approach set out in the methodology, particularly:</p> <ul style="list-style-type: none"> a) What other documents should be considered, in addition to those referred to in the literature review and listed in Appendix A of the methodology paper? b) What type of noise parameters should be used in the policy? c) Which receptors/land uses should be covered by the policy? <p>Peel, through its advisers, Temple, has considerable knowledge and expertise on the issues this policy, once drafted, will seek to address, and as such it is very keen to liaise with and open a dialogue with the council</p>

Consultee	Consultation point	Summary of issue
		<p>and its professional advisers so as to assist it develop this policy.</p> <p>By way of background on this, Temple has already drafted a response, in the form of a note, on the Methodology for Development of Aircraft Noise Policy so as to assist the council and add weight to the offer made above. This forms Appendix 1 of our letter. The note covers a range of general matters and comments in more detail on key matters set out in the methodology. It also sets out a literature review to assist future work.</p> <p>Peel is hopeful that its offer of putting its consultants forward to work with the council's planning and EHO team will be taken up, and it will follow this up post the making of these representations to hopefully progress this offer further.+ file:///ce-userdata/CEHomeDrive\$/AS934M/Downloads/719710%20Peel%20Appendix%201%20Aircraft%20Noise%20(2).pdf</p>
<p>Adam Keppel-Green (ID: 763041) , Knutsford Town Council</p> <p>FDR2066</p>	<p>ENV 13</p>	<p>ENV12 and ENV13 are too general and the Town Council believes the airport operations need more attention in these policies, both for aircraft emissions over Knutsford and the horrific effects of noise in the town, particularly from aircraft landing on Runway 2 in an easterly direction at night. Further development of new homes under the easterly final approach to Runway 2 should be refused for environmental reasons alone. These issues could also be dealt with in Health Policies.</p>
<p>Mrs Natalie Belford (ID: 763340) , Manchester Airports Group</p> <p>FDR 1820</p>	<p>ENV13</p>	<p>The effect of aircraft noise upon the amenity of local residents requires careful consideration in the planning process and development should be limited in certain affected areas. Policy should therefore be included within the SADPD that controls development (residential and other noise sensitive development) in areas adversely affected by aircraft noise and should provide details of the levels of noise at which planning permission would be refused or granted subject to appropriate protection against noise. This would limit development to that which is compatible with noise levels in the area and ensure that development is capable of occupation without undue nuisance from aircraft noise. The policy should reflect guidance contained within the National Planning Policy Framework (NPPF) and Noise Policy Statement for England (NPSE).</p>

Consultee	Consultation point	Summary of issue
		<p>We also strongly recommend that the aircraft noise policy is informed by Manchester Airport's Noise Action Plan and regularly updated noise contours. Consultation on the draft Noise Action Plan 2019-2023 took place earlier this year and it is now awaiting formal adoption. We are making a commitment in the Noise Action Plan to offer predicted noise contours, which will allow the policy to take forecast noise into consideration.</p> <p>Another forecast impact that can be considered when writing the aircraft noise policy is Airspace Change. This is a nationally promoted review of airspace by NATS (National Air Traffic Services) that will re-position some of the airways over the UK and will determine the future routing of aircraft in the vicinity of Manchester Airport. Consultation on Airspace Change is imminent, and we therefore advise that you are mindful of this to ensure that the aircraft noise policy is not compromised by the outcome of this.</p> <p>We are keen to work with you to develop a suitable aircraft noise policy and suggest we do this ahead of your next phase of consultation on the final draft SADPD.</p>
<p>Mr Paul Webster (ID: 1183441)</p> <p>FDR1221</p>		<p>Object</p> <p>This draft Policy is weak and ineffective. It is hoped it will be informed and strengthened by the further information to be evaluated.</p>
<p>Andrew Needham (ID: 617947) , CPRE Cheshire</p> <p>FDR162</p>		<p>CPRE objects to the fact that the stated purpose of the intended policy is very limited, only to "evaluate" for amenity and wellbeing; and even then it is not stated (as it should be) that if the vague "appropriate" level is not achievable, planning permission will not be granted for development proposals. Some people might wonder whether the intended policy is cosmetic and will have any teeth. The effect is to be considered, but not the cause. What about limiting aircraft noise?</p> <p>Reference is made to "the airport". It should be to "Manchester Airport".</p>

Appendix C – Responses to Publication Draft SADPD 2019

Consultee	Consultation point	Summary of issue
<p>Tatton Group (ID: 1187474) PBD2568</p>	<p>ENV 13</p>	<p>Tatton strongly object to this policy, which precludes residential development in certain areas (including Knutsford) – including potentially a ban on extensions and conservatories - and is not reflective of national guidance.</p> <p>The policy as currently drafted is overly restrictive going far beyond the requirements of UK legislation. It is notable that existing and proposed future aviation noise policy recognizes that land affected by aircraft noise can be developed for residential development, provided that appropriate mitigation is included to ensure adequate noise conditions are achieved. The wording of Policy ENV 13 does not reflect this and provides no flexibility for mitigation measures.</p> <p>Turning to technical matters, whilst the SONA14/CAP1506 report (which is the basis of this policy) can be interpreted as justifying a reduction in the sound level that represents the Lowest Observed Adverse Effect Level (LOAEL) for aviation noise to 54 decibels (LAeq,16hrs) due to increased community sensitivity nowadays at relatively low aviation noise levels; at the same time it bolsters the case for 63 decibels (LAeq,16hrs) being the threshold of Significant Observed Adverse Effect Level (SOAEL) for aviation noise as community sensitivity to moderate to high levels of aviation noise has not increased at or above this level. Furthermore, scrutiny of the outcomes of the SONA14/CAP1506 report shows it includes consideration of the impacts of aviation noise on people outside their homes in both private and public amenity spaces. Consequently, there is no need to have different SOAEL values for internal conditions and outdoor amenity spaces.</p> <p>Recent Secretary of State planning appeal decisions and existing noise insulation requirements for road, rail and aircraft noise confirm a precedent that SOAEL for aviation noise should be 63 dB LAeq,16 hrs and is appropriate.</p> <p>However, the nature of aviation noise means that protecting outdoor amenity spaces to achieve a LOAEL of</p>

Consultee	Consultation point	Summary of issue
		<p>54 dB LAeq,16 hrs to ensure an overwhelming proportion of the exposed population are unlikely to be highly annoyed can be impractical. However, a substantial majority of the population are still protected against being highly annoyed at aviation noise levels up to 63 dB LAeq,16 hr.</p> <p>Between 2001 and 2011, the population in the 60 to 63 dB LAeq,16 hr noise contours at 10 of the main UK airports grew by around 10%, showing that significant numbers of people have been and are prepared to trade off the dis-benefits of living in areas exposed to such levels of aviation noise against the benefits of doing so e.g. to gain from employment, housing availability and affordability, leisure and transportation opportunities.</p> <p>A blanket ban to prevent resident development in areas subject to these noise contours is therefore entirely unjustified and inappropriate. In the Cheshire East context, this would prevent a number of areas (including Knutsford and Mobberley) from providing additional housing in otherwise suitable and sustainable locations without any allowance for noise mitigation measures but if the logic were applied elsewhere vast swathes of the UK including South Manchester and West London would be sterilized from development removing hundreds of thousands of homes from the land supply and significantly exacerbating the Housing Crisis.</p> <p>The introduction of this strict policy has national interest ramifications in the context of times of critical and acute housing shortages. The NPPF is clear on the Government's continued commitment to significantly boost the supply of housing (paragraph 59), most recently evidenced by the Government target to deliver 300,000 homes a year (https://www.gov.uk/government/news/government-announces-newhousing-measures). The introduction of Policy ENV3 is significantly at odds with this, particularly poignant in a localized context which should be pursuing ambitious development targets to take advantage of the £1bn new terminal under construction at Manchester Airport, the £200m A556, M6 and M56 Smart Motorway upgrades, improvements to the Mid Cheshire Rail Line, HS2 and Northern Powerhouse Rail.</p>
Steve Melligan, The Crown Estate	ENV 13	The Crown Estate is the freehold owner of land in Cheshire East including land in North West Knutsford allocated for residential and commercial development under Policy LPS 36 of Cheshire East's Local Plan Strategy adopted July 2017 ('the LPS'). The Crown Estate is also the freehold owner of land in North West Knutsford that has been safeguarded for potential longer-term development under Policies LPS 39 and LPS

Consultee	Consultation point	Summary of issue
(ID: 1075552) PBD1738		<p>40 of the LPS.</p> <p>Policy ENV 13 sets a series of thresholds to control development in relation to aircraft noise. However, noise risk itself should not determine whether a development is acceptable as consideration should also be given to acoustic design. Therefore, there needs to be greater flexibility in the policy, including flexibility in the application of any thresholds, in order to enable the risk and associated mitigation to be fully considered. Without this, Policy ENV 13 may constrain delivery of development land. Furthermore, noise should not be considered in isolation, with the NPPF (2019), at paragraph 8, requiring economic, social and environmental objectives to be considered together - that is, the negative effects of noise should be balanced against the positive benefits of development.</p> <p>For the reasons set out above, Policy ENV 13 is not effective and is not consistent with national policy.</p>
Mrs Anna Benksy Peel Real Estate Properties Ltd (ID: 1227568) PBD1554	ENV 13	<p>The policy is fundamentally flawed. Its main fault is to wrongly set the levels of SOAEL and UOAEL – the effect of which is to wrongly calibrate the threshold levels in terms of mitigation and compensation. As it is currently worded is not consistent with Government policy or guidance, nor is it justified by evidence. Accordingly, it cannot be regarded as sound.</p> <p>There is no prohibition in relation to residential development above 63 dB LAeq,16hour in national planning policy (para 170) or guidance (the PPG). The PPG expressly contemplates mitigation at this level in order to avoid significant effects. The Aviation Policy Framework uses this level as the threshold that airports should start to offer noise insulation and Secretary of State decisions confirm that by using noise insulation the Significant Observed Adverse Effects of noise (SOAEL) can be avoided. Moreover, there is no suggestion in the Jacobs [Aircraft Noise Policy Background Report (2019) Pub15] advice to the Council, which forms a background evidence base document to the SADPD, that 63dB LAeq should represent a cut-off point and above that level development would necessarily be unacceptable (ie equating to an UOAEL noise level). Such an approach would be inconsistent with the Cranford appeal decision cited earlier. It is of also concern that the Jacobs report makes no reference to the mitigation and compensation requirements in the Aviation Policy Framework; nor does it fully consider the Secretary of State’s decision in the Cranford appeal. This element of the draft policy is therefore neither consistent with national policy and guidance, nor justified by the</p>

Consultee	Consultation point	Summary of issue
		<p>evidence.</p> <p>The policy applies a presumption against residential development between 60 and 63 dB LAeq. However, noise levels within these bounds would lie between LOAEL (54 dB) and SOAEL (63 dB). NPPF para 170 seeks to prevent new development being adversely affected by “unacceptable” levels of noise pollution. Noise below SOAEL does not come within the “unacceptable” category. Para 180 establishes a policy requirement to seek to “avoid noise giving rise to significant adverse impacts on health and the quality of life”. Below SOAEL that impact does not arise. The PPPG indicates that the approach development should take to dealing with noise between these two levels is to “mitigate and reduce to a minimum”. It is not suggested that this noise level should be avoided or prevented. Contrary to this policy and guidance, this part of the draft policy seeks to prevent development even when there is no significant observed adverse effect. As with the first part of the draft policy, the approach here is inconsistent as well with the Secretary of State’s approach in the Cranford decision. Moreover, it is not justified by the Jacobs report, which treats 63dB Laeq as SOAEL (and does not properly consider the Cranford decision). This part of the draft policy is therefore not consistent with national policy or guidance, nor justified by the evidence. The draft policy admits of an exception but only where “external amenity spaces do not form an intrinsic part of the overall design”. It follows from the above that this part of the criterion is similarly not justified or necessary.</p> <p>The requirement for “suitable noise control measures” is too vague.</p> <p>The use of 54 dB LAeq,16hour as the starting point for requiring noise control measures fits with the concept of LOAEL in this case from policy i.e. the point at which it is appropriate to start to consider how noise can be mitigated. The requirement to provide an Acoustic Design Statement (as per the ProPG) to meet the noise recommendations of BS 8223 is policy compliant and standard practice. Both these documents recognise that noise inside dwellings can be controlled by building design and construction to achieve acceptable conditions. The noise guidelines in BS 8223 and the ProPG for outdoor amenity spaces are ideal/aspirational and higher noise levels can be permitted where it is not practicable to achieve such a value.</p> <p>Acoustic conditions in schools are controlled via the Building Regulations. Regulations and the standards of BB93 are enforced via this legislation. Using the planning system to control the acoustic conditions in</p>

Consultee	Consultation point	Summary of issue
		<p>educational development to this level of detail is in conflict with the advice of paragraph 183 of the NPPF that “The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes).</p>
<p>Mr Paul Webster (ID: 1183441) PBD1015</p>	<p>ENV 13</p>	<p>I am not satisfied that this policy is sound. It may also not be legally compliant.</p> <p>In any event, there appears to be no clarity on policy towards aircraft noise at night generated by aircraft movements at Manchester Airport. Why should policies apply on night-time aircraft noise limits at London Airports, but similar or more effective policies on night-time aircraft noise limits not apply also at Manchester Airport?</p> <p>Moreover, where development is proposed in the vicinity of Manchester Airport, for example in Knutsford or Mobberley, and those proposals are deemed by Cheshire East Council's Environmental Health Officers (or equivalent job titles) as would be affected by aircraft noise that such noise is prejudicial to the health of future residents (or other people at that location), policy should be drafted to ensure that such development proposals are refused planning permission.</p>
<p>Mrs Natalie Belford Manchester Airports Group (ID: 763340) PBD931</p>	<p>ENV 13</p>	<p>We welcome the clarity that policy ENV 13 provides and propose just one addition to the wording of the policy related to residential development. Under criteria 1(ii) we recommend specifying that if planning consent is granted then planning conditions will be imposed to ensure a commensurate level of protection against noise within dwellings. Suggested wording is as follows:</p> <p>1(ii) Planning permission for residential development will not normally be granted within areas subject to daytime noise levels between 60 and 63 dB LAeq,16hour (07:00-23:00). If, exceptionally, it is considered that other material considerations outweigh the adverse noise effects, then planning permission should only be granted for developments where the external amenity spaces do not form an intrinsic part of the overall design, for example smaller, non-family one bed and studio housing. If planning consent is granted, then planning conditions will be imposed to ensure a commensurate level of protection against noise within</p>

Consultee	Consultation point	Summary of issue
		dwellings.
<p>Mrs Debbie Jamison</p> <p>(ID: 546346)</p> <p>PBD790</p>	ENV 13	<p>The noise policy in relation to outdoor space at educational development has not been restricted and this appears an oversight.</p> <p>Revisions sought: Educational development, extension of or entirely new educational space that relies on outdoor amenity space will be refused where the daytime noise levels outdoors are in excess of those outlined for residential development. This is because outdoor space is an integral part of the education and children cannot be expected to be indoors all the time.</p> <p>Hotels and rooms for residential purposes, instead of including student halls of resident and school boarding should exclude them. Outdoor amenity space for students and boarders should be subject to the residential standards.</p>
<p>Mr Brian Chaplin</p> <p>South Knutsford Residents group</p> <p>(ID: 1227036)</p> <p>PBD725</p>	ENV 13	<p>Strong support for this policy and the reduction of noise pollution. It is crucial that the Authority contributes fully and robustly to the current cycle of consultations on the planned increase in the use of airspace to the south and west of Manchester International Airport. The profits of the airport accrue to Greater Manchester but the harm brought about aircraft noise is borne by CEC residents. The existing S106 agreements are now out of date and agreements on restriction of night flights need to be reviewed, extended and confirmed. Although these strategies cannot be included in this policy, they offer the most effective mitigation of noise. Gardens under flight paths cannot be double-glazed.</p>

Appendix D - Literature Review

Table D.1 Legislation, planning policy and guidance, planning decisions and planning consultations.

Document	Overview
<p>HM Government, 2018. Beyond the horizon. The future of UK aviation. Next steps towards an Aviation Strategy. [3]</p>	<p>The Aviation Strategy is currently being developed by the Government and aims to set out the long-term direction to 2050 and beyond, focusing on achieving a safe, secure and sustainable aviation sector meeting everyone's needs. The report is aimed at making the aviation industry work for its customers ensuring a safe and secure way to travel whilst helping to build a global and connected Britain, encouraging competitive markets, developing innovation, technology and skills whilst managing noise and other environmental impacts. As airports grow its important that any adverse noise impacts are mitigated where possible. Newer aircraft are reported to be up to 50% quieter on departure on 30% quieter on arrival due to more stringent international noise standards. It is important for the Government to balance noise impacts on communities with benefits to the UK economy.</p>
<p>Department for Transport (DfT), 2018. Airports and National Policy Statement: new runway capacity and infrastructure at airports in the South East of England. [4]</p>	<p>The report outlines how the UK aviation sector plays an important part in the modern economy but is also (particularly in the South East) at or near to capacity which is having an adverse impact on the UK's economy. One additional runway at Heathrow by 2030 combined with a significant package of noise mitigation measures has been unanimously concluded by the Airports Commission as being the preferred option. The Airport National Policy Statement (NPS) sets out the Government policy for expanding airport capacity which includes judging any new proposals on their individual merits by relevant planning authorities and taking environmental impacts into account. It does not affect any Government policy on wider aviation issues.</p>
<p>Department for Transport (DfT), 2018. Health Impact Analysis. Shortlisted Schemes for Airports National Policy Statement. [5]</p>	<p>An Appraisal of Sustainability has been prepared by the Department of Transport as a means of informing the Government of environmental, social and economic effects expected from three, shortlisted expansion schemes for UK aviation. Each scheme was deemed credible for expansion, capable of delivering value added enhancements to the UK's economy. The report includes an impact analysis of the schemes to assess health, well-being and quality of life for communities in the surrounding areas should the proposed schemes be granted permission to go ahead.</p>
<p>Department for Transport (DfT), 2017. Consultation Response on UK Airspace Policy: A framework for balanced decisions in the design and use of airspace. [6]</p>	<p>In February 2017 the Government launched a consultation on how to address the noise impacts of aviation and this report presents the Government's response to the consultation. The changes made were in part a response to support the delivery of the airspace changes needed for the proposed Northwest Runway at Heathrow. The policies set out within this document are an update to some of the</p>

Document	Overview
	policies on aviation noise contained within the Aviation Policy Framework and should be viewed as the current Government policy. The Government also intends to develop aviation noise policy further through the Aviation Strategy consultation process.
Airport Operators Association AOA, (2017). Aviation Strategy Paper. Shaping the UK Aviation Strategy for Sustainable Aviation Growth [7]	The Government has launched a public discussion to create a new Aviation Strategy which aims to put both passengers and business at its core. This paper sets out the Airport Operators Association's vision for a strategy to deliver the connectivity the country needs for a flourishing economy, creating jobs and growth across the UK. It states that UK airports are looking to Government to set out a clear long-term plan to truly unlock the potential of UK aviation, which will give airports the certainty to make long-term investment decisions and deliver on the Aviation Strategy at a local level. In respect of noise it calls for improved planning guidance and greater consistency from Government on land-use, and the safeguarding of both land and airspace that would be required by an airport for future expansion.
ProPG: Planning & Noise jointly published by the Chartered Institute of Environmental Health, The Institute of Acoustics and the Association of Noise Consultants in May 2017 [8]	ProPG: Planning & Noise - Professional Practice Guidance on Planning & Noise supports the implementation of policy and guidance regarding noise and planning and noise sensitive development. Due to it having a significant effect on quality of life, health and community amenity, noise is outlined as a material consideration in the planning process and a key aspect of sustainable development requiring serious attention when new developments may create additional noise or be sensitive to prevailing acoustic conditions. Restricted to the consideration of new residential developments, ProPG encourages consistency throughout all planning and decision making on acoustic matters whilst reflecting the National Planning Policy Framework [9] and Noise Policy Statement for England [10] and any other authoritative sources of guidance.
The "Cranford Appeal" issued on the 2nd February 2017 (APP/R5510/A/14/2225774) [11]	This appeal considered the noise level at which insulation grants should be provided due to runway alterations. This appeal considered appropriate LOAEL and SOAEL values, which in this case were identified by the Inspector to be 54 dB LAeq,16-hour and 63 dB LAeq,16-hour respectively
The London City Airport Development Programme Appeal issued on the 26th July 2016 (APP/G5750/W/15/3035673) [12]	This appeal considered the noise level at which insulation grants should be offered to local residents in connection with the proposed expansion of London City Airport. The Inspector considered the noise levels set out in the Aviation Policy Framework [13] and the airport's provision of a noise insulation scheme at a level of 57 dB LAeq,16-hour was considered acceptable.
Airports Commission, 2015. Airports Commission: Final Report [14].	The Airports Commission Final Report considers three options for increasing capacity at a London airport whilst reviewing implications for noise A noise 'scorecard approach' was used to assess options; this approach was based on responses to the 'discussion paper 05: Aviation Noise' after concluding that the focus on any single metric would be an unlikely way to give a

Document	Overview
	<p>rounded view on potential impacts: Day noise level (LAeq, 16h 07:00-23:00) and night noise (LAeq, 8h 23:00-07:00) which proposes assessing not only the 57 dB(A) currently used by the Government as a key metric, but also rather a lower level of 54 dB(A) during the day and 48 dB(A) at night, and up to 72 dBA in both cases The European 24 hour period L_{den} covering the 55 dBA limit used by the European Commission to assess aviation noise and additional levels up to 75 dBA N70 contours for the daytime, capturing the population affected during the day by overflights whose noise impacts exceed 70 dBA, and N60 contours for the night-time. The report concludes that the proposal for the Northwest Runway at Heathrow Airport, with measures associated with the environmental and community impacts being addressed, presents the strongest case.</p>
<p>Airport Operators Association AOA, 2014. Sustainable Airports. Improving the Environmental Impact of the UK's Global Gateways [15].</p>	<p>Aviation is vital to the UK supporting tourism, exports and industry and is a significant benefit to the economy and society. The Government believes that aviation needs to grow whilst respecting our environment and quality of life. The report demonstrates what airports have been doing in recent years to deliver growth and sustainability whilst limiting climate change and noise effects and sets out steps that the Government can take to help airports further reduce these effects.</p> <p>The Sustainable Aviation Noise Challenge illustrates the complexity of noise and suggests which aspects industry can control. Airports are dealing with noise by:</p> <ul style="list-style-type: none"> a) Reducing the noise contour (introduction of quieter aircraft means even with the doubling of quantities of aircraft there are no increase in noise) b) Community engagement (the use of surveys to gain public opinion) C) Controlling land use. Developments on noise contours are a national problem and should be dealt with locally. <p>Airports are working with aircraft developers to deliver quieter flights and are becoming more sustainable but cannot achieve the goal of a more sustainable future without the Government's support.</p>
<p>Institute of Environmental Management and Assessment, 2014. Guidelines for Environmental Noise Impact Assessment [16].</p>	<p>The report offers guidelines on Noise Impact Assessments which serve as a valuable resource for potential new noise sources as currently, there are no real guidelines on how a noise impact assessment should be undertaken. The extent of the impact should be taken into consideration and not just the collection of a range of data when producing Acoustic assessments.</p> <p>New development, regardless of scale will generate noise. The report aims as a guide to gain a better understanding of the impacts from new noise sources to ensure appropriate management.</p>
<p>Secretary of State for Transport, 2013. Aviation Policy Framework. March 2013</p>	<p>Noise and other Environmental impacts are addressed in Chapter 3 of the the Aviation Policy Framework (APF). In support of the sustainable development objectives in the</p>

Document	Overview
[13].	<p>NPSE [10], the APF states that the overall policy objective in relation to aviation noise is “<i>to limit and where possible reduce the number of people in the UK significantly affected by aircraft noise</i>”.</p> <p>The framework also states that the Government’s policy on aviation noise fully recognises international approaches and European law as well as the ICAO ‘balanced approach’ and Resolution A33-7 which are considered to apply to the UK. The Government requires noise-designated airports to produce annual noise exposure maps including the 57 dB LAeq, 16h contour. Separate night-time noise contours are also required for the designated airports. The APF encourages the use of other forms of noise descriptors for airports as the LAeq indicator is an average which does not necessarily reflect all aspects of aircraft noise. This includes the frequency and pattern of movements and the highest noise levels that can be expected (LAMax).</p>
Department for Communities and Local Government (DCLG), 2018. National Policy Planning Framework NPPF [9].	<p>The National Planning Policy Framework came into force in March 2012, it was revised in July 2018 and then again in February 2019. The NPPF paragraph 170 states that the planning policies and decisions should contribute to and enhance the natural and local environment by, among other things, preventing new and existing development from being put at unacceptable risk or being affected by unacceptable levels of noise pollution.</p>
Her Majesty’s Stationery Office (HMSO), 2012. Civil Aviation Act, CAA 2012 [17].	<p>This Act makes provision about the regulation of operators of dominant airports; it confers functions on the Civil Aviation Authority under competition legislation in relation to services provided at airports; it makes provision about aviation security, the regulation of provision of flight accommodation; and provisions about the Civil Aviation Authority’s membership, administration and functions in relation to enforcement, regulatory burdens and the provision of information relating to aviation.</p> <p>The UK Government is one of the CAA clients. The CAA is a regulatory body which has different roles including the power to decide whether the design of contracted airspace can be changed (in accordance with government, law and noise policy) and the task to monitor noise around UK airports and publish information about noise levels and impacts. It also has a duty to collaborate on, and review research into, the effects of noise and how these can be reduced as well as offering advice to Government on these effects.</p> <p>The CAA cannot make decisions about the amount of noise that is considered damaging or annoying for people or about particular plans for airports, such as expansions.</p>
Department for Environment and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England, NPSE [10]	<p>The Government’s noise policy is set out in the Noise Policy Statement for England and contains a high-level vision of promoting good health and good quality of life (well-being) through the effective management of noise.</p>
ICAO guidance DOC 9184, Part 2 Edition NO. 3. (ICAO 2009) [18].	<p>The aim of the manual is to provide guidance regarding land-use planning within airport vicinities and the environmental control for airport operations and development.</p>

Document	Overview
	It is seen as a necessity to update this information from previous editions of the manual due to the evolution in recent years of both land-use planning and environmental control.
Statutory Instruments 2006 No. 2238. Environmental protection, England. The Environmental noise (England) Regulations 2006. [19].	This statutory instrument transposes the Environmental Noise Directive 2002/49/EC into English law.
European Commission, 2002. Environmental Noise Directive 2002/49/EC. [20].	The Environmental Noise Directive 2002/49/EC (END) sets out an ongoing programme of noise mapping and noise action planning, aimed at: <i>“Preventing or reducing on a prioritised basis noise exposure and preserving environmental noise quality where currently good.”</i> The END requires member states to produce noise maps of major sources and to develop actions plans to address the management of noise issues and effects, and sets out a definition of the L_{den} noise descriptor.
Her Majesty’s Stationery Office (HMSO), 1990. Environmental Protection Act 1990 Part III. [21].	Section 79(1) of the Environmental Protection act states that any noise emitted from a premises so as to be prejudicial to health or a nuisance constitutes a statutory nuisance, and places a duty on the local authority to investigate. However, section 79(6) states that this does not apply to noise cause by aircraft. Notwithstanding this, noise from other aspects of airport operations (e.g. noise from airside vehicles, building services and loading/unloading activities) is within the scope of Section 79(1).

Table D.2 Guidance, studies into the effects of aircraft noise on humans, and documents which recommend thresholds

Document	Overview
<p>World Health Organization, 2018. Environmental Noise Guidelines for the European Region [22]</p>	<p>The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources including aircraft. For average noise exposure, the guidelines strongly recommends reducing noise levels produced by aircraft below 45 dB L_{den}, as aircraft noise above this level is associated with adverse health effects. For night aircraft noise exposure, the guidelines strongly recommend reducing noise levels produced by aircraft during night time below 40 dB L_{night}, as night-time aircraft noise above this level is associated with adverse effects on sleep.</p> <p>To reduce health effects, the guidelines strongly recommend that policy-makers implement suitable measures to reduce noise exposure from aircraft in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions the implementation of suitable changes in infrastructure is recommended.</p>
<p>Civil Aviation Authority (CAA), 2018. Aircraft Noise and annoyance: Recent Finding. CAP 1588 [23].</p>	<p>The report provides an overview of the effects of the complex area of aircraft noise and annoyance responses. Annoyance can be defined as a displeasure, a feeling of resentment, a discomfort and a dissatisfaction. It is considered detriment to people’s health, psychological well being and quality of life. However, annoyance is a subjective response and therefore cannot be measured objectively. The overview of recent findings observed in the report highlights that a change in annoyance over time means that noise is considered more annoying than it was 30 years ago. Annoyance response characteristics via non-acoustic factors are important, continuing work and a recommendation of survey questions involving levels of trust of authorities and perceived fairness in air traffic should also be included.</p>
<p>WHO Environmental Noise Guidelines for the European Region: A Systematic Review of Transport Noise Interventions and Their Impacts on Health; Alan Lex Brown and Irene van Kamp 2, Int. J. Environ. Res. Public Health 2017, 14, 873 [24]</p>	<p>The paper investigates the evidence on the effects of noise interventions on human health from road traffic, railway and aircraft sources. Aspects of health covered include annoyance, sleep disturbance, the cognitive impairment of children and cardiovascular disease and helps to support that sufficient noise mitigation (sound insulation), moderates adverse responses to aircraft noise.</p>
<p>Environmental Research and Consultancy Department, “Survey of noise attitudes 2014: Aircraft,” Civil Aviation Authority,</p>	<p>Whilst airports provide many positive aspects for the economy, they can also be detrimental to the environment and for residents living nearby therefore, assessments throughout the world are carried out for airport noise using noise exposure indices. The report details a research study commissioned by the Department of Transport and expands on earlier Defra studies on attitudes to aviation noise around UK airports and how they relate to commonly used noise indices.</p>

Document	Overview
CAA Publication CAP1506, Feb. 2017 [25].	The current UK civil aircraft noise exposure index is LAeq,16h. A value of 57dB LAeq, 16h has traditionally been taken as the threshold of community annoyance, with 63 and 69dB LAeq, 16h represent medium and high annoyance respectively. All three of these thresholds incorporated into planning policy guidance but are now criticised as being out of date as there is evidence to suggest that community attitudes to noise have changed. The report states five aims, two of which are (1) to obtain updated evidence on attitudes to aviation noise, and (2) to consider the appropriateness of the policy threshold for significant community annoyance of aviation noise.
Clarke, C, 2015. Aircraft noise effects on health [26].	This report, prepared for the Airports Commission, outlines an increase in evidence linking environmental noise to human health, highlighting that properties close to airports can experience chronic aircraft noise. Insulation measures, stricter guidelines and noise limits are being widely supported to reduce exposure, annoyance, health issues and to improve children's learning environments. Environmental noise exposure accounts for approximately 1-1.6 million healthy life years lost annually in high income western European Countries.
Department for Education and Education Funding Agency, 2015. Acoustic design of schools: performance standards. Building bulletin 93 [27].	The document sets out the acoustic performance standards required in schools and applies to both new and existing to ensure that each room within a school building is designed so that the internal noise levels are appropriate for its use. It does not apply to sixth form colleges that have not been established as schools or to higher education facilities such as universities and adult education centres, but does apply to school nurseries. The standard provides the upper limits for indoor ambient noise levels for specific types of rooms within a school and an option for if they are a new or existing building. It also gives limits and corrections to achieve the required indoor ambient noise levels for building services, impact sound insulation levels, reverberation limits, sound absorption objectives, speech transmission indexes whilst outlining any exceptions.
British Standards Institution, 2014. BS8233:2014 Guidance on sound insulation and noise reduction for buildings [28].	The standard discusses noise in and around buildings objectively and quantifiably and provides guidance on sound insulation and noise reduction for buildings, suggesting criteria such as suitable sleeping/resting conditions and proposing noise levels to meet this criterion. It is noted however, that people vary greatly in terms of sensitivity to noise and noise levels refer to the physical characteristics of sound not the psychological factors. The standard also reviews if sound insulation materials may in fact reduce fire safety levels and infringe other health and safety issues. The standard covers a small section relating to airports, their noise action plans and how they control aircraft noise. It also explains how the prediction of aircraft noise is extremely complex.
Institute of Acoustics and the Association of Noise Consultants, 2014. Acoustics of Schools: a design guide. St Albans [29].	Produced by both the Institute of Acoustics (IoA) and the Association of Noise Consultants (ANC) to provide guidance and recommendations on the acoustic design of new and refurbished schools. Regarding aircraft noise, where a school is to be located in an area close to aircraft noise, acoustic consultants should be appointed, and special measures may be necessary.
Aircraft noise and	The study highlights how the field study of aircraft noise exposure and

Document	Overview
cardiovascular disease near Heathrow Airport in London: small area study. Stephen Stansfeld, Colin Grimwood, Bernard Berry, 2013 [30].	health in the UK supports evidence that aircraft noise can affect health. However, the magnitude of the size of the reported effect is likely to be subject to error due to factors including a relatively small study area and limitations of aircraft data.
European Environment Agency, Good practice guide on noise exposure and potential health effects. Luxembourg: Office for Official Publications of the European Union, 2010 [31]	This good practice guide is intended to assist policymakers, competent authorities and any other interested parties in understanding and fulfilling the requirements of the directive by making recommendations on linking action planning to recent evidence relating to the health impacts of environmental noise. The guide considers the strength of evidence for a wide range of effects of transportation noise on health, and identifies appropriate thresholds for the onset of effects, and dose-response curves where there is sufficient evidence to do so.
M. Matheson et al., "The effects of road traffic and aircraft noise exposure on children's episodic memory: The RANCH Project," Noise and Health, vol. 12, no. 49, p. 244, Oct. 2010 [32]	This study examines the effects of two noise sources, aircraft and road traffic, on children's episodic memory. It also examines exposure-effect relationships and, by carrying out parallel field studies in three European countries, enables cross-country comparisons to be made. A total of 2844 children aged between 8 years 10 months and 12 years 10 months (mean age 10 years 6 months) completed classroom-based tests of cued recall, recognition memory and prospective memory. This study indicates that exposure to aircraft noise and road traffic noise can impact on certain aspects of children's episodic memory.
World Health Organisation (WHO), 2009. Night Noise Guidelines for Europe [33].	The report considers scientific evidence on the thresholds of night noise exposure and the targets of night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. The guidelines are applicable to the Member States of the European Region, and may be considered as an extension to, as well as an update of, the previous WHO Guidelines for community noise (1999). In relation to aircraft noise, the NNG presents a relationship between the SEL and L _{Amax} indices. Where noise events in SEL can be measured to derive the L _{Amax} noise level.
International Civil Aviation Organization (ICAO), 2007. Guidance on the Balanced Approach to Aircraft Noise Management, ICAO Doc 9829. [34].	The guidance document based on aircraft noise, which was revised in 2007, consists on a balanced approach to identify the specific airport noise problem and to reduce the noise as to achieve maximum environmental benefit. The report outlines steps to be taken for a noise assessment. The first to identify the noise problem, then to define the noise objective and finally to use the list of key tools and procedures provided in the document to support a useful assessment of the; noise contours, noise index, baseline and management plants. The APF adopts the ICAO 'balanced approach' which considers the following four aspects: <ul style="list-style-type: none"> • Reduction of noise at source • Land-use planning and management • Noise abatement operational procedures • Operating restrictions

Document	Overview
<p>MVA Consultancy, 2007. Attitudes to noise from Aviation Sources in England (ANASE). Prepared for Department for Transport in association with John Bates Services, Flindell I. and RPS. (MVA,2007)</p>	<p>Highlighting that the last major study in relation to aircraft noise in the UK was conducted in 1982 and reported in 1985, the document explains how aircraft noise has since been significantly reduced due to technological advances replacing older, louder aircraft with much quieter ones. Social changes since 1985 also give support to whether the current threshold for annoyance at 57dB LAeq, 16h is still plausible today. The main study objectives were to re-asses current aircraft noise in the UK and to re-assess its correlation with the LAeq noise index.</p>
<p>C. Clark et al., Exposure-Effect Relations between Aircraft and Road Traffic Noise Exposure at School and Reading Comprehension The RANCH Project, vol. 163. 2006. [35]</p>	<p>This paper reports on the 2001–2003 RANCH project, the first cross-national epidemiologic study known to examine exposure-effect relations between aircraft and road traffic noise exposure and reading comprehension. Participants were 2,010 children aged 9–10 years from 89 schools around Amsterdam Schiphol, Madrid Barajas, and London Heathrow airports. Aircraft noise exposure at school was linearly associated with impaired reading comprehension; the association was maintained after adjustment for socio-economic variables, aircraft noise annoyance, and other cognitive abilities. Aircraft noise exposure at home was highly correlated with aircraft noise exposure at school and demonstrated a similar linear association with impaired reading comprehension. Findings were consistent across the three countries.</p>
<p>Bernard. F. Berry et al., Position paper on dose response relationships between transportation noise and annoyance. Luxembourg: Office for Official Publications of the European Communities, 2002 [36]</p>	<p>This position paper was prepared by a working group of noise experts set up by the European Commission in order to provide guidance on the dose-effect relations to be used for the assessment of numbers of people annoyed by noise. It summarises the recommended descriptors of noise exposure and of annoyance and recommends dose-effect curves, together with formulae. These curves are recommended for use in the context of the proposal for a Directive on the Assessment and Management of Environmental Noise.</p>
<p>World Health Organisation (WHO), 1999. Guidelines for Community Noise [37].</p>	<p>The World Health Organization, WHO document on “Guidelines for Community Noise (1999)” sets guideline values for community noise in specific environments and states that the critical effects of noise in a dwelling are on sleep, annoyance and speech interference and gives guideline values to minimise sleep disturbance. The document reviews studies and statistics on the effects of chronic exposure to aircraft noise on children which have found consistent evidence that noise exposure harms cognitive performance, consistent association with impaired well-being and motivation to a slightly more limited extent and moderate evidence of effects on blood pressure and catecholamine hormone secretion.</p>
<p>J B Critchley and J B Ollerhead, “The use of Leq as an Aircraft Noise Index,” Civil Aviation Authority, London, UK, DORA Report 9023, Sep.</p>	<p>This report reviews the results of the public consultation on the proposal to replace the Noise and Number Index by Equivalent Continuous Sound Level that was prompted by the ANIS [39] study. It discusses potential time periods, weightings for time periods, and insensitivity to the number of aircraft movements in relation to Leq based indices. Perceived Heathrow bias and other issues with the ANIS study are also examined.</p>

Document	Overview
1990 [38]	Ultimately the report concludes that there are no substantive technical or statistical arguments against the adoption of Leq as the aircraft noise index in the UK. It does however note concerns about the use of the Leq averaged over 24-hours and on this matter notes there were no statistical difference between LAeq,24-hour and LAeq,16-hour as a predictor of annoyance, and that a subsequent study examined LAeq,16-hour and found it to provide a statistically acceptable index.
P Brooker, J B Critchley, D J Monkman, and C Richmond, "United Kingdom Aircraft Noise Index Study: main report," Civil Aviation Authority, London, UK, DR Report 8402, 1985 [39]	The Aircraft Noise Index Study (ANIS) was commissioned by the Department of Transport to either substantiate the continued use of the Noise and Number Index (NNI) which was adopted as the measure of aircraft noise in the UK in 1963, or to devise a better index for aircraft noise. The major fieldwork for the study took place in 1982. The study concluded that NNI was not the best indicator for aircraft noise and suggested that using the LAeq,24-hour was a better measure. The study suggested that 57dB LAeq, 24-hour represented the onset of community disturbance and that 70 dB LAeq,24-hour signified the point of high disturbance levels.
Civil Aviation Authority (CAA), 1980. Aircraft Noise and sleep disturbance: final report. Dora Report, 8008.	In 1977 the Minister for Companies, Aviation and Shipping commissioned a major study into aircraft noise-related sleep disturbance around Gatwick and Heathrow airports. The results were published in DORA Report 8008, which found that: a) disturbance, such as difficulty in falling asleep, awakening during the night and tiredness on waking occurred frequently irrespective of aircraft noise, b) the Leq index, corresponding to the total noise energy produced by aircraft during the night-time period (23:00-07:00), was a satisfactory measure of aircraft noise exposure i.e. it correlated well with sleep disturbance, c) the total disturbance of sleep, irrespective of attributed cause, showed a slight increase at higher Leq levels, and, d) the disturbance attributed by respondents to aircraft noise increased more substantially as Leq values increased i.e. the increase was greater than the corresponding increase in total reported disturbance.

Appendix E – Glossary

Term	Description
A-weighting	The human ear demonstrates increased sensitivity at some frequencies compared to others. The A-weighting network applies filters to the signal processing of a sound level meter to mimic the response of the human ear at each frequency. The logarithmic sum of the noise levels in each frequency band after the A-weighting network has been applied is referred to as the A-weighted level.
dB	Abbreviation of ‘decibel’ which is a scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds S1 and S2 is given by $20 \cdot \log_{10}(S1/S2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 μ Pa.
dB(A)	A-weighted decibel. See ‘A-weighting’ and ‘dB’.
L_{Aeq}	The notional A-weighted steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the fluctuating sound measured over that period. The period of time over which this quantity is evaluated is normally added to the sub-script notation, as shown in the following examples which relate to five minutes, one hour, and eight hours respectively: $L_{Aeq,5min}$, $L_{Aeq,1-hour}$, $L_{Aeq,8-hours}$.
L_{den}	L_{den} is a 24-hour L_{Aeq} metric, with penalties of 5 dB and 10 dB for aircraft noise levels occurring in the evening (19.00 to 23.00) and night-time (23.00 to 07.00) respectively. All times are local, and this metric is adopted by the EU for noise mapping and population noise exposure statistics. It is defined in EC Directive 2002/49/EC (END) [30].
$L_{AF,max}$	The maximum sound level ($L_{A,max}$) is the highest time-weighted sound level measured during a short period. The time constant of the measure may either be Fast (125 ms), Slow (1 s) or Impulsive (35 ms), and it is usual to identify the time constant in the notation – e.g. $L_{AF,max}$ indicates that the maximum sound level was measured with the fast time-weighting.
L_{night}	The night-time noise indicator L_{night} is defined in ISO 1996-8: 1987 as the free-field A-weighted long-term average sound level of the 8-hour night-time period (23.00 to 07.00 local time) determined over all nights of a year outside a property. Although the external location is implicit within the definition of L_{night} , some authors use $L_{night,outside}$ to avoid ambiguity.
N60	N60 contour maps show the number of aircraft events louder than 60 dB $L_{AF,max}$ during a given period. Based on an assumed sound insulation of 15 dB from outside to inside for a partially open window, this gives an indication of the number of noise events inside that exceed 45 dB $L_{AF,max}$ in traditionally built and ventilated dwellings.
N70	N70 contour maps show the number of aircraft events louder than 70 dB $L_{AF,max}$. Based on an assumed sound insulation of 15 dB from outside to inside for a partially open window, this gives an indication of the number of noise events inside that exceed 55 dB $L_{AF,max}$ in traditionally built and ventilated dwellings.

Appendix F - Draft aircraft noise policy

9.1.1 Policy ENV 13

9.1.1.1 Aircraft noise

The 2019 summer (mid-June to mid-September) average mode daytime $L_{Aeq,16\text{-hour}}$ noise contours published by Manchester Airport, as shown on the policies map, will be used for the purposes of planning application decision making until the number of air transport movements is equal or greater than that for 2019. The noise mitigation to achieve the requirements set out in the policy must assume the noise levels shown by these contours.

1. Dwellings (houses, flats, bungalows and maisonettes)

- i. Planning permission for new dwellings will not normally be granted within areas subject to aircraft noise levels above the Significant Observed Adverse Effect Level (SOAEL)¹.
- ii. Planning permission for new dwellings will be granted in areas subject to daytime aircraft noise levels between the Lowest Observed Adverse Effect Level (LOAEL)² and the SOAEL where it is demonstrated by the applicant that:
 - a. the internal ambient noise levels under summertime conditions with windows closed (and with the necessary ventilation to prevent overheating and ensure good indoor air quality) shall not exceed the levels set out in BS8233:2014 (or any successor to this standard), which are repeated in the table below.

Indoor ambient noise levels for dwellings			
Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16\text{hour}}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\text{hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{hour}}$	30 dB $L_{Aeq,8\text{hour}}$

The application should demonstrate that the acoustic design of the proposed development will achieve the above indoor ambient noise levels and has been developed in combination with ventilation and overheating strategies. The application should maximise natural ventilation, avoid overheating, minimise sound pollution and have good air quality in accordance with policy H1 of the National Design Guide and avoid a situation where occupants would have to choose between good internal ambient noise levels and thermal comfort or good indoor air quality³. The acoustic, ventilation and overheating strategies must not rely upon continuous mechanical extract (MEV) or continuous

¹ Currently considered to be 63 dB $L_{Aeq,16\text{hour}}$ (07:00 -23:00).

² Currently considered to be 54 dB $L_{Aeq,16\text{hour}}$ (07:00 -23:00).

³ The Acoustics, Ventilation and Overheating Residential Design Guide published by the Association of Noise Consultants provides advice to designers on adopting an integrated approach to the acoustic design within the context of the ventilation and thermal comfort requirements.

mechanical supply and extract with heat recovery (MVHR) ventilation systems that require energy use unless these can be powered by renewable energy generation within the development; and

b. private gardens, sitting out areas and balconies that are intended to be used for relaxation that form an intrinsic part of the overall scheme are designed to achieve the lowest practicable noise level and will not exceed 55dB $L_{Aeq,16hour}$ across a reasonable proportion of them.

iii. Given that individual noise events can also cause sleep disturbance, where average mode summer night noise levels exceed 48 dB $L_{Aeq,8hour}$, planning permission will only be granted where applicants can demonstrate that a commensurate level of protection can be provided so that a maximum sound level of 45 dB $L_{AF,max}$ in bedrooms during the summer (mid-June to mid-September) will not normally be exceeded more than ten times during a night (23:00 to 07:00). Typical aircraft $L_{AF,max}$ noise levels may be determined either by noise survey over a representative period (typically a number of weeks) or by noise modelling, in line with a methodology that should be first agreed with the council so that the application is based on suitable noise data.

iv. Applications for sites affected by aircraft noise should be accompanied by a noise impact assessment. The noise assessment should highlight any noise mitigation measures and demonstrate:

a. a good acoustic design process;

b. that the indoor ambient noise levels set out in criterion 1(ii)(a) will be achieved;

c. that the external noise levels set out in criterion 1(ii)(b) will be achieved; and

d. any other relevant issues (e.g. how the acoustic design will avoid unintended adverse consequences on indoor air quality and overheating).

2. **Hotels and rooms for residential purposes (including student halls of residence, school boarding houses and hostels):** The requirement for achieving acceptable internal ambient noise levels (including for individual noise events) due to external noise ingress is the same as for dwellings. There are no requirements in respect of noise levels within external amenity areas.
3. **Hospices and residential care homes:** The requirement for achieving acceptable internal ambient noise levels (including for individual noise events) due to external noise ingress is the same as for dwellings. Due to the potential for residents of such developments to have difficulties with their hearing and limited mobility, schemes must incorporate easily accessible external amenity areas that are subject to noise levels at or below 55 dB $L_{Aeq,16hour}$.
4. **Educational development:** Planning permission will normally only be granted for schools and nursery schools if suitable noise control measures to achieve the internal noise levels set out in BB93: Acoustic design of schools - performance standards (or any successor) are demonstrated.
5. **Healthcare development:** Planning permission will normally only be granted for hospitals and other medical facilities with accommodation for patients if suitable noise control measures to achieve the internal noise levels set out in 'Table 1 Criteria for noise intrusion from external sources' of Health Technical Memorandum 08-01: Acoustics (or any successor) are demonstrated.
6. **Other noise sensitive development:** Planning permission will normally only be granted where the applicant demonstrates that the internal ambient noise levels will be suitable for the intended use.

9.1.1.2 Supporting information

4.74 This policy seeks to avoid significant adverse aircraft noise impacts on health and quality of life, and adequately mitigate and minimise adverse impacts on health and quality of life.

4.75 Under normal circumstances, the application of this policy would be based on the latest available summer-time noise contours published annually by Manchester Airport. This is to make the policy reactive to changes in aircraft noise over time, due to factors such as growth in air transport movements and potential reductions in noise from individual aircraft due to technological improvements. However, the coronavirus situation since March 2020 has radically reduced the number of air transport movements into and out of Manchester Airport and it may be several years before movements return to pre-coronavirus levels again. Under these circumstances it is necessary to adopt the 2019 noise contours instead, which are the latest ones available prior to advent of coronavirus, to prevent decisions being made based on atypically low aircraft noise levels. The policy allows the noise contours for a future year to be used when the number of air transport movements return to, or exceed, that recorded in 2019. The council will liaise with Manchester Airport to monitor this and will publicise through the Local Plan pages on its web site and in the Authority Monitoring Report when this position is reached.

4.75a Planning Practice Guidance advises that for noise sensitive developments, mitigation measures can include avoiding noisy locations in the first place; designing the development to reduce the impact of noise from adjoining activities or the local environment; incorporating noise barriers; and optimising the sound insulation provided by the building envelope. It also advises that care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development.

4.75b The council considers it important to avoid building homes that will result in additional carbon emissions through additional energy use associated with mechanical ventilation systems to mitigate aircraft noise. This approach is consistent with the statutory target set by the Climate Change Act 2008 for at least a 80% reduction of UK greenhouse gas emissions by 2050 (compared to 1990 levels) and the council's commitment to tackling climate change expressed through its Environment Strategy and Carbon Action Plan.

4.76 It is recommended that an Acoustic Design Statement be prepared in accordance with ProPG to demonstrate good acoustic design with a focus on Element 2 – observing internal noise level guidelines. If relying on closed windows to meet the internal noise levels, the application would need to demonstrate how an appropriate alternative method of ventilation will be achieved that does not compromise the facade thermal insulation, summertime internal temperatures or the resulting noise level. There should be consistency between the method of ventilation (and operating mode) assumed for acoustic calculations, and the method of ventilation assumed for thermal analysis (especially overheating). For example, if the acoustic strategy relies upon closed windows then these conditions should also be adopted for the thermal analysis.

9.1.1.3 Related documents

- Aircraft Noise Policy Background Report (2020, Jacobs) [ED 15]
- ProPG: Planning and Noise, New Residential Development (2017, Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health)

- Acoustics Ventilation and Overheating Residential Design Guide, Version 1.1 (2020, Association of Noise Consultants)
- BS 8233 Guidance on sound insulation and noise reduction for buildings (2014, British Standards Institute)
- BB93: Acoustic design of schools - performance standards (2015, Department for Education)
- Health Technical Memorandum 08-01: Acoustics (2013, Department of Health)
- BS EN 16798-1 Energy performance of buildings – ventilation for buildings part 1: Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics - Module M1 (2019, British Standards Institute)
- Cheshire East Council Environment Strategy 2020-2024 (2020, Cheshire East Council)
- Cheshire East Council Carbon Neutrality Action Plan 2020-2025 (2020, Cheshire East Council)
- National Design Guide (2019, MHCLG)