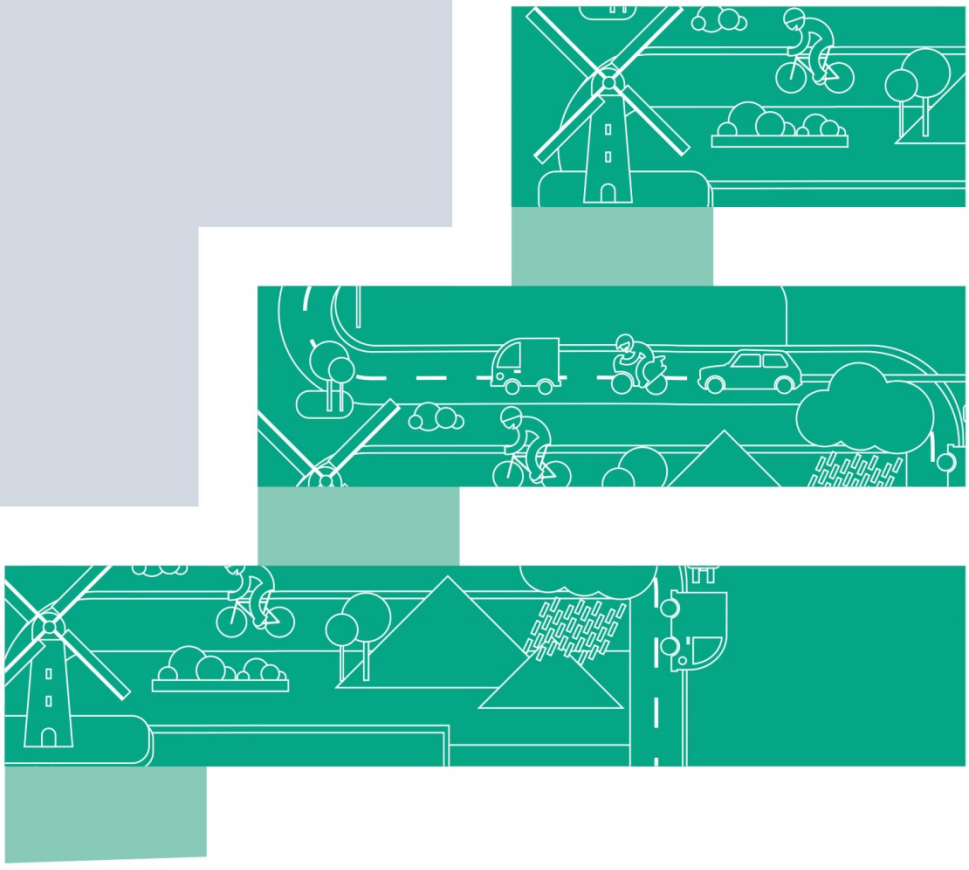
TRANSFORMING LONDON STANSTED AIRPORT

35+ PLANNING APPLICATION

Chapter 7
Air Noise



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7 AIR NOISE

Introduction

7.1 This chapter of the ES has been prepared by Cole Jarman Associates. It considers the impact of air noise associated with the proposed development. The assessment quantifies existing air noise levels (for the 2016 Baseline Year) and those projected to occur in the future, both with the proposed development (Development Case – DC) and without the proposed development (Do Minimum – DM) scenarios. The assessment focuses on the difference in air noise effects between these two scenarios in the Principal Assessment Year of 2028, but also considers intervening years in order to account for changes in air noise over time.

7.2 Air noise is that produced by aircraft during departure and arrival at the airport. It includes the noise generated:

On departure:

- from the point at which an aircraft commences its take-off roll;
- proceeds along the runway to the point of leaving the ground; and
- climbs into the air and departs the vicinity of the airport.

On arrival:

- from the point at which an aircraft approaches the vicinity of the airport;
- descends to the runway;
- touches down;
- slows down along the runway to the point of departure onto a taxiway; and
- includes reverse thrust, if that is required to slow the aircraft down on the runway.

7.3 The application is for minor airfield infrastructure works, as described in ES Chapter 3 (Description of Site, Proposed Development, Policy Context and Alternatives). Through increased airfield efficiency and stand capacity, these works would enable a higher passenger throughput to 43mppa. As this would in turn, require a larger balance of passenger aircraft movements than currently permitted, a combined aircraft movement cap (for PATM, CATM and 'Other' flights) of 274,000 movements is sought.

7.4 The noise assessments are based on detailed air traffic forecasts for the relevant year. These described in ES Chapter 4 (Aviation Forecasts) of this ES. How they have been applied is explained in the following sections.

7.5 This chapter describes:

- Legislation, guidance and planning policy as it affects the assessment of air noise;
- The assessment methodology, including assumptions and limitations, and significance criteria;

- Baseline noise conditions, including an analysis of noise complaints;
- Mitigation incorporated into the current and proposed operations, including operational controls applied at the airport;
- Impact assessment;
- Further mitigation required or desirable to reduce assessed impacts; and
- An assessment of cumulative and residual effects.

7.6 Noise from aircraft operations is considered at the local level to be among the most, if not the single most, significant environmental impact associated with airports. Airborne aircraft noise is described in a number of ways and several metrics are used in this chapter to quantify the existing and forecast noise levels in the local community. These are:

7.7 **$L_{Aeq,T}$**, the average noise level generated by all aircraft overflights in a given time period (T), is the primary metric for quantifying community effects. When averaged over a 16-hour day (07:00 to 23:00) and aggregated over the busy 3-month summer period (92 days between mid-June and mid-September), this measure of aircraft noise has been found in the UK to offer the best correlation with community annoyance. Consistent with the findings of the Civil Aviation Authority's report CAP 1506, Survey of noise attitudes 2014: aircraft[1], this chapter gives it, and the corresponding average over the 8-hour night-time period (23:00 to 07:00), most weight in assessing the scale of impacts arising from the proposed development.

7.8 **L_{den}**, the average over a 24-hour period which incorporates weightings to reflect evening (19:00 to 23:00) and night-time (23:00 to 07:00) operations is used more commonly in Europe and in conformance with EU directives on strategic noise maps and Noise Action Plans. L_{den}, and L_{night} (pertaining only to operations between 23:00 and 07:00) are derived based on operations aggregated over a full calendar year. Their use in this assessment is primarily to determine the scale of health impacts.

7.9 **N65** and **N60** are recently adopted metrics that identify the number of overflights, aggregated over the busy 3-month summer period (mid-June to mid-September), experienced at locations in the community that meet or exceed 65 dB L_{Amax} during the daytime (07:00 to 23:00) or 60 dB L_{Amax} during the night-time (23:00 to 07:00). These metrics are employed because they are believed to be more descriptive and transparent to a non-technical audience and because they are considered to represent an aspect of noise not entirely reflected by the $L_{Aeq,T}$ metric. It is reported in CAP 1506 that this measure has been found in the UK to have inferior correlation with community annoyance than $L_{Aeq,T}$ and for this reason is considered a supplementary indicator and given less weight in assessing the scale of impacts arising from the proposals.

7.10 CAP 1506 therefore advises that while there is merit in considering greater use of Nx metrics as supplemental indictors of noise exposure, evidence based decisions should continue to use $L_{Aeq,16h}$.

7.11 To avoid over complication, the aim has been to keep this chapter focussed and as short as possible. A more detailed analysis of airborne aircraft noise is set out in ES Appendix 7.3 (Air Noise). Tables and figures referred to, but not explicitly contained in, this chapter can be found in that document.

7.12 A full list of the appendices dealing with specific noise issues contained in ES Volume 2 is:

7.1 Glossary of Acoustic Terms;

7.2 Planning and Assessment Framework;

7.3 Air Noise;

7.4 Background Noise Measurements;

7.5 Complaints Analysis;

8.1 Ground Noise;

9.1 Surface Access Noise.

Legislation, Guidance and Planning Policy Context

7.13 ES Appendix 7.2 (Planning and Assessment Framework), sets out relevant details of current National and Local Policy as they apply to noise at Stansted Airport, and establishes the basis on which the assessment criteria are derived. ES Appendix 7.3 (Air Noise) then uses the relevant guidance and policy to explain the basis on which noise from aircraft in flight is analysed and assessed in terms of its impact on the local community.

Legal Framework

International Guidance

7.14 A UN body, the International Civil Aviation Organisation (ICAO) is responsible for establishing technical standards and recommended practices (SARPs). After a standard is agreed and adopted, it is put into national effect by each ICAO member state, the UK being one of these. ICAO has established a number of aircraft operating standards, aircraft noise certification and guidelines for a balanced approach to aircraft noise management.

7.15 The ICAO guidance material covered by the Balanced Approach provides Contracting States with an internationally agreed but flexible approach to address aircraft noise problems at individual airports. This balanced approach consists of four key pillars, as described in detail in Sections 1.7 and 1.8 of ES Appendix 7.2. These are:

1. Reducing aircraft noise at source;
2. Land use planning;
3. Changes to operational procedures; and
4. Restrictions on the use of the noisiest aircraft.

7.16 With regard to controlling noise at source, environmental certification standards for aircraft have been adopted by the Council of ICAO. These are contained in Annex 16 (Environmental Protection)[2] to the Convention on International Civil Aviation. This Annex at present consists of three volumes: Volume I (Aircraft Noise), Volume II (Aircraft Engine Emissions) and Volume III (CO_2 Emissions). As explained in Section 1 of ES Appendix 7.2, progressively more stringent standards for noise emissions from new civil aircraft are identified in various *chapters* of Annex 16. Each relevant chapter sets maximum permissible noise levels for different aircraft during landing (approach noise level) and take-off (flyover and side line noise levels). The permissible levels depend on the operating weight of the aircraft and the number of engines it has.

7.17 As explained in section 1 of ES Appendix 7.2, the most recently adopted standards, Chapter 14, apply to all new aircraft entering service after 31st December 2017 (or 31st December 2022 for aircraft less than 55 tonnes in mass). These are set at 7dB lower in aggregate than Chapter 4 limits which apply to all new aircraft entering service after 2006. Chapter 4 limits are in turn 10dB lower than Chapter 3 limits in aggregate. Cumulatively, these changes represent significant improvements in noise emission; as each new generation of aircraft is introduced into operation, people living near airports will experience perceptible and beneficial reductions in aircraft noise.

UK and European Legislation

7.18 The ICAO guidance, contained in the form of SARPs, has been given effect in the form of Directives and Regulations; which have in turn been adopted by the UK.

7.19 The following regulations in relation to aircraft noise are currently in force:

The Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003[3]

7.20 Under the terms of these Regulations, Stansted Airport is designated for the purposes of section 78 of the Civil Aviation Act 1982(c) and the Secretary of State shall be the competent authority in respect of all matters provided for by notice under the section and the airport operator (STAL) shall be the competent authority in respect of all other matters for the purposes of these Regulations. Under Regulation 6, STAL is required to produce strategic noise maps and to adopt a Noise Action Plan (NAP), both which are to be updated every five years.

The Environmental Noise (England) Regulations 2006[4]

7.21 These Regulations transposed the European Noise Directive (END)[5] into UK law, requiring the production of maps from all transportation sources in urban areas by 2007 and the adoption of NAPs to manage noise by 2008.

Night flight restrictions at Heathrow, Gatwick and Stansted[6]

7.22 Under section 78 of the 1982 Civil Aviation Act the Secretary of State for Transport has the power to impose a range of measures to control noise from designated airports, including setting night flight restrictions. Stansted has been designated, along with Heathrow and Gatwick since 1971. The current night noise regime for these airports was set in July 2017 and runs from October 2017 to October 2022. The controls are set out at paragraphs 7.107 to 7.111.

7.23 It is important to note that the restrictions apply over the 6.5-hour period between 23:30 and 06:00, commonly referred to as the night quota period. This is distinct from the 8-hour night period from 23:00 to 07:00 that is used in this chapter to assess the scale of night-time noise impacts.

Policy Framework

National Policy

7.24 The elements of the planning framework that apply to noise emitted by operations at Stansted are described in Sections 4 to 7 of ES Appendix 7.2. They include:

- National Planning Policy Framework (NPPF)[7];
- Noise Policy Statement for England (NPSE)[8];
- National Planning Practice Guidance (NPPG)[9];
- Aviation Policy Framework[10].

7.25 National aviation policy is currently under review and on 2nd February 2017 the Government published a number of policy consultation documents. Those directly relevant to noise are:

- UK airspace policy consultation: executive summary[11];
- UK airspace policy consultation: a framework for balanced decisions on the design and use of airspace[12]; and
- Air navigation guidance on airspace and noise management and environmental objectives[13]

7.26 Also published on 2nd February 2017 were the findings of a study by the CAA to obtain new and updated evidence on attitudes to aviation noise around airports in England. The findings are contained in CAA 'CAP 1506, Survey of noise attitudes 2014: aircraft'**.** A summary of the key findings is set out in Section 5 of ES Appendix 7.2 and Section 10.4 of ES Appendix 7.3.

7.27 On 20th October 2017, the Government published a Consultation Response on UK Airspace Policy[14]. At the same time it published Air Navigation Guidance 2017[15]. The policies set out within the Consultation Response document should be viewed as current Government policy for airspace change[i].

7.28 The Government is required to appointment a competent body to ensure the rules set out in Regulation (EU) 598/2014[16] are followed when operating restrictions are being considered at major airports. The consultation document sets out the Government position, namely that the body in question should be that responsible for making decisions under the planning system. That would be the Local Planning Authority save for all consent applications that fall to be determined by the Secretary of State. As Stansted is a designated airport the Secretary of State will remain the authority responsible for approving noise control changes.

7.29 In July 2017 the Government published the first stage of a consultation process on the future of UK Aviation[17]. The call for evidence document asks for views on the approach the Government is proposing to take and the issues it wants identified as part of a new Aviation Strategy, which sets out a long term vision for the sector to 2050 and beyond.

[i] Paragraph 9 of the Executive Summary

Local Planning Policy

Adopted Local Plan

7.30 In relation to noise, there are a number of policies in 2005 Local Plan adopted by UDC which are described in paragraphs 2.3.11 and 2.3.12 of ES Appendix 7.3.

Regulation 18 Local Plan

7.31 The new Uttlesford Local Plan will be the statutory local planning framework for the District to 2033. When it is adopted it will replace all the remaining saved policies from the Uttlesford District Plan adopted in 2005.

7.32 In relation to noise, and specifically noise associated with operations at Stansted Airport, there are a number of key policies which are identified in Section 14 of ES Appendix 7.2. Key points to be made in relation to aircraft noise are set out in Section 2.3 of ES Appendix 7.3, summarised below as:

Policy SP11 – London Stansted Airport

"The growth of London Stansted Airport will be supported and it is designated as Strategic Allocation in the Local Plan.

Proposals for expansion and development will only be supported where all of the following criteria are met:

- *Do not result in a significant increase in Air Transport Movements that would adversely affect the amenities of surrounding occupiers or the local environment (in terms of noise);*
- *Achieve further noise reduction or no increase in day or night-time noise or otherwise cause excessive noise including ground noise at any time of the day or night;*
- *Include an effective noise control, monitoring and management scheme;*
- *Include proposals which will over time result in a significant diminution and betterment of the effects of aircraft operations on the amenity of local residents."*

Assessment Methodology and Significance Criteria

Assessment Methodology

Noise Metrics

7.33 It must be appreciated that the current application is not for an airspace change, as no increase in the number of permitted operations and no changes to aircraft routes are proposed. Nevertheless, the analysis of noise effects has been undertaken having due regard to the recommended methodology and metrics set out in the following CAA guidance documents, where these are considered relevant to the application.

7.34 A comprehensive range of noise metrics have been analysed by reference to CAP 725:2016[18], CAP 1616a:2017[19] and taking account of CAP 1520:2017[20]. These include those recommended by current UK policy and EU Directives as well as emerging metrics. referred to in the recent Policy Consultation Documents, and are set out in Table 7.1.

Table 7.1: Air noise assessment metrics

Metric	Description	Note
$L_{Aeq,16h}$:	16-hour daytime L_{Aeq} value for the period 07:00 to 23:00 based on summer operations during the 92 day period from mid-June to mid-September; plotted from 51 to 72 dB in 3 dB increments	Primary metric for assessing community effects
$L_{Aeq,8h}$	the 8-hour night-time L_{Aeq} value for the period 23:00 to 07:00 based on summer operations during the 92 day period from mid-June to mid-September; plotted from 45 to 66 dB in 3 dB increments	Primary metric for assessing community effects
L_{den}	24 hour L_{Aeq} value with 5dB penalty applied to evening operation (19:00 – 23:00) and 10dB penalty applied to night operations (23:00 – 07:00) based on annual operations; plotted from 55 to 70 dB in 5 dB increments	Health impact assessment metric
L_{night}	8-hour night-time L_{Aeq} value for the period 23:00 to 07:00 based on annual operations; plotted from 45 to 60 dB in 5 dB increments	Health impact assessment metric
N65	number of aircraft noise events exceeding 65dB during the period 07:00 – 23:00 based on summer operations during the 92 day period from mid-June to mid-September; plotted at aircraft movement values of 25, 50, 100 and 200	Supplementary metric for assessing community effects
N60	number of aircraft noise events exceeding 60dB during the period 23:00 – 07:00 based on summer operations during the 92 day period from mid-June to mid-September; plotted at aircraft movement values of 25, 50, 100 and 200	Supplementary metric for assessing community effects
SEL footprints (80dBA and 90dBA)	single event noise exposure for the most frequent aircraft types operating in the night-time period(s)	Additional metric for assessing community effects

Metric	Description	Note
Number of 'Highly Annoyed' People	using the percentage highly annoyed set out in Table 25 of SoNA 2014: Aircraft (CAP 1506)	Additional metric for assessing community effects
Difference Contours	plotted over the range -3 dB ≤ Δ ≤+3 dB, in increments of 1dB	Additional metric for differentiating between assessment cases
Diurnal Variation	change in operations and implications for noise levels throughout the day	Additional metric for assessing community effects

7.35 As noted in paragraphs 7.7 to 7.10, these metrics are accorded different weights in assessing the likely scale of noise impacts forecast to arise as a result of the proposed development.

Assessment Model

7.36 All of the modelling and outputs used in this chapter (and ES Appendix 7.3) have been produced by the CAA's Environmental Research and Consultancy Department (ERCD), using their Aircraft Noise Contour (ANCON) model (current version 2.3). The ERCD is a specialist body within the CAA with national and international expertise on the assessment of aircraft noise. They produce noise contours for the designated London airports, and they generated the noise contours used by the Airports Commission. Their work is robust, authoritative and impartial.

7.37 The ANCON noise modelling package has been the subject of continual development for more than 40 years and conforms to international recommended practices by three major international organisations: ICAO, ECAC (European Civil Aviation Conference) and the SAE (Society of Automotive Engineers). It has been used as the basis for all current and past noise reporting and modelling at Stansted, and all conditions and commitments involving noise metrics are informed by the results of this modelling. This approach is consistent with CAA guidance[ii].

7.38 Aircraft noise modelling in the UK conventionally takes the total number of aircraft movements over a given period, either a full year or the busy 92-day summer period between 16th June and 15th September, and then uses this to develop a typical day of operations. The number of movements by each aircraft type is identified, separated into departures and arrivals and also allocated to different time periods; daytime 07:00 to 23:00, night-time 23:00 to 07:00 and quota night period 23:30 to 06:00, for instance. For historic and baseline contours, actual recorded movements are used: for future year contours forecasts of the likely numbers and mix of aircraft are used.

7.39 The actual aircraft types and numbers used for the average summer day airborne aircraft noise modelling are set out in Schedules A7.3/SCH3 to SCH8 in ES Appendix 7.3.

7.40 Each aircraft type has specific noise characteristics for take-off and landing, which are based on the manufacturers' noise certification data. The noise model uses actual departure and arrival profiles, drawn from air traffic control data. For average noise contours, the effect of each individual movement is aggregated to determine a period average (daytime or night-

[ii] CAP 725: 2016, CAP 1616a: 2017 and CAP 1520:2017

time) noise level for the typical day, allowing for the fact that in aggregate over the full analysis period, both departures and arrivals occur on each runway, the split or operations mode being determined by historic data on the runway use.

Operations Mode

7.41 Stansted's runway is designated Runway 04 or Runway 22 depending on whether aircraft are arriving and departing in a north easterly direction or south westerly direction respectively. Weather determines the runway in use at any given time as aircraft generally land and take off into the prevailing wind. The proportion of movements in each direction is known as the *modal split*. Year on year the modal split can vary, because of variable weather conditions.

7.42 Up to 2016, the 20-year average modal split of operations on Runway 04 – 22 is 73% south westerly (runway 22) and 27% north easterly (runway 04). This is the standard modal split that has been used for the noise assessment in all cases except the re-assessed '2008 25+ planning permission case', described later in this chapter. This is because the modal split used for the 25+ planning application was 76% SW and 24% NE, reflecting the 20-year average modal split at that time (June 2006).

7.43 There are three Noise Preferential Routes (NPRs) or Standard Instrument Departure Routes (SIDS) for each runway direction. Each route is designed to minimise the population overflown. These are termed: BUZAD (BUZ/BKY/CPT), CLACTION (CLN) and DETLING (DET/LAM/LYD), and are shown in the UK AIP for Stansted Airport[21] and in Figure 7.1.

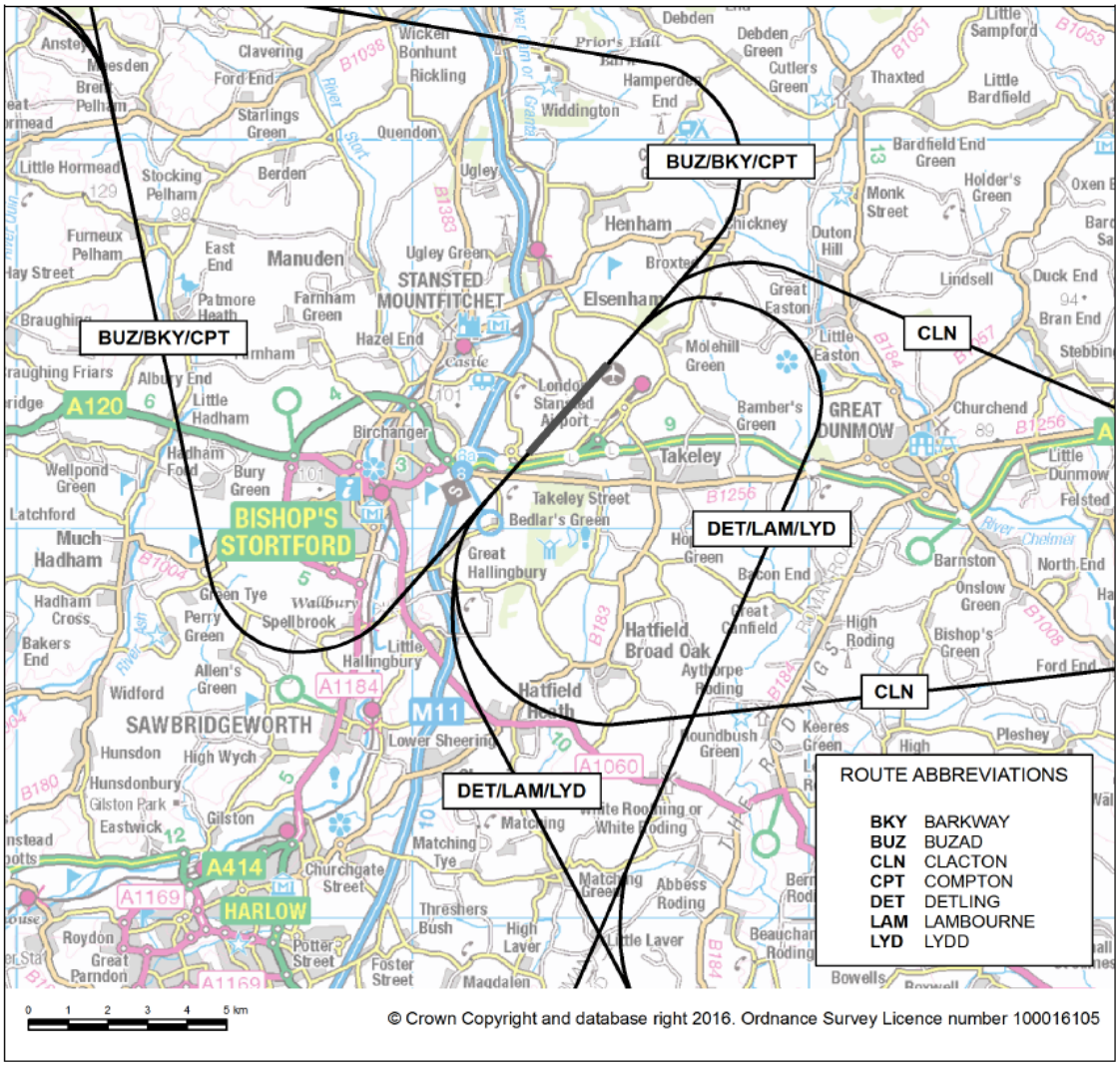

Figure 7.1: Stansted Noise Preferential Routes

7.44 The proportion of departures flying on each route is summarised in Table 7.2.

Table 7.2: Standard apportionment of SID Use for the noise assessment

Runway	Period	BUZ/BKY/CPT	CLN	DET/LAM/LYD
04	Daytime	45%	54%	1%
	Night-time	49%	39%	12%
22	Daytime	45%	54%	1%
	Night-time	52%	36%	12%

Track Dispersion

Existing Procedures

7.45 Departing aircraft should follow the specified route within a swathe either side of the centreline. This varies with distance from the runway up to 3km, (i.e. 1.5km either side of the track centreline). If aircraft are flying within this swathe below a height of 4,000 ft. amsl (above

mean sea level), they are deemed to be 'on track[iii]'. The width of the swathe is designed to give departing aircraft the tolerances they require when flying a particular route given varying wind and climatic conditions.

7.46 On reaching 4,000 ft. amsl at any point along the route, aircraft may be directed by ATC onto more direct headings to their destinations, and are no longer constrained by the noise abatement procedures referred to above.

7.47 The ANCON model uses departure and arrival tracks based on actual radar data for Stansted. Figure F4 in Section 13 of ES Appendix 7.3 shows the departure NPRs along with the permitted dispersion limits and the actual 2016 departure (in green) and arrival (in red) tracks.

Assessment Cases

7.48 Airborne noise modelling has been undertaken for the following operating cases:

- 2008 25+ planning permission, 35mppa
- 2016 Baseline Year;
- 2023 Do Minimum (DM) full capacity, 35mppa;
- 2023 Development Case (DC), 36mppa;
- 2028 Do Minimum full capacity (DM), 35mppa; and
- 2028 Development Case (DC), 43mppa.

7.49 The last of these replicates fully the operating conditions assessed in the 2006 planning application to grow beyond 25mppa. These are the basis of condition AN1 attached to that planning permission, namely that the 57dB $L_{Aeq,16h}$ contour shall not exceed 33.9km^2. (Ancon 2.3 or later.)

7.50 For the reasons set out later in this chapter (paragraphs 7.190 to 7.201), limited noise modelling has also been undertaken for the year 2024. $L_{Aeq,16h}$ summers day contours have been prepared for the 2024 Development Case (DC), 38mppa.

[iii] Explanatory note 7 of EGSS AD 2.21: Noise Abatement Procedures of the UK AIP

Significance Criteria

Range of Observed Adverse Effect Levels

7.51 The Noise Policy Statement for England (NPSE) sets the principles for the effective management of noise. It includes some established World Health Organisation (WHO) concepts for the evaluation of noise. These are; No Observed Effect Level (NOEL), Lowest Observed Adverse Effect level (LOAEL), and Significant Observed Adverse Effect Level (SOAEL). In addition, the concept of an Unacceptable Adverse Effect Level (UEAL) was introduced in the 2014 Planning Practice Guidance. UAEL represents a situation where noise is 'noticeable', 'very disruptive' and should be 'prevented'. This contrasts with the SOAEL, which represents a situation where noise is 'noticeable' and 'disruptive' and should be 'avoided'.

7.52 Table 7.3 sets out the airborne aircraft noise levels corresponding to the NPSE descriptions used for this assessment. Information on their derivation can be found in Section 11.1 of ES Appendix 7.3.

Table 7.3 Airborne aircraft noise effect levels

Effect level	Noise Level (dB)		Typical Action
	Daytime	Night-time	
NOEL	$L_{Aeq,16h} \leq 51$	$L_{Aeq,8h} \leq 45$	None required
LOAEL	$51 < L_{Aeq,16h} \leq 63$	$45 < L_{Aeq,8h} \leq 54$	Identify, mitigate and reduce to a minimum
SOAEL	$63 < L_{Aeq,16h} < 69$	$54 < L_{Aeq,8h} < 63$	Avoid
UAEL	$L_{Aeq,16h} \geq 69$	$L_{Aeq,8h} \geq 63$	Prevent

Study Area

7.53 The air noise study area is approximately 25 x 30km centred on the midpoint of the runway – the Aerodrome Reference Point (ARP) as defined in the Stansted AIP[22]. It is an appropriate area as it contains all dwellings and other noise sensitive properties forecast to be exposed to noise levels at or above the LOAEL for all assessment cases. The area is shown in Figure 7.2.

Noise Impact

7.54 Any noise impact is focused on the degree to which the noise will change as a result of proposed development. The normal test is to consider the noise levels expected with the development in place and operating at capacity compared to the levels that would exist without the development having taken place but with all existing facilities operating at capacity.

7.55 Section 10.5 of ES Appendix 7.3 correlates specific community responses to changes in noise levels for a number of environmental sources, including aircraft. With regard to human response and the perceptibility of noise level changes, Section 10.6 summarises as follows:

- Noise level changes of less than 3 dB are generally not perceptible and therefore give rise to effects that are negligible;

- Noise level changes of between 3 and 6 dB are perceptible and would generally be equated with a minor perceived difference in the noise climate. They can give rise to effects that are minor;
- Noise level changes of between 6 and 9 dB are clearly perceptible and would generally be equated with a moderate perceived difference in the noise climate. They give rise to effects that are moderate;
- Noise level changes of more than 9 dB are perceptible and would generally be equated with a significant perceived difference in the noise climate. For reference, a 10 dB increase or decrease in noise levels equates to a subjective doubling or halving of perceived loudness. Noise level changes of this magnitude can give rise to effects that are major and significant.

7.56 Change alone does not determine an adverse effect if noise levels are below the LOAEL. The noise level changes used to assess the scale of impact are therefore subject to appropriate threshold tests.

7.57 Taking these factors together, the range of significance criteria used in this assessment is set out in Table 7.4.

Table 7.4: Air noise impact significance criteria

Receptor	Significance criteria	Value of Δ* denoting significance			
		Negligible	Minor	Moderate	Major
Dwellings and other residential buildings Healthcare facilities	Day (07:00 – 23:00) Change in $L_{Aeq,16h}$ ≥Δdb where outdoor $L_{Aeq,16h}$ > 51dB	<3 dB	≥3 dB	≥ 6dB	≥ 9dB
	Night (23:00 – 07:00) Change in $L_{Aeq,8h}$ ≥Δdb where outdoor $L_{Aeq,8h}$ > 45dB and SEL > 90dBA				
Education facilities	Day (07:00 – 23:00) Change in $L_{Aeq,16h}$ ≥Δdb where outdoor $L_{Aeq,16h}$ > 51dB or outdoor L_{Amax} > 75dB	<3 dB	≥3 dB	≥ 6dB	≥ 9dB
Places of worship Community facilities	Day (07:00 – 23:00) Change in $L_{Aeq,16h}$ ≥Δdb where outdoor $L_{Aeq,16h}$ > 51dB	<3 dB	≥3 dB	≥ 6dB	≥ 9dB

* Δ (delta) represents the change in noise level

7.58 Subject to noise level changes being perceptible, where air noise levels are forecast to increase, the resulting impact is adverse: where they are forecast to reduce, the resulting impact is beneficial. The scale of significance is applied in either a negative or a positive sense

7.59 When assessing changes in aircraft noise levels against the criteria set out in Table 7.4, the modelling results for the busiest 92-day summer period from 16th June to 15th September are

considered. This is a long established approach that has been used across the UK aviation industry to reflect the fact that studies of the community response to noise from aircraft in flight have found that levels of annoyance experienced by affected people correlate most closely with the aggregate daily noise levels ($L_{Aeq,16h}$) experienced over this busy summer period.

7.60 This approach has been recently reinforced by the findings of SoNA 2014: Aircraft Noise, a key conclusion of which is that evidence based decisions about aircraft noise should be based on the use the $L_{Aeq,16h}$ metric for a typical summer's day operations.

Supplementary Indicator of Noise Exposure

7.61 It is recognised that people do not all experience noise in an averaged manner and some residents do not intuitively embrace the concept of a time averaged metric such as $L_{Aeq,16h}$ which is reported on a logarithmic scale. On that scale 3dB represents a doubling or halving of noise energy, and this is the minimum change perceptible to the human ear. Therefore, while it is the commonly used metric, this assessment has not solely relied on L_{Aeq} measures. It also includes the use of 'number above (Nx)' contours, specifically N65 average summer daytime (07:00 – 23:00) contours and N60 average summer night-time (23:00 – 07:00) contours.

7.62 'Number above' contours have been plotted at values of 25, 50, 100 and 200. These indicate the number of times that the threshold noise level (65 dB(A) for daytime and 60 dB(A) for night-time) are exceeded at given locations on a typical summer day. This reflects the approach taken in CAP 1506 'Survey of noise attitudes 2014: Aircraft'.

7.63 Importantly, unlike using $L_{Aeq,16h}$ as a daytime average or SEL for individual flyovers, the N65 value gives no indication as to the total noise to which people are exposed nor the actual level of the individual overflights. The metric merely notes the number of time that 65 dB L_{Amax} is reached or exceeded.

7.64 For example, at a particular location where the N65 value is, say, 100 this reflects the number of overflights meeting or exceeding the value on a typical summer's day. However, what cannot be known is whether each overflight is exactly 65 dB L_{Amax} or some substantially higher number. There is a significant difference in noise effect of 100 overflights all at 65 dB L_{Amax} compared to 100 flights all at 85 dB L_{Amax}.

7.65 Another matter for consideration is that a given location might be exposed to a number of overflights that generate L_{Amax} noise levels virtually indistinguishable from 65 dB but not quite at that threshold. The overflight noise effects at this location would not be captured by the N65 contours.

7.66 It is also important to note that 65 dB L_{Amax} as an overflight noise level is linked to a resident experiencing speech interference indoors, rather than being correlated with a community annoyance threshold. In Australia, where the Nx metric was conceived and has been used since the late 1990's, 70 dB L_{Amax} has been used in this context. CAP 1506 also studied the correlation between N70 daytime contours and community response, reflecting previous CAA advice in CAP 725 that N70 contours would constitute a useful supplementary indicator of aircraft noise effects. However, N65 is preferred as a supplementary indicator of overflight

effects because, as set out in paragraph 8.10 of CAP 1506, noise events in many areas are already beginning to occur at levels below 70 dB L_{Amax} and are forecast to reduce over time.

7.67 The use of N65 and N60 contours provide useful supplementary information on the effects of aircraft noise on a community, but current UK practice gives them subsidiary status in relation to $L_{Aeq,T}$. CAP 1506 states that evidence based decisions shall continue to use $L_{Aeq,16h}$.

Noise Sensitive Receptors

7.68 Different sensitivity criteria have been used for different receptors. These are summarised below, and Section 12 of ES Appendix 7.3 provides more detail.

Dwellings

7.69 All the major UK noise studies have been based on surveys of people living in houses affected by aircraft noise. The adverse effects most likely to be experienced are annoyance and, for night-time operations, sleep disturbance.

7.70 Consideration is given not only to existing dwellings in the vicinity of the airport but also those that can reasonably be expected to be constructed as a result of committed development plans. The development sites that are considered relevant for assessment are identified in Schedule 7.3/SCH2 of ES Appendix 7.3. Further details on these committed developments are provided in ES Chapter 17 (Cumulative Effects).

Education

7.71 51 dB $L_{Aeq,16h}$ has been adopted as representing the LOAEL for aircraft noise in the community given the sensitivity of the learning environment to aircraft noise. This indicates a significance criterion of noise level increases of ≥ 3 dB when the value of $L_{Aeq,16h}$ is greater than 51 dB.

Healthcare

7.72 Given that healthcare facilities catering for in-patients are sensitive to aircraft noise in a similar manner and over the same time periods as dwellings, the same significance criteria have been applied.

Places of Worship

7.73 For churches and other places of worship, speech intelligibility and freedom from excessive disturbance are important. These are similar to the daytime objectives in dwellings and so the same criteria have been used.

Community Facilities

7.74 For community facilities such as village halls, the similarity in use and desirable acoustic environment to those described above for places of worship mean that the same significance criteria can be applied.

Schedule of Identified Receptors

7.75 Table 7.5 lists the noise sensitive receptors, other than dwellings, that have been identified within the air noise study area. At each of these locations an assessment of air noise effects has been undertaken using the appropriate significance criteria. They are shown on a plan of the study area in Figure 7.2.

Table 7.5: Noise sensitive receptors that are not dwellings

	Receptor	Postcode	Easting	Northing
	SCHOOLS			
1	Howe Green School	CM22 7UF	550890	220250
2	Spellbrook Primary School	CM23 4BA	548610	217260
3	Little Hallingbury C of E Primary school	CM22 7RE	550130	217530
4	North and West Essex Adult Community College	CM20 1NW	544050	210640
5	Thaxted Primary School	CM6 2LH	563090	230930
6	The Leventhorpe School	CM21 9BY	548160	215810
7	Great Sampford Primary School	CB10 2RL	564330	235460
8	Thorn Grove Primary School	CM23 5LD	549670	220690
9	Mandeville Primary School	CM21 0BL	547860	215430
10	The Bishops Stortford High School	CM23 3LU	548950	219770
11	Birchwood High School	CM23 5BD	550400	212840
12	High Wych C of E Primary School	CM21 0JB	546210	214120
13	Summercroft Primary School	CM23 5BJ	550150	221590
14	Hatfield Heath Primary School	CM22 7EA	548630	221170
15	Thorley Hill Primary School	CM23 3NH	548860	219760
16	Herts and Essex High School	CM23 5NJ	549530	220520
17	Reedings Junior School	CM21 9DD	548380	215300
18	Hockerill Anglo European College	CM23 5HX	549500	221530
19	Richard Whittington Primary School	CM23 3NP	548300	219780
20	All Saints C of E Primary School	CM23 5BE	549760	221840
	HEALTHCARE			
21	Falcon House Little Hallingbury	CM22 7PP	549850	217940
22	Humfrey Lodge, Thaxted	CM6 2PX	561000	231420
23	Herts and Essex Hospital	CM23 5JH	549790	220870
24	Lyne Driscoll, High Wych	CM21 0HN	546450	214460
25	Saint Elizabeth's Centre, Much Hadham	SG10 6EW	543870	216880
	PLACES OF WORSHIP			
26	St Giles Church, Great Hallingbury	CM22 7TZ	550980	219660
27	St Mary the Virgin Church Broxted	CM6 2BU	557730	227410
28	Ebenezer Chapel Molehill Green	CM22 6PH	556340	224960
29	St Mary the Virgin Church Chickney	CM6 2BY	557310	228080
30	Thaxted Baptist Church	CM6 2ND	561100	230850
31	St Mary the Virgin Church Little Hallingbury	CM22 7RE	550200	217530
32	Thaxted Church (St. John the Baptist) Thaxted	CM6 2QY	560920	231060
33	Thaxted URC Church	CM6 2PY	560720	230930
	COMMUNITY FACILITIES			
34	Thaxted Anglican Church Hall	CM6 2PY	560720	230930
35	Little Hallingbury Village Hall	CM22 7RD	550170	217360
36	Thaxted Baptist Church Hall	CM6 2ND	561100	230850
37	The Barn Theatre Little Easton Major	CM6 2JN	560300	223570

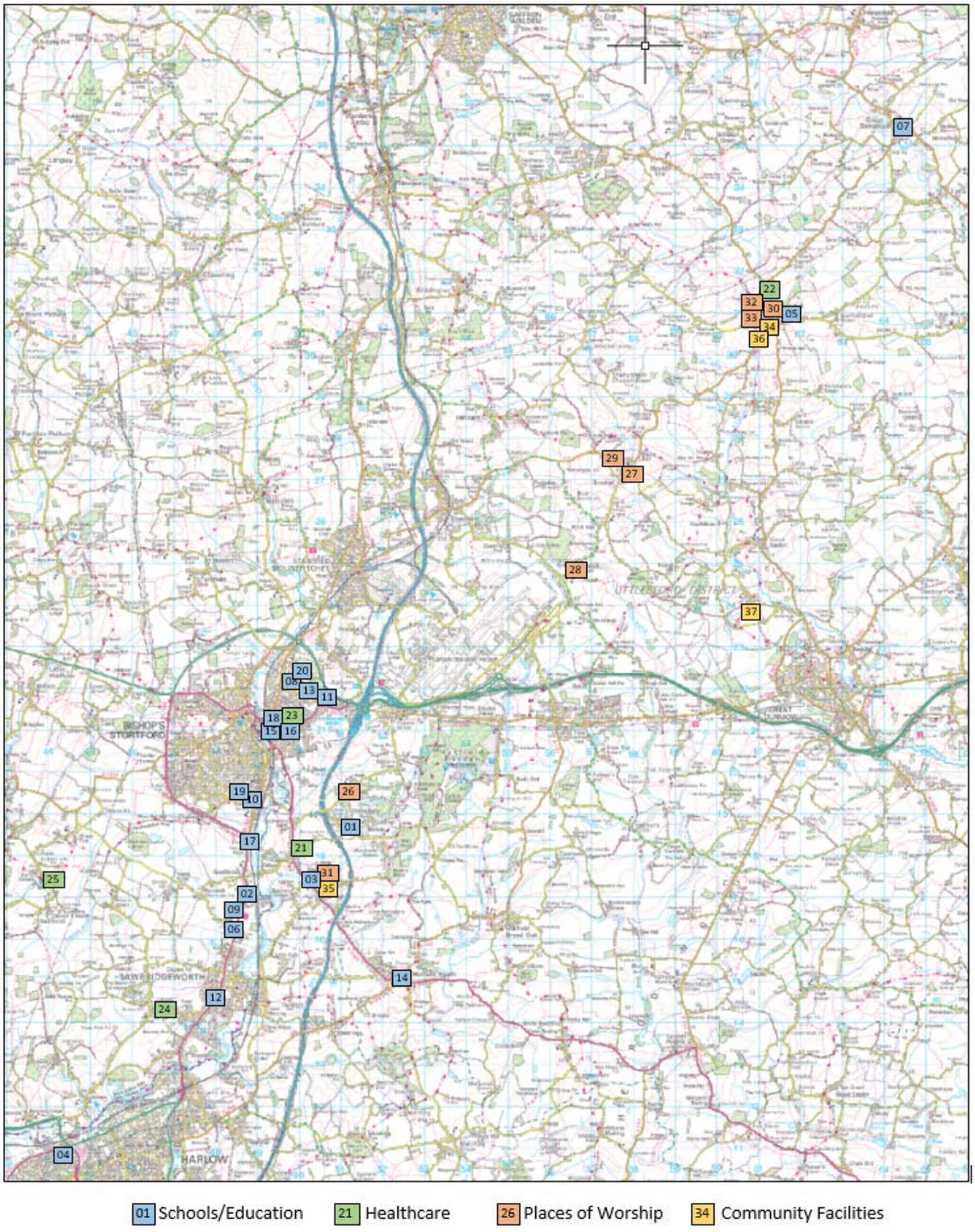

Figure 7.2: Plan of study area showing noise sensitive receptors that are not dwellings

Assumptions and Limitations

Operations

7.76 Forecasts of the different aircraft types and numbers flying on each of the departure and arrival routes underpin the noise study and related conclusions. The data used for this study are summarised in ES Chapter 4 (Aviation Forecasts) with additional information on aircraft types and number supplied by ICF, ACL and STAL's own forecasters.

Accuracy

7.77 ERCD has conducted a study of the long-term noise measurements at 16 monitors around Heathrow Airport[23] and how they compare to the ANCON noise model predictions. Table 4.4.1 of that report identifies that the majority of differences between measurements and modelled data were within ± 1 dB, and the average noise level difference was 0.1 dB. This level of accuracy is considered to apply to the current modelling of noise levels around Stansted. The ANCON model is regarded as technically robust, accords with international standards and is used for the preparation of noise contours for the other major airports in the UK.

7.78 The calculation of population and number of households is based on a 2016 update of the 2011 Census supplied by CACI Ltd. A value of 2.4 people per household is used, and all numbers, of households and population counts, are rounded to the nearest 50.

Aircraft Noise Levels

Current Aircraft

7.79 Noise performance data for existing aircraft types are held in the ANCON noise model database.

Future Aircraft

7.80 New generation aircraft types, conforming to the new ICAO Chapter 14 certification standard, which are starting to enter into service, include the Airbus A319, A320 and A321 NEO (New Engine Option) and the Boeing B737-MAX family (often referred to as Generation 1). Their noise performance has been assessed by reference to:

- ICAO certification data where relevant; and
- the ERCD database (also used for the work of the Airports Commission).

7.81 The largest operator at Stansted, Ryanair, currently operates Boeing B737-800 aircraft on an almost exclusive basis. The replacement aircraft that it has ordered from Boeing is the B737-MAX200[iv]. It is a Ryanair specific variant of the 737-MAX8 with a seating capacity of 197.

7.82 The noise level adjustments used by ERCD for Generation 1 narrow body jets compared to today's fleet are set out in Table 7.6.

Table 7.6: Adjustments to current aircraft noise levels for new generation variants

Aircraft Type	Departure	Arrival
Airbus A319 neo	-5.2 dB	-2.6 dB
Airbus A320 neo	-5.2 dB	-2.6 dB
Airbus A321 neo	-6.3 dB	-1.8 dB
Boeing 737-MAX8	-3.0 dB	-2.2 dB

[iv] http://corporate.ryanair.com/news/ryanair-buys-another-10-boeing-737-max-200s-bringing-firm-orders-to-110-with-100-options-outstanding/

Baseline Conditions

7.83 The preceding sections of this chapter describe that policy background to aircraft noise assessments as well as the basis on which the analyses are undertaken, which receptors are most sensitive to noise and the key operating parameters that need to be taken into account. This section describes the environmental conditions in the 2016 Baseline Year. It is an important precursor to the remainder of the chapter, which considers the noise effects arising from the proposed development, as it provides context on the degree and type of change that might be expected.

Character of the Area

7.84 Reaction to aircraft noise depends on a wide range of factors such as the general noise environment including the background noise. At Stansted, the existing noise environment is mostly dominated by road traffic which is audible at all locations studied and is a combination of very busy roads such as M11 and A120 and lightly trafficked local roads. The closer to a busy road a receptor point is located, the louder and steadier will be the perceived traffic noise.

7.85 Some properties to the west and south of the airport are located sufficiently close to the West Anglia railway line that train noise will also be a feature of the noise environment.

7.86 Otherwise the noise experienced will depend on the locality, which can vary from ‘busy urban’ in large towns, such as Bishops Stortford and Harlow, to ‘semi urban’ in smaller towns, such as Stansted Mountfitchett, Sawbridgeworth and Great Dunmow, to relatively rural in the large number of smaller villages across the study area.

7.87 Aircraft noise is audible at many locations, the level and frequency of which depends on the proximity of receptors to the flight paths and the airport itself. Close to the airport boundary, noise from ground operations is audible as a relatively steady background noise. At greater distances, only noise from aircraft in flight is audible. The actual level experienced at any given receptor will depend on its location relative to the departure or arrival route.

Noise Levels

Measurements

7.88 Baseline noise levels were taken from various surveys. These comprised:

- Attended measurements, carried out over relatively short time intervals between April and August 2017; and
- Unattended measurements carried out over matters of days, between December 2016 and August 2017.

7.89 ES Appendix 7.4 sets out more details, along with the locations, procedures, methodology and instrumentation used.

7.90 The measurement locations were chosen to reflect the density of population and flight paths. Figure 7.4/F1 of ES Appendix 7.4. also shows the locations of the Stansted permanent noise monitors which provide continuous long-term noise measurements of aircraft and background noise.

Results

Short Term Attended Measurements

7.91 The daytime noise levels and contributing noise sources are set out in Table 7.7.

Table 7.7: Short term attended daytime noise survey results

	Measurement Position	Range		Typical Noise Sources
		L_{Aeq}	L_{A90}	
1	Bishops Stortford	54-57	48-50	Frequent traffic along Dunmow Road, distant aircraft flyovers, wildlife audible.
2	Great Hallingbury	60	48-49	M11 motorway noise, local vehicle pass-bys, aircraft flyovers (landing on Rwy 04, departures on Rwy 22)
3	Little Hallingbury	56-60	46-47	M11 motorway noise, regular local vehicle pass-bys, aircraft flyovers (landing on Rwy 04, departures on Rwy 22)
4	Hatfield Forest	48-53	41-44	Distant traffic on A120, local traffic, aircraft movements.
5	Takeley	51-55	45-46	Local traffic, aircraft movements at some times, no movements at others.
6	Elsenham	67-68	45-46	Frequent traffic along Henham Road, aircraft departures some distance away.
7	Tye Green	56-58	45-46	Aircraft movements, very occasional traffic along Claypitt Hill, cockerel/chickens, neighbourhood noise, aircraft ground movements.
8	Stansted Mountfitchet	54-58	43-50	Frequent traffic along Church Road: cars, vans, HGVs.
9	Broxted	63-66	39-42	Regular road traffic, aircraft arrivals (Rwy 22 in use), aircraft departures (Rwy 04 in use).
10	Plegdon Green	55-62	36-40	Occasional vehicle pass-by, aircraft arrivals (Rwy 22 in use), aircraft departures (Rwy 04 in use).
11	Brick End	57-63	42-45	Light and heavy vehicle pass- bys a regular occurrence, aircraft flyovers, birdsong
12	Thaxted North	57-58	39-40	Intermittent traffic on Wedow Road and nearby roads, landing aircraft (Rwy 22 in use), distant departing aircraft (Rwy 04 in use).

	Measurement Position	Range		Typical Noise Sources
		L_{Aeq}	L_{A90}	
13	Thaxted South	67-69	53-55	Frequent light and heavy vehicle traffic on B1842, aircraft departure just audible (Rwy 22 in use), aircraft departure more audible (Rwy 04 in use).
14	Hatfield Heath	56	49	General traffic, HGVs, aircraft flyovers
15	Great Easton	66	39	B182 traffic, vehicle pass-bys at junction, aircraft flyovers
16	Bran End/Stebbing	58	41	Vehicle pass-bys, distant road traffic, aircraft flyovers, neighbourhood noise, some construction activity

7.92 The night-time noise levels and contributing noise sources are set out in Table 7.8.

Table 7.8: Short term attended night-time noise survey results

	Measurement Position	Range		Typical Noise Sources
		L_{Aeq}	L_{A90}	
1	Bishops Stortford	44	34	Intermittent traffic along Dunmow Road, occasional distant aircraft flyovers, wildlife audible.
2	Great Hallingbury	52	43	M11 motorway noise, local vehicle pass-bys, occasional aircraft flyovers (landing on Rwy 04, departures on Rwy 22), cockerel and birdsong in daylight hours
3	Little Hallingbury	48	40	M11 motorway noise, local vehicle pass-bys, occasional aircraft flyovers (landing on Rwy 04, departures on Rwy 22)
4	Hatfield Forest	41	38	Distant traffic on A120, occasional aircraft movements.
5	Takeley	48	46	Distant road traffic, occasional aircraft departures and flyovers, local traffic, birdsong during daylight hours.
6	Elsenham	59	44	M11 motorway noise, infrequent car pass-bys, occasional aircraft flyovers.
7	Tye Green*	50	46	M11 motorway noise, aircraft departing and arriving, aircraft ground movements, vehicle pass-bys.
8	Stansted Mountfitchet	51	46	M11 motorway noise, local traffic, occasional distant aircraft flyovers.
9	Broxted*	45	29	Wind in trees, M11 traffic, birdsong in daylight hours, occasional vehicle pass-by, occasional aircraft flyover.
10	Plegdon Green	55	34	Wind in trees, M11 traffic, birdsong in daylight hours, occasional vehicle pass-by, occasional aircraft flyover.
11	Brick End	48	31	Wind in trees, M11 traffic, birdsong in daylight hours, occasional vehicle pass-by, occasional aircraft flyover.
12	Thaxted North	41	31	Distant road traffic noise, birdsong
13	Thaxted South	56	40	Plant from PFS; local traffic on B1842 is consistent through the night; single cargo aircraft departure
14	Hatfield Heath	60	44	M11 traffic, local traffic car and HGV pass-bys, aircraft flyovers
15	Great Easton*+	30-50	28	Occasional vehicle pass-by, wind in trees and birdsong in daylight hours, aircraft flyovers in daylight hours
16	Bran End/Stebbing	43	25	Distant road traffic, wind in trees and birdsong in daylight hours, occasional vehicle pass-by.

* These values apply to the night-time period prior to commencement of the early morning peak operations at Stansted Airport.

+ Short term levels significantly affected by incidence of cars passing by, so range given

7.93 The noise data above indicate:

- There is significant variation in the ambient and background noise levels across the selected measurement locations. This is reflective of the wide range of noise environments that exist;
- Road traffic noise is audible and a feature of the noise environment at all locations at all times;
- Aircraft flyovers, which range from almost overhead to distant, are audible at all locations at least some of the time, but there are periods when no aircraft activity is apparent;
- In areas containing a reasonably large number of dwellings, daytime noise is characterised by typical domestic activities such as the use of garden machinery (lawn mowers, leaf blowers and the like), cars departing and arriving at houses, people walking and talking etc.;
- In more sparsely populated areas, daytime noise is characterised by more rural activities such as livestock or wild animals and agricultural activities involving the use of farm equipment and machinery; and
- Local noise sources such as road traffic or even individual vehicle pass-bys typically dominate the noise climate at all locations.

Unattended Measurements

7.94 The long term noise levels and contributing noise sources are set out in Table 7.9.

Table 7.9: Unattended noise survey results

	Measurement Position	Daytime		Night-time		Typical Noise Sources
		L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}	
A	**Gaunts End**	66	47	61	39	Aircraft flyovers, aircraft ground noise, road traffic, birdsong
B	**Burton End**					
	Monks Farm	59	47	53	43	Aircraft departures, aircraft taxiing and engine running noise, road traffic, some construction activity (temporary)
	Ash Tree Pub	55	46	50	42	Aircraft flyovers, aircraft ground noise, road traffic,
	Warmans Farm	54	50	51	46	M11 road traffic noise, contribution from aircraft and helicopter operations, birdsong
	Warmans Farm (a)	53	48	50	45	M11 road traffic noise, contribution from aircraft and helicopter operations, birdsong
	Bury Lodge	58	52	54	48	Aircraft departures, aircraft taxiing and engine running noise, road traffic, some construction activity (temporary)
C	**Molehill Green**	57	50	54	44	M11 road traffic noise, road traffic on Hall Road, aircraft landing on Rwy 22
D	**Thaxted**	58	44	54	32	Aircraft arrivals on Rwy 22 dominant feature, distant road traffic on Vicarage Lane and Margaret Street.

7.95 The noise data above indicate:

- Noise levels at locations close to the airport are higher in areas clustered around each end of the runway than they are to the side. This is as expected given the contribution to overall levels from aircraft flying (more or less) directly overhead;
- Road traffic noise is audible and a feature of the noise environment at all locations at all times;
- Aircraft flyovers, which range from almost overhead to distant, are audible at all locations at least some of the time, but there are periods when there appears to be very little airborne aircraft activity; and
- Noise levels at locations in Burton End are influenced by two large scale and significant steady noise sources, road traffic on the M11 motorway and ground activity at the airport. Noise levels from location to location do not vary significantly. Similarly, the difference between the ambient levels (L_{Aeq}) and background levels (L_{A90}) is consistently moderate across all locations.

Incorporated Mitigation

7.96 STAL implement a number of measures and apply a variety of policies that are aimed at controlling and managing the noise generated by operations at the airport. These are described in this section of the chapter as, notwithstanding any changes that may arise from the current application, they are an important means of controlling the effects of these operations in the community around the airport.

Current Planning Permission

7.97 In 2016 Stansted handled approximately 24.3mppa, which is around 30% lower than the current cap on annual passenger numbers (35mppa) permitted by the 2008 25+ planning permission (UTT/0717/06/FUL). Aircraft movements in the year amounted to just less than 181,000 compared to the 25+ consented limit for all aircraft of 274,000.

7.98 The conditions of the 25+ permission are described in ES Chapter 3 (Description of Site, Proposed Development, Policy Context and Alternatives) and the full wording of conditions and obligations relating to noise are set out in paragraphs 2.4.1 and 2.4.2 of ES Appendix 7.3.

Existing Controls at the Airport

7.99 There are a number of operating procedures that have been put in place by STAL with the express intention of controlling, and where possible reducing, noise.

Departure and Arrival Procedures

7.100 The Noise Abatement Procedures (NAP) adopted by all aircraft operating at the airport have been developed over the years by STAL and are described in paragraphs 7.41 to 7.44 and are clearly set out in Section 2.21 of the UK AIP.

Departures

7.101 Six Noise Preferential Routes (NPRs) are in place at the airport, three diverging from the end of each runway (04 and 22). The centre line of each NPR routes aircraft away from areas of concentrated population in line with Government advice and require aircraft to fly these corridors until a minimum altitude of 4,000 ft. amsl is reached. Additionally, aircraft are required to reach at least 1,000 ft. amsl at a range of 6.5km from start of roll point on the runway. Required Navigational Performance (RNP1) was formally introduced for the two trialled RNP1 SIDs, CLN1E and DET1D in 2017.

7.102 The (SIDs) instructions, which shall be followed unless otherwise instructed by ATC, include the following key local elements:

- Avoid flying over the centre of Bishops Stortford;
- Avoid flying over Sawbridgeworth and Stansted Mountfitchet at heights below 2,500ft amsl: and
- Aircraft must be higher than 4,000ft amsl before they can fly over St. Elizabeth's Centre at Much Hadham.

Arrivals

7.103 Continuous Descent Approach (CDA) flight procedures are in place on Runway 22 (landing from the NE, occurring on average ~73% of the time) which are adopted by almost 90% of aircraft arriving on this runway. CDA is not used on Runway 04 (landing from the SW, occurring on average ~27% of the time) due to current London airspace restrictions which prevent aircraft to the south and west of Stansted from flying at altitudes over 4,000 ft. amsl.

7.104 Aircraft using the Instrument Landing System (ILS) shall not descend below 2,000 ft. amsl before intercepting the glidepath and shall not fly below the glidepath thereafter. During the night quota period (23:30 – 06:00) no arriving aircraft shall descend below 3,000 ft. amsl until it is established on final approach and is less than 10nm from touchdown.

Noise Penalty Limits

7.105 L_{Amax} noise limits have been set by the DfT at a location 6.5km from the start of roll (commencement of an aircraft's departure on the runway) for different times of the day, as set out in Table 7.10:

Table 7.10: Stansted Airport Noise Penalty Limits

When	Times	Noise Limit: dB(A)
Day	07:00 to 23:00	94
Day Shoulder Period	06:00 to 07:00	89
Night Shoulder period	23:00 to 23:30	89
Night	23:30 to 06:00	87

7.106 Aircraft violating these limits incur a financial penalty, imposed by STAL. All money collected from infringements is allocated to local community, environmental and school projects through the Stansted Community Trust Fund.

Night Noise Controls

7.107 In July 2017 the Government announced the new night flight restrictions at Heathrow, Gatwick and Stansted for a five-year period commencing in October 2017. The modified controls on noise during the night quota period (23:30 to 06:00), are shown in Table 7.11:

Table 7.11: Night Noise limits at Stansted

Season	Movements Limit	Quota Count
Summer	8,100	4,560
Winter	5,600	3,310
TOTAL	13,700	7,870

7.108 The Quota Count (QC) system assigns a specific value to an aircraft depending on the noise levels it generates: there is one value for departures and another value for arrivals. The QC value ranges from 0 (an aircraft operation generating levels that are low enough to be considered exempt from an overall noise budget) up to 16. Table T3 in section 3 of ES Appendix 7.3 gives details of the noise levels associated with each QC category. There are no aircraft in common use in the UK that have QC values of 8 or 16 on either departure or arrival. A halving or doubling of the QC value represents a 3dB decrease or increase in noise level.

7.109 The Quota Count referred to in Table 7.11 above is the sum of the individual QC values for all departures and arrivals over the relevant season. The Summer season covers the seven months from May to October; the Winter season covers the remaining five months from November to March.

7.110 From October 2017:

- All aircraft movements will now count towards an airport's movement limit. No aircraft will be exempt from the movements limit but aircraft that currently fall below the QC/0.25 threshold will remain QC/0 (i.e. exempt from the noise quota limits).

7.111 From October 2018:

- A new QC/0.125 category will be introduced for aircraft from 81 to 83.9 EPNdB. Their contribution to the noise quota limit will be counted.
- Aircraft quieter than this will continue to count towards the airport's movement limits and remain QC/0.

Noise Management at Stansted

Noise Monitoring and Track Keeping

7.112 Stansted operates a Noise Monitoring and Track Keeping System (NMTKS), based on ANOMS (Airport Noise Monitoring and Management System) which is produced, calibrated and hosted by Brüel and Kjær of Denmark, a recognised and internationally renowned manufacturer of all type of noise measurement and monitoring systems. An in-built feature of ANOMS allows members of the public to access a flight track replay service called WebTrak[v].

Noise Monitoring

7.113 There are eight permanent fixed noise monitors; four located at the end of Runway 04 and four located at the end of Runway 22 as illustrated by Figure F1 and paragraph 4.1.2 of ES Appendix 7.3. The noise generated by all aircraft overflying the monitors is recorded and correlated with the operating schedule and ATC radar data, enabling the noise levels by all aircraft operations to be continuously monitored.

7.114 The data recorded at each fixed noise monitor are used to check the flight performance of all departing aircraft against the published noise limits, set out in Table 7.10 above so that fines can be levied for infringements as required. The data are also used as input into the annual noise contour generation process undertaken and reported by the CAA. Regular monitoring and reporting against the noise limits set out in planning conditions uses this data.

7.115 The airport also has two mobile monitors which are regularly deployed to assess noise levels at locations within the surrounding communities. Details of this monitoring, together with noise level results and analysis can be found on the Stansted Airport website[vi].

Track Keeping

7.116 By means of a radar feed into the ANOMS system, all aircraft movements are monitored for adherence to the NPRs published in the UK AIP. Departure track keeping is assessed against the published track(s) with an allowance made for the 3km wide swathe permitted about the track centreline as described in paragraphs 7.45 to 7.47 above.

Reporting

7.117 The results of all noise monitoring and track keeping are reported at least annually in a Noise Abatement Summary report[vii]. Aircraft noise reports are also presented to the Airport's Consultative Committee (STACC).

Complaints Collection

7.118 ES Appendix 7.5 Complaints Analysis: Noise, provides information on STAL's complaints handling policy and the annual Complaints Analysis reports. In summary, the key findings are:

- Complaints are a poor indicator of the degree of noise exposure experienced by people;

[v] http://webtrak5.bksv.com/stn3
[vi] http://www.stanstedairport.com/community/local-environmental-impacts/noise/noise-in-your-area/noise-monitoring-reports/
[vii] http://mag-umbraco-media-live.s3.amazonaws.com/1001/noise-abatement-2016-2017.pdf

- The vast majority of complaints are responses to levels of aircraft noise and whether aircraft are flying at heights or locations that accord with the complainant's expectations;
- People's propensity to complain varies significantly: a small number of complainants generate a high number of complaints;
- Where noise levels change gradually over time, there is poor correlation between the number of complaints and the number of movements or levels of aircraft noise; and
- Noise level changes that occur quickly or unexpectedly can be seen to lead to a surge in complaints.

Sustainable Development Plan

7.119 As described in ES Chapter 3, in 2015 STAL published a Sustainable Development Plan (SDP)[viii]. The 2015 SDP sets out how Stansted will make best use of its existing single runway along with an assessment of the associated benefits and impacts. The published plan was produced following a comprehensive consultation with key stakeholders and the public between June and November 2014.

Noise Action Plan

7.120 Stansted is covered by a formal Noise Action Plan[ix] as required under the Environmental Noise (England) Regulations 2006 and is approved by Defra. The plan sets out the airport's strategy for minimising and controlling noise and includes a detailed list of actions. It includes noise contour maps and details of the airport's noise controls. Stansted's current NAP was published in 2013 and a new version is scheduled to be adopted by January 2019.

Sound Insulation Grant Scheme

7.121 The airport has a Sound Insulation Grant Scheme (SIGS) available to home owners in those areas exposed to aircraft noise levels above certain limits. The key elements of the scheme are described below.

Relocation

7.122 Offer eligible households exposed to noise levels of 69dB $L_{Aeq,16h}$ or above assistance with the cost of moving,

Insulation

7.123 Offer to pay 50% of the total cost of acoustic insulation to residences exposed to noise levels in excess of:

- 63dB LAeq,16h;
- 57dB LAeq,8h (night-time); and
- 90dB(A) SEL departure footprint for the noisiest aircraft (QC/2) operating at night (23:30 to 06:00).

[viii] http://www.stanstedairport.com/about-us/developmentplan/
[ix] http://www.stanstedairport.com/community/local-environmental-impacts/noise/future-plans/

7.124 The same offer is made to properties located within 600m of the airport boundary to reflect their exposure to noise generated by ground based activities at Stansted.

7.125 Acoustic insulation is also offered to other noise sensitive properties such as hospitals and schools subject to medium to high levels of noise (63dB $L_{Aeq,16h}$ or more).

Impact Assessment

7.126 This section of the noise chapter looks at the noise effects arising from the proposed development. It briefly describes the alterations that are expected to take place, i.e. the extent of physical works and the changes in numbers and types of aircraft and goes on to set out the forecast noise levels using appropriate metrics.

7.127 Reference is made to noise contours prepared by ERCD for each assessment case. These are contained in ES Appendix 7.3. The effects of the operational changes are then quantified by reference to:

- Changes in noise levels directly attributable to the proposed development, this being the key determinant of the overall impact of this application;
- Absolute noise levels for each assessment case and what these mean in terms of community response;
- Likely changes in the pattern of movements throughout the day and night periods; and
- The sensitivity of the forecast noise levels to changes in the aircraft mix.

Operations

Proposed Works

7.128 This application relates to various airfield infrastructure works, as described in ES Chapter 3 (Description of Site, Proposed Development, Policy Context and Alternatives). It includes two new rapid access and rapid exit taxiways and nine new aircraft stands to help meet the increased level of runway throughput and the additional peak period overnight parking needs of more based aircraft.

7.129 The proposed new infrastructure is considered in more detail in ES Chapter 8 (Ground Noise) as, unlike for air noise, the physical location and extent of the works influences the expected changes in ground noise at different locations around the airport.

Aircraft Movements

7.130 The main assessment is based on future noise levels, with the development in place and operating in 2028 at the level of 43mppa and 274,000 aircraft movements. Referred to as the 2028 Development Case (DC), this is compared to:

- The noise impact with the airport operating at the current limit of 35mppa in 2028 referred to as the Do Minimum (DM) scenario;
- The noise impacts of the Development Case and Do Minimum at an intermediate year of 2023;
- The current noise impact in 2016 representing the baseline conditions; and
- The noise impact of 35mppa assessed in 2008 as part of the previous planning permission.

7.131 Aircraft movement data have been provided by ICF, the forecasters appointed by STAL, and the forecasts are described in ES Chapter 4 (Aviation Forecasts). The key inputs to the noise modelling (rounded to the nearest 1,000) are set out in Table 7.12:

Table 7.12: Key operating considerations for air noise assessment

Condition	Year	Mppa	PATMs	CATMs	Other (inc. GA)	Total
Baseline	2016	24.3	152,400	13,700	14,500	180,600
Do Minimum	2023	35	213,000	14,000	19,000	247,000
Development Case	2023	36	219,000	14,000	20,000	253,000
Development Case	2024	38	227,000	15,000	20,000	263,000
Do Minimum	2028	35	212,000	17,000	20,000	249,000
Development Case	2028	43	253,000	16,000	5,000	274,000
25+ Permission	N/A	35	243,500	20,500	10,000	274,000

7.132 The modal split of operations used in the assessment as well as the apportionment of daytime and night-time departures on each of the SIDs are as defined in paragraphs 7.41 to 7.44 and Table 7.2 of this chapter. The selection of a particular SID for any given aircraft operation depends on its final destination and, at present, there is approximately a 50:50 split of aircraft making a first turn to the left or the right after take-off. On runway 04 the actual split is 55%

day and 51% night turning right (CLN and DET/LAM/LYD) with 45% day and 49% night turning left (BUZ/BKY/CPT). On runway 22 the actual split is 45% day and 52% night turning right (BUZ/BKY/CPT) with 55% day and 48% night turning left (CLN and DET/LAM/LYD).

7.133 It is notable that for departures turning right from Runway 04 or left from Runway 22, there are fewer operations on DET/LAM/LYD than on CLN. In the daytime this is particularly marked and reflects a change that took place in 2016 (trial) and 2017 (formal), namely the migration of significant number of departures onto CLN from DET/LAM/LYD.

7.134 There are no further changes to departure or arrival procedures which would be necessary to accommodate the proposed development. That is not to say that these procedures will not naturally evolve over the timeline of this assessment as departing aircraft adhere to narrower swathe Performance Based Navigation routes (PBNs) on all SIDs. At the present time, PBN procedures have been adopted on 22-CLN and 04-DET all noise assessment cases take this into account.

7.135 This change, which was trialled in 2016 and adopted in 2017, has brought environmental benefits and significantly reduced the degree to which a large number of houses are overflown, which is evident when looking at the change over time of the departure flight paths on 22-CLN.

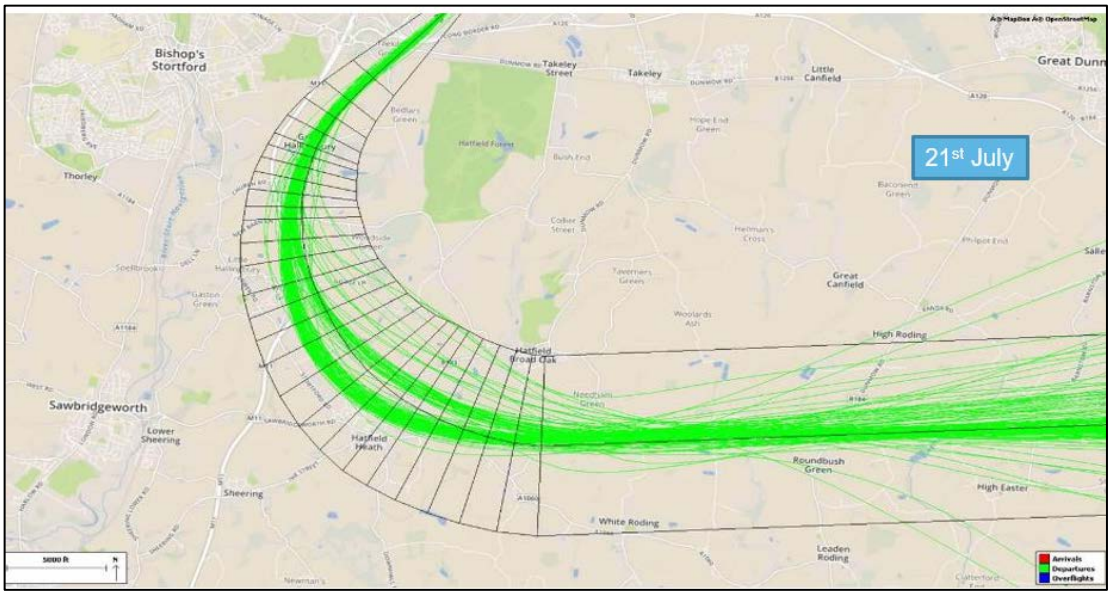

Figure 7.3: PBN flight paths by Ryanair on 22-CLN in July 2017

7.136 At the start of the Performance Based Navigation operations on Clacton (CLN), Figure 7.3 indicates that departures on Runway 22 occupied considerably more of the permitted dispersion swathe, with a number of turns bringing aircraft south of the track centre line just to the north of Hatfield Heath.

7.137 Two months later, a review of the radar data as shown in Figure 7.4 indicates that aircraft are now flying along much better defined tracks and using less of the permitted dispersion swathe. The benefits in terms of keeping aircraft further from Hatfield Heath can clearly be seen.

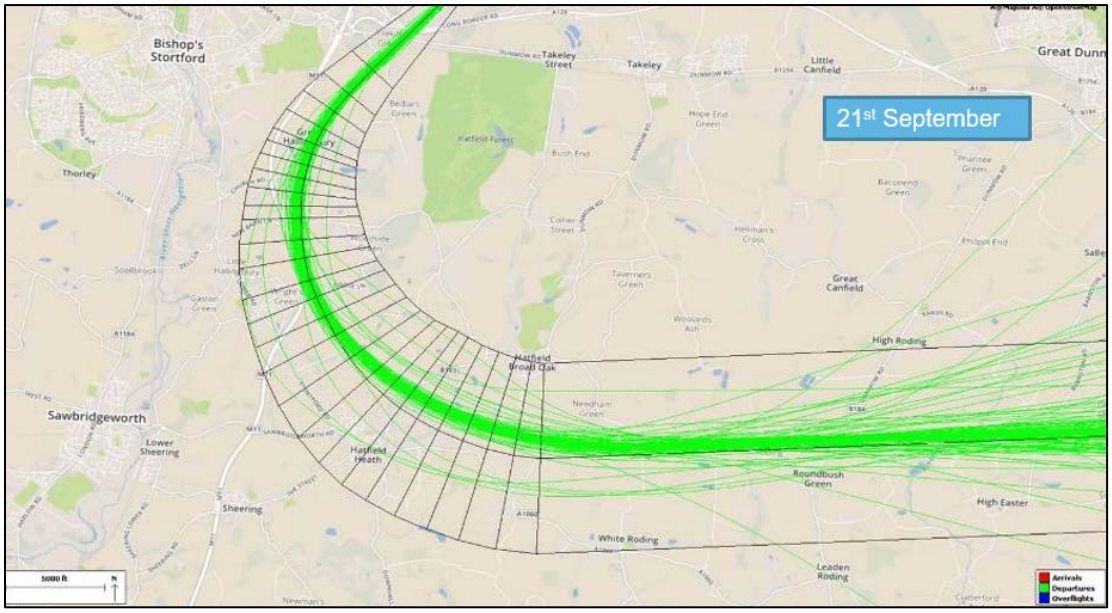

Figure 7.4: PBN flight paths by Ryanair on 22-CLN in September 2017

7.138 The ANCON noise modelling uses departure and arrival tracks based on actual radar data. These are summarised in Figure 7.5: the narrower dispersion swathes for the CLN PNB tracks is clearly evident.

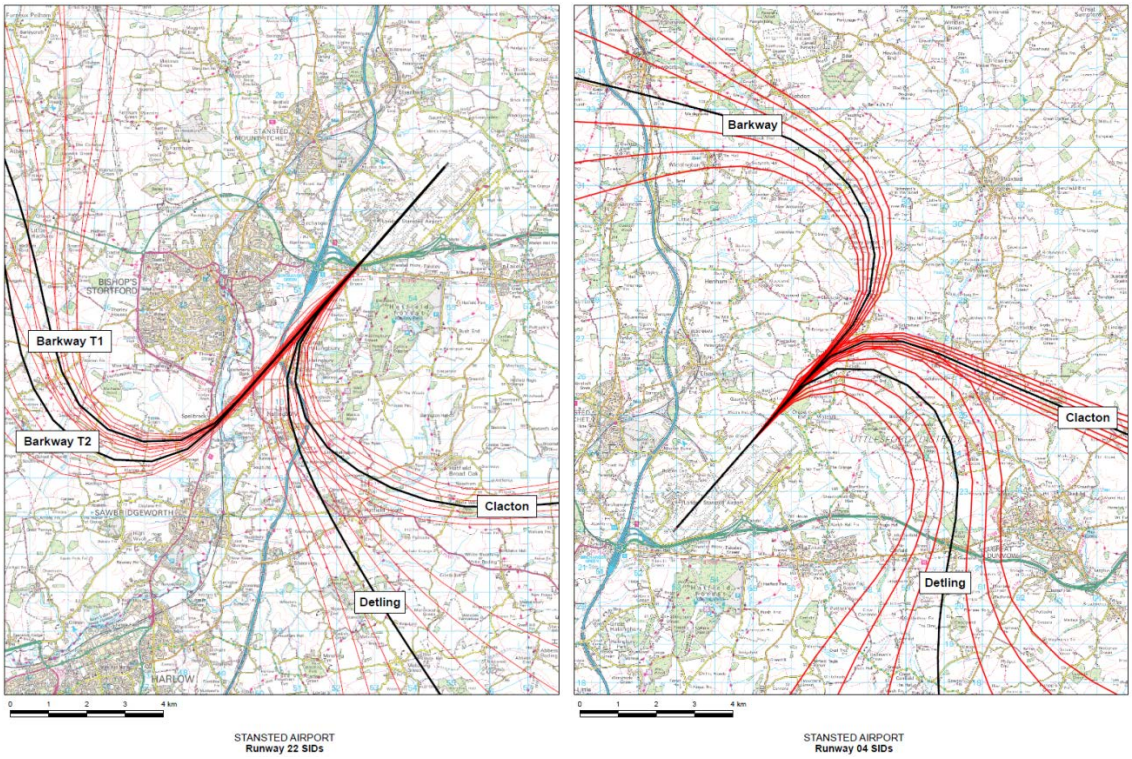

Figure 7.5: SID dispersion used for the ANCON noise modelling

Forecast Operations

7.139 The number and types of aircraft used for the noise modelling are summarised in schedules contained in ES Appendix 7.3, as follows:

- Schedule 7.3/SCH3: 2016 Baseline Year;
- Schedule 7.3/SCH4: 2023 Do Minimum (DM) 35mppa;
- Schedule 7.3/SCH5: 2023 Development Case (DC), 36mppa;
- Schedule 7.3/SCH6: 2024 Development Case (DC), 38mppa
- Schedule 7.3/SCH7: 2028 Do Minimum (DM) 35mppa;
- Schedule 7.3/SCH8: 2028 Development Case (DC) 43mppa full capacity.

Noise Modelling Results

7.140 This section sets out the results of the noise modelling which is contained in a large number of tables and contour figures corresponding to the different assessment scenarios at the different dates. A guide to all the individual tables and figures is provided below, which is then followed by a summary description of the key assessment findings.

7.141 The full output from the ERCD ANCON modelling exercise, covering all the assessment metrics and operational scenarios summarised above are contained in ES Appendix 7.3. For ease of reference, Table 7.13 identifies the Figure and Table (e.g. T26) references within ES Appendix 7.3 for each of the noise scenarios.

Table 7.13: References for air noise modelling results

Case	Summers Day		Annual		Number Above	
	$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{den}	L_{night}	N65	N60
25+ Permission						
Contours	25+/L_{Aeq}/Day	25+/L_{Aeq}/Night	-	-	25+/N65/Day	25+/N60/Night
Area, households, population	T26	T27	-	-	T28	T29
2016 Baseline Year						
Contours	2016/L_{Aeq}/Day	2016/L_{Aeq}/Night	2016/L_{den}	2016/L_{night}	2016/N65/Day	2016/N60/Night
Area, households, population	T30	T31	T32	T33	T34	T35
2023 Do Minimum						
Contours	2023DM/L_{Aeq}/Day	2023DM/L_{Aeq}/Night	2023DM/L_{den}	2023DM/L_{night}	2023DM/N65/Day	2023DM/N60/Night
Area, households, population	T36	T37	T38	T39	T40	T41
2023 Development Case						
Contours	2023DC/L_{Aeq}/Day	2023DC/L_{Aeq}/Night	2023DC/L_{den}	2023DC/L_{night}	2023DC/N65/Day	2023DC/N60/Night
Area, households, population	T42	T43	T44	T45	T46	T47
2024 Development Case						
Contours	2024DC/L_{Aeq}/Day					
Area, households, population	T61					
2028 Do Minimum						
Contours	2028DM/L_{Aeq}/Day	2028DM/L_{Aeq}/Night	2028DM/L_{den}	2028DM/L_{night}	2028DM/N65/Day	2028DM/N60/Night
Area, households, population	T48	T49	T50	T51	T52	T53
2028 Development Case						
Contours	2028DC/L_{Aeq}/Day	2028DC/L_{Aeq}/Night	2028DC/L_{den}	2028DC/L_{night}	2028DC/N65/Day	2028DC/N60/Night
Area, households, population	T54	T55	T56	T57	T58	T59

7.142 The noise metrics applicable at each of the noise sensitive receptors that are not dwellings are set out in Table 7.5 are summarised in Schedule 7.3/SCH9 for daytime and Schedule 7.3/SCH10 for night-time of ES Appendix 7.3 (Air Noise).

7.143 It should be noted that there are a number of assessment cases for which N60 night-time values at 100 and 200 cannot be plotted as there are simply not that number of overflights at or above 60 dB L_{Amax} expected at locations anywhere around the airport.

7.144 The annual operations results L_{den} and L_{night} are interpreted as part of the Health Impact Assessment (HIA) (ES Appendix 14.1) which is summarised in ES Chapter 14 (Public Health and Wellbeing).

25+ Permission 35mppa Re-stated

7.145 The current 2008 25+ Permission sets, in Condition AN1, a limit to the area of the 57dB $L_{Aeq,16h}$ contour of 33.9km^2. The condition applies today and can be taken as an acceptable and proportionate means of controlling noise generated by aircraft operations at Stansted.

7.146 Therefore, it is a helpful starting point to assess the noise impact arising from the current proposals against this planning condition limit, but viewed in the light of the methodology and assumptions used today.

7.147 For example, current CAA guidance is to produce noise level contours at lower levels than the 57 dB $L_{Aeq,16h}$ value, which was the CAA recommended lower limit when the analysis was carried out for the for the 25+ application ES. Other new metrics are also now recommended as best practice.

7.148 Accordingly, the noise contours that were originally prepared for the 25+ application ES have been re-plotted in a way that reflects current guidance in order to aid comparison with the contours for this application.

7.149 This requires:

- Extending the $L_{Aeq,16h}$ analysis down to values of 54 and 51 dB(A);
- Preparing night-time $L_{Aeq,8h}$ contours, which were not calculated previously in the 2006 ES; and
- Preparing 'number above' contours for the daytime (N65) and night-time (N60).

7.150 As noted previously, for accurate comparison with existing Condition AN1, the contour analysis has been undertaken using precisely the same aircraft types, operating numbers, tracks and flight profiles as used in the original analysis.

L_{Aeq} Noise Contours

7.151 Only daytime L_{Aeq} contours were produced as part of the 25+ Permission ES, and these were only plotted down to a value of 57 dB. Re-plotting these contours as well as providing night-time contours down to the values set out in CAP 1616a and CAP 1520 identifies the entire area around the airport within which aircraft noise would be expected to have an adverse effect based on the most recent survey of noise attitudes. Noise levels have not changed from

those assessed in 2006; the difference here is that they are restated in terms consistent with those used to assess the current application with an increased passenger cap of 43mppa.

Number Above Contours

7.152 N65 and N60 contours were not prepared for the 25+ planning case as such metrics were not in use at the time. However, they do not represent any new or different noise conditions; merely they simply restate what is already consented in terms of number of flyovers above the defined noise levels.

2016 Baseline Year

L_{Aeq} Noise Contours

7.153 2016 daytime and night-time L_{Aeq} contours are contained in ERCD Report 1703[24], although as part of this noise assessment they are restated in terms consistent with those used to assess the increase of the passenger cap to 43mppa.

Number Above Contours

7.154 N65 and N60 contours for the 2016 Baseline Year have not previously been published; ERCD Report 1703 contains only N70 daytime contours. Again, they do not represent a new condition and instead simply restate the 2016 noise conditions in terms of number of flyovers above the defined noise levels.

2023 Do Minimum

L_{Aeq} Noise Contours

7.155 The 2023 Do Minimum 57 dB $L_{Aeq,16h}$ contour extends to an area of 30.3 km^2, below the permitted level of 33.9km^2. This is expected to be the worst case year for daytime noise impacts as the permissible throughput of 35mppa is achieved in 2023. The proportion of operations undertaken by new generation, aircraft is substantially lower than in the 2028 Principal Assessment Year (which benefits from an additional five years of uptake), meaning that, in effect, the average noise level per aircraft movement will be higher in 2023 than in 2028.

7.156 The same observation applies to all the 2023 Do Minimum $L_{Aeq,8h}$ contours.

Number Above Contours

7.157 The shape and extent of the 2023 Do Minimum N65 and N60 contours is similarly influenced by the fact that the average noise level per aircraft movement is higher in 2023 than in 2028. With no change to the passenger cap, these contours represent the most wide ranging overflight effects between now and any point in the future.

2023 Development Case

L_{Aeq} Noise Contours

7.158 The 2023 Development Case 57 dB $L_{Aeq,16h}$ contour extends to an area of 31.2 km^2, which is also below the consented envelope limit of 33.9km^2. The contour area is larger than the 2023 Do Minimum case, due to the additional albeit small number of aircraft movements handling

the larger forecast passenger throughput of 36mppa, if the passenger cap is increased. As a result, the total number of aircraft operations increases by 6,000 from 247,000 to 253,000, and it is this relatively modest change in movements that gives rise to relatively modest increases in noise levels and contour areas compared to the 2023 Do Minimum scenario.

7.159 The same observation applies to all the 2023 Development Case $L_{Aeq,8h}$ contours.

Number Above Contours

7.160 As for the 2023 Do Minimum scenario, the shape and extent of the 2023 Development Case N65 and N60 contours is influenced by the fact that the average noise level per aircraft movement is higher in 2023 than in 2028.

2024 Development Case

L_{Aeq} Noise Contours

7.161 The year in which the 57 dB $L_{Aeq,16h}$ Development Case contour is forecast to reach its maximum extent is 2024, for which an area of 32.0 km^2 is predicted, still below the consented envelope limit of 33.9km^2.

2028 Do Minimum

7.162 2028 is the Principal Assessment year, being the point at which the Development Case reaches full capacity (43mppa and 274,000 aircraft movements). Comparing the noise conditions in 2028 with (DC) and without (DM) the development in place is the primary test of the noise impact associated with this application.

L_{Aeq} Noise Contours

7.163 By 2028, with 35mppa and without the development, noise levels are expected to fall from the 2023 levels due to the higher percentage of operations by new generation, low noise aircraft. Compared to the 2016 Baseline Year, noise levels are expected to be marginally higher, with the various noise contours covering slightly larger areas.

7.164 The scale of noise level changes from one assessment case to another are discussed in the section **Air Noise Effects** from paragraph 7.202 onwards. In all cases, noise levels changes are small and would not be expected to give rise to conditions that are perceptibly different from one assessment case to the next.

Number Above Contours

7.165 In the case of the N65 index, the lower value contours (50 and 20) cover a larger area in 2016 than in 2028. The reason for this is the relatively high percentage of operations forecast to be undertaken by new generation, low noise aircraft in 2028 whereas in 2016 there are none.

2028 Development Case

L_{Aeq} Noise Contours

7.166 In 2028, with 274,000 aircraft movements and 43mppa due to development having taken place, noise levels and contour areas are expected to reduce from 2023 (36mppa and 253,000 aircraft movements). Despite there being 16% more movements, there will be a

higher percentage of operations by new generation, low noise aircraft, which are between 3 dB and 5 dB quieter than current aircraft (see Table 7.6).

7.167 This is the key reason why noise levels in the 2028 Development Case (43mppa) are lower than those for the 2023 Do Minimum (35mppa, 247,000 aircraft movements) and 2023 Development Case (36mppa, 253,000 aircraft movements). Thus the 2028 Development Case 57 dB $L_{Aeq,16h}$ contour covers an area of 28.7 km^2, 15% smaller than the current consented envelope limit of 33.9km^2.

7.168 Compared to the 2016 Baseline conditions, noise levels are expected to be marginally higher, that is to say the various noise contours cover slightly larger areas.

Number Above Contours

7.169 Similar to the 2028 Do Minimum scenario the N65 index lower value contours (50 and 20) cover a larger area in 2016 than in 2028 Development Case, even with the development having taken place. Again, the reason for this is the relatively high percentage of operations forecast to be undertaken by new generation, low noise aircraft in 2028 whereas in 2016 there are none.

Difference Contours: 2028

7.170 This section compares the noise levels forecast in 2028 with the development having taken place to what they would be with no development.

Daytime $L_{Aeq,16h}$ Noise Levels

7.171 The difference in daytime $L_{Aeq,16h}$ noise levels in 2028 with and without the development are shown in ES Appendix 7.3 Figure, 2028 DC vs. DM/L_{Aeq}/Day. The contours extend to the 2028 Development Case (43mppa) 51 dB $L_{Aeq,16h}$ contour, as beyond this boundary average noise levels would be expected to have no adverse effects within the community.

7.172 The uniform appearance of the contours reflects the fact that the noise changes resulting from the development are expected to be very small and consistent across the study area. Imperceptible noise level increases of between 0.5 and 0.6 dB are expected.

Night-time $L_{Aeq,8h}$ Noise Levels

7.173 The difference in night-time $L_{Aeq,8h}$ noise levels in 2028 with and without the development are shown in ES Appendix 7.3 Figure 2028 DC vs. DM/L_{Aeq}/Night. The contours extend to the 45 dB $L_{Aeq,8h}$ contour, as that is the relevant night-time range for adverse effects.

7.174 The contours indicate noise level increases are within the range -1 to +1 dB, although examination of the forecast noise levels at the noise sensitive receptors set out in Schedule A7.3/SCH1 of ES Appendix 7.3 indicates actual changes of between -0.2 and +0.4 dB forecast. These very small changes are not within a range that is normally perceptible.

7.175 In contrast to the predicted daytime noise level changes, some areas are forecast to experience small reductions in noise levels while others will experience small increases. The reason for this is the displacement of night-time general aviation operations by scheduled passenger operations and an attendant shift in the use of the various SIDs.

Pattern of Movements

Busy Summer Day

7.176 The noise analysis focuses on the aggregate daytime and night-time noise levels, consistent with the findings of the most recent survey of attitudes to aircraft noise (SoNA 2014: Aircraft). This approach has been adopted by the Government in current and emerging aviation policy and is the accepted approach to assessing airport development and meets the CAA's requirements in CAP 1616a.

7.177 Nevertheless, it is recognised that people's sensitivity to noise is not necessarily uniform over the assessment periods and airport operations can fluctuate throughout the day. Therefore, an additional assessment has been made using the concept of a 'busy summer day'. Section 29 of ES Appendix 7.3 describes the results for the Baseline Year 2016 and also the Principal Assessment Year of 2028, with and without the proposed development.

7.178 A busy summer day represents operations that are close to the highest daily number of movements, and is therefore indicative of a peak day of activity. That is not the same as the aggregate summer's day, which averages operations over the 92-day busy summer period between mid-June and mid-September, and which for the reasons set out in paragraph 7.59 is used for the creation of noise contours and the noise impact analysis.

7.179 Comparing movements on the busy summer day to those taking place on an aggregate summer day suggests the following:

- For daytime movements between 07:00 and 23:00, the busy summer day does not handle substantially larger numbers of movements than the aggregate summer day. This implies that the pattern of daytime movements through the busy summer season is relatively steady;
- For night-time movements between 23:00 and 07:00, the busy summer night is 16% to 17% busier than the aggregate summer night. Given that the less busy summer nights will handle fewer movements in order to balance out the aggregate, this suggests that there is some fluctuation in the pattern of night-time movements during the busy summer season; and
- By 2028, night-time movements will be operating at or close to the night-time movements limits imposed by the Government, whether or not the proposed passenger cap is lifted. As can be seen in Table T60 of ES Appendix 7.3, the number of movements forecast for a busy summer night is hardly affected by whether the proposed development is implemented or not.

Hourly Movements

7.180 To better understand the activity that is represented by the noise contours, and especially the nature of over-flying experienced in local communities, this section describes the pattern of aircraft movements throughout the day. It complements the 'Number' above contour analyses described earlier.

7.181 Section 29 of ES Appendix 7.3 includes graphs showing the number of departures and the number of arrivals occurring during every hour of the full 24 hour period of a busy summer day.

2016 Baseline

7.182 The pattern of movements over a 24-hour period in 2016 Baseline Year can be summarised as:

- During the dead of night, i.e. midnight to 06:00, there is very little activity at the airport;
- In the hour beginning 06:00, there is a surge in departures which continues for the next two hours, with an increasing number of arrivals between 07:00 and 09:00; This reflects the large number of based, overnight parked aircraft leaving for their first wave of flights;
- Between 09:00 and 12:00, there is a relative lull in activity;
- From 12:00 to 16:00 the activity fluctuates hour on hour at a moderate level;
- From 16:00 to 21:00, the level of activity picks up and is reasonably steady hour on hour; and
- The hour commencing 21:00 is relatively quiet, but thereafter and up to midnight, activity is dominated by significant numbers of arriving aircraft each hour, returning to their home base at Stansted.

2028 Do Minimum

7.183 For the 2028 Do Minimum scenario, the forecast pattern of movements shows a similar pattern to the 2016 baseline:

- During the dead of night, i.e. midnight to 06:00, there is relatively little activity at the airport;
- In the hour beginning 06:00, there is a surge in departures which continues through the next two hours, with an increasing number of arrivals between 07:00 and 09:00; and
- After 21:00 and up to midnight, there are a significant number of arrivals in each hour.

7.184 With no development and natural growth up to the currently permitted capacity, by 2028 the extra number of movements on a busy summers day leads to more intense use of the 'off peak' hours between 09:00 to 21:00. Unlike in 2016, where there are some periods of relative inactivity, by 2028 the airport will be reasonably and uniformly active throughout this period.

2028 Development Case

7.185 For the Development Case, the pattern of movements in 2028 is broadly similar to the Do Minimum scenario. The key difference is that for the Development Case, with the higher

passenger cap of 43mppa, there will be an increase in the number of movements which is relatively uniform across the daytime hours.

Changes in Hourly Movements

2028: Development Case vs. Do Minimum

7.186 A comparison of the forecast hourly movements for these two conditions indicates that the increase in the number of movements associated with the proposed development will take place across the daytime hours and will be relatively uniform. The increase will be slightly greater between 09:00 and 11:00 and again between 20:00 and 22:00, but the differences compared to the bulk of the daytime hours is not great.

7.187 For the night-time period, the forecasts indicate hardly any change in the number of movements. In fact, fewer movements are forecast between the hours of 03:00 and 05:00 due to the displacement of 'Other' traffic by PATM in the night-time.

2028: Development Case vs. 2016 Baseline

7.188 A comparison of the forecast hourly movements for these two conditions indicates that the relatively greater increase in the number of flights associated with the proposed development compared to the baseline conditions will again take place across the daytime hours. In this situation, the increase is not so uniform, with some periods of relatively large increases in aircraft movements being observed between 09:00 and 12:00 and again between 20:00 and 22:00.

7.189 For the night-time period, the forecasts indicate only small changes during the dead of night (03:00 to 05:00), with some hours showing reduction due to the loss of 'Other' traffic for the 2028 Development Case. There are more significant changes at each end of the night with more arrivals expected between 00:00 and 03:00 and more departures between 06:00 and 07:00. The changes are a direct consequence of the controls on night flights imposed by the Government which, according to the most recent policy consultation on airspace change, are expected to continue through to the 2028 Principal Assessment Year.

Fleet Mix Sensitivity

7.190 The modelling and assessments described above use a current and forecast mix of aircraft which is believed to be reasonable and appropriate. It takes account of past trends, the nature of Stansted's activity, the current known intentions and fleet orders of airlines, and wider assumptions within the industry. Nevertheless, some sensitivity tests have been carried out, using the 57 dB $L_{Aeq,16h}$ noise contour and the impact of a ±10% change in the rate at which existing aircraft are replaced by new generation, low noise aircraft. Section 30 of ES Appendix 7.3 sets out the results.

7.191 This sensitivity test responds to UDC's request, as set out in its Scoping Opinion of 21st December 2017 (ES Appendix 2.4). Although these alternative rates of fleet replacement are plausible, they are not considered likely. ICF take a balanced and reasonable view on the rate of uptake of new generation, low noise aircraft in their forecasts as described in ES Chapter 4 (Aviation Forecasts).

Indicative Noise Level Changes

7.192 Rather than producing a suite of noise contours for each assessment year that separately identify the effect of a 10% quicker or slower uptake in new generation, lower noise aircraft, the analysis makes use of an 'indicative community noise level' that can be computed for every year of operations between 2016 and 2028. The meaning of 'indicative community noise level' and how it is used in this assessment is described in ES Appendix 7.3. The results of the analysis are shown graphically in Figure F14 of ES Appendix 7.3.

Sensitivity Study

7.193 By altering the rate at which the new generation, low noise aircraft are adopted into the mix by ±10%, the effect on the annual noise levels is shown in Figure F15 of ES Appendix 7.3. The overall conclusion from this analysis is that changes in the rate of uptake of new variant, low noise aircraft of up to 10% either way are unlikely to have material practical consequences for levels of airborne aircraft noise experienced in the local community. Of note:

- In the early years, 2017 to 2019, the uptake of new variant, low noise aircraft is low, and changing the rate of uptake therefore has no effect on the predicted noise levels;
- By 2020 some noise benefits are starting to become apparent. A 10% quicker year on year uptake could give rise to a noise benefit of around 0.1 dB. A 10% slower year on year uptake makes no discernible difference;
- The same conclusion can be drawn for the peak noise year of 2024;
- By the year of full capacity, 2028, a 10% quicker year on year uptake could give rise to a noise benefit of around 0.1 dB, while a 10% slower year on year uptake could give rise to a noise dis-benefit of around 0.1 dB. This is of no material consequence;

7.194 The overall conclusion from this analysis is that changes in the rate of uptake of new variant, low noise aircraft of up to 10% either way are unlikely to have material practical consequences for levels of airborne aircraft noise experienced in the local community.

Effect on the Extent of the Noise Contours

7.195 The relationship between the 'indicative community noise level' and the extent of the corresponding noise contours is complex and cannot be accurately derived without detailed ANCON noise modelling. However, for the purposes of assessing how the contour area might be expected to appear between 2016 and 2028 a simple analysis of the relevant data for those years which have been modelled has been undertaken. The analysis method is in Section 30 of ES Appendix 7.3, gives rise to the reasonably foreseeable changes set out in Figure 7.6.

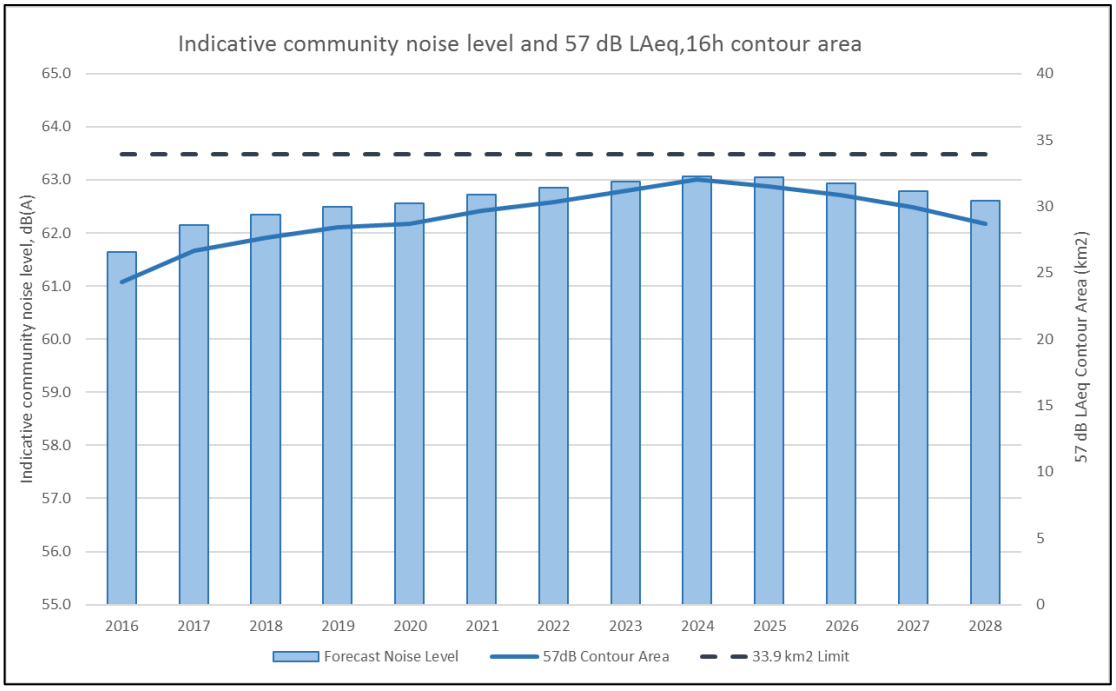

Figure 7.6: Forecast indicative community noise level and 57 dB $L_{Aeq,16h}$ contour area

7.196 The first point of note is that the changes in noise level over the entire forecast period from 2016 to 2028 are very small. By 2028 they are predicted to be less than 1 dB higher than in 2016: in 2024, the year forecast to have the highest aircraft noise, the increase over 2016 is less than 1.5 dB. Both of these noise level increases would be rated as **imperceptible**.

7.197 As is to be expected, the shape of the 57 dB contour area follows the general trend of the 'indicative community noise level', with the peak forecast to be reached in 2024. Thereafter, the contour area reduces in line with the community noise level as the benefits of the new generation, lower noise aircraft become more apparent.

7.198 Notably, the 25+ Permission noise contour limit (AN1) of 33.9 km^2, shown as a dotted grey horizontal line, is never forecast to be breached. After reaching a peak of 32.0 km^2 in 2024, the contour area is forecast to drop to 28.7 km^2 in the 2028 Development Case.

7.199 If the rate of uptake of new generation, low noise aircraft is not as forecast but varies by 10% either way, the likely effect on the extent of the 57 dB $L_{Aeq,16h}$ contour is indicated in Figure 7.7. It is clear that the differences are marginal and always well below the permitted limit of 33.9km^2.

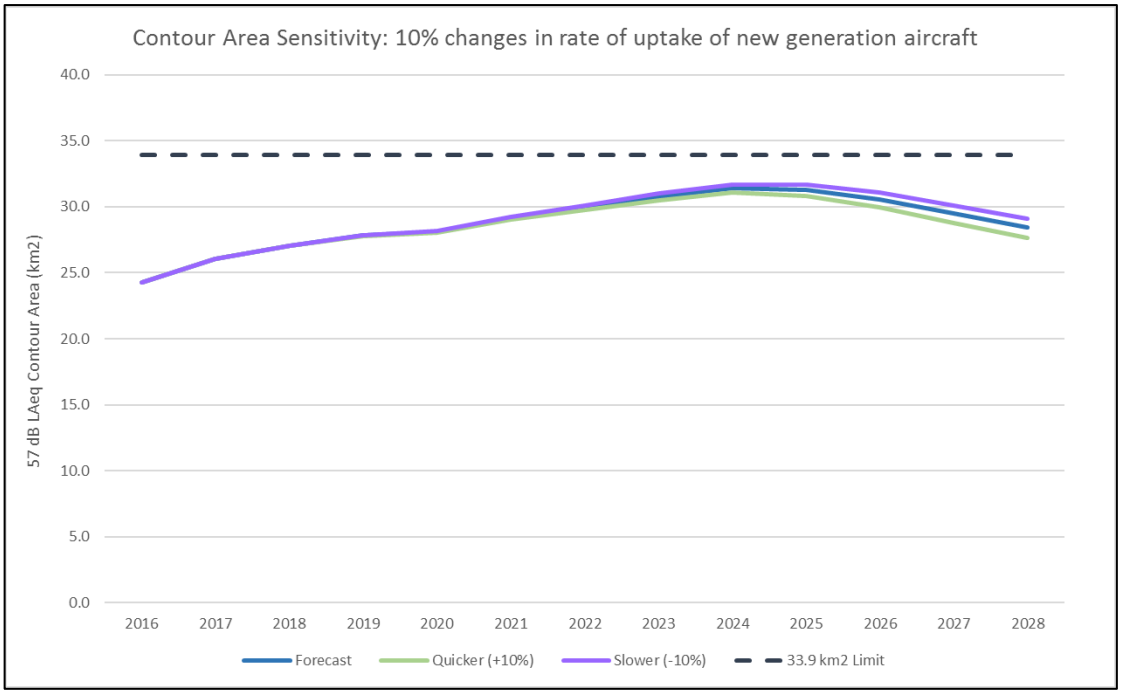

Figure 7.7: Forecast 57 dB $L_{Aeq,16h}$ contour area: ±10% change in rate of uptake of new aircraft

7.200 A 10% slower uptake in new generation, low noise aircraft still gives rise to a 'peak' contour year of 2024, and although the contour area is slightly higher than if the forecast rate of uptake actually occurs, it is still comfortably below the current limit. The relatively small differences are consistent with the very small changes in overall noise level described previously in this chapter.

7.201 In conclusion, future airborne aircraft noise levels would only be higher in the community than was foreseen when the 25+ Planning Permission was granted if there is virtually no uptake of new generation, low noise aircraft. This is not a realistic proposition given known commercial commitments of the airport's airlines to acquire new generation aircraft, the continued commitments from STAL and the wider airline industry approach to noise management (i.e. the ICAO balanced approach).

Air Noise Effects

7.202 This section draws together the different results from the various modelled scenarios. Its primary objective is to assess them against the objective criteria that are set out in Table 7.4 earlier in the chapter to describe the significance of any changes.

7.203 The assessment methodology is summarised in the flow chart at Figure 7.8 below.

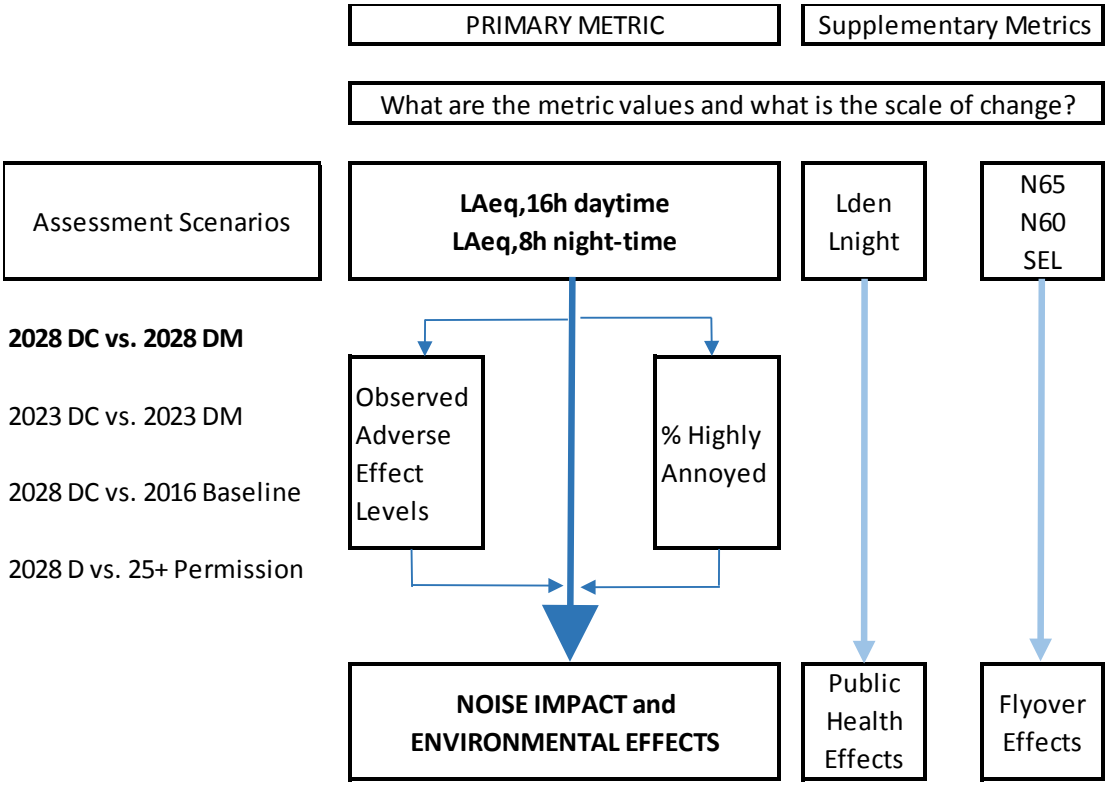

Figure 7.8: Air noise assessment methodology

7.204 What the flow chart demonstrates is that changes in noise level resulting from the application constitute the core of the noise impact assessment. Those changes are assessed by reference to the L_{Aeq} noise levels for the typical summer daytime and night-time periods, which has been confirmed by SoNA 2014 as being the primary assessment metric on which reliance should be placed whenever evidence based decisions are to be made.

7.205 The chart indicates how changes to the number of people who are exposed to the NPSE Observed Adverse Effect Levels or who are likely to be 'highly annoyed' by aircraft noise are factored into the assessment of noise level change. While the analysis is able to identify quite precise numbers in each case, the significance of those numbers is ultimately governed by the change in noise level with which they are associated.

7.206 It is extremely important to view the predicted changes in the number of people exposed to noise above the NPSE thresholds or who are 'highly annoyed' by noise in the context of the levels they currently experience and the degree to which those levels are forecast to change. The analysis that follows shows that even when comparing forecast noise levels in 2028, with the development, to those existing in 2016, increases of not more than 0.8 dB daytime and

1.2 dB night-time are indicated. Such a change in noise is, by all relevant measures, **imperceptible**.

7.207 Therefore, any predicted increase in the number of people exposed to noise levels above the LOAEL or SOAEL or who are 'highly annoyed' must be weighed against the practical consideration of this being due to an increase in noise levels that is not discernible. It is therefore very important in the circumstances of this application to consider all the relevant noise factors together so that each strand of assessment can be seen in its proper context.

7.208 The assessment of supplementary metrics provides important information on public health effects (dealt with in ES Chapter 14) and flyover effects, specifically the changes that people in different areas around the airport might experience and what these changes might mean. They are, however, supplementary and not the basis on which the noise impact and the associated environmental effects are determined.

7.209 There are four assessment scenarios for which all of the above effects are assessed. Of these, the most significant is the comparison of conditions arising for **2028 DC vs. 2028 DM**, i.e. the difference forecast to occur for full capacity operating conditions with and without the development having gone ahead. For this reason, difference contours have been prepared for the daytime and night-time periods for the **2028 DC vs. 2028 DM** comparison scenario. They have not been prepared for the remaining scenarios, for which reference is made to the noise levels predicted at the noise sensitive receptors that are not dwellings in order to determine the scale of change in noise level.

Noise Level Changes

2028 Development Case vs. 2028 Do Minimum

Daytime

7.210 The daytime difference contours shown in ES Appendix 7.3 Figure 2028 DC vs. DM/L_{Aeq}/Day indicate noise level increases attributable to the proposed development of not more than 1dB.

7.211 ES Appendix 7.3 Schedule 7.3/SCH9 indicates that at noise sensitive receptors that are not dwellings within the study area identified in ES Appendix 7.3 Schedule 7.3/SCH1 daytime noise level increases of 0.5 to 0.6 dB are forecast, with an overall aggregate across all assessment locations of 0.5 dB.

7.212 As Figure 7.2 shows, these receptors are wide spread across the study area and are exposed a range of aircraft noise levels. Therefore, a change in $L_{Aeq,16h}$ value of between 0.5 and 0.6 dB is indicative of the noise level change across the entire study area: this is consistent with the 1 dB range expressed in the difference contours but can be considered a more accurate reflection of that range.

7.213 The change represents a **negligible** effect.

Night-time

7.214 The night-time difference contours shown in ES Appendix 7.3 Figure 2028 DC vs. DM/L_{Aeq}/Night indicate noise level increases attributable to the development of -1 to +1 dB.

7.215 ES Appendix 7.3 Schedule 7.3/SCH10 indicates that at the same non-residential noise sensitive receptors, night-time noise level increases of -0.2 to +0.4 dB are forecast. For the reasons set out in paragraphs 7.211 and 7.212, this change in $L_{Aeq,8h}$ value is considered to be a more accurate reflection of the range indicated in the night-time difference contours referred to above. The aggregate change across all receptors is +0.2 dB.

7.216 The change represents a **negligible** effect.

2023 Development Case vs. 2023 Do Minimum

Daytime

7.217 ES Appendix 7.3 *Schedule 7.3/SCH9* indicates that at the non-residential noise sensitive receptors, daytime noise level increases of 0.1 to 0.2 dB are forecast, with an overall aggregate across all assessment locations of 0.1 dB.

7.218 The change represents a **negligible** effect.

Night-time

7.219 ES Appendix 7.3 Schedule 7.3/SCH10 indicates that at the non-residential noise sensitive receptors, night-time noise level increases of 0.1 to 0.3 dB are forecast, with an overall aggregate across all assessment locations of 0.2 dB.

7.220 The change represents a **negligible** effect.

2028 Development Case vs. 2016 Baseline

Daytime

7.221 ES Appendix 7.3 Schedule 7.3/SCH9 indicates that at all assessed sensitive receptors that are not dwellings, noise level increases of 0.2 to 1.0 dB are forecast. The aggregate change across all receptors is +0.8 dB.

7.222 The change represents a **negligible** effect.

Night-time

7.223 ES Appendix 7.3 Schedule 7.3/SCH10 indicates that at all assessed sensitive receptors that are not dwellings, night-time noise level increases of 1.0 to 1.4 dB are forecast. The aggregate change across all receptors is +1.3 dB.

7.224 The change represents a **negligible** effect.

2028 Development Case vs. 25+ Planning Permission

Daytime

7.225 ES Appendix 7.3 Schedule 7.3/SCH9 indicates that at all scheduled non-residential noise sensitive receptors, daytime noise level differences of between –2.0 and 0.5 dB are forecast.

7.226 The aggregate difference across all non-residential receptors is -0.9 dB, indicating that the overall noise level position for the 2028 Development Case is marginally lower than the 25+ Permission case.

7.227 The difference represents a **negligible** effect in a positive sense.

Night-time

7.228 Schedule 7.3/SCH10 indicates that at all scheduled non-residential noise sensitive receptors, night-time noise level differences of between 0 and 1.7 dB are forecast. The aggregate difference across all non-residential receptors is 0.9 dB, indicating that the overall noise level position for the 2028 Development Case is marginally higher than the 25+ Permission case.

7.229 The difference represents a **negligible** effect.

Observed Adverse Effect Levels

7.230 This section describes the assessments using the significance criteria from Noise Policy Statement for England described at para 7.52.

Daytime

7.231 Table 7.14 shows cumulative numbers of population located within the daytime Observed Adverse Effect Level noise contours for the assessment years. The population estimates for all future years include an allowance for cumulative consented dwellings as follows:

- 35 dwellings to be built and occupied in Great Hallingbury under application UTT 16 3669 OP. All 35 dwellings, equivalent to an additional 84 people are located with the daytime SOAEL value of 63 dB $L_{Aeq,16h}$;
- 20 dwellings to be built and occupied in Takeley Street under application UTT 17 1852 FUL. None of these dwellings are located within the daytime SOAEL value of 63 dB $L_{Aeq,16h}$. Within the LOAEL value of 51 dB $L_{Aeq,16h}$ the numbers of dwellings (and population) are: 2023DM 4 (10), 2023DC 4 (10), 2028 DM 0 (0), 2028 DC 1 (2) and 25+ Permission 19 (46).

Table 7.14: Population within Daytime Observed Adverse Effect Level contours*

Year	dB $L_{Aeq, 16h}$		
	LOAEL: 51	SOAEL: 63	UAEL: 69
2016 Baseline	12,600	200	0
2023 Do Minimum	16,944	384	0
2023 Development Case	17,634	384	0
2028 Do Minimum	11,884	284	0
2028 Development Case	15,336	334	0
25+ Permission	15,480	484	0

*All changes in numbers of people within LOAEL and SOAEL categories to be viewed in the context of noise level changes between cases being **imperceptible.**

Full Capacity Year 2028 DC vs. 2028 DM

- *LOAEL:* moderate increases in the population exposed to levels ≥ LOAEL, <30% (11,884 to 15,334): but because the noise level changes are not perceptible (negligible effect) this change in population exposed to LOAEL is a **negligible** effect.
- *SOAEL:* the increase in the population exposed to levels ≥ SOAEL is indicated as increasing by <18% (284 to 334); but because the noise level changes are not perceptible (negligible effect) this change in population exposed to SOAEL is a **minor** effect.
- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Transitional Year 2023 DC vs. 2023 DM

- *LOAEL:* small increases in the population exposed to levels ≥ LOAEL, <3%: taken on its own, this increase is a **negligible** effect. This is reinforced by the fact that the noise level changes are not perceptible (**negligible** effect).

- *SOAEL:* no indicated increase in the population exposed to levels ≥ SOAEL: this is a **nil** effect.

- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Full Capacity Year 2028 DC vs. Baseline 2016

- *LOAEL:* moderate increases in the population exposed to levels ≥ LOAEL, >20%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to LOAEL is a **negligible** effect.

- *SOAEL:* the increase in the population exposed to levels ≥ SOAEL is indicated as increasing by <70% (200 to 334, mainly attributable to the permission for 35 new houses Great Hallingbury); but because the noise level changes are not perceptible (negligible effect) this change in population exposed to SOAEL is a **minor** effect.

- It is noted above that the greater part of this increase is due to the presence of 35 additional dwellings in Great Hallingbury which are scheduled to be built in a location forecast to be subject to noise levels above the SOAEL. If these dwellings are not built, the increase in the population exposed to levels ≥ SOAEL is indicated as increasing by 25% (200 to 250). This would be a lesser, albeit still **minor,** effect.

- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Full Capacity Year 2028 DC vs. 25+ Permission

- *LOAEL:* modest reduction in the population exposed to levels ≥ LOAEL, <1%: this is a **negligible** effect.

- *SOAEL:* moderate reduction in the population exposed to levels ≥ SOAEL, >25%: this is a **negligible** effect, but in a **positive** sense.

- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Night-time

7.232 Table 7.15 shows the cumulative numbers of population located within the night-time Observed Adverse Effect Level noise contours for the assessment years. The population estimates for all future years include an allowance for the cumulative consented dwellings referred to above, the effect of these being:

- Great Hallingbury, UTT 16 3669 OP. All 35 dwellings, equivalent to an additional 84 people are located with the night-time time SOAEL value of 54 dB $L_{Aeq,8h}$;

- Takeley Street, UTT 17 1852 FUL. None of these dwellings are located within the night-time LOAEL value of 54 dB $L_{Aeq,8h}$. Within the LOAEL value of 45 dB $L_{Aeq,8h}$ the numbers of dwellings (and population) are: 2023DM 10 (24), 2023DC 10 (24), 2028 DM 19 (46), 2028 DC 19 (46) and 25+ Permission 19 (46).

Table 7.15: Population within Night-time Observed Adverse Effect Level contours*

Year	dB $L_{Aeq, 8h}$		
	LOAEL: 45	SOAEL: 54	UAEL: 63
2016 Baseline	17,800	1,050	0
2023 Do Minimum	24,830	2,334	<50
2023 Development Case	25,430	2,834	<50
2028 Do Minimum	22,630	2,084	<50
2028 Development Case	21,980	2,734	0
25+ permission	15,980	1,384	0

*All changes in numbers of people within LOAEL and SOAEL categories to be viewed in the context of noise level changes between cases being **imperceptible.**

Full Capacity Year 2028 DC vs. 2028 DM

- *LOAEL:* minor reduction in the population exposed to levels ≥ LOAEL, <3%: this is a **negligible** effect in a **positive** sense.
- *SOAEL:* moderate increase in the population exposed to levels ≥ SOAEL, <33%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to SOAEL is a **minor** effect.
- *UAEL:* there is a reduction in the population exposed to levels ≥ UAEL: the reduction is from a value less than 50 down to 0. This is a relatively small change, but since the net result is to eliminate an Unacceptable Adverse Impact at any receptor, this is determined to be a **moderate** effect in a **positive** sense.

7.233 An important point needs to be made about the forecast increase in the population exposed to noise levels at SOAEL or above. With an increase from 2,084 to 2,734, the assessed figure is 650 (or marginally less than 33% as indicated above). This seemingly large number appears incongruous given that for a typical summer night, the total number of movements in 2028 is 104 for the Do Minimum scenario increasing to only 107 for the Development Case. Furthermore, the projected increase in noise levels within the community is only between 0.5 and 0.6dB, an imperceptible change.

7.234 Comparing and contrasting the extent of the 54 dB $L_{Aeq,8h}$ summer night contours reveals that these very small increases in number of additional flights and overall noise levels leads to an extension in the contour in a north easterly direction which gives rise to a disproportionate geographical effect at Thaxted. This is indicated in Figure 7.9.

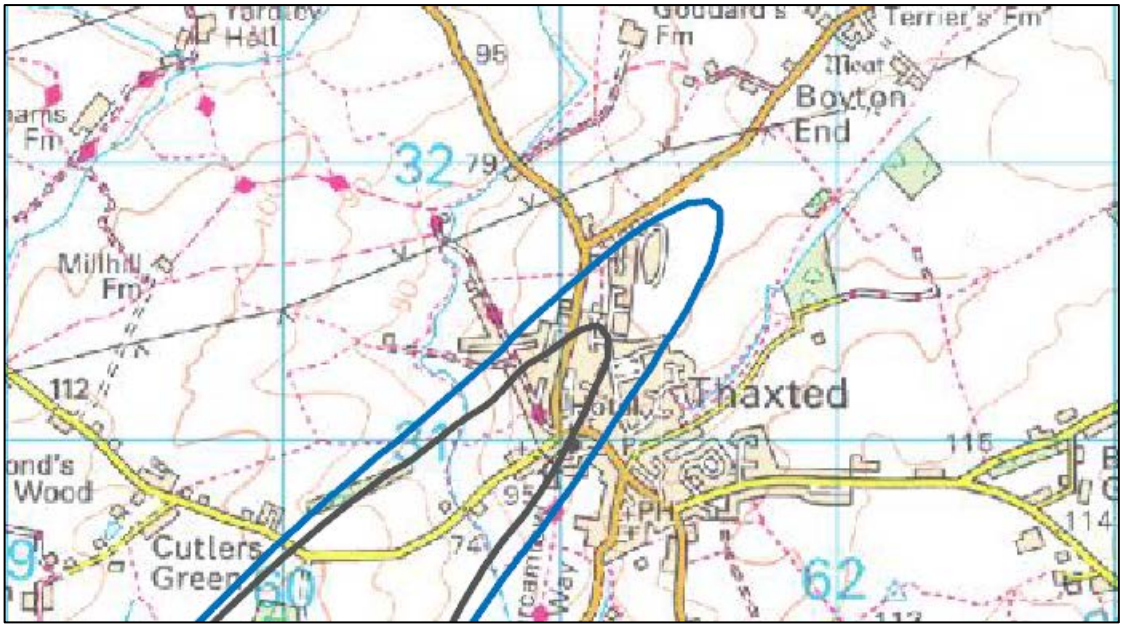

Figure 7.9: Extent of 2028 54 dB $L_{Aeq,8h}$ summer night contour over Thaxted: DC = blue, DM = black

7.235 The majority of the additional 650 dwellings encapsulated within the 2028 DC contour compared to the 2028 DM contour occur due to of the change in its extent over Thaxted. This a very local effect, and its significance needs to be understood in the context of there also being imperceptible changes in the overall level of aircraft noise and aircraft overflights. As can be seen in Schedule A7.3/SCH10, by reference to the changes forecast at Humfrey Lodge, night-time noise level difference between 2028 DC and 2028 DM are 0.4 dB. This is an **imperceptible** difference.

7.236 This is an important example of why changes in the number of people affected at particular noise levels can only be judged within the context of the changes in noise level they are likely to experience.

Transitional Year 2023 DC vs. 2023 DM

- *LOAEL:* small increases in the population exposed to levels ≥ LOAEL, <3%: this is a **negligible** effect.
- *SOAEL:* moderate increase in the population exposed to levels ≥ SOAEL, <25%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to SOAEL is a **minor** effect.
- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Full Capacity Year 2028 DC vs. Baseline 2016

- *LOAEL:* moderate increases in the population exposed to levels ≥ LOAEL, <25%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to LOAEL is a **negligible** effect.

- *SOAEL:* large increase in the population exposed to levels ≥ SOAEL, 160%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to SOAEL is a **minor** effect.

- Some of this increase is due to the presence of 35 additional dwellings in Great Hallingbury forecast to be subject to noise levels above the SOAEL. If these dwellings are not built, the increase in the population exposed to levels ≥ SOAEL is indicated as increasing by 150%. This is still a **minor** effect

- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Full Capacity Year 2028 DC vs. 25+ Permission

- *LOAEL:* moderate increases in the population exposed to levels ≥ LOAEL, <40%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to LOAEL is a **negligible** effect.

- *SOAEL:* large increase in the population exposed to levels ≥ SOAEL, <100%: but because the noise level changes are not perceptible (negligible effect) this change in population exposed to SOAEL is a **minor** effect.

- *UAEL:* no increases in the population exposed to levels ≥ UAEL: this is a **nil** effect.

Number of People Highly Annoyed

7.237 This following analysis summarises the number of people within the different noise bands, and uses the 'highly annoyed' categorisation described in Section 33 of ES Appendix 7.3. A person is defined as highly annoyed if they score 72 or above on a 100-point scale of annoyance.

7.238 Using the estimated population figures within each of the daytime contours bands, as opposed to the cumulative numbers contained in the ES Appendix 7.3 tables referred to above, it is possible to derive upper and lower figures for the number of people expected to be 'highly annoyed' by aircraft noise for each assessment case.

7.239 A single figure cannot be determined in each case, as the % 'highly annoyed' information relates to noise exposure given as a specific figure, whereas the population counts relate to numbers of people living within a range of noise levels, i.e. the band 51-54, 54-57 etc.

7.240 Therefore, an upper and lower value for the number of people 'highly annoyed' is reported based on the assumption that all the people living within a certain location are actually exposed to noise at the upper limit or they are exposed to the lower limit. See Table T16. The actual number will fall between the two extremes, but within the limits of the information available this is the best form of assessment.

7.241 The population estimates for all future years include those expected to be living in the 35 dwellings consented in Great Hallingbury under application UTT 16 3669 OP and the 20 dwellings consented in Takeley Street under application UTT 17 1852 FUL, although these are not yet built (and therefore are not included in the 2016 figures).

Table 7.16: Number of people 'highly annoyed' (HA) for each assessment year*

$L_{Aeq,16h}$ (dB		51	54	57	60	63	66	69	TOTAL H A
25+permission	Population	8,046	3,800	2,300	850	250	234	0	
	HA: lower	563	342	299	145	58	73	0	**1,479**
	HA: upper	724	494	391	196	78	91	0	**1,973**
2016 Baseline	Population	6,900	3,950	1,150	400	150	50	0	
	HA: lower	483	356	150	68	35	16	0	**1,106**
	HA: upper	621	514	196	92	47	20	0	**1,488**
2023 DM	Population	10,210	3,300	2,450	600	300	84	0	
	HA: lower	715	297	319	102	29	26	0	**1,527**
	HA: upper	919	429	417	138	93	38	0	**2,025**
2023 DC	Population	10,710	3,350	2,550	698	238	98	0	
	HA: lower	750	302	332	119	55	30	0	**1,586**
	HA: upper	964	436	434	161	74	38	0	**2,109**
2028 DM	Population	6,250	3,800	1,100	450	234	50	0	
	HA: lower	438	342	143	77	54	16	0	**1,058**
	HA: upper	563	494	187	81	104	20	0	**1,447**
2028 DC	Population	9,102	3,350	2,000	550	277	57	0	
	HA: lower	637	302	260	94	94	18	0	**1,374**
	HA: upper	819	436	340	127	86	22	0	**1,829**

*All changes in numbers of people 'highly annoyed' to be viewed in the context of noise level changes between cases being **imperceptible.**

7.242 The ratio between the upper limit and the lower limit of total people 'highly annoyed' for each assessment case is virtually the same, falling consistently in the range 1.33 to 1.35. Therefore, although the absolute numbers are different, the text below applies in a consistent manner across the full range of values.

7.243 The number ‘Highly Annoyed’ is expected to increase for all assessment cases compared to the 2016 Baseline Year. In the 2023 Development Case this number is expected to peak while handling a similar number of aircraft movements to the 2028 Do Minimum scenario, and is expected to generate a higher impact because the full benefits of the introduction of new generation aircraft have not yet been seen.

7.244 In the 2028 Development Case, the number of people ‘highly annoyed’ is approximately 7% lower than that predicted for the 25+ Permission scenario. This is because noise levels and the extent of the overall impact are forecast to be less for the 2028 Development Case than for the 25+ Permission scenario.

7.245 In the 2028 Development Case, the number of people ‘highly annoyed’ is just less than 30% higher than that predicted for the 2028 Do Minimum. This reflects the greater extent of the contours at all levels.

7.246 It is extremely important to view the predicted changes in the number of people highly annoyed in the context of the noise levels they currently experience and how those are forecast to change. As set out in paragraphs 7.210 to 7.229 aircraft noise levels are forecast in aggregate to be only 0.5 dB higher in 2028 if the development is permitted compared to no development taking place. Such a change in noise is, by all relevant measures, imperceptible.

7.247 Therefore, the assessed case of 30% more people being exposed to noise levels that would render them highly annoyed must be weighed against the practical consideration of this being due to an increase in noise levels that is not discernible. It is therefore very important in the circumstances of this application to consider all the relevant noise factors together so that each strand of assessment can be seen in its proper context.

Night Quota Period

7.248 An assessment of noise effects arising during the night quota period does not form part of the noise assessment. The reason for this is that aircraft movements and the noise generated during this period are regulated by the Government as formulated in the 'Night flight restrictions at Heathrow, Gatwick and Stansted'. The 2017 Decision Document[25] sets out the current position with regard to quota period movement numbers and noise restrictions at Stansted and makes proposals for how this would be modified over the next five year period.

7.249 Stansted Airport will continue to operate within the restrictions set by the Government, and these, as reviewed from time to time, will set a constraint on operations within the night quota period which is not affected by the current planning application.

Overflight Analysis

7.250 This section deals with the noise environment as defined by the use of 'N' – number above – contours. This shows how many over flights exceeding threshold noise levels of 65 dB L_{Amax} during the day and 60 dB L_{Amax} during the night any particular area may experience. The assessment does not provide evidence as to the impact arising as, according to CAP 1506, that can strictly only be achieved using the $L_{Aeq,T}$ noise metric. Nevertheless, Nx contours are considered to be informative and useful indicators of some aspects of the noise environment generated by aircraft in flight not fully expressed using the $L_{Aeq,T}$ averaging metrics, and that is why they are presented as an important supplement to the core analysis.

Daytime: N65

7.251 65 dB(A) has been suggested by the CAA in CAP 1506 and adopted by the Government, as an appropriate threshold for the daytime level of noise generated by an overflying aircraft. That is not to say that overflights generating lower levels of noise will not be perceived, or may not be found annoying by some individuals, but 65 dB(A) is an important threshold in overall airport noise assessments.

7.252 The 'number above' contours can help in determining:

- The areas affected by aircraft overflights generating noise level of 65 dB(A) or above (at least once per hour in aggregate);
- The areas experiencing increasingly frequent overflights at this level or above; and
- How the different operating conditions compare with respect to location and frequency of overflights at this level or above.

7.253 In accordance with accepted practice, the contours are plotted at values of 25, 50, 100 and 200 movements per day exceeding 65 dB(A), equivalent to:

- 200: 13 overflights per hour, or one every 5 minutes;
- 100: 6 overflights per hour, or one every 10 minutes;
- 50: 3 overflights per hour, or one every 20 minutes;
- 25: 1.5 overflights per hour, or one every 40 minutes.

2016 Baseline, 2023 Transitional Year and 2028 Principal Assessment Year

7.254 The highest number of overflights, i.e. N65 200, is limited to a swathe centred on the extended runway centre line for all the assessed conditions. This is indicative of 65 dB(A) generally only being exceeded by aircraft in the early stages of departure, prior to turning onto any individual departure route, or within the later stages of approach on arrival.

7.255 For the 2016 Baseline Year, the same can be said for the N65 100 value. By 2028, with or without the development in place, the use of the CLN and BUZ SIDs can clearly be seen influencing the shape and extent of the contours. As the N65 contour value gets lower (e.g. 50 overflights an hour), the influence of each individual departure route becomes increasingly apparent until at N65 25 values, all of the routes are clearly defined.

7.256 The 2016 Baseline Year gives rise to contour areas for N65 25 and 50 values which are larger than those for either of the 2028 Development Case or Do Minimum scenarios. It is only at N65 values of 100 and 200 that the 2028 contours extend to greater areas than those of the 2016 Baseline Year. This is because those areas under the flight paths that are close to the airport will be the ones experiencing some increases in the number of overflights at 65 dB(A) or above. Other areas will not see the same level of increase.

7.257 It can be concluded from this assessment that the wider community around Stansted Airport will not be expected to experience significantly different conditions with respect to daytime noise from aircraft overflights than is currently the case.

25+ Planning Permission

7.258 N65 contours have been produced for the 25+ Permission condition. Both the inner (N65 200) and outer (N65 25) contours cover larger areas than either of the 2028 Development Case contours, while the middle value contours (N65 100 and 50) are marginally smaller. In terms of dwelling and population counts, the 2028 Development Case contours contain slightly higher numbers in most cases, apart from the N65 100 contour where the number reduces. The differences are generally small with increases of not more than 13% within any contour category.

7.259 It is also noticeable that the general shape of the contours differs from those for 2016 Baseline and the 2028 contours. This reflects a different runway split and different allocations to the departure routes considered when the 25+ Permission analysis was originally undertaken (2006). The recent shift of departures from DET onto CLN removes the 'twin lobe' shape of the N65 contours that are evident in the 25+ Permission case.

7.260 In particular, the fact that PBN procedures are used on all CLN departures leads to a concentration of aircraft departure routes over less sensitive areas. It focusses flyover noise over a ground area which is narrower but with fewer people, even though it extends slightly further from the airport.

Night-time: N60

7.261 Similar considerations apply to the N60 night-time values as are set out above for the N65 daytime values. In this case the contours are plotted, in line with convention, at values of 25, 50 and 100 movements. There are insufficient night flights at Stansted to plot the N200 60 dB(A) contour. These are equivalent to:

- 100: 12 overflights per hour, or one every 5 minutes;
- 50: 6 overflights per hour, or one every 10 minutes;
- 25: 3 overflights per hour, or one every 20 minutes.

7.262 The higher (N60 100) contour is not relevant, as in 2016 there are only 82 night-time movements, and for both the 2028 Development Case and Do Minimum scenario it only covers a small area within the airport boundary.

7.263 For 2016, the N60 50 contour barely extends beyond the airport boundaries. For each of the 2028 Principal Assessment year conditions it extends along a swathe around the centre line

of the runway This is indicative of 60 dB(A) only being exceeded at this frequency by aircraft in the early stages of departure, prior to turning onto an individual departure route, or within the later stages of approach on arrival.

7.264 In all three cases, the N60 25 contour extends generally further out into the community, but is not concentrated in any particular route.

7.265 When measuring the overall size of the contour areas, there is a more notable change in the N60 50 value between 2016 and the 2023 and 2028 conditions, for both the Do Minimum scenario and Development Case. The reason for this is that in either case, the number of movements over the 8-hour night-time period is expected to increase by more than 25%. The 82 movements in a typical summer night in 2016 are likely to increase to 104 and 107 in 2028 for the Do Minimum and Development Case respectively.

7.266 Considering the N60 25 contour value, there is much less of change in area between 2016 Baseline and either of the 2028 Principal Assessment year conditions. Similar to the N65 daytime analysis, this shows that local communities will not experience significantly different numbers of night-time overflights than at present.

Difference Contours

7.267 Contours have also been plotted that show the differences in daytime N65 and night-time N60 contours between the various assessment scenarios. This section describes those differences.

Daytime N65

7.268 The difference in daytime N65 contours levels in 2028 between the Development Case and Do Minimum scenario are shown in ES Appendix 7.3 Figure 2028 DC vs. DM/N65/Day.

7.269 The forecasts for daytime operations in 2028 indicate that there will be 72 additional movements with the development in place (712 between 07:00 and 23:00) compared to the Do Minimum condition (640 between 07:00 and 23:00). Since there is an approximately equal split between departures and arrivals this indicates an additional 36 or so of each.

7.270 As most areas only experience noise from either departures or arrivals on any given day, for an area to see an increase in the N65 value it will only be if it is very close to the airport The difference contours confirm this, showing that changes to the N65 value of greater than 36 only occur within areas along the centre line of the runway affected by both departures and arrivals.

7.271 Thirty-six events occur within the N65 change category 25 to 50. This is expected to affect areas where the majority of aircraft generate maximum noise levels of 65 dB(A) or above. Given the normal modal split, areas to the south west of the runway are more regularly overflown by departures while to the north east they are more regularly overflown by arrivals. The N65 changes of less than 75 only affect those areas overflown by every departure, i.e. before aircraft turn on to their departure route. This is a small area, close to the airport.

7.272 In the N65 change category of 0 to 25, the effect of individual departure routes become apparent.

7.273 Overall, the N65 change contours are helpful in setting some context for the degree to which people may be affected by increasing numbers of flights. One of the concerns raised in the consultation process is that removing the 35mppa cap will give rise to large increases in the number of overflights people will experience. The headline figure of an additional 72 daily movements by 2028 if the proposed development is permitted could, on the face of it, raise fears that everyone in the community will suffer the full negative effects of this increase.

7.274 However, 72 movements equate to 36 departures and 36 arrivals, which affect different people, and are spread across the 16 hour day. In addition, the N65 change analysis indicates that large changes in the number of overflights above 65 dB(A) do not occur throughout the surrounding community. The combined noise effects of 72 additional daily movements is only seen within the airport boundary. At any location outside the airport boundary less than half of these additional movements generate overflight noise levels above 65 dB(A), and the further away from the airport a receptor is located then the lower the number of overflights becomes. With increasing distance, this number diminishes to the point where the vast majority of people living under the flight paths will experience increases in overflights generating noise above the 65 dB(A) threshold of less than 25 per day.

Night-time N60

7.275 The difference in night-time N60 contours levels between the 2028 Development Case and Do Minimum scenario are shown in ES Appendix 7.3 Figure 2028 DC vs. DM/N65/Night.

7.276 The forecast night-time operations for 2028 show 3 additional movements with the development in place (107 between 23:00 and 07:00) compared to the Do Minimum condition (104 between 23:00 and 07:00).

7.277 Given that the mix of aircraft does not materially change between the two conditions, 3 additional movements over a baseline of 104, over an 8-hour period, represents a barely discernible change. The change is so small that it cannot be considered to give rise to any material effects.

SEL Footprints

7.278 Sound Exposure Level (SEL) footprints provide a further means of assessing the changes arising from the development. They identify the noise footprint generated a single flyover of a given aircraft and are helpful in demonstrating the effect of changes in aircraft type.

7.279 For comparison purposes, Sound Exposure Level (SEL) footprints have been produced at values of 80 and 90 dB(A) SEL for the Boeing B737-800 and the Boeing B737-MAX8[x]. The results are presented in:

- Figure SEL/Rwy22: Runway 22 SIDs;
- Figure SEL/Rwy04: Runway 04 SIDs.

7.280 Visually it is clear that the planned replacement of current generation narrow bodied jet aircraft by the new generation models will lead to lower noise levels. Quantitatively, this can be demonstrated by comparing the areas under the various footprints for the two aircraft types as set out in Tables 7.17 to 7.20:

Table 7.17: Runway 04 SIDs comparison of 80 dB(A) SEL footprint

Rwy 04 SID	Aircraft	Area (km^2)	Households	Population	reduction
Buzad	B737-800	23.0	350	950	
	B737-MAX8	13.0	200	600	39%
Clacton	B737-800	22.4	600	1,500	
	B737-MAX8	12.4	250	650	57%
Detling	B737-800	22.5	550	1,400	
	B737-MAX8	12.7	150	450	61%

Table 7.18: Runway 04 SIDs comparison of 90 dB(A) SEL footprint

Rwy 04 SID	Aircraft	Area (km^2)	Households	Population
Buzad	B737-800	2.8	0	0
	B737-MAX8	1.3	0	0
Clacton	B737-800	2.8	0	0
	B737-MAX8	1.3	0	0
Detling	B737-800	2.8	0	0
	B737-MAX8	1.3	0	0

[x] The B737-MAX200 proposed to be acquired and operated by Ryanair is a slightly modified version of the B737-MAX8 and differs from the standard B737-MAX8 in that it has an additional mid fuselage emergency exit on each side.

Table 7.19: Runway 22 SIDs comparison of 80 dB(A) SEL footprint

Rwy 04 SID	Aircraft	Area (km^2)	Households	Population	reduction
Buzad	B737-800	22.9	750	1,950	
	B737-MAX8	12.4	450	1,200	39%
Clacton	B737-800	22.4	550	1,450	
	B737-MAX8	12.5	300	750	48%
Detling	B737-800	22.3	1,350	3,600	
	B737-MAX8	12.4	400	1,050	71%

Table 7.20: Runway 22 SIDs comparison of 90 dB(A) SEL footprint

Rwy 04 SID	Aircraft	Area (km^2)	Households	Population
Buzad	B737-800	2.7	0	<50[xi]
	B737-MAX8	1.3	0	0
Clacton	B737-800	2.7	0	<50
	B737-MAX8	1.3	0	0
Detling	B737-800	2.7	0	<50
	B737-MAX8	1.3	0	0

7.281 As is clearly shown above, the lower noise B737-MAX8 replacing the B737-800 will lead to much lower numbers of people being affected by high levels of noise on departure. With the B737-MAX8 fleet replacement there are forecast to be no people living within the 90 dB(A) SEL footprint on departure on either runway. This is significant in that it leaves no local residents in areas exposed to a risk of sleep disturbance from B737-MAX8 aircraft taking off[26]. Furthermore, this reduction in noise by each movement, more than outweighs the modest increase in the number of movements per day.

7.282 The B737-MAX8 departure 90 dB(A) SEL footprints are all contained within the boundaries of the airport.

7.283 It should be noted that SEL footprints for the noisiest aircraft operating in the night-time periods are associated with cargo movements. Future cargo movements are forecast to be undertaken by the same types of aircraft as currently operate as typically cargo operators do not renew their fleet as regularly as passenger airlines. This therefore represents a worst-case scenario as some fleet replacement to newer and quieter variants will occur at some stage before 2028. What is clear is that future cargo movements will not be undertaken by noisier aircraft as a result of this application. As the extent of these footprints is already quantified and is a factor used to determine the extent of the existing Sound Insulation Grant Scheme qualification area, further analysis of these footprints is not contained in this ES.

[xi] The apparent anomaly of footprints containing 0 houses but having <50 people living in them is explained by the fact that ERCD only report these figures from the CACI census dated rounded to the nearest 50.

Summary of Effects

7.284 A wide range of assessments, using different criteria, have been made. This includes individual aircraft noise levels, the number of overflights, and various noise contours. All of these have been combined to produce an over-arching conclusion on noise effects.

7.285 Using the significance criteria set out in Table 7.4, noise effects are summarised in Table 7.21.

Table 7.21: Summary of Noise Effects

Year	Daytime (07:00 to 23:00)		Night-time (23:00 to 07:00)	
	Level difference	Impact	Level difference	Impact
2028	0.5 to 0.6 dB	**NEGLIGIBLE**	-0.2 to 0.4 dB	**NEGLIGIBLE**
2023	0.1 to 0.2 dB	**NEGLIGIBLE**	0.1 to 0.3 dB	**NEGLIGIBLE**

Further Mitigation

7.286 Paragraphs 7.96 to 7.125 of this chapter and Section 3 of ES Appendix 7.3 identifies the controls that are currently imposed at the airport as part of the overall noise management strategy. Section 4 gives details of the measures applied to minimise the impact of aircraft noise in the local community.

7.287 These measures will be retained and implemented in a manner which ensures that future noise levels do not exceed the limits indicated in the air noise assessment presented in this chapter and its associated appendices.

Proposed Enhanced Mitigation

Approach

7.288 No significant noise impacts are predicted as a result of the proposed development and, therefore, the view could be taken that no further mitigation is required. This section sets out some of the ways STAL manages the noise impacts that arise from its operations. This includes existing planning obligations and SDP commitments. In addition to summarising the current control and mitigation measures, the following sets out how they may be enhanced.

Night Noise Surcharges

7.289 Around 30% of air transport movements during the night quota period are by cargo operators, and these can be the noisier aircraft. At present, operational charges levied by STAL do not distinguish between daytime and night-time operations. However, a scheme is to be introduced which will impose surcharges to operations taking place at any time during the night quota period (23:30 to 06:00). The objectives of the scheme are to:

- Ensure that those movements generating the highest noise levels during the most sensitive hours pay the highest price, responding to the 'polluter pays' principle;
- Encourage the displacement of non-essential night-time movements to less sensitive daytime hours; and
- Raise additional monies that can be used to fund an enhanced sound insulation scheme, again ensuring that those creating the greatest disturbance make the largest contribution.

7.290 At present, QC4 aircraft movements are not permitted to be scheduled during the night-quota period. However, such movements can be operated on a delayed basis due to extenuating circumstances. It is proposed that a significant surcharge be applied in these circumstances.

7.291 Recently STAL implemented a local rule through the Scheduling Committee, that no additional QC2 movements, other than those that already hold historic rights, are permitted to be scheduled during the night quota period. As with QC4 movements, it is proposed that any late running QC2 movements would be subject to a surcharge.

7.292 The night noise surcharge scheme would be dependent on consultations taking place between STAL and the airlines affected. STAL aims to agree a scheme that is fair and proportionate, while addressing the key objectives of minimising the impact of noise at night

and, consistent with the 'polluter pays' principle ensuring that operators of the noisier aircraft make the largest contribution to the costs of compensation or mitigation.

Noise Penalty Limits

7.293 In order to incentivise the best operational practices, STAL operates a noise penalty scheme. The limits are current set by central Government (DfT) as part of the 'designation' of Stansted under the Civil Aviation Act. Subject to consultation with stakeholders, STAL proposes to tighten the noise limits for different times of the day as shown in Table 7.22:

Table 7.22: Existing and proposed departure noise limits

When	Times	Noise Limit: (dB(A)	
		Current	Proposed
Day	07:00 to 23:00	94	89
Day Shoulder Period	06:00 to 07:00	89	84
Night Shoulder period	23:00 to 23:30	89	84
Night	23:30 to 06:00	87	84

7.294 However, as a designated airport, STAL will need to ensure that such changes are agreed with the DfT and have been subject to consultation with the airlines. The practical effect of these proposed changes is to set a single limit for the entirety of an 8 hour night period, which would encompass the existing night quota period and 'shoulders'.

7.295 The fining structure is proposed to remain in line with current practice and is summarised in Table 7.23.

Table 7.23: Noise penalty limit violation fines

Period	Tim	Noise Limit	Fine ≤3 dB above limit	Additional fine > 3 dB, per dB(A) or part
Daytime	07:00-23:00	89 dB(A)	£1,000	£250
Night-time	23:00-07:00	84 dB(A)	£1,000	£1,000

7.296 All monies collected through noise infringement fines will continue to be given over to local community projects through the Stansted Airport Community Trust Fund.

7.297 Subject to approval from the DfT, the new noise limits would apply on receipt of consent for the planning application.

Sound Insulation Grant Scheme (SIGS)

Existing Scheme

7.298 The terms of the existing SIGS are described in paragraphs 7.121 to 7.125 above.

7.299 Under the terms of this scheme, 1,088 properties are eligible for support, of which 648 have taken up the option and have benefitted from insulation.

7.300 The rate of uptake of the scheme has reached ~60% of qualifying properties. It would appear, therefore, that just under half of those residents who are eligible to benefit from the SIGS declined to do so. This is consistent with the rate of uptake at other airports in the UK.

Enhanced Scheme

7.301 STAL proposes an enhanced SIGS. There are three key elements that differentiate the proposed scheme from the current SIGS. They are the removal of the requirement for the householder to contribute financially to the cost of insulation works; a three-tiered offer, to target greatest support to those who are most impacted and increased grant payments.

Cost of the Works

7.302 Under the terms of the new scheme, qualifying properties could receive a grant, up to a maximum award, that would cover up to 100% of the cost of the works. There would no longer be a requirement for a householder to contribute financially.

7.303 The rationale for this approach is that residents of any property identified as being eligible for a sound insulation upgrade, by virtue of the levels of aircraft noise to which they are exposed, should not have to pay to achieve satisfactory internal living conditions. This removes the risk that the scheme prejudices those who cannot afford to make a contribution to the cost of works.

Qualification Criteria

7.304 It is proposed to offer three tiers of support under the new scheme. The objective is to ensure that those that are subject to the highest noise levels receive greatest support. The approach is summarised in Table 7.24. If a property is eligible, a home survey would be offered and completed to ensure the householder receives professional advice and can choose the most appropriate insulation works.

Table 7.24: Qualification criteria for the enhanced noise mitigation and sound insulation scheme

Noise Impact	Noise Contour	Grant Maximum
Upper	69 and 66 dB $L_{Aeq,16h}$	£10,000
Middle	63 and 60 dB $L_{Aeq,16h}$	£8,000
Lower	57 dB $L_{Aeq,16h}$ / N65 200 / 90 dBA SEL* 600m distance / 55 dB $L_{Aeq,16h}$ ground noise	£5,000

* 90 dB(A) SEL footprint for the noisiest aircraft operating at night (23:00 to 06:00)

Residual Effects

7.305 The air noise assessment concludes that effects arising as a result of the application are negligible. In practical terms this is entirely expected as, although the application seeks to increaser the annual passenger cap, it does not seek to increase the permitted number of annual ATMs. In addition, an increasing proportion of future PATMs, which make up the bulk of daytime and night-time movements, will be undertaken by new generation, low noise variants of the aircraft already operating.

7.306 As a consequence, specific mitigation to control or limit significant air noise effects are not required. Nonetheless, it is proposed to enhance various controls and compensation schemes implemented by the airport, including the SIGS.

7.307 The net result is that there will be no residual adverse air noise effects of significance arising as a result of this application.

Cumulative Effects

7.308 There are no other developments proposed in the vicinity of the airport which could generate noise levels requiring consideration in conjunction with aircraft air noise to derive a cumulative effect.

7.309 There arises the question as to whether air noise effects should be considered in conjunction with other noise effects arising as a result of the proposed development, namely ground noise and surface access noise. By convention, it should not.

7.310 Each of the main noise sources associated with operations at an airport is assessed according to its character, with specific methodologies and assessment criteria applied.

7.311 Air noise at any given location is characterised by a series of individual noise events interspersed with periods of relative quiet: its effect can extend quite far into the community. Ground activity generates a steady underlying noise which can vary slightly over time according to how busy the airport is: its effects are much more localised and only audible to small numbers of people close to the airport boundary. Surface access noise, particularly road traffic noise, is a feature of the underlying noise climate in many parts of the UK irrespective of whether they are located near an airport or not. Its effect can extend quite far into the community and may be unrelated to proximity to the airport.

7.312 It is for these reasons that each of the noise sources are dealt with separately and it is not feasible to derive a ‘cumulative noise impact’. This is the approach that has been used for the noise assessment at recent airport planning applications; the Heathrow Cranford Agreement application (determined on appeal in February 2017), and the London City Airport application (determined on appeal in July 2016). It is the approach adopted for this application.

References

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2 ICAO International Standards and Recommended Practices, Annex 16 to the Convention on International Civil Aviation: Environmental Protection

3 The Aerodromes (Noise Restrictions) (Rules and Procedures) Regulations 2003

4 The Environmental Noise (England) Regulations 2006

5 European Noise Directive 2002/49/EC, published June 2002

6 Night flight restrictions at Heathrow, Gatwick and Stanstead Decision Document: Department for Transport, 2017

7 National Planning Policy Framework (NPPF): March 2012

8 Noise Policy Statement for England (NPSE): March 2010

9 National Planning Practice Guidance (NPPG): Noise, March 2014

10 Aviation Policy Framework: March 2013

11 UK airspace policy consultation: executive summary

12 UK airspace policy consultation: a framework for balanced decisions on the design and use of airspace

13 Air navigation guidance on airspace and noise management and environmental objectives

14 Consultation Response on UK Airspace Policy: A framework for balanced decisions on the design and use of airspace: Cm 9520, DfT, October 2017

15 Air Navigation Guidance 2017: Guidance to the CAA on its environmental objectives when carrying out its air navigation functions, and to the CAA and wider industry on airspace and noise management: DfT, October 2017

16 EU Regulation 598/2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC

17 Beyond the horizon. The future of UK Aviation. A call for evidence on a new strategy. DfT July 2017

18 CAP 725: CAA Guidance on the Application of the Airspace Change Process March 2016

19 CAP 1616a: Airspace Design: Environmental requirements technical annex

20 CAP 1520: CAA Draft airspace design guidance, draft for consultation: March 2015

21 UK AIP: AD 2-EGSS-3-1

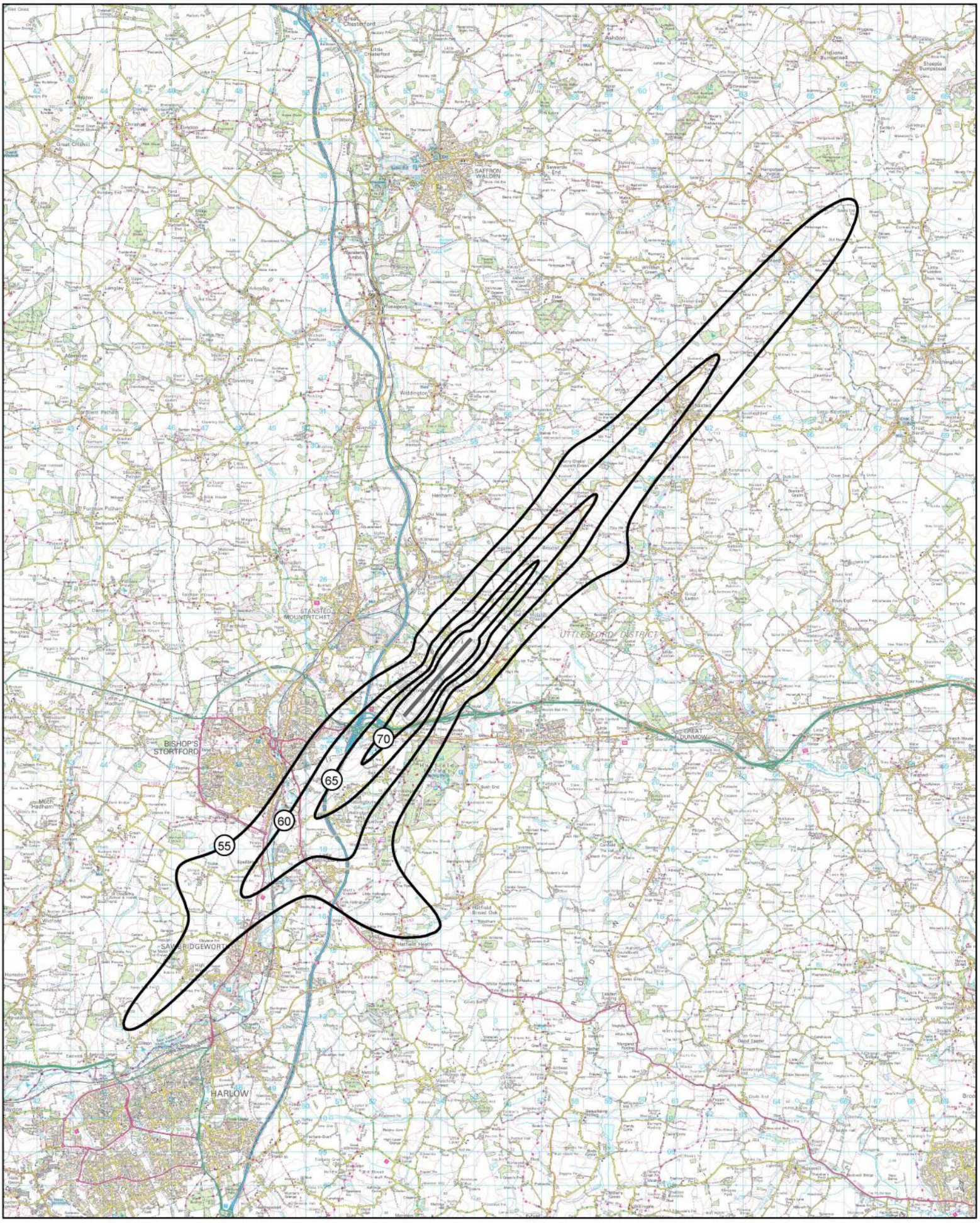
22 UK AIP: EG_AD_2_EGSS_en_2016-10-13

[23] ERCD Report 0306 Noise Mapping – Aircraft Traffic Noise, a research study on aircraft noise mapping at Heathrow Airport conducted on behalf of Defra: February 2004.

[24] Noise Exposure Contours for Stanstead Airport 2016, ERCD Report 1703: CAA ERCD April 2017

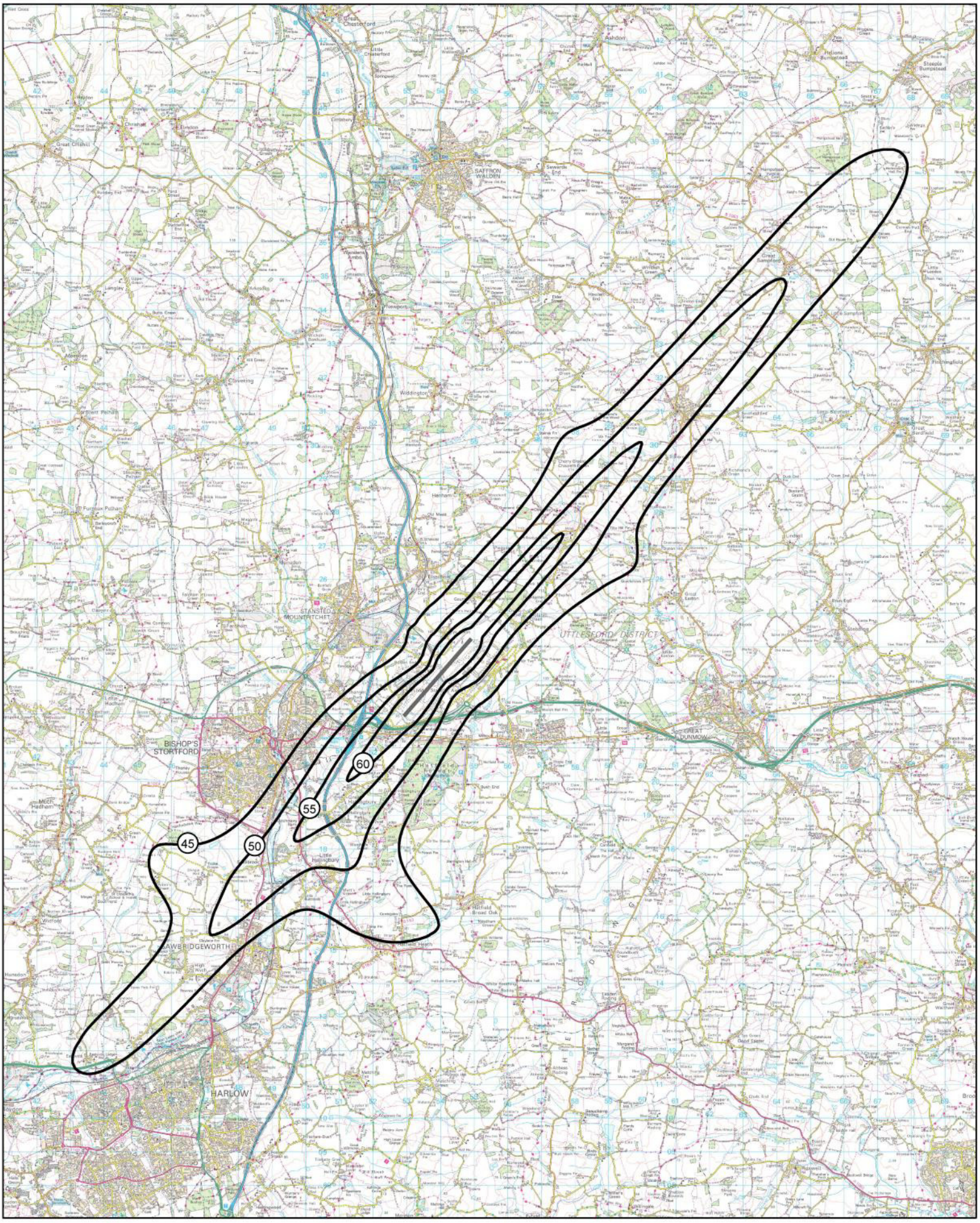
[25] Night flight restrictions at Heathrow, Gatwick and Stansted. Decision Document, DfT 2017

[26] DfT Field study of sleep disturbance



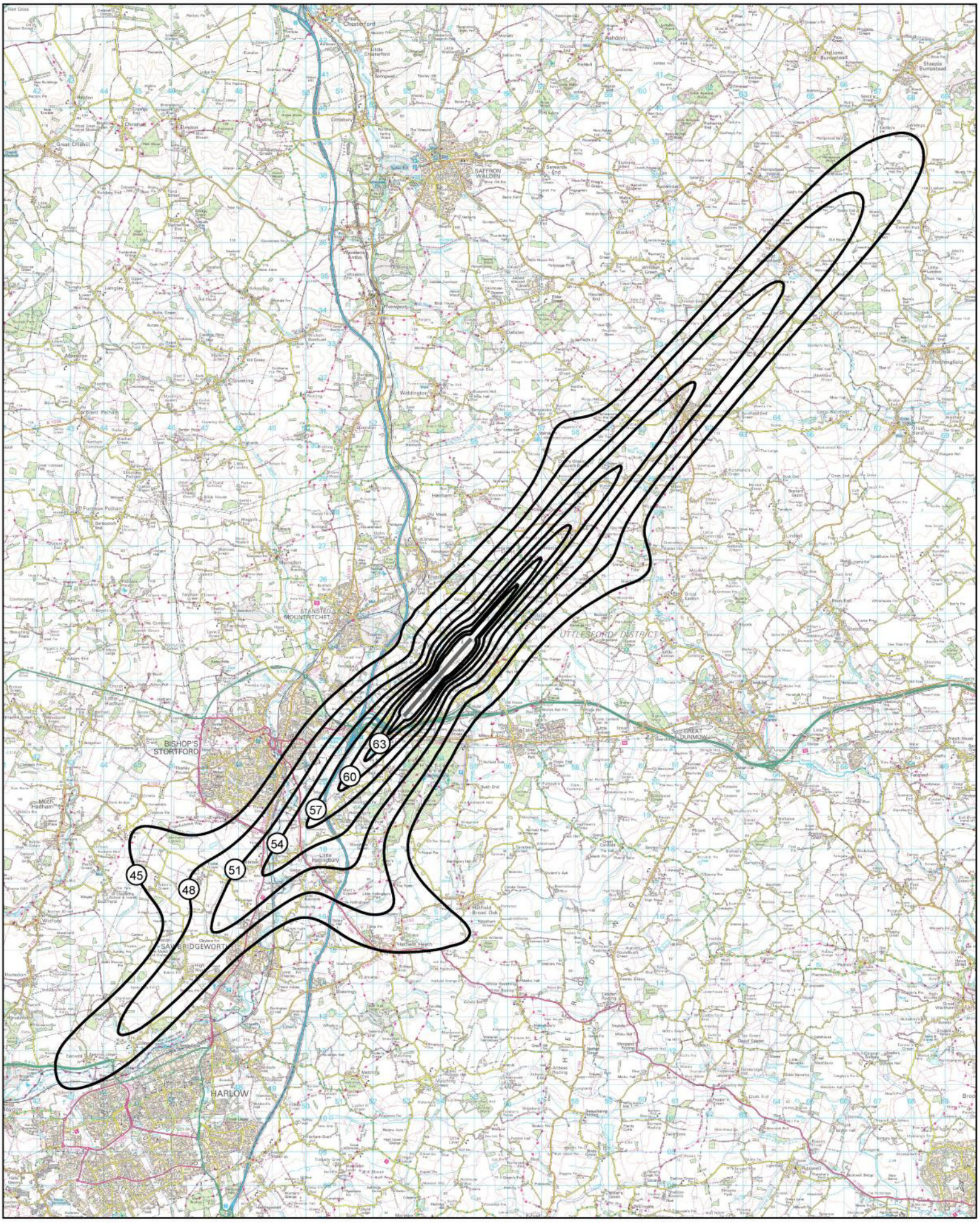
STANSTED AIRPORT

Figure 2028DC/L_{den}: 2028 Development Case L_{den} Contours
Long-term runway modal split 73% SW / 27% NE



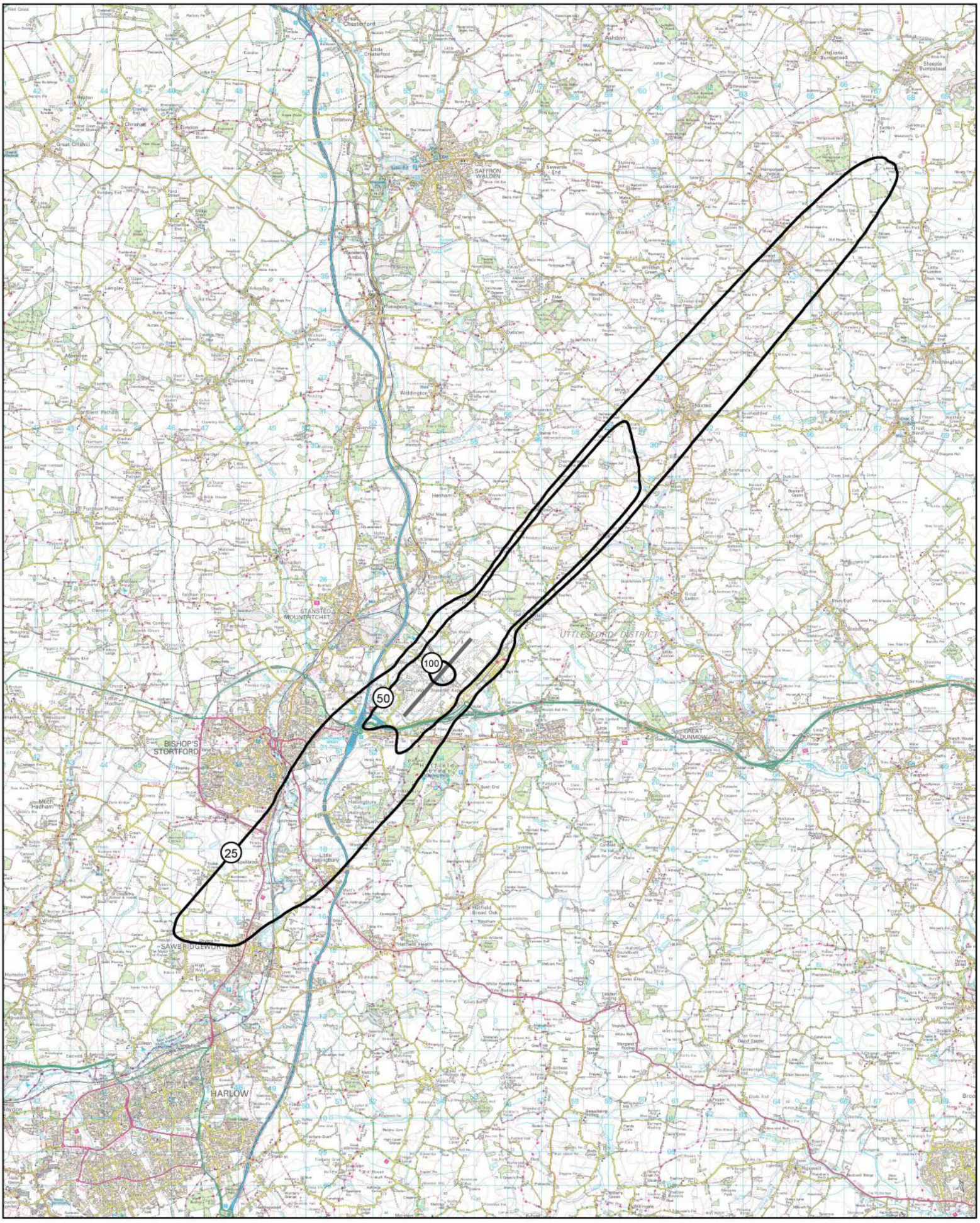
STANSTED AIRPORT

Figure 2028DC/L_{night}: 2028 Development Case L_{night} Contours
Long-term runway modal split 73% SW / 27% NE



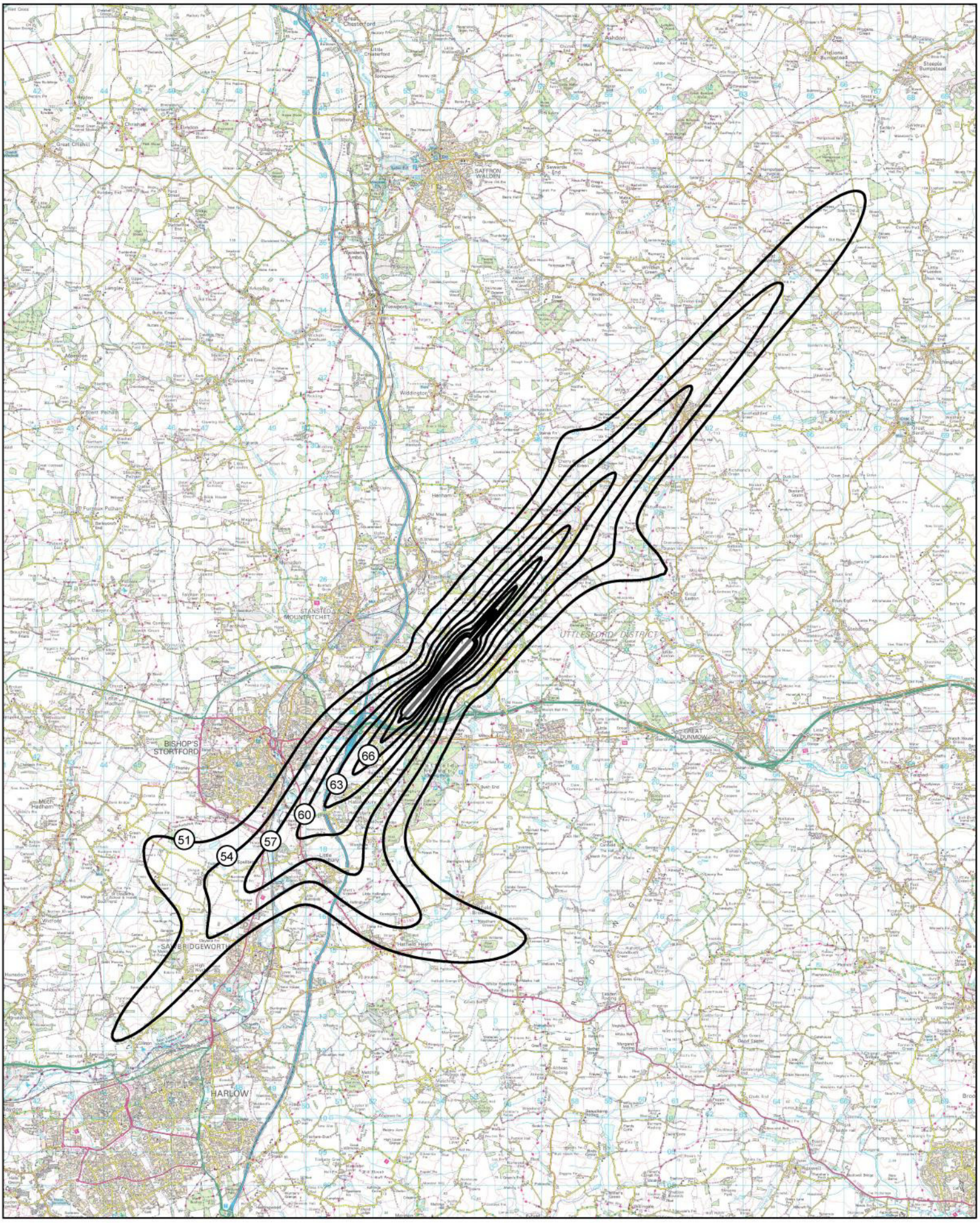
STANSTED AIRPORT

Figure 2028DC/L_{Aeq}/Night: 2028 Development Case $L_{Aeq,8h}$ Summer Night Contours
Long-term runway modal split 73% SW / 27% NE



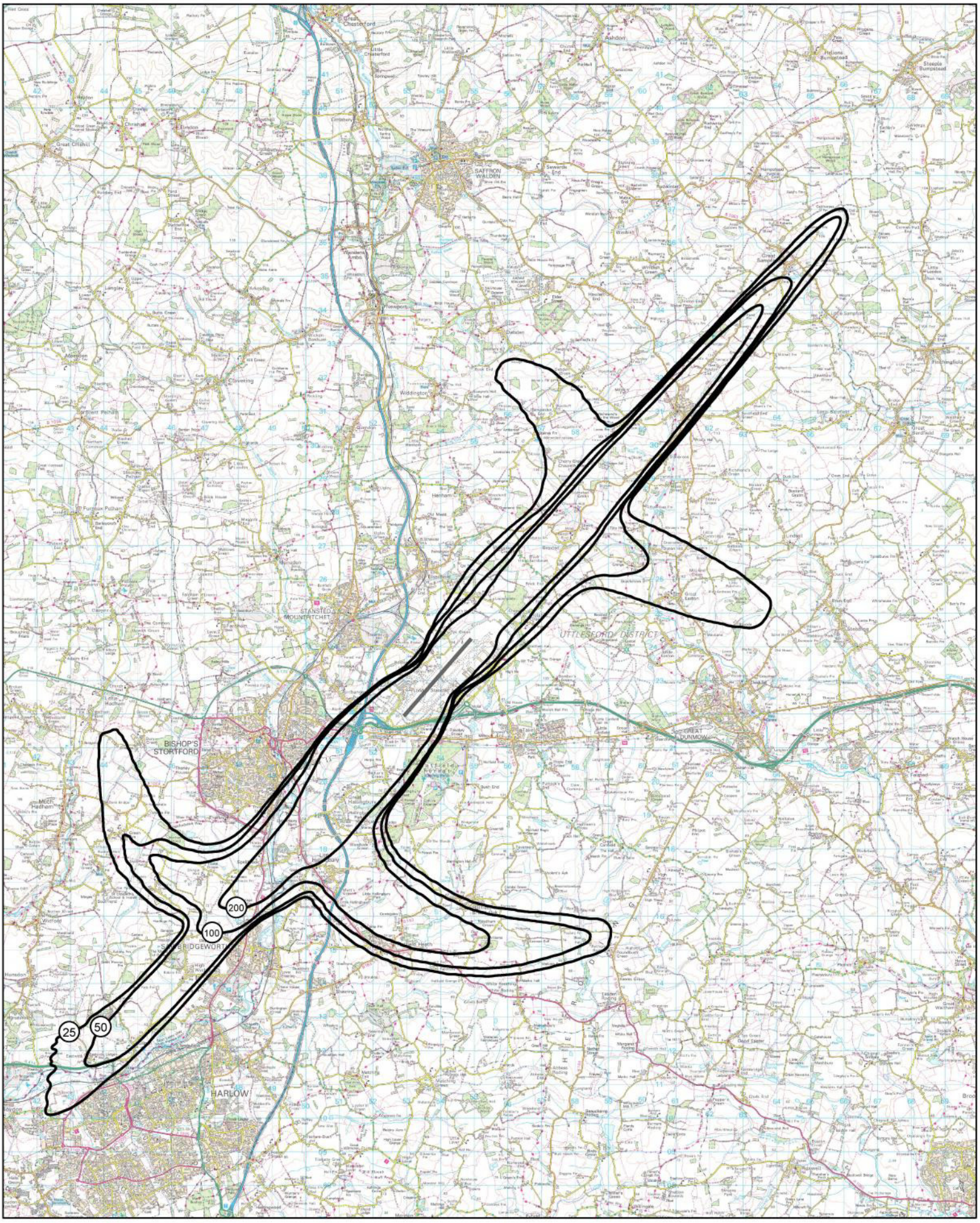
STANSTED AIRPORT

Figure 2028DC/N60/Night: 2028 Development Case N60 Summer Night Contours
Long-term runway modal split 73% SW / 27% NE



STANSTED AIRPORT

Figure 2028DC/L_{Aeq}/Day: 2028 Development Case $L_{Aeq,16h}$ Summer Day Contours
Long-term runway modal split 73% SW / 27% NE



STANSTED AIRPORT

Figure 2028DC/N65/Day: 2028 Development Case N65 Summer Day Contours
Long-term runway modal split 73% SW / 27% NE