



FARNBOROUGH  
AIRPORT SUSTAINABILITY

Sections 106 and 299A  
Town and Country Planning Act 1990

Annual INM7 Noise Assessment 2025  
Predictive Contours January to December 2026

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## 1. INTRODUCTION

- 1.1 In compliance with the requirements of paragraph 2.5 b), c), d) and e) of the Section 106/299A Town and Country Planning Act 1990 agreement, between Rushmoor Borough Council (RBC) and Farnborough Airport Ltd (FAL), this report provides details of the outcome of the latest Integrated Noise Model (INM) study run for business aviation operations at Farnborough.

This report is for the calendar year 2025 and includes predictive contours for 2025, based on forecast growth in movement numbers and aircraft track data from the study year.

- 1.2 Paragraph 2.5 of the planning agreement states:

- b) *At the end of the 4<sup>th</sup> Quarter in each year the INM model will be used to produce noise contours based on the actual movements in the past year and a second set of theoretical contours for the year ahead*
- c) *These sets of contours shall be supplied to the council no later than 6 weeks after the model has been used.*
- d) *For paragraphs 2.5 a) and c) the INM model shall use a simplified departure track representation and such simplified departure track representations shall be made after inspection of the spread of actual aircraft tracks on site.*
- e) *For paragraphs 2.5 a) and c) the INM model shall include terrain information and at the end of each year the results shall be compared between the individual INM predicted levels with the measured levels determined by the fixed and mobile monitoring points in and around the site.*

This report is intended to address the requirements of paragraph 2.5, b), c), d) and e).

- 1.3 The intended use of the INM, to produce noise contours relating to business aircraft movements at Farnborough, is to assess the noise impact on the surrounding area under existing conditions and the potential impact of the predicted growth of the airport as permitted by the Planning Agreement.

- 1.4 Civil operations at FAL are restricted to 'daytime' hours only (as defined by PPG 24 "Planning and Noise"). The airport is open from 07:00 to 22:00 hours on weekdays and 08:00 to 20:00 hours at non-weekdays<sup>1</sup>. The modelling process uses representative tracks produced from study of actual track data, to construct contours that represent the time averaged noise of operations.

- 1.5 For this report modelling was completed using Version 7.0d of the FAA's Integrated INM. This version of INM includes aircraft types that better represent those in operation at Farnborough Airport together with revised aircraft substitutions.

- 1.6 As in previous reports, the contours displayed within this report reference the work commissioned by RBC from Acoustic Technology Ltd during the consideration of the original FAL planning application. The outcome of this work established contours referred to in paragraph 2.1a of the Agreement, annotated as the "control contours" within this document.

- 1.7 In accordance with clause 12.1 of the planning agreement, further reductions in area of the control contours apply. The reductions are as follows:

- a 72.5% reduction of the land area within the 55dB(A)  $L_{Aeq,16h}$  contour
- a 60.0% reduction of the land area within the 60dB(A)  $L_{Aeq,16h}$  contour

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<sup>1</sup> Weekends and bank holidays

- 1.8 Table 1 displays the resultant effect on the land area within the control contours.
- 1.9 Aircraft operations during this study period consisted of 30,427 movements of movement types required by the Planning Agreement.

## 2. METHODOLOGY

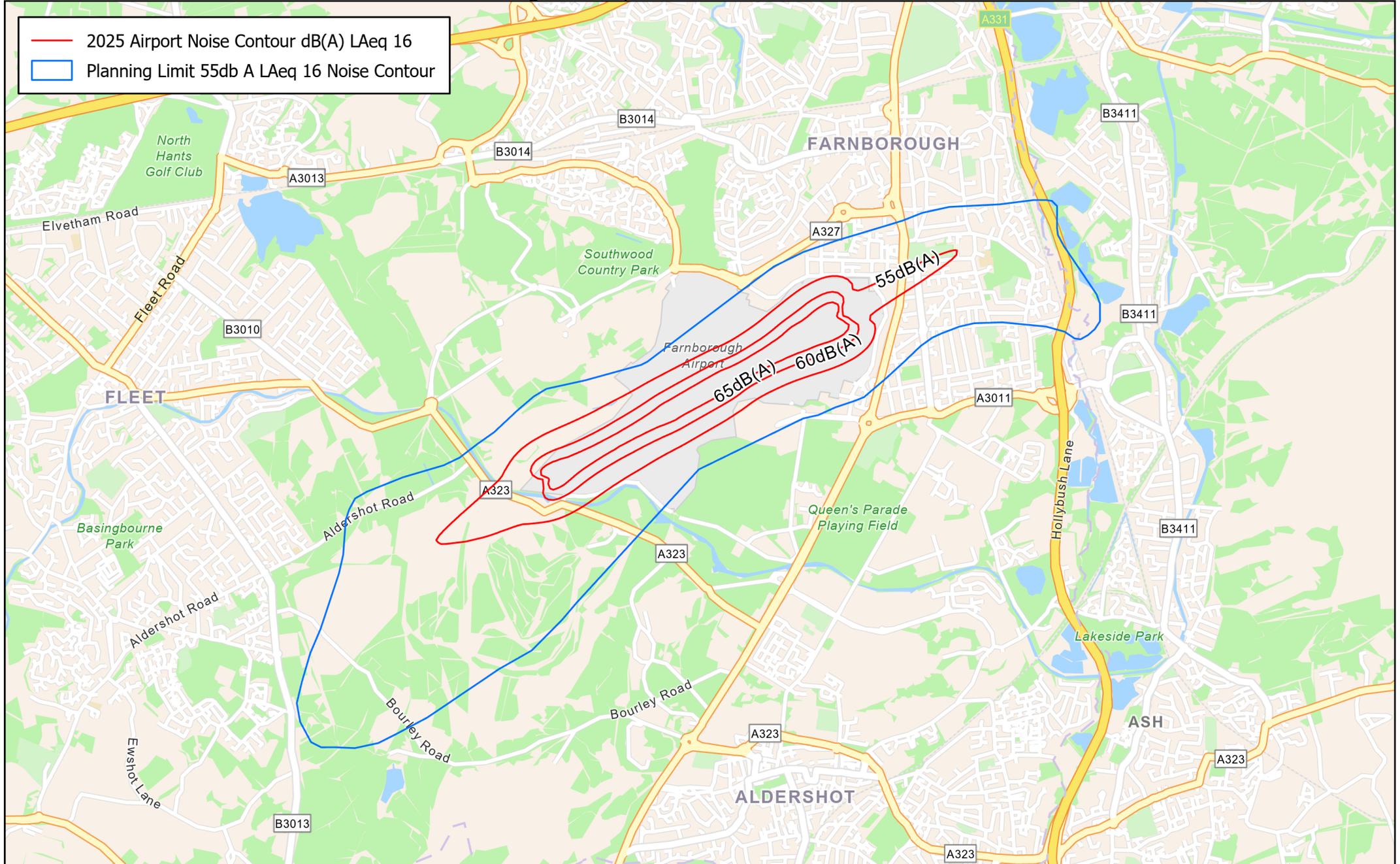
- 2.1 The core stages of the contour methodology are as follows:
- 2.2 The contours in this report have been produced using Federal Aviation Administration (FAA) software, the Integrated Noise Model (INM) version 7.0d. This version of the software was released on 30 May 2013. The INM software has been replaced by the FAA with the Aviation Environmental Design Tool (AEDT) as of May 2015. When using the same settings, the two models give similar results.
- 2.3 As INM is specifically mentioned in the S106 it is considered that this is the appropriate software to use when producing contours to compare with contour area limits given in the S106 unless or until FAL and RBC agree otherwise.
- 2.4 FAL have provided simplified departure and arrival tracks for use in the model, which have been produced following inspection of actual track data from the Aircraft Noise and Operations Management System (ANOMS). These simplified tracks include dispersion to reflect the track variations observed in the ANOMS data.
- 2.5 For each runway there is a single modelled arrival route and a single modelled departure route.
- 2.6 Local terrain has been included in the model, as it was in the previous methodology and as required by the S106, paragraph 2.5 (e).
- 2.7 FAL have provided BAP with a log of the aircraft movements which occurred in the calendar year of 2025. This section summarises how this log has been processed. There were 29,412 fixed wing movements and 1,015 helicopter movements at Farnborough Airport in the calendar year of 2025.
- 2.8 In order to produce the 2026 forecast, the 2025 movements were pro-rata based on forecast information provided by FAL.
- 2.9 There are various categories of aircraft at Farnborough Airport. The majority of aircraft are included for the purposes of producing the noise contours, however some categories are excluded, for example those associated with the Airshow or emergencies. The aircraft category has been provided with the log of flights.
- 2.10 The INM software includes noise information for many common aircraft types, but it does not include every aircraft type. Therefore, the aircraft type codes used in the log have been mapped to aircraft types in the INM software. For some aircraft, substitutions are proposed by the INM software where a similar alternative aircraft type is used to model the actual type. For larger aircraft substitutions are generally not necessary but for some smaller aircraft, including a number of the types which commonly operate at Farnborough Airport, substitutions are required. Where the INM software has no guidance, an aircraft type has been assigned based on the aircraft size and engine details. A full list of the substitutions used by BAP for each operational aircraft code used in the log is given in Appendix 1.
- 2.11 Civil aircraft operations at Farnborough Airport are restricted to daytime hours only. The airport is open from 07:00 to 22:00 on weekdays and from 08:00 to 20:00 on non-weekdays.
- 2.12 Each movement in the log is categorised as either an arrival or departure.
- 2.13 The INM "STANDARD" profiles have been used for all aircraft departures. For arrivals, a user defined 3.5 degree approach profile has been used for all aircraft to reflect the steeper approach in operation at Farnborough Airport.

- 2.14 For departures, the INM software offers a number of flight profiles for most aircraft types, particularly the larger aircraft types. These relate to different departure weights, which are greatly affected by the fuel load and consequently the length of the flight. In the INM software this is referred to as the stage length. As the stage length increases, the aircraft has to depart with more fuel and so its flight profile is slightly lower than when a shorter stage length is flown.
- 2.15 Stage lengths are defined in increments of 500 nmi up to 1,500 nmi and then in increments of 1000 nmi.
- 2.16 For the contours in this report, destination airports were given for each departure in the movement log. Subject to the validation exercise, stage lengths have been assigned based on the distance of these airports from Farnborough Airport. Where the stage length determined using this method does not exist in the INM software for a particular aircraft type, the highest stage length available has been used.
- 2.17 To check the methodology used to produce the noise contours for this report, a validation exercise has been conducted along similar lines to those done for previous contours for the airport. This has involved the comparison of predicted noise levels for individual operations by the 20 most common aircraft types in 2025 with the measured noise levels obtained from the airport's permanent noise monitors located at Farnborough College and Tweseldown Racecourse.
- 2.18 Data for the whole year was used from the Tweseldown Racecourse NMT. However, building works at Farnborough College affected the measured noise levels at the college NMT for part of the year. Therefore, for the validation, the measured noise levels for Farnborough College were based only on the periods January to June and December 2025, which we understand were not affected. This period of excluded data is not considered significant to the validation; further details are given in Appendix 2.
- 2.19 Modifications to the noise model have been made where appropriate to minimise any residual differences between the predicted and measured noise levels. Further details of the validation exercise and the resulting modifications are given in Appendix 2.

### 3. RESULTS

- 3.1 Figure 1 displays a comparison between this INM contour assessment (2025) and the RBC 1997 Planning Contours. Figure 2 displays predicted contours for 2026 against the same 1997 contours. Both contours include helicopter movements following the same trend as fixed wing movements in terms of movement numbers. When examining the contours there are several important points to note:
- 3.1.1 The planning agreement refers only to 55 and 60dB(A) LAeq,16h however a third 65dB(A) LAeq,16h contour has been added for information.
- 3.1.2 The contour areas for this study period are within the planning permission control contour areas, as amended under clause 12.1a of the planning agreement.
- 3.1.3 The predicted contour areas for the study period are also within the planning permission control contour areas, as amended under clause 12.1a of the planning agreement.
- 3.1.4 The contours use assumptions and data inputs as described within this report.
- 3.1.5 The contours should be regarded as indicative only and represent time averaged noise levels expressed as dB(A) LAeq,16h. This measure represents the sound energy released as noise varies over time, expressed as an average for the relative period.
- 3.1.6 Control Contours included as part of the planning agreement between RBC were theoretical and used conceptual aircraft movement routes. The contours attached to this document are generated using representative tracks created through inspection of actual flight track data.

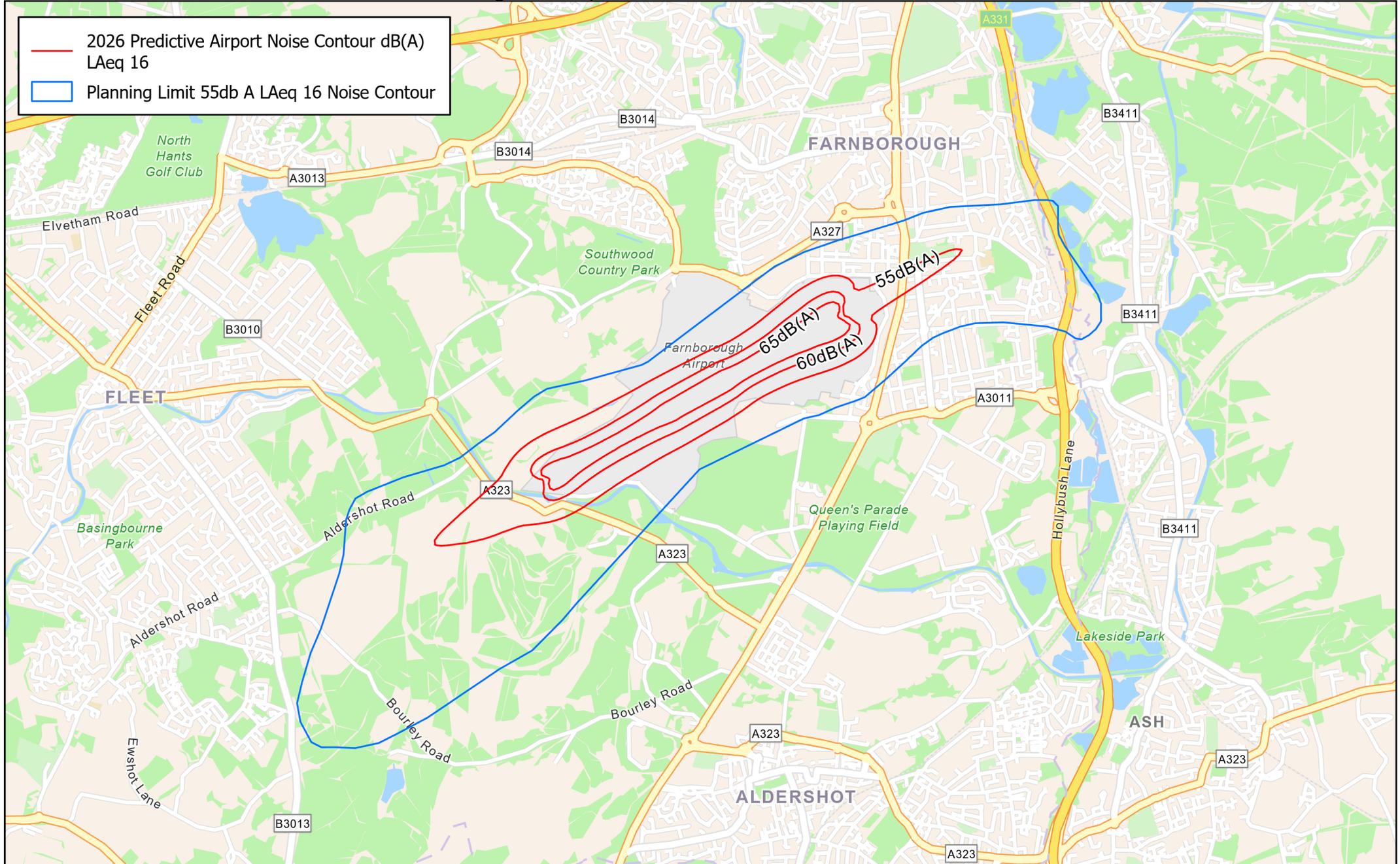
Figure 1: Airport Noise Contours All 2025



— 2025 Airport Noise Contour dB(A) LAeq 16  
 □ Planning Limit 55db A LAeq 16 Noise Contour



Figure 2: Airport Noise Contours Predictive 2026



— 2026 Predictive Airport Noise Contour dB(A)  
 LAeq 16

□ Planning Limit 55db A LAeq 16 Noise Contour



- 3.1.7 Helicopter movements are included in the modelling process.
- 3.1.8 The steeper angle of approach used at FAL (3.5 as opposed to 3 degrees) has been included in the model to correctly represent the height of arriving aircraft.
- 3.1.9 Comparison of INM predicted noise levels for individual aircraft movements against measured noise levels at the NMTs validates the assessment. This shows, as with the exercise reported at the Public Inquiry in 2010, that some of the INM standard aircraft substitutions used older aircraft types that over-estimated the noise levels of the more modern types operating out of Farnborough Airport. The standard substitutions are revised annually, (refer to Appendix 1).
- 3.2 Comparison of total land area within each Noise Contour, Tables 1 and 2 compare the total land area within each contour for both the “control contours” and the most recently produced actual and predicted contours.

**Table 1: Predicted noise contour areas, 20,000 movements at 1997 mix (Control Contours)**

dB(A) L <sub>Aeq,16h</sub>	Predicted 20,000 movements 1997 mix (km <sup>2</sup> )	Amended Control Contour Areas as per clause 12.1a of the S106 (29/10/2010) (km <sup>2</sup> )
55	9.07	6.58
60	4.03	2.42
65	1.70	n/a

**Table 2: Contour areas: Actual 2025 and Predicted 2026**

dB(A) L <sub>Aeq,16h</sub>	Actual contour areas 2025 (km <sup>2</sup> )	Predicted contour areas, 2026 (km <sup>2</sup> )
55	2.23	2.28
60	0.95	0.97
65	0.45	0.46

## 4. CONCLUSION

- 4.1 Contours produced for 2025 and the predicted contours for 2026 are within the planning permission area limits.

## 5.0 SUMMARY

Noise contours have been produced for Farnborough Airport for 2025 and 2026 using a similar methodology to that used in previous years. These are within the planning permission area limits.

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## Appendix 1

### INM 7.0d Substitution List

Key:

Operational Aircraft Code: Operational ATC aircraft type identification

INM Aircraft Code: Equivalent aircraft code as used by INM software

Notes:

- Operational Codes do not necessarily reflect correct ICAO Codes.
- The 20 most common aircraft types have been part of the validation exercise, and have been denoted by their ICAO aircraft code followed by an asterisk. See Appendix 2 for details

Operational Aircraft Code	INM Aircraft Code	Operational Aircraft Code	INM Aircraft Code
A109	A109	B738	737800
A109A	A109	BE20	BE20*
A119	A109	BE30	CNA441
A139	SA330J	BE40	MU3001
A19N	A319-131	BE9L	CNA441
A220	737700	C25A	CNA525C
A318	A319-131	C25B	CNA525C
A319	A319-131	C25C	CNA525C
A320	A320-211	C25M	CNA525C
AS35	SA355F	C510	CNA510
AS50	SA355F	C525	CNA525C
AS55	SA355F	C52A	CNA525C
AS65	SA365N	C52B	CNA525C
ASTR	IA1125	C550	CNA500
AT72	DO328	C56X	C56X*
AT76	DO328	C650	CIT3
AW169	S76	C670	CIT3
B190	1900D	C680	CNA680
B206	B206L	C680A	C68A*
B250	BE20*	C68A	C68A*
B350	CNA441	C700	CNA680
B429	B429	C750	CNA750
B505	B206L	CL30	CL601
B733	737300	CL35	CL35*
B734	737400	CL60	CL60*
B735	737500	CL604	CL60*
B737	737700	CL605	CL60*

Operational Aircraft Code	INM Aircraft Code	Operational Aircraft Code	INM Aircraft Code
CL65	CL60*	G150	IA1125
CL850	CRJ2*	G200	CL600
CRJ2	CRJ2*	G280	CL601
CRJ7	CRJ9-ER	G450	GIV
CX30	GASEPF	G5	GLF5*
DA42	BEC58P	G550	GLF5*
DA62	BEC58P	G650	GLF6*
E135	EMB145	G650ER	GLF6*
E135N	EMB145	GA5C	GV
E145	E145*	GA6C	GA6C*
E170	EMB170	GA7C	GV
E190	EMB190	GALX	CL600
E35L	E35L*	GL5T	GL5T*
E50P	CNA510	GL6T	GLEX*
E545	CNA55B	GL7T	GL7T*
E550	E550*	GLEX	GLEX*
E55P	E55P*	GLF4	GIV
EC30	EC130	GLF5	GLF5*
EC35	EC130	GLF6	GLF6*
EC45	B429	H145	B429
F2LX	F2TH*	H25B	LEAR35
F2TH	F2TH*	H25C	LEAR35
F900	F10062	H750	LEAR35
F9LX	F10062	H850XP	LEAR35
FA6X	GV	HA-420	CNA510
FA7X	FA7X*	HA4T	CL600
FA8X	F10062	HDJT	CNA510

<b>Operational Aircraft Code</b>	<b>INM Aircraft Code</b>	<b>Operational Aircraft Code</b>	<b>INM Aircraft Code</b>
HU16	DC3	PAY1	PA31
L545	CNA55B	PC121	PC12*
L550	E550*	PC24	PC24*
LJ35	LEAR35	PRM1	LEAR35
LJ40	LEAR35	S76	S76
LJ45	LEAR35	S92	S70
LJ55	LEAR35	SB20	HS748A
LJ60	CNA55B	SF34	SF340
LJ75	LEAR35	SF50	ECLIPSE500
P180	SD330	SK76	S76
P28A	PA28	SW4	DHC6
P46T	GASEPV	TBM7	CNA208
PA46	GASEPV		

## Appendix 2

### Validation Adjustments

For each validated aircraft type, the measured noise levels obtained from the airport's permanent noise monitors located at Farnborough College and Tweseldown Racecourse have been compared with the default modelled noise levels at the same locations.

For each aircraft type, an INM aircraft type has been selected along with a multiplier to the number of aircraft movements. This multiplier serves to modify the  $L_{Aeq}$  noise level, for example a multiplier of 2 will add approximately 3 dB to the noise level for that aircraft type. All the validated types have been modelled at stage length 1, which in most cases is the only option. The selections have been based on minimising the difference between the predicted and measured results at the noise monitors.

The table below shows, for each validated aircraft type, the resulting INM type and multiplier used.

Due to building works on the roofs of Farnborough College a temporary cover was placed over the building where the NMT is located. This resulted in lower measured noise levels while the cover was in place. Therefore, for the validation the measured noise levels for Farnborough College were based only on the period January to June and December 2025, when we understand the cover was not in place. Data for the whole year was used for the Tweseldown Racecourse NMT.

The NMT data for 2024 and 2025 was checked for seasonal variation and no material variation was found, therefore the exclusion of a period of data is not considered significant to the validation. Furthermore, with the exclusion, the resulting adjustments to the multipliers for the individual aircraft types was within the range typically seen due to year on year variation, and the overall effect of the 2025 validation adjustments compared to the 2024 validation is estimated to be less than 0.1 dB.

Validated Aircraft Code	Arrivals		Departures	
	INM Aircraft Code	Multiplier	INM Aircraft Code	Multiplier
BE20	CNA441	3.80	CNA441	1.85
C56X	CNA560XL	0.60	CNA560XL	0.35
C68A	CNA680	0.75	CNA750	0.30
CL35	CL601	0.75	CNA560XL	0.45
CL60	CL600	1.50	CNA560XL	0.40
CRJ2	CL601	1.80	CNA560XL	0.75
E35L	EMB145	0.85	F10062	0.30
E145	EMB145	1.10	F10062	0.25
E550	CNA55B	0.50	CNA55B	0.35
E55P	CNA510	1.45	CNA560XL	0.55
F2TH	CL600	0.90	F10065	0.15
FA7X	F10062	0.65	F10065	0.50
GA6C	GV	0.60	F10065	0.20
GL5T	GV	0.65	F10065	0.35
GL7T	GV	0.85	F10065	0.45
GLEX	GV	0.70	F10065	0.50
GLF5	GV	0.65	F10065	0.40
GLF6	GV	0.65	F10065	0.40
PC12	CNA208	0.90	CNA208	0.30
PC24	CNA55B	0.65	CNA55B	0.70