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Architecture
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Project: **BRISTOL AIRPORT – 12MPPA APPEAL**

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Subject: **Comparison of ESA and Jacobs Forecasts**

1.0 INTRODUCTION

Bristol Airport Limited (BAL) has submitted a planning application to increase its maximum passenger throughput from 10 million passengers per annum (mppa) to 12 mppa (the Appeal Proposal). As part of its planning application, it presented an assessment of the noise impacts of the proposed development in an Environmental Statement (ES) and then, in updated form, in an ES Addendum (ESA).

North Somerset Council (NSC) refused the application, and BAL is now appealing against that decision. As part of the appeal process, NSC's advisors Jacobs have developed an alternative forecast of the aircraft fleet mix for the 12 mppa 2030 scenario. This is referred to in this document as the Jacobs forecast, in contrast to the ESA forecast used in the ESA modelling. For avoidance of doubt the ESA forecast used here is that of the core case, not the faster or slower growth scenarios.

The purpose of this note is to present a comparison of the two fleet forecasts with regard to the likely effects on noise. The methodology used in this comparison follows that presented in the ESA.

Summer day and night noise contours have been produced based on the Jacobs forecast, and the area of these noise contours are compared with those based on the ESA forecast. This note also compares the number of dwellings exposed to noise levels above the daytime and night-time LOAELs and SOAELs based on the Jacobs forecast with the number of dwellings above these respective levels based on the ESA forecast.

2.0 COMPARISON OF FORECAST FLEET MIXES

A summary of the differences in the two forecasts is given in Table 1.

Aircraft Type	Annual Aircraft Movements		
	ESA	Jacobs	Difference
Airbus A320	6,540	2,765	-3,775
Airbus A320neo	20,200	23,985	3,785
Airbus A321neo	15,600	9,664	-5,936
Airbus A321neo XLR	120	0	-120
ATR 72-500	3,850	2,554	-1,296
ATR 72-600	4,510	2,554	-1,956
Boeing 737 MAX 10	2,050	2,050	0
Boeing 737 MAX 8	14,360	11,421	-2,939
Boeing 737-700	750	0	-750
Boeing 737-800	2,380	14,582	12,202
Boeing 787-8	510	879	369
Boeing 787-9	0	586	586
Embraer 190	2,240	878	-1,362
Embraer 195-E2	2,240	2,343	103
Embraer RJ145	0	1,089	1,089
Total	**75,350**	**75,350**	**0**

Table 1: Annual movements by aircraft type

The overall noise impact of the airport is dominated by the Airbus and Boeing types, which make up the bulk of the fleets of the main airlines at Bristol Airport.

Comparing the fleet mixes there are some changes that will generally reduce noise, such as the Jacobs forecast replacing around 4,000 movements by the current generation Airbus A320 with a similar number by the next generation Airbus A320neo, which is quieter. The Jacobs forecast also replaces around 1,400 movements by the Embraer E190 with 100 movements by the Embraer 195-E2 and around 1,100 movements by the Embraer RJ145, which are both quieter.

Every other aircraft type has reduced activity to varying degrees in the Jacobs forecast, except for the Boeing 737-800 and the Boeing 787, whose movements increase by around 12,000 and around 1,000 respectively. These are two of the loudest types in operation at the airport so it would therefore be expected that the total noise impacts would increase.

The key assessment periods for noise are the 92-day summer day (07:00 to 23:00) and night (23:00 to 07:00). The Jacobs fleet mix only provides an annual fleet mix. York Aviation Limited (YAL), who prepared the ESA forecast, have provided a 92-day summer day and night fleet mix by starting with the Jacobs forecast and applying the same relationships between the 92-day and day/night distribution relative to the annual fleet mix as were used for the ESA forecast.

Additionally, positioning and general aviation aircraft have been added to the above fleet mix. These are identical to the ESA mix and have little bearing on the overall noise impacts.

3.0 RESULTS

3.1 Contour Area

The resulting summer day and night contour areas based on the ESA forecast and the Jacobs forecast are compared in Table 2 and Table 3 below.

Contour Value, dB $L_{Aeq,16h}$	Summer Daytime Noise Contour Area, km^2	
	ESA 12mppa	Jacobs 12mppa
51	35.2	40.0
54	19.1	21.4
57	10.7	11.7
60	5.8	6.4
63	2.9	3.2
66	1.5	1.7
69	0.9	0.9

Table 2: Summer Daytime Air Noise Contour Areas

Contour Value, dB $L_{Aeq,8h}$	Summer Night-time Noise Contour Area, km^2	
	ESA 12mppa	Jacobs 12mppa
45	50.0	61.1
48	28.1	34.1
51	15.3	18.1
54	8.3	9.8
55	6.8	8.0
57	4.3	5.2
60	2.1	2.5
63	1.2	1.3

Table 3: Summer Night-time Air Noise Contour Areas

The changes vary slightly by contour band, but overall the Jacobs forecast results in noise contours which are a little over 10% larger for the day, and around 20% larger for the night, excepting the very smallest contours where rounding becomes an issue when calculating percentage change.

BAL have proposed limits on the area of the 57 dB daytime contour and the area of the 55 dB night-time contour. The contours based on the Jacobs forecast exceed both of those limits. They would therefore not be permitted to occur, should the application as proposed be successful.

In order to assess in detail how this would change the ESA assessment, it would be necessary for Jacobs to have provided an equivalent 10 mppa scenario so that the situation with and without the development could be compared. This has not been provided, so this cannot be done on a like-for-like basis. However it is reasonable to assume that if the same assumptions were used, then Jacobs would consider that changes of a similar nature would occur to the ESA 10 mppa fleet mix. This would have the effect of reducing the difference between the 10 mppa and 12 mppa scenarios and therefore reducing the impact of the development, unless the proposed planning conditions were breached.

3.2 Dwellings

Table 4 compares the number of dwellings exposed to a noise level above the daytime and night-time LOAELs and SOAELs based on the Jacobs and the ESA forecasts.

Noise Level ≥	Number of Dwellings[1]	
	ESA 12mppa	Jacobs 12mppa
Daytime LOAEL, 51 dB $L_{Aeq,16h}$	3,100	3,450
Daytime SOAEL, 63 dB $L_{Aeq,16h}$	10	20
Night-time LOAEL, 45 dB $L_{Aeq,16h}$	4,000	4,800
Night-time SOAEL, 55 dB $L_{Aeq,16h}$	250	300

[1] Dwelling numbers have been rounded to the nearest 50 above 100 and the nearest 10 below 100.

Table 4: Dwellings Exposed to Noise Above the Daytime and Night-time LOAELs and SOAELs

The Jacobs forecast results in around 350 more dwellings being exposed to a noise level above the daytime LOAEL and around 10 more dwellings being exposed to a noise level above the daytime SOAEL.

The Jacobs forecast results in around 800 more dwellings being exposed to a noise level above the night-time LOAEL and around 50 more dwellings being exposed to a noise level above the night-time SOAEL.

4.0 SUMMARY

Overall the Jacobs forecast results in an increase in the proportion of movements by noisier aircraft types. This results in an increase in the area of the day contours of just over 10% and an increase in the area night noise contours of around 20%. There are corresponding increases in the number of dwellings exposed to noise levels above the daytime and night-time LOAELs and SOAELs.

However, the Jacobs fleet mix results in noise contours which exceed the proposed contour area limits, and therefore these increased impacts would not be permitted should the application as proposed be successful.

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