

LONDON CITY AIRPORT

2013 SECTION 106 ANNUAL PERFORMANCE REPORT

APPENDIX 11 ANNUAL NOISE CATEGORISATION REPORT

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Appendix 1: Mean Annual Departure Noise Levels

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1.0 INTRODUCTION

In accordance with London City Airport's planning obligations, aircraft operating at London City Airport are required to be categorised by their departure noise level into one of five noise categories. This aircraft categorisation process is set out in detail in Condition 7 of the planning permission dated 9th July 2009.

The categorisation procedure requires that, before any aircraft is permitted to operate at London City Airport, a provisional noise categorisation for that aircraft type must be approved in writing by the local planning authority. Annually, a review of the provisional categorisation is undertaken of each approved aircraft type having regard to the departure noise levels recorded using the airport's noise monitoring system. This report records the results of this review.

The airport's noise monitoring system records the departure events of aircraft over the categorisation year (January to December inclusive), the results of which are used to undertake the annual review of the provisional categorisation of aircraft.

This report records the results of a review of the provisional categorisation of those aircraft using the airport that received provisional categorisation over the period 1st January 2013 up to and including 31st December 2013. The review is based on the results obtained from noise monitoring in the period 1st January 2013 up to and including 31st December 2013.

In Appendix A, this report includes a list of those aircraft that have already received confirmation of their provisional categorisation to operate at London City Airport, together with their associated mean annual departure noise level (MADNL) recorded over the period 1st January 2013 up to and including 31st December 2013.

Information is also provided on the number of aircraft movements and noise factored movements that have taken place at the airport over the period 1st January 2013 up to and including 31st December 2013.

2.0 PLANNING REQUIREMENTS

The planning requirements concerning the provisional categorisation of aircraft at London City Airport are set out in Condition 7(4) of the planning permission dated 9th July 2009.

It has been previously agreed that general aviation interim categorisation is simplified due to the small numbers of similar GA type aircraft. This was formally approved on the 19th November 1998 as planning application number P/98/0998, and places "*General Aviation:*

Executive Turbo-Fan Aircraft” in Category A and *“General Aviation: Non-Jet Aircraft”* in Category B, according to the noise exposure categories (NECs) discussed in Section 2.1 below.

2.1 Noise Categories

Condition 7(2) to the planning permission of 9th July 2009 states that:

“Aircraft types using the airport shall be placed in categories and allocated noise factors as set out below:

| Category | Noise Reference Level (PNdB) | Noise Factor |
|----------|---------------------------------|--------------|
| A | 91.6 – 94.5 | 1.26 |
| B | 88.6 – 91.5 | 0.63 |
| C | 85.6 – 88.5 | 0.31 |
| D | 82.6 – 85.5 | 0.16 |
| E | less than 82.6 | 0.08 |

“where the noise reference level is the departure noise level at the four noise categorisation locations shown on Plan P1 that accompanies this permission, expressed in PNdB...”

Figure 1 shows the noise categorisation points (NCPs) which are defined as being 2000 metres from the start-of-roll and 300 metres sideline from the extended centre line of the runway.

The noise reference level is determined using the mean annual departure noise levels (MADNLs) measured by the noise monitoring system. The noise factors are multiplying factors to the actual number of aircraft movements and are used to obtain the number of factored movements at the airport. The permitted numbers of actual and factored movements at the airport are detailed below.

2.2 Number of Aircraft Movements

Condition 8 of the planning permission of 9th July 2009 details the number of movements that are permitted at the airport:

- “(1) The number of aircraft movements at the airport shall not exceed:*
- (a) 100 per day on Saturdays and 200 per day on Sundays but not exceeding 280 on any consecutive Saturday and Sunday*
 - (b) 592 per day on weekdays except 1 January, Good Friday, Easter Monday, the May Day holiday, the late May bank holiday, the late August bank holiday, 25 December and 26 December*

- (c) 132 on 1 January
 - (d) 164 on Good Friday
 - (e) 198 on Easter Monday
 - (f) 248 on the May Day Holiday
 - (g) 230 on the late May Bank Holiday
 - (h) 230 on the late August Bank Holiday
 - (i) 100 on 26 December
 - (j) 120,000 per calendar year
- (2) *In the event of there being a Bank Holiday or Public Holiday in England which falls upon or is proclaimed or declared upon a date or dates not referred to in sub-paragraph (c) to (i) (inclusive) of condition 8(1) then the number of aircraft movements permissible on that date shall not exceed 330 unless the local planning authority otherwise agrees in writing but in any event the limit for any particular date or dates shall not exceed 396 per day."*

In addition, condition 8(4) adds a requirement concerning the number of factored movements as stated below:

- "(4) The number of factored movements shall not exceed:*
- (a) In any one week the number of permitted aircraft movements for that week by more than 25%*
 - (b) 120,000 per calendar year."*

Condition 8(5) defines a factored movement as stated below:

- "(5) For the purpose of condition 8(4) the number of factored movements shall be calculated by multiplying the number of take-offs and landings by each aircraft by the relevant noise factor for an aircraft of this type under condition 7 and adding together the total for each aircraft type using the airport."*

3.0 NOISE MONITORING

3.1 The Noise Monitoring System

A precision Brüel & Kjær (B&K) noise monitoring system was first installed in March 1992 consisting of four permanent noise monitoring terminals arranged in two gateway pairs. The

four noise monitoring terminals (NMTs) were located as close as possible to the four noise categorisation points (NCPs), taking account of local site constraints. Correction factors were developed to account for any difference in position between the NMT and NCP.

This system was upgraded by B&K in 2000 and a flight track monitoring system added. In September 2013 the B&K noise and flight track monitoring systems were replaced by Topsonic Systemhaus GmbH. The new system uses Norsonic noise monitoring equipment. No changes to the masts were made so measurements continue to be made at precisely the same positions as before.

The NMTs send data to a central computer each day for long-term storage and analysis. The analysis determines which noise events should be correlated with aircraft movements by referring to radar data (previously the flight information display system, FIDS, prior to 2000). The system records the aircraft movements for each day.

The categorisation procedure is based around the measurement of noise from departing aircraft at the four points noise categorisation points, two at each end of the runway. As an aircraft flies through a gateway pair of noise monitors, the departure noise level is measured in dB(A) at each noise monitoring terminal. Corrections are applied to the measured noise level to take account of where a noise monitor is not located exactly at the noise categorisation point and also for converting from the noise units of dB(A) into PNdB¹. Finally, the mean departure noise level is determined from the average of the resulting gateway pair corrected noise measurements.

This noise control regime described above has been in operation for approximately 20 years. During this time, a large amount of data has been obtained concerning the departure noise characteristics of aircraft in operation at the airport. As a result, it has been possible to categorise each aircraft type operating at the airport.

For the existing noise monitoring system to operate efficiently, it is necessary to maintain the four noise monitors in operation and, as far as possible, to ensure that the landscape around each monitor is relatively clear of any large objects (such as buildings). Significant development has taken place around the airport over the years, particularly in close proximity to some of the noise monitoring terminals. This led to the need to relocate some of the noise monitors from their original positions (e.g. NMT 1 and NMT 3) to ensure more accurate noise

¹ dB(A) is the unit of the A-weighted Sound Level. PNdB is the unit of the Perceived Noise Level. The latter is considered to better represent the subjective noise of an aircraft noise event by taking into account the presence of any discrete tones.

monitoring. The current locations of the four noise monitoring terminals are shown in Figures 2 and 3.

During the calendar year of 2013, the noise and flight track monitoring system has been in operation every day, enabling the measurement of data to achieve a correlation of 91% of all aircraft departures from the airport during this period.

4.0 RESULTS

4.1 Noise Levels

The following correction factors have been determined from previous studies² and are applied to account for the NMT to NCP relationship and any associated reflection effects, see below:

| NMT | NMT – NCP and reflection effect correction factors |
|------------|---|
| 1 (NW) | -6.1 |
| 2 (SW) | -4.6 |
| 3 (NE) | -6.4 |
| 4 (SE) | -1.7 |

There have been no new aircraft types seeking provisional categorisation at London City Airport during the period 1st January 2013 up to and including 31st December 2013. No categorisation changes to existing aircraft types at the airport are sought either.

A full list of aircraft types and their associated mean annual departure noise level recorded over the period 1st January 2013 up to and including 31st December 2013 is included in Appendix A.

² NMT Correction Factor Assessment Report, Bickerdike Allen Partners, Report A1125-111-R01-PH, 9th July 2008.

4.2 Number of Actual and Factored Aircraft Movements

Table 4.1 shows the number of actual and factored aircraft movements in the period 1st January 2013 to 31st December 2013 inclusive.

| Aircraft Type | Number of Aircraft Movements | Noise Factor | Number of Factored Movements * |
|---|------------------------------|--------------|--------------------------------|
| Airbus A318 | 985 | 1.26 | 1241 |
| BAe 146 | 130 | 1.26 | 164 |
| RJ85 | 9985 | 1.26 | 12581 |
| RJ1H | 7670 | 1.26 | 9664 |
| Embraer 135 | 100 | 1.26 | 126 |
| Embraer 170 | 9206 | 1.26 | 11600 |
| Embraer 190 | 16036 | 1.26 | 20205 |
| Dash 8-400 | 2726 | 0.63 | 1717 |
| Fokker 50 | 13901 | 0.63 | 8758 |
| Dornier 328 | 4882 | 0.63 | 3076 |
| Dornier 328 Jet | 4 | 1.26 | 5 |
| ATR 42 | 1080 | 0.63 | 680 |
| Saab 2000 | 1772 | 0.63 | 1116 |
| General Aviation: Turbo-Fan Aircraft | 5060 | 1.26 | 6376 |
| General Aviation: Non-Jet Aircraft | 103 | 0.63 | 65 |
| TOTAL: | 73640 | | 77374 |

* Computed to the nearest whole number

Table 4.1: Aircraft Movement Numbers

The analysis indicates that the Airport is currently operating within the annual limits on aircraft movements and factored movements contained in condition 8 of the planning permission dated 9th July 2009.

5.0 CONCLUSIONS

No new aircraft have sought provisional categorisation at London City Airport during the period 1st January 2013 up to and including 31st December 2013.

This report presents movement numbers for aircraft operating at London City Airport during the period 1st January 2013 up to and including 31st December 2013. During this period, the airport was operating within the annual limits on aircraft movements and factored movements contained in the planning conditions that apply to the Airport.

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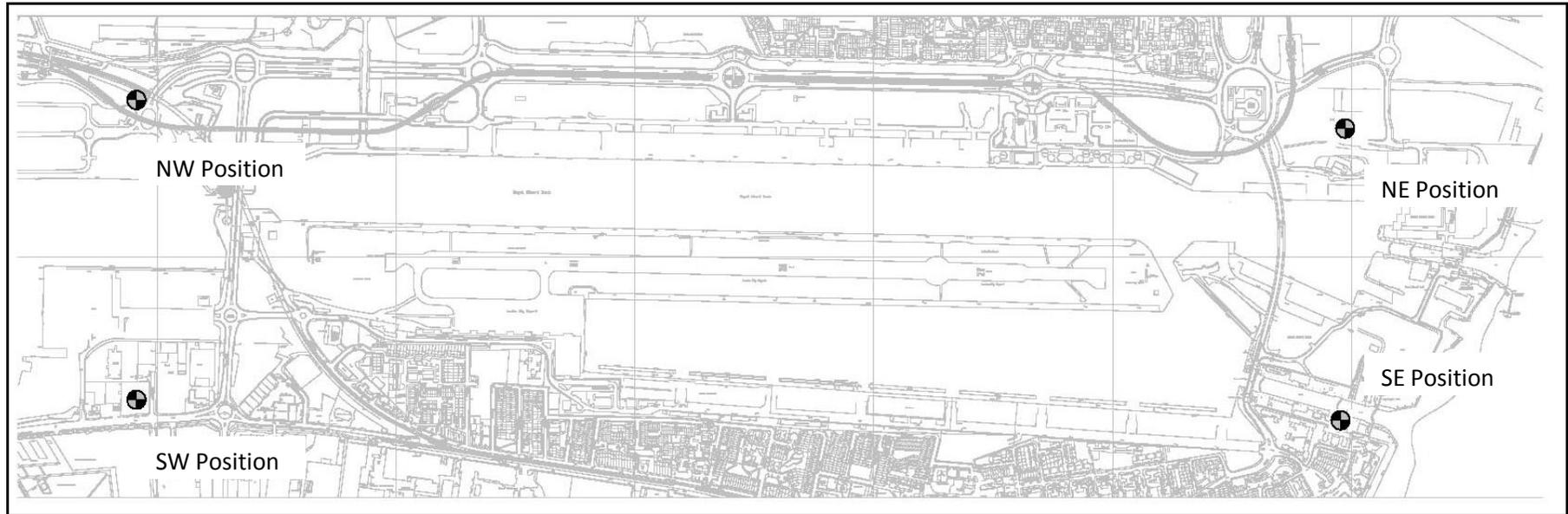


Figure 1 - Noise Categorisation Locations

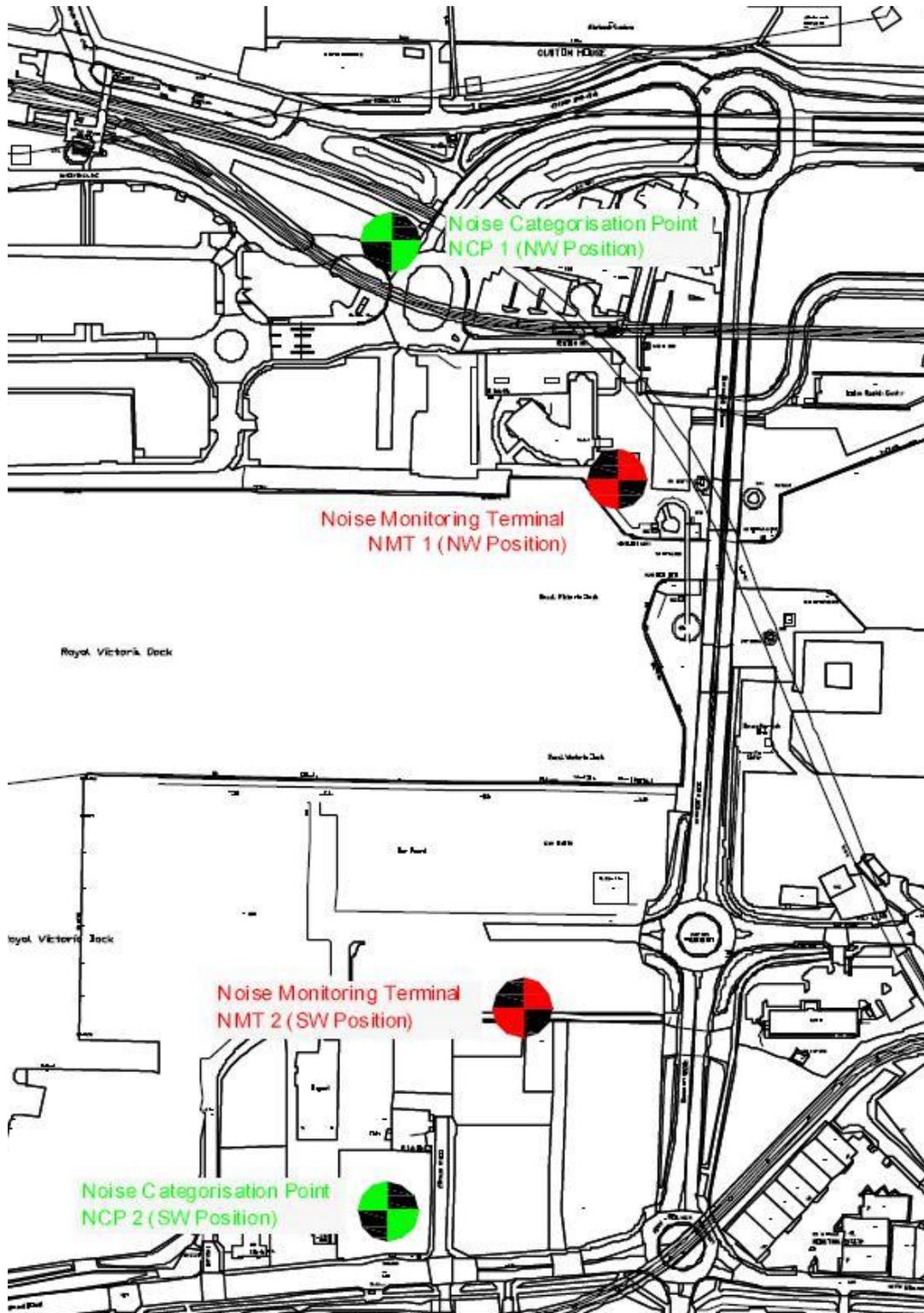


Figure 2 – Noise monitoring locations, west of runway

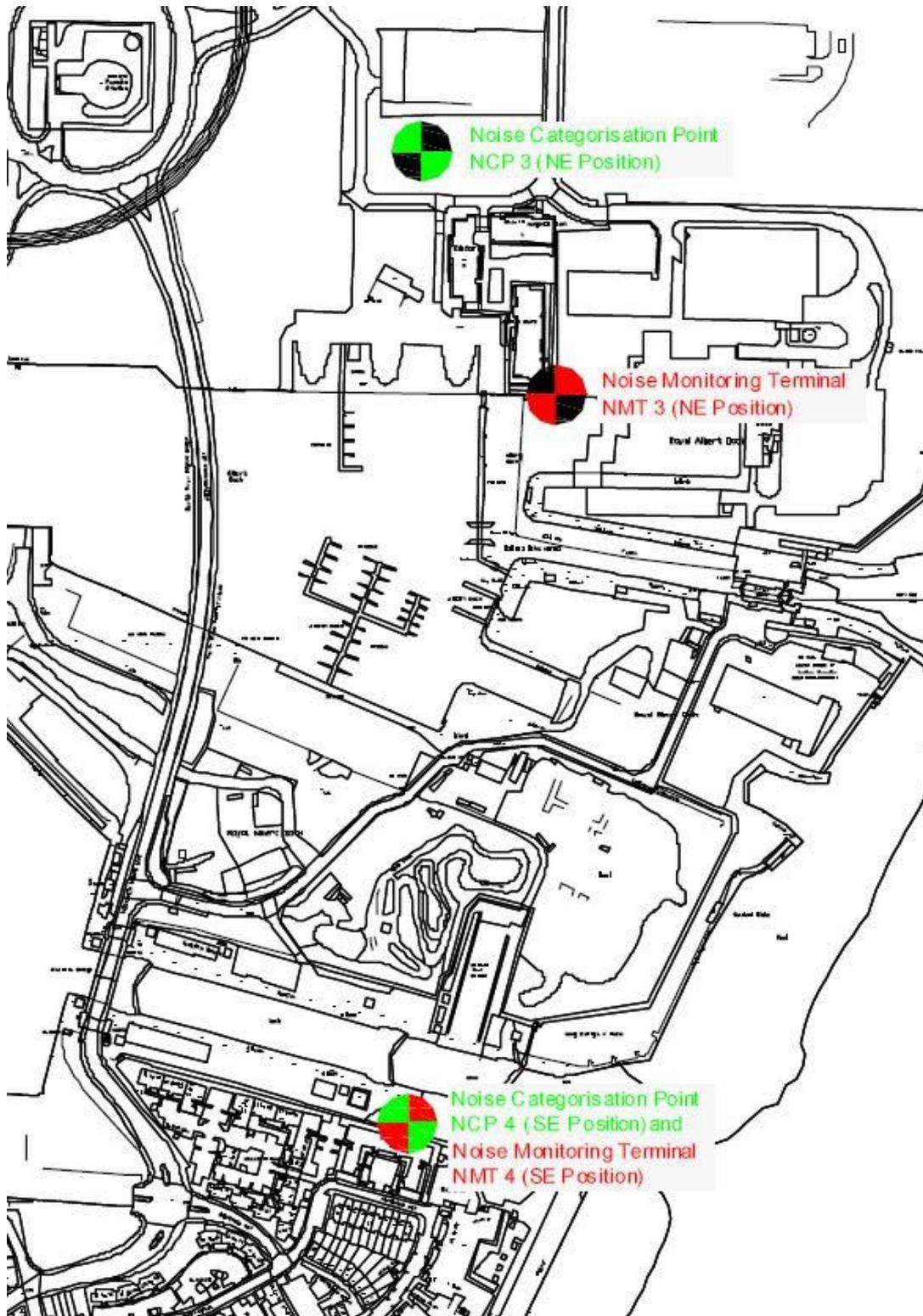


Figure 3 – Noise monitoring locations, east of runway

APPENDIX A

MEAN ANNUAL DEPARTURE NOISE LEVELS

| Aircraft Type | Measured Noise Level (PNdB) | Provisional Noise Category¹ |
|------------------------|------------------------------------|---|
| Airbus A318 | 93.4 | A |
| ATR 42 | 90.7 | B |
| ATR 72 | --* | B |
| BAe 146-100 | --* | A |
| BAe 146-200 | 93.8 | A |
| BAe 146-300 | 92.8 | A |
| Canadair CL60 | 90.0 | A |
| Cessna Citation C25A | 89.5 | A |
| Cessna Citation C25B | 88.7 | A |
| Cessna Citation C25C | --* | A |
| Cessna Citation C510 | 87.5 | A |
| Cessna Citation C525 | 89.5 | A |
| Cessna Citation C550 | 87.6 | A |
| Cessna Citation C560 | --* | A |
| Cessna Citation C56X | 86.8 | A |
| Cessna Citation C680 | 89.5 | A |
| Dassault Falcon 10 | 89.4 | A |
| Dassault Falcon 2000EX | 87.9 | A |
| Dassault Falcon 50 | 92.0 | A |
| Dassault Falcon 900 | 88.6 | A |
| Dassault Falcon 7X | 86.6 | A |
| Dornier 328 | 88.9 | B |
| Dornier 328 Jet | --* | A |
| Dash 8-400 | 89.7 | B |
| Embraer 135 | 90.3 | A |
| Embraer 170 | 93.4 | A |
| Embraer 190 | 94.3 | A |

| Aircraft Type | Measured Noise Level (PNdB) | Provisional Noise Category¹ |
|-------------------------|------------------------------------|---|
| Fokker 50 | 90.8 | B |
| Gulfstream G150 | --* | A |
| Learjet 40 | --* | A |
| Learjet 45 | 87.7 | A |
| Piaggio 180 | 90.7 | B |
| Piper Navajo 31 | --* | B |
| Raytheon Beechcraft 350 | --* | B |
| Raytheon Beechcraft 200 | 86.2 | B |
| Raytheon Beechjet 400 | 89.3 | A |
| Raytheon Beechcraft 58 | --* | B |
| Raytheon Hawker 800XP | 88.8 | A |
| RJ-85 | 93.3 | A |
| RJ-100 | 95.1 | A |
| Saab 2000 | 89.2 | B |

¹ Previously confirmed Provisional Categorisation unless otherwise stated.

*Insufficient numbers recorded (ie. less than 10 departures).

Table A1 – Mean Annual Departure Noise Levels 2013

Table A1 above indicates that whilst some aircraft are operating below their provisional categorisation, such as the Embraer 135 and various turbo-fan executive aircraft, one is operating above their category; the RJ-100.

The RJ-100 aircraft operated outside of category in 2013 by 0.6dB. This represents a 0.1dB improvement on the previous year. This slight improvement is due to the on-going work LCY and the operator of the RJ-100, Swiss International, are doing to bring the aircraft back within category. The RJ-100 has successfully operated within Category A in the past and a trial conducted during the second quarter of 2013 has illustrated how departure operating procedures can be revised to help reduce departure noise. In 2014, using trial results and up to date noise data, LCY and Swiss International are planning to undertake a further trial, based on these findings, later in 2014. The performance of the RJ-100 has been provided on a bi-monthly basis to the London Borough of Newham accordingly.

Turbo-fan executive aircraft are categorised universally as Category A, and the turbo-prop executive aircraft are categorised universally as Category B. Appendix A indicates that most turbo-fan executive aircraft operated below Category A this year.