BELFAST CITY AIRPORT

2024 Annual Performance Report

Contents

Executive Summary

Belfast City Airport operates under a Planning Agreement with the Department for Infrastructure dated 22 July 2019 which sets out a series of requirements relating to:

- Aircraft noise, including the numbers and types of aircraft operating at the airport
- The hours within which flights are permitted, and
- The noise exposure resulting from aircraft operations.

This report has been prepared to provide key information demonstrating how the Airport has performed against the requirements of the Planning Agreement.

Since 2021, Belfast City Airport has successfully managed a period of recovery enabling a steady return towards pre-pandemic business levels, with flight numbers growing from 12,849 to 30,368 and passenger numbers increasing from 813,681 to 2,389,405 during the period 2021 to 2024.

Against this backdrop, the Airport has maintained full compliance with the requirements of the Planning Agreement, including for 2024.

To summarise key aspects of performance during 2024 –

- Almost 99% of flights operated within permitted operating hours (06:30-21:30) with the remainder operating within extended hours (21:30-23:59) due to exceptional circumstances
- £92,862 was lodged from fines applied to delayed flights and noise exceedances, to be invested in community projects
- The area of the 57 dB LAeq,16h noise exposure contour area was 3.09 km^2 – well within the contour area limit of 5.2 km^2
- The Quota Count total (a measure relating to the certificated noise levels generated by individual aircraft types) was 1,549.1 – significantly below than the required upper limit of 4,665
- There was 99.8% adherence by aircraft to departure tracks compared with the Airport's Environmental Noise Directive Noise Action Plan target of 95%

Summary of Reporting Requirements

This report has been prepared to meet the following requirement of the Planning Agreement (the Agreement) between Belfast City Airport and the Department for Infrastructure (the Department) dated 22 July 2019:

Covenant 1.1: To submit the Annual Performance Report by 31st March in each calendar year and within the Annual Performance Report to report on the performance and compliance with the covenants in this Agreement in the preceding calendar year in a form which shall include all the annual reporting requirements contained in this Agreement or as agreed with the Department from time to time and which shall be published on the Company's website.

The report addresses each of these reporting requirements either directly within the sections of this report or by reference to further reports (or sections of these) which are provided as appendices.

Table 1 summarises the current reporting requirements within the covenants of the Agreement.

Table 1 – Reporting Requirements

Covenant Reference	Reporting Requirement Summary
2.4.2	Written details of every delayed aircraft outside of permitted hours and circumstances for any aircraft during extended hours
2.4.3	Written report of the payments into and out of the Community Fund
6.7.1.1	Noise exposure contours for year x-1* based on actual ATM (air traffic movements) data
6.7.1.2	Forecast noise contours for years x and x+1 based on predicted ATM data
6.7.1.3	Composite graphic superimposing contours for year, x-1, x and x+1
6.7.2	Comparison of the area within the 57 dB $L_{Aeq,\ 16h}$ contours for the cases described in 6.7.1.1 and 6.7.1.2 with a 5.2km² area
6.7.3	Total number of ATM by aircraft type and actual modal split (for year x-1) and assumed modal split (for years x and x+1) for the cases described in 6.7.1.1 and 6.7.1.2
6.7.4	Number of monthly and annual ATM and a comparison against 48,000 in any period of twelve months
6.7.6	The Quota for year x-1 and a comparison against 4,665
6.7.7	Record of movements by aircraft types not permitted to use the Aerodrome in year x-1 (i.e. to only accept those which meet the requirements of ICAOC Chap 3, Annex 16 and which are not Marginally Compliant Aircraft)
6.7.8	Record of the use by Aircraft of approaches and climb-outs over Belfast Lough in year x-1
6.7.9	Record of ATM within extended hours and fines administered in year x-1
6.7.10	Log of engine ground runs including time & duration for year x-1
6.7.11	Summary of noise complaints received by the Company, the responses given and the actions taken for year x-1
6.7.12	Review of the degree of adherence to any published noise abatement procedures in operation

6.7.13	Information to verify the accuracy and consistency of the operation of the integrated noise and track keeping system
6.7.14	Evaluation of the data reported including a description of any trends and identification of any relevant features of the Aerodrome operation which may have affected the results
6.7.15	Where the results of the comparison described in 6.7.2 show that the area within the 57 dB $LA_{eq,\ 16h}$ contour of 4.68km2 was exceeded in year x-1 or is likely to be exceeded in year x or x+1, submit (and promptly implement) proposed actions to ensure compliance in year x (and report in the subsequent Annual Performance Report)
6.9	In the Annual Performance Report for 2024, provide data showing the percentage of total arrivals in year x-1 that implemented Continuous Descent Approaches and any agreed improvement
6.11	In the Annual Performance Report for 2024, details of the number and type of departing aircraft breaching the departure noise limits (which are to be introduced by 22 July 2020 along with a mechanism to fine breaches of the limits) and a report of payments into and out of the Community Fund in year x-1
6.12.3	Report regarding compliance with the obligation to ensure the availability of fixed electrical ground power (FEGP) (as described in 6.12 and 6.12.1 to 6.12.2.2 in the Agreement) for year x-1 and agreed actions for improvements (if any) in each Annual Performance Report
7	Include a written report on the operation of a noise insulation scheme

Note *In this report 'year x-1', 'year x' and 'year x+1' refer to 2024, 2025 and 2026, respectively

Reports by Requirement

This section provides a report by each requirement within the Agreement.

Details of every delayed aircraft outside of permitted hours and circumstances for any aircraft during extended hours (Reference 2.4.2)

During 2024, 98.9% of flights operated within permitted hours with only a very small proportion utilising extended hours.

Of the 354 flights which operated during extended hours, 267 (75.4%) were arrivals and 87 (24.6%) were departures. There were 28 instances when extension requests were refused by the Airport.

Details of each delayed aircraft are provided at Appendix 1 - Extensions Log for 2024 Details of IATA codes and descriptions explaining the reasons for flights which operated during extended hours are provided in Appendix 2 – Delay Causes.

Summary of payments into and out of the Community Fund (Reference 2.3.4); Record of ATMs within extended hours and fines administered in year x-1 (Reference 6.7.9)

Belfast City Airport administers a fining mechanism in respect of all delayed aircraft operating during extended hours in accordance with the Agreement, with fines lodged into a Community Fund for investment in local community projects. In 2024 there were 354 ATMs within extended hours (60.7% before 22:00; 5.4% after 23:00) resulting in a total of £90,860 administered fines. Appendix 3 – Extension & Departure Noise Charges for 2024 provides a breakdown of ATM s within extended hours and associated fines administered.

Table 2 shows the payments into the Community Fund in 2024 and the payments out, so far, including a summary of the types of projects receiving funding (in due course as projects are identified further allocations will be made which will meet or exceed the total payments into the Community Fund in 2024).

Table 2 – Community Fund Payments

	£	£
Payments In		
Extensions Jan-Dec		90,860
Extensions over 480		0
Departure Noise Exceedances		2,004
Subtotal		92,864
Payments Out		
Community & Social Inclusion	15,155	
Sports, Health & Wellbeing	6,919	
Sustainability, Equality & Diversity	14,800	
Education; Employability, Skills & Engagement	28,490	
Subtotal		50,209
Balance		42,655

The Planning Agreement requires Belfast City Airport to review the Extension and Departure Noise charges on the fifth anniversary of the Agreement (i.e. 22 July 2024) to account for the effects of general inflation. These charges were reviewed and uplifted with effect from 1 July 2024 (as set out in Appendix 3).

Noise Exposure Contours (Reference 6.7.1.1 to 6.7.1.3)

Under the Planning Agreement, Belfast City Airport is required annually to produce Noise Contours showing the noise exposure on an average summer day (between 16th June and 15th September inclusive) in terms of the LAeq,16h noise indicator at a range of values including 57, 60 and 63 dB. Table 3 shows the area of the 2024, 2025 forecast and 2026 forecast noise contours at values from 54 to 69 dB LAeq,16h in 3 dB steps.

Table 3 – 2024, 2025 and 2026 Noise Contour Areas

Contour Level (dB LAeq,16h)	Area of Daytime Air Noise Contours (km2)			Contour Area Limit (km) ^{2}
	2024	2025	2026	
54	5.86	5.65	6.14	
57	3.09	2.96	3.22	5.20
60	1.60	1.55	1.68	
63	0.89	0.87	0.94	
66	0.51	0.51	0.54	
69	0.31	0.31	0.33	

Under the Agreement, the area enclosed by the 57 dB LAeq,16h contour shall not exceed 5.2km ^{2} is set within the context of a permitted maximum of 48,000 Air Transport Movements (ATMs) per annum.

The areas of the noise contours for 2024 have increased compared to 2023 due to the increase in ATMs. However, the area of the 2024 57 dB LAeq,16h contour area was 3.09 km^2, which is 40.6% smaller than the contour area limit of 5.2 km^2. The contour areas remain smaller than in 2019, when the 57dB LAeq,16h contour area was 3.3 km^2.

Looking ahead, the 57dB LAeq,16h noise contour is forecast to remain below the contour area limit in both 2025 and 2026.

The Noise Contours are discussed in Section 4 and shown in tables 4 to 8 of the report prepared by Bickerdike Allen Partners on behalf of Belfast City Airport, provided at Appendix 4 – Bickerdike Allen Partners Report 2024.

Comparison of the area within the 57 dB LAeq, 16h contours for the cases described in 6.7.1.1 and 6.7.1.2 with a 5.2km ^{2} area (Reference 6.7.2)

Table 4 shows a comparison of the area within the 57 dB LAeq,16h contour with a 5.2 km ^{2} area for 2024 with forecasts for 2025 and 2026. Further details are provided in Section 4 of Bickerdike Allen Partners Report 2024 (Appendix 4).

Table 4 – Area of the 57 dB LAeq,16h contour compared with a 5.2km2 area

Contour Level (dB LAeq,16h)	Area of Daytime Air Noise Contours (km2)			Contour Area Limit (km)2
	2024	2025 (forecast)	2026 (forecast)	
57	3.09	2.96	3.22	5.2

Total number of ATMs by aircraft type and actual modal split (for year x-1) and assumed modal split (for years x and x+1) for the cases described in 6.7.1.1 and 6.7.1.2 (Reference 6.7.3)

Total number of ATM by aircraft type for the cases described in 6.7.1.1 and 6.7.1.2 is provided below in Table 5.

Table 5 – Total number of ATM by aircraft type

Aircraft Type	INM Type(s)	Summer Fixed Wing Movements		
		2024 Actual	2025 Forecast	2026 Forecast
Airbus A319ceo	A319-131(1)	1,365	980	1,051
Airbus A320ceo	A320-211(1)	801	792	838
Airbus A320neo	A320-211(1)	472	515	537
ATR 42	DO328	134	118	118
ATR 72	DO328/DHC6(1)	4,321	4,195	4,689
Cessna Citation Excel	CNA560XL	37	n/a	n/a
Dassault Falcon 2000	CL600	13	n/a	n/a
Embraer E145	EMB145	170	164	164
Embraer E175	EMB175/737500(1)	54	n/a	n/a
Embraer E190	EMB190(1)	641	830	939
Embraer Legacy 500	CNA55B	18	n/a	n/a
Embraer Phenom 300	CNA510	14	n/a	n/a
Other (less than 10 movements)	Various	164	276	302
Total (2)		8,204	7,870	8,638

(1) INM type modified based on results of a validation exercise.
(2) Forecast totals may not match due to rounding.

The term ‘modal split’ refers to the split of movements by runway – at Belfast City Airport this is between Runway 04 (c 040º bearing) and Runway 22 (c 220º bearing). This is generally determined by wind direction as aircraft will take off and land into a headwind to maximise lift - so variation is likely between individual years.

Table 6 shows the actual modal split for 2024 and the long-term average summer modal split for 2020-2024. The actual modal split and the long-term average modal split were used in determining the 2024 contour and the forecast contours respectively, as discussed in Section 3.2 of Bickerdike Allen Partners Report 2024 (Appendix 4).

Table 6 – 2024 and Long-Term Average Summer Modal Split

Runway	% of Summer Movements			
	2024		2020-2024 Average	
	Arrivals	Departures	Arrivals	Departures
04	30%	31%	36%	40%
22	70%	69%	64%	60%

Number of monthly and annual ATM and a comparison against 48,000 in any period of twelve months (Reference 6.7.4)

Table 7 shows the monthly ATM in 2023 and 2024 along with the rolling 12-month total from January 2024 onwards – which remained lower than the upper limit of 48,000 movements.

Table 7 – Rolling 12 Month ATM

ATM 2023		ATM 2024		Rolling 12 month ATM
Jan-23	2,554	Jan-24	2,116	29,037
Feb-23	2,031	Feb-24	2,245	29,333
Mar-23	2,248	Mar-24	2,619	29,782
Apr-23	2,409	Apr-24	2,519	29,928
May-23	2,505	May-24	2,736	30,161
Jun-23	2,500	Jun-24	2,663	30,339
Jul-23	2,707	Jul-24	2,747	30,414
Aug-23	2,572	Aug-24	2,774	30,591
Sep-23	2,525	Sep-24	2,624	30,669
Oct-23	2,634	Oct-24	2,602	30,648
Nov-23	2,517	Nov-24	2,356	30,530
Dec-23	2,580	Dec-24	2,367	30,368

The Quota for year x-1 and a comparison against 4,665 (Reference 6.7.6)

The Quota Count total for the Quota Period 2024 was 1,549.1, which is lower than the upper limit of 4,665. Details of how the Quota Count has been calculated are provided in Table 9: Summer 2024 Quota Count in Section 5 of Bickerdike Allen Partners Report 2024 (Appendix 4) including details of how the Quota Count has been calculated.

Record of movements by aircraft types not permitted to use the Aerodrome in year x-1 (Reference 6.7.7)

In 2024 there were no movements of aircraft that did not meet the requirements of ICAO Chapter 3, Annex 16 or are only marginally compliant. Details are provided in Section 6 of Bickerdike Allen Partners Report 2024 (Appendix 4).

Record of the use by Aircraft of approaches and climb-outs over Belfast Lough in year x-1 (Reference 6.7.8)

The Agreement requires Belfast City Airport to maintain a bias in favour of approaches and climb-outs by aircraft over Belfast Lough (the 'Lough Bias'). Whilst direction of approach/climb-out is generally determined by wind direction, Air Traffic Control aims to maximise additional opportunities to direct aircraft over Belfast Lough (for example during light wind conditions, if safe to do so) i.e. departure using runway 04 and arrival using runway 22. Table 8 shows the number of arrivals and departures over both the City and Belfast Lough throughout 2024. There were 15,589 movements over the Lough from a total of 30,368 movements. On average over the year, 51% of movements were over the Lough, so a bias in favour of arrivals and departures over Belfast Lough was maintained, in compliance with the Agreement.

Table 8 – Arrivals and Departures over the City and Belfast Lough (2024)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Arrivals over City (04*)	312	211	545	600	800	523	544	59	757	242	118	219	**4,930**
Departures over City (22)	736	888	730	635	505	786	837	1,304	506	1,020	998	904	**9,849**
Total over City	1,048	1,099	1,275	1,235	1,305	1,309	1,381	1,363	1,263	1,262	1,116	1,123	**14,779**
Arrivals over Lough (22)	744	912	763	659	568	809	829	1,329	554	1,058	1,060	966	**10,251**
Departures over Lough (04)	324	234	581	625	863	545	537	82	807	282	180	278	**5,338**
Total over Lough	1,068	1,146	1,344	1,284	1,431	1,354	1,366	1,411	1,361	1,340	1,240	1,244	**15,589**
Total ATMs	2,116	2,245	2,619	2,519	2,736	2,663	2,747	2,774	2,624	2,602	2,356	2,367	**30,368**
Percentage over Lough	50%	51%	51%	51%	52%	51%	50%	51%	52%	51%	53%	53%	**2024 average 51%**

*Runway in use

Log of engine ground runs including time & duration for year x-1 (Reference 6.7.10)

Belfast City Airport operates restrictions on engine ground runs. These are prohibited between 22:30 and 06:00 and require prior approval by Airfield Operations, with further restrictions in place according to location and the power level of runs. All engine ground runs in 2024 complied with these requirements. Details of engine ground run requirements are provided in Appendix 5 – AOI-07 Aircraft Engine Ground Running and Use of Auxiliary Power Units and Ground Power Units. A log of engine ground runs is provided at Appendix 6 – Engine Run Log 2024.

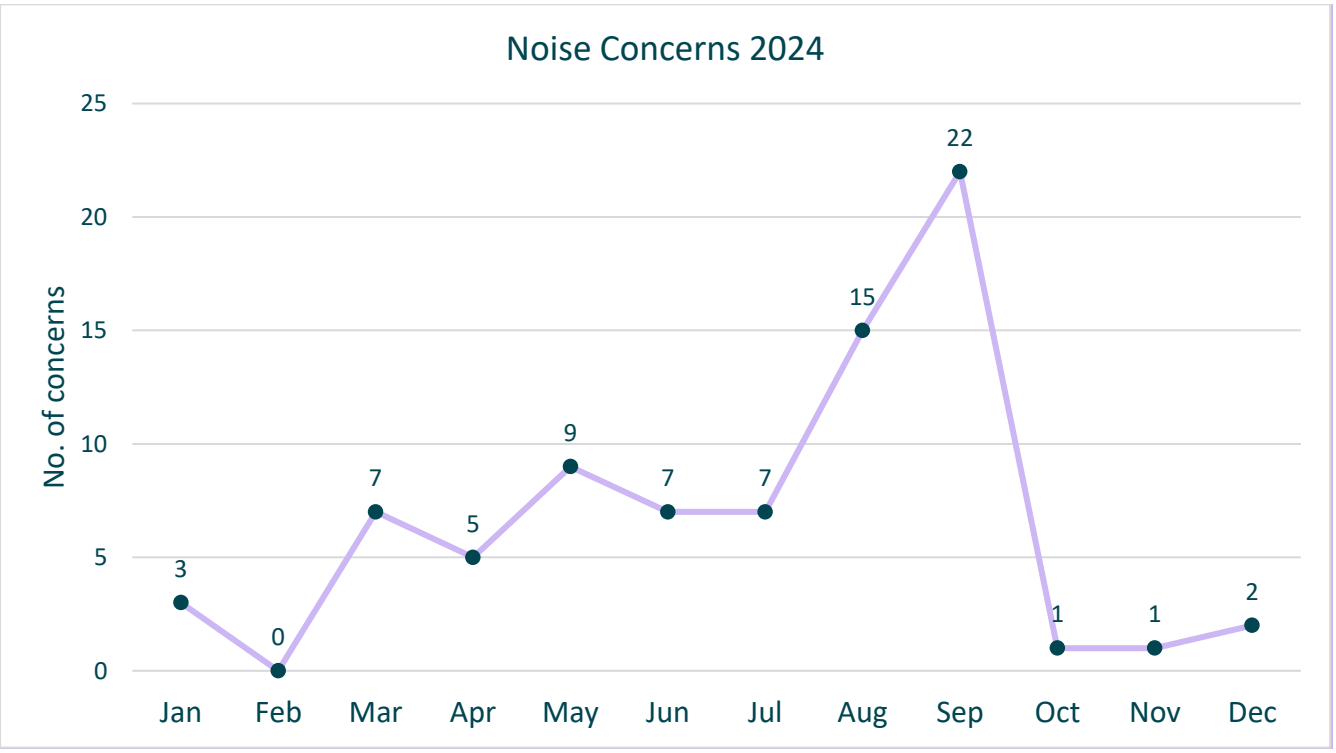
Summary of noise complaints received by the Company, the responses given and the actions taken for year x-1 (Reference 6.7.11)

A summary of noise concerns logged in 2024 is provided at Appendix 7 – Noise Concerns Summary 2024. All noise concerns received are responded to by letter, email or telephone, as far as possible within 15 working days. This target was achieved for all noise concerns received in 2024.

Various responses are provided according to the nature of the concern lodged. In the case of general queries, information on the procedures and standards applied at the airport will be provided. In the case of concerns relating to specific noise events, the results of investigation will be provided. In the case of concerns relating to movements during

extended hours, our response will include reference to the relevant requirements of our Planning Agreement and to the guidance issued by the Department for Infrastructure relating to extensions.

In 2024, there were a total of 79 complaints made (equating to 2.6 complaints per 1,000 flights). 65% of concerns were received from June to September and 46% of the total concerns throughout the year were associated with flights within extended hours. 37% of the total concerns were associated with track keeping. 47% of all concerns were raised by three individuals, with one accounting for 24%. All track keeping concerns are investigated by the Environment Team and action is taken where necessary including dialogue with airlines to ensure effective implementation of the noise abatement procedures in place at the aerodrome. The chart below shows the monthly distribution of concerns in 2024.



Review of the degree of adherence to any published noise abatement procedures in operation (Reference 6.7.12)

Belfast City Airport's noise abatement procedures are published at https://www.aurora.nats.co.uk/htmlAIP/Publications/2020-01-30-AIRAC/html/eAIP/EG-AD-2.EGAC-en-GB.html#AD-2.EGAC. These determine specific tracks to be flown by aircraft on departure/arrival to minimise the impact of noise on local populations. Whilst the incidence of track deviation is relatively low, in certain situations adherence may prove problematic, for example in poor weather conditions. Belfast City Airport reports track deviations to Airlines on a monthly basis. The Airport maintains dialogue with Airline

representatives, with the aim of minimising the number of occurrences, investigating the reasons for these and providing guidance on the noise abatement procedures including materials for use by flight crew.

Table 9 summarises the limited number of track deviations in 2024.

Table 9 – Track Deviations

Runway	A / D	Number Flights	Number Track Deviations	Percentage
04	D	5338	54	1.0%
04	A	4930	0	0.0%
22	D	9849	8	0.1%
22	A	10251	2	0.0%
Total		**30368**	**64**	**0.21%**

Information to verify the accuracy and consistency of the operation of the integrated noise and track keeping system (Reference 6.7.13)

Belfast City Airport operates a Noise & Flight Track Monitoring System which provides ongoing data on aircraft movements including noise levels and tracks flown. A maintenance and support contract is in place with Topsonic Systemhaus GmbH. This includes a daily preventative maintenance programme incorporating remote system checks on data transmission, completeness, process and storage. Third-party calibration of microphones and monitoring equipment is conducted on a two-yearly basis. A record of current equipment calibration status is provided at Appendix 8 – Calibration Records 2024.

Evaluation of the data reported including a description of any trends and identification of any relevant features of the Aerodrome operation which may have affected the results (Reference 6.7.14)

Belfast City Airport has fully complied with the requirements of the Agreement during 2024.

The Airport has continued to provide bi-monthly performance reports to the Department since the Agreement came into effect in July 2019, including details of delayed aircraft using the aerodrome in extended hours and the circumstances for use. The following summarises key data and trends:

- In 2024, movements totalled 30,368 compared with 29,404 in 2023.
- In 2024, delayed flights after 21:30 constituted 1.2% of all movements (compared with 1.18% in 2023).

- In 2024, 91% of delays after 21:30 were due to the late arrival of aircraft from another flight or previous sector.
- The size of the 57 dB LAeq, 16h noise contour area in 2024 was 3.09 km^2, an increase of 0.18 km^2 from 2.91 km^2 in 2023. This can be attributed to a change in fleet mix, with an increase in the use of passenger jets.
- The Quota Count total for summer 2024 was 1,549.1- an increase from 1,446.5 in 2023 but remaining lower than the 2019 total of 2,216.375.
- On average, 79% of arrivals in 2024 implemented CDA compared with 78% in 2023.

Where the results of the comparison described in 6.7.2 show that the area within the 57 dB LAeq, 16h contour of 4.68km2 was exceeded in year x-1 or is likely to be exceeded in year x or x+1, submit (and promptly implement) proposed actions to ensure compliance in year x (and report in the subsequent Annual Performance Report) (Reference 6.7.15)

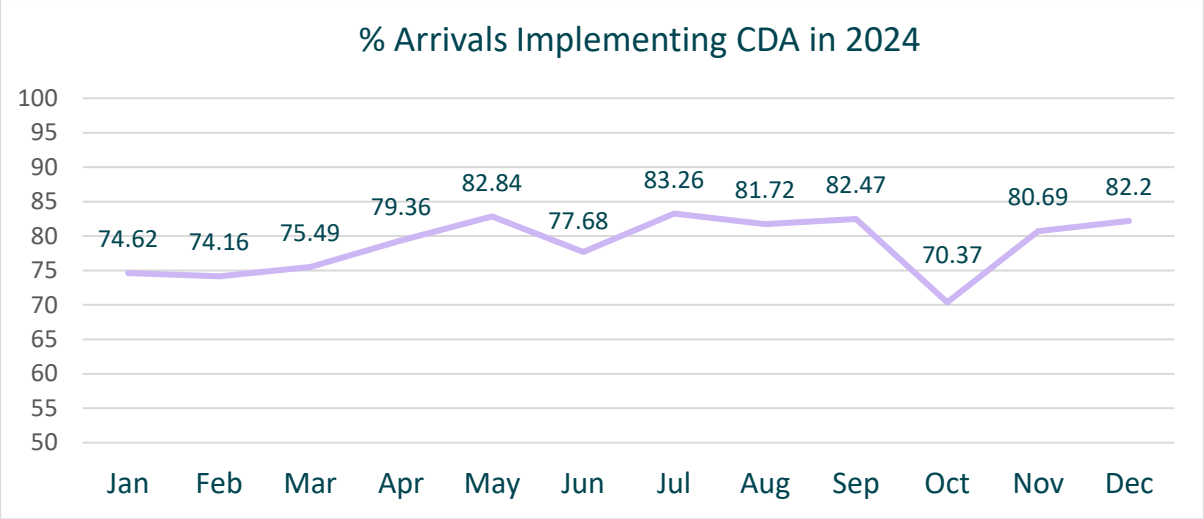
The area within the 57 dB LAeq, 16h contour of 4.68km^2 was not exceeded in 2024 and is not forecasted to be exceeded in years 2025 or 2026. The areas of the 57 dB LAeq, 16h 2024 contour and forecasted 2025 and 2026 contours are shown in Table 4 (above).

In the Annual Performance Report for 2024, provide data showing the percentage of total arrivals in year x-1 that implemented Continuous Descent Approaches and any agreed improvement (Reference 6.9)

Continuous Descent Approach (CDA) is an operating technique in which arriving aircraft follow a constant-angle descent (rather than a series of steps) in order to reduce noise and fuel consumption.

The chart below shows the percentage of arrivals implementing Continuous Descent Approaches by month. On average, 79% of arrivals in 2024 implemented CDA (up from 78% in 2023). Variation in CDA performance is due to a range of factors including weather, air traffic conditions and crew experience.

Subject to safety constraints and the operational requirements of individual aircraft, the Airport will continue to maximise implementation of CDA.



Data provided by NATS (Air Traffic Control provider at Belfast City Airport)

In the Annual Performance Report for 2024, details of the number and type of departing aircraft breaching the departure noise limits and a report of payments into and out of the Community Fund in year x-1 (Reference 6.11)

Departure noise limits are set to encourage improved performance by airlines in how aircraft are flown to minimise noise impact. The following departure noise limits are in place at Belfast City Airport:

83dB LAsmax for aircraft departing towards the city and 87dB LAsmax for aircraft departing towards Belfast Lough (as measured by the Airport's noise monitoring terminals).

Any breaches of these noise limits are identified through the Airport's Noise and Track Monitoring System. During 2024, there were three breaches of the departure noise limit. All three exceedances were departures from runway 22 by Embraer E190 aircraft. In June, there was an exceedance of 0.1 dB. In November, there were two exceedances, one of 0.9 dB and the other 0.8 dB.

As outlined in Section 2.4.3, Departure Noise charges were reviewed on the fifth anniversary of the Agreement and uplifted to account for the effects of general inflation with effect from 1 July 2024 (as set out in Appendix 3).

In compliance with the requirements of the Planning Agreement, work commenced in 2024 to review the Departure Noise limits (the review is ongoing in conjunction with the Department).

Compliance with the obligation to ensure the availability of fixed electrical ground power (FEGP) (as described in

6.12 and 6.12.1 to 6.12.2.2 in the Agreement) for year x-1 and agreed actions for improvements (if any) in each Annual Performance Report (Reference 6.12.3)

All stands at Belfast City Airport are equipped with FEGP. In 2024, 98% of flights overall used FEGP. Occasions when FEGP was not used were due to the following: aircraft parked in non-standard positions due to weather (whilst operational and available for use at the stand, FEGP equipment in these cases could not reach due to aircraft orientation) and maintenance.

FEGP at Belfast City Airport is subject to an ongoing maintenance regime aimed at achieving maximum serviceability.

Summary of requirement for a noise insulation scheme

At present, no residential dwellings are affected by the level of noise at which a noise insulation scheme must be implemented (ie as defined by the 63 dB LAeq, 16h contour). For this reason, the scheme is not yet operating.

Glossary

The following provides a glossary of key terms used in the report:

Term	Explanation
ATM	Air Traffic Movements ie individual instances of departure and arrival
Community Fund	The fund into which fines imposed as penalties for delays and departure noise exceedances are paid. The money is used to fund local community-based projects
Continuous Descent Approach (CDA)	An operating technique in which arriving aircraft follow a constant-angle descent (rather than a series of steps) in order to reduce noise and fuel consumption
Extended Hours/Extension	The period from 21:31 to 23:59 during which extensions may be granted under exceptional circumstances
FEGP	Fixed Electrical Ground Power – a system into which aircraft can directly connect for power whilst parked. Eliminates noise and emissions arising from the use of traditional diesel-powered GPUs (mobile Ground Power Units) and on-board APUs (Auxiliary Power Units)
ICAO Chapter 3, Annex 16	Noise standards set out in the Convention on International Civil Aviation (which jet aircraft must meet if operating at Belfast City Airport)

Lough Bias	Bias in favour of movements over Belfast Lough (as opposed to over the City) in order to minimise community noise impact
Modal Split	The split of movements by runway – this is between Runway 04 (c 040° bearing) and Runway 22 (c 220° bearing)
Noise Abatement Procedure (NAP)	Instructions followed by departing/arriving aircraft requiring specified tracks to be flown in order to minimise noise nuisance
Noise and Track Monitoring System	A system combining information from recorded noise events, radar tracks, and flight schedules to provide data used in generating noise contours and reporting on noise exceedances and track deviations
Noise Contour	Line drawn on a map which represents an area inside which noise levels exceed a given threshold. Under the Planning Agreement, the area enclosed by the 57 dB LAeq 16h contour must not exceed 5.2 square kilometres. This contour is determined from data relating to ATM during the period from 16th June to 15th September each year
Permitted Hours	The period between the hours of 06:30 and 09:30 pm local time
Quota/Quota Count	Each aircraft type is assigned a quota count - a numerical value based on the level of noise it produces during take-off and landing. The Quota is the totalled quota count values for all ATMs during a given period. At Belfast City Airport the Quota is limited to 4,665 during the period from 16th June to 15th September

Appendices

Appendix 1 – Extensions Log for 2024

Appendix 2 – Delay Causes

Appendix 3 – Extension & Departure Noise Charges for 2024

Appendix 4 – Bickerdike Allen Partners Report 2024

Appendix 5 – AOI-07 Aircraft Ground Running and Use of Auxiliary Power Units and Ground Power Units

Appendix 6 – Engine Run Log 2024

Appendix 7 – Noise Concerns Summary 2024

Appendix 8 – Calibration Records 2024

z	Airline Code	Sch Time	Actual Time	Delay Time (mins)	Arr / Dep	Registration	Flight #	Airport	Runway	Delay code 1	Description 1	Delay code 2	Description 2
01-Jan-24	EI	20:25	22:47	142	A	GCMJL	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due a tech delay on a previous sector
01-Jan-24	EI	21:00	21:58	58	A	GCMJN	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to a tech delay ex BHD on the previous sector
01-Jan-24	EI	21:15	22:02	47	A	GCMMN	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
02-Jan-24	BA	18:35			A	GNEOY	1420	LHR			due to adverse weather at LHR (storm Henk) the departing flight as per below would not have departed before our curfew so was cancelled		
02-Jan-24	BA	19:20			D	GNEOY	1421	LHR			due to adverse weather AT LHR (storm Henk) / severe ATC delays so this flight couldnt have departed before our curfew so was cancelled		
03-Jan-24	EI	21:15	22:09	54	A	GCMMN	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an aircraft change for tech reasons
08-Jan-24	EI	20:30	21:40	70	A	GCMJM	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
08-Jan-24	EI	21:15	22:46	91	A	GCMMN	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH ISSUE
10-Jan-24	EI	21:15	21:40	25	A	GCMJL	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
11-Jan-24	EI	21:15	21:59	44	A	GCMJM	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	earlier tech issues and aircraft changes
11-Jan-24	EI	21:00			A	GCMMK	3619	MAN			delayed due to tech issues and aircraft changes / refused as eta is after 2300		
21-Jan-24	EZY	20:20	22:46	146	D	GEZBJ	644	LTN		81	ATFM due to ATC EN-ROUTE DEMAND/CAPACITY, standard demand/capacity problems	72	Storm Isha
22-Jan-24	BA	20:25	21:32	67	A	GLCYT	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Tech issue dept LCY
22-Jan-24	EI	21:00	21:42	42	A	GCMMN	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Tech issue earlier in day on EI3656
22-Jan-24	EI	21:10	22:07	57	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	63	Late paperwork from Cpt on EI3658
23-Jan-24	EI	21:15	21:55	40	A	GCMMK	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	A/C swap due tech on EI3628
24-Jan-24	EI	21:10	21:33	23	A	GCMMK	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	A/C to accom pax from cx GLA
25-Jan-24	EI	20:25	21:33	68	A	GCMMN	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	95/47	CREW ROTATION / LACK OF AIRCRAFT DUE TECH ISSUES
25-Jan-24	EI	21:15	22:11	56	A	GCMJL	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	95/47	CREW ROTATION / LACK OF AIRCRAFT DUE TECH ISSUES
25-Jan-24	EI	20:30	22:39	129	A	GCMMK	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	95/47	CREW ROTATION / LACK OF AIRCRAFT DUE TECH ISSUES
26-Jan-24	EI	21:15	22:30	75	A	GCMMK	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	47	LACK OF AIRCRAFT DUE TECH ISSUES
28-Jan-24	EI	21:15	22:37	82	A	GCMJN	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	47	LACK OF AIRCRAFT DUE TECH ISSUES
31-Jan-24	EI	21:00	21:49	49	A	GCMJM	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		earlier tech issues
02-Feb-24	EI	20:30			A	GCMMK	3649	BHX			delayed due to tech issues and aircraft changes / refused as eta is after 2300		
02-Feb-24	EI	21:00			A	GCMJN	3619	MAN			delayed due to tech issues and aircraft changes / refused as eta is after 2300		
02-Feb-24	EI	21:15			A	GCMMN	3629	GLA			delayed due to tech issues and aircraft changes / refused as eta is after 2300		
02-Feb-24	EI	19:10	21:40	150	D	GCMMN	3628	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react delay due to earlier tech issues / then further 1 hour delay - acft change due to tech issues
02-Feb-24	EI	21:10	21:36	26	A	GCMJM	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	due to earlier tech issues and aircraft changes
08-Feb-24	EI	20:30			A	GCMJM	3649	BHX			delayed due to earlier weather issues but eta was after 2300 so diverted to BFS		
08-Feb-24	EI	21:10	21:44	34	A	GCMJN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		earlier tech issues
09-Feb-24	EI	15:45	22:07	382	D	GCMJN	3646	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	tech issues and aircraft changes
09-Feb-24	EI	18:00	22:22	262	D	GCMMK	3688	EMA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	tech issues and aircraft changes
09-Feb-24	EI	17:35	21:54	259	A	GCMMN	3657	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	tech issues and aircraft changes
09-Feb-24	EI	12:50	22:18	568	A	GCMJM	3613	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	tech issues and aircraft changes
09-Feb-24	EI	18:45			A	GCMJN	3647	BHX			delayed due to tech issues and aircraft changes / refused as eta is after 2300		
09-Feb-24	EI	21:00			A	GCMMK	3689	EMA			delayed due to tech issues and aircraft changes / refused as eta is after 2300		
11-Feb-24	EI	21:00	21:37	37	A	GCMMT	3689	EMA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react due earlier weather issues
11-Feb-24	EI	21:00	21:32	32	A	GCMMN	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	the aircraft was off stand at 2015 but not airborne until 2047 / had earlier been delayed due to weather
18-Feb-24	EI				D	GCMJN	701P	DUB			Emerald had requested a departure time of 2230 for an engineering flight but refused as etd was		
18-Feb-24	EI				D	EIGZV	401P	DUB			the aircraft was needed in DUB following its arrival from LBA but the etd was after 2130 so the		
26-Feb-24	BA	20:35	22:17	102	A	GEUUG	1422	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC delays earlier at LHR
28-Feb-24	EI	21:15	22:18	63	A	GCMMT	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due earlier tech issue and aircraft change at BHD
29-Feb-24	EI	21:15	21:33	18	A	GCMJM	3629	GLA		65	FLIGHT DECK CREW SPECIAL REQUEST, not within operational requirements	93	REAC
01-Mar-24	EI	21:00	21:44	44	A	GCMJM	3689	EMA		19	REDUCED MOBILITY, boarding / deboarding of passengers with reduced mobility.	93	REAC
04-Mar-24	EI	21:00	22:00	60	A	GCMMT	3619	MAN		82	ATFM due to ATC EQUIPMENT	82	server down in Swanick
04-Mar-24	EI	21:00	22:07	67	A	GCMMK	3689	EMA		82	ATFM due to ATC EQUIPMENT	82	server down in Swanick
04-Mar-24	EI	21:10	22:19	69	A	GCMJL	3659	EDI		82	ATFM due to ATC EQUIPMENT	82	server down in Swanick
04-Mar-24	EI	21:15	21:38	23	A	GCMJM	3629	GLA		82	ATFM due to ATC EQUIPMENT	82	server down in Swanick
07-Mar-24	EI	21:00	21:46	46	A	GCMJL	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an earlier aircraft change at BHD due to tech issues
08-Mar-24	EI	21:00	21:38	38	A	GCMMK	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an earlier aircraft change at BHD due to tech issues
08-Mar-24	EI	21:15	22:31	76	A	GCMJL	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an earlier aircraft change at BHD due to tech issues
10-Mar-24	EZY	20:35	21:45	70	A	GUZLV	805	LGW		46	aircraft change due to technical issues		
10-Mar-24	EI	21:15	22:28	73	A	GCMJM	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to tech issues and aircraft changes
10-Mar-24	BA	20:35	21:50	75	A	GEUUJ	1422	LHR		64	awaiting replacement captain to operate the flight		the captain who was to operate had to be stood down due to compassionate reasons
14-Mar-24	EI	21:15	21:39	24	A	GCMJJ	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
24-Mar-24	EI	20:30	21:59	89	A	GCMMT	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	AIRCRAFT HAD TECH ISSUE AT BHX
25-Mar-24	EI	20:25	22:12	107	A	GCMMK	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
25-Mar-24	EI	21:15			A	GCMMN	3629	GLA			delayed due to tech issues and aircraft changes / refused as eta is after 2300		diverted to DUB
26-Mar-24	EI	21:10	21:47	37	A	GCMJJ	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to a tech delay ex BHD on previous sector
26-Mar-24	EI	21:15	21:52	37	A	GCMMT	3629	GLA		72	would have landed at 2130 but had a go around due to crosswinds	10	landed at second attempt
28-Mar-24	EI	21:15	21:51	36	A	GCMMT	3629	GLA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		Tech issue and checkin error on EI3628 41/13/0015/0010
03-Apr-24	EI	21:00	21:45	45	A	GCMJN	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
05-Apr-24	EI	17:40	21:47	247	A	GCMJJ	3657	EDI		41	tech delay in EDI		
07-Apr-24	EZY	20:40	21:36	56	D	GEZDM	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		earlier ATC delay on a previous sector
07-Apr-24	EI	21:00	22:06	66	A	GCMJJ	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
07-Apr-24	EI	21:10	21:45	35	A	GCMJN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
08-Apr-24	EI	21:10	22:55	105	A	GCMMN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH ISSUES THRU DAY
09-Apr-24	EI	20:50	21:55	65	A	GCMJJ	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
12-Apr-24	EI	21:10	22:22	72	A	EIFAT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
12-Apr-24	EI	20:55	21:47	52	A	GCMJJ	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
14-Apr-24	EI	17:40	21:52	252	A	GCMJJ	3657	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech in EDI and awaiting engineers
15-Apr-24	EI	21:10	22:04	54	A	GCMMK	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech and required checks
15-Apr-24	EZY	20:35	21:35	60	D	GEJCF	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	63	flight deck procedures after doors closed
15-Apr-24	EI	18:05	21:37	212	D	EIGZV	3678	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	awaiting pos a/c from DUB for previous sectors
15-Apr-24	EI	21:00	22:00	60	A	GCMJJ	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	31	lack of GH staff in SOU
16-Apr-24	EI	19:55	22:44	169	A	EIGPP	3639	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	sec alert in BHX resulting in airport closed
16-Apr-24	BA	20:45	21:52	67	A	GEUUL	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	a/c swap in LHR due to lightening strike
16-Apr-24	EI	20:55	21:56	61	A	GCMMK	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	sec alert in BHX resulting in airport closed and backlog
16-Apr-24	EI	21:10	22:36	86	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	prev sector pos from EMA due to divert due BHX closed
16-Apr-24	EI	16:55	23:17	382	D	EIGPP	3638	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	sec alert in BHX resulting in airport closed and backlog. awaiting avail aicraft to operate
18-Apr-24	EI	21:10	21:57	47	A	GCMJM	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech issue on earlier sector

z	Airline Code	Sch Time	Actual Time	Delay Time (mins)	Arr / Dep	Registration	Flight #	Airport	Runway	Delay code 1	Description 1	Delay code 2	Description 2
18-Apr-24	EI	20:50	22:26	96	A	EIGZV	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
19-Apr-24	EI	20:55	21:50	55	A	GCMJJ	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech issue on earlier sector
19-Apr-24	EI	21:10	21:55	45	A	GCMJM	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech issue on earlier sector
19-Apr-24	BA	20:40	21:45	65	A	GEUPU	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech issue on earlier sector
23-Apr-24	EI	21:10	21:42	32	A	GCMMN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		earlier tech issues at BHD
24-Apr-24	EI	19:55	21:48	113	A	EIGPP	3639	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		earlier tech delay at BHD
25-Apr-24	EI	20:50	22:20	90	A	GCMJM	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	a/c swap due tech aircraft in fleet
28-Apr-24	BA	20:40			A	GDBCA	1426	LHR			BA ops initially request ext to 22:30 due AOG in LHR. Following further issues it was decided to		
28-Apr-24	EI	20:55	21:36	41	A	GCMMN	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	a/c swap due tech aircraft in fleet (GCMMK)
28-Apr-24	EI	21:10	22:38	88	A	GCMJM	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	a/c swap due operational reasons for tech a/c
02-May-24	BA	20:45	21:38	53	A	GEUUV	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier ATC delays due to thunderstorm activity
03-May-24	BA	20:05	21:31	86	D	GEUUL	1425	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier ATC delays due to thunderstorm activity
03-May-24	EZY	20:45	22:10	85	D	GUZLD	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an earlier aircraft change for operational reasons
05-May-24	EI	21:10	22:04	54	A	GCMMN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due an aircraft change required at BHD on the previous sector due to tech issues
08-May-24	EI	20:50	22:40	110	A	GCMMK	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	AIRCRAFT SWOP DUE TECH ISSUES / EARLIER LOCAL SBY
09-May-24	EZY	20:30	22:12	102	D	GEZDN	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		flt deck training, slow turnaround in LGW
11-May-24	EI	16:25	21:32	307	A	GCMJL	3647	BHX		51	A/C damaged during turnaround in BHX		
12-May-24	EI	21:00	21:46	46	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
12-May-24	EZY	20:45	21:31	46	D	GEZTB	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
20-May-24	BA	15:25	22:37	432	D	GEUYL	1417	LHR		46	aircraft change required due to tech issues		
21-May-24	BA	20:45	21:31	46	A	GEUPO	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	due to earlier ATC delays at LHR
22-May-24	BA	20:20	21:45	85	A	GLCYK	8758	LCY		46	aircraft change required at LCY due to tech issues		
23-May-24	EI	19:55	21:34	99	A	GCMJJ	3639	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
23-May-24	EZY	20:30	21:37	67	D	GEZGI	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	63	CREW PROCEDURE BAGGAGE DISCREPANCY AT BHD
23-May-24	EI	21:10	21:53	43	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	AIRCRAFT CHANGE
24-May-24	EI	21:10	22:38	88	A	GCMMK	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
26-May-24	EZY	20:45	21:59	74	A	GEZAU	893	LGW		93	AIRCRAFT ROTATION	81	SLOT DELAYS THRU AFTERNOON LONDON AREA
26-May-24	BA	21:15	21:34	19	A	GLCAG	8758	LCY		93	AIRCRAFT ROTATION	81	SLOT DELAYS THRU AFTERNOON LONDON AREA
28-May-24	EI	18:50	21:36	166	D	GCMMK	3658	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Long tech delay on earlier GLA sector, then a/c did GLA - BHX/ BHX - BHD/ BHD -EDI / EDI - BHD
28-May-24	EI	21:10	23:33	143	A	GCMMK	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Long tech delay on earlier GLA sector, then a/c did GLA - BHX/ BHX - BHD/ BHD -EDI / EDI - BHD
29-May-24	BA	20:40	21:50	70	A	GEUUK	1426	LHR		92	awaiting flight deck crew in LHR		
30-May-24	BA	20:45	22:32	107	A	GEUYX	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC delays at LHR
30-May-24	EI	20:55	21:39	44	A	GCMJJ	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to ealier tech issues
30-May-24	EI	20:55	21:32	37	A	GCMMK	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to an earlier ground handling delay
01-Jun-24	EZY	20:45	21:49	64	A	GEZBI	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due earlier ATC slot delays at LGW
02-Jun-24	EZY	20:00	21:48	108	A	GEJCJ	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	86	react due congestion at LGW + sickness on the aircraft from the previous sector
02-Jun-24	EZY	20:30	22:33	123	D	GEJCJ	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	86	react due to the above
02-Jun-24	EZY	20:45	21:39	54	A	GEZBT	893	LGW		89	due to congestion at LGW		
02-Jun-24	BA	21:15	21:31	16	A	GLCYL	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to earlier ATC delays at LCY
02-Jun-24	EI	21:10	22:38	88	A	GCMMN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to an earlier tech delay at BHD
06-Jun-24	EI	21:10	21:35	25	A	GCMMK	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	19	react due to a ground handling delay (PRM) on a previous sector
07-Jun-24	BA	20:20	21:53	93	A	GLCYP	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to ealier tech issues in fleet
07-Jun-24	BA	21:00	21:50	50	A	GLCYU	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to ealier tech issues in fleet
09-Jun-24	EZY	20:45	21:36	51	A	GEZBU	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due ATC delays on a previuos sector
09-Jun-24	EI	21:10	23:36	146	A	GCMJN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due an aircraft change required at BHD on the previous sector due to tech issues / the original aircraft had
10-Jun-24	EZY	20:15	21:31	76	D	GUZHO	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	83	Slot restrictions on previous sectors
13-Jun-24	EI	18:25			A	GCMJM	3645	BHX		41	Refused as no definite arrival time tech issues at BHX - Due after midnight		
13-Jun-24	EI	20:55	21:48	53	A	GCMJJ	3679	LBA		93	LIAC DUE EARLIER TECH + AIRCRAFT SWOP		
13-Jun-24	EI	21:10	23:03	113	A	GCMJN	3659	EDI		93	LIAC DUE EARLIER TECH + AIRCRAFT SWOP		
14-Jun-24	EI	21:00	21:38	38	A	GCMJN	3607	SOU		93	LIAC DUE EARLIER A/C SWOP - TECH ISSUES		
14-Jun-24	EZY	20:30	21:46	76	D	GEZFI	804	LGW		93	LIAC DUE DELAYS EARLIER IN DAY		
15-Jun-24			21:37	0	A					99	Emergency arrival of Coastguard helicopter with injured patient for transfer to NIAS		
15-Jun-24	EZY	20:30	21:40	70	D	GEZGJ	804	LGW		93	LIAC DUE DELAYS EARLIER IN DAY		
15-Jun-24	BACF	20:40	22:01	81	A	GLCYM	4526	REU		93	LIAC DUE LATE SLOTS THRU AFTERNOON		
15-Jun-24	BA	20:45	21:57	72	A	GEUUY	1426	LHR		93	LIAC DUE LATE SLOTS THRU AFTERNOON		
15-Jun-24			22:20	0	D					99	Departure of Coastguard helicopter following emergency transfer of injured patient to NIAS		
16-Jun-24	BA	20:40	21:32	52	A	GEUPD	1426	LHR		93	LIAC DUE LATE SLOTS THRU AFTERNOON		
17-Jun-24	EZY	20:45	21:47	62	A	GEZBV	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to earlier ATC slot delay on the previous sector
17-Jun-24	EI	21:10	21:41	31	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due an ground handling delay on a previous sector
18-Jun-24	EZY	20:30	21:41	71	D	GEZDF	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	react due to adverse weather on a previous sector
20-Jun-24	EZY	20:30	21:55	85	D	GEZUC	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	
21-Jun-24	EZY	20:30	21:48	78	D	GEZGO	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC Slot restriction in LGW
22-Jun-24	EZY	20:30	21:41	71	D	GEZFR	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	19	delayed PRM assistance in LGW / accom WCHR pax
23-Jun-24	EZY	20:15	21:31	76	A	GEZTG	723	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	87	power failure at MAN causing mass disruption
23-Jun-24	EZY	20:45	22:09	84	D	GEZTG	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	87	power failure at MAN causing mass disruption
25-Jun-24	EZY	20:45	21:45	60	A	GEZAO	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	a/c tech issue on earlier sector
28-Jun-24	EI	21:00	21:32	32	A	GCMJN	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due an earlier tech issue
28-Jun-24	EZY	20:45	21:53	68	D	GEZWS	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
28-Jun-24	EZY	20:00	21:48	108	A	GEZDA	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due an earlier runway closure at LGW
28-Jun-24	EZY	20:30	22:36	126	D	GEZDA	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due an earlier runway closure at LGW
29-Jun-24	EZY	20:45			A	GEZGG	893	LGW			had given an eta of 2357 so this was refused / flight cancelled		
29-Jun-24	BA	20:45	22:36	111	A	GDBCD	1426	LHR		92	awaiting flight deck crew in LHR	81	ATC slot delays in Europe this afternoon
30-Jun-24	EI	20:50	22:00	70	A	GCMMT	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to an earlier tech issue at BHD
30-Jun-24	EI	21:10	22:04	54	A	GCMMN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to an earlier tech issue at MAN
01-Jul-24	EZY	20:35	21:33	58	D	GEJCF	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slot delays in Europe this afternoon
01-Jul-24	EI	21:00	21:43	43	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	19	High volume of PRMs on previous sectors
02-Jul-24	EZY	20:30	22:09	99	D	GEJCO	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	Crewing issues
04-Jul-24	EZY	20:30	21:38	68	D	GUZHB	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC/GROUND CONTROL ISSUE PREVIOUS SECTOR
04-Jul-24	EI	21:00	21:51	51	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	19	accomodating PRM pax in SOU
05-Jul-24	BA	20:05	21:45	100	D	GEUUA	1425	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	87	Airport facilities earlier in LHR
05-Jul-24	EZY	20:30	21:55	85	D	GEZGG	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC/ground control LGW & slot delay at BHD

z	Airline Code	Sch Time	Actual Time	Delay Time (mins)	Arr / Dep	Registration	Flight #	Airport	Runway	Delay code 1	Description 1	Delay code 2	Description 2
06-Jul-24	EZY	20:45	21:45	60	A	GEZBY	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due late on earlier sector
07-Jul-24	EI	21:10	21:44	34	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	19	PRM delay on previous sector in BHX
07-Jul-24	EZY	20:45	21:54	69	A	GEZBO	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to slot in LGW earlier in day
09-Jul-24	EZY	20:45	22:01	76	A	GEZFW	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to slots in LGW earlier in day on NCE sector
11-Jul-24	EZY	20:00	21:32	92	A	GEJCL	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH ISSUE AT LGW
11-Jul-24	BA	20:45	22:12	87	A	GEUUP	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH ISSUE AT LHR
12-Jul-24	EZY	20:30	21:46	76	D	GEZBT	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	87	LATE SLOT INTO LGW
12-Jul-24	EZY	20:45	22:10	85	D	GEZTC	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	LANDED WITH HOT BRAKES - HAD TO WAIT BEFORE BOARDING
13-Jul-24	EZY	20:30	21:47	77	D	GEZBU	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	ATC ISSUES / AIRCRAFT SWOPS
13-Jul-24	EZY	20:45	21:44	59	A	GEZBH	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	ATC ISSUES / AIRCRAFT SWOPS
14-Jul-24	EZY	20:45	22:07	82	D	GEZRT	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC ISSUES ON AN EARLIER SECTOR
15-Jul-24	EZY	20:35	21:51	76	D	GEZUF	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	63/16	late crew on previus sector and pax convenience
15-Jul-24	BA	20:45	22:03	78	A	GDBCA	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	weather in LHR area caused delays on earlier sectors
15-Jul-24	BA	20:20			A		8758	LCY			eta 2300 but likely later- extension refused, flight cancelled		
17-Jul-24	BA	20:40	22:28	108	A	GEUOG	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	63	crew change/late crew
18-Jul-24	EZY	20:00	21:33	93	A	GEZDK	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
18-Jul-24	EZY	20:30	22:11	101	D	GEZDK	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
19-Jul-24	BA	20:40	21:35	55	A	GTTND	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LHR on previous sectors
19-Jul-24	EZY	20:45	21:32	47	A	GEZDH	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
19-Jul-24	EZY	20:45	21:52	67	D	GEZTC	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into MAN on previous sectors
19-Jul-24	BA	21:00	22:46	106	A	GLCYR	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Tec issue with a/c in LCY
20-Jul-24	EZY	20:45	21:37	52	A	GEZAX	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	Slot delay from previous sector
21-Jul-24	BA	20:40	22:23	103	A	GTTOE	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	Slot for pushback at LHR
21-Jul-24	EI	20:55	22:03	68	A	GCMMT	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Tec h issue on previous sector
21-Jul-24	EI	19:55			A	GCMJN	3639	BHX		46	A/C CHANGE DUE TO TECH ISSUE. EXPECTED NOT TO MEET 23:59 CURFEW	DIV TO BFS	
22-Jul-24	BA	20:45	21:36	51	A	GDBCJ	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	Late crew in LHR
22-Jul-24	EZY	20:45	21:32	47	A	GEZBW	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	Late crew in LGW
22-Jul-24	EZY	20:35	21:48	73	D	GEZTD	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		issue at BHD with adding standby pax
23-Jul-24	EZY	20:30	21:51	81	D	GEZAX	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89/4	ATC and handling issue in LGW
25-Jul-24	EI	20:50	21:47	57	A	GCMJN	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier operational and tech issues
26-Jul-24	EI	17:20	21:34	254	A	GCMJL	3629	GLA		41	tech issue at GLA		
26-Jul-24	EZY	20:45	22:20	95	D	GUZHU	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	86	main part of delay was a tech issue ex MAN + 25 mins at BHD due to a medical issue with a pax
28-Jul-24	EZY	20:30	22:02	92	D	GEZTL	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	8	react delay due to congestion at LGW
28-Jul-24	EZY	20:45	21:54	69	A	GEZBO	893	LGW		87	due to congestion at LGW		
30-Jul-24	EZY	20:00	21:32	92	A	GEZWI	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
30-Jul-24	EZY	20:30	22:22	112	D	GEZWI	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
31-Jul-24	EZY	20:30	22:10	100	D	GEZWY	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
31-Jul-24	EZY	20:45	22:13	88	A	GEZAO	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots into LGW on previous sectors
01-Aug-24	EZY	20:00			A	GEZPX	803	LGW		81	DUE TO ADV WX IN LGW, UNABLE TO MEET CURFEW AIRCRAFT DIV TO BFS		
01-Aug-24	EZY	20:30			D	GEZPX	804	LGW		81	DUE TO ADV WX IN LGW, UNABLE TO MEET CURFEW INBOUND DIV TO BFS AND OUTBOUND CX		
01-Aug-24	EZY	20:45			A	GEZDV	893	LGW			CX DUE TO CREW OUT OF HOURS AND UNABLE TO MAKE CURFEW		
01-Aug-24	BA	20:45	22:04	79	A	GTTNG	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	Adv wx in LHR halting ground handling resulting in dept slots
02-Aug-24	BA	20:05	21:43	98	A	GEUUY	1425	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
02-Aug-24	EZY	20:15	21:36	81	A	GUZHR	723	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots at MAN on previous sectors
02-Aug-24	EZY	20:45	22:22	97	D	GUZHR	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots at MAN on previous sectors
02-Aug-24	BA	21:00	21:53	53	A	GLCYO	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slots in LCY
04-Aug-24	EZY	20:10	21:42	92	A	GEZBY	803	LGW		89	ramp congestion at LGW		
04-Aug-24	EZY	20:40	22:33	113	D	GEZBY	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	8	react due to ramp congestion at LGW
04-Aug-24	EZY	20:45	21:50	65	A	GEZBX	893	LGW		89	ramp congestion at LGW		
04-Aug-24	EI	21:00	22:49	109	A	GCMMN	3607	SOU		41	tech delay ex SOU		
04-Aug-24	BA	21:15	22:44	89	A	GLCYP	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due earlier tech issues and aircraft changes
07-Aug-24	EI	16:25	23:33	428	A	GCMJL	3647	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	tech in BHX due to bird strike on EI3646. Awaiting engineer inspection
08-Aug-24	EI	21:00	22:02	62	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
09-Aug-24	EZY	20:45	22:12	87	D	GEZUI	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC DELAYS ON EARLIER INTERNATIONAL SECTOR INTO MAN
11-Aug-24	BACF	21:15	23:04	109	A	GLCYP	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH DELAY ON EARLIER SECTOR
14-Aug-24	EZY	20:05	21:42	97	A	GEZDV	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to an ATC delay on a previous sector
14-Aug-24	EZY	20:35	22:27	112	D	GEZDV	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to an ATC delay on a previous sector
16-Aug-24	BA	21:00	21:43	43	A	GLCYN	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
16-Aug-24	EZY	20:45	22:17	92	A	GEZGE	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	87	Boarding delay in LGW
17-Aug-24	EZY	14:20	22:13	473	D	GEZDA	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	Awaiting pos a/c due tech
17-Aug-24	EZY	20:40	21:37	57	A	GEZDF	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
17-Aug-24	BA	20:40	22:23	103	A	GLCYN	4526	REU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	31	Loadsheet issues in REU
18-Aug-24	EI	21:00	21:32	32	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
18-Aug-24	EZY	20:45	21:58	73	D	GEZTG	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	tech issue in MAN with cargo door
18-Aug-24	BA	21:15	21:55	40	A	GLCYK	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	95	Crew change required in LCY
19-Aug-24	EZY	20:35	21:54	79	D	GEJCF	6750	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	late cabin crew in LGW
20-Aug-24	EZY	20:45	21:52	67	A	GEZBJ	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	32	loading issue in LGW
22-Aug-24	EZY	20:45	21:36	51	A	GEZAX	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due an aircraft change at LGW due to tech issues
22-Aug-24	EZY	20:35	22:27	112	D	GEZGH	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an earlier aircraft change at LGW due to tech issues
22-Aug-24	BA	20:45	22:12	87	A	GDBCC	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC delays at LHR
23-Aug-24	EZY	20:40	21:31	51	D	GEZDV	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to earlier Atc delays at LGW
27-Aug-24	BA	19:15	21:35	140	A	GLACB	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	Delay due to WX enroute on previous sector
28-Aug-24	EI	21:10	22:19	69	A	GCMJJ	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	A/C change due to tech issue
30-Aug-24	EZY	20:40	21:55	75	D	GEZFV	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66 &96	late cabin crew & catering issue in LGW
30-Aug-24	EI	21:00	21:33	33	A	GCMJM	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC/Ground control in SOU
02-Sep-24	EI	20:55	21:37	42	A	GCMJM	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	ATC slot and delayed PRM on prev sectors in/out of EDI
04-Sep-24	EZY	20:35	22:05	90	D	GEZWP	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	83	ATC slot due flow rate into LGW
05-Sep-24	EZY	20:45	22:14	89	A	GEZDI	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	ATC DELAYS FLO RESTRICTIONS THUNDERSTORM ACTIVITY
05-Sep-24	EZY	20:00	22:39	159	A	GEZBW	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	ATC DELAYS FLO RESTRICTIONS THUNDERSTORM ACTIVITY
05-Sep-24	EZY	20:30	23:22	172	D	GEZBW	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	ATC DELAYS FLO RESTRICTIONS THUNDERSTORM ACTIVITY
06-Sep-24	EZY	20:45	21:48	63	A	GEZDX	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		

z	Airline Code	Sch Time	Actual Time	Delay Time (mins)	Arr / Dep	Registration	Flight #	Airport	Runway	Delay code 1	Description 1	Delay code 2	Description 2
06-Sep-24	EZY	20:40	22:06	86	D	GEZBH	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
06-Sep-24	BACF	21:00	22:04	64	A	GLCAB	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
07-Sep-24	BA	20:45	21:54	69	A	GEUYF	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	15	BOARDING DISCREPANCY LHR
07-Sep-24	EZY	20:45	21:49	64	A	GEZBJ	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	31	ISSUE WITH AIRCRAFT DOCUMENTS
07-Sep-24	EZY	20:35	21:57	82	D	GEZDL	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
08-Sep-24	EI	21:00	21:40	40	A	GCMJN	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
08-Sep-24	EI	21:10	21:32	22	A	GCMJM	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
08-Sep-24	EZY	20:15	21:36	81	A	GEZWI	723	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
08-Sep-24	EZY	20:45	22:36	111	D	GEZWI	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
09-Sep-24	EZY	20:35	21:47	72	D	GEJCF	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to earlier ATC delays at LGW
09-Sep-24	BA	20:45	21:34	49	A	GDBCE	1426	LHR		92	awaiting a replacement crew at LHR		the original crew were delayed on the previous sector due to tech issues
10-Sep-24	EZY	20:35	21:40	65	D	GEZAO	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to a ground handling delay at LGW
11-Sep-24	EZY	20:05	21:44	99	A	GEZFW	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	rarect due ATC slot and holding delays due to thunderstorm activity in the south of England
11-Sep-24	EZY	20:35	22:41	126	D	GEZFW	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	rarect due ATC slot and holding delays due to thunderstorm activity in the south of England
11-Sep-24	BA	20:40	21:49	69	A	GEUPG	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	rarect due ATC slot and holding delays due to thunderstorm activity in the south of England
11-Sep-24	EZY	20:45	22:37	112	A	GEZBW	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	rarect due ATC slot and holding delays due to thunderstorm activity in the south of England
12-Sep-24	EZY	20:45	21:35	50	A	GEZIY	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
12-Sep-24	EZY	20:00			A	GEZDX	803	LGW			UNABLE TO MAKE CURFEW - DIV TO BFS		
12-Sep-24	EZY	20:30			D	GEZDX	804	LGW			UNABLE TO MAKE CURFEW - FLIGHT CANCELLED		
13-Sep-24	EZY	20:40	21:41	61	D	GEZBO	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
13-Sep-24	BA	20:40	21:48	68	A	GDBCA	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	85	Delayed on previous sector due disruptive pax
15-Sep-24	EI	21:10	22:45	95	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Airport terminal exvac on previous sector out of BHX // Tech issue in EDI
15-Sep-24	EZY	20:45	21:35	50	D	GEZUC	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
17-Sep-24	EI	21:10	21:56	46	A	GCMJJ	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		reac due earlier tech and slot issues
17-Sep-24	EI	20:55	21:39	44	A	GCMMN	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
17-Sep-24	EI	20:55	21:31	36	A	GCMJN	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
18-Sep-24	EI	21:10	23:39	149	A	GCMJN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due earlier tech issues and aircraft changes
19-Sep-24	EZY	20:30	21:35	65	D	GEZFI	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
19-Sep-24	EZY	20:45	21:32	47	A	GEZBO	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
19-Sep-24	EI	20:55	21:51	56	A	GCMJM	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
19-Sep-24	EI	21:10	21:38	28	A	GCMJJ	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
20-Sep-24	EZY	20:40	22:26	106	D	GEZFV	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
20-Sep-24	EZY	20:45	22:49	124	A	GEZDD	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
21-Sep-24	EZY	20:05	22:24	139	A	GEZBO	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
21-Sep-24	EZY	20:35	23:08	153	D	GEZBO	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
21-Sep-24	BA	20:45	23:12	147	A	GEUUK	1426	LHR		46	aircraft change required due to tech issues		
22-Sep-24	EZY	20:40	22:14	94	D	GEZGK	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
22-Sep-24	EZY	20:45	21:45	60	A	GEZBZ	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC slots delays at LGW
22-Sep-24	EZY	20:45	22:03	78	D	GEZRY	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
22-Sep-24	EI	21:00	22:05	65	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
23-Sep-24	EZY	20:35	21:33	58	D	GEJCO	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to earlier tech issues
23-Sep-24	BA	19:30	21:53	143	D	GEUUP	1425	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	raect due to ATC slot delays at LHR
26-Sep-24	BA	20:45	23:40	175	A	GEUYG	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
26-Sep-24	EI	20:50	22:19	89	A	GCMJL	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC/Ground control in MAN
26-Sep-24	EI	20:55	21:36	41	A	GCMJM	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
26-Sep-24	EI	20:55	22:12	77	A	GCMJJ	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	77	Weather in BHX
26-Sep-24	EI	21:00	21:42	42	A	GCMMK	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC/Ground control in SOU
26-Sep-24	EI	21:10	22:58	108	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	ATC/Ground control in EDI
27-Sep-24	EZY	20:05	22:28	143	A	GEZAX	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	late crew
27-Sep-24	EZY	20:15	21:52	97	A	GEZTG	723	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89/41	slot issues and tech
27-Sep-24	EI	20:55	21:38	43	A	GCMJL	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
27-Sep-24	BA	21:00	22:38	98	A	GLCYJ	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	slot issues due wx
27-Sep-24	EZY	20:40	23:20	160	D	GEZAX	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
27-Sep-24	EZY	20:45	22:47	122	D	GEZTG	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
28-Sep-24	EZY	20:45	22:37	112	A	GEZBO	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	3	despatch issue in LGW
29-Sep-24	EZY	20:40	21:54	74	D	GEZGO	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	Late cabin crew
29-Sep-24	EI	20:55	22:58	123	A	GCMJN	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	6	checkin error in LBA, also earlier tech issues
29-Sep-24	EI	21:10	22:12	62	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	tech and a/c swaps acroos the network
30-Sep-24	EZY	20:35	21:38	63	D	GEJCD	6570	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	Late crew on LGW-BHD sector
30-Sep-24	EI	20:55	21:47	52	A	GCMJN	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	19	Late PRM handling in BHX
01-Oct-24	EI	21:10	22:09	59	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	Aircraft swap due to tech issue
02-Oct-24	BA	20:40	21:32	52	A	GEUYC	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
02-Oct-24	EZY	20:45	21:36	51	A	GEZDV	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	95	Crew change in LGW
04-Oct-24	EZY	20:45	21:56	71	D	GEZPE	724	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
04-Oct-24	EI	21:10	22:42	92	A	GCMJM	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH ISSUE ORIGINAL AIRCRAFT - AIRCRAFT SWOP
06-Oct-24	EI	21:00	21:54	54	A	GCMJL	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	66	LATE CREW ON EARLIER SECTOR
08-Oct-24	EI	17:40	21:58	258	A	GCMMN	3657	EDI		41	tech delay ex EDI		
08-Oct-24	EZY	20:05	21:32	87	A	GEZBY	803	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	16	react due to ATC delays at LGW + a sick shild + family had to offload
08-Oct-24	EZY	20:35	22:28	113	D	GEZBY	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	86	react due to ATC delays at LGW + a sick shild + family had to offload
08-Oct-24	EZY	20:45	21:35	50	A	GEZAV	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to ATC delays at LGW
09-Oct-24	EI	20:50	21:57	67	A	GCMMK	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
09-Oct-24	EI	21:00	21:50	50	A	GCMJM	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to earlier tech issues and aircraft changes
09-Oct-24	EI	21:10	22:47	97	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due a tech delay on the previous sector from BHD
12-Oct-24	EZY	20:35	21:31	56	D	GEZDV	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
12-Oct-24	EZY	20:45	21:40	55	A	GEZDF	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH ISSUE AT LGW - AIRCRAFT SWOP
13-Oct-24	BA	21:15	21:47	33	A	GLCYT	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		CAPT CAUGHT IN TRAFFIC JAM ON WAY TO ICY
16-Oct-24	EZY	20:45	21:39	54	A	GEZDK	893	LGW		89	ATC/GRND CONTROL	71	weather in LGW stopped departures for a short time
16-Oct-24	EI				A	GCMMN	401P	LPL			refused due ETA after curfew diverted to BFS		
18-Oct-24	EZY	20:45			A	GEZAJ	893	LGW			refused as eta outside our curfew		
18-Oct-24	BA	21:00	21:47	47	A	GLCAH	7346	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react due to earlier fog at LCY and ATC delays
18-Oct-24	EI	20:55	22:00	65	A	GCMMK	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react due to earlier weather issues

z	Airline Code	Sch Time	Actual Time	Delay Time (mins)	Arr / Dep	Registration	Flight #	Airport	Runway	Delay code 1	Description 1	Delay code 2	Description 2
19-Oct-24	EZY	20:35	22:29	114	D	GEZBI	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	react due to an aircraft change at LGW
20-Oct-24	EZY	20:40	22:24	104	D	GEZBU	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		react due to an earlier tech delay
20-Oct-24	EZY	20:45	22:33	108	A	GEZAV	893	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	81	react due to an ATC slot delay on the previous sector
20-Oct-24	BA	20:40	22:29	109	A	GTTNR	1426	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react due an earlier delay due tom adverse weather
21-Oct-24	EI	21:00	21:48	48	A	GCMMN	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Tech issue on previous sector during day
24-Oct-24	EI	20:50	23:07	137	A	GCMJL	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	Tech issue and a/c swap
25-Oct-24	EZY	20:40	21:32	52	D	GEZFT	804	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	react due to earlier fog and ATC delays at LGW
25-Oct-24	EI	20:55	22:13	78	A	GCMMK	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react due to fog at LBA
25-Oct-24	EI	21:00	21:45	45	A	GCMMT	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react due to earlier weather issues
02-Nov-24	KL	21:00	21:31	31	A	PHEZN	951	AMS		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	BIRD STRIKE AT AMS
15-Nov-24	EI	21:10	21:54	44	A	GCMJN	3659	EDI		19	Late offload of PRM's in EDI on previous sector.		
20-Nov-24	KL	21:00	21:44	44	A	PHEXT	951	AMS		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	64	CREW SHORTAGE AT AMS
21-Nov-24	EI	21:10	21:39	29	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	75	DE ICING EDI
21-Nov-24	EI	20:55	21:36	41	A	GCMMN	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	WX ON EARLIER ROTATION
21-Nov-24	KL	21:00	21:42	42	A	PHEXN	951	AMS		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	94	cabin crew rotation
22-Nov-24	BA	20:20	21:59	99	A	GEUPK	1422	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	react + deicing delay at LHR
22-Nov-24	EZY	20:30	22:08	98	A	GEZDJ	805	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	85	react due to earlier issues at LGW - South terminal closure due to security incident
23-Nov-24	EI	20:50	22:33	103	A	GCMJJ	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	wx and deicing on earlier sectors
24-Nov-24	BA	20:25	21:31	66	D	GEUYJ	1421	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
24-Nov-24	EI	20:55	21:33	38	A	GCMJL	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
28-Nov-24	EI	20:55	22:33	98	A	GCMJN	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	react as result of aircraft out of position folllowing yesterdays freezing fog at BHD
28-Nov-24	EI	20:55	22:00	65	A	GCMJM	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	react as result of aircraft out of position folllowing yesterdays freezing fog at BHD
28-Nov-24	EI	21:00	21:55	55	A	GCMMK	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	16	PAX CONVENIENCE
28-Nov-24	EI	21:10	21:48	38	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	72	react as result of aircraft out of position folllowing yesterdays freezing fog at BHD
05-Dec-24	EI	21:00	21:33	33	A	GCMJJ	3607	SOU		71	Adv weather in SOU	72	a/c carried out a go-around on arrival due WX in BHD
06-Dec-24	BA	20:30	21:34	64	A	GLCYJ	8758	LCY		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	Adv weather in LCY
06-Dec-24	EI	20:55	21:39	44	A	GCMJM	3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	Adv weather in BHD on previous sector
06-Dec-24	EI	20:55	22:38	103	A	GCMJN	3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	Aircraft diverted on previous sector to BFS
06-Dec-24	EI	21:10	21:47	37	A	GCMJL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	77	Ground handling delayed on previous sector due WX in BHD
09-Dec-24	EI	21:10			A	GCMMK	3659	EDI			EXTENSION REFUSED, DIVERTED TO BFS		
09-Dec-24	EI	21:00			D	EIGZV	EA102	DUB			EXTENSION REFUSED AS OUTSIDE CURFEW		
08-Dec-24	EZY	20:35	21:46	71	A	GEZWA	805	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	83	Slot on previous sector to LGW
13-Dec-24	EI	19:55	21:31	96	A	GCMMT	EI3637	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	react due earlier runway closure at BHX
13-Dec-24	EI	21:00	23:44	164	A	GCMMK	EI3607	SOU		41	tech delay in SOU		
13-Dec-24	EI	21:10	23:19	129	A	GCMJJ	EI3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	89	react due earlier runway closure at BHX
20-Dec-24	EI	21:10	22:41	91	A	GCMJN	EI3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	tech on earlier rotation
20-Dec-24	EZY	14:15	21:48	453	D	GEJCL	890	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
23-Dec-24	EI	12:50	23:18	628	A	GCMJN	EI3643	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	delayed on pos sector in morning due to airfield closed 22nd
23-Dec-24	EI	20:50	23:02	132	A	GCMMT	EI3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	delayed on pos sector in morning due to airfield closed 22nd
23-Dec-24	EI	20:55	22:39	104	A	GCMJJ	EI3649	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	delayed on pos sector from DUB. covering disruption from 22nd
23-Dec-24	EI	20:55	22:23	88	A	EIGZV	EI3679	LBA		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	delayed on pos sector in morning due to airfield closed 22nd
23-Dec-24	EI	21:00	22:58	118	A	GCMJL	EI3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	delayed on pos sector in morning due to airfield closed 22nd
23-Dec-24	EI	21:10	22:29	79	A	GCMJM	EI3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	96	delayed on pos sector in morning due to airfield closed 22nd
26-Dec-24	EI	20:50	22:52	122	A	GCMJN	EI3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	WX ISSUES MAN AREA CAUSING LATE SLOTS
26-Dec-24	EI	20:55	21:47		A	GCMJJ	EI702P	LPL		93	REFUSED AS OVER CURFEW OF 2130 FOR POSN AIRCRAFT - DIVERTED TO BFS	71	
27-Dec-24	BA	19:35	21:43	128	D	GEUYI	1421	LHR		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	WX ISSUES CAUSING LATE SLOTS
27-Dec-24	EZY	20:05	23:08	183	D	GEZTA	714	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	WX ISSUES CAUSING LATE SLOTS
27-Dec-24	EZY	19:35	22:23	168	A	GEZTA	713	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	WX ISSUES CAUSING LATE SLOTS
27-Dec-24	EI	21:10	22:19	69	A	EIFSL	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	WX ISSUES CAUSING LATE SLOTS
27-Dec-24	EI	20:50			A	GCMJJ	3619	MAN		93	REFUSED AS OVER CURFEW OF 2359	71	
28-Dec-24	EZY	20:30	22:36	126	A	GEZDK	805	LGW		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	ONGOING WX ISSUES CAUSING LATE SLOTS
28-Dec-24	EI	20:50	21:33	43	A	GCMMT	3619	MAN		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		
29-Dec-24	EI	18:50	21:33	163	D	GCMMT	3658	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	41	TECH AIRCRAFT CAUSING ONGOING AIRCRAFT SWOPS
29-Dec-24	EI	21:00	21:35	35	A	GCMJM	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	TECH AIRCRAFT CAUSING ONGOING AIRCRAFT SWOPS
29-Dec-24	EI	19:55	22:01	126	A	GCMJN	3637	BHX		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	TECH AIRCRAFT CAUSING ONGOING AIRCRAFT SWOPS
29-Dec-24	EI	21:10	23:52	162	A	GCMMT	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	46	TECH AIRCRAFT CAUSING ONGOING AIRCRAFT SWOPS
30-Dec-24	EI	21:00	21:32	32	A	GCMMT	3607	SOU		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector		Earlier tech issue
31-Dec-24	EI	21:10	21:32	22	A	GCMJN	3659	EDI		93	AIRCRAFT ROTATION, late arrival of aircraft from another flight or previous sector	71	Delayed in EDI due high winds

Entries in red indicate where requests for extensions were refused by Belfast City Airport.

Appendix 2 - Delay Causes

IATA Code[1]	IATA Description	No. (arr)	No. (dep)
3	A/C dispatch	1	
6	No gate/stand availability due to own airline activity	1	
8	Taxiway congestion		2
10	Missed slot	1	
15	Boarding, discrepancies and paging, missing checked-in passenger	1	
16	PR/Pax convenience/VIP	2	1
19	Reduced mobility, boarding / deboarding of passengers with reduced mobility	6	1
31	Aircraft documentation late/inaccurate	3	
32	Loading/unloading, bulky, special load, cabin load, lack of loading staff	1	
41	Aircraft defects	32	4
46	Aircraft change, for technical reasons	38	11
47	Stand-by aircraft, lack of planned stand-by aircraft for technical reasons	5	
51	Aircraft damage - flight	1	
63	Late crew boarding or departure procedures, other than connection and standby (flight deck or entire crew)	2	2
64	Flight deck crew shortage	2	
66	Late cabin crew boarding or departure procedures, other than connection and standby	4	4
71	Weather departure station	24	3
72	Weather at destination	5	4
75	De-ice/de-snow	1	
77	Ground handling impaired bad weather	2	
81	ATFM due to demand/capacity problems	31	16
82	ATC Staff/Equipment problem	4	
83	ATFM (air traffic flow management) due to restriction at destination airport, airport and/or runway closed due to obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights	1	2
85	Mandatory security	2	
86	Immigration, customs, health	1	3
87	Airport Facilities	3	3
89	Restrictions at airport of departure with or without ATFM restrictions, including air traffic services, start-up and pushback, airport and/or runway closed due to obstruction or weather, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights	10	4
92	Awaiting flight deck crew	2	
93	Aircraft rotation, late arrival of aircraft from another flight or previous sector	65	24
94	Cabin crew rotation, awaiting cabin crew from another flight	1	

95	Crew rotation, awaiting crew from another flight (flight deck or entire crew)	2	
96	Operations control	12	2
99	Other reason (not matching other codes)	1	1
	Totals	**267**	**87**

Whilst Delay Code 1 (as shown in Appendix 1 – Extensions Log for 2023) provides the primary description of each delay, where appropriate Delay Code 2 (as shown in Appendix 1) has been counted in this table, in order to ensure clarity and provide greater detail on delay causes.

Appendix 3

Extension & Departure Noise Charges 1 Jan to 31 Dec 2024

Timeband	Fine rate to 30	Fine rate from 1 July	No. Extensions to 30 June	No. Extensions from 1 July	Fines value to 30 June	Fines value to 30 June
21:31 - 21:45	100	134	52	75	5,200	10,050
21:46 - 22:00	125	167	40	48	5,000	8,016
22:01 - 22:15	150	200	15	29	2,250	5,800
22:16 - 22:30	300	401	11	21	3,300	8,421
22:31 - 22:45	400	534	14	17	5,600	9,078
22:46 - 23:00	550	735	4	9	2,200	6,615
23:01 - 23:15	700	935	1	6	700	5,610
23:16 - 23:30	800	1,069	1	4	800	4,276
23:31 - 23:45	900	1,202	2	4	1,800	4,808
23:46 - 23:59	1,000	1,336	0	1	0	1,336
				Sub totals	*26,850*	*64,010*
				Total £	**90,860**	

Departure Noise Exceedances			
Excess over dBLASmax		**Charge**	**Total**
No greater than 3 dB(A)	3	£668	£2,004
Greater than 3 dB(A)	0	£1,336	£0
Total			£92,864

Bickerdike
Allen
Partners
Architecture
Acoustics
Technology

GEORGE BEST BELFAST CITY AIRPORT

2024 ANNUAL REPORT

Report to

George Best Belfast City Airport
Sydenham By-Pass
Belfast
BT3 9JH

A11298_16_RP011_2.0
10 June 2025

121 Salusbury Road
London NW6 6RG
T 020 7625 4411
F 020 7625 0250
mail@bickerdikeallen.com
www.bickerdikeallen.com

Bickerdike Allen Partners LLP is an integrated practice of Architects, Acousticians, and Construction Technologists, celebrating over 60 years of continuous practice.

Architects: Design and project management services which cover all stages of design, from feasibility and planning through to construction on site and completion.

Acoustic Consultants: Expertise in planning and noise, the control of noise and vibration and the sound insulation and acoustic treatment of buildings.

Construction Technology Consultants: Expertise in building cladding, technical appraisals and defect investigation and provision of construction expert witness services.

Contents

Page No.

Figures

Appendices

1.0 INTRODUCTION

The planning agreement[1] between Belfast City Airport Limited (BCA) and the Department for Infrastructure dated 22 July 2019 sets out regular reporting that the airport is required to make. The required reporting includes an Annual Performance Report (APR) which is to be submitted annually on 31 March. The content of the APR is detailed in paragraphs 6.7.1 to 6.7.15 of *PART II The Covenants* of the agreement.

Bickerdike Allen Partners LLP (BAP) have been retained by George Best Belfast City Airport (GBBCA) to produce some of the information required for the APR, specifically the information related to the following paragraphs:

- 6.7.1 Noise exposure contours
- 6.7.2 Comparison of noise contour areas
- 6.7.3 Air traffic movements the contours are based on
- 6.7.6 The Quota Count for the previous year
- 6.7.7 A record of movements by aircraft types not permitted to use the airport in the previous year (those only marginally compliant with Chapter 3)
- 6.7.14 (Partial) An evaluation of the data reported, specifically that we are preparing.

Noise contours have been produced for 2024 based on the actual aircraft movements over the 92 day summer period, and for 2025 and 2026 based on forecasts provided by GBBCA. All of the noise contours have been produced using the Federal Aviation Administration's prediction software, the Integrated Noise Model (INM) version 7.0d. This methodology has been validated for the key aircraft types operating at the airport, using results from the Noise Monitoring Terminals (NMTs) installed at GBBCA.

Section 2 of this report gives details of the air traffic movements used to produce the noise contours. Section 3 gives details of the methodology used to produce the noise contours. Section 4 reports the areas of the noise contours and compares them with the 57 dB $L_{Aeq,16h}$ noise contour area limit. Population counts for the key noise exposure contours are also provided. Section 5 reports the results of the quota count assessment for 2024. Section 6 gives details of movements in 2024 by aircraft types that were only marginally compliant with Chapter 3.

[1] Agreement Pursuant to Section 77(1)(a) of the Planning Act (Northern Ireland) 2011

A glossary of acoustic terms can be found in Appendix 1 and Appendix 2 contains details of BAP's noise contour validation exercise.

2.0 AIRCRAFT MOVEMENTS

The basis for the 2024 noise contours are the actual movements during the 92 day summer period, 16 June to 15 September inclusive. Detailed information was provided by GBBCA for all aircraft movements during this period. Although a small proportion of movements occur early in the morning between 6:30 and 7:00 or late in the evening between 23:00 and 00:00 over the 92 day period, for the production of the noise contours all movements have been modelled as taking place within the "daytime period" of 07:00 to 23:00.

The actual movements in 2024 include 12 movements by helicopters. Historically helicopters have not been modelled at GBBCA, as they typically comprise less than 1% of the total movements, and this was also the case in 2024. Their continued omission is not considered significant to the overall contours due to their small number of movements and this maintains consistency with previous contouring.

Compared to 2023, there has been an increase in movements from 7,779 to 8,204 in 2024, although this remains less than the 9,745 movements that occurred in 2019 before the COVID-19 pandemic.

Forecasts of summer movements have been provided for 2025 and 2026. Total summer movements are forecast to decrease to 7,870 in 2025, followed by an increase to 8,638 movements forecast for 2026. The forecasts include an allowance for general aviation (GA) movements, without specifying particular aircraft types. These movements have been modelled based on the GA types which operated in summer 2024.

The INM software includes noise information for many common aircraft types, but as with all noise modelling software, it does not include every aircraft type. This means that substitutions are required, where an alternative aircraft type is used to model the actual type. For larger aircraft this generally does not involve a change but for the smaller types, and in particular the general aviation aircraft, substitutions occur. Where INM has no guidance, an aircraft type has been assigned based on the aircraft size and engine details. Table 1 below shows the aircraft movements by aircraft type in summer 2024 and those forecast for 2025 and 2026. It also includes the INM type used for each aircraft type in the modelling. "n/a" is shown where a type performed fewer than 10 movements or for the forecast movements was not specifically included in the forecast. Movements by these types have been grouped under "other."

Aircraft Type	INM Type(s)	Summer Fixed Wing Movements		
		2024 Actual	2025 Forecast	2026 Forecast
Airbus A319ceo	A319-131[(1)]	1,365	980	1,051
Airbus A320ceo	A320-211[(1)]	801	792	838
Airbus A320neo	A320-211[(1)]	472	515	537
ATR 42	DO328	134	118	118
ATR 72	DO328/DHC6[(1)]	4,321	4,195	4,689
Cessna Citation Excel	CNA560XL	37	n/a	n/a
Dassault Falcon 2000	CL600	13	n/a	n/a
Embraer E145	EMB145	170	164	164
Embraer E175	EMB175/737500[(1)]	54	n/a	n/a
Embraer E190	EMB190[(1)]	641	830	939
Embraer Legacy 500	CNA55B	18	n/a	n/a
Embraer Phenom 300	CNA510	14	n/a	n/a
Other (less than 10 movements)	Various	164	276	302
Total[(2)]		**8,204**	**7,870**	**8,638**

[(1)] INM type modified based on results of a validation exercise.

[(2)] Forecast totals may not match due to rounding.

Table 1: 2024, 2025 and 2026 Summer Fixed Wing Movements

3.0 NOISE CONTOUR METHODOLOGY

3.1 General

The aircraft movement data, provided by GBBCA, has been assessed in relation to aircraft type, departure and arrival route, flight profiles and runway usage to enable input into the noise computation program, the Integrated Noise Model (INM). This section of the report describes how this information has been compiled in a form suitable for analysis purposes.

3.2 Runway Usage

The overall split of movements by runway during the 2024 summer period is given in Table 2, and is compared with the long term average (2020-2024). For the 2024 actual contours, the actual runway usage for each individual movement was used. For the 2025 and 2026 forecast contours the long term average modal split has been used.

Runway	% of Summer Movements			
	2024		2020-2024 Average	
	Arrivals	Departures	Arrivals	Departures
04	30%	31%	36%	40%
22	70%	69%	64%	60%

Table 2: 2024 and Long Term Average Summer Modal Split

The usage of the runways is dependent on the direction of the wind, therefore some variation is to be expected between individual years. Compared to the long term average there was around 6% less usage of runway 04 by both arrivals and departures in 2024, with corresponding increases in the usage of runway 22.

3.3 Flight Tracks

For each runway there is a single modelled arrival route, which follows the runway centreline. There is one modelled initial departure route on runway 22, but four modelled initial departure routes on runway 04.

A validation exercise was undertaken in 2011 to validate the flight tracks used in the INM software. The details of this exercise are shown in Appendix B of the BAP report Ref: A9443-R01-NW dated November 2011. The resulting main departure tracks are shown in Figure 01 and have been used for the contours as there have been no changes to the published routes since 2011.

The method of determining the split of aircraft between the routes from runway 04 takes into account both aircraft type and destination. Where the destination is in Scotland or in Northern Europe (Iceland, Norway, etc.) the initial route heading in a north easterly direction is used. The remaining traffic is split amongst the three routes which turn south. The particular route depends on the distance at which the aircraft type involved is expected to have achieved one of a set of specific altitudes, as required by the airport's noise abatement procedures. These altitudes are 1,500 ft for small propeller aircraft (maximum takeoff weight of up to 13,000 kg); 2,000 ft for large propeller aircraft; and 3,000 ft for jet aircraft.

For the forecast runway 04 departures, the long-term average (2020-2024) split between the north easterly and southerly routes has been used. This results in 18% of departures using the north easterly route, with the remainder using the southerly routes. Aircraft have been split between the three southerly routes according to weight and type, as was done for the actual contours.

3.4 Dispersion

Aircraft on departure are allocated a departure route to follow. In practice, this route is not followed precisely by all aircraft. To allow for this the INM software was used to generate a mean track for each of the five initially distinct routes, and these mean tracks were then dispersed as described below.

The dispersion model has the common assumption that there are five "dispersed" tracks associated with each departure route; these comprise the mean track of each route and two sub-tracks either side, as the actual pattern of departing aircraft is dispersed about the route's centreline. The degree of dispersion is normally a function of the distance travelled by an aircraft along the route after take-off and also on the form of the route.

When considering many departures, it is commonly found that the spread of aircraft approximates to a "normal distribution" pattern. A simplified mathematical model can be adopted to represent a normal distribution of events, based on standard deviations. The five "dispersed" tracks used to model each departure route comprise the main track of each route and two sub-tracks either side. The resulting allocation of movements to each track is as follows:

- 53.3% departures along the main track;
- 22.2% departures split equally along two inner sub tracks either side of the main track and offset by a distance of 1.355 standard deviations;
- 1.15% departures split equally along two outer sub tracks either side of the main track and offset by a distance of 2.71 standard deviations.

This dispersion model has been used in the INM software, which generates the sub-tracks with distances supplied by the user. The distances and percentages used have been determined by BAP from analysis of similar activity at other airports.

3.5 Flight Profiles

For departure movements the INM software offers a number of standard flight profiles for most aircraft types, particularly for the larger aircraft types. These relate to different departure weights which are greatly affected by the length of the flight, and consequently the fuel load. In the INM software this is referred to as the stage length. The stage length increases in increments of 500 nmi up to 1,500 nmi and then in increments of 1,000 nmi. As the stage length increases, the aircraft has to depart with greater fuel, and so its flight profile is slightly lower than when a shorter stage length is flown.

For the 2024 contours, destination airports were given with the actual movements. Stage lengths have been assigned, where INM offers the option, based on the distance of these airports from GBBCA.

For the forecast 2025 and 2026 contours stage lengths have been assigned based on information provided by GBBCA. Where no information is available, such as for general aviation flights, movements have been modelled as stage length 1, which in most cases is the only option available in the INM for the aircraft type.

3.6 INM Model

All contours and population counts have been determined using the Integrated Noise Model (INM) version 7.0d software. GBBCA data relevant to the INM study is taken from the latest edition of the UK Aeronautical Information Package. A 3.0° approach angle has been used for all aircraft and the ground topography has been assumed to be flat. The INM default headwind of 14.8 km/h has been assumed.

Results from the airport's Noise Monitoring Terminals (NMTs) from the period September 2023 to September 2024 have been used in the 2024 validation exercise to review the INM assumptions for the key aircraft types operating at GBBCA.

The 2024 validation exercise included reviewing six key aircraft types, to best model their operations at GBBCA. The result is that the modelled noise characteristics of some of these aircraft have been adjusted by modifying the INM aircraft used and/or the noise level of the INM aircraft types as necessary. Where modifications have been made to the noise levels, this has been by applying a factor to the number of movements. These adjustments are detailed in Table 3 below.

Aircraft Type	Default INM Type	Modification to INM Assumptions	
		Arrivals	Departures
Airbus A319ceo	A319-131	A319-131 × 0.7	A319-131 × 1.2
Airbus A320ceo	A320-211	A320-211 × 0.8	A320-211 × 1.0
Airbus A320neo	-	A320-211 × 0.6	A320-211 x 0.4
ATR 72	DO328	DO328 × 0.6	DHC6 × 1.0
Embraer E175	EMB175	EMB175 × 1.1	737500 x 1.2
Embraer E190	EMB190	EMB190 × 1.0	EMB190 × 1.8

Table 3: Modifications to INM Assumptions Used for the Contours

No changes have been made to the modifications compared to those used for the 2023 contours.. Full details of the 2024 validation exercise are given in Appendix 2.

4.0 NOISE CONTOURS

Noise contours for 2024, 2025 and 2026 in terms of the $L_{Aeq,16h}$ metric have been produced for the 16 hour daytime period, 07:00 to 23:00; although they also include the movements that occur between 06:30 and 07:00 and the small number that occurred between 23:00 and 00:00. They are based on the actual movements for the 92 day summer period in 2024 and the forecasts provided for 2025 and 2026 as detailed in Section 2. The areas of the noise contours are given in Table 4, where they are compared with the 57 dB $L_{Aeq,16h}$ contour area limit.

The 2024 actual, 2025 forecast and 2026 forecast noise contours are shown in Figures 02, 03 and 04 respectively at values from 54 to 69 dB $L_{Aeq,16h}$ in 3 dB steps. The 57 dB contours for all three years are compared in Figure 05.

Contour Level (dB $L_{Aeq,16h}$)	Area of Daytime Air Noise Contours (km^2)			Contour Area Limit $(km)^2$
	2024	2025	2026	
54	5.86	5.65	6.14	
57	3.09	2.96	3.22	5.20
60	1.60	1.55	1.68	
63	0.89	0.87	0.94	
66	0.51	0.51	0.54	
69	0.31	0.31	0.33	

Table 4: 2024, 2025 and 2026 Noise Contour Areas

The area of the 2024 57 dB $L_{Aeq,16h}$ contour area is 3.09 km^2, which is well below the contour area limit of 5.2 km^2. The areas of the noise contours for 2024 have increased compared to 2023 due to the increase in movements. The contour areas remain smaller than in 2019, when the 57 dB $L_{Aeq,16h}$ contour area was 3.3 km^2.

The noise contour areas are forecast to decrease in 2025 due to a reduction in movements, before increasing in 2026 due to an increase in movements. The 57 dB contour areas are forecast to remain below the contour area limit in both 2025 and 2026.

4.1 Population and Dwelling Counts

The population and dwelling data has been derived from a 2024 postcode database supplied by CACI Ltd. Population counts for the 2024, 2025, and 2026 $L_{Aeq,16h}$ daytime contours are given in Table 5 and Table 6 below, the corresponding dwelling counts are given in Table 7 and Table 8.

Contour Level (dB $L_{Aeq,16h}$)	2024 Population	2025 Population	2026 Population
54	11,835	10,493	11,637
57	3,252	2,453	3,360
60	0	0	0
63	0	0	0
66	0	0	0
69	0	0	0

Table 5: Comparison of 2024, 2025 and 2026 Population Counts – Cumulative Totals

Year	Population by Contour Band (dB $L_{Aeq,16h}$)						Total
	> 69	69 – 66	66 – 63	63 – 60	60 – 57	57 – 54	
2024	0	0	0	0	3,252	8,583	11,835
2025	0	0	0	0	2,453	8,040	10,493
2026	0	0	0	0	3,360	8,277	11,637

Table 6: Comparison of 2024, 2025 and 2026 Population Counts

Contour Level (dB $L_{Aeq,16h}$)	2024 Dwellings	2025 Dwellings	2026 Dwellings
54	5,540	4,897	5,468
57	1,455	1,117	1,514
60	0	0	0
63	0	0	0
66	0	0	0
69	0	0	0

Table 7: Comparison of 2024, 2025 and 2026 Dwelling Counts – Cumulative Totals

Year	Dwellings by Contour Band (dB $L_{Aeq,16h}$)						Total
	> 69	69 – 66	66 – 63	63 – 60	60 – 57	57 – 54	
2024	0	0	0	0	1,455	4,085	5,540
2025	0	0	0	0	1,117	3,780	4,897
2026	0	0	0	0	1,514	3,954	5,468

Table 8: Comparison of 2024, 2025 and 2026 Dwelling Counts

The number of people and dwellings within the 2024 contours has increased compared to 2023, but remains less than in 2019, when there were 14,033 people and 6,699 dwellings within the 54 dB $L_{Aeq,16h}$ noise contour. The 2025 contours contain less people and dwellings than the 2024 contours, due to the decrease in area of the 2025 contours.

The number of people and dwellings in the 57 dB contour is forecast to increase in 2026 from those in 2025, due to the increase in contour area. However, the 54 dB 2026 contour has fewer people and dwellings than in 2024 despite being slightly larger overall. This is due to slight differences in the shape of the 2024 and 2026 contours. The 2026 contours are slightly narrower, although longer, in the more densely populated areas south west of the airport. This slight difference in shape is primarily due to the forecast contours being based on the long term average runway split, whereas the 2024 contours are based on the actual runway usage in 2024 which had more departures from Runway 22 than the long term average.

There were no people or dwellings within the 63 – 60 dB $L_{Aeq,16h}$ contour band in 2024. In 2025 and 2026 there are forecast to be no people or dwellings within this contour band.

5.0 QUOTA COUNT

As part of their planning agreement BCA are required to report the quota count for the year just completed. The quota count is based on the aircraft movements in the 92 day summer period and is limited to 4,665.

The quota count production methodology is described in paragraphs 6.4 to 6.6 of *PART II The Covenants* of the agreement. In summary, the method requires the certification data for the aircraft type, which is then processed and compared to a scale to determine the quota count for the aircraft type when arriving, and separately when departing.

For the aircraft that operated, the noise certification data has been obtained either from the noise certificate of the specific aircraft, or for those registered in the UK from the CAA G-INFO database[2] and those registered in Switzerland from the FOCA Swiss Aircraft Register[3]. Where certification data was not available, quota count values have been taken from the Noise Databases published by the CAA[4]. In some cases the tables offer more than one value for an aircraft type, in these cases the expected QC value based on available information has been used, and where only limited information is available the higher QC value has been taken.

The resulting quota count total for summer 2024 was 1,549.125, which is less than the limit of 4,665. Table 9 below gives details of how the quota count for summer 2024 has been calculated, including the specific arrival and departure quota count values used for the key aircraft types. Where more than one quota count value has been used for an aircraft type based on the individual noise certificates, both values are shown.

[2] https://siteapps.caa.co.uk/g-info/

[3] https://app02.bazl.admin.ch/web/bazl/en/#/lfr/search

[4] https://www.caa.co.uk/commercial-industry/aircraft/airworthiness/certificates-and-permits/noise-certificates/aircraft-noise-certificate/

Aircraft Type	Arrivals	Arr. QC	Departures	Dep. QC	QC Total
Airbus A319ceo	683	0.25	523 156 3	0.25 0.5 1.0	382.500
Airbus A320ceo	400	0.25	394 7	0.5 1.0	304.000
Airbus A320neo	236	0.125	236	0.125	59.000
ATR 42	67	0.125	67	0	8.375
ATR 72	2,160	0.125	2,161	0.125	540.125
Cessna Citation Excel	18	0.125	19	0	2.250
Dassault Falcon 2000	7	0.125	6	0.25	2.375
Embraer E145	85	0.125	85	0.125	21.250
Embraer E175	27	0.25	27	0.25	13.500
Embraer E190	320	0.125	49 272	0.25 0.5	188.250
Embraer Legacy 500	5 2	0 0.125	5 2	0 0.25	0.500
Embraer Phenom 300	9	0	9	0	0.000
Other[1]	88	Various	88	Various	27.000
Total	**4,107**	-	**4,109**	-	**1,549.125**

[1] Includes 12 movements by helicopters

Table 9: Summer 2024 Quota Count

6.0 MARGINALLY COMPLIANT CHAPTER 3 AIRCRAFT MOVEMENTS

As part of their planning agreement BCA are required to accept in respect of jet aircraft, only those air traffic movements that comply with the certificate limits, as laid down in Chapter 3 of Annex 16, of the standards adopted by the International Civil Aviation Organisation Council and which are not Marginally Compliant Aircraft. In the agreement these are defined as:

> 11. 'Marginally Compliant Aircraft' means civil subsonic jet aeroplanes, that meet the certification limits as laid down in Chapter 3 of Annex 16 by a cumulative margin of not more than 5 EPNdB, whereby the cumulative margin is a figure expressed in EPNdB obtained by adding the individual margins at each of the three reference noise management points as defined in Chapter 3 of Annex 16

BCA are required to report any movements in the year just completed by any aircraft not permitted to use the airport.

For the aircraft that operated in 2024, the noise certification data has been obtained either from the noise certificate of the specific aircraft, or for those registered in the UK from the CAA G-INFO database[2] and those registered in Switzerland from the FOCA Swiss Aircraft Register[3]. Where specific certification data was not available, certification values have been taken from the latest EASA Approved Noise Levels[5].

In some cases, the EASA database offers more than one possible classification for an aircraft type. In these cases a worst case assumption has been made.

There were no movements in 2024 by jet or large propeller aircraft types that do not meet the requirements of Chapter 3 or were only marginally compliant with Chapter 3. Table 10 below provides a breakdown of the number of movements that fully comply with Chapter 3 or comply with the more stringent Chapter 4 or Chapter 14. The certification of helicopters and light propeller aircraft is to different standards and so these aircraft have been separately recorded.

[5] https://www.easa.europa.eu/easa-and-you/environment/easa-certification-noise-levels

2024 Aircraft Movements					
Not Chapter 3 or Chapter 3 Marginally Compliant	**Chapter 3 Fully Compliant**	**Chapter 4**	**Chapter 14**	**Helicopters and Light Propeller Aircraft**	**Total**
0	8	4,779	25,359	222	30,368

Table 10: 2024 Aircraft Noise Classification

7.0 SUMMARY

$L_{Aeq,16h}$ noise contours and the associated population counts have been produced, based on the actual movements during the 92 day summer period in 2024, and the forecast summer movements for 2025 and 2026. The movements used to produce them have been reported in addition to the contours and the number of people they contain.

The area of the 2024 57 dB $L_{Aeq,16h}$ contour area at 3.09 km^2 is well below the contour area limit of 5.2 km^2. The noise contour areas are forecast to decrease in 2025 then increase in 2026. However, the area of the 57 dB contours for 2025 and 2026 are both forecast to remain below the contour area limit.

The 2024 57 dB $L_{Aeq,16h}$ contour contains 1,455 dwellings and a population of 3,252. There are no dwellings in the 60 dB or higher contours. The number of people and dwellings within the contours is forecast to initially decrease then increase over the next two years, mainly due to the forecast changes in aircraft movements. In both 2025 and 2026 there are forecast to be no people or dwellings in the 60 – 63 dB contour band, and no dwellings in the 63 dB or higher contours.

The quota count total for summer 2024 was 1,549.125, which is less than the limit of 4,665.

There were no movements in 2024 by jet or large propeller aircraft types that do not meet the requirements of Chapter 3 or are only marginally compliant with Chapter 3, in compliance with the restriction on the airport.

Abiyouth Sandakumar
for Bickerdike Allen Partners LLP

Duncan Rogers
Senior Acoustic Consultant

David Charles
Partner

LEGEND:

Initial Departure Routes

REVISIONS

Bickerdike Allen Partners
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com T: 0207 625 4411
www.bickerdikeallen.com F: 0207 625 0250

Belfast City Airport
Regular Reporting

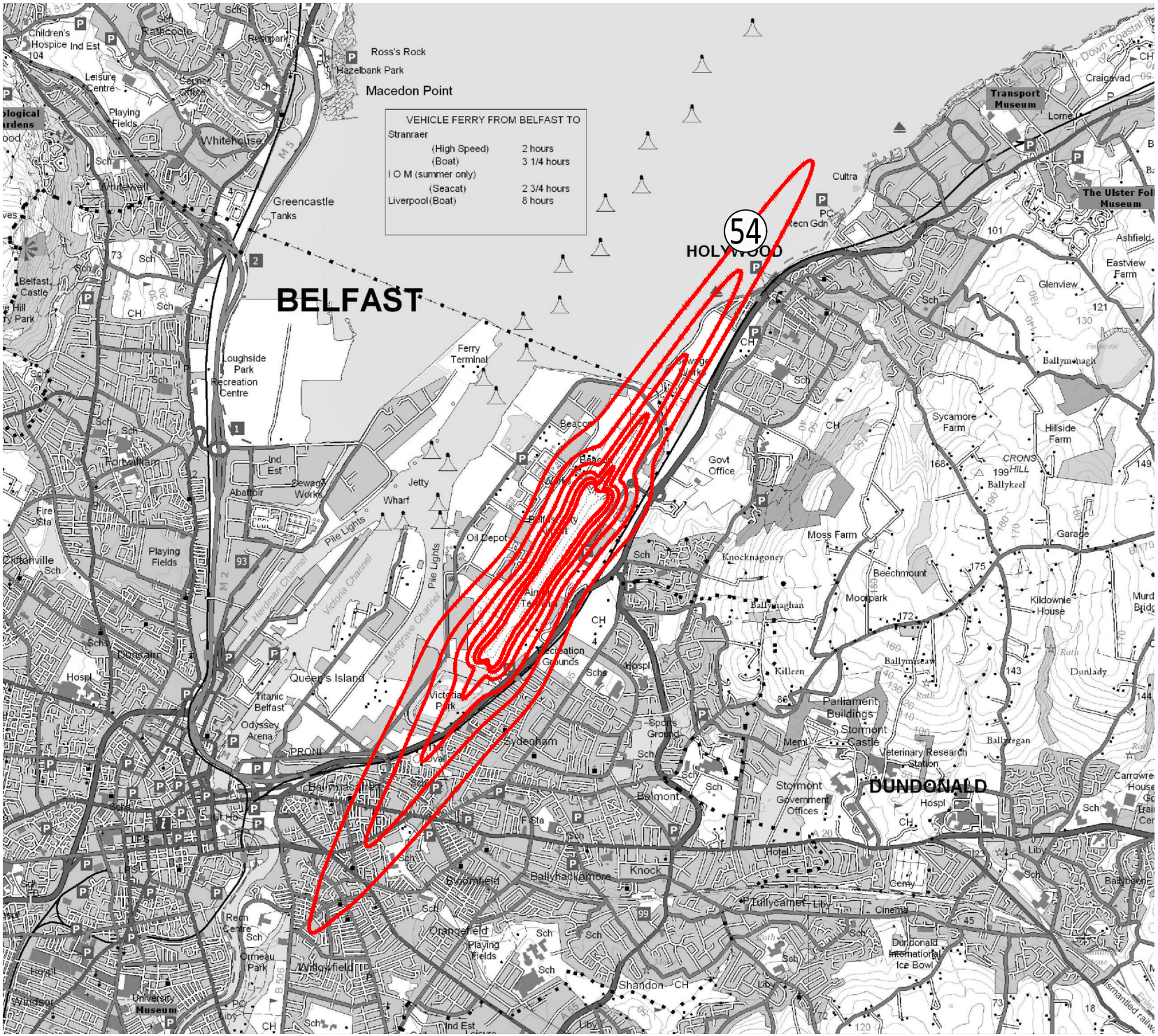
Figure 01
Initial Departure Routes

DRAWN: AS CHECKED: DR

DATE: February 2025 SCALE: 1:125,000@A4

FIGURE No:

A11298_16_DR001_1.0



LEGEND:

Noise Contours,
54 to 69 dB $L_{Aeq,16h}$ in 3 dB steps

REVISIONS

Bickerdike Allen Partners
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com T: 0207 625 4411
www.bickerdikeallen.com F: 0207 625 0250

Belfast City Airport
Regular Reporting

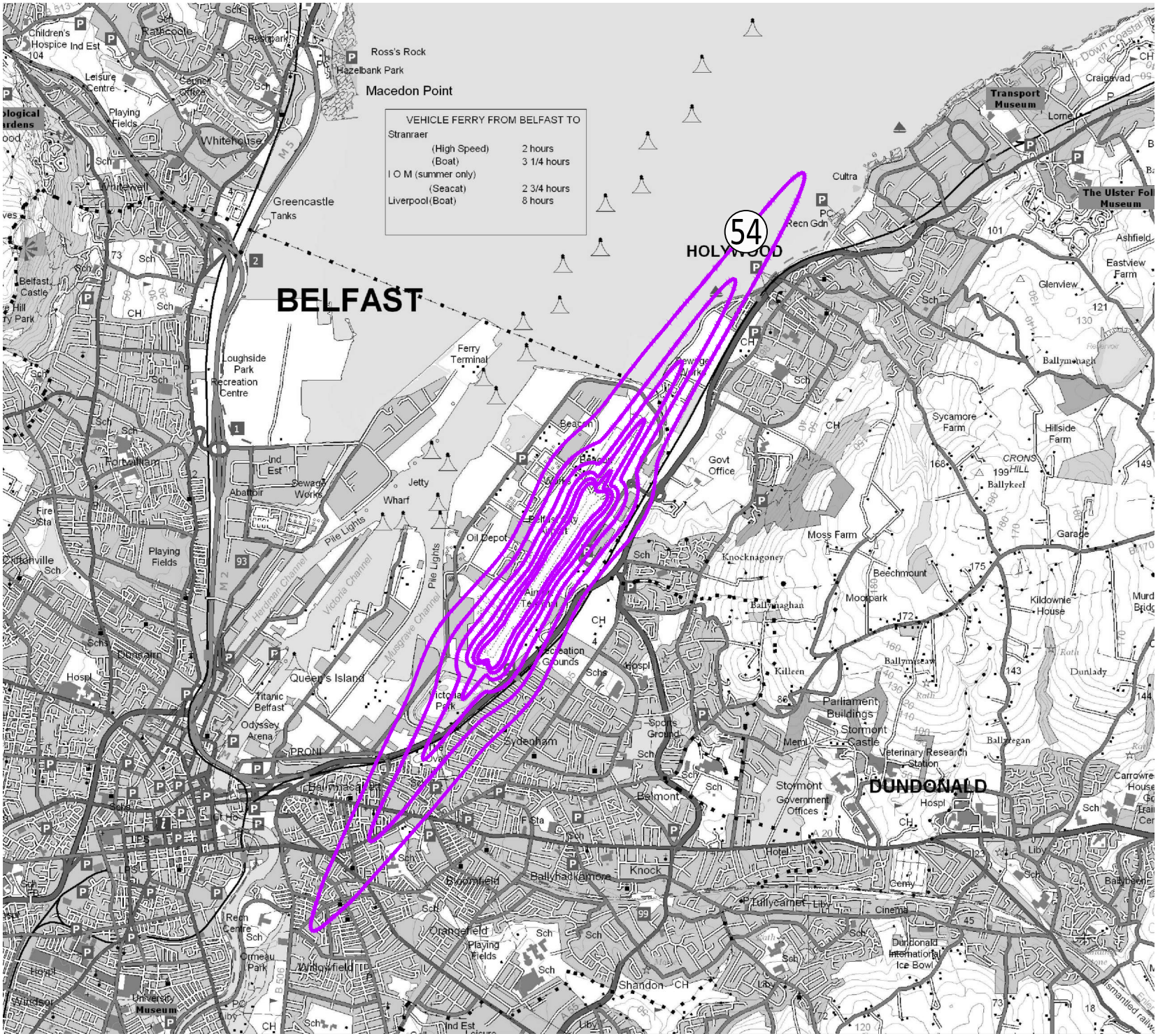
Figure 02
Summer Daytime Noise Contours
2024

DRAWN: AS CHECKED: DR

DATE: February 2025 SCALE: 1:50,000@A4

FIGURE No:

A11298_16_DR002_1.0



LEGEND:

Noise Contours,
54 to 69 dB $L_{Aeq,16h}$ in 3 dB steps

REVISIONS

Bickerdike Allen Partners
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com T: 0207 625 4411
www.bickerdikeallen.com F: 0207 625 0250

Belfast City Airport
Regular Reporting

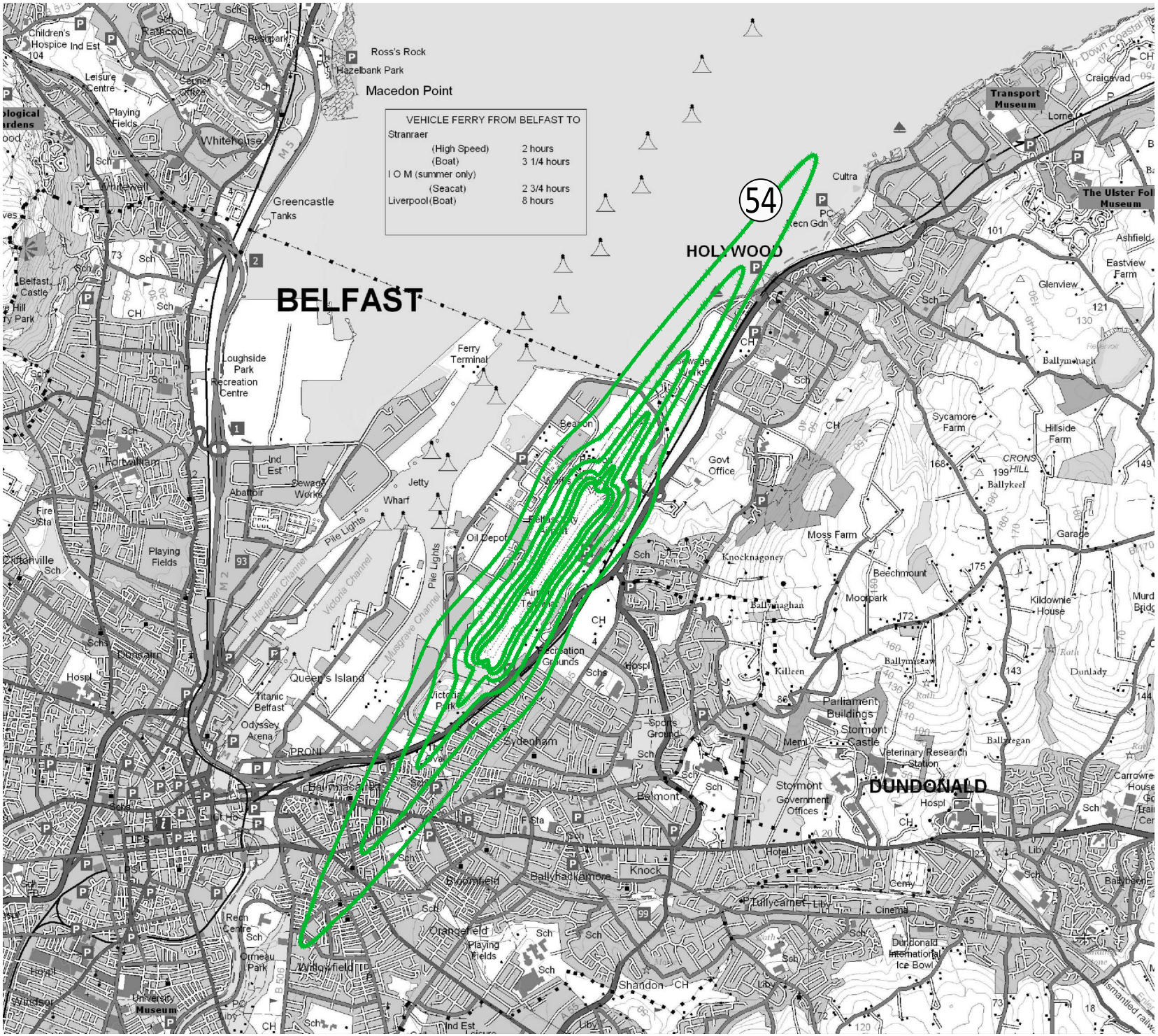
Figure 03
Summer Daytime Noise Contours
2025 Forecast

DRAWN: AS CHECKED: DR

DATE: February 2025 SCALE: 1:50,000@A4

FIGURE No:

A11298_16_DR003_1.0



LEGEND:

Noise Contours,
54 to 69 dB $L_{Aeq,16h}$ in 3 dB steps

REVISIONS

Bickerdike Allen Partners
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com T: 0207 625 4411
www.bickerdikeallen.com F: 0207 625 0250

Belfast City Airport
Regular Reporting

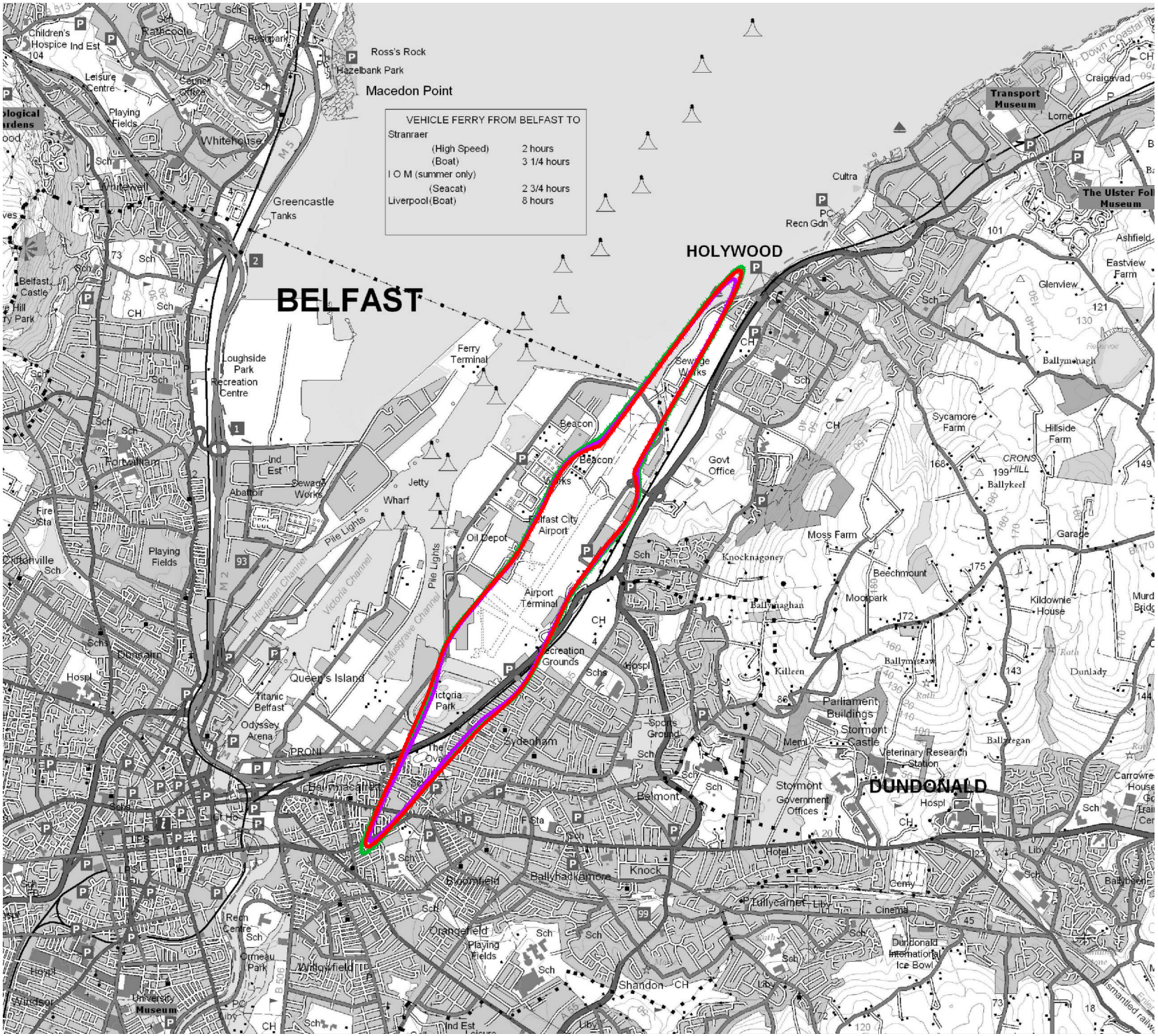
Figure 04
Summer Daytime Noise Contours
2026 Forecast

DRAWN: AS CHECKED: DR

DATE: February 2025 SCALE: 1:50,000@A4

FIGURE No:

A11298_16_DR004_1.0



LEGEND:

Noise Contours,

- 2024
- 2025
- 2026

REVISIONS

Bickerdike Allen Partners
Architecture
Acoustics
Technology

121 Salusbury Road, London, NW6 6RG
Email: mail@bickerdikeallen.com T: 0207 625 4411
www.bickerdikeallen.com F: 0207 625 0250

Belfast City Airport
Regular Reporting

Figure 05
Summer Daytime Noise Contours
2024, 2025 and 2026 57 dB $L_{Aeq,16h}$

DRAWN: AS CHECKED: DR

DATE: February 2025 SCALE: 1:50,000@A4

FIGURE No:

A11298_16_DR005_1.0

APPENDIX 1
GLOSSARY OF ACOUSTIC TERMINOLOGY

Sound

This is a physical vibration in the air, propagating away from a source, whether heard or not.

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2 x 10-5 Pascals) and the threshold of pain is around 120 dB.

The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in Watts. The sound power level, L_w is expressed in decibels, referenced to 10-12 Watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules which transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

A-Weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Effective Perceived Noise Level

Effective Perceived Noise Level (EPNL) is a measure used to express noise levels which analyses the frequency spectra of noise events as well as the duration of sound. The measurement unit for EPNL is EPNdB. This measure is used for the noise certification of aircraft, and the subsequent quota count determination.

Quota Count

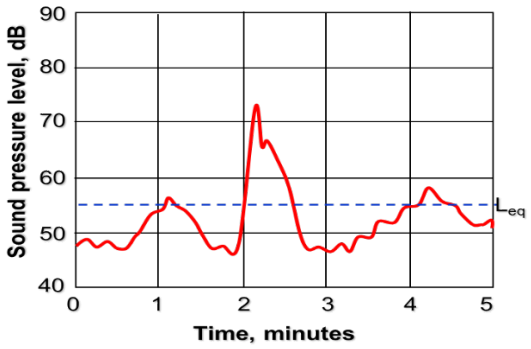
The value assigned to one take-off or to one landing by the aircraft in question, this number being related to its noise classification. The classification is determined from the noise level band in EPNdB, for take-off or landing, as the case may be, for the aircraft in question, as defined in the individual aircraft's noise certificate.

Environmental noise descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

$L_{Aeq,T}$ The most widely applicable unit is the equivalent continuous A-weighted sound pressure level (LAeq,T). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.

This is shown in the graph below:



Noise Contour

A line which joins points on the ground which receive the same noise exposure from the nearby airborne aircraft; often for daytime studies the exposure is considered over a 16 hour period ($L_{Aeq,16h}$) and for night studies over a 8 hour period (LAeq,8h) with a range of levels used to express the different exposures.

Sound transmission in the open air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law. In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB.

Meteorological effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradients are variable and difficult to predict.

Aviation terms

NPR

Noise preferential route – departure flight ground tracks to be followed by aircraft to minimise noise disturbance on the surrounding population.

Dispersion

Due to the effect of the wind, aircraft speed, and pilot choice differing aircraft tracks about the nominal track are flown; this is known as dispersion around a nominal track.

Start of Roll

The position on a runway where aircraft commence their take-off runs.

Threshold

The beginning of that portion of the runway usable for landing.

Radar Vectoring

Aircraft are provided by Air Traffic Control (ATC) with various instructions which result in changes of heading, altitude, and speed. The controller affects safe separation from other traffic by use of radar.

Nominal Tracks

Using recognised international design techniques, tracks across the ground can be delineated for departing and arriving aircraft. These tracks are nominal because they can be influenced by the wind, ATC instructions, the accuracy of navigational systems and the flight characteristics of individual aircraft. In UK it is usual to permit a 1500m swathe to be established about the nominal track for the purposes of assessing whether an aircraft has stayed on track.

Altitude

Height of aircraft above sea level.

APPENDIX 2
GEORGE BEST BELFAST CITY AIRPORT
2024 NOISE CONTOUR VALIDATION

INTRODUCTION

Summer noise contours have been prepared for George Best Belfast City Airport (GBBCA) for a number of years. This has involved the use of the Federal Aviation Administration (FAA) prediction methodology, the Integrated Noise Model (INM).

The INM software has been used around the world in over 50 countries and consequently is flexible enough to allow local circumstances to be taken into account. This can be achieved by entering specific departure routes, operational profiles, or weather conditions but also by creating or modifying specific noise information for aircraft types.

In order to improve the accuracy of the modelling at GBBCA, validation exercises have been conducted which compare predicted noise levels for individual aircraft movements with noise levels measured at Belfast. This is particularly useful for aircraft types where the INM does not have actual data and so suggests a substitute type.

VALIDATION

The validation exercises use the measured results from the permanent noise monitoring system at GBBCA. Specifically, the results from the Noise Monitoring Terminal (NMT) at Nettlefield Primary School (MP01) and at Kinnegar Army Base (MP02). These NMT locations are approximately 4.5 km from the start of roll location of runway 22 and 3.9 km from the start of roll location of runway 04 respectively. MP02 was relocated on 22nd August 2023 to a new location on the base. A correction factor has therefore been applied to the measured results at this monitor to an allow for the differences between the old and new locations.

Six aircraft types have been selected to be analysed in the validation exercise. These are the Airbus A319ceo, A320ceo and A320neo, the ATR 72, the Embraer E175 and E190. These aircraft types comprised around 90% of the summer period movements in 2024 and were also selected for the 2023 validation exercise. The 2024 validation is based on the results for the period 16th September 2023 to 15th September 2024, which comprise over 23,000 individual aircraft measurements. In 2024 a manual correlation exercise was carried out which resulted in a large increase in the number of correlated noise events compared to the automatic correlation rate, a similar exercise was undertaken in 2023.

The correlation exercise took the flights in the airport movement log, and for each looked for noise events from the relevant monitor whose maximum noise level time occurred within a window based on the time of the flight. This window allowed for the time the flights took from passing the monitor to reach the airport, and that the movement times in the log were to the nearest minute. For example for arrivals passing NMT1 the time window was from 1 minute 45 seconds before the movement log time until 15 seconds after.

In some instances more than one noise event was identified within the time window for a flight. Where this occurred the loudest of the events was taken as that which correlated.

The average measured noise levels used for the 2024 validation exercise are given below in Table A2.1 for these aircraft types, where they are compared with the corresponding measured results used for the 2023 validation exercise.

Aircraft Type	Operation	2024 Validation Measured Noise Levels (SEL dB)		2023 Validation Measured Noise Levels (SEL dB)	
		Number	Average[(1)]	Number	Average
Airbus A319ceo	Arrival Rwy 04	667	86.3	450	85.6
	Arrival Rwy 22	1,080	87.6	798	89.3
	Departure Rwy 04	505	89.3	387	88.8
	Departure Rwy 22	1,429	88.0	877	87.5
Airbus A320ceo	Arrival Rwy 04	595	86.1	523	85.5
	Arrival Rwy 22	797	87.6	1,260	89.6
	Departure Rwy 04	395	89.5	494	89.0
	Departure Rwy 22	1,176	87.5	1,276	87.4
Airbus A320neo	Arrival Rwy 04	231	84.9	140	84.4
	Arrival Rwy 22	322	85.9	292	88.1
	Departure Rwy 04	160	85.2	131	85.4
	Departure Rwy 22	466	84.3	312	84.0
ATR 72	Arrival Rwy 04	2,446	84.6	2,161	83.5
	Arrival Rwy 22	3,813	86.2	4,552	87.9
	Departure Rwy 04	1,909	82.1	2,178	82.0
	Departure Rwy 22	5,087	82.7	4,510	82.4
Embraer E175	Arrival Rwy 04	55	85.6	58	85.4
	Arrival Rwy 22	65	87.3	111	88.7
	Departure Rwy 04	31	89.5	58	89.2
	Departure Rwy 22	100	88.3	116	87.9
Embraer E190	Arrival Rwy 04	373	86.9	379	86.2
	Arrival Rwy 22	568	87.9	662	88.7
	Departure Rwy 04	249	90.4	357	89.8
	Departure Rwy 22	707	89.2	678	88.8

[(1)] 2024 results for Rwy 22 arrivals and Rwy 04 departures include an allowance for the new location of MP02

Table A2.1: Measured Noise Levels used for Validation in 2024 and 2023

For each aircraft type there are four sets of measured results; arrivals and departures at each of the two monitors. As the monitors are not located symmetrically with regard to the runway the noise levels at each will differ and so they need to be considered separately. For the individual movements within a set there is some variation, so every arrival by an aircraft type does not produce exactly the same noise level. There are a number of factors which contribute to this, in particular the weather conditions.

The spread of results is illustrated in Figures A2.1 to A2.2 below. These show the distribution of measured noise levels from the validation period for the most common operations, arrivals from the north and departures to the south, for the most common aircraft type in the summer period of 2024, the ATR 72.

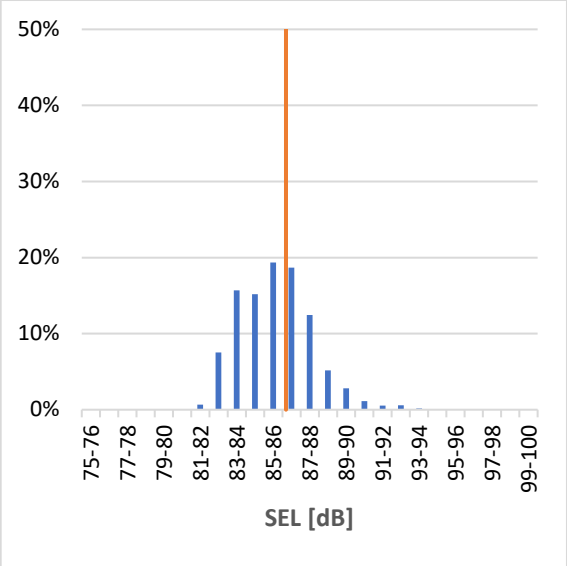


Figure A2.1 – ATR 72 Arrivals

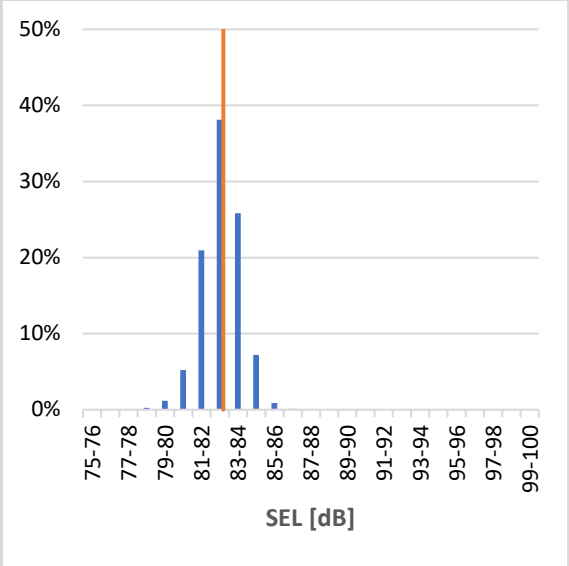


Figure A2.2 – Airbus ATR 72 Departures

The distributions have the large majority of measured noise levels closely grouped together around the averages, shown as a vertical red line on the figures, with a pattern that approximates to a normal distribution with a standard deviation of less than 2 dB. Such distributions of measured noise levels are commonly found at airport fixed noise monitors at a similar distance from the runway. From the distributions of measured noise levels for each of the aircraft types considered, the averages have been determined and compared to INM standard predicted noise levels. Table A2.2 gives the latest measured average noise levels for the six aircraft types considered for validation in 2024.

Aircraft Type	Operation	2024 Validation Measured Noise Levels (SEL dB)		INM Standard Assumptions (SEL dB)	
		Number	Average[(1)]	Type	Level
Airbus A319ceo	Arrival Rwy 04	667	86.3	A319-131	87.0
	Arrival Rwy 22	1,080	87.6		88.5
	Departure Rwy 04	505	89.3		87.4
	Departure Rwy 22	1,429	88.0		87.0
Airbus A320ceo	Arrival Rwy 04	595	86.1	A320-211	87.4
	Arrival Rwy 22	797	87.6		88.8
	Departure Rwy 04	395	89.5		88.9
	Departure Rwy 22	1,176	87.5		88.2
Airbus A320neo[(1)]	Arrival Rwy 04	231	84.9	A320-211	87.4
	Arrival Rwy 22	322	85.9		88.8
	Departure Rwy 04	160	85.2		88.9
	Departure Rwy 22	466	84.3		88.2
ATR 72[(1)]	Arrival Rwy 04	2,446	84.6	DO328	86.3
	Arrival Rwy 22	3,813	86.2		88.2
	Departure Rwy 04	1,909	82.1		81.9
	Departure Rwy 22	5,087	82.7		81.6
Embraer E175	Arrival Rwy 04	55	85.6	EMB175	85.5
	Arrival Rwy 22	65	87.3		86.8
	Departure Rwy 04	31	89.5		87.4
	Departure Rwy 22	100	88.3		87.4
Embraer E190	Arrival Rwy 04	373	86.9	EMB190	86.6
	Arrival Rwy 22	568	87.9		87.8
	Departure Rwy 04	249	90.4		86.6
	Departure Rwy 22	707	89.2		86.0

[(1)] 2024 results for Rwy 22 arrivals and Rwy 04 departures include an allowance for the new location of MP02

Table A2.2: Measured and Standard Predicted Noise Levels

Approach to Validation

The general approach to validation modifications has been to only change from the INM standard type when the measured results show clear divergence, i.e. an apparent prediction error in excess of 1.5 dB at a single NMT or an average error of over 1.0 dB across both NMTs. If the type has historically been modified from the standard type, then the approach has been to only change from the previous validation when there is an apparent prediction error or change in measured level in excess of 1.0 dB at a single NMT. Also, the approach seeks to determine any modification by aircraft type and aircraft operation, but not by runway used. This means one modification is adopted for all arrivals by an aircraft type, and one for all departures by an aircraft type.

Comparison of Measured and Predicted Results

No changes have been made to the modifications compared to those used for the 2023 contours. The final validation modifications are summarised below in Table A2.3. These have been used for the 2024, 2025 and 2026 contours.

Aircraft Type	INM Type	Modification to Movements Numbers	
		Arrivals	Departures
Airbus A319ceo	A319-131	A319-131 × 0.7	A319-131 × 1.2
Airbus A320ceo	A320-211	A320-211 × 0.8	A320-211 × 1.0
Airbus A320neo	A320-211	A320-211 × 0.6	A320-211 x 0.4
ATR 72	DO328/DHC6	DO328 × 0.6	DHC6 × 1.0
Bombardier Dash 8	SD330/DHC6	SD330 × 1.1	DHC6 x 0.5
Embraer E175	EMB175	EMB175 × 1.1	737500 x 1.2
Embraer E190	EMB190	EMB190 × 1.0	EMB190 × 1.8

Table A2.3: 2024 Validation Modifications

The need for modifications for the larger aircraft types in particular is not unexpected as they are available in a range of specifications with different engine types, sometimes from different manufacturers. This means that the actual type operated by the airline may differ to the one in the INM software.

The Airbus A319ceo has been modelled with the standard type but with departures factored up and arrivals factored down. The Airbus A320ceo, also using the standard type, is factored down on arrival, but unmodified on departure. The Airbus A320neo is a newer quieter version of the A320ceo and is therefore factored down on both arrival and departure.

For the ATR 72, modifications were needed to the INM type as the substitute type it suggests does not agree well with the measured departure results. On arrival the substitute type was used, but with movements factored down.

For the Embraer E175, modifications were needed to the INM type as the standard type does not agree well with the measured departure results. On arrival the standard type was used, but with movements factored up.

For the Embraer E190, the standard INM type has been used, but with departures factored up.

Effect of Validation

The effect of the validation exercise on the predicted noise levels for the six aircraft types is detailed in Table A2.4 which gives the differences between the measured noise levels and those predicted after allowing for the validation modifications.

Aircraft Type	Operation	Noise Levels (SEL dB)			
		Measured Average	INM Validated Prediction	Difference Predicted - Measured	Operation Weighted Average Difference
Airbus A319ceo	Arrival Rwy 04	86.3	85.5	-0.8	- 0.9
	Arrival Rwy 22	87.9	87.0	-0.9	
	Departure Rwy 04	89.0	88.2	-0.8	- 0.4
	Departure Rwy 22	88.0	87.8	-0.2	
Airbus A320ceo	Arrival Rwy 04	86.1	86.4	+0.3	+ 0.0
	Arrival Rwy 22	87.9	87.8	-0.1	
	Departure Rwy 04	89.2	88.9	-0.3	+ 0.3
	Departure Rwy 22	87.5	88.2	+0.7	
Airbus A320neo	Arrival Rwy 04	84.9	85.2	+0.3	+ 0.4
	Arrival Rwy 22	86.2	86.6	+0.4	
	Departure Rwy 04	85.0	84.9	-0.1	- 0.1
	Departure Rwy 22	84.3	84.2	-0.1	
ATR 72	Arrival Rwy 04	84.6	84.1	-0.5	- 0.4
	Arrival Rwy 22	86.4	86.0	-0.4	
	Departure Rwy 04	81.9	81.9	+0.0	- 0.7
	Departure Rwy 22	82.7	81.6	-1.1	
Embraer E175	Arrival Rwy 04	85.6	85.9	+0.3	- 0.1
	Arrival Rwy 22	87.6	87.2	-0.4	
	Departure Rwy 04	89.2	88.2	-1.0	- 0.4
	Departure Rwy 22	88.3	88.2	-0.1	
Embraer E190	Arrival Rwy 04	86.9	86.6	-0.3	- 0.3
	Arrival Rwy 22	88.2	87.8	-0.4	
	Departure Rwy 04	90.1	89.2	-0.9	- 0.7
	Departure Rwy 22	89.2	88.6	-0.6	

Table A2.4: Measured and Validated Predicted Noise Levels

Table A2.4 shows that with the validation modifications there is good correlation between measured and predicted noise levels with differences of less than 1 dB when results from both NMTs are operationally averaged.

The effect of the validation exercises on the contours depends both on the modifications made and the contribution of those aircraft types to the overall noise. Changes to infrequent aircraft types are likely to have very little effect on the contours.

SUMMARY

The validation of noise contours at George Best Belfast City Airport has been continually improved, more recently by checking predictions against the results obtained from GBBCA's noise monitors. This has demonstrated that without validation the standard INM assumptions would be less accurate.

The latest validation has considered six key aircraft types, which were selected based on their number of movements and noise levels. These are the Airbus A319ceo, Airbus A320ceo, Airbus A320neo, ATR 72, Embraer E175 and Embraer E190. The validation exercise has taken into account over 23,000 individual aircraft noise measurements for these types at GBBCA between September 2023 and September 2024.

GBBCA will continue to collect further detailed information from the fixed noise monitors at Nettlefield Primary School and the new location of MP02, which will be used to regularly validate future GBBCA contours. This is in line with the EiP Panel's advice on contour validation.

Appendix 5

AIRPORT OPERATIONAL INSTRUCTION (AOI)

AOI-07

Issue 8.1

Subject:	**Aircraft Engine Ground Running and Use of Auxiliary Power Units and Ground Power Units**
Date of issue:	**05 April 2024**
Authorised by:	DocuSigned by: 14438788A10A4AE... **Michael McDowell, Airfield Operations Manager**

It is the responsibility of all employers to ensure that relevant Airport Operational Instructions (AOIs) and Operational Safety Notices (OSNs) are brought to the attention of their staff. However, individuals remain responsible for their own actions and those who are in doubt should consult their supervisor or manager within their own organisation.

1. Introduction

Belfast City Airport (BCA) is responsible for taking adequate measures to ensure the safety of aircraft, vehicles and persons using the airside environment.

Environmental Policy:
"Through its programme of sustainable development, GBBCA is committed to achieving a balance between the social and economic benefits of the airport's growth and its environmental impacts. We will work with all airport 'stakeholders', including statutory authorities, airlines, business partners and local residents to minimise the impact of our operations on the environment".

2. Distribution and Control

This AOI is published and distributed electronically to organisations involved with the operation of aircraft and supporting services at BCA. The controlled copy is located in the Airport Online Document Library.

Hard copies are not produced by BCA for distribution but may be printed for internal office use. Any hard copies printed by recipients of the electronic distribution are not controlled. Care must be taken to ensure that paper copies are disposed of or fully as required.

Comments or queries relating to the contents of this document should be directed to:

Airfield Operations Manager
Belfast City Airport
Sydenham Bypass
BELFAST
BT3 9JH

Telephone: 028 9093 5006

3. Acronyms

AOI	Airport Operational Instruction
APU	Auxiliary Power Unit
ATC	Air Traffic Control
BCA	Belfast City Airport
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
FEGP	Fixed Electrical Ground Power
FOD	Foreign Object Debris
GPU	Ground Power Unit
OPS	Airfield Operations
OSN	Operational Safety Notice
SMS	Safety Management System

4. Requirements

Aircraft Engine Ground Running

Aircraft engine ground runs are required under certain conditions to enable engineers to certify that an aircraft is "fit for service".

However, engine ground runs cause both significant adverse impact on the environment and create hazards on the apron. They are therefore strictly controlled within the terms of the BCA Environmental Policy, and CAP 642 guidelines.

CAP 642 (Airside Safety Management) advises:
"Engine runs and check starts should be controlled and only carried out with prior approval of the aerodrome operator who should specify the conditions to be applied." This AOI outlines these conditions.

5. Definitions

Engine Ground Run

An engine ground run is defined in **CAP 642 (Airside Safety Management)** as:

"Any engine start-up not followed immediately by the departure of the aircraft concerned."

Person in Charge

The Person in Charge is that ground engineer in contact with the flight deck (usually via headset). This person has full view of the surrounding area and can indicate to the flight deck immediately to cut the engine power in the event of an incident or potential hazard.

Auxiliary Power Units (APU)

Small gas turbines normally mounted in the rear fuselage of most aircraft. They are used to power electrical systems on board, to run air circulation and conditioning systems and to supply bleed air for starting main engines before or during push back.

Mobile Ground Power Units (GPU)

A vehicle capable of supplying power to aircraft parked on the ground usually powered by diesel fuel.

Fixed Electrical Ground Power (FEGP)

Ground based power system which uses grid electricity. An electrical supply cable is plugged into the underside of the aircraft and draws its power from the airport's electricity supply.

6. Hazards

Engine ground runs present an extremely dangerous and complex operation. They carry a high risk of engine ingestion and pose a hazard to ramp personnel and vehicular traffic.

7. General Rules

It must always be ensured that:

- The 'Person in Charge' is in communication with the flight deck (ideally via a headset).
- All the aircraft wheels are chocked (aprons only).
- If on the main apron, the rear of stand roadway has been closed off.

Use of aircraft Auxiliary Power Units (APUs)

Aircraft APUs generate high levels of noise and significant fumes which can cause disturbance to those on nearby aprons, in buildings and in residential areas.

BCA has provided Fixed Electrical Ground Power (FEGP) on Stands 1–10 for the purpose of minimising levels of ambient noise and emissions.

On stands where FEGP is available, it must be used in preference to APUs, where possible.

Airlines and handlers are to ensure that APUs are used for the absolute minimum time necessary to meet operational needs.

APUs are not to be used as a substitute for either FEGP or GPUs.

Use of mobile Ground Power Units (GPUs)

Constantly running mobile GPUs can cause high noise levels on the apron, are an additional obstruction to free movement around a parked aircraft and, if poorly maintained, may deposit oil spillage on the stand.

BCA has provided FEGP on Stands 1–10 for the purpose of minimising levels of ambient noise and emissions.

On stands where FEGP is available, it must be used in preference to GPUs, where possible.

Where there is no alternative to the use of GPUs they should be parked outside the stand (when aircraft parked nose in) and promptly shut down when power is no longer required. The GPU should never be parked over a drain.

When purchasing new GPUs airlines and handling agents are urged to make low working noise levels a prime requirement in the selection process.

8. Approval

Aircraft Engine Ground Running

8.1 Aircraft Parked on Apron Areas (Main Apron & General Aviation Apron)

All engine ground runs shall be subject to the prior approval of Airfield Operations (extension **5027**). Airfield Operations (OPS) will record details electronically for audit purposes.

Requests to carry out engine ground runs must be made no later than 2130 hours' local time.

All engine ground runs are strictly prohibited between 2230 – 0600 hours.

Engine ground runs are permitted on apron areas at "engine idle" setting for short periods of time only. **All other engine runs including high powered runs** require the aircraft to be positioned to the north side of the airfield at "**Sierra"**.

A map illustrating the location of "Sierra" on the north side of the airfield is contained at **Annex A**.

Prior to making a request for permission to carry out an engine ground run the 'Person in Charge' must assess the surrounding area for potential hazards.

The 'Person in Charge' should then seek prior permission to conduct the engine ground run by contacting OPS (extension **5027**) or alternatively by contacting Flight Dispatch on the ground handling frequency. Flight Dispatch staff shall in turn contact OPS.

OPS will advise if the engine ground run is approved.

Once approval has been obtained pilots/engineers must seek permission to start engines from Air Traffic Control (ATC) – Radio contact must be maintained with ATC at all times.

8.2 Aircraft parked on "Sierra" (Airfield north side)

Engine ground runs in this area may be of a higher power.

Engine ground runs in this area are permitted between 0630 – 2130 hours. Pilots/engineers who wish to carry out engine grounds runs on the north side of the airfield between these hours should seek prior permission from OPS (extension **5027**).

Annex B sets out the 'Follow-me' procedure for engineers taxiing aircraft between the apron and Sierra.

8.3 Use of Auxiliary Power Units (APUs)

Use of APUs for aircraft maintenance purposes is strictly prohibited between 2230 – 0600 hours unless there is no alternative power source available (FEGP or GPU).

Should APU use be required outside of permitted hours (0600 hours – 2230 hours), prior approval must be sought from OPS (extension **5027**).

9. Safety

All personnel concerned with engine ground running must be fully conversant with this instruction, which must be complied with at all times.

The 'Person in Charge' of the engine ground run is responsible for ensuring the safety of personnel and equipment in the vicinity of the aircraft.

The use of aircraft strobe lighting is strictly prohibited during engine ground runs.

Consistent with CAA guidance, aircraft strobe lighting should not be displayed for any reason when an aircraft is on the apron or taxiway areas.

Any essential engineering work requiring a strobe light test shall only be carried out when the airport has closed.

9.1 Aircraft Parked on Apron Areas (Main Apron & General Aviation Apron)

The 'Person in Charge' of the engine ground run must ensure that all apron equipment is placed at a safe distance from the aircraft.

The aircraft must be positioned correctly on the stand in such a way that the engine running will not harm persons or cause damage to aircraft, buildings, installations, vehicles or equipment in the vicinity.

On the main apron, the rear of stand road must be closed to safeguard vehicular traffic, before the engine ground run is commenced. This must be undertaken by the airline engineering department or handling agent.

In the event that the closure of the rear of stand road will cause severe disruption to the timely dispatch of other aircraft, OPS may deny approval or request ATC to stop the engine ground run.

If aircraft are parked in a non-standard fashion (e.g. not nose in due to high winds) then all engine ground runs are prohibited on the main apron at this time.

The engine anti-collision beacons must be switched on for the duration of the engine ground run.

The 'Person in Charge' of the engine ground running activities must ensure that all the aircraft wheels are chocked and that the aircraft cannot move under any circumstances.

Engine ground running must not take place and must be ceased when passengers are being embarked/disembarked on any adjacent stands.

The 'Person in Charge' must be in communication with the flight deck at all times during engine ground runs. This will ensure that the engine(s) can be shut down if persons or vehicles move into a dangerous position in front of, behind or in the vicinity of a live engine.

In all instances where aircraft are unserviceable, they should be relocated to a non-contact stand or to the north side of the airfield. Airfield OPS will advise a suitable location.

9.2 Aircraft parked on "Sierra" (Airfield north side)

The aircraft must be positioned in such a way that the engine running will not harm persons or cause damage to aircraft, buildings, installations, vehicles or equipment in the vicinity. The aircraft must also be positioned within the white circle provided.

The "Person in Charge" must ensure that the ground area behind the aircraft is free from loose tarmac, stones and other materials.

The engine anti-collision beacon(s) must be switched on for the duration of the ground run.

The "Person in Charge" must be in communication with the flight deck at all times during engine ground runs. This will ensure that the engine(s) can be shut down if persons or vehicles move into a dangerous position in front of, behind or in the vicinity of a live engine.

NOTE: Where OPS find that the procedures outlined here are not being complied with, or where it is necessary in the interests of safety, they will request ATC, or directly to the 'Person in Charge', to have the engine ground run halted.

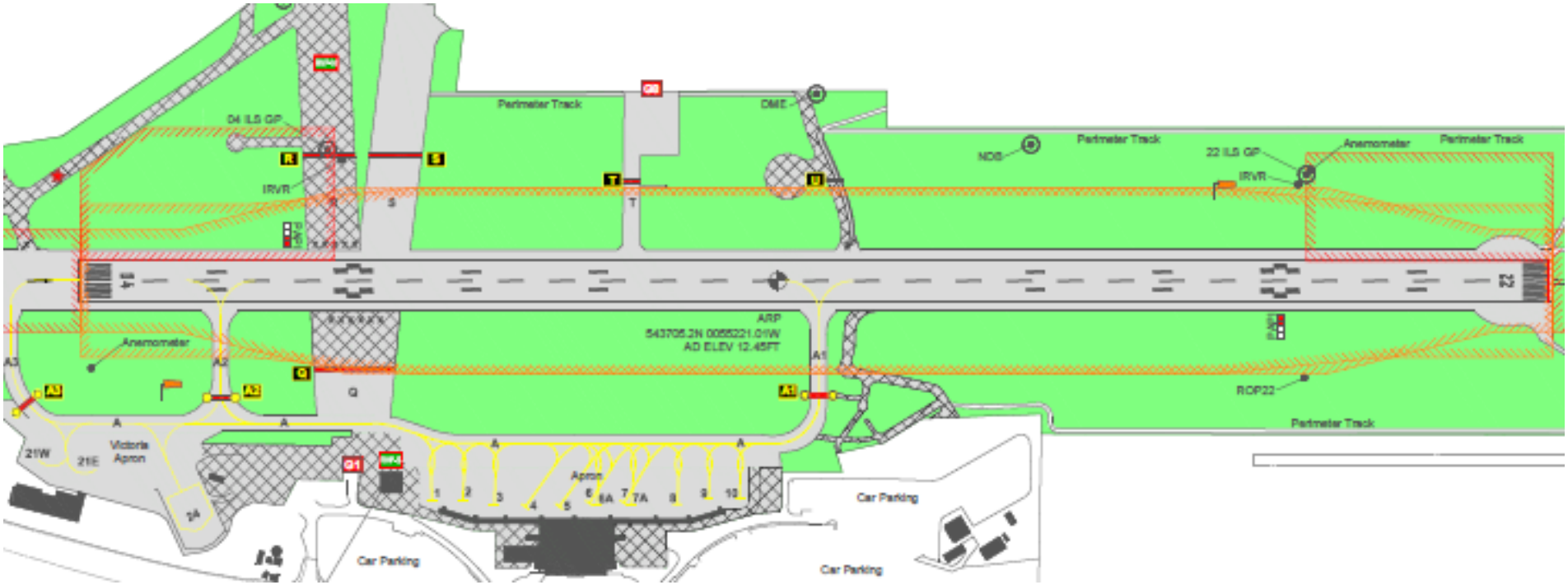
10. Monitoring of Standards

BCA, as the Airport Authority, operates a cautioning mechanism in airside areas.

Where individuals are found to be in breach of regulations, they may be subject to a Written Caution, which shall be formally recorded. This may also involve the issuing of penalty points

Airside Penalty Points will be issued in accordance with **AOI 05 – Airside Safety Regulation Scheme.**

ANNEX A


04 ILS GP
IRVR
Perimeter Track
D/ME
NDB
Perimeter Track
22 ILS GP
Anemometer
Perimeter Track
IRVR
04
22
ARP
543706.2N 0055221.0W
AD ELEV 12.45FT
Anemometer
ROP22
Perimeter Track
21W
21E
Victoria
Apron
Apron
Car Parking
Car Parking
Car Parking

ANNEX B

‘Follow-me’ Procedures	
1.	OPS contact ATC and pass the following information: Aircraft registration, type, current stand, and destination e.g. Sierra.
2.	When pushback clearance is received, OPS pass this on to pushback crew (verbally). OPS then move to the ROSR (to halt vehicle movements) and when in place give ‘thumbs-up’ for the pushback to commence.
3.	When the pushback is complete and all equipment and personnel are clear of the aircraft, the pushback team signal to engineers and OPS. OPS now position their ops vehicle in front of the aircraft (so the vehicle is visible from the cockpit).
4.	When the engineers are ready to taxi they should signal to the ops vehicle with their taxi light.
5.	OPS will now request permission to escort aircraft to destination.
6.	On receiving positive clearance, OPS will illuminate the ‘Follow-me’ sign on top of the Ops vehicle and move off slowly. The aircraft will follow. The engineers must keep a listening watch on the frequency so they are aware of clearance i.e. holding point only, or full clearance to Sierra.
7.	Once both ops vehicle and aircraft are clear of the holding point the ops vehicle will call runway vacated. The airline engineers will self-position the aircraft in the circle provided.
8.	Engineers must follow the safety instructions detailed in AOI-07.
9.	OPS are not required to remain with the engineers during the engine runs.
10.	Engineers should contact OPS by telephone when the engine run is complete.
11.	OPS will position the ops vehicle in front of the aircraft and contact ATC for clearance to cross the runway to the allocated stand.
12.	Once positive clearance has been received the ‘follow-me’ sign will be switched on.
13.	The allocated stand should be checked for FOD and stand guidance activated where appropriate.
14.	Once aircraft is on stand OPS will report taxiway and runway vacated.
Exceptions	
15.	If this procedure is from stand 21 then the aircraft engineer will contact ATC and ask for start-up. Then follow points 4 – 14.
16.	If LVPs are in force, then ATC will refer to AOI-12 and MATS part 2.
17.	Overspeed checks may be carried out on the taxiway at the discretion of ATC.

Appendix 6

Engine runs by Airline for the period: 01-Jan-24 - 31-Dec-2024

	Total	High	Low
Total	176	31	145
BA	4	0	4
Emerald Airways	170	30	140
Loganair	2	1	1

Date	Reg	Start	Finish	Location	Power
01-01-24	GCMJN	14:58	15:00	Runway	High
02-01-24	GCMMN	06:12	06:18	6a	Low
02-01-24	GCMJN	06:22	06:28	03	Low
03-01-24	GCMJM	15:00	15:10	03	High
03-01-24	GCMJM	20:04	20:15	Sierra	High
06-01-24	GCMMN	09:24	09:40	Sierra	High
06-01-24	GCMMK	14:43	14:47	Sierra	High
06-01-24	GCMMK	14:39	14:46	Sierra	High
09-01-24	GCMMN	17:31	17:35	Runway	High
10-01-24	GCMMN	06:45	07:45	Sierra	High
13-01-24	GCMMK	08:09	08:21	Sierra	High
13-01-24	GCMJN	16:25	16:30	10	Low
15-01-24	GCMJM	21:45	22:00	09	Low
16-01-24	GCMJN	14:55	15:02	01	Low
24-01-24	GCMJN	14:20	14:24	02	Low
24-01-24	GCMJN	18:00	18:16	Sierra	High
26-01-24	GCMJN	17:02	17:50	Sierra	High
27-01-24	GCMJN	06:49	06:53	Runway	High
29-01-24	GCMJM	06:21	06:25	09	Low
29-01-24	GCMMN	06:45	06:41	03	Low
30-01-24	GCMJM	13:15	13:19	09	Low
30-01-24	GCMJL	14:23	14:25	Taxiway	Low
30-01-24	GCMJL	14:25	14:28	10	High
02-02-24	GCMMK	06:10	06:15	01	Low
10-02-24	GCMMK	19:48	19:55	10	Low
10-02-24	GCMJM	21:01	21:08	02	Low
12-02-24	GCMMN	06:25	06:29	09	Low
12-02-24	GCMJM	21:22	21:29	10	Low
13-02-24	GCMMN	06:45	06:56	03	Low
13-02-24	GCMMT	12:35	12:38	10	Low
17-02-24	GCMMK	20:45	20:49	02	Low
18-02-24	GCMMK	06:30	06:35	02	Low
22-02-24	GCMMN	06:15	06:20	03	Low
22-02-24	GCMMN	08:15	08:21	03	Low
24-02-24	GCMMT	06:14	06:19	09	Low
26-02-24	GCMMT	06:15	06:18	6a	Low
28-02-24	GCMJN	21:52	22:02	01	Low
02-03-24	GCMMN	15:35	15:52	Sierra	High
04-03-24	GCMMN	16:20	16:31	Sierra	High
05-03-24	GCMJL	20:14	20:20	02	Low
06-03-24	GCMMN	15:20	15:26	09	Low
07-03-24	GCMJJ	20:46	20:52	09	Low
07-03-24	GCMMK	21:29	21:34	02	Low
10-03-24	GCMMN	09:54	10:08	09	Low
10-03-24	GCMMN	10:02	10:07	09	Low
16-03-24	GCMJM	18:42	18:53	09	Low
17-03-24	GCMMT	20:29	20:35	09	Low

19-03-24	GCMJL	06:35	06:42	6a	Low
26-03-24	GCMJM	18:52	18:57	6a	Low
26-03-24	GCMJJ	18:53	19:00	6a	Low
27-03-24	GCMJN	07:28	07:35	6a	Low
28-03-24	GCMJN	21:43	21:47	03	Low
29-03-24	GCMMT	18:05	18:10	02	Low
30-03-24	GCMJN	18:35	18:42	10	Low
07-04-24	GCMMT	21:15	21:22	01	Low
11-04-24	GCMMT	06:15	06:20	01	Low
13-04-24	GCMMT	20:10	20:15	21	Low
14-04-24	GCMMK	21:55	22:00	03	Low
20-04-24	GCMJM	06:16	06:21	7a	Low
20-04-24	G-CMMN	16:13	16:19	02	Low
21-04-24	GCMJL	07:42	07:47	05	Low
27-04-24	GCMMK	18:55	19:04	02	Low
27-04-24	GCMMT	19:23	19:31	02	Low
28-04-24	GCMMT	22:23	22:26	01	Low
01-05-24	GCMJL	06:14	06:16	01	Low
02-05-24	GCMMN	06:13	06:16	7a	Low
02-05-24	GCMJL	12:19	12:25	10	Low
04-05-24	GCMJJ	20:09	20:11	02	Low
04-05-24	GCMMN	20:20	20:22	10	Low
08-05-24	GCMJM	06:11	06:14	03	Low
11-05-24	GCMJM	16:00	16:15	Sierra	High
12-05-24	GCMMK	20:54	20:57	09	Low
13-05-24	G-TTNG	15:05	15:10	24	Low
13-05-24	GCMJN	07:20	07:25	7a	Low
13-05-24	GTTNG	08:20	08:40	24	Low
17-05-24	GCMJL	22:00	22:05	10	Low
18-05-24	GCMJM	20:10	20:15	09	Low
20-05-24	G-EUYT	16:47	17:01	04	Low
24-05-24	GCMJN	10:00	10:04	02	Low
31-05-24	GCMJJ	06:15	06:17	7a	Low
01-06-24	GCMMN	18:20	18:30	10	Low
02-06-24	G-CMMK	22:28	22:33	03	Low
08-06-24	G-CMJN	17:32	17:40	09	Low
09-06-24	GCMMT	22:00	22:05	7a	Low
10-06-24	G-CMJJ	13:46	13:55	10	Low
16-06-24	GCMJJ	08:46	08:50	03	Low
19-06-24	GCMJN	19:45	19:48	24	Low
22-06-24	GCMMK	15:22	15:25	Sierra	High
22-06-24	GCMMK	18:10	18:21	10	Low
23-06-24	GCMMT	11:32	11:37	21	Low
23-06-24	GCMMT	11:32	11:37	21	Low
29-06-24	GCMJM	06:35	06:42	10	Low
30-06-24	GCMJJ	07:40	07:46	01	Low
30-06-24	GCMMT	08:47	08:53	10	Low
05-07-24	GCMJL	20:31	20:40	10	Low
07-07-24	GCMMN	06:55	07:00	02	Low
07-07-24	GCMJL	07:46	07:51	01	Low
07-07-24	GCMMK	09:31	09:39	Sierra	High
08-07-24	GCMMT	13:31	13:57	Sierra	High
09-07-24	GCMMK	06:39	06:40	10	Low
09-07-24	GCMJL	15:22	15:29	10	Low
10-07-24	GCMMN	18:49	18:54	10	Low
10-07-24	GCMMN	18:53	18:58	10	Low
11-07-24	GCMMK	20:04	20:13	10	Low
12-07-24	GCMMT	20:02	22:30	Sierra	High

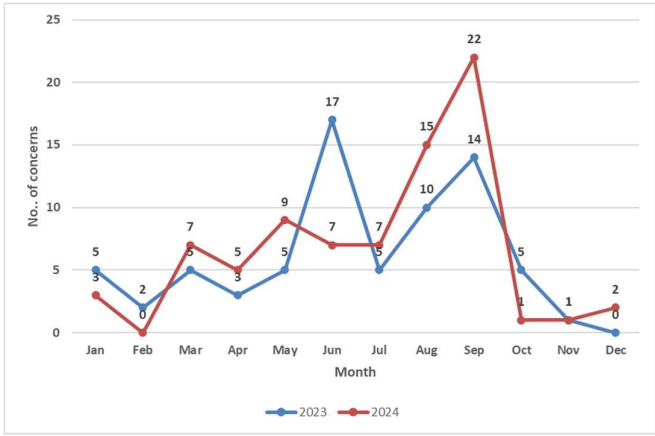
15-07-24	GCMMT	07:20	07:30	Sierra	High
19-07-24	GCMJJ	06:28	06:33	7a	Low
26-07-24	GCMMN	06:15	06:20	10	Low
26-07-24	GCMMN	07:19	07:26	10	Low
26-07-24	GCMMN	07:20	07:25	10	Low
26-07-24	GCMMN	08:02	08:12	10	Low
26-07-24	GCMMN	11:07	11:17	Sierra	High
26-07-24	GCMJN	21:06	21:15	02	Low
30-07-24	GTTOE	14:45	14:50	04	Low
03-08-24	GCMMN	18:22	18:24	10	Low
04-08-24	GCMJL	19:58	17:08	01	Low
06-08-24	GCMMK	08:55	09:00	07	Low
06-08-24	GCMMK	11:47	11:52	07	Low
16-08-24	GCMMK	22:21	22:25	09	Low
17-08-24	GCMMT	19:08	19:13	09	Low
17-08-24	GCMJM	19:20	19:25	10	Low
17-08-24	GCMJM	19:15	19:21	10	Low
17-08-24	GCMMT	19:26	19:29	09	Low
20-08-24	GCMMN	06:29	06:34	7a	Low
24-08-24	GCMJJ	20:53	21:03	21	Low
31-08-24	GCMMN	10:15	10:25	Sierra	High
31-08-24	GCMMN	10:15	10:25	Sierra	High
31-08-24	GCMJL	21:08	21:18	24	Low
03-09-24	GCMJM	18:55	19:05	10	Low
08-09-24	GCMJL	14:05	14:12	01	Low
10-09-24	GCMMK	21:39	21:54	01	Low
15-09-24	GCMMT	07:15	07:20	02	Low
15-09-24	GCMMN	06:55	07:00	24	Low
15-09-24	GCMMN	12:12	12:16	24	Low
19-09-24	GCMMT	21:27	21:34	7a	Low
20-09-24	GCMMK	06:22	06:27	6a	Low
20-09-24	GCMMK	08:18	08:28	6a	Low
22-09-24	GCMMN	10:01	10:08	21	Low
23-09-24	GCMMK	06:11	06:20	02	Low
28-09-24	GCMJM	09:20	09:25	21	Low
28-09-24	GCMJN	18:33	18:36	01	Low
29-09-24	GCMJJ	07:44	07:50	09	Low
02-10-24	GCMJJ	09:40	09:45	09	Low
03-10-24	GCMMT	20:00	20:05	03	Low
03-10-24	GCMMK	21:30	21:33	09	Low
09-10-24	GCMJJ	19:38	19:45	01	Low
11-10-24	GCMMK	06:27	06:32	09	Low
13-10-24	GCMJJ	20:21	20:26	09	Low
14-10-24	GCMJJ	09:05	09:18	Sierra	High
14-10-24	GCMJL	20:04	20:09	01	Low
16-10-24	GCMJL	13:19	13:25	02	Low
21-10-24	GLMRA	15:00	15:05	01	Low
21-10-24	GLMRA	15:10	15:15	Taxiway	High
05-11-24	GCMMK	14:28	14:33	10	Low
05-11-24	GCMMK	14:26	14:35	10	Low
06-11-24	GCMJL	12:20	12:27	01	Low
06-11-24	GCMJL	12:15	12:25	01	Low
12-11-24	GCMJN	08:47	08:53	02	Low
12-11-24	GCMJL	19:14	19:24	10	Low
13-11-24	GCMMT	13:50	13:50	09	Low
13-11-24	GCMMT	14:35	14:40	09	Low
23-11-24	GCMMT	07:57	08:02	7a	Low
24-11-24	GCMJJ	07:15	07:20	03	Low

26-11-24	GCMMN	20:05	20:10	10	Low
03-12-24	GCMMK	15:52	16:00	10	Low
09-12-24	GCMJL	14:22	14:35	Sierra	High
09-12-24	GCMJL	16:35	16:47	21	Low
10-12-24	GCMJL	07:40	08:00	Sierra	High
10-12-24	GCMJL	07:40	07:55	Sierra	High
11-12-24	GCMJL	06:44	06:48	21	Low
11-12-24	GCMJL	08:04	08:37	Sierra	High
13-12-24	GCMJJ	07:49	07:54	01	Low
13-12-24	GCMJJ	08:20	08:40	Sierra	High
14-12-24	GCMJJ	16:17	16:22	10	Low
14-12-24	GCMJL	16:34	16:39	09	Low
30-12-24	GCMMN	18:37	18:40	6a	Low

Appendix 7 - Noise Concerns Summary 2024

Concerns by Type and Area, 2024																
Area	Bias over City / Flight paths	Low	Noise	Track keeping	After 2130	Disturbed Sleep / Pre-0700 / Early / Weekend	Aircraft Type / Size	Frequency / Too many flights	Ground Noise	Air Quality / Pollution	Specific Aircraft	Other	TOTAL Concerns by Area	% Concerns by Area	TOTAL Individuals logging Concerns By Area	Concern Area by Runway End
Comber / D'adee / Bangor / Dundonald													0	0%	0	Lough
Carnalea / Crawfordsburn													0	0%	0	Lough
Helen's Bay													0	0%	0	Lough
Craigavad													0	0%	0	Lough
Seahill / Cultra / Marino													0	0%	0	Lough
Holywood		2		26									28	35%	8	Lough
Kinnegar													0	0%	0	Lough
Knocknagoney / Old Holywood Road	1												1	1%	1	Lough
Sydenham / Inverary					1								1	1%	1	City
Ballymacarret													0	0%	0	City
City Centre			1										1	1%	1	City
Beersbridge / Albertbridge													0	0%	0	City
Newtownards Road / Ballymacarret / Connswater					19								19	24%	1	City
Donegall Road													0	0%	0	City
Ravenhill / Cregagh / Castlereagh	1												1	1%	1	City
Ormeau / Annadale	2	1			1	2							6	8%	1	City
Stranmillis / Malone	2				5								7	9%	1	City
Drumbeg / Tullyard													0	0%	0	City
G'wally / C'duff / N'breda / K'breda / Rosetta / Four Winds													0	0%	0	City
Not Given	2			3	10								15	19%	9	Not given
TOTALS	8	3	1	29	36	2	0	0	0	0	0	0	79	100%	24	
Percent	10%	4%	1%	37%	46%	3%	0%	0%	0%	0%	0%	0%	100%			

Concerns by Month		
	2023	2024
Jan	5	3
Feb	2	0
Mar	5	7
Apr	3	5
May	5	9
Jun	17	7
Jul	5	7
Aug	10	15
Sep	14	22
Oct	5	1
Nov	1	1
Dec	0	2
Total	72	79



Appendix 8 - Calibration Records

Type	Model	Serial No.	Calibration Date	Certificate No.	Lab/On-site Calibration	Notes
Meter	NOR-118	32115	23/01/2024	46524	Lab calibration	In use at NMT1
Pre-amp	GRAS-41AM	97213	23/01/2024	46523	Lab calibration (with 32115)	In use at NMT1
Mic	GRAS-42AS	73645	23/01/2024	46523	Lab calibration (with 32115/97213)	In use at NMT1
Meter	NOR-118	32112	17/01/2023	42986	Lab calibration	Not in use
Pre-amp	GRAS-41AM	56262	17/01/2023	42985	Lab calibration (with 32112)	Not in use
Mic	GRAS-42AS	69414	17/01/2023	42985	Lab calibration (with 32112/56262)	Not in use
Meter	NOR-118	32117	06/08/2024	48480	Lab calibration	In use at NMT2
Pre-amp	GRAS-41AM	95491	06/08/2024	48479	Lab calibration (with 32117)	In use at NMT2
Mic	GRAS-42AS	73643	06/08/2024	48479	Lab calibration (with 32117/95491)	In use at NMT2
Meter	NOR-118	32059	23/10/2023	U45706	Lab calibration (with 317389/168460	Not in use
Pre-amp	GRAS-41AM	317389	23/10/2023	45705	Lab calibration (with 32059/168460)	Not in use
Mic	GRAS-41AS	168460	23/10/2023	45705	Lab calibration (with 317389/32059	Not in use

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **48479**

Test Object: **Measurement Microphone**

Producer: **GRAS**
Type: **41AS**
Serial number: **73643**
Customer: **Belfast City Airport**
Address: **Airport Road, Belfast,**
Co. Antrim, Northern Ireland. BT3 9JH.
Contact Person: [redacted]
Order No:

Measurement Results	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	Capacitance (pF)
Measurement 1	*-27.23*	*43.49*	*21.02*
Measurement 2	*-27.23*	*43.51*	*21.08*
Measurement 3	*-27.23*	*43.49*	*21.08*
Result (Average):	***-27.23***	***43.50***	***21.06***
Expanded Uncertainty:	0.10		2.00
Degree of Freedom:	>100		>100
Coverage Factor:	2		2

The stated sensitivity is the pressure sensitivity at 250Hz, S_{250}, and is valid at reference conditions. The following correction factors have been applied during the measurement:

Pressure:0 dB/kPa Temperature:0 dB/°C Humidity:0 dB/%RH

Conditions	*Pressure kPa*	*Temperature °C*	*Humidty %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.292 ± 0.042	22.0 ± 0.1	61.5 ± 2.2

The calibration test report shown on the next page gives details of the response at other frequencies relative to this 250 Hz reference sensitivity. Results ≥100 Hz are obtained using an electrostatic actuator as described in BS EN 61094-6 and those below 100 Hz are obtained in a reference pressure chamber. Detailed results are available from the calibration laboratory upon request.

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a coverage probability of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level.

Calibration Dates:

Received date:	02/08/2024	Reviewed date:	06/08/2024
Calibration date:	06/08/2024	Issued date:	06/08/2024

Technicians: (Electronic certificate)

Calibrated by: [redacted]
Reviewed by: [redacted]

Certificate of Calibration

Continuation of Certificate number: 48479

Reference Calibrator: WSC9 (C) - Nor-1253.21816
Measurement Record: K:\C A\Calibration\Nor-1504\Nor-1017 MicCal\GRAS41AS_73643_M1.nmf

Preconditioning

The equipment was preconditioned for more than 12 hours at the specified calibration temperature and humidity.

Instruments and Program

A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Traceability

The measured values for sound pressure, frequency, voltage, capacitance, temperature, humidity and ambient pressure are traceable to an accredited national physical laboratory.

Observations

The differences between the two results at 100 Hz are within normal limits bearing in mind the different test methods and are taken into account in arriving at the uncertainties of measurement.

Method of Calibration

The open circuit sensitivity of the microphone has been determined at 250 Hz against a reference laboratory standard measurement microphone by insert voltage techniques using a laboratory standard sound calibrator as a transfer standard. The electrostatic actuator frequency response was then obtained for frequencies above 100 Hz as described in BS EN IEC 61094-6. In addition, where requested the optional free field frequency response over the range 2 – 100 Hz has been obtained using a pressure chamber; in this case the reference frequency is 100 Hz. All of these results and their associated uncertainties are detailed in the table on page 3 of this certificate. See the observations field below for details of any discrepancies between the 100 Hz results obtained via the electrostatic actuator and pressure chamber.

The overall uncertainty at any frequency Combined,Fn may be obtained by combining the uncertainty of the open circuit sensitivity S250 with the uncertainty of the actuator / or LF pressure response at any other frequency Act,Fn where Fn is the uncertainty at the frequency of interest using the relationship:

$$\text{Combined,Fn} = 2\sqrt{(2S250 + 2\text{ActFn}}\ )$$

Appendix to this certificate

Where data is available from the microphone manufacturer to correct the actuator / pressure frequency response to obtain the random incidence and / or free field response it is shown in the appendix to this certificate. The uncertainty information relating to these corrections is the responsibility of the microphone manufacturer and when it is available the total uncertainty for the corrected frequency response at each point may then be obtained by including the correction uncertainty in the root-sum-square formula given above. These responses are outside the UKAS accredited scope, but are provided for information.

Observations

Certificate of Calibration

Continuation of Certificate number: 48479

Numerical Results for Relative Frequency Response

Actuator Results					
Freq	Actuator	Uncert.	Freq	Actuator	Uncert.
Hz	dB re 250 Hz	dB	Hz	dB re 250 Hz	dB
100.0	0.01	0.21	5,010.70	-2.24	0.24
112.2	0.01	0.21	5,622.00	-2.63	0.24
125.9	0.01	0.21	6,307.90	-3.06	0.24
141.3	0.00	0.21	7,077.50	-3.54	0.24
158.5	0.00	0.21	7,940.90	-4.08	0.24
177.9	0.00	0.21	8,909.70	-4.71	0.48
199.6	0.00	0.21	9,996.70	-5.45	0.48
223.9	-0.01	0.21	11,216	-6.13	0.48
251.2	Ref	0.21	12,585	-6.70	0.48
281.9	-0.02	0.21	14,120	-7.29	0.48
316.3	-0.02	0.21	15,843	-7.83	0.48
354.9	-0.03	0.21	17,775	-8.47	0.70
398.2	-0.03	0.21	19,944	-9.46	0.70
446.7	-0.04	0.21	22377		0.90
501.2	-0.05	0.21	25107		0.90
562.4	-0.06	0.21	28170		0.90
631.0	-0.07	0.21	31607		0.90
708.0	-0.09	0.21	35463		0.90
794.4	-0.10	0.21	39790		0.90
891.3	-0.13	0.21	44644		0.90
1000.0	-0.15	0.21	50091		0.90
1122.0	-0.19	0.21	56202		1.20
1258.9	-0.23	0.21	63058		1.20
1412.5	-0.27	0.21	70752		1.20
1584.8	-0.33	0.21	79383		1.20
1778.1	-0.41	0.21	89068		1.20
1995.1	-0.49	0.21	99934		1.20
2238.5	-0.61	0.21	112126		-
2511.6	-0.74	0.21	125806		-
2818.0	-0.89	0.21	141154		-
3161.8	-1.08	0.21	158375		-
3547.5	-1.30	0.21	177696		-
3980.3	-1.57	0.21	199375		-
4465.9	-1.87	0.24	-		-

Low Frequency		
Freq	dB re 100 Hz	Uncert.
Hz		dB
2.0		0.7
2.2		0.7
2.5		0.7
2.8		0.7
3.2		0.7
3.6		0.7
4.0		0.7
4.5		0.7
5.0		0.7
5.6		0.7
6.3		0.7
7.1		0.7
8.0		0.7
8.9		0.7
10.0		0.7
11.2		0.7
12.6		0.7
14.1		0.7
15.9		0.7
17.8		0.7
20.0		0.7
22.4		0.7
25.1		0.7
28.2		0.7
31.6		0.7
35.5		0.7
39.8		0.7
44.7		0.7
50.1		0.7
56.3		0.7
63.1		0.7
70.8		0.7
79.5		0.7
89.2		0.7
100.0	Ref	0.7

Certificate of Calibration

Continuation of Certificate number: 48479

Appendix to certificate (not accredited). Random and Free Field Corrected Data

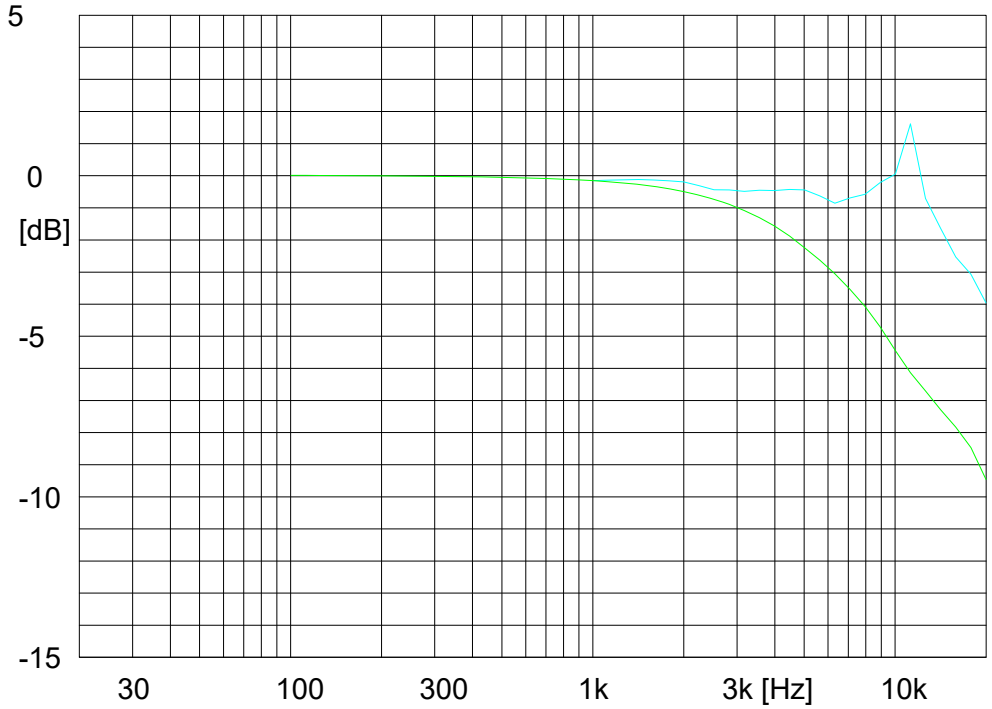
Corrected results, dB re 250 Hz					
Freq Hz	Random incidence corrected	Free field corrected	Freq Hz	Random incidence corrected	Free field corrected
100	0.01	0.01	5,010.70	-2.24	-0.44
112.2	0.01	0.01	5,622.00	-2.63	-0.63
125.9	0.01	0.01	6,307.90	-3.06	-0.86
141.3	0.00	0.00	7,077.50	-3.54	-0.69
158.5	0.00	0.00	7,940.90	-4.08	-0.58
177.9	0.00	0.00	8,909.70	-4.71	-0.21
199.6	0.00	0.00	9,996.70	-5.45	0.05
223.9	-0.01	-0.01	11,216	-6.13	1.62
251.2	-0.01	-0.01	12,585	-6.70	-0.70
281.9	-0.02	-0.02	14,120	-7.29	-1.64
316.3	-0.02	-0.02	15,843	-7.83	-2.53
354.9	-0.03	-0.03	17,775	-8.47	-3.07
398.2	-0.03	-0.03	19,944	-9.46	-3.96
446.7	-0.04	-0.04	22,377		
501.2	-0.05	-0.05	25,107		
562.4	-0.06	-0.06	28,170		
631	-0.07	-0.07	31,607		
708	-0.09	-0.09	35,463		
794.4	-0.10	-0.10	39,790		
891.3	-0.13	-0.13	44,644		
1,000.00	-0.15	-0.15	50,091		
1,122.00	-0.19	-0.14	56,202		
1,258.90	-0.23	-0.13	63,058		
1,412.50	-0.27	-0.12	70,752		
1,584.80	-0.33	-0.13	79,383		
1,778.10	-0.41	-0.16	89,068		
1,995.10	-0.49	-0.19	99,934		
2,238.50	-0.61	-0.31	112,126		
2,511.60	-0.74	-0.44	125,806		
2,818.00	-0.89	-0.44	141,154		
3,161.80	-1.08	-0.48	158,375		
3,547.50	-1.30	-0.45	177,696		
3,980.30	-1.57	-0.47	199,375		
4,465.90	-1.87	-0.42	-		

The corrections used to produce these random and free field responses are published by the manufacturer and they are responsible for the accuracy of the data and for the associated uncertainties to be applied. Campbell Associates Limited use their best endeavours to ensure the accuracy of this data but are not responsible for any errors, omissions or for ensuring that the data is of the current issue.

If the actuator response was not measured for any frequency, then the corresponding cell in the above table will be blank; similarly, if correction data is not available from the manufacturer the cell will also be blank.
Correction data for frequencies below 100 Hz are not required

** End of Table Section **

Microphone Calibration Certificate



GRAS
Type: 41AS

Serial no: 73643

Sensitivity: 43.50 mV/Pa
-27.23 ±0.10 dB re. 1 V/Pa
Capacitance: 21.1 ±2.0 pF
Date: 06/08/2024

Signature:

Measurement conditions:

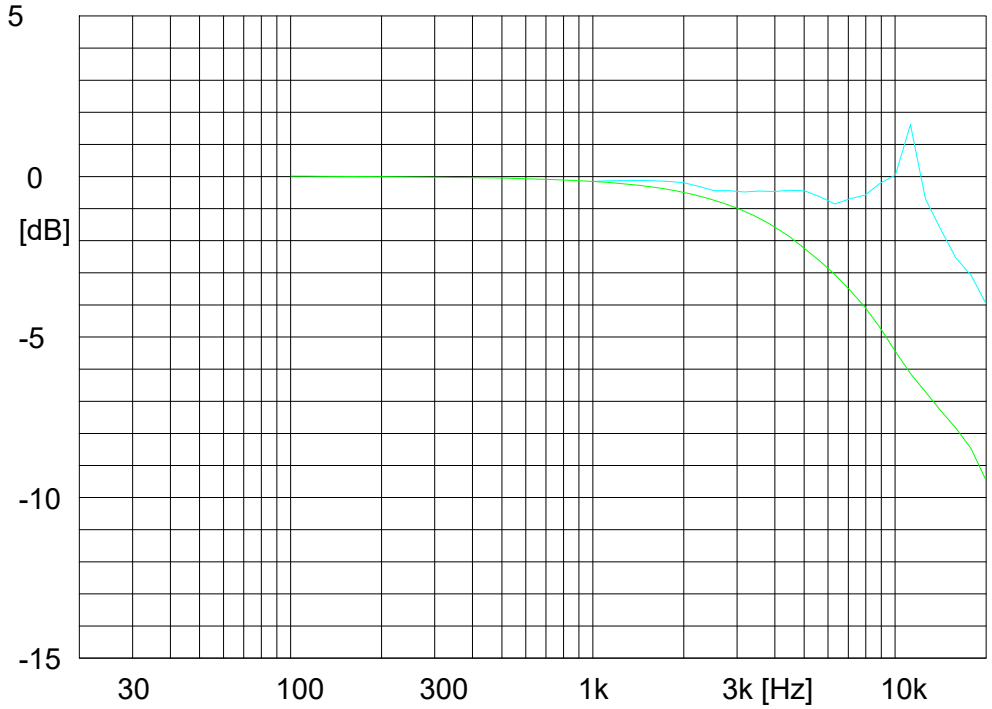
Polarisation voltage:	200.0 V
Pressure:	100.29 ±0.04 kPa
Temperature:	22.0 ±0.1 °C
Relative humidity:	61.5 ±2.2 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



GRAS
Type: 41AS

Serial no: 73643

Sensitivity: 43.50 mV/Pa
-27.23 ±0.10 dB re. 1 V/Pa
Capacitance: 21.1 ±2.0 pF
Date: 06/08/2024

Signature:

Measurement conditions:

Polarisation voltage:	200.0 V
Pressure:	100.29 ±0.04 kPa
Temperature:	22.0 ±0.1 °C
Relative humidity:	61.5 ±2.2 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Comment:

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **46523**

Test Object: **Measurement Microphone**

Producer: **GRAS**
Type: **41AS**
Serial number: **73645**
Customer: **Belfast City Airport**
Address: **Airport Road, Belfast,**
Co. Antrim, Northern Ireland. BT3 9JH.
Contact Person: [redacted]
Order No: [redacted]

Measurement Results	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	Capacitance (pF)
Measurement 1	*-27.73*	*41.08*	*20.67*
Measurement 2	*-27.73*	*41.09*	*20.75*
Measurement 3	*-27.73*	*41.09*	*20.78*
Result (Average):	***-27.73***	***41.09***	***20.73***
Expanded Uncertainty:	0.10		2.00
Degree of Freedom:	>100		>100
Coverage Factor:	2		2

The stated sensitivity is the pressure sensitivity at 250Hz, S_{250}, and is valid at reference conditions. The following correction factors have been applied during the measurement:
Pressure:0 dB/kPa Temperature:0 dB/°C Humidity:0 dB/%RH

Conditions	*Pressure kPa*	*Temperature °C*	*Humidty %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.87 ± 0.040	22.6 ± 0.1	39.1 ± 0.7

The calibration test report shown on the next page gives details of the response at other frequencies relative to this 250 Hz reference sensitivity. Results ≥100 Hz are obtained using an electrostatic actuator as described in BS EN 61094-6 and those below 100 Hz are obtained in a reference pressure chamber. Detailed results are available from the calibration laboratory upon request.

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a coverage probability of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level.

Calibration Dates:

Received date:	11/01/2024	Reviewed date:	25/01/2024
Calibration date:	23/01/2024	Issued date:	25/01/2024

Technicians: (Electronic certificate)

Calibrated by: [redacted]
Reviewed by: [redacted]

Certificate of Calibration

Continuation of Certificate number: 46523

Reference Calibrator: WSC2 (B) - GRAS42AA-18277
Measurement Record: K:\C A\Calibration\Nor-1504\Nor-1017 MicCal\GRAS41AS_73645_M1.nmf

Preconditioning
The equipment was preconditioned for more than 12 hours at the specified calibration temperature and humidity.

Instruments and Program
A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Traceability
The measured values for sound pressure, frequency, voltage, capacitance, temperature, humidity and ambient pressure are traceable to an accredited national physical laboratory.

Observations
The differences between the two results at 100 Hz are within normal limits bearing in mind the different test methods and are taken into account in arriving at the uncertainties of measurement.

Method of Calibration
The open circuit sensitivity of the microphone has been determined at 250 Hz against a reference laboratory standard measurement microphone by insert voltage techniques using a laboratory standard sound calibrator as a transfer standard. The electrostatic actuator frequency response was then obtained for frequencies above 100 Hz as described in BS EN IEC 61094-6. In addition, where requested the optional free field frequency response over the range 2 – 100 Hz has been obtained using a pressure chamber; in this case the reference frequency is 100 Hz. All of these results and their associated uncertainties are detailed in the table on page 3 of this certificate. See the observations field below for details of any discrepancies between the 100 Hz results obtained via the electrostatic actuator and pressure chamber.

The overall uncertainty at any frequency Combined,Fn may be obtained by combining the uncertainty of the open circuit sensitivity S250 with the uncertainty of the actuator / or LF pressure response at any other frequency Act,Fn where Fn is the uncertainty at the frequency of interest using the relationship:

$$\text{Combined,Fn} = 2\sqrt{(2\text{S250} + 2\text{ActFn})}$$

Appendix to this certificate
Where data is available from the microphone manufacturer to correct the actuator / pressure frequency response to obtain the random incidence and / or free field response it is shown in the appendix to this certificate. The uncertainty information relating to these corrections is the responsibility of the microphone manufacturer and when it is available the total uncertainty for the corrected frequency response at each point may then be obtained by including the correction uncertainty in the root-sum-square formula given above. These responses are outside the UKAS accredited scope, but are provided for information.

Observations

Continuation of Certificate number: **46523**

Numerical Results for Relative Frequency Response

Actuator Results					
Freq	Actuator	Uncert.	Freq	Actuator	Uncert.
Hz	dB re 250 Hz	dB	Hz	dB re 250 Hz	dB
100.0	0.01	0.21	5,010.70	-2.25	0.24
112.2	0.02	0.21	5,622.00	-2.65	0.24
125.9	0.02	0.21	6,307.90	-3.10	0.24
141.3	0.01	0.21	7,077.50	-3.61	0.24
158.5	0.01	0.21	7,940.90	-4.10	0.24
177.9	0.01	0.21	8,909.70	-4.70	0.48
199.6	0.01	0.21	9,996.70	-5.43	0.48
223.9	0.01	0.21	11,216	-6.22	0.48
251.2	Ref	0.21	12,585	-6.87	0.48
281.9	0.00	0.21	14,120	-7.36	0.48
316.3	-0.01	0.21	15,843	-7.89	0.48
354.9	-0.01	0.21	17,775	-8.51	0.70
398.2	-0.02	0.21	19,944	-9.50	0.70
446.7	-0.03	0.21	22377		0.90
501.2	-0.03	0.21	25107		0.90
562.4	-0.04	0.21	28170		0.90
631.0	-0.05	0.21	31607		0.90
708.0	-0.07	0.21	35463		0.90
794.4	-0.09	0.21	39790		0.90
891.3	-0.11	0.21	44644		0.90
1000.0	-0.13	0.21	50091		0.90
1122.0	-0.17	0.21	56202		1.20
1258.9	-0.21	0.21	63058		1.20
1412.5	-0.25	0.21	70752		1.20
1584.8	-0.32	0.21	79383		1.20
1778.1	-0.39	0.21	89068		1.20
1995.1	-0.48	0.21	99934		1.20
2238.5	-0.60	0.21	112126		-
2511.6	-0.73	0.21	125806		-
2818.0	-0.90	0.21	141154		-
3161.8	-1.09	0.21	158375		-
3547.5	-1.32	0.21	177696		-
3980.3	-1.61	0.21	199375		-
4465.9	-1.90	0.24	-		-

Low Frequency		
Freq	dB re 100 Hz	Uncert.
Hz		dB
2.0		0.7
2.2		0.7
2.5		0.7
2.8		0.7
3.2		0.7
3.6		0.7
4.0		0.7
4.5		0.7
5.0		0.7
5.6		0.7
6.3		0.7
7.1		0.7
8.0		0.7
8.9		0.7
10.0		0.7
11.2		0.7
12.6		0.7
14.1		0.7
15.9		0.7
17.8		0.7
20.0		0.7
22.4		0.7
25.1		0.7
28.2		0.7
31.6		0.7
35.5		0.7
39.8		0.7
44.7		0.7
50.1		0.7
56.3		0.7
63.1		0.7
70.8		0.7
79.5		0.7
89.2		0.7
100.0	Ref	0.7

Continuation of Certificate number: 46523

Appendix to certificate (not accredited). Random and Free Field Corrected Data

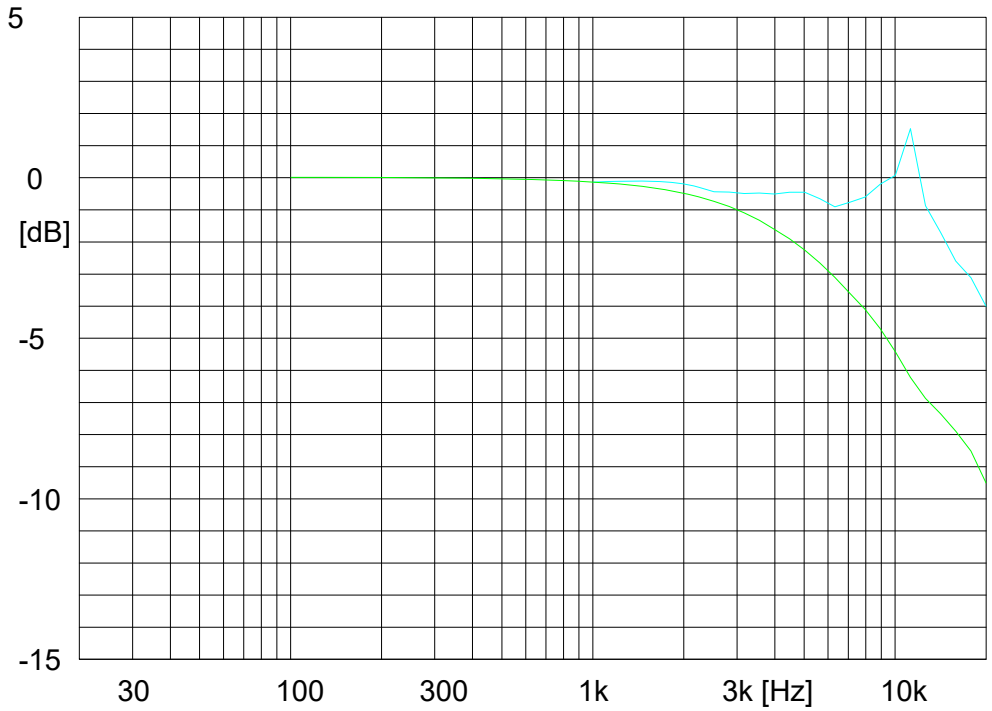
Corrected results, dB re 250 Hz					
Freq Hz	Random incidence corrected	Free field corrected	Freq Hz	Random incidence corrected	Free field corrected
100	0.01	0.01	5,010.70	-2.25	-0.45
112.2	0.02	0.02	5,622.00	-2.65	-0.65
125.9	0.02	0.02	6,307.90	-3.10	-0.90
141.3	0.01	0.01	7,077.50	-3.61	-0.76
158.5	0.01	0.01	7,940.90	-4.10	-0.60
177.9	0.01	0.01	8,909.70	-4.70	-0.20
199.6	0.01	0.01	9,996.70	-5.43	0.08
223.9	0.01	0.01	11,216	-6.22	1.53
251.2	0.00	0.00	12,585	-6.87	-0.87
281.9	0.00	0.00	14,120	-7.36	-1.71
316.3	-0.01	-0.01	15,843	-7.89	-2.59
354.9	-0.01	-0.01	17,775	-8.51	-3.11
398.2	-0.02	-0.02	19,944	-9.50	-4.00
446.7	-0.03	-0.03	22,377		
501.2	-0.03	-0.03	25,107		
562.4	-0.04	-0.04	28,170		
631	-0.05	-0.05	31,607		
708	-0.07	-0.07	35,463		
794.4	-0.09	-0.09	39,790		
891.3	-0.11	-0.11	44,644		
1,000.00	-0.13	-0.13	50,091		
1,122.00	-0.17	-0.12	56,202		
1,258.90	-0.21	-0.11	63,058		
1,412.50	-0.25	-0.10	70,752		
1,584.80	-0.32	-0.12	79,383		
1,778.10	-0.39	-0.14	89,068		
1,995.10	-0.48	-0.18	99,934		
2,238.50	-0.60	-0.30	112,126		
2,511.60	-0.73	-0.43	125,806		
2,818.00	-0.90	-0.45	141,154		
3,161.80	-1.09	-0.49	158,375		
3,547.50	-1.32	-0.47	177,696		
3,980.30	-1.61	-0.51	199,375		
4,465.90	-1.90	-0.45	-		

The corrections used to produce these random and free field responses are published by the manufacturer and they are responsible for the accuracy of the data and for the associated uncertainties to be applied. Campbell Associates Limited use their best endeavours to ensure the accuracy of this data but are not responsible for any errors, omissions or for ensuring that the data is of the current issue.

If the actuator response was not measured for any frequency, then the corresponding cell in the above table will be blank; similarly, if correction data is not available from the manufacturer the cell will also be blank.
Correction data for frequencies below 100 Hz are not required

** End of Table Section **

Microphone Calibration Certificate



GRAS
Type: 41AS

Serial no: 73645

Sensitivity: 41.09 mV/Pa
-27.73 ±0.10 dB re. 1 V/Pa
Capacitance: 20.7 ±2.0 pF
Date: 23/01/2024

Signature:

Measurement conditions:

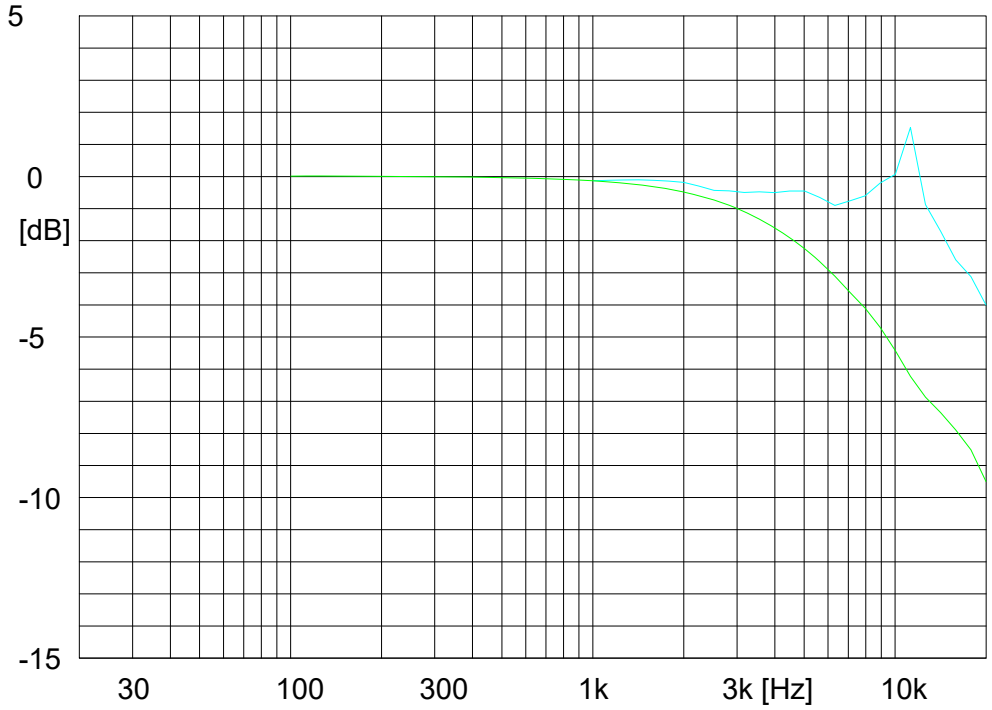
Polarisation voltage:	200.0 V
Pressure:	100.87 ±0.04 kPa
Temperature:	22.6 ±0.1 °C
Relative humidity:	39.1 ±0.7 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Microphone Calibration Certificate



GRAS
Type: 41AS

Serial no: 73645

Sensitivity: 41.09 mV/Pa
-27.73 ±0.10 dB re. 1 V/Pa
Capacitance: 20.7 ±2.0 pF
Date: 23/01/2024

Signature:

Measurement conditions:

Polarisation voltage:	200.0 V
Pressure:	100.87 ±0.04 kPa
Temperature:	22.6 ±0.1 °C
Relative humidity:	39.1 ±0.7 %RH

Results are normalized to the reference conditions.

Free field response
Pressure (Actuator) response

Campbell Associates
www.campbell-associates.co.uk

Comment:

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **46524**

Test Object: **Sound Level Meter, BS EN 60651 and or BS EN 60804 Class 1**

Producer: **Norsonic AS.**
Type: **118**
Serial number: **32115**
Customer: **Belfast City Airport**
Address: **Airport Road, Belfast,**
Co. Antrim, Northern Ireland. BT3 9JH.
Contact Person: [redacted]
Order No: [redacted]

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	GRAS	41AS	73645	46523
Calibrator*	Norsonic	1253_250Hz	26672	U44593
Preamplifier	GRAS	41AM	97213	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:
Wind shield N/A
Attenuator N/A
Extension cable N/A
These items have been taken into account wherever appropriate.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.82 ±0.07	22.08 ±0.55	41.85 ±2.75

Calibration Dates:

Received date:	11/01/2024	Reviewed date:	25/01/2024
Calibration date:	23/01/2024	Issued date:	25/01/2024

Technicians: (Electronic certificate)

Calibrated by: [redacted]

Reviewed by: [redacted]

Certificate of Calibration

Continuation of Certificate number: **46524**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN 60651 and or BS EN 60804**
Periodic Tests:	**BS 7580 Part 1:1997**
Pattern Evaluation:	**Not Applicable**

Conformance:
From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - BS7580 #5.4	Passed
Noise test - BS 7580 #5.5.2	Passed
Level Linearity Test - BS 7580, #5.5.3	Passed
Frequency weightings: A Network - BS 7580 #5.5.4	Passed
Frequency weightings: C Network - BS 7580 #5.5.4	Passed
Frequency weightings: Z Network - BS 7580 #5.5.4	Passed
Time weightings F and S - BS 7580 #5.5.5	Passed
Peak response - BS 7580 #5.5.6	Passed
RMS accuracy - BS 7580 #5.5.7	Passed
Time weighting I - BS 7580 #5.5.8	Passed
Integrating Test : Time averaging - BS 7580 #5.5.9	Passed
Integrating Test : Pulse range - BS 7580 #5.5.10	Passed
Integrating Test : Sound exposure level - BS 7580 #5.5.11	Passed
Overload SPL Test - BS 7580 #5.5.12	Passed
Overload Leq Test - BS 7580 #5.5.12	Passed
Acoustic tests - BS 7580 #5.4 and 5.6	Passed
Summation of acoustic tests - BS 7580 #5.5.4	Passed

Calibration Method
The reference range, reference sound pressure level, primary indicator range, secondary indicator range, pulse range, linearity range and display range as specified by the manufacturer were used for the verification. The test object was set to A weighting and adjusted to read correctly in response to the associated sound calibrator the reading was derived from the calibrator calibration certificate and manufacturer's instruction manuals.
A measurement of the self noise of the sound level meter was then made using a dummy microphone having a capacitance of ±20% of the associated microphones self capacitance. The sound level meter was then tested, and its overall sensitivity adjusted, in accordance with the requirements of the listed standard . The acoustic calibration at 1 kHz was performed by application of a reference sound calibrator, whilst the tests at 125 Hz and 8k Hz were performed by the electrostatic actuator method. At the end of the test, the associated sound calibrator was reapplied to the sound level meter and the meter reading was recorded and is noted.

Statement of Conformance
The sound level meter in the configuration tested was found to comply with the requirements of the listed standard. The associated calibrator has been corrected for barometric pressure at the time of calibration in accordance with the relevant manufacturer's instructions

Observations
The sound level meter in the configuration tested conforms to the requirements of BS 7580 Part 1.

Certificate of Calibration

Continuation of Certificate number: 46524

The final response obtained using the associated calibrator.(§5.6.3): 123.9dB(C) with GRAS-RA0009 s/n 1142 calibration adaptor with corrections of -0.1dB at 250Hz. This reading should be used henceforth to set up the sound level meter for field use.

The self-generated noise recorded in the test specified in § 5.5.2 was: (Below MSD) 11.8dB(A), (Below MSD) 13.6dB(C) and (Below MSD) 18.5dB(Z).

A stricter test than that specified in paragraphs 5.5.6 of BS7580:1997 has been used by verifying that the 10 ms reference pulse is also correct. The level uncertainty of the Laboratory's 1 kHz sound calibrator used during this verification is ± 0.1 dB.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate relates only to the items tested above.

** End of Certificate **

Measurement Results:

Indication at the calibration check frequency - BS7580 Clause 5.4

```
Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC1  (A) - Nor1253-24269
Reference calibrator level: 123.98
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.1
Notional level: 123.88
Calibrator level before adjustment: 123.9
After calibration:
Environmental corrections: 0.00
Other corrections: -0.1
Notional level: 123.88
Reference calibrator level after calibration: 123.9
Associated Calibrator: Norsonic - 1253_250Hz - 26672
Associated calibrator level: 123.98
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.10
Notional level: 123.88
Indicated level: 123.9
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.10
Notional level: 123.88
Calibrator level after adjustment: 123.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed
```

Noise test - BS 7580 Clause 5.5.2

The SLM is set to A-weighted and the most sensitive range setting. A dummy microphone is fitted, and the self-noise is measured on all available weighting networks over a 20 second period.

```
Network  Noise Level Max allowed Result
            (dB)        (dB)     code
   A        11.8        13.0       P   The value is less than MSD.
   C        13.6        15.0       P   The value is less than MSD.
   Z        18.5        25.0       P   The value is less than MSD.
Test Passed
```

Level Linearity Test - BS 7580, Clause 5.5.3

The LEQ linearity of the detector of the SLM is tested in 5 dB steps on the reference range. Additionally, the reference level and a level 2 dB above the bottom and 2 dB below the top of the other available measurement ranges are also measured.
The measurements on the reference range is repeated with SPL results, if possible
Test signal: 4 kHz sine wave.

Reference Value (dB)	Measured Value (dB)	Tol. Value (dB)	Error Value (dB)	Error Code
Measured at 4 kHz				
Full scale setting: 130dB				
The following measurements are LEQ measurements				
114.0	114.0	0.7	0.0	P
119.0	119.0	0.7	0.0	P
124.0	124.0	0.7	0.0	P
129.0	129.0	0.7	0.0	P
131.0	131.0	0.7	0.0	P
132.0	132.0	0.7	0.0	P
133.0	133.0	0.7	0.0	P
134.0	134.0	0.7	0.0	P
135.0	135.0	0.7	0.0	P
136.0	136.0	0.7	0.0	P
137.0	137.0	0.7	0.0	P
114.0	114.0	0.7	0.0	P
109.0	109.0	0.7	0.0	P
104.0	104.1	0.7	0.1	P
99.0	99.1	0.7	0.1	P
94.0	94.1	0.7	0.1	P
89.0	89.1	0.7	0.1	P
84.0	84.1	0.7	0.1	P
79.0	79.0	0.7	0.0	P
74.0	74.0	0.7	0.0	P
69.0	69.0	0.7	0.0	P
64.0	64.0	0.7	0.0	P
59.0	59.0	0.7	0.0	P
54.0	54.1	0.7	0.1	P
49.0	49.1	0.7	0.1	P
46.0	46.1	0.7	0.1	P
45.0	45.1	0.7	0.1	P
44.0	44.1	0.7	0.1	P
43.0	43.1	0.7	0.1	P
42.0	42.1	0.7	0.1	P
41.0	41.1	0.7	0.1	P
40.0	40.1	0.7	0.1	P
Full scale setting: 130dB				
114.0	114.0	0.7	0.0	P
135.0	135.0	0.7	0.0	P
40.0	40.1	0.7	0.1	P
Full scale setting: 130dB				
The following measurements are SPL measurements				
114.0	114.0	0.7	0.0	P
119.0	119.0	1.0	0.0	P
124.0	124.0	1.0	0.0	P
129.0	129.0	1.0	0.0	P
131.0	131.0	1.0	0.0	P
132.0	132.0	1.0	0.0	P

Level Linearity Test - BS 7580, Clause 5.5.3

Reference Value (dB)	Measured Value (dB)	Tol. Value (dB)	Error Value (dB)	Error Code
133.0	133.0	1.0	0.0	P
134.0	134.0	1.0	0.0	P
135.0	135.0	1.0	0.0	P
136.0	136.0	1.0	0.0	P
137.0	137.0	1.0	0.0	P
114.0	114.1	0.7	0.1	P
109.0	109.0	0.7	0.0	P
104.0	104.1	0.7	0.1	P
99.0	99.1	0.7	0.1	P
94.0	94.1	0.7	0.1	P
89.0	89.1	0.7	0.1	P
84.0	84.1	0.7	0.1	P
79.0	79.0	0.7	0.0	P
74.0	74.0	0.7	0.0	P
69.0	69.0	0.7	0.0	P
64.0	64.0	0.7	0.0	P
59.0	59.0	0.7	0.0	P
54.0	54.1	0.7	0.1	P
49.0	49.1	0.7	0.1	P
46.0	46.0	0.7	0.0	P
45.0	45.1	0.7	0.1	P
44.0	44.1	0.7	0.1	P
43.0	43.1	0.7	0.1	P
42.0	42.1	0.7	0.1	P
41.0	41.1	0.7	0.1	P
40.0	40.1	0.7	0.1	P

Test Passed

Frequency weightings: A Network - BS 7580 Clause 5.5.4

The SLM is set to its reference range and tested relative to 1k Hz at the reference SPL. All available networks are tested. Tolerances given here are for information only and relate to complete instrument, see test §5.5.4. for complete instrument data to which these tolerances relate.

Freq (Hz)	Ref (dB)	Meas. Value (dB)	Tolerance HiLim (dB)	Tolerance LoLim (dB)	Result Value (dB)	Code	
31.6	114.0	113.9	1.5	-1.5	-0.1	P	Adjusted 25.4dB **
63.1	114.0	113.9	1.5	-1.5	-0.1	P	Adjusted 12.2dB **
125.9	114.0	113.9	1.0	-1.0	-0.1	P	
251.2	114.0	113.9	1.0	-1.0	-0.1	P	
501.2	114.0	113.9	1.0	-1.0	-0.1	P	
1000.0	114.0	114.0	1.0	-1.0	0.0	P	
1995.3	114.0	113.9	1.0	-1.0	-0.1	P	
3981.1	114.0	113.9	1.0	-1.0	-0.1	P	
7943.3	114.0	113.9	1.5	-3.0	-0.1	P	
12589.3	114.0	113.9	3.0	-6.0	-0.1	P	

** indicates that level is adjusted because of limited dynamic range.

Test Passed

Frequency weightings: C Network - BS 7580 Clause 5.5.4

The SLM is set to its reference range and tested relative to 1k Hz at the reference SPL. All available networks are tested. Tolerances given here are for information only and relate to complete instrument, see test §5.5.4. for complete instrument data to which these tolerances relate.

Freq (Hz)	Ref (dB)	Meas. Value (dB)	Tolerance HiLim (dB)	Tolerance LoLim (dB)	Result Value (dB)	Code
31.6	114.0	113.8	1.5	-1.5	-0.2	P
63.1	114.0	113.9	1.5	-1.5	-0.1	P
125.9	114.0	114.0	1.0	-1.0	0.0	P
251.2	114.0	113.9	1.0	-1.0	-0.1	P
501.2	114.0	114.0	1.0	-1.0	0.0	P
1000.0	114.0	114.0	1.0	-1.0	0.0	P
1995.3	114.0	113.9	1.0	-1.0	-0.1	P
3981.1	114.0	113.8	1.0	-1.0	-0.2	P
7943.3	114.0	113.9	1.5	-3.0	-0.1	P
12589.3	114.0	113.9	3.0	-6.0	-0.1	P

Test Passed

Frequency weightings: Z Network - BS 7580 Clause 5.5.4

The SLM is set to its reference range and tested relative to 1k Hz at the reference SPL. All available networks are tested. Tolerances given here are for information only and relate to complete instrument, see test §5.5.4. for complete instrument data to which these tolerances relate.

Freq (Hz)	Ref (dB)	Meas. Value (dB)	Tolerance HiLim (dB)	Tolerance LoLim (dB)	Result Value (dB)	Code
31.6	114.0	113.8	1.5	-1.5	-0.2	P
63.1	114.0	113.9	1.5	-1.5	-0.1	P
125.9	114.0	113.9	1.0	-1.0	-0.1	P
251.2	114.0	113.9	1.0	-1.0	-0.1	P
501.2	114.0	113.9	1.0	-1.0	-0.1	P
1000.0	114.0	114.0	1.0	-1.0	0.0	P
1995.3	114.0	113.9	1.0	-1.0	-0.1	P
3981.1	114.0	113.9	1.0	-1.0	-0.1	P
7943.3	114.0	114.0	1.5	-3.0	0.0	P
12589.3	114.0	113.9	3.0	-6.0	-0.1	P

Test Passed

Time weightings F and S - BS 7580 Clause 5.5.5

A continuous sine wave is applied to the SLM and adjusted to give an indication 4 dB below upper limit of the primary indicator range. Then onset transient characteristics are tested using a single sine wave burst with an amplitude equal to the continuous signal and a duration of T(ms).
Test signal: Single Sine Wave Burst of 2 kHz.

Time Constant	Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Value (dB)	Result Value (dB)	
Fast	200	112.0	112.0	1.0	0.0	P
Slow	500	108.9	108.9	1.0	0.0	P

Test Passed

Peak response - BS 7580 Clause 5.5.6

Rectangular wave pulses are used to test the peak response. The response of a 100 micro second pulse shall not differ from the response of a 10 milliseconds pulse by more than 2dB.

Pulse Duration	Pulse Polarity	Ref. Value (dB)	Meas. Value (dB)	Tolerance Value (dB)	Error values Abs. (dB)	Error values Rel. (dB)	Result Code
10ms	+	116.0	116.6		0.6		P
0.1ms	+	116.0	115.6	2.0	-0.4	-1.0	P
10ms	-	116.0	116.5		0.5		P
0.1ms	-	116.0	115.5	2.0	-0.5	-1.0	P

The results have been compensated for the impulse response of
the C-weighting network.
Test Passed

RMS accuracy - BS 7580 Clause 5.5.7

The instrument is set to time constant Slow. A continuous sine wave (2kHz) is applied to the SLM and adjusted to give an indication 2 dB below upper limit of the primary indicator range
The signal is replaced by a sequence of tone bursts (CF=3) with a repetition rate of 40Hz.

	Crest Factor	Ref. Value (dB)	Meas. Value (dB)	Tolerance norm (dB)	Result Value (dB)	
F	3	115.0	115.0	0.5	0.0	P
S	3	115.0	114.9	0.5	-0.1	P

Test Passed

Time weighting I - BS 7580 Clause 5.5.8

A continuous sine wave (2 kHz) is applied to the SLM and adjusted to give an indication at the upper limit of the primary indicator range. The onset transient characteristics are tested. First, a single sine wave burst with the amplitude equal to the continuous signal and the duration of 5 ms is used. Then, the same burst is repeated with a frequency of 100 Hz.

Burst type	Reference Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Result Value (dB)	
5 ms single burst	108.2	107.9	2.0	-0.3	P
100Hz repeated	114.3	113.9	1.0	-0.4	P

Test Passed

Integrating Test : Time averaging - BS 7580 Clause 5.5.9

The SLM is set to the reference range. The signal generator is adjusted to give a 4 kHz sine wave with an rms level 30dB below the top of the Linearity range. The sine wave is replaced by a sequence of tone burst with the same frequency and the same rms level. For type 1 and 0 instruments, the burst duty factor (the distance between each burst) is increased, while the amplitude is increased to keep the same equivalent rms level. 1 minute, 6 minutes and 1 hour respectively.
Test signal: Continuous sine wave burst of 4kHz

Burst Duration (ms)	Ref. Value (dB)	Tolerance norm (dB)	Meas. Value (dB)	Error (LeqA) (dB)	
1/10^3	107.0	1.0	106.9	-0.1	P
1/10^4	97.0	1.0	96.9	-0.1	P

Test Passed

Integrating Test : Pulse range - BS 7580 Clause 5.5.10

Pulse handling is tested on the reference range using a 10 ms tone burst (of 4 kHz) during an integration period of 10 seconds superimposed on a low level background signal. The resulting A-weighted Leq shall correspond to table II of BS EN IEC 60804. The test is repeated on the upper end of the linearity range.

Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
10	52.0	52.0	1.7	0.0	P
10	102.0	101.9	1.7	-0.1	P

Test Passed

Integrating Test : Sound exposure level - BS 7580 Clause 5.5.11

Pulse handling is tested on the reference range using a 10 ms tone burst (of 4 kHz) during an integration period of 10 seconds. The A-weighted SEL of the burst shall correspond to table II of BS EN 60804. The test is repeated on the lower end of the pulse range.

Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
10	62.0	62.0	1.7	0.0	P
10	112.0	111.9	1.7	-0.1	P

Test Passed

Overload SPL Test - BS 7580 Clause 5.5.12

The SLM is set to reference range. A continuous tone burst is applied and adjusted until overload occurs. Then signal is reduced to give an on-scale indication. The level is further reduced 3 dB and the SLM shall indicate correctly within the tolerances given in table XIII of BS EN 60651.

	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
SPL CF3	130.7 -3	127.7	1.0	0.0	P

Overload occurred at: 131.7dB RMS

Test Passed

Overload Leq Test - BS 7580 Clause 5.5.12

The SLM is set to Leq. A 1 ms pulse of 4 kHz on a low level background is applied and adjusted until overload occurs. Then the level is reduced 1 dB. A single tone burst is then applied and the Leq,10s measured. The result shall be within the tolerances given in table II of BS EN IEC 60804.

	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
LEQ 1ms	97.0	97.0	2.2	0.0	P

Overload occurred approximately at: 141.0 dB (peak level)

Test Passed

Acoustic tests - BS 7580 Clause 5.4 and 5.6

The sound level meter was initially calibrated with the associated calibrator.(§5.4)

Reference level:	123.98 dB
Ambient corrections:	0.00 dB
Pressure to free field correction:	-0.10 dB
Corrected level:	123.88 dB
Indicated level:	123.9 dB

The sound level meter was tested at 125 Hz. (§5.6.2)

Reference level:	87.0 dB
Ambient corrections:	dB
Pressure to free field correction:	0.00 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.17 dB
Windscreen corrections:	dB
Notional level:	86.83 dB
Indicated level:	86.9 dB
Tolerance:	+/- 1 dB
Error:	0.07 dB

The sound level meter was tested at 1k Hz. (§5.6.2)

Reference level:	87.0 dB
Ambient corrections:	dB
Pressure to free field correction:	0.00 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.00 dB
Windscreen corrections:	dB
Notional level:	87.00 dB
Indicated level:	87.0 dB
Tolerance:	+/- 1 dB
Error:	0.00 dB

The sound level meter was tested at 4k Hz. (§5.6.2)

Reference level:	87.0 dB
Ambient corrections:	dB
Pressure to free field correction:	1.10 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.82 dB
Windscreen corrections:	dB
Notional level:	85.08 dB
Indicated level:	84.7 dB
Tolerance:	+/- 1 dB
Error:	-0.38 dB

The sound level meter was tested at 8k Hz. (§5.6.2)

Reference level:	87.0 dB
Ambient corrections:	dB
Pressure to free field correction:	3.50 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	3.01 dB
Windscreen corrections:	dB
Notional level:	80.49 dB
Indicated level:	80.1 dB
Tolerance:	+1.5; -3 dB
Error:	-0.39 dB

The measurement was performed using an electrostatic actuator method.
Response: Free field
The following response was finally obtained using the associated calibrator.(§5.6.3)

Acoustic tests - BS 7580 Clause 5.4 and 5.6

Calibrator level: 123.98 dB
Ambient corrections: 0.00 dB
Other corrections: -0.10 dB
Notional level: 123.88 dB
The sound level meter reading obtained at the end of the measurements in response to the associated sound calibrator was: 123.9 dB.
This reading should be used henceforth to set up the sound level meter for field use.
Test Passed

Summation of acoustic tests - BS 7580 Clause 5.5.4

The microphone data are measured using electrostatic actuator.
SLM: A-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-0.1	0.0			+-1.5	-0.1
63	-0.1	0.0			+-1.5	-0.1
125	-0.1	0.0			+-1.0	-0.1
250	-0.1	0.0			+-1.0	-0.1
500	-0.1	0.0			+-1.0	-0.1
1 k	0.0	-0.1			+-1.0	-0.1
2 k	-0.1	-0.2			+-1.0	-0.3
4 k	-0.1	-0.5			+-1.0	-0.6
8 k	-0.1	-0.6			+1.5,-3	-0.7
12.5 k	-0.1	-0.9			+3,-6	-1.0

SLM: C-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-0.2	0.0			+-1.5	-0.2
63	-0.1	0.0			+-1.5	-0.1
125	0.0	0.0			+-1.0	0.0
250	-0.1	0.0			+-1.0	-0.1
500	0.0	0.0			+-1.0	0.0
1 k	0.0	-0.1			+-1.0	-0.1
2 k	-0.1	-0.2			+-1.0	-0.3
4 k	-0.2	-0.5			+-1.0	-0.7
8 k	-0.1	-0.6			+1.5,-3	-0.7
12.5 k	-0.1	-0.9			+3,-6	-1.0

SLM: Z-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-0.2	0.0			+-1.5	-0.2
63	-0.1	0.0			+-1.5	-0.1
125	-0.1	0.0			+-1.0	-0.1
250	-0.1	0.0			+-1.0	-0.1
500	-0.1	0.0			+-1.0	-0.1
1 k	0.0	-0.1			+-1.0	-0.1
2 k	-0.1	-0.2			+-1.0	-0.3
4 k	-0.1	-0.5			+-1.0	-0.6
8 k	0.0	-0.6			+1.5,-3	-0.6
12.5 k	-0.1	-0.9			+3,-6	-1.0

Test Passed
The overall frequency response of the sound level meter and microphone response has shown to conform with the requirements in §6 of the BSEN 60651 and §5.5.4 in BS 7580 Part 1.

Summation of acoustic tests - BS 7580 Clause 5.5.4

*** End of results ***

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration

Certificate number: **48480**

Test Object: **Sound Level Meter, BS EN 60651 and or BS EN 60804 Class 1**

Producer: **Norsonic AS.**
Type: **118**
Serial number: **32117**
Customer: **Belfast City Airport**
Address: **Airport Road, Belfast,**
Co. Antrim, Northern Ireland. BT3 9JH.
Contact Person: [redacted]
Order No: [redacted]

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	GRAS	41AS	73643	48479
Calibrator*	Norsonic	1253_250Hz	26672	U48274
Preamplifier	GRAS	41AM	95491	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:
Wind shield N/A
Attenuator N/A
Extension cable N/A
These items have been taken into account wherever appropriate.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.27 ±0.01	22.03 ±0.1	59.53 ±1.95

Calibration Dates:

Received date:	02/08/2024	Reviewed date:	06/08/2024
Calibration date:	06/08/2024	Issued date:	06/08/2024

Technicians: (Electronic certificate)

Calibrated by: [redacted]

Reviewed by: [redacted]

Certificate of Calibration

Continuation of Certificate number: **48480**

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	**BS EN 60651 and or BS EN 60804**
Periodic Tests:	**BS 7580 Part 1:1997**
Pattern Evaluation:	**Not Applicable**

Conformance:
From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - BS7580 #5.4	Passed
Noise test - BS 7580 #5.5.2	Passed
Level Linearity Test - BS 7580, #5.5.3	Passed
Frequency weightings: A Network - BS 7580 #5.5.4	Passed
Frequency weightings: C Network - BS 7580 #5.5.4	Passed
Frequency weightings: Z Network - BS 7580 #5.5.4	Passed
Time weightings F and S - BS 7580 #5.5.5	Passed
Peak response - BS 7580 #5.5.6	Passed
RMS accuracy - BS 7580 #5.5.7	Passed
Time weighting I - BS 7580 #5.5.8	Passed
Integrating Test : Time averaging - BS 7580 #5.5.9	Passed
Integrating Test : Pulse range - BS 7580 #5.5.10	Passed
Integrating Test : Sound exposure level - BS 7580 #5.5.11	Passed
Overload SPL Test - BS 7580 #5.5.12	Passed
Overload Leq Test - BS 7580 #5.5.12	Passed
Acoustic tests - BS 7580 #5.4 and 5.6	Passed
Summation of acoustic tests - BS 7580 #5.5.4	Passed

Calibration Method
The reference range, reference sound pressure level, primary indicator range, secondary indicator range, pulse range, linearity range and display range as specified by the manufacturer were used for the verification. The test object was set to A weighting and adjusted to read correctly in response to the associated sound calibrator the reading was derived from the calibrator calibration certificate and manufacturer's instruction manuals.
A measurement of the self noise of the sound level meter was then made using a dummy microphone having a capacitance of ±20% of the associated microphones self capacitance. The sound level meter was then tested, and its overall sensitivity adjusted, in accordance with the requirements of the listed standard . The acoustic calibration at 1 kHz was performed by application of a reference sound calibrator, whilst the tests at 125 Hz and 8k Hz were performed by the electrostatic actuator method. At the end of the test, the associated sound calibrator was reapplied to the sound level meter and the meter reading was recorded and is noted.

Statement of Conformance
The sound level meter in the configuration tested was found to comply with the requirements of the listed standard. The associated calibrator has been corrected for barometric pressure at the time of calibration in accordance with the relevant manufacturer's instructions

Observations
The sound level meter in the configuration tested conforms to the requirements of BS 7580 Part 1.

The self-generated noise recorded in the test specified in § 5.5.2 was: (Below MSD) 11.7dB(A), (Below MSD) 13.1dB(C) and (Below MSD) 18.1dB(Z)

Certificate of Calibration

Continuation of Certificate number: 48480

The final response obtained using the associated calibrator.(§5.6.3): 123.9dB(C).

This reading should be used henceforth to set up the sound level meter for field use.

A stricter test than that specified in paragraphs 5.5.6 of BS7580:1997 has been used by verifying that the 10 ms reference pulse is also correct. The level uncertainty of the Laboratory's 1 kHz sound calibrator used during this verification is ± 0.1 dB.
The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate relates only to the items tested above.

** End of Certificate **

Measurement Results:

Indication at the calibration check frequency - BS7580 Clause 5.4

```
Reference level: 114.0 dB
Reference Range: 130 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC9  (C) - Nor-1253.21816
Reference calibrator level: 124.00
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.1
Notional level: 123.90
Calibrator level before adjustment: 123.9
After calibration:
Environmental corrections: 0.00
Other corrections: -0.1
Notional level: 123.90
Reference calibrator level after calibration: 123.9
Associated Calibrator: Norsonic - 1253_250Hz - 26672
Associated calibrator level: 124.00
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.10
Notional level: 123.90
Indicated level: 123.9
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.10
Notional level: 123.90
Calibrator level after adjustment: 123.9
This value shall be used for adjusting the sound level meter in the future.
Test Passed
```

Noise test - BS 7580 Clause 5.5.2

The SLM is set to A-weighted and the most sensitive range setting. A dummy microphone is fitted, and the self-noise is measured on all available weighting networks over a 20 second period.

```
Network  Noise Level Max allowed Result
            (dB)        (dB)     code
   A        11.7        13.0       P   The value is less than MSD.
   C        13.1        15.0       P   The value is less than MSD.
   Z        18.1        25.0       P   The value is less than MSD.
Test Passed
```

Level Linearity Test - BS 7580, Clause 5.5.3

The LEQ linearity of the detector of the SLM is tested in 5 dB steps on the reference range. Additionally, the reference level and a level 2 dB above the bottom and 2 dB below the top of the other available measurement ranges are also measured.
The measurements on the reference range is repeated with SPL results, if possible
Test signal: 4 kHz sine wave.

Reference Value (dB)	Measured Value (dB)	Tol. Value (dB)	Error Value (dB)	Error Code
Measured at 4 kHz				
Full scale setting: 130dB				
The following measurements are LEQ measurements				
114.0	114.1	0.7	0.1	P
119.0	119.1	0.7	0.1	P
124.0	124.1	0.7	0.1	P
129.0	129.1	0.7	0.1	P
131.0	131.1	0.7	0.1	P
132.0	132.1	0.7	0.1	P
133.0	133.0	0.7	0.0	P
134.0	134.0	0.7	0.0	P
135.0	135.0	0.7	0.0	P
136.0	136.0	0.7	0.0	P
137.0	137.0	0.7	0.0	P
114.0	114.0	0.7	0.0	P
109.0	109.0	0.7	0.0	P
104.0	104.0	0.7	0.0	P
99.0	99.1	0.7	0.1	P
94.0	94.0	0.7	0.0	P
89.0	89.1	0.7	0.1	P
84.0	84.0	0.7	0.0	P
79.0	79.0	0.7	0.0	P
74.0	74.0	0.7	0.0	P
69.0	69.0	0.7	0.0	P
64.0	64.0	0.7	0.0	P
59.0	59.0	0.7	0.0	P
54.0	54.0	0.7	0.0	P
49.0	49.0	0.7	0.0	P
46.0	46.0	0.7	0.0	P
45.0	45.0	0.7	0.0	P
44.0	44.0	0.7	0.0	P
43.0	43.0	0.7	0.0	P
42.0	42.0	0.7	0.0	P
41.0	41.0	0.7	0.0	P
40.0	40.0	0.7	0.0	P
Full scale setting: 130dB				
114.0	114.1	0.7	0.1	P
135.0	135.1	0.7	0.1	P
40.0	40.0	0.7	0.0	P
Full scale setting: 130dB				
The following measurements are SPL measurements				
114.0	114.0	0.7	0.0	P
119.0	119.1	1.0	0.1	P
124.0	124.0	1.0	0.0	P
129.0	129.1	1.0	0.1	P
131.0	131.0	1.0	0.0	P
132.0	132.0	1.0	0.0	P

Level Linearity Test - BS 7580, Clause 5.5.3

Reference Value (dB)	Measured Value (dB)	Tol. Value (dB)	Error Value (dB)	Error Code
133.0	133.0	1.0	0.0	P
134.0	134.0	1.0	0.0	P
135.0	135.0	1.0	0.0	P
136.0	136.0	1.0	0.0	P
137.0	137.0	1.0	0.0	P
114.0	114.1	0.7	0.1	P
109.0	109.1	0.7	0.1	P
104.0	104.0	0.7	0.0	P
99.0	99.1	0.7	0.1	P
94.0	94.0	0.7	0.0	P
89.0	89.1	0.7	0.1	P
84.0	84.0	0.7	0.0	P
79.0	79.0	0.7	0.0	P
74.0	74.0	0.7	0.0	P
69.0	69.0	0.7	0.0	P
64.0	64.0	0.7	0.0	P
59.0	59.0	0.7	0.0	P
54.0	54.0	0.7	0.0	P
49.0	49.0	0.7	0.0	P
46.0	46.0	0.7	0.0	P
45.0	45.0	0.7	0.0	P
44.0	44.0	0.7	0.0	P
43.0	43.0	0.7	0.0	P
42.0	42.1	0.7	0.1	P
41.0	41.0	0.7	0.0	P
40.0	40.0	0.7	0.0	P

Test Passed

Frequency weightings: A Network - BS 7580 Clause 5.5.4

The SLM is set to its reference range and tested relative to 1k Hz at the reference SPL. All available networks are tested. Tolerances given here are for information only and relate to complete instrument, see test §5.5.4. for complete instrument data to which these tolerances relate.

Freq (Hz)	Ref (dB)	Meas. Value (dB)	Tolerance HiLim (dB)	Tolerance LoLim (dB)	Result Value (dB)	Code	
31.6	114.0	113.9	1.5	-1.5	-0.1	P	Adjusted 25.4dB **
63.1	114.0	114.0	1.5	-1.5	0.0	P	Adjusted 12.2dB **
125.9	114.0	114.0	1.0	-1.0	0.0	P	
251.2	114.0	114.0	1.0	-1.0	0.0	P	
501.2	114.0	114.0	1.0	-1.0	0.0	P	
1000.0	114.0	114.0	1.0	-1.0	0.0	P	
1995.3	114.0	114.0	1.0	-1.0	0.0	P	
3981.1	114.0	114.0	1.0	-1.0	0.0	P	
7943.3	114.0	114.0	1.5	-3.0	0.0	P	
12589.3	114.0	114.0	3.0	-6.0	0.0	P	

** indicates that level is adjusted because of limited dynamic range.

Test Passed

Frequency weightings: C Network - BS 7580 Clause 5.5.4

The SLM is set to its reference range and tested relative to 1k Hz at the reference SPL. All available networks are tested. Tolerances given here are for information only and relate to complete instrument, see test §5.5.4. for complete instrument data to which these tolerances relate.

Freq (Hz)	Ref (dB)	Meas. Value (dB)	Tolerance HiLim (dB)	Tolerance LoLim (dB)	Result Value (dB)	Code
31.6	114.0	113.9	1.5	-1.5	-0.1	P
63.1	114.0	114.0	1.5	-1.5	0.0	P
125.9	114.0	114.1	1.0	-1.0	0.1	P
251.2	114.0	114.0	1.0	-1.0	0.0	P
501.2	114.0	114.1	1.0	-1.0	0.1	P
1000.0	114.0	114.0	1.0	-1.0	0.0	P
1995.3	114.0	114.0	1.0	-1.0	0.0	P
3981.1	114.0	114.0	1.0	-1.0	0.0	P
7943.3	114.0	114.0	1.5	-3.0	0.0	P
12589.3	114.0	114.0	3.0	-6.0	0.0	P

Test Passed

Frequency weightings: Z Network - BS 7580 Clause 5.5.4

The SLM is set to its reference range and tested relative to 1k Hz at the reference SPL. All available networks are tested. Tolerances given here are for information only and relate to complete instrument, see test §5.5.4. for complete instrument data to which these tolerances relate.

Freq (Hz)	Ref (dB)	Meas. Value (dB)	Tolerance HiLim (dB)	Tolerance LoLim (dB)	Result Value (dB)	Code
31.6	114.0	114.0	1.5	-1.5	0.0	P
63.1	114.0	113.9	1.5	-1.5	-0.1	P
125.9	114.0	114.0	1.0	-1.0	0.0	P
251.2	114.0	114.0	1.0	-1.0	0.0	P
501.2	114.0	114.0	1.0	-1.0	0.0	P
1000.0	114.0	114.0	1.0	-1.0	0.0	P
1995.3	114.0	114.0	1.0	-1.0	0.0	P
3981.1	114.0	114.0	1.0	-1.0	0.0	P
7943.3	114.0	114.0	1.5	-3.0	0.0	P
12589.3	114.0	114.0	3.0	-6.0	0.0	P

Test Passed

Time weightings F and S - BS 7580 Clause 5.5.5

A continuous sine wave is applied to the SLM and adjusted to give an indication 4 dB below upper limit of the primary indicator range. Then onset transient characteristics are tested using a single sine wave burst with an amplitude equal to the continuous signal and a duration of T(ms).
Test signal: Single Sine Wave Burst of 2 kHz.

Time Constant	Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Value (dB)	Result Value (dB)	
Fast	200	112.0	111.9	1.0	-0.1	P
Slow	500	108.9	108.9	1.0	0.0	P

Test Passed

Peak response - BS 7580 Clause 5.5.6

Rectangular wave pulses are used to test the peak response. The response of a 100 micro second pulse shall not differ from the response of a 10 milliseconds pulse by more than 2dB.

Pulse Duration	Pulse Polarity	Ref. Value (dB)	Meas. Value (dB)	Tolerance Value (dB)	Error values Abs. (dB)	Error values Rel. (dB)	Result Code
10ms	+	116.0	116.7		0.7		P
0.1ms	+	116.0	115.7	2.0	-0.3	-1.0	P
10ms	-	116.0	116.7		0.7		P
0.1ms	-	116.0	115.7	2.0	-0.3	-1.0	P

The results have been compensated for the impulse response of
the C-weighting network.
Test Passed

RMS accuracy - BS 7580 Clause 5.5.7

The instrument is set to time constant Slow. A continuous sine wave (2kHz) is applied to the SLM and adjusted to give an indication 2 dB below upper limit of the primary indicator range
The signal is replaced by a sequence of tone bursts (CF=3) with a repetition rate of 40Hz.

	Crest Factor	Ref. Value (dB)	Meas. Value (dB)	Tolerance norm (dB)	Result Value (dB)	
F	3	115.0	115.1	0.5	0.1	P
S	3	115.0	115.0	0.5	0.0	P

Test Passed

Time weighting I - BS 7580 Clause 5.5.8

A continuous sine wave (2 kHz) is applied to the SLM and adjusted to give an indication at the upper limit of the primary indicator range. The onset transient characteristics are tested. First, a single sine wave burst with the amplitude equal to the continuous signal and the duration of 5 ms is used. Then, the same burst is repeated with a frequency of 100 Hz.

Burst type	Reference Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Result Value (dB)	
5 ms single burst	108.2	107.9	2.0	-0.3	P
100Hz repeated	114.3	113.9	1.0	-0.4	P

Test Passed

Integrating Test : Time averaging - BS 7580 Clause 5.5.9

The SLM is set to the reference range. The signal generator is adjusted to give a 4 kHz sine wave with an rms level 30dB below the top of the Linearity range. The sine wave is replaced by a sequence of tone burst with the same frequency and the same rms level. For type 1 and 0 instruments, the burst duty factor (the distance between each burst) is increased, while the amplitude is increased to keep the same equivalent rms level. 1 minute, 6 minutes and 1 hour respectively.
Test signal: Continuous sine wave burst of 4kHz

Burst Duration (ms)	Ref. Value (dB)	Tolerance norm (dB)	Meas. Value (dB)	Error (LeqA) (dB)	
1/10^3	107.0	1.0	106.9	-0.1	P
1/10^4	97.0	1.0	96.9	-0.1	P

Test Passed

Integrating Test : Pulse range - BS 7580 Clause 5.5.10

Pulse handling is tested on the reference range using a 10 ms tone burst (of 4 kHz) during an integration period of 10 seconds superimposed on a low level background signal. The resulting A-weighted Leq shall correspond to table II of BS EN IEC 60804. The test is repeated on the upper end of the linearity range.

Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
10	52.0	52.0	1.7	0.0	P
10	102.0	102.0	1.7	0.0	P

Test Passed

Integrating Test : Sound exposure level - BS 7580 Clause 5.5.11

Pulse handling is tested on the reference range using a 10 ms tone burst (of 4 kHz) during an integration period of 10 seconds. The A-weighted SEL of the burst shall correspond to table II of BS EN 60804. The test is repeated on the lower end of the pulse range.

Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
10	62.0	61.9	1.7	-0.1	P
10	112.0	112.0	1.7	0.0	P

Test Passed

Overload SPL Test - BS 7580 Clause 5.5.12

The SLM is set to reference range. A continuous tone burst is applied and adjusted until overload occurs. Then signal is reduced to give an on-scale indication. The level is further reduced 3 dB and the SLM shall indicate correctly within the tolerances given in table XIII of BS EN 60651.

	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
SPL CF3	130.6 -3	127.6	1.0	0.0	P

Overload occurred at: 131.6dB RMS

Test Passed

Overload Leq Test - BS 7580 Clause 5.5.12

The SLM is set to Leq. A 1 ms pulse of 4 kHz on a low level background is applied and adjusted until overload occurs. Then the level is reduced 1 dB. A single tone burst is then applied and the Leq,10s measured. The result shall be within the tolerances given in table II of BS EN IEC 60804.

	Ref. Value (dB)	Measured Value (dB)	Tolerance Norm (dB)	Result Value (dB)	
LEQ 1ms	97.0	97.0	2.2	0.0	P

Overload occurred approximately at: 141.0 dB (peak level)

Test Passed

Acoustic tests - BS 7580 Clause 5.4 and 5.6

The sound level meter was initially calibrated with the associated calibrator.(§5.4)

Reference level:	124.00 dB
Ambient corrections:	0.00 dB
Pressure to free field correction:	-0.10 dB
Corrected level:	123.90 dB
Indicated level:	123.9 dB

The sound level meter was tested at 125 Hz. (§5.6.2)

Reference level:	89.9 dB
Ambient corrections:	dB
Pressure to free field correction:	0.00 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.00 dB
Windscreen corrections:	dB
Notional level:	89.90 dB
Indicated level:	89.9 dB
Tolerance:	+/- 1 dB
Error:	0.00 dB

The sound level meter was tested at 1k Hz. (§5.6.2)

Reference level:	89.9 dB
Ambient corrections:	dB
Pressure to free field correction:	0.00 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.00 dB
Windscreen corrections:	dB
Notional level:	89.90 dB
Indicated level:	89.8 dB
Tolerance:	+/- 1 dB
Error:	-0.10 dB

The sound level meter was tested at 4k Hz. (§5.6.2)

Reference level:	89.9 dB
Ambient corrections:	dB
Pressure to free field correction:	1.10 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.00 dB
Windscreen corrections:	dB
Notional level:	88.80 dB
Indicated level:	88.4 dB
Tolerance:	+/- 1 dB
Error:	-0.40 dB

The sound level meter was tested at 8k Hz. (§5.6.2)

Reference level:	89.9 dB
Ambient corrections:	dB
Pressure to free field correction:	3.50 dB
Case reflections:	dB
Linearity error:	dB
Weighting correction:	0.00 dB
Windscreen corrections:	dB
Notional level:	86.40 dB
Indicated level:	85.8 dB
Tolerance:	+1.5; -3 dB
Error:	-0.60 dB

The measurement was performed using an electrostatic actuator method.
Response: Free field
The following response was finally obtained using the associated calibrator.(§5.6.3)

Acoustic tests - BS 7580 Clause 5.4 and 5.6

Calibrator level: 124.00 dB
Ambient corrections: 0.00 dB
Other corrections: -0.10 dB
Notional level: 123.90 dB
The sound level meter reading obtained at the end of the measurements in response to the associated sound calibrator was: 123.9 dB.
This reading should be used henceforth to set up the sound level meter for field use.
Test Passed

Summation of acoustic tests - BS 7580 Clause 5.5.4

The microphone data are measured using electrostatic actuator.
SLM: A-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-0.1	0.0			+-1.5	-0.1
63	0.0	0.0			+-1.5	0.0
125	0.0	0.0			+-1.0	0.0
250	0.0	0.0			+-1.0	0.0
500	0.0	0.0			+-1.0	0.0
1 k	0.0	-0.2			+-1.0	-0.2
2 k	0.0	-0.2			+-1.0	-0.2
4 k	0.0	-0.5			+-1.0	-0.5
8 k	0.0	-0.6			+1.5,-3	-0.6
12.5 k	0.0	-0.7			+3,-6	-0.7

SLM: C-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-0.1	0.0			+-1.5	-0.1
63	0.0	0.0			+-1.5	0.0
125	0.1	0.0			+-1.0	0.1
250	0.0	0.0			+-1.0	0.0
500	0.1	0.0			+-1.0	0.1
1 k	0.0	-0.2			+-1.0	-0.2
2 k	0.0	-0.2			+-1.0	-0.2
4 k	0.0	-0.5			+-1.0	-0.5
8 k	0.0	-0.6			+1.5,-3	-0.6
12.5 k	0.0	-0.7			+3,-6	-0.7

SLM: Z-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	0.0	0.0			+-1.5	0.0
63	-0.1	0.0			+-1.5	-0.1
125	0.0	0.0			+-1.0	0.0
250	0.0	0.0			+-1.0	0.0
500	0.0	0.0			+-1.0	0.0
1 k	0.0	-0.2			+-1.0	-0.2
2 k	0.0	-0.2			+-1.0	-0.2
4 k	0.0	-0.5			+-1.0	-0.5
8 k	0.0	-0.6			+1.5,-3	-0.6
12.5 k	0.0	-0.7			+3,-6	-0.7

Test Passed
The overall frequency response of the sound level meter and microphone response has shown to conform with the requirements in §6 of the BSEN 60651 and §5.5.4 in BS 7580 Part 1.

Summation of acoustic tests - BS 7580 Clause 5.5.4

*** End of results ***