

6	302	LUXEMBURG	930
AZ	419	TURIN	935
LH	1122	NEAPEL	935
LH	1906	MADRID	935
LH	1022	STUTTGART HBF	935
AF	1701	LYON	940
AY	822	HELSINKI	940
AA	071	STANFORD-DALLAS	940
AF	743	PARIS	940
LH	1118	VENEZIA	940
DL	023	DALLAS	940
6	892	AMSTERDAM	940

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## Dublin Airport Compliance Report

*Report supplement*

## **Dublin Airport Compliance Report**

Report supplement

### **Report**

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The Hague, October 2020

## Table of Contents

1	Introduction .....	4
1.1	Report structure .....	4
2	Noise mitigation measures .....	5
2.1	Advanced Noise & Track Monitoring System (ANOMS) .....	5
3	Route usage, tracks and noise contours .....	9
4	Fleet mix.....	13
5	Compliance with environmental corridors .....	15
A	Glossary .....	16

## 1 Introduction

The Aircraft Noise (Dublin Airport) Regulation Act 2019, Part 4, section 19 states that the airport shall on or before each anniversary of the date of commencement of this section, prepare and adopt a report in writing in the specified form (in this section referred to as a “compliance report”) on the compliance of airport users with noise mitigation measures and operating restrictions.

The daa has requested To70 to draft a compliance report in accordance with the Act. The compliance report was finalised in August 2020 as Dublin Airport Noise Compliance Report 2019. The Aircraft Noise Competent Authority (ANCA) has reviewed the compliance report. This review by ANCA produced several points on which additional information was requested.

This report acts as a supplement to the 2019 compliance report, providing additional information to the compliance report.

### 1.1 Report structure

**Section 2** of this supplement provides a complete overview of all noise mitigation measures in place at Dublin Airport. The following chapter (**section 3**) presents a series of maps, presenting the usage of departure routes, the actual flown tracks and the calculated noise contours. **Section 4** provides a detailed overview of the fleet mix. Finally, **Section 5** will go into details on compliance with the environmental corridors.

Appendix A of this supplement provides a glossary of all acronyms and technical terms used in the compliance report and this supplement.

## **2 Noise mitigation measures**

Aircraft operators are instructed to ensure that, at all times, aircraft are operated in such a way as to cause the least disturbance practicable in areas surrounding the airport. The supplementary compliance report refers to several noise mitigation measures and goes into more details specifically on the environmental corridors.

The table on the next page provides a complete overview of all noise mitigation measures in place at Dublin Airport. Information is provided on the current monitoring system, enforcement, compliance and the introduction of monitoring systems. Besides daa, Dublin ATC ensures compliance with noise mitigation measures. ATC ensures that clearances to aircraft do not breach the environmental corridors (except for traffic or weather deviations requested by the pilot). NADP and reverse thrust are flight operations issues which are transparent to ATC.

### **2.1 Advanced Noise & Track Monitoring System (ANOMS)**

For several noise mitigation measures, there is currently no live monitoring system available. To increase monitoring capabilities daa is in the process of sourcing a more Advanced Noise & Track Monitoring System (ANOMS). This system will strengthen the monitoring capabilities of the daa, which will help in gathering more detailed statistics on compliance and with enforcement.

ANOMS will provide accurate and reliable information on which compliance reports, noise impact reduction strategies and community engagement can be built. The system is modular and accommodates multiple data sources, including the existing Noise Monitoring Terminals (NMTs) around Dublin Airport which collect noise and weather data. The implementation process of ANOMS will also include an analysis of additional NMTs at appropriate locations.

Besides the NMTs, ANOMS can make use of a wide variety of data sources, including radar and flight plan systems, to give a complete overview of operating conditions at the airport and support in determining the source of any environmental disturbances. ANOMS assist airports with monitoring and reporting on noise mitigation measures using a range of airport standard rules which are applied to the gathered data. The system also allows the airport to specify more advanced violation rules, which monitor airport specific measures. This will provide the daa with improved reporting capabilities on, among others, Reverse Thrust, Continuous Climb and Continuous Descent Operations.

ANOMS delivers information in a user-friendly manner, so anyone, even those untrained in acoustics or noise management terminology, can benefit from its impartiality and independence. Especially the Webtrak Replay module of ANOMS can be used externally for community engagement programs. The online system's interactive and user-friendly display shows flights, weather, noise monitoring locations, noise level graphs and point of closest approach in relation to a person's location. With this information, WebTrak enables people to investigate noise disturbances in near real time. Besides providing people to conduct their own investigations, Webtrak streamlines complaints handling by integrating relevant flight data with an automated form sent from a PC, tablet or smartphone.

Noise mitigation measures				
<p><b>SID compliance</b></p> <p>At Dublin Airport strict compliance with Standard Instrument Departures (SIDs) are mandatory. Tracks are monitored in Noise Desk. The new ANOMS / Webtrak systems will allow for monitoring capabilities on this measure.</p>				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Noise Desk	NIL	Not available	Not available	ANOMS / Webtrak
<p><b>Preferential Runway Program</b></p> <p>Runway 10 or Runway 28 are the required runways between 0600 and 2300 local time when the crosswind component is 20 knots or less. Runway 28 will be the preferential runway when the tailwind component is 10 knots or less and braking action is assessed as good. Aircraft will be required to use these runways except when operational reasons dictate otherwise. If the crosswind component on Runway 10 or Runway 28 is greater than 20 knots, Runway 16 or Runway 34 may become the active runway. If the forecast crosswind component on Runway 10 or 28 is greater than 20 knots, Runway 16 or 34 may become the active runway. The use of Runway 16-34 is kept to an absolute minimum subject to operational conditions.</p> <p>Runways will be prioritized for noise abatement purposes between 2300 and 0600 local time, subject to the same wind calculation method and values as used between 0600 and 2300 local time. When weather conditions and flight operations permit, runway usage will be prioritized as follows: Arrivals: Priority 1 (Runway 10), Priority 2 (Runway 16), Priority 3 (Runway 28), Priority 4 (Runway 34); Departures: Priority 1 (Runway 28), Priority 2 (Runway 34), Priority 3 (Runway 10), Priority 4 (Runway 16).</p> <p>Runway usage is monitored and reported on monthly and annually. The prioritization of runways is laid down in procedures for ATC. The preferential 10/28 runway was used by 98% of movements in 2019, against 95% the previous year. Runway performance will also be included in the ANOMS system.</p>				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Runway performance	Procedural	95% usage RWY 10/28	98% usage RWY 10/28	ANOMS
<p><b>Environmental Corridors / Noise Preferential Routes (NPRs) and Track Keeping</b></p> <p>The intent is to minimize disruption by routing aircraft away from built-up areas, where possible. Unless directed otherwise by ATC, all category C/D aircraft taking off from Dublin Airport are required to follow specific NPRs. To minimize impact, NPRs are designed to avoid overflight of built-up areas, where possible. An NPR is a path or corridor (1.8 kilometers at its widest point) that category C/D aircraft must follow from take-off until being directed by ATC onto their designated air traffic routes, typically at 3,000 feet altitude above mean sea level.</p> <p>Aircraft flying inside the environmental / NPR corridor are considered to be flying on-track. Departures from all runways (except easterly departures from Runway 10) must maintain course straight out for 5 nautical miles after take-off before commencing a turn, unless otherwise cleared by ATC. Easterly departures on Runway 10 must maintain course straight out for 5 nautical miles before commencing a turn to the north, or to 6 nautical miles before commencing turn to the south. There is no upper limit on this corridor. Once an aircraft departing on Runway 28, 16 or 34 reaches the end of the NPR, or an altitude of 3,000 feet, ATC may turn it onto a more direct heading to its destination. ATC can turn aircraft off NPRs below 3,000 feet for safety reasons, for example to avoid storms.</p> <p>Category A/B traffic may operate outside the environmental corridors (NPRs) as long as they achieve an altitude of 750ft (on a SID) or 2000ft (on ATC climb-out) above mean sea level before commencing a turn. Category A/B jet traffic (BAE146 type aircraft) may also operate outside the environmental corridors as long as they achieve an altitude of 750ft above mean sea level and pass the end of the runway before commencing a turn.</p>				

Noise mitigation measures				
<p>The SIDs are designed to comply with the environmental corridors. ATC give SID instructions to pilots to remain within the corridor. Dublin Airport monitors breaches of the environmental corridor in their Noise &amp; Flight Track Monitoring Service (NFTMS / Noise desk). In both 2018 and 2019 over 99% of all category C/D movements complied with the environmental corridor. With the introduction of the ANOMS and Webtrak systems, track adherence monitoring will be conducted with these systems.</p>				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Noise desk	SID design and ATC Staff instructing pilots	99.3% track keeping	99.2% track keeping	ANOMS / Webtrak
Noise Abatement Departure Procedures (NADP) Climb Profile				
<p>Dublin Airport's departure procedure is based on noise-abatement departure climb guidance contained in ICAO's Procedures for Air Navigation Services Aircraft Operations Document 8168 Volume 1, Flight Procedures Appendix to Chapter 3 – NADP2.</p> <p>It is currently not possible to monitor NADP profiles. daa is researching the possibility of developing and implementing this with EnviroSUIT in the future.</p>				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
NIL	NIL	Not available	Not available	Under development
Visual Approach				
<p>Jet aircraft (Cat C/D) on visual approach to Runways 28, 10, 16, and 34 must join final approach no closer than 6 nautical miles from touchdown. Aircraft must follow a descent path that is no lower than the ILS glide path.</p> <p>All approaches are monitored but it is unknown if they are visual or not.</p>				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Noise desk	NIL	Not available	Not available	ANOMS
Reverse Thrust				
<p>Reverse thrust is used to aid the deceleration of aircraft on landing through the use of the aircraft's engines. This should not be used at night, unless required for safety reasons.</p> <p>Reverse thrust is currently not monitored and enforced. The new ANOMS system will allow for monitoring capabilities on this measure.</p>				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
NIL	NIL	Not Available	Not Available	ANOMS
Engine Ground Running				
<p>Engine test runs are not permitted between 2000 and 0700. All aircraft types may undertake testing between 0900 and 2000HRs, and only aircraft up to Code C may undertake engine testing between 0700 and 0900.</p>				

Noise mitigation measures				
Engine test runs are currently monitored by airside operations. Airside ops. also enforces the time, length and positioning of the engine test runs. The new ANOMS system will allow for more monitoring capabilities on this function.				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Airside Ops	Airside Ops	Not Available	Not Available	ANOMS
<b>Continuous Decent Operations (CDO)</b>				
At Dublin Airport Continuous Decent Operations should be applied as much as possible. Data on the percentage of flights conducted with a CDO is collected by Eurocontrol. ATC and daa have access to this data, but currently don't regularly report on this metric. The IAA ANSP is currently engaging with EUROCONTROL regarding the validity of metrics for CDO's. daa plans to use Eurocontrol data combined with information from ANOMS for reporting when ANOMS is introduced.				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Eurocontrol	NIL	Figure 1	Figure 1	ANOMS
<b>Continuous Climb Operations (CCO)</b>				
At Dublin Airport Continuous Climb Operations should be applied as much as possible. Data on the percentage of flights conducted with a CCO is collected by Eurocontrol. ATC and daa have access to this data, but currently don't regularly report on this metric. daa plans to use Eurocontrol data combined with information from ANOMS for reporting when ANOMS is introduced.				
Monitoring system	Enforcement	Compliance 2018	Compliance 2019	System Introduction
Eurocontrol	NIL	Figure 1	Figure 1	ANOMS

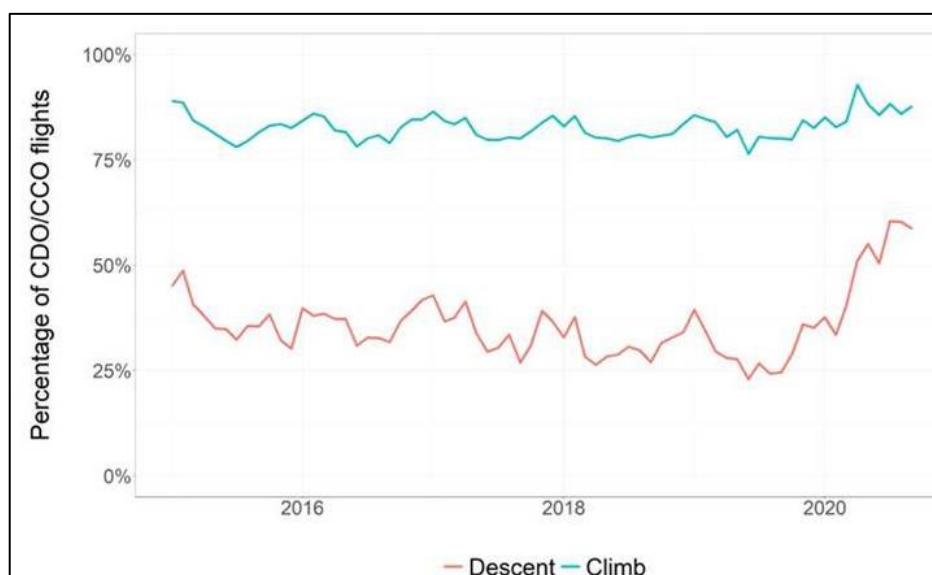
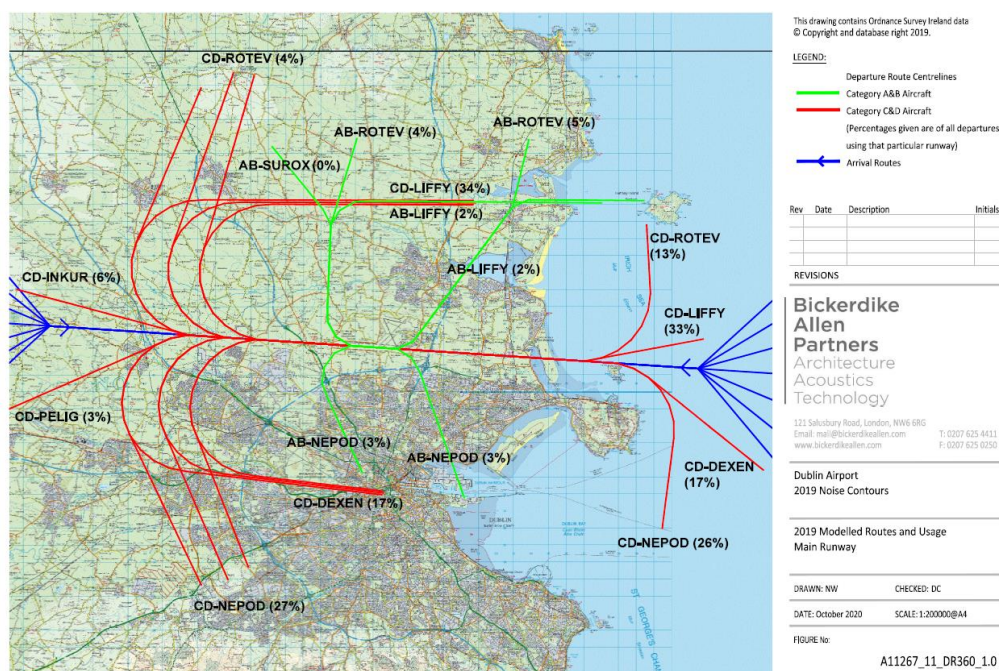


Figure 1: CDO and CCO flights Dublin Airport



### 3 Route usage, tracks and noise contours

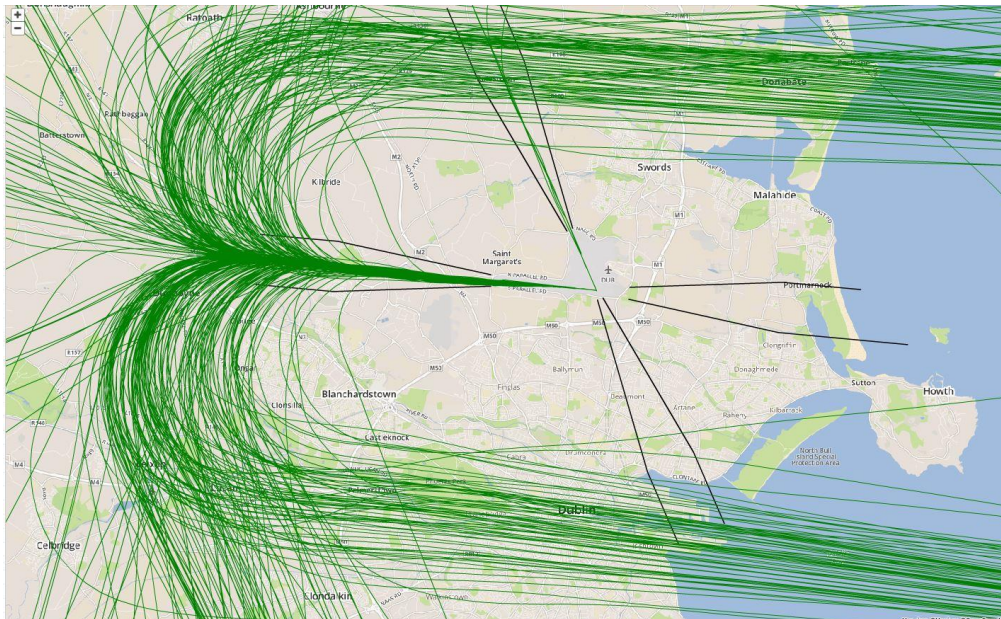
As mentioned in the compliance report, Runway 10/28 is operated as the primary runway with 72% of all movements using the runway in westerly operation and 26% in easterly operation. Figure 2 provides an overview of the route usage for departing aircraft on the primary runway. The majority of large aircraft (cat. C/D) departing in westerly direction make a left or a right turn after clearing the environmental corridor. Aircraft departing in easterly direction turn in different directions over the sea. Category A/B traffic may operate outside the environmental corridors and therefore turns earlier towards different directions.



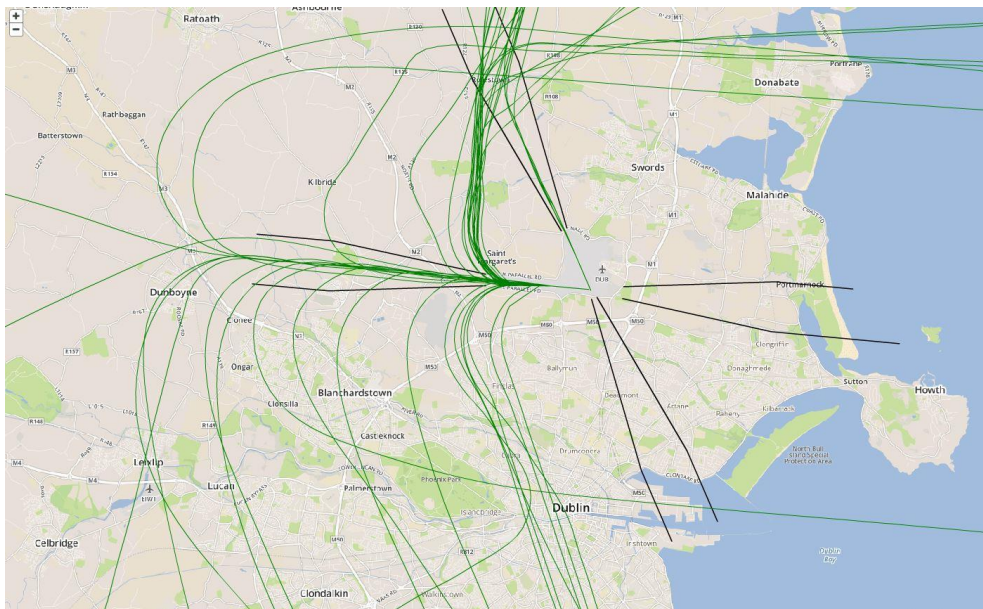
**Figure 2: Overview of route usage 2019**

Figures 3 to 6 provide radar tracks of flights performed on the 11<sup>th</sup> of August, 2019. The figures provide tracks for aircraft categories C/D and A/B separately for both departures and arrivals. The figures also show the environmental corridors for each runway. This day was chosen since it falls within the busiest period of the year at Dublin Airport. On this day the primary runway was operated in westerly direction (runway 28), a small minority of flights operated on other runways / in other directions.

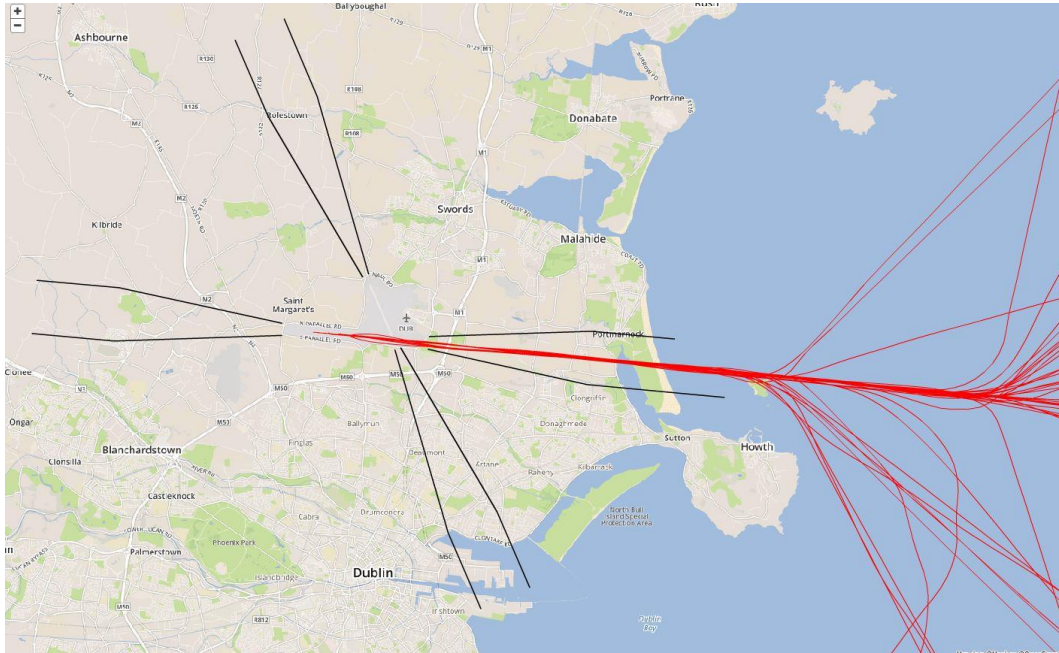
Figures 7 and 8 provide the calculated Lden and Lnight contours for 2019. Lden is the weighted average of the yearly individual noise level during day, evening and night. Lnight is the weighted average of the yearly individual noise level specifically during the night (23:00 – 07:00). The contours show that higher noise levels concentrate around the airport and in the extension of the primary runway. Lower noise level contours to the west of the airport follow the turns made by departing aircraft after they clear the environmental noise corridors. Noise contours in the extent of runway 16/34 are considerably smaller, due to the low traffic volumes on this runway.



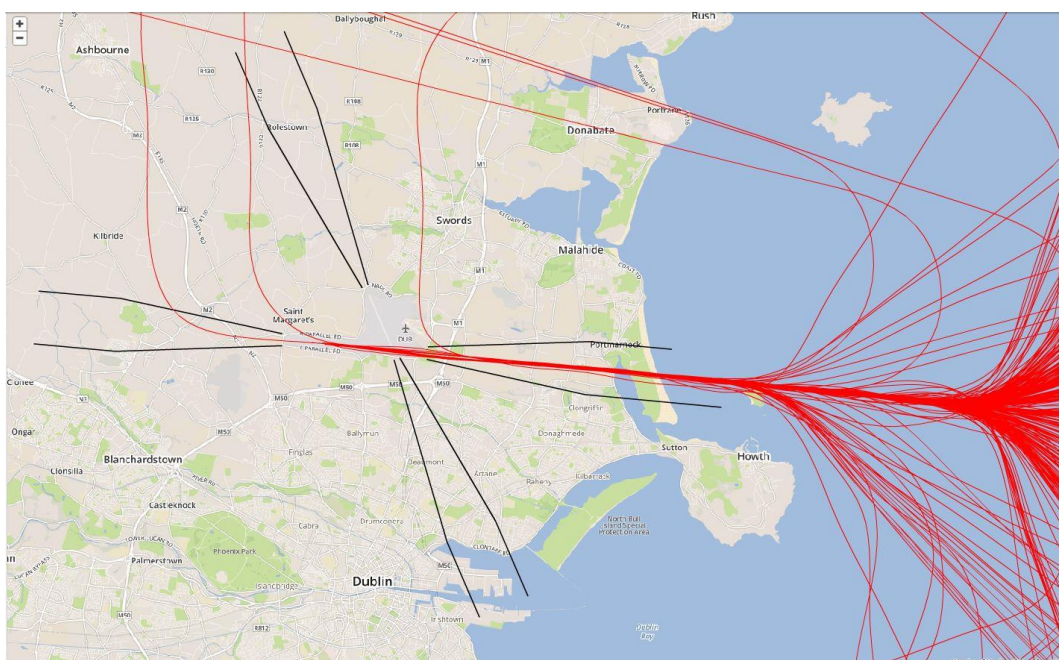
**Figure 3: Tracks of category C/D departures on the 11-08-2019**



**Figure 4: Tracks of category A/B departures on the 11-08-2019**



**Figure 5: Tracks of category A/B arrivals on the 11-08-2019**



**Figure 6: Tracks of category C/D arrivals on the 11-08-2019**

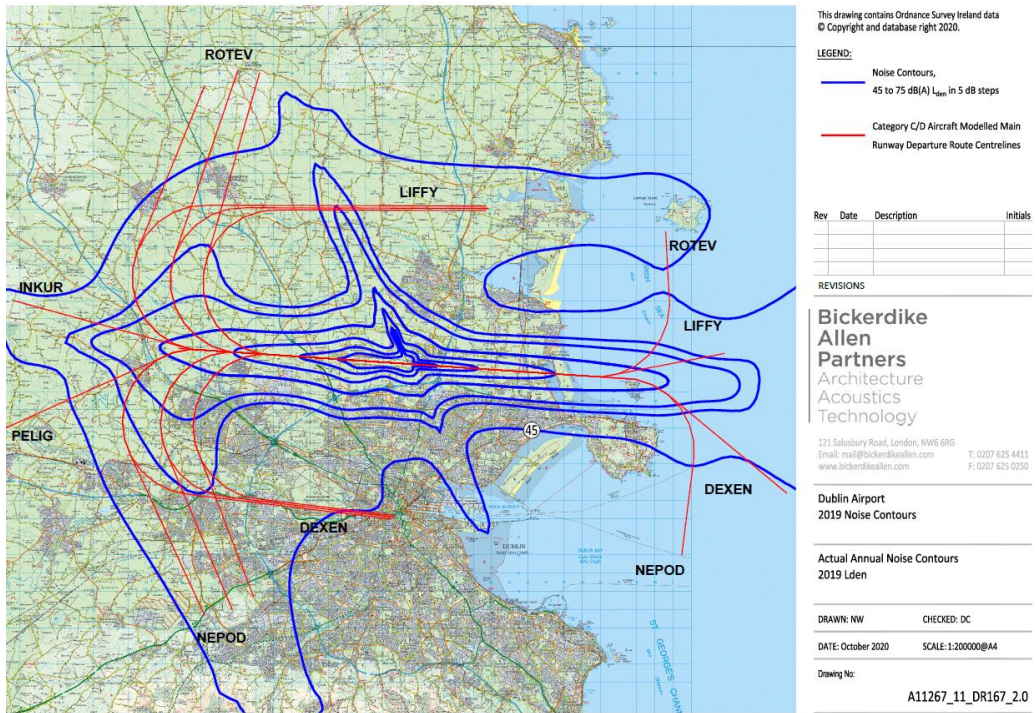


Figure 7: Calculated Lden noise contours for 2019

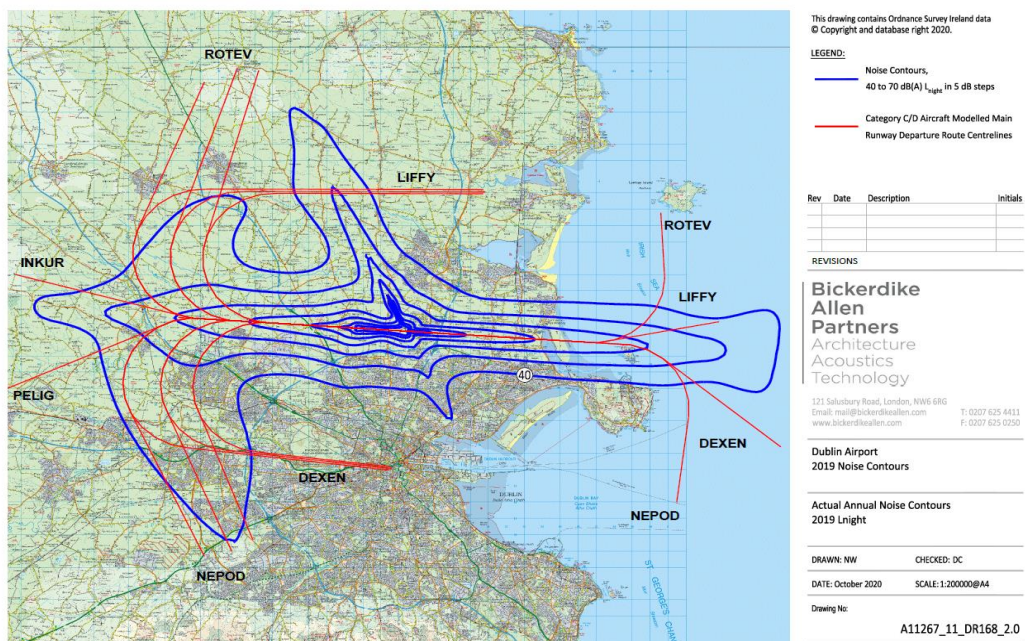


Figure 8: Calculated Lnlight noise contours for 2019

#### **4 Fleet mix**

In the compliance report, a figure with the distribution of aircraft type groups in 2019 was included, such as 737-Series and A320-Series. A more detailed overview of movements per aircraft type and a comparison with the preceding year has been added to provide more insight, see Figure 9. Only aircraft types with more than 200 movements are shown to improve readability. As can be seen, in both years the B737-800 (B738) and A320 aircraft types were used the most. Most of the aircraft configurations (engine types and take-off weights) of these two types are compliant with chapter 4 limits.

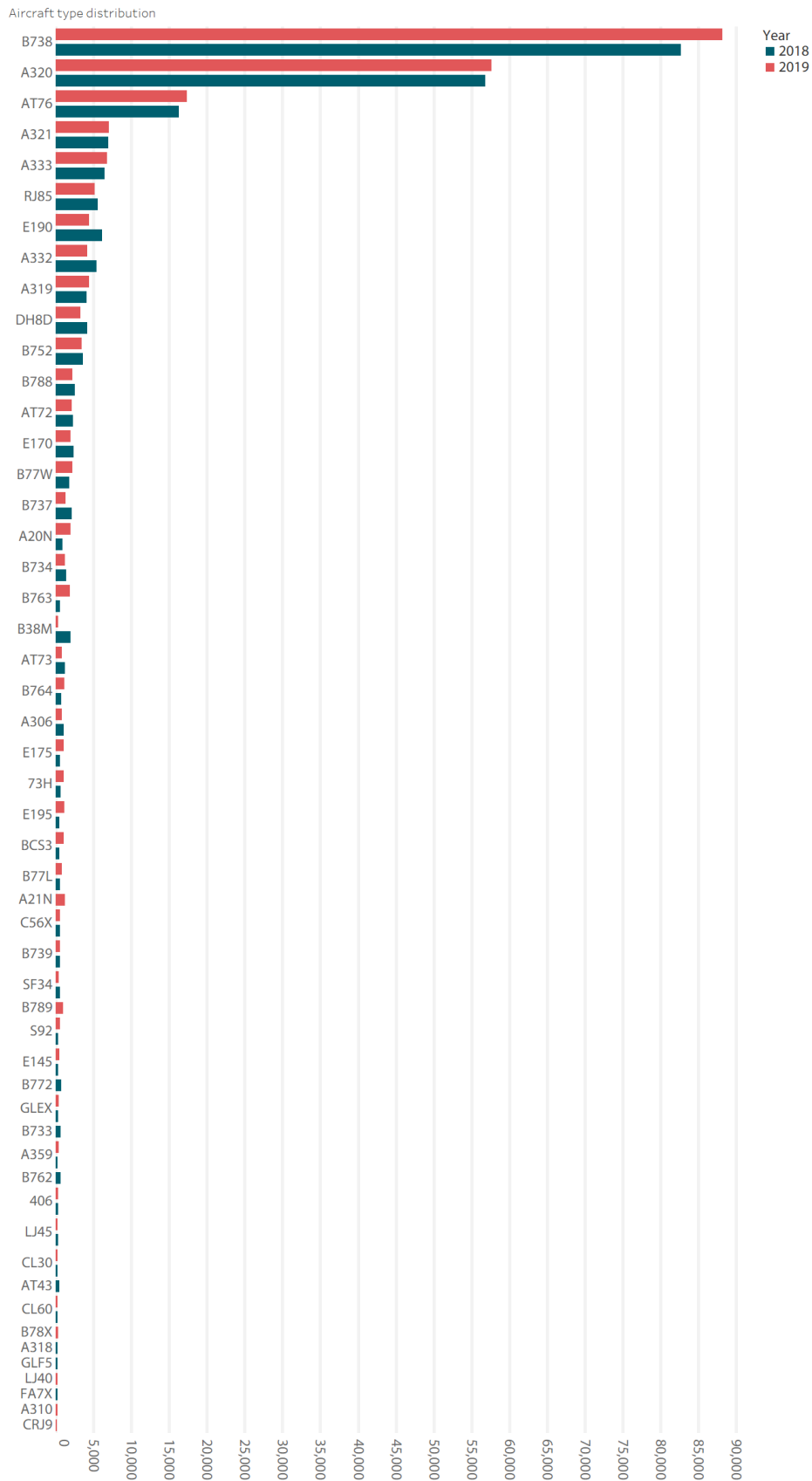


Figure 9: Movements per aircraft type in 2018 and 2019

## **5 Compliance with environmental corridors**

As mentioned in the compliance report, there were 1,594 breaches of the Environmental Corridors (NPRs) in 2019. This means over 99% of all category C/D movements (200,931 in 2019) complied with the environmental corridor. Focusing on departures (110,234 in 2019), 98.5% of departing category C/D movements stayed within the Environmental Corridors.

Of the 1,594 breaches of the Environmental Corridors (NPRs), 56 aircraft were the subjects of complaints from the public. The IAA ANSP (ATC) only investigates a query if an aircraft is the subject of a complaint from a member of the public. Other breaches are not sent to the IAA but are reported on in the bi-annual noise reports (as a track keeping percentage) and in the annual compliance report.

## A Glossary

A/B category aircraft	Category of smaller aircraft, containing propeller aircraft, turboprop aircraft, Whisperjets (like Bae-146 and Avro-Jet) and other small general aviation aircraft powered by jets engines.
ANSP	Air Traffic Service Provider
ANOMS	Advanced Noise & Track Monitoring System
ATSU	Air Traffic Service Unit
ATC	Air Traffic Control
C/D category aircraft	Large aircraft, such as Airbus and Boeing aircraft, Bombardier Canadair Regional Jet series, business jets and Embraer aircraft.
Clearway	End part of the runway
daa	Dublin airport authority
NMP	Noise Management Plan
dB	Decibels, a unit of sound pressure
FCC NAP	Fingal County Council Noise Action Plan
HR	Hour
IAA	Irish Aviation Authority
ILS	Instrument Landing System
ICAO	International Civil Aviation Organisation
KT	knots
LAEq	Equivalent average sound level
LAP	Local Area Plan
Lden	Lden is the weighted average of the yearly individual noise level during day, evening and night.
Lnight	Lnight is the weighted average of the yearly individual noise level specifically during the night (23:00 – 07:00).
Reverse thrust	Using the engine of the aircraft for braking after landing on the runway
SID	Standard Instrument Departure