DublinAirport

Noise and Track Keeping (NTK) System Report

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Version	Purpose of Version
I01	First version
I02	Appendices renumbering

Abbreviation	Full Form
ABP	An Bord Pleanála
ACP	An Coimisiún Pleanála
ADS-B	Automatic Dependent Surveillance–Broadcast
AENA	A Spanish airports group
AFL	Above Field Level
AIP	Aeronautical Information Publication
ANCA	Aircraft Noise Competent Authority
ANOMS	Airport Noise and Operations Monitoring System
ANSP	Air Navigation Service Provider
APU	Auxiliary Power Unit
ATM	Air Traffic Movement
BAS	Bewoners Aanspreekpunt Schiphol / Local Community Contact Centre Schiphol
CAA	Civil Aviation Authority
CCO	Continuous Climb Operation
CDO	Continuous Descent Operation
CET	Community Engagement Tools
CISHA	Council for the Independent Scrutiny of Heathrow Airport
CLG	Community Liaison Group
DAA	Dublin Airport Authority
DAEWG	Dublin Airport Environmental Working Group
DFT	Department for Transport
ECAC	European Civil Aviation Conference
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESG	Environmental Social Governance
FAA	Federal Aviation Administration
FCC	Fingal County Council
FFR	Forum Flughafen und Region
FRA.NoM	Fraport Noise Monitoring System
GIS	Geographic Information System

Abbreviation	Full Form
GNMG	Gatwick Noise Monitoring Group
IA	Infrastructure Application
IEC	International Electrotechnical Commission
IFP	Instrument Flight Procedure
INAA	The Inspect Noise Assess Announce
InsightFull	Information Portal showing postcode-specific aircraft noise and complaint data
ISO	International Organisation for Standardization
IVR	Interactive Voice Response
LA10	Sound level exceeded for 10% of the time
LA90	Sound level exceeded for 90% of the time
LAWA	Los Angeles World Airports
Leq	Equivalent Continuous Sound Level
Lmax	Maximum Sound Pressure Level
Maploom	Tool to check eligibility for noise insulation or buyout schemes using Eircode
METAR	Meteorological Aerodrome Report
MPPA	Million Passenger Per Annum
NAC	Netherlands Aerospace
NATMAG	Noise and Tracking Monitoring Advisory Group
NFPMS	Noise and Flight Path Monitoring System
NMT	Noise Monitoring Terminal
NOMOS	Noise Monitoring System
NPR	Noise Preferential Route
NQC	Noise Quota Count
NRRA	North Runway Relevant Action
NTK	Noise and Track Keeping
OA	Operational Application
ONCC	O'Hare Noise Compatibility Commission
Primary Radar	Detects aircraft by reflected radio waves; gives position only.
RFI	Request For Further Information
RNIS	Residential Noise Insulation Scheme
RSSI	Received Signal Strength Indicator

Abbreviation	Full Form
SACF	Sydney Airport Community Forum
Secondary Radar	Uses aircraft transponder; gives position, altitude, and ID.
SEL	Sound Exposure Level
SID	Standard Instrument Departure
SIS	School Insulation Scheme
SoN	Statement of Need
STAR	Standard Terminal Arrival Route
TANOS	Topsonic Aircraft Noise and Operations System
TraVis	Topsonic Resident Access Viewer
UNH	Umwelt- und Nachbarschaftus
VDPS	Voluntary Dwelling Purchase Scheme

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alongside the ANCA report attached as Appendix 3, and the Wave Dynamic Report as Appendix 4

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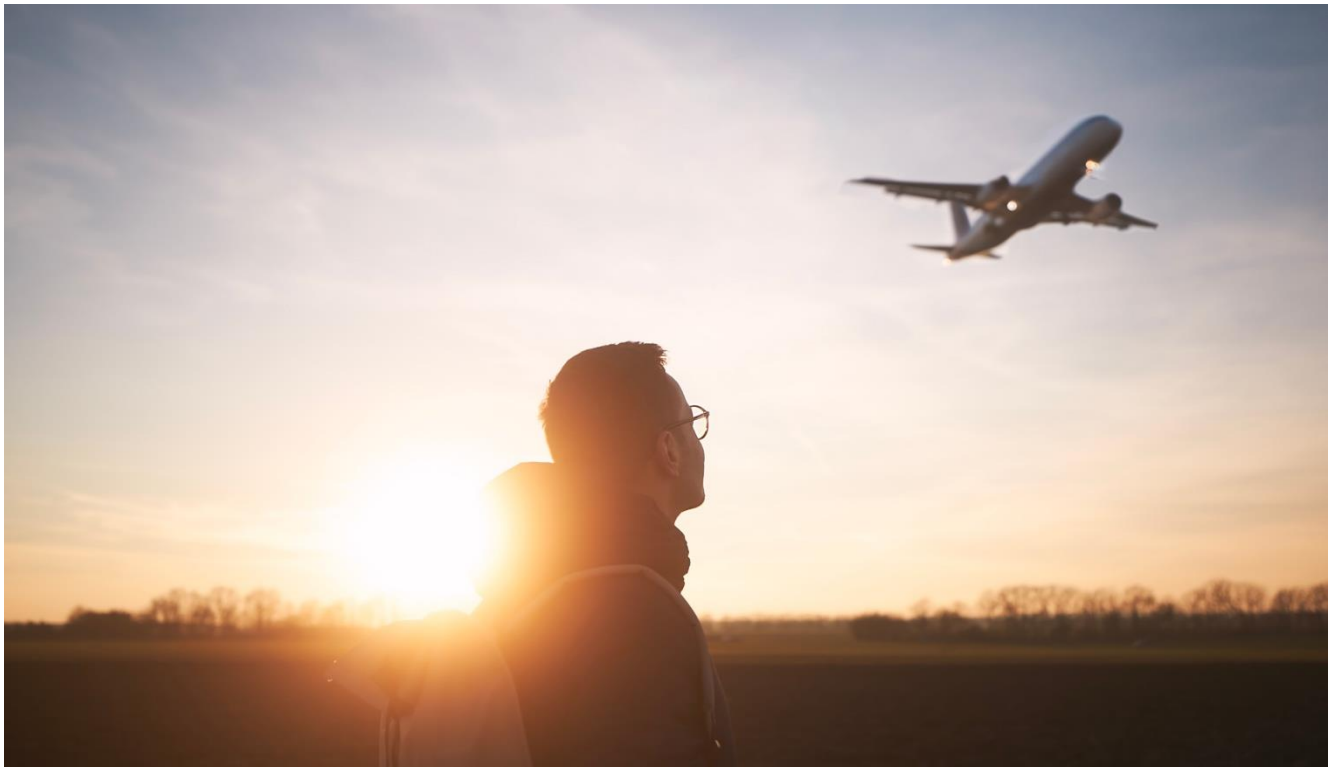
1.0 Executive Summary

This report has been prepared by daa plc. to respond to recent feedback from our noise regulator, the Aircraft Noise Competent Authority ('ANCA'), and the local community on aircraft noise monitoring and community engagement at Dublin Airport. It follows feedback contained in three important publications:

- **Technical Review: Benchmarking Noise Measuring Systems and Community Engagement Tools, which reviewed international best practice in noise monitoring programmes at airports;**
- **ANCA's correspondence of July 2025, requesting validation of Noise Monitoring Terminals (NMTs); and**
- **the Wave Dynamics report commissioned by residents, providing some measurements of summer 2024 noise levels (see Section 7).**



daa has made substantial progress in enhancing its Noise and Track Keeping (NTK) and Community Engagement Tool (CET) systems. Following the issue of the Technical Review: Benchmarking Noise Measuring Systems and Community Engagement Tools (hereafter referred to as ***ANCA's Report***), the ANCA issued two directions on the minimum number of NMTs required. **As of 2025, Dublin Airport operates a network of 32 Noise Monitoring Terminals (NMTs), comprising 25 fixed and seven portable units.** These fixed installations are being deployed in collaboration with the ANCA.

Additionally, in response to the ANCA letter dated 7th July 2025 regarding the validation of NMTs, this report provides a comprehensive overview of the daa's NTK and CET systems. It demonstrates how daa has addressed the specific requirements outlined in the letter including calibration certificates, accuracy validation, and correlation with aircraft events while also covering the broader recommendations from *ANCA's Report*.

This network significantly exceeds the benchmarked recommendation of 11–18 NMTs. The terminals are strategically positioned within a 45 km radius of the airport, with site selection aligned to the ISO 20906:2009+A1:2013 standard. The deployment of portable NMTs is further informed by community feedback through the Dublin Airport Environmental Working Group (DAEWG) and the Community Liaison Group (CLG), ensuring responsiveness to local concerns and transparency in environmental monitoring.

The NTK system integrates radar, weather, and acoustic data for precise aircraft noise monitoring. Its CET suite includes WebTrak, which offers historical flight tracking with noise data and complaint submission, Maploom which allows homeowners to check eligibility for the various mitigation schemes provided by Dublin Airport, and InsightFull, a location-based portal providing interactive operations and noise information dashboards and community engagement tools to enhance transparency and understanding of airport operations. Monthly, quarterly, and annual reports are published to ensure transparency and regulatory compliance.

Compliance and Best Practice Alignment

Dublin Airport's NTK and CET systems are aligned with:

- Condition 10 of the North Runway planning permission (PL 06F.217429),
- ISO 20906:2009+A1:2013 for unattended aircraft noise monitoring,
- ECAC Doc 29 for noise contour modelling.

The systems meet or exceed all technical and operational requirements, including 0.5 second sampling, Class 1 IEC 61672-1 equipment, integration of radar and meteorological data, and provision of robust complaint handling systems. The NTK system supports both individual with cumulative noise event reporting, and all data is accessible in GIS compatible formats.

Historical Evolution and Strategic Investment

Between 2019 and 2025, daa has quadrupled its NMT network, from eight to **32 units.** This includes the relocation and upgrade of legacy monitors, and the deployment of new units in areas identified through community feedback and strategic noise mapping. The NTK system operates continuously, 24/7, with automated diagnostics and daily calibration checks. CET capabilities have also expanded, with enhanced public access to data and improved complaint resolution workflows.

Global marking: A Leading Position

Dublin Airport now ranks among the top performing airports globally in terms of NTK and CET coverage relative to air traffic movements (ATMs) based on the comparative findings presented in this report. Benchmarking against 30 peer airports shows that:

- Dublin Airport has **the greatest number of NMTs per ATM out of the 30 peer airports** mentioned in this report.
- The airport's NMT density exceeds the global average, placing it above the regression line in comparative analyses.
- **Dublin's CET tools are on par with those at major European and UK Hub airports** such as London Heathrow, Amsterdam Schiphol, and Frankfurt, offering postcode specific insights, real time tracking, and multi-channel complaint handling.

Strategic Outlook 2025–2030

Planned enhancements include:

- Deployment of at least three additional portable NMTs.
- Relocation and upgrade of existing NMTs, including Bay Lane, Dunboyne and Kilcoskan National School to improve data quality and representativeness.
- Fixed NMT improvements, including enhanced weather protection and calibration systems.
- Integrating automatic dependent surveillance–broadcast (ADS-B) data to improve spatial coverage.
- Upgrade to 4G routers
- On-going noise mitigation plan publication
- Planned reverse thrust detection to better characterise noise events during landing.
- Auxiliary Power Unit (APU) monitoring to assess apron noise impacts.
- Landing gear deployment monitoring to refine aircraft noise profiling.

These initiatives will ensure that Dublin Airport remains at the forefront of environmental noise monitoring and community engagement, aligned with ISO 20906 and relevant requirements outlined in the *ANCA'S Report*.

2.0 Introduction & Context

This section outlines the context and purpose behind this report.

2.1 Purpose of the ANCA Report

In September 2020, the Aircraft Noise Competent Authority (ANCA) received a report it had commissioned entitled "*Technical Review: Benchmarking Noise Measuring Systems and Community Engagement Tools*", prepared by Noise Consultants Limited. The ANCA's Report benchmarked the daa Noise and Track Keeping (NTK) System and Community Engagement Tools (CET) at Dublin Airport against systems in operation at select UK, European, and international airports.

The report was commissioned by ANCA to evaluate the effectiveness of Dublin Airport's NTK and CET systems. The primary goals of the *ANCA's Report* were to:

- Assess the current NTK and CET systems at Dublin Airport against international best practice.
- Identify gaps and opportunities for improvement in system design, monitoring, reporting, and stakeholder engagement.
- Provide recommendations to ensure compliance with legal obligations under the Aircraft Noise (Dublin Airport) Regulation Act 2019 and Condition 10 of the North Runway planning permission.
- Support ANCA in its regulatory role by informing future directions for noise monitoring and community engagement.

The scope of the *ANCA's Report* included comparisons with peer airports across the UK, Europe, and internationally, focusing on system capabilities, number and placement of NMTs, data transparency, and public engagement tools.

2.2 Synopsis of ANCA Report 2020 Requirement

ANCA's Report set out a comprehensive framework for how daa should evolve its approach to noise monitoring and community engagement. Rather than focusing solely on technical upgrades, the report emphasised the need for a comprehensive, future ready system that aligns with international best practices and meets both regulatory and community expectations.

At its core, *ANCA's Report* called on daa to:

- Modernise and expand its NTK system to ensure it is capable of accurately capturing, analysing, and reporting aircraft noise across a wide geographic area with sufficient coverage to reflect both operational realities and community impact.
- Enhance transparency and accountability by making noise and flight data more accessible to the public, and by ensuring that reporting is regular, comprehensive, and easy to understand.
- Strengthen community engagement using advanced CET, including platforms that allow residents to track flights, understand noise levels, and submit complaints in a user-friendly way.
- Support evidence-based policy development by ensuring that data collected through NTK and CET systems can inform noise contour mapping, compliance monitoring, and the development of mitigation strategies.
- Demonstrate leadership and alignment with global standards, particularly ISO 20906:2009+A1:2013 and ECAC Doc 29, by adopting practices that are already in place at leading international airports.

Ultimately, *ANCA's Report* envisioned a system that not only meets legal obligations but also builds trust with the public, supports long term planning, and positions Dublin Airport as a responsible and responsive operator in the face of growing environmental and community concerns.

2.3 ANCA NMT Directions

On 30th November 2022, ANCA issued two Direction letters to daa: one concerning the installation of a total of 23 fixed Noise Monitoring Terminals (NMTs), and the other addressing acquiring a minimum of 2 portable NMTs. These directives referenced Section 19(2)(a) and Section 19(1)(b) of the Aircraft Noise (Dublin Airport) Regulation Act 2019.

Subsequently, on 7th July 2025, ANCA requested by letter that daa provide a demonstration of compliance of the NMT system with Section 19 of the same Act. The relevant subsections cited in this request include 1(b), 2(a), and 4(c). Although the July 2025 letter does not explicitly reference the earlier directives, its content aligns with the measures previously outlined.

Data required by Item 4(c) is included in the Quarterly Noise and Flight Track Monitoring Reports published on the daa website (Airport Plans & Reports Dublin Airport) and in the 2024 Section 19 Compliance report submitted to ANCA on 4th September 2025 and subsequently published on their website.

Evidence on calibration is provided in Appendix 1 of this report.

Evidence on the accuracy validation of the NMT system including correlation with aircraft events is provided in part in the report (see Section 3 and in Appendix 1). Further detail is provided in the *Condition 10 Compliance Report 2024 (2025 Revision)* submitted to the FCC on 2 September 2025 and in the Quarterly Noise and Flight Track Monitoring Reports referred to above.

It is not usual practice to attempt “validation tests using secondary equipment” for permanent installations of aircraft NMT. The equipment and the installation are compliant with the relevant international standards, including microphone quality, installation height, calibration and aircraft event correlation. “Secondary equipment” installed at lower than the required minimum height does not provide reliable validation measurements. The consistency and correlation between the measured noise levels and the annual noise contours calculated in the airport noise model (as detailed in the above-mentioned Condition 10 Compliance Report) support the validation of the NTK system.

2.4 Objectives of this Report

This report aims to reflect on the progress made since *ANCA's Report* and to demonstrate how daa has addressed the recommendations and requirements outlined therein. The key objectives of this response are to:

- **Benchmark Progress:** Evaluate the current state of the NTK and CET systems against the 2019 baseline, highlighting improvements, system expansions, operational enhancements and outlook using a timeline. We are also aiming to validate operation and placement.
- **Assess Peer Comparisons**: Revisit the international benchmarking exercise by comparing Dublin Airport's systems with those of peer airports, identifying areas where daa now meets or exceeds global standards, and where further alignment may be needed.
- **Shape Future Strategy:** Use the insights gained from benchmarking and operational experience to inform daa's strategic direction for 2025–2030. This includes planning for further system upgrades, enhancing community engagement, and ensuring continued compliance with legal and regulatory obligations.
- Through this response, daa seeks to demonstrate effectiveness, accuracy and compliance/alignment with both regulators and the communities it serves.

2.5 Legal and Institutional Framework

Background

Dublin Airport's approach to noise monitoring and community engagement is governed by a combination of national legislation, planning conditions, and international standards. Two key components underpin this framework:

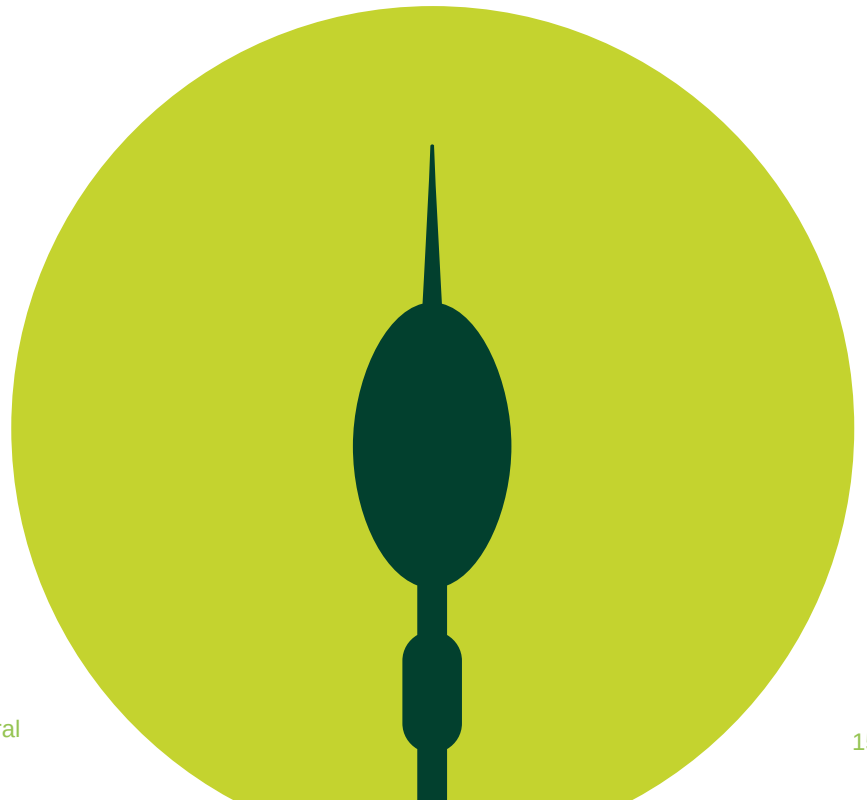
- **NTK System:** This refers to the integrated system used to monitor aircraft noise and correlate it with flight tracks. It includes a network of fixed and portable NMTs, radar data, and meteorological inputs. The NTK system enables daa to assess the acoustic impact of aircraft operations and ensure compliance with noise related obligations.
- **CET:** These are platforms and processes that allow the public to access flight and noise data, submit complaints, and engage with daa on noise-related issues. Tools like WebTrak provide near real time information and support transparent communication with affected communities alongside Noise Information Portal (InsightFull). Maploom allows homeowners to see if they are eligible for any noise insulation or purchase schemes.

Legislative Context

The Aircraft Noise (Dublin Airport) Regulation Act 2019, particularly Section 19, establishes the legal basis for noise monitoring at Dublin Airport. Under this Act:

- daa is required to ensure that appropriate noise measuring systems are in place and operational on an ongoing basis.
- ANCA is empowered to direct daa, following consultation, to install noise monitoring systems at specified locations within or outside the airport boundary.
- daa must also support the preparation of annual compliance reports, which include analysis of NTK data and highlight any deviations from approved noise mitigation measures or flight procedures.

This legal framework ensures that daa's noise monitoring and engagement systems are not only technically robust but also responsive to regulatory oversight and community expectations.



3.0 Legal Requirements and Guidance Compliance

This section outlines how Dublin Airport's NTK and CET systems align with the:

- Condition 10 of the original grant of planning permission for the North Runway and ECAC Doc 29[1], which inter alia, require noise and flight track monitoring to be implemented at Dublin Airport.
- ISO 20906:2009+A1:2013 for unattended aircraft noise monitoring
- The recommendations of the *ANCA's Report*

The NTK and CET systems at Dublin Airport have undergone significant development since 2020 with enhancements in system design, monitoring coverage, data integration, and public engagement. This section demonstrates how the current systems not only meet the minimum legal obligations but also align with international standards and benchmarking expectations.

[1] https://www.ecac-ceac.org/images/documents/ECAC-Doc_29_4th_edition_Dec_2016_Volume_1.pdf

Please read the below sub-sections in conjunction with Appendix 1 for references and evidence.

3.1 Condition 10 of the An Bord Pleanála decision on the North Runway as referred in the ANCA Report

Condition 10 of the 2007 grant of permission for the North Runway sets out a comprehensive framework for the operation of Dublin Airport's NTK system. This includes continuous monitoring, data reporting, and the use of noise data to inform mitigation measures. It provides:

"Noise and flight track monitoring shall be operated at all times as detailed in the Environmental Impact Statement Addendum received by the planning authority on the 9th day of August 2005 and in accordance with the recommendations of ECAC.CEAC. Doc 29. An annual report on noise contours shall be submitted to the planning authority. A noise and flight track monitoring report shall be submitted to the planning authority on a quarterly basis and shall be made available for public inspection. The results of the noise and flight track monitoring shall be used to re-evaluate noise impacts and the application of mitigation measures, including (a) the noise insulation scheme (including residences and schools) and (b) the property buy-out scheme, biannually. "

The NTK system in place at Dublin Airport is fully aligned with these requirements and the associated Environmental Impact Statement (EIS) Addendum accompanying the application.

3.1.1 Continuous Operation of the NTK System

Condition 10 requires that:

> ***"Noise and flight track monitoring shall be operated at all times as detailed in the Environmental Impact Statement Addendum…"***

The NTK system at Dublin Airport is operated continuously, 24 hours a day, 365 days a year. The system is monitored in real time by the Envirosuite Operations Centre. Any issues with data feeds or equipment are automatically flagged, and appropriate responses are initiated. Each NMT is equipped with internal battery backup, ensuring up to eight hours of operation during power outages. Device uptime is tracked and reported, and the system's reliability is evidenced through monthly noise reports showing data capture.

3.1.2 Identification of Individual Flight Paths and Noise Context

The ANCA's report states:

> ***"The Noise & Flight Track Monitoring system measures noise levels generated by aircraft and identifies the flight path taken to and from the airport, for each individual aircraft movement."***

The NTK system integrates radar and acoustic data to identify the flight path of each aircraft. This enables a detailed understanding of aircraft operations and their impact on local communities. The system supports both compliance monitoring and community engagement by correlating noise events with specific aircraft movements.

In addition, under Condition 10 3.8, the NTK system is required to:

> ***"Measure aircraft and non-aircraft noise events to gain an understanding of ambient sound levels."***

To meet this requirement, the system records radar and meteorological data concurrently from airport's METAR and five weather stations externally placed alongside the NMTs with noise data. It distinguishes between aircraft related noise and other environmental or human activity noise, providing a more accurate picture of the acoustic environment surrounding the airport. This dual capability enhances the reliability of noise event classification and supports more informed policy and operational decisions.

3.1.3 Integration of Radar and Weather Data

As per *ANCA's Report*, Condition 10 requires that the system:

> ***"Integrates primary and secondary radar data, meteorological and noise data".***

The NTK system integrates both primary and secondary radar data, including flight plan data and meteorological inputs such as wind speed, temperature, and humidity. This integration ensures accurate correlation of noise events with aircraft operations and supports the classification of aircraft and non-aircraft noise sources. Five NMTs are equipped with a weather station for accuracy. The remainder NMTs are mapped to the nearest weather station.

3.1.4 GIS Based Complaint Management and Noise Contour Support

As per ANCA's Report, Condition 10 requires that the system:

> ***"Uses a geographical information system to support community complaints management. The system also assists in the definition of noise contours leading to the creation of noise preferential routes."***

WebTrak, launched in 2021, provides GIS based visualisation of flight paths and noise levels. It allows users to search by Eircode or map, view historical and near real-time data, and submit noise complaints. In addition, Maploom is used internally to support spatial analysis of noise data, complaint patterns, and flight track dispersion. Maploom also allows homeowners to see if they are eligible for any noise insulation or purchase schemes. Together, these tools enhance the airport's ability to manage community feedback and monitor operational impacts.

The NPR is an environmental overlay of the Standard Instrument Departure (SID), which is approved by the Irish Aviation Authority (IAA) the regulatory body responsible for aviation safety. The NPR is specifically designed to guide aircraft along flight paths that reduce noise impact on surrounding communities. Creation of NPR does not require noise contour data but system support data output for the contour and system can assist in creating NPR for flight track monitoring.

Exports of radar flight tracks, noise data from NMTs, meteorological data, aircraft details, noise certificates, and destination information (to determine stage length) are used to support the generation of noise contours, which in turn inform the development and refinement of NPRs.

3.1.5 Monitoring Radius and Aircraft Data Capture

As per ANCA's Report, Condition 10 requires that the system:

> ***"Monitors aircraft flight tracks within a radius of some 40-45 miles from Dublin Airport with details provided on the particular aircraft being flown, its origin and destination, operator, time sequence, flight path, and elevation."***

The NTK system is configured to monitor aircraft within a 40-45 miles radius and beyond. Radar tracking ensures full coverage of operational airspace. The system captures detailed aircraft metadata, including origin, destination, operator, altitude, and time of event.

3.1.6 NMT Deployment and Site Selection

ANCA's Report specifies:

> ***"NMTs are located at approximately 6.5 kilometres from start of roll on the three runways (10R-28L and 16-34) … and also on the proposed future parallel runway (10L-28R) … with a further two portable trailers mounted NMTs…"***

Dublin Airport has expanded its network to 32 NMTs (25 fixed and seven portable), exceeding the minimum recommendations in *ANCA's Report* and requirements in the 2 ANCA Directions of 2022.

In line with the EIS Addendum, six NMTs have been strategically placed at approximately 6.5 km from the start of roll on each runway to ensure consistent and representative noise capture. The 6.5 km location matches the ICAO Noise Certification point for aircraft departure called "Flyover" and the departure performance assessment location used at some UK airports.

These NMTs are:

- Bay Lane NMT #1
- St. Doolaghs NMT #2
- Feltrim NMT #4
- Balcultry NMT #5
- St. David's NMT #6
- Newpark NMT #28

The other NMT site selections were based on the ANCA Direction on Permanent NMT and follow ISO 20906:2009+A1:2013 criteria, considering proximity to flight paths, low ambient noise, and avoidance of reflective surfaces. Portable NMT locations are selected in consultation with community groups through the DAEWG and CLG.

3.1.7 High Frequency Noise Measurement

As per the ANCA report, Condition 10 requires that the system:

> ***"Measures the noise levels every ½ second in all Noise Monitoring Terminal Sites, 24 hours a day, 365 days a year…"***

All NMTs are Class 1 IEC 61672-1 compliant and measure at 0.5-second intervals, running 24 hours a day and 365 days a year. They support one-third octave band spectral analysis and dual frequency weighting, ensuring high resolution, continuous data capture.

3.1.8 Proactive Noise Management and System Capability

ANCA's Report states:

> ***"The Noise and Flight Track Monitoring System will ensure that Dublin Airport is equipped with the best form of aircraft noise management available anywhere in the world…"***

The NTK system is used proactively to monitor trends, identify exceedances, and support operational improvements. It enables data driven decision making and supports the airport's commitment to minimising community impact. Dublin Airport uses systems recognised worldwide for noise and flight tracking.

3.1.9 Policy Development and Noise Abatement

As per *ANCA's Report*, Condition 10 requires that the system:

> ***"Will provide enough data to enable an effective policy to be developed… including the measures which Dublin Airport Authority may introduce to control noise."***

The NTK system provides baseline data for the development of contours and noise metrics on an annual basis and in line with END reporting requirements.

3.1.10 Complaint Logging and Analysis

ANCA's report states:

> ***"Recording complaints about noise disturbance is the responsibility of Dublin Airport's Community Affairs Department. All complaints which are received are recorded and investigated and contribute to the airport's Noise Abatement Policy."***

Complaints are accepted via WebTrak, ViewPoint (online complaint form), telephone and post. All are logged in the NTK system and analysed monthly, quarterly, and annually. Complaint trends are used to inform noise policy development and operational responses.

3.1.11 Reporting Requirements

As per ANCA's report, Condition 10 requires that the system:

> ***"An annual report on noise contours shall be submitted… A noise and flight track monitoring report shall be submitted… quarterly… and made available for public inspection."***

Dublin Airport publishes monthly, quarterly, and annual reports on operations, noise and flight track data. These are submitted to both the ANCA and planning authority as required and made publicly available via the airport's website.

3.1.12 ECAC Doc 29 Compliance

In addition to the requirements set out in the EIS Addendum and Condition 10, Dublin Airport's NTK system is expected to meet the technical standards outlined in ECAC Doc 29, Report on Standard Method of Computing Noise Contours Around Civil Airports.

Section 3.3.5 of ECAC Doc 29 (4th Edition) specifies that:

> ***"For a measurement to be considered valid, the level due to the aircraft flyby should be at least 10 dB above the ambient level, and at least 50 such measurements should be available for each combination of aircraft type and ground track to enable sound levels to be estimated with adequate statistical confidence."***

The NTK system at Dublin Airport is designed to meet these criteria. It distinguishes aircraft noise from ambient (community) noise using radar flight track correlation and acoustic thresholds. The system collects thousands of valid measurements across a wide range of aircraft types and flight paths, ensuring statistically robust data for contour modelling.

This supports the generation of accurate and representative noise contours, which are used to inform policy, assess community impact, and guide mitigation measures such as insulation and buy out schemes.

3.2 ISO 20906:2009+A1:2013

The NTK system at Dublin Airport has been developed and expanded in line with ANCA Directions and the requirements of ISO 20906:2009+A1:2013, which sets out international standards for unattended monitoring of aircraft sound in the vicinity of airports. The following subsections demonstrate how the system complies with each specific requirement of the standard.

3.2.1 NMT Site Selection Criteria

"The airport should consider the location of flight paths; the maximum sound level of the quietest aircraft; and residual long term average sound levels when siting additional NMTs."

In response to this requirement, a key provision of the Regulation Act 2019 is that the ANCA, following consultation with the airport authority, holds the power to direct the installation of noise monitoring systems at designated locations, which may be situated either within or beyond the airport boundary.

The daa is responsible for selecting the exact locations within these areas, guided by technical, regulatory, and operational considerations. To support this process, daa engaged a specialist noise consultancy, to conduct detailed site surveys. These surveys assess ambient sound levels, proximity to flight paths, and the ability to detect the quietest aircraft with a minimum 15 dB margin above background noise, in line with ISO 20906:2009 ISO 20906:2009+A1:2013 recommendations.

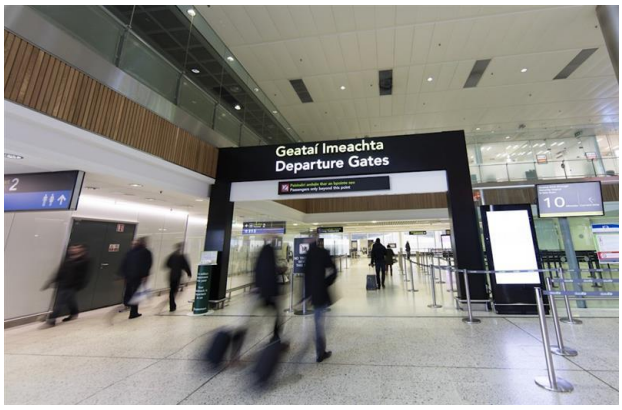
In accordance with ISO 20906:2009+A1:2013, each NMT location must meet the following criteria:

- Low residual sound levels, ideally at least 10 dB below the quietest aircraft expected to overfly the site.
- Microphone height of six metres above ground level.
- Reflective surfaces located at least 10 metres from the microphone.
- Obstacle-free surroundings to ensure accurate sound capture.
- Stable meteorological conditions to support consistent long-term monitoring.

In addition to these standards, daa has identified further requirements to ensure effective and practical deployment:

- Proximity to populated areas to monitor community noise exposure.
- Alignment with existing and proposed Standard Instrument Departures (SIDs) and Standard Terminal Arrival Routes (STARs) to capture representative aircraft operations.
- Within a 40 km radius of Dublin Airport, with some monitors placed further out as directed by ANCA to validate noise contours in both high and low noise areas.
- Adequate cellular coverage for data transmission.
- Access to a reliable power source.
- Simple, secure and safe means of access and egress for maintenance, with measures in place to minimise the risk of theft or vandalism.

As a result of this comprehensive approach, 17 new Class 1 fixed NMTs have been deployed in addition to the eight existing units from 2019, ensuring robust and representative coverage within a 45 km radius of Dublin Airport.



3.2.2 Avoidance of Obstacles and Reflective Surfaces

"NMT site selection should ensure obstacles between the microphone and flight paths should be avoided, and the NMT located away from acoustically reflective surfaces."

All fixed NMTs are installed at a minimum height of six metres above field level (AFL) and are sited away from buildings, trees, or other reflective surfaces. Where feasible, sites were chosen to maintain a 70° line of sight angle to the monitored flight paths, as recommended by ISO. In cases where this was not achievable due to practical constraints, the associated measurement uncertainty is acknowledged.

3.2.3 Class 1 Equipment and Spectral Capability

"NMT should conform to Class 1 IEC 61672-1, with one-third octave band spectral measurement capability, and specified sound pressure level and linear operating ranges."

All fixed and portable NMTs deployed at Dublin Airport are Class 1 IEC 61672-1 compliant. They are equipped with one-third octave band spectral analysis capability and operate within a sound pressure level range of 30–120 dB, with a linear operating range of at least 60 dB at 1 kHz.

3.2.4 Maximum and Average Sound Pressure Levels

"NTK shall record maximum and average sound pressure levels."

The NTK system records both maximum sound pressure level (Lmax) and equivalent continuous sound level (Leq) sound pressure levels for each noise event which are used in reporting and analysis including the calculation of the annual END metrics, Lden and Lnight.

3.2.5 Clock Accuracy and Meteorological Data

"NMT should have a clock within two seconds of actual time and should record hourly meteorological conditions."

All NMTs are synchronised to local time via internet connection and maintain clock accuracy within two seconds. Five NMTs are equipped with weather station that records meteorological data, including wind speed, temperature, humidity, and precipitation, every 15 minutes. The reminder NMTs received the weather data from its nearest weather station. The NTK system also utilise the METAR data from the airport and Air Navigation Service Provider (ANSP). METAR is updated every 30 minutes.

3.2.6 Flight Path Identification

"NTK shall identify the individual flight path taken to and from the airport."

The NTK system integrates radar and flight plan to identify the flight path of each aircraft. This includes altitude, heading, and position relative to the NMT, enabling precise correlation of noise events with specific aircraft movements and NPR adherence monitoring.

3.2.7 Integration of Radar, Meteorological, and Noise Data

"NTK should integrate primary and secondary radar data, meteorological and noise data."

The NTK system integrates all three data streams which are radar, meteorological, and acoustic into a unified platform. The primary and secondary radar data including flight plans come from the ANSP. This allows for comprehensive analysis of aircraft operations and environmental conditions.

3.2.8 Aircraft Metadata Recording

"NTK shall record an aircraft's origin, destination, operator, time sequence, flight path, and elevation."

The NTK system captures and stores detailed metadata for each aircraft event, including flight number, operator, origin and destination airports, time of overflight, altitude, and track. This data comes from the flight plan and radar data stream.

3.2.9 Measurement of Aircraft and Non-Aircraft Noise Events

"NTK should measure aircraft and non-aircraft noise events to gain an understanding of ambient sound levels."

The system distinguishes between aircraft and non-aircraft noise events using acoustic signatures and radar correlation of event time and aircraft location. This allows for identification of local aircraft, non-local aircraft (flyovers) and non-aircraft (ambient or community) noise events, and thus accurate assessment of aircraft noise versus community (ambient) noise levels.

3.2.10 Detection of Incomplete or Corrupted Data

"NTK should allow recognition of incomplete or corrupted data."

The NTK system includes automated diagnostics that flag calibration failures, data gaps, or anomalies. Alerts are sent to the Envirosuite Operations Centre, and corrective actions are initiated promptly.

3.2.11 Classification Accuracy and Uncertainty

"NTK should ensure that the uncertainty of the cumulated sound exposure level of all aircraft events is less than 3 dB, and at least 50% of aircraft sound events are correctly classified."

The NTK system is calibrated automatically daily, with alerts sent to the Envirosuite Operations Centre if any calibration failure occurs. In addition, calibrations are manually performed before and after each deployment using a Class 1 calibrator.

To ensure classification accuracy, the noise team manually reviews a sample of events, particularly where aircraft noise overlaps with elevated community noise. These manual checks help confirm correct classification of aircraft events and support the system's compliance with ISO standards.

The Condition 10 Compliance Report (Section 5.11) reported that in 2024 only 1.2% of aircraft movements were not correlated with any of the 32 NMT. These were mostly smaller turboprop aircraft which are not required to follow the jet aircraft SID procedures.

The NTK system maintains cumulative sound exposure uncertainty below 3 dB, and internal validation confirms that at least 50% of aircraft sound events are correctly classified, in line with regulatory expectations.

3.2.12 Reporting of Individual and Cumulative Events

"The system shall report separate individual and cumulative aircraft event data."

The NTK system generates both individual event records and cumulative summaries. The Quarterly Noise and Flight Monitoring Reports provide "cumulative" data in the form of measured monthly, quarterly and annual, Lden and Lnight data, the EU END metrics. "Separate individual event data" are provided in the form of the Number Above metrics for both ranges of Lmax (60 through 85 in 5 decibel steps) and SEL (70 through 95) values at each NMT, based on average day each quarter and year, and based on the END divisions of Day (07-19h), Evening (19-23) and Night (23-07h).

For example, N60 is the number of measured daily events of Lmax 60 dBA or greater.

3.2.13 Windscreen Performance

"A suitable windscreen shall be installed around each microphone… the one-minute equivalent continuous sound pressure level from this test shall not exceed 65 dB at 10 m/s wind speed."

Each microphone is fitted with a windscreen tested to ensure that wind induced noise at 10 m/s does not exceed 65 dB(A), in accordance with ISO 20906.

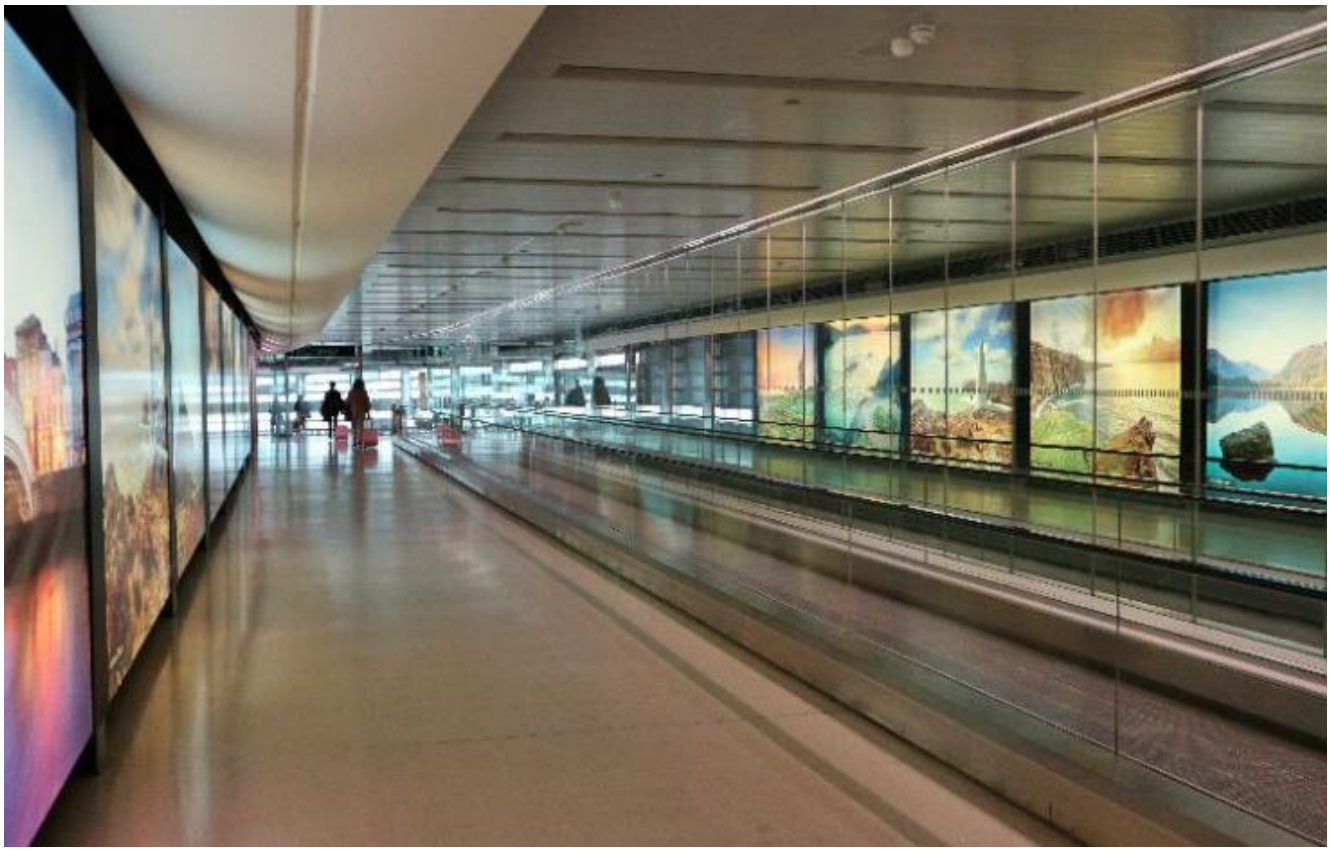
3.2.14 Calibration and System Checks

"Periodic testing of monitor system performance shall be carried out at least annually… acoustic calibration shall be performed using a Class 1 calibrator verified by an accredited laboratory."

All NMTs undergo annual acoustic calibration using a Class 1 calibrator, verified by an accredited laboratory. In addition, daily automated operational checks are performed remotely to ensure system integrity. Any deviation greater than 0.5 dB triggers an alert and the monitor is flagged for inspection.

3.3 Benchmarking

ANCA's Report compared Dublin Airport's NTK and CET systems with those of peer airports across the UK, Europe, and internationally. The following subsections demonstrate how Dublin Airport aligns with the key benchmarking recommendations outlined by ANCA.



3.3.1 Recommended Number of NMTs

"The airport's NTK system should support 11–18 NMTs…"

Dublin Airport currently operates 32 NMTs, comprising 25 fixed and seven portable units. This exceeds the recommended range and reflects a significant expansion of the monitoring network since *ANCA's Report*. The deployment strategy ensures coverage of key flight paths and communities, aligning with international best practice.

3.3.2 Community Input into portable NMT Deployment

"Community groups would have advance warning and input to the deployment locations of portable NMTs."

This recommendation is being implemented through regular engagement with the DAEWG and the CLG. These forums provide opportunities for community representatives to contribute to the siting of portable NMTs, ensuring transparency and responsiveness to local concerns.

3.3.3 Customisable Reporting Frequency

"Customisable reporting including annual, 6 monthly and monthly performance reports are undertaken."

Dublin Airport produces reports at all three frequencies:

- **Monthly:** Noise & Operations Reports
- **Quarterly**: Noise and Flight Track Monitoring Reports (Specific Half-yearly reports are covered by every second Quarterly Report.)
- **Annual:** Compliance Reports

These reports are based on data from the NTK system and are made publicly available via the airport's website.

The Quarterly reports include comparisons of the Annual modelled Noise Contours (Lden and Lnight) compared with the point measurements at the permanent NMT locations. (Portable NMT are not located sufficiently long for annual data readings.)

3.3.4 Historical Data Accessibility and GIS Integration

"Historical data to be accessible, and to be recorded in GIS."

All NTK data is stored and accessible in multiple formats for analysis and reporting.

Extensive flight track data including typical busy days of arrival and departure under both easterly and westerly conditions are provided in the Annual Section 19 Compliance Report and some Quarterly reports, including overlays of tracks and Annual Contours.

For public transparency, WebTrak provides simplified access to historical flight and noise data through an interactive GIS interface. Annual Noise Contours (Lden and Lnight) can be displayed in WebTrak. This multi-platform setup ensures both regulatory compliance and meaningful engagement with the community.

4.0 Historical & Strategic Evolution of NTK/CET Systems

4.1 Evolution Timeline (from 2019 to 2025)

This section outlines NTK and CET improvements and changes implemented by Dublin Airport from 2019 onwards.

Please read the below sub-sections in conjunction with Appendix 2, acting as a supplementation.

2019

In 2018/2019 there were 3 NMT on the centreline of the main (now South) Runway, 2 off the ends of the Cross Runway (16-34), and 2 of the ends of the new North Runway that was under construction. There was one portable NMT.

Extensive reporting was completed for each of the NMTs, showcasing a pie chart spread of noise event types, the operational status, and detailed noise level data – including hourly distribution of noise.

ANCA was established in 2019 within the Fingal County Council (FCC) following the Aircraft Noise (Dublin Airport) Regulation Act 2019.

The Aircraft Noise (Dublin Airport) Regulation Act 2019, Part 4, section 19 required Dublin Airport to produce yearly compliance reports in terms of noise mitigation measures and operating restrictions. daa commissioned To70, a global aviation consultancy, to draft a compliance report in accordance with the act. The purpose of these reports is to document: any breaches of noise rules, how traffic is managed to reduce noise, noise data collected, causes of non-compliance, actions to fix issues (including penalties), and a plain language summary of all findings.

2020

In late 2020, daa received *ANCA's Report*.

In 2020, daa submitted an application, the North Runway Relevant Action ('NRRA') (ACP Ref. PL06F.314485) requesting changes to two of the NR planning conditions on nighttime operational limits and introduce a Noise Quota Scheme (NQS) and night noise mitigation with an insulation grant scheme. There was no impact on the NTK system.

daa improved upon the Annual Section 19 Compliance report structure with more detailed information regarding the Dublin Airport noise mitigation measures. It notes the noise mitigation measures in place and the compliance to it, air traffic distribution and management, engagement forums with the community, operating restrictions, flight procedure changes, a chapter assessment of aircraft, noise contours, and discusses opportunities for improvement.

2021

daa launched its community engagement flight tracking tool, WebTrak. WebTrak is a web-based service that provides information on flights, tracks and measured noise levels related to aircraft using Dublin Airport.

Developed by Envirosuite and used at many international airports, WebTrak provides near real-time information on flight origin and destinations, aircraft types, altitudes, and flight paths, as well as noise levels registered at Dublin Airport's NMT. The system also provides a simplified way for members of the public to monitor flights and submit noise complaints. The interactive tool allows users to identify their location by Eircode or map, and view flight data in relation to that specific location. Historic flight information is of particular interest to aviation enthusiasts, but also supports the system's automated noise complaint system, which is supplementary to the existing electronic, telephone and postal options.

The quarterly reporting (since 2017) continued to be uploaded onto the daa website, providing data on traffic of both passengers and aircraft, track adherence, runway use and weather, overflight height analysis in relation to the NMTs. Alongside this it provides information about what data the NMT gathered in a more understandable format for the public to view.

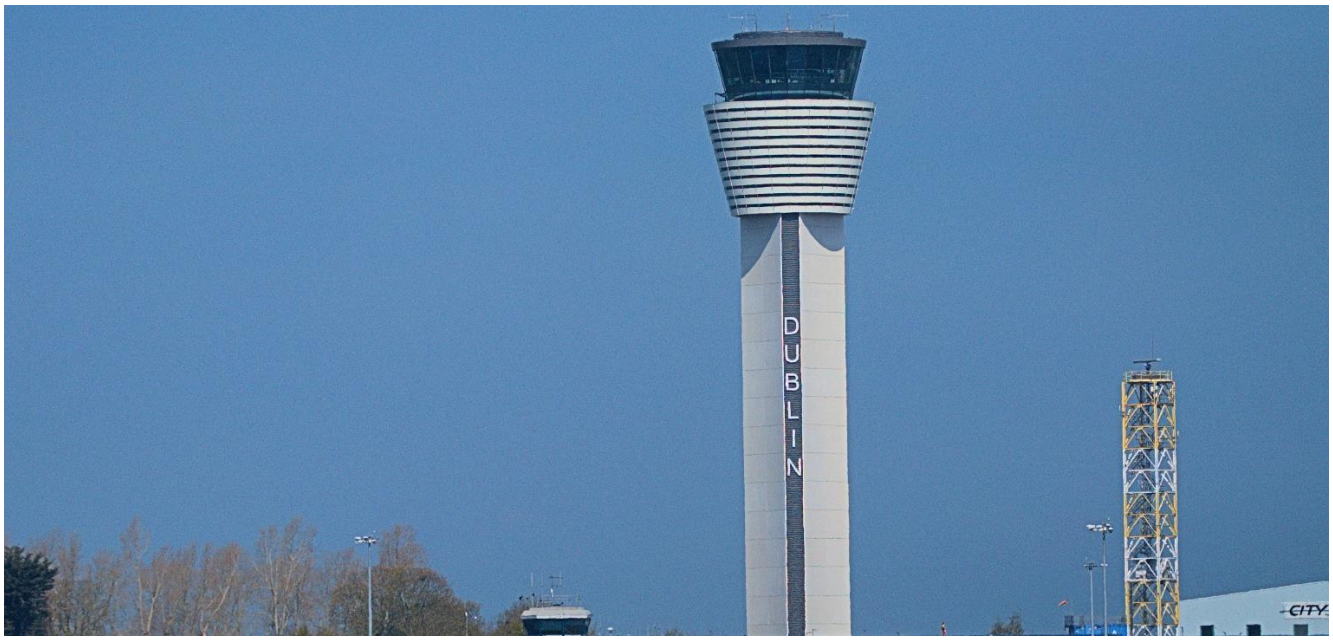
In addition to the quarterly and bi-annual reporting, daa also introduced monthly reports. The focus of these reports tailored to documenting complaint data and analysis of this data. It illustrated complaints based on location, time, and provided comparisons between the previous year.

With regards to new NMTs for an expanded network, initial site selections were made, with site surveys commencing in December.

2022

Four additional NMTs were deployed – Swords (NMT 7), Malahide (8), St. Margaret's National School (10), and Kilcoskan National School (26). These NMTs cover area closer to the expected traffic to and from the new North Runway. This leads to the total number of NMTs at 12 – 11 fixed and one portable. They were operational since July 2022, predating the August opening of the North Runway.

Dublin Airport also endeavoured to inform the public, in advance, of any runway closures due to maintenance, which would drive noise to other areas of the population which would not be accustomed to it. daa began to do this through news updates on the Dublin Airport website for the public to easily view and access.



2023

The total count of NMTs rose to 18 – 17 fixed and one portable. One NMT was deployed closer to the North Runway westerly departure track at Newpark NMT (28). The remaining five, as directed by ANCA, were placed further out from the Airport – Summerhill (27), Ashbourne (29), Roundwood (30), Dunboyne (31), and Donabate (32). This increases the range of noise captured for more thorough investigations and reporting.

Viewpoint, a module of the ANOMS NTK system developed by Envirosuite, is the automated phone system (IVR telephone), launched for better telephone noise complaint management and to provide more user-friendly methods of lodging complaints. The system recorded voice messages from the public, transposed these into text, and created a Complaint record on the NTK system, along Webtrak and website lodged complaints.

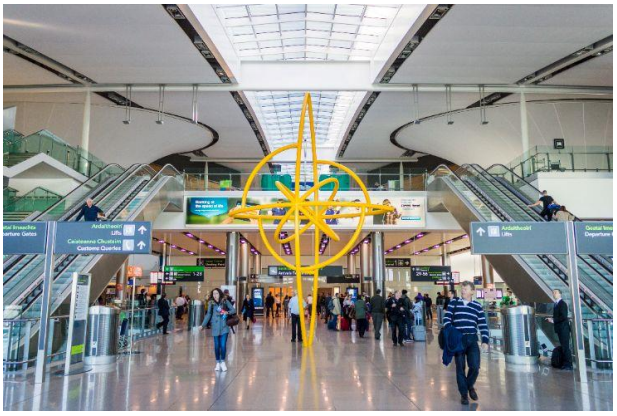
The new system removed the need for repeat complainants to re-enter their details for each complaint. This system auto filled their details after their initial complaint, reducing time needed to submit complaints once they have created a login. It also allowed users to view their complaint history.

2024

New permanent NMT were installed at Ongar (NMT 37), Clondalkin (38), Lucan (39) and Bray (40). This completed the permanent NMT required by the 2022 ANCA Direction. The NMT count increases to 27 – 25 fixed and two portable NMTs.

A research company conducted a survey in 2024. They aimed to understand emotional sentiment and attitudes toward Dublin Airport, particularly as a neighbour to local communities. It explores how factors such as residential location, noise experience, and the airport's community and environmental initiatives influence these perceptions. Additionally, it seeks to identify both positive and negative aspects of the relationship between the airport and nearby residents. The 2024 Dublin Airport Community Sentiment Report reveals that most residents in the Fingal area hold a generally positive view of the airport, recognising its value to both the local and national economy. Many appreciate the convenience it offers and the employment opportunities it provides. However, concerns persist—particularly around noise pollution, which is a significant issue for those living near flight paths. Residents also expressed a desire for improved communication and greater transparency from the airport, especially regarding operational changes and future developments. While there is strong awareness and support for the airport's community and environmental initiatives, such as the Community Fund and sustainability programmes, some feel these efforts could be more inclusive and better targeted towards the areas most affected by airport activity.

To assist with the Noise Insulation Schemes, Dublin Airport launched an online tool named Maploom. Accessed seamless from the Dublin Airport website, this tool allows users to input their Eircode to check their eligibility to any of the following schemes: Voluntary Dwelling Purchase Scheme (VDPS), Residential Noise Insulation Scheme (RNIS), and School Insulation Scheme (SIS).



In anticipation of the NRRA, daa began work to integrate a Quota Count (QC) module into ANOMS with Envirosuite. A QC system limits the total permitted nighttime, based on aircraft arrival and departure QC categories derived from on their aircraft noise certificates. The QC module tracks the QC of nighttime (23-07h) operations across airlines and assessment periods.

New features on WebTrak were added. The NPR layers provided users a better understanding of the flight paths aircraft would follow when departing. The South Runway night closure notifications were added as a pop-up information tab to keep users informed in advance.

2025

To improve responsiveness to community requests, daa purchased 5 new portable NMT, above the number required by the 2022 ANCA Direction. At present total NMT count is 32 – 25 fixed and seven portable NMTs.

daa launched a Noise Information Portal (Insightfull) developed by Envirosuite, in April, with seamless access to additional noise and operational data from the Dublin Airport website. The system features for in information dashboards covering Operations, Overflights, Noise Measurements and Complaint data.

On a dashboard called “Flights Over My Area”, by inputting an Eircode or location, a user can review overflight information specific to that area.

Data is updated monthly and extends back several years. ANCA acknowledges and welcomes the addition of this CET. The website received extensive coverage by news outlets, even internationally, which increased engagement and outreach for the public to be informed of this new tool.

An independent research survey was conducted this year in Spring. It showed that community sentiment towards Dublin Airport is generally very positive. According to the research, 86% of Fingal residents support further development of Dublin Airport to allow it to grow, while 84% agree that having the airport in their community fuels economic development. The survey, based on 1,011 face-to-face interviews across the Fingal Electoral Area, also found that two in every three (66%) residents view Dublin Airport as a “trustworthy neighbour”.

A NTK module called Perform Track was integrated into ANOMS with Envirosuite. This module provides airlines and our ANSP with self-service access to the procedure adherence data. Airlines are restricted to viewing their own adherence. Additionally, they can see operations that were assessed against the same abatement procedure but adhered with it. ANSP can review all deviations and can efficiently flag operations that have been instructed to deviate from the SID or NPR. This module was released to airline users and ANSP in April.

A new feature was added on WebTrak. A track deviation notification was implemented. This is a visual indicator to showcase aircraft deviating from NPR procedures.

Below shows a table with the current NMTs as fixed and the placement of the portable NMTs. The portable NMTs are subject to change in liaison with the community groups.

Table 1: List of NMT Locations and Installation

Location ID	Location	Date
1	Bay Lane	2015
2	St. Doolaghs	2015
3	Bishopswood	2015
4	Feltrim	2015
5	Balcultry	2015
6	St. Davids	2015
7	Swords	07/2022
8	Malahide	07/2022
10	St. Margarets NS	07/2022
20	Coast Rd (OP)	2015
26	Kilcoskan NS	12/2022
27	Summerhill	09/2023
28	Newpark	09/2023
29	Ashbourne	09/2023
30	Roundwood	09/2023
31	Dunboyne	09/2023
32	Donabate	09/2023
33	Ardgillan	01/2024
34	Portmarnock	06/2024
35	Ballyboughal	06/2024
37	Ongar	08/2024
38	Clondalkin	08/2024
39	Lucan	08/2024
40	Bray	08/2024
206	Ratoath	03/2024

Location ID for Portable	Location	Installation Date
207	Kilcoskan	07/2024
210	Ballystrahan	30/06/2025
211	Toberburr	30/06/2025
212	Wotton	01/07/2025
213	Mabestown	01/09/2025
214	Kilreesk	01/09/2025
215	Forest Road	01/09/2025

4.2 Current NTK and CET at Dublin Airport

As of 2025, the NTK and CET systems at Dublin Airport form the core of daa's environmental noise monitoring and public engagement framework. These systems support a wide range of functions, including regulatory compliance, operational planning, public transparency, and community liaison.

4.2.1 NTK System Capabilities

The NTK system integrates acoustic monitoring, aircraft tracking, and meteorological data to measure, classify, and analyse noise generated by aircraft operating at Dublin Airport. It is designed to provide accurate and verifiable data that can be linked to specific aircraft movements.

Noise Monitoring Terminals (NMTs)

The system currently comprises of 32 operational NMTs — 25 fixed and 7 portable - located at strategically selected sites within a 45 km radius of the airport. Site selection follows criteria outlined in ISO 20906, considering ambient noise levels, proximity to reflective surfaces, population exposure, and operational relevance.

All monitors are:

- Class 1 IEC 61672-1 certified, ensuring high-accuracy sound level measurements.
- Measure 0.5-second sampling, allowing for detailed resolution of aircraft noise events.
- Operated 24/7, with automated calibration checks and system diagnostics to maintain data quality.

Each terminal is housed in a weatherproof enclosure, with five units equipped with dedicated meteorological stations that measure wind speed and direction, temperature, and humidity - key factors in understanding and contextualising noise propagation.

The portable units are deployed on a rotational basis or in response to operational reviews and community concerns. Their portability enables daa to conduct targeted investigations in areas where permanent monitors may not be feasible.

Data Integration and Event Matching

Acoustic data from NMTs is integrated with radar flight data provided by the ANSP, using both primary and secondary radar sources to determine aircraft position, speed, altitude, and track. Aircraft metadata - such as registration, operator, type, origin, and destination are retrieved from the flight plan and is cross-referenced with radar tracks and linked to noise events.

This integrated system enables:

- Automatic detection and classification of aircraft-related noise events
- Temporal and spatial matching of noise data to individual flights
- Filtering of non-aircraft noise using profile characteristics and meteorological context
- Calculation of key metrics (e.g. Lmax, SEL, hourly LAeq)
- Assessment of track adherence, altitude compliance, and operational behaviour

These capabilities allow daa to conduct detailed analyses of flight procedures, evaluate runway usage impacts, and identify operational patterns associated with elevated noise, such as early turns, NPR deviations, and non-adherence of Continuous Descent Operation (CDO) and Continuous Climb Operation (CCO).

4.2.2 CET System Capabilities

daa's CET provide the public access to noise and flight track data, support noise complaint submission and tracking, and promote transparency in the airport's operations and environmental performance.

WebTrak

Launched in 2021, WebTrak is an interactive online tool that allows users to view near real-time aircraft movements and instantaneous NMT noise levels. Key features include:

- Aircraft tracking with flight path, altitude, and estimated noise levels
- Overlays of historic Noise Contours including Lden and Lnight
- Historical data searches by date, time, and location
- Eircode-based queries for location-specific analysis
- Direct submission of noise complaints through the platform

The interface is supported by near-live radar and NTK data and is designed for ease of use by the public.

Noise Information Portal (InsightFull)

Introduced in 2025, InsightFull expands on WebTrak by offering Eircode-level summaries of aircraft operations, runway use, measured noise levels, and complaint and complainant data. Users can view trends over time, access curated visualisations, and compare data across reporting periods. The platform utilises Power BI dashboards and aims to present complex operational data in a simplified and accessible format.

Viewpoint, IVR System

Viewpoint centralises noise complaint handling, providing multi-channel options (web, phone, and post), auto-fill functionality, and real-time complaint acknowledgement with reference tracking. A dedicated interactive voice response (IVR) phone line supports users without internet access.

Maploom

Maploom is a geospatial tool that enables residents to check their eligibility for noise mitigation schemes, such as insulation or dwelling purchase, based on their address and proximity to official noise contours.

4.2.3 System Oversight and Use

The NTK and CET systems support daa's compliance with:

- Section 19 of the Aircraft Noise Regulation Act 2019, which requires annual reporting.
- Condition 10 of the North Runway planning permission, mandating annual contour production, quarterly noise and flight track reporting and track adherence monitoring.
- ISO 20906 and ECAC Doc 29, which inform data collection, noise contour modelling, and reporting standards.

Together, these systems form the basis of daa's monthly, quarterly, and annual reports, which cover aircraft movements, runway usage, noise trends, complaints, and NPR adherence. These reports are submitted to ANCA and FCC and are made publicly available.

4.2.4 Operational Integration

NTK and CET data are embedded in daa's operational decision-making and environmental strategy. Following the revision of SIDs in 2023, NTK data has been used to assess compliance and evaluate community impact. The system also plays a role in managing eligibility criteria for the VDPS and the RNIS, ensuring mitigation measures are evidence-based.

4.2.5 Stakeholder Engagement

daa maintains regular engagement with local communities and stakeholders through the DAEWG and the CLG. These forums support information sharing, inform the residents' requests for the placement of portable NMTs, and provide feedback on CET usability and reporting.

Noise complaints submitted through CET platforms are logged, categorised, and linked to NTK data for validation. They are analysed by location and time to identify patterns and trends and are used to inform both operational responses and long-term planning. Responses are managed in line with daa's published complaint policy, with aggregated data forming part of its regular reports.

5.0 Global Benchmarking Comparison

This section outlines the most recent performance of Dublin Airport compared to peer airports worldwide.

In response to *ANCA's Report*, the information has been updated to reflect the systems and practices in place as of 2025.The same research methodology and benchmarking criteria outlined in the original report were applied. The information was gathered over the period May to July 2025 principally from online searches and literature reviews. It is therefore considered representative of the systems in place at the selected airports at that time.

As per *ANCA's Report*, this response considers the following:

- ATMs and population density within the vicinity of the airport;
- NTK system, and associated information, such as the system currently in place and the number of NMTs; and
- CET system, and associated information, such as reporting, data accessibility and stakeholder engagement.

The data gathered has considered airports in the following three categories:

- Irish and UK Airports – Major airports in Ireland and UK;
- EU Airports – chosen airports previously selected; and
- International Airports – researched previously selected airports.

For convenience and clarity, this update focuses in detail on 12 major airports. The remaining airports included in the benchmarking exercise are summarised in Table 2, with the updated information provided for reference.

5.1 Irish and UK Airports

5.1.1 Dublin Airport (Dublin, Ireland)

The NTK system at Dublin Airport is ANOMS, and it is comprised of 32 NMTs, of which 25 are fixed as shown in Figure 1. The placement of the NMTs have been directed by ANCA, which positions them in areas most affected by noise. The portable NMTs are decided by the community for placements. Dublin Airport has a suite of CET: WebTrak, Viewpoint – which includes IVR, the noise information portal – Insightfull, and a dedicated noise page to inform the public about aircraft noise. WebTrak offers near real-time and historical data about noise levels and flight track data which the community can utilise to submit noise complaints. Noise reports are published on monthly, quarterly, and annual basis and are available on the airport website. There are also regular community and stakeholder meetings that occur with groups such as DAEWG and CLG.

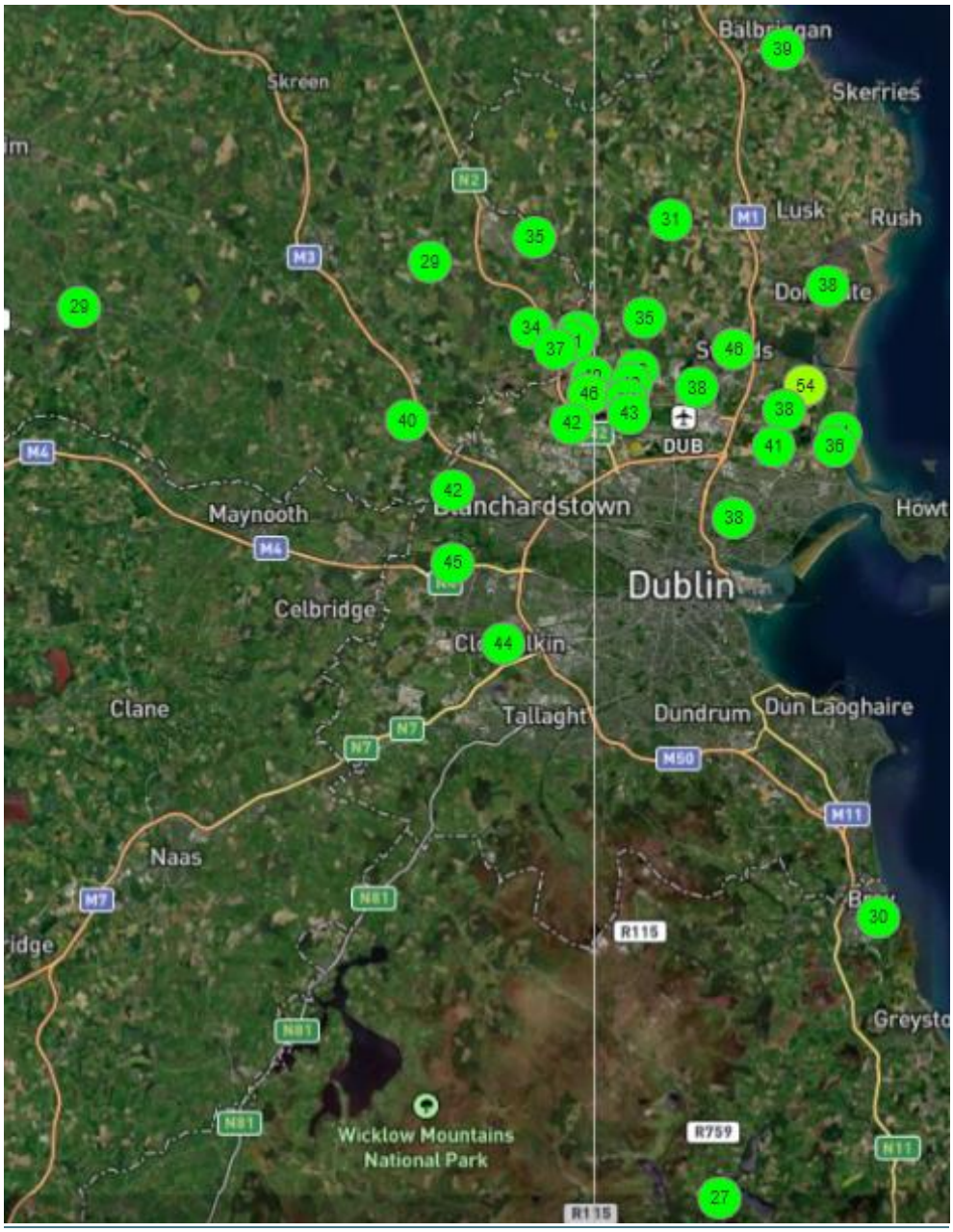


Figure 1 Dublin Airport NMT Locations

5.1.2 London Heathrow Airport (London, England)

London Heathrow Airport uses ANOMS for its NTK. The airport operates a total of 39 NMTs. The NMTs are positioned in relation to the current NPRs as well as in communities in proximity to the airport affected by noise. 12 fixed monitors are positioned to meet UK's Department for Transport (DfT) requirements for monitoring aircraft noise. The NMTs are shown on Figure 2. London Heathrow has three map-based CET – WebTrak, WebTrak My Neighbourhood, and xPlane. All tools are supported by the NTK system and are validated by the UK's Civil Aviation Authority (CAA) and Netherlands Aerospace (NAC). WebTrak provides near real-time flight tracking with aircraft type, altitude, speed, and noise data from nearby monitors. WebTrak My Neighbourhood shows long-term flight path trends over specific postcodes to help residents understand typical aircraft activity. xPlane is an advanced tool used for analysing aircraft overflights at a specific property. The Council for the Independent Scrutiny of Heathrow Airport (CISHA) ensures governance for community representation. The Airport produces monthly and annual reporting of operational data, and track keeping performance on their website.

Figure 2 London Heathrow Airport NMT Locations

5.1.3 London Gatwick Airport (London, England)

London Gatwick Airport uses the ANOMS system which is supported by 21 NMTs surrounding the airport and areas affected by aircraft noise, as shown on Figure 3. The airport CET consists of WebTrak, and InsightFull. The noise information portal is an interactive dashboard which provides users specific data about aircraft flying over their postcode. In terms of governance, the airport operates a Noise and Tracking Monitoring Advisory Group (NATMAG) which oversees NTK performance, night engine testing, and complaints. The Gatwick Noise Monitoring Group (GNMG) advises on monitor placement community issues. London Gatwick Airport issues annual, and quarterly reports. There are also NATMAG reports produced, as well as night flight dispensation letters issued for Summer and Winter since 2024.

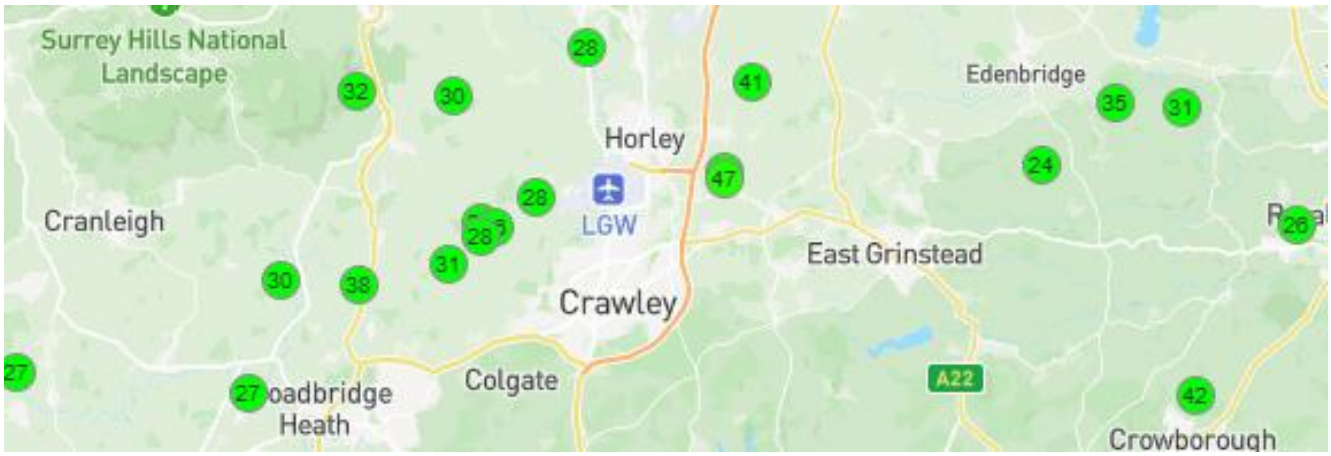


Figure 3 London Gatwick Airport NMT Locations

5.1.4 Amsterdam Schiphol Airport (Amsterdam, The Netherlands)

Amsterdam Airport Schiphol is still operating the Noise Monitoring System (NOMOS) NTK which is supported by 41 NMTs (as shown in Figure 4). They have transitioned into a new generation of noise measurement stations provided by Casper BV. The new system integrates both the hardware (NMTs) and the online platform under one provider, however it has yet to merge. The NOMOS NTK system website also provides real-time and historical noise data, overflight data, noise contours, and performance reports. The Local Community Contact Centre Schiphol (BAS) handles noise complaints from residents. In addition, it offers quarterly and annual reports.

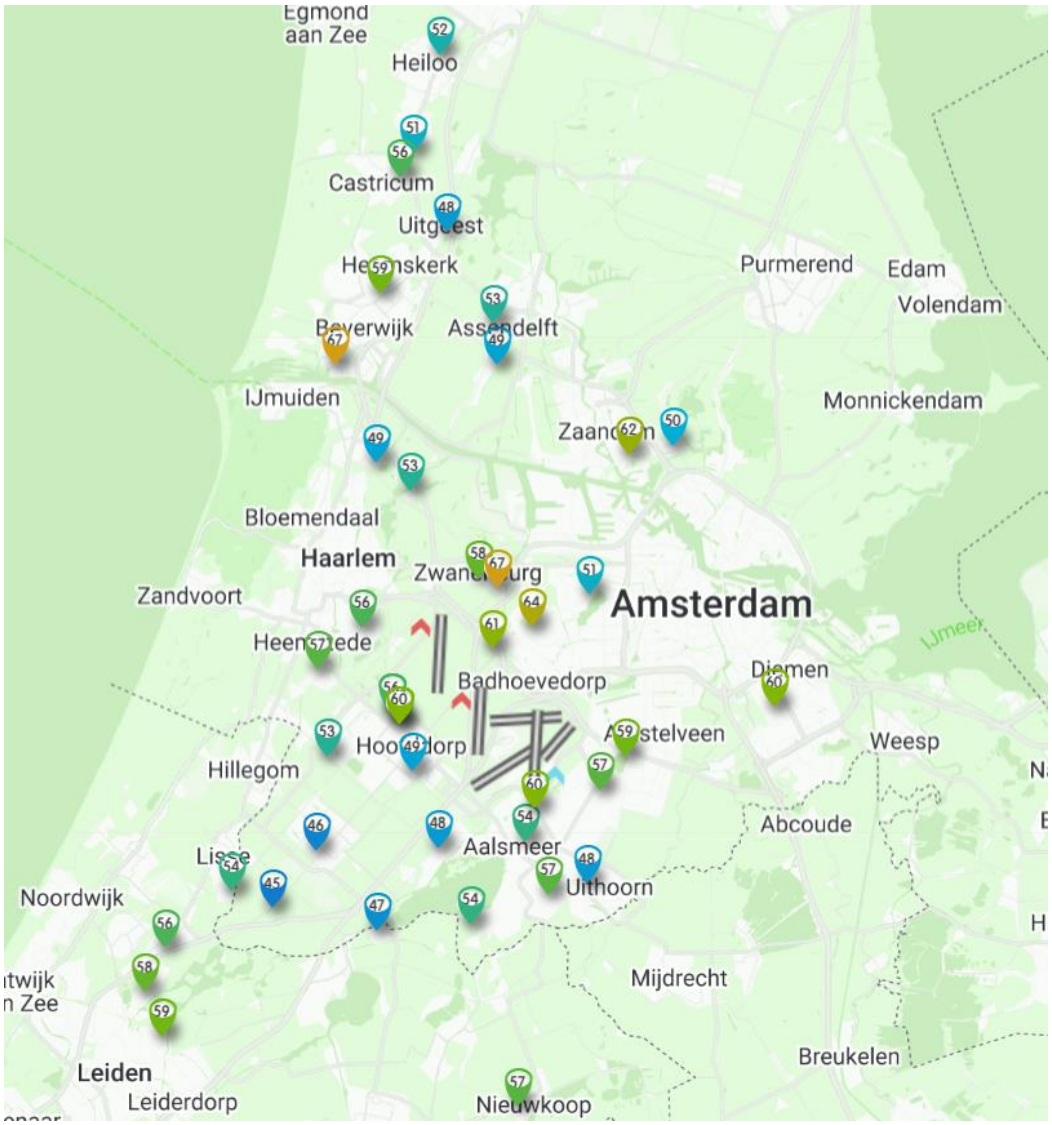


Figure 4 Amsterdam Schiphol Airport NMT Locations

5.1.5 Frankfurt am Main Airport (Frankfurt, Germany)

Currently Frankfurt am Main Airport will be transitioning from the Fraport Noise Monitoring System (FRA.NoM) to Topsonic in 2026 for their NTK system. At present, there are 29 fixed NMTs and two portable NMTs supporting it (as shown on Figure 5). There is interactive, real-time, and historical flight data available on the FRA.NoM. The Inspect Noise Assess Announce (INAA) platform operated by Umwelt- und Nachbarschaftus (UNH) also provides public access to flight paths, noise levels, and aircraft data. It is a CET which is used to handle complaints and inform the public. Annual and quarterly reports are published by both the UNH and the airport. Information would include noise complaint statistics, track-keeping performances, noise contour maps and flight movement summaries. Regular community and stakeholder meetings are organised with the Forum Flughafen und Region (FFR).

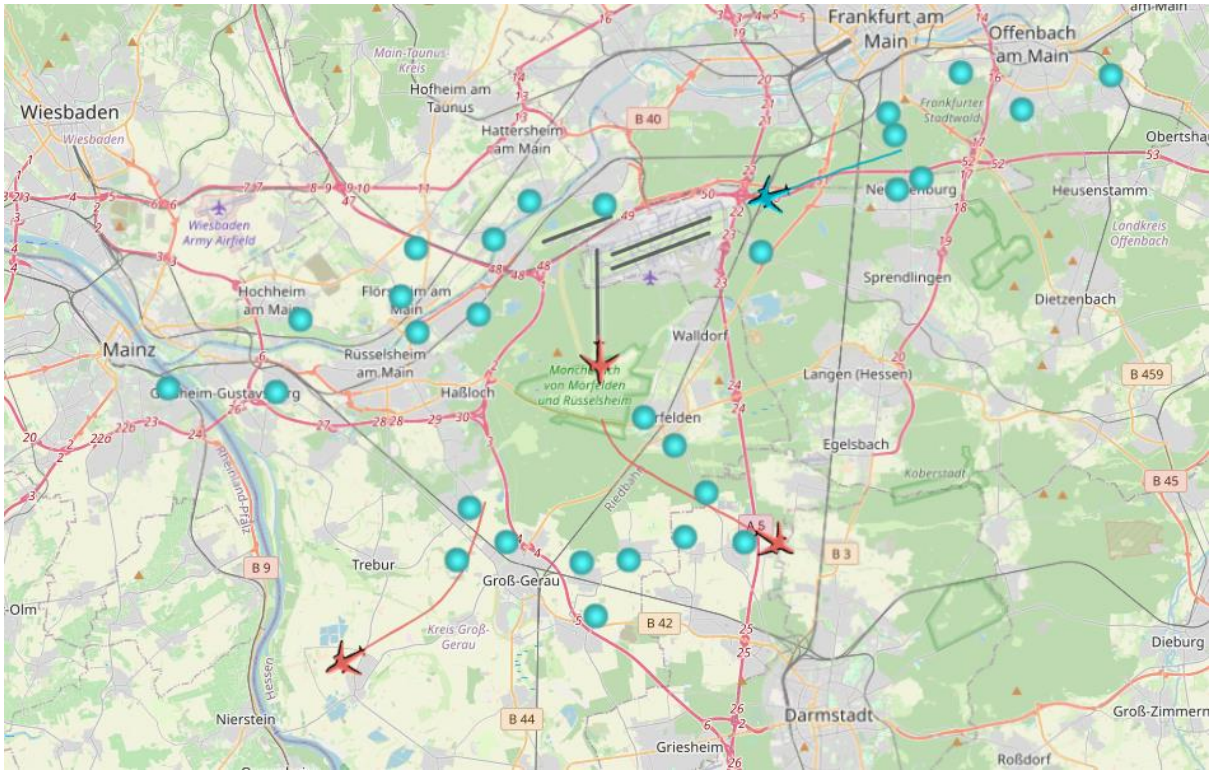


Figure 5 Frankfurt am Main Airport NMT Locations

5.1.6 Adolfo Suárez Madrid–Barajas Airport (Madrid, Spain)

Adolfo Suárez Madrid–Barajas Airport is managed by Aeropuertos Españoles y Navegación Aérea (AENA) and utilise an in-house NTK system known as SIRMA. This system is assisted by 27 NMTs both fixed and portable (as shown on Figure 6). The system complies with noise procedures overseen by the Spanish Airspace Security Agency and the data supports the enforcement of EIS requirements. AENA publishes monthly noise reports, noise contours, and historic noise data. CET consists of on WebTrak, InsightFull, which provides near real-time and historical flight and noise data.

1 La Moraleja
2 Algete
3 Dehesa Vieja
4 Fuente del Fresno
5 Urb. Santo Domingo Sur
6 Fuente el Saz
7 Paracuellos del Jarama
8 Mejorada del Campo
9 Belvis de Jarama
10 San Fernando de Henares
11 Coslada (Estación)
12 Alameda de Osuna
13 Barajas
16 Tres Cantos
20 Torrejón
21 Urb. Santo Domingo Norte
23 Los Berrocales
24 Ciudalcampo
25 Prado Norte
26 Club de Campo
27 La Granjilla

Figure 6 Adolfo Suárez Madrid–Barajas Airport NMT Locations

5.1.7 Son Sant Joan Airport (Palma de Mallorca, Spain)

AENA manages the Son Sant Joan Airport NTK, SIRPMI. This system is supported by eight fixed and one portable NMT (as shown in Figure 7). The NMTs are located primarily near to the perimeter of the airport. The airport operates WebTrak which allows the public to access near real-time information about noise and overflight data at each NMT. Monthly noise reports are published by AENA and include acoustic emissions by location, vertical and horizontal dispersion of flight paths, trends in aircraft operations and noise levels. Complaints can be submitted via WebTrak or AENA's complaint portal.

Figure 7 Son Sant Joan Airport (Palma de Mallorca) NMT Locations

5.1.8 Brussels Airport (Brussels, Belgium)

Brussels Airport uses the Topsonic Aircraft Noise and Operations System (TANOS) which is provided by Topsonic. To support this system, 21 fixed and three portable NMTs (as shown on Figure 8) provide radar data. TraVis (Topsonic Resident Access Viewer) is a CET utilised by the airport. It visualises data, showcases near real-time and historical flight data, similar to Envirosuite's WebTrak. Reports are published on the airport's noise environment page – monthly and annual reports are produced. An interactive noise map is also released yearly.

Figure 8 Brussels Airport NMT Locations

5.1.9 Chicago O'Hare International Airport (Chicago, USA)

The O'Hare International airport is still operating the Airport Noise Management System (ANOMS) NTK system, which is supported by 43 NMTs (as shown in Figure 9). They have been strategically located to cover near the perimeter of the airport, as well affected communities from aircraft noise. The NTK integrates data from Federal Aviation Administration (FAA), NMTs, weather systems and noise complaints. WebTrak offers public access to historical flight paths and aircraft data with a 72-hour delay; users can submit noise complaints. ONCC (O'Hare Noise Compatibility Commission) facilitates community engagement, oversees noise mitigation programs, and publishes reports and recommendations based on NTK system data. Monthly and annual reports include noise contours, complaint statistics, and aircraft operation trends, available via the ANMS Reports Portal.

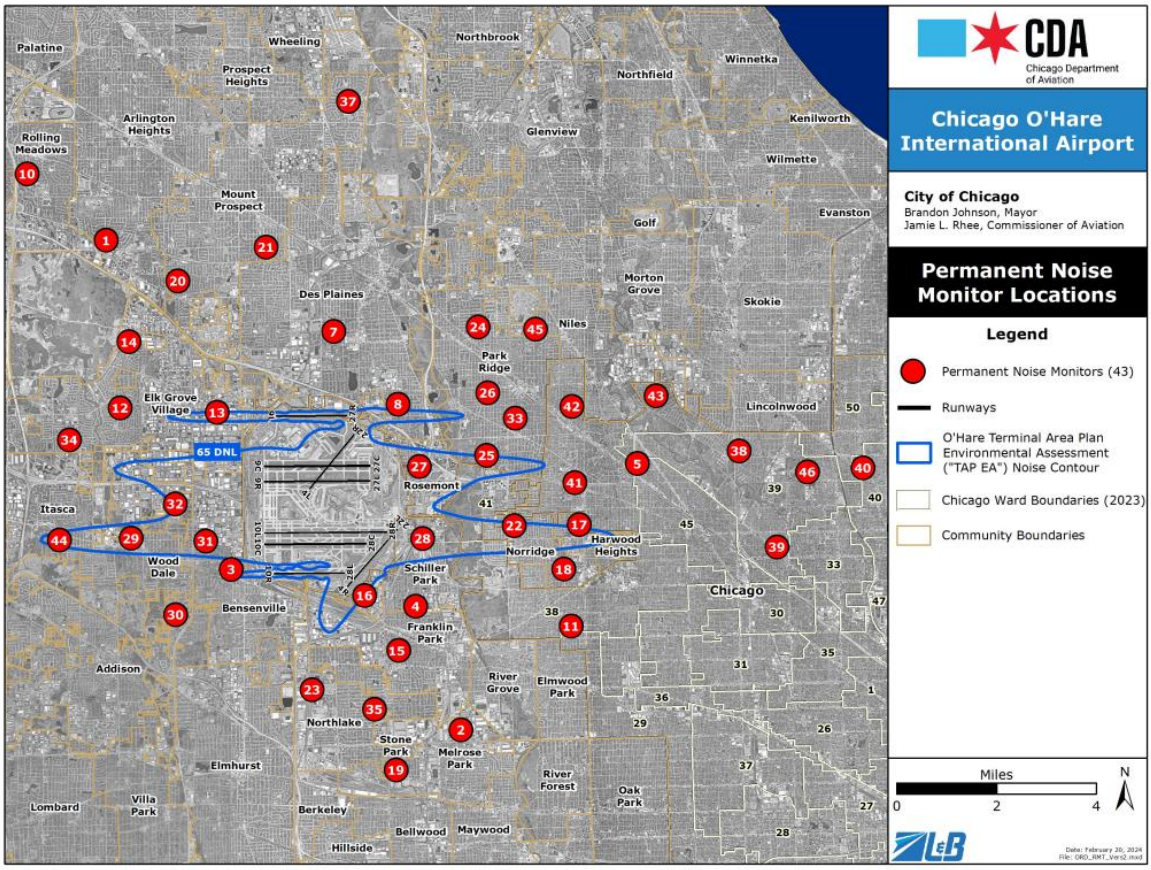


Figure 9 Chicago O'Hare International Airport NMT Locations

5.1.10 Los Angeles International Airport (Los Angeles, USA)

The NTK system of Los Angeles International Airport utilises an in-house system. It consists of 26 NMTs (as shown in Figure 10) The CET includes WebTrak and a LAX noise portal. WebTrak offers near real-time and historical flight data. The noise portal is an interactive neighbourhood focused platform that allows residents to submit noise complaints directly, and view information related to aircraft noise and operations. The Los Angeles World Airports (LAWA) host public meetings with local representatives and stakeholders. Annual, quarterly, and monthly reports are published by the airport.

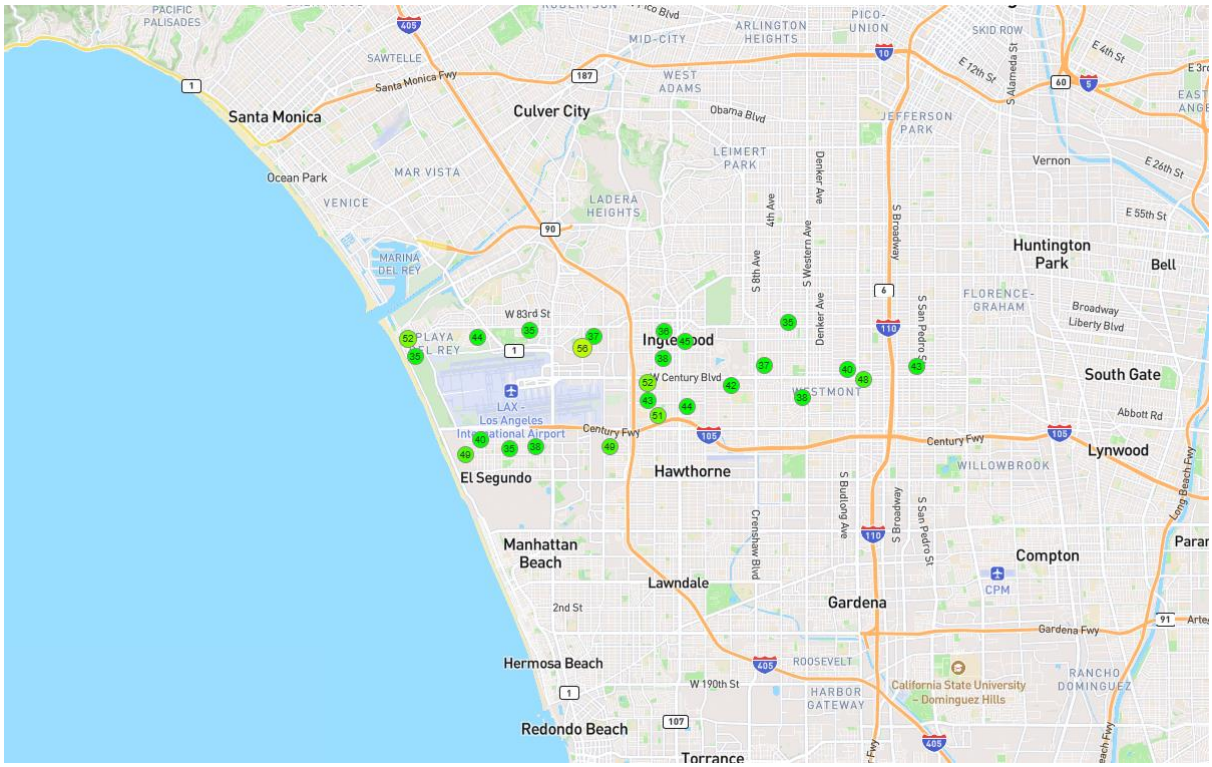


Figure 10 Los Angeles International Airport NMT Locations

5.1.11 Sydney Airport (Sydney, Australia)

Sydney Airport remains part of the national Noise and Flight Path Monitoring System (NFPMS), operated by Airservices Australia. This system continuously collects data on aircraft operations and noise levels at major airports across Australia. The NTK is supported by 12 NMTs which are strategically placed to cover key arrival and departure routes as shown in Figure 11. The airport engages with residents via Sydney Airport Community Forum (SACF) meetings, seasonal newsletters, and online feedback forms. These channels support two-way communication with local councils and stakeholders. Residents can access detailed data and insights through the Community Noise Portal, performance reports, and WebTrak, which provide historical and near real-time information on aircraft operations and noise levels. Monthly, quarterly, and annual reports are published, which are available for the public to access online.

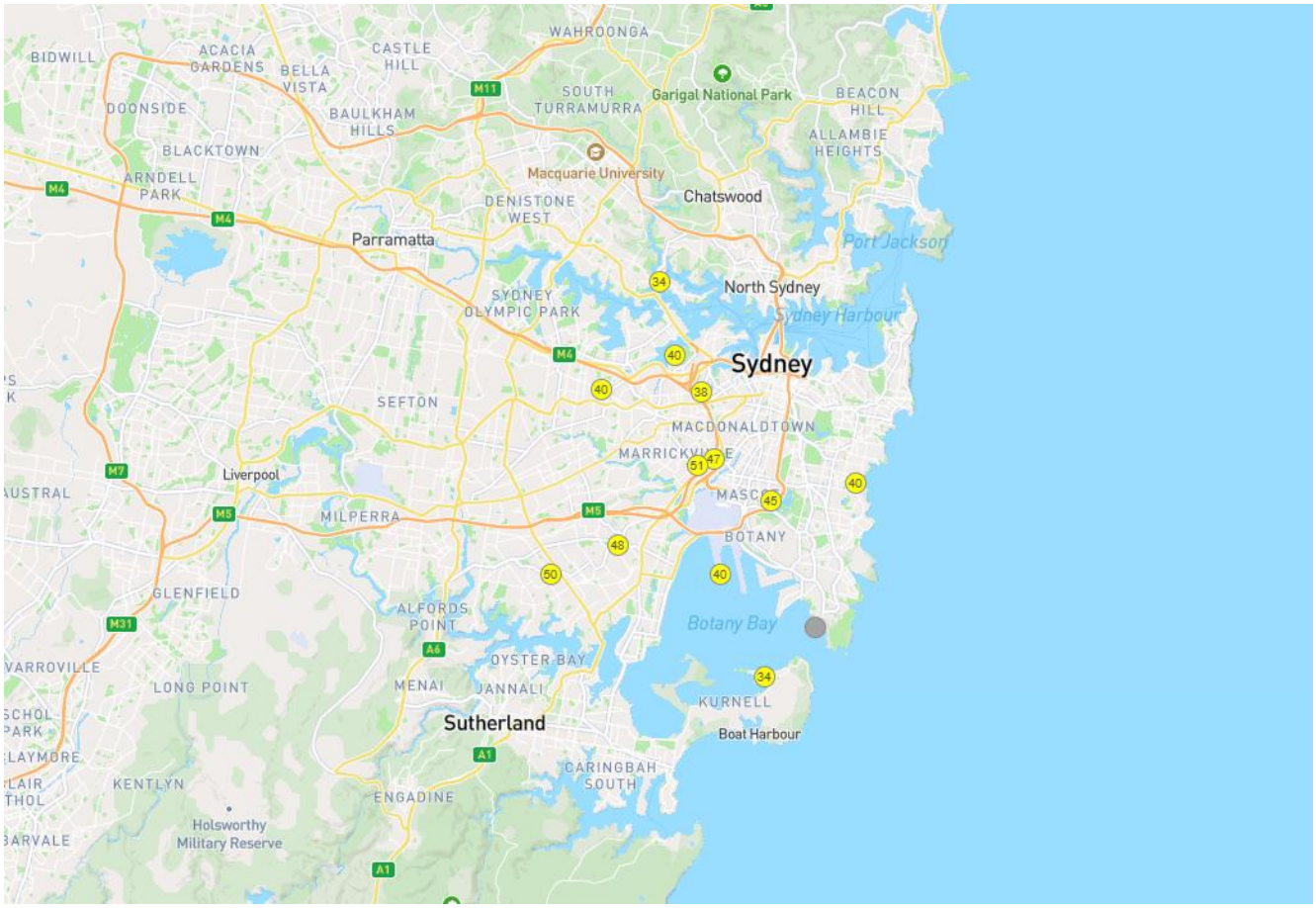


Figure 11 Sydney Airport NMT Locations

5.1.12 Vancouver Airport (Vancouver, Canada)

Vancouver airport utilises ANOMS as its NTK, which is supported by 23 fixed NMTs and one portable NMT (as shown in Figure 12). There are plans to install an additional fixed NMT later in the year of 2025. It integrates noise data with NAV CANADA radar flight tracks. Vancouver manages a suite of CET. The WebTrak system is available via YVR website. This provides near real-time and historical data about overflights and noise levels. Noise FAQs and informational materials available online. YVR Aeronautical Noise Management Committee includes municipal and Musqueam Indian Band reps; meets three times a year in a consultative role. The Noise Management Office handles all concerns via web form, WebTrak, or voicemail; all issues are logged in ANOMS and responded to with explanatory information. The airport releases yearly reports regarding noise.

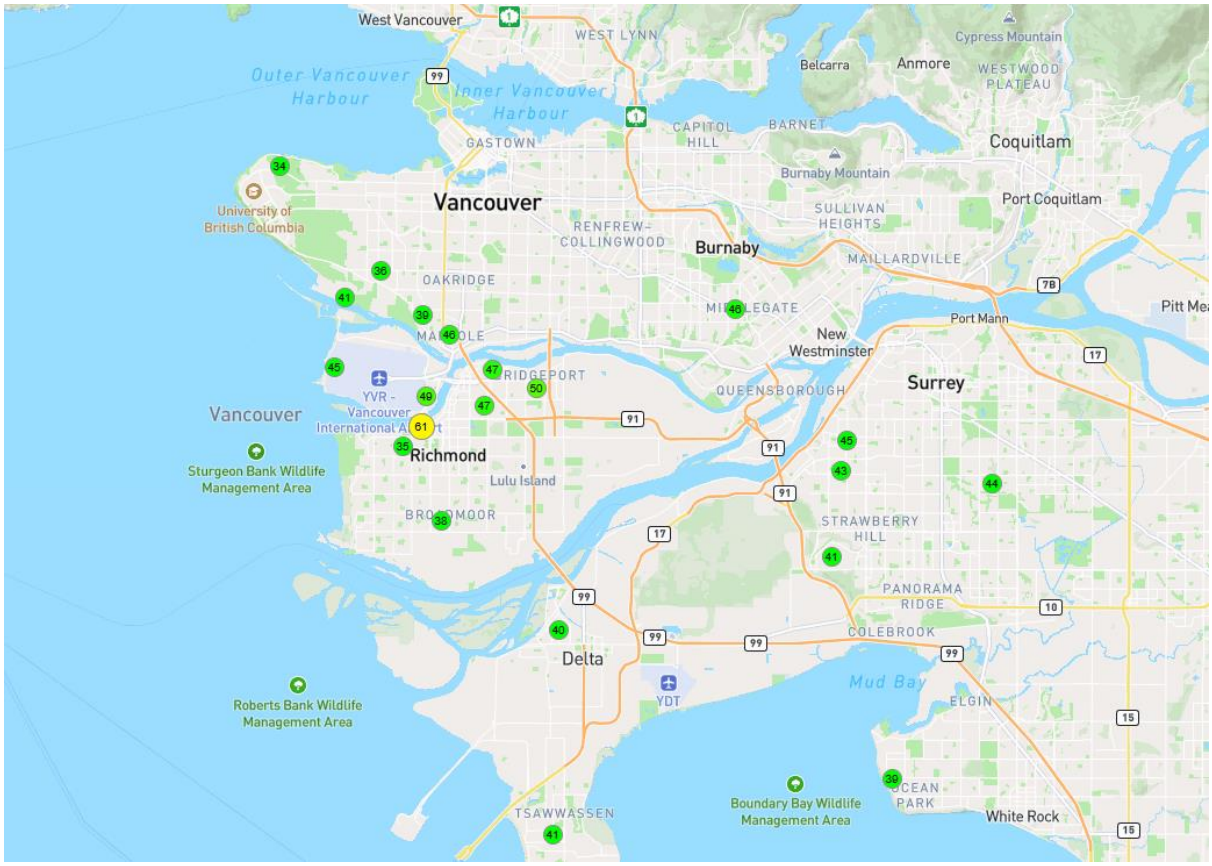


Figure 12 Vancouver Airport NMT Locations

5.2 Summary

All major airports surveyed operate a NTK system, typically supported by a network of NMTs, with configurations varying between fixed and portable units to ensure effective noise data capture across affected areas.

Most airports deploy CET platforms to facilitate transparency and resident interaction. WebTrak remains the most widely used public-facing tool, providing real-time and historical flight and noise data.

While many airports offer community access to NTK outputs via interactive tools or portals, others limit access to internal stakeholders or publish only summary reports. Not all systems allow for near real-time or postcode-specific insight, but most do.

Reporting practices differ significantly. Some airports, such as Frankfurt and Sydney, publish frequent and detailed reports (monthly, quarterly), while others offer only annual overviews. Tools like FRA, map and InsightFull provide GIS-based noise visualisation and analytics.

Most airports provide multi-channel complaint submission systems—typically via WebTrak, forms, email, and phone. These are often integrated with CET platforms to ensure traceability and analysis of concerns.

Several airports, including Dublin, London Heathrow, London Gatwick, Frankfurt, and Vancouver, maintain active governance frameworks through local advisory groups, stakeholder committees, and independent oversight bodies to guide NTK and CET application.

Dublin Airport operates an ANOMS NTK system with 32 NMTs (25 fixed and seven portable units) and offers tools such as WebTrak and a dedicated noise information webpage on the airport website. It publishes routine performance reports and accepts noise complaints via multiple channels, with a recent addition of InsightFull for postcode specific information about aircraft operations and noise.

A summary of the NFPMS in place at the considered domestic and international airports is presented below.

Table 2 Peer Airports NTK and CET systems

Airport	IATA	ATM (2024)	Runways	NMTs (Fixed and portable)	NTK	CET
Dublin	DUB	240,000	3	32	ANOMS	Performance reports available on website (noise complaint analysis and track keeping statistics). Regular community and stakeholder meetings. WebTrak, Maploom and InsightFull.
Adolfo Suárez Madrid–Barajas	MAD	417,481	4	27	Sirma	Performance reports available on website (noise complaint analysis and track keeping statistics) + WebTrak+ InsightFull (InsightFull portal).
Arlanda	ARN	230,000	3	11	Airport NTK	No public tool and no noise reports.
Barcelona El Prat	BCN	347,977	3	14	ANOMS	Performance reports available on website (noise complaint analysis and track keeping statistics) + WebTrak + InsightFull
Belfast City	BHD	28,002	1	0	Airport NTK	Webpage to complain and no reports or WebTrak etc
Birmingham	BHX	94,130	2	7	ANOMS	Monthly reports/Form to complain/WebTrak
Brussels	BRU	198,617	3	24	Topsonic	Monthly reports/Interactive maps for contours/Tanos is system for noise and flight data /TraVis public tool for live flight and noise data.
Charles de Gaulle	CDG	460,916	4	24	N/A	Nothing available for CET on webpage
Cork	ORK	20,864	2	2	N/A	N/A
Frankfurt am Main	FRA	440,853	4	31	Envirosuite to Topsonic in 2026 (FRA.Nom)	Performance reports available on website (noise complaint analysis and track keeping statistics). Regular community and stakeholder meetings. WebTrak (flight tracking) and InsightFull (noise monitoring). INAA is a public platform to help residents understand aircraft noise operations.
Gatwick	LGW	265,319	2	22	ANOMS	InsightFull, monthly reports, WebTrak, noise contour data and community engagement.
Heathrow	LHR	474,029	2	39	ANOMS	xPlane, monthly reports, WebTrak and community engagement.
Hong Kong	HKG	363,305	3	16	Airport NTK	Noise data updates and Complaint email on webpage
Humberto Delgado	LIS	225,268	2	10	Airport NTK	WebTrak and annual performance reports
Kastrup	CPH	240,680	3	14	Airport NTK	Own flight tracker, annual reports, Community engagement, Own data

Airport	IATA	ATM (2024)	Runways	NMTs (Fixed and portable)	NTK	CET
						base like InsightFull and own complaint browser like WebTrak
Leonardo da Vinci–Fiumicino	FCO	315,597	3	16	Airport NTK	No public tool and no noise reports.
Los Angeles International	LAX	581,779	4	26	Airport NTK	Own flight tracker, annual and monthly reports, Community engagement, Own data base like InsightFull and WebTrak
London Luton	LTN	131,974	1	10	Topsonic	Airport website, Inform newsletter, regular community group meetings, public noise surgery, home visits, online consultation tool
Manchester	MAN	197,000	2	16	ANOMS	WebTrak / Community Noise Portal
Milano Malpensa	MXP	214,511	2	14	Airport NTK SARA	Performance reports available on website (Track keeping statistics) Annual performance report available on website
Munich	MUC	327,228	2	19	Topsonic	Performance reports available on website (noise complaint analysis and track keeping statistics) WebTrak and WebTrak neighbourhood
O'Hare International	ORD	776,036	8	43	ANOMS	Performance reports available on website (noise complaint analysis and track keeping statistics) WebTrak (no NMT) Regular community and stakeholder meetings
Orly	ORY	203,757	3	9	Airport NTK	Performance reports available on website (noise complaint analysis and track keeping statistics) WebTrak and WebTrak neighbourhood
Schiphol	AMS	473,815	6	41	NOMOS	Performance reports available on website (noise complaint analysis and track keeping statistics) WebTrak and WebTrak neighbourhood Regular community and stakeholder meetings
Shannon	SNN	30,469	1	0	N/A	Noise Complaint handling system
Son Sant Joan	PMI	243,200	2	9	SIRPMI	Monthly and annual reports, WebTrak, InsightFull
London Stansted	STN	201,000	2	10	ANOMS	WebTrak / InsightFull

Airport	IATA	ATM (2024)	Runways	NMTs (Fixed and portable)	NTK	CET
Sydney	SYD	328,156	3	12	NFPMS	Performance Reports / WebTrak / Community Noise Portal / Sydney Airport Community Forum
Vancouver International	YVR	289,395	2	24	ANOMS	WebTrak system available via YVR website. Noise FAQs and informational materials available online. YVR Aeronautical Noise Management Committee includes municipal and Musqueam Indian Band reps; meets three times a year in a consultative role. Noise Management Office handles all concerns via web form, WebTrak, or voicemail; all issues are logged in ANOMS and responded to with explanatory info.
Vienna International	VIE	234,100	2	18	FANOMOS	Neighbourhood Advisory Council Dialogue Forum - Non-profit discussion platform for successful reconciliation of interests on all aviation issues. Community Noise Portal.

5.3 NMT and ATM Analysis

The ATM and NMT data presented in in Table 2 has been used to benchmark the number of NMT at Dublin with each of the airport categories, namely:

- Irish and UK Airports;
- EU Airports; and
- All Airports – the Irish, UK and EU airports, and international airports

Figure 13 shows the 2025 ATM for each of the Irish and UK Airports plotted against the number of NMT, as taken from Table 2.

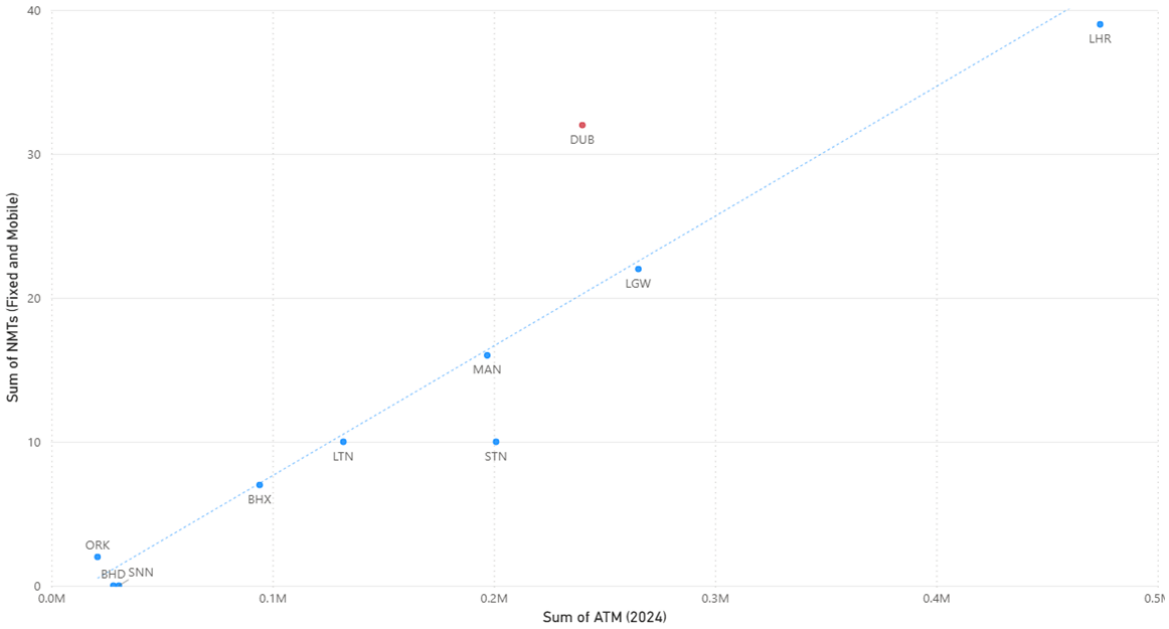


Figure 13 Sum of ATM (2024) and sum of NMTs (Fixed and Mobile) Within Ireland and the UK

Dublin operates 32 NMTs, making it the highest number within this regional group. Linear regression analysis suggests that for airports with approximately 240,000 ATM, the expected number of NMTs is around 20. Dublin's higher-than-expected NMT count reinforces its proactive noise monitoring efforts as it is above the linear regression line. The same 2019 ATM and NMT analysis is presented EU airports, Figure 14.

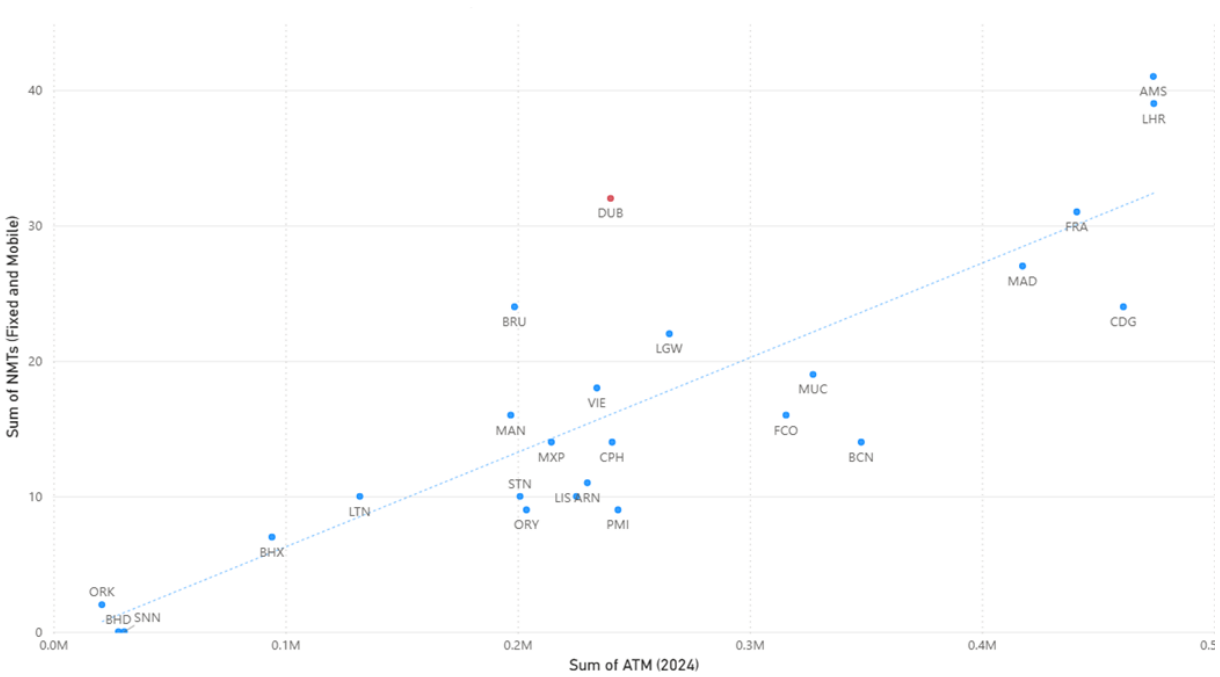


Figure 14 Sum of ATM (2024) and Sum of NMTs (Fixed and Mobile) Within Europe

Among the EU airports, Dublin's NMT network is the most extensive relative to traffic volume. Linear regression analysis for EU airports suggestion that an airport with 240,000 ATM would typically operate 16 NMTs. Dublin Airport is considerable above the linear regression line, which indicates vast improvements has been made to improve Dublin's NTK. In comparison to other airports operating with a similar ATM, many are falling under the line, where previously Dublin and Orly where relatively on par based on the last iteration of these analyses. Dublin has now exceeded the average and is excelling.

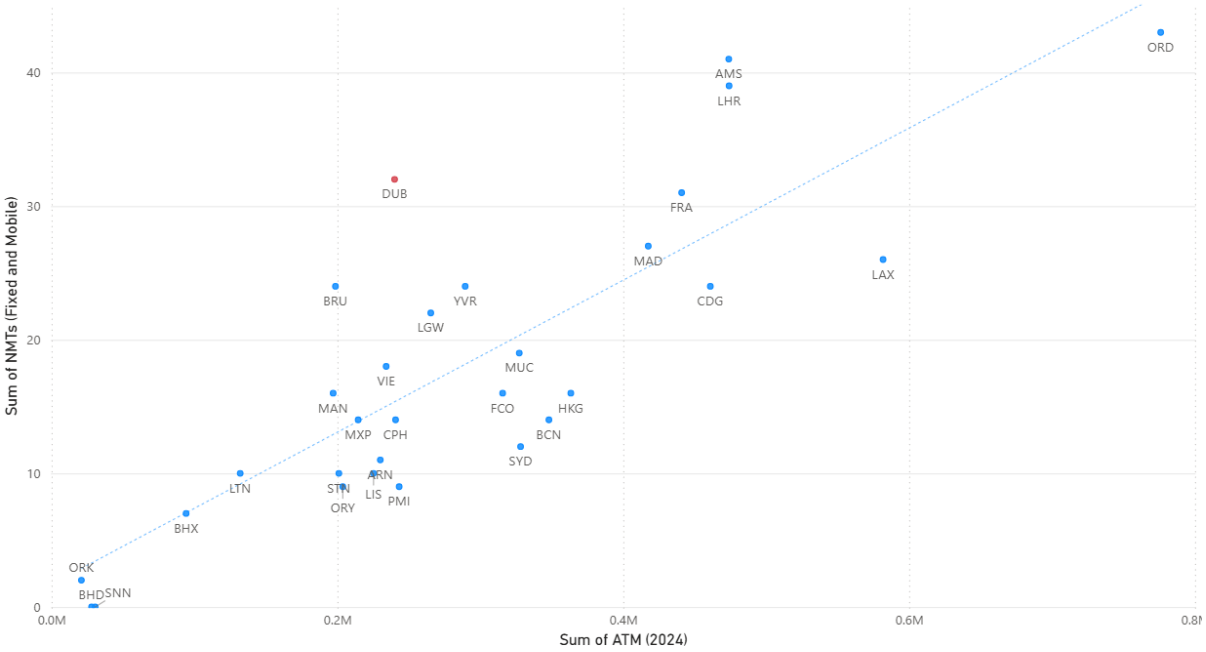


Figure 15 Sum of ATM (2024) and Sum of NMTs (Fixed and Mobile) Internationally

The ATM and NMT analysis are presented for all the airports listed in Table 2, where information is available. Figure 15 illustrates the comparison in a global setting considering airports from Asia, Europe and America. Despite higher ATM, many of these global hubs operate fewer or equivalent NTMs. Even airports with complex airspace and multiple runways (e.g. LAX/ORD) have lower coverage density.

The linear regression line across international airports suggests that Dublin's current NMT level is well-aligned with best practices in environmental noise monitoring on a global scale. The linear regression equation supports the airport having 15 NMTs.

6.0 Compliance and Benchmarking Matrix for Dublin Airport NTK and CET Systems

This section outlines the minimum requirement and best practices for NTK and CET systems.

The benchmarking exercise compared Dublin Airport's NTK and CET systems with those of a range of UK, European, and international airports. This analysis considered system design, monitoring capabilities, data analysis, reporting outputs, and community engagement practices.

The findings from this benchmarking are summarised in Table 3 below like the Table 3 in *ANCA's Report*, which identifies both the minimum requirements and examples of best practice for NTK and CET systems. These are drawn from:

- ISO 20906:2009+A1:2013 (international standard for unattended aircraft noise monitoring),
- Condition 10 of the North Runway planning permission (PL 06F.217429),
- The existing NTK and CET system at Dublin Airport, and
- Benchmarking insights from peer airports.

Each requirement in Table 3 is categorised under one of five functional areas:

- Design – considerations for the physical and technical configuration of the NTK system.
- Monitoring – specifications for data collection and system performance.
- Analysis – how data is processed and interpreted.
- Reporting – how data is communicated and shared.
- Engagement – how the system supports community interaction and policy development.

For each entry, Table 3 also identifies the source of the requirement (e.g. ISO, Condition 10, Benchmarking), the status of implementation at Dublin Airport.

The benchmarking confirms that Dublin Airport's NTK and CET systems meet or exceed the identified requirements. In particular:

- The airport operates 32 NMTs, exceeding the benchmarked range of 11–18.
- Community groups are engaged in the siting of portable NMTs through DAEWG and CLG.
- The system supports customisable reporting (monthly, quarterly, 6-monthly, annual) and GIS-based data access.
- All ISO 20906:2009+A1:2013 technical specifications are met, including Class 1 equipment, 0.5-second sampling, and meteorological integration.

6.1 Airport NTK and CET Minimum Requirements and Best Practice

The below table provides a consolidated reference for assessing compliance, this is also thoroughly covered in Section 3 of this response. Refer to Appendices 1 for evidence on Table 3 and Section 3 of this response.

Table 3 Dublin Airport NTK and CET Minimum Requirements and Best Practices

Category	Requirement	System	ANCA's Comments	Dublin Airport
Design	ISO 20906:2009+A1:2013	NTK	For any new NMTs, the site selection should consider the location of flight paths; the maximum sound level of the quietest aircraft; and residual long-term average sound levels. The locations of the existing NMT at the airport have been selected in relation to flight paths, and areas where the maximum aircraft noise levels are likely to occur. NMT locations have also been selected to validate the strategic noise maps. Evidence supporting whether the selected NMT locations are monitoring locations in all communities has not been identified.	Fixed NMTs are located based on flight paths and high-noise areas directed by ANCA and engagement with community for portable NMTs.
Design	ISO 20906:2009+A1:2013	NTK	For any new NMTs, NMT site selection should ensure obstacles between the microphone and flight paths should be avoided, and the NMT located away from acoustically reflective surfaces. The specific siting of the existing NMT has not been determined from publicly available information, however assumed to be away from acoustically reflective surfaces.	All fixed NMTs installed at 6 metres or higher above ground level, avoids obstacles and acoustically reflective surfaces.
Design	Benchmark	NTK	The benchmarking indicates that Dublin Airport's NTK should be supported by at least 11-18 NMT based on trends at other airports. This potentially means an increase of 3-10 NMT above the existing system.	25 fixed NMTs and seven portable NMTs, in total 32 NMTs
Design	Benchmark	NTK	Community groups would have advance warning and input to the deployment locations of portable NMT. Evidence supporting whether this is already in place at the airport has not been identified.	Through the community engagement team that involves meetings with the community groups. (DAEWG and CLG)
Monitoring	Condition 10 3.1 Existing System	NTK	NTK shall be operated at all times. The airports monthly noise reports show hourly distributions of noise levels and aircraft movements, which is evidence that the NTK is working at all times.	Reports can be seen on Dublin Airport website and continuous update on WebTrak.
Monitoring	Condition 10 3.1	NTK	NTK is required to support an understanding of the impact on local communities, therefore NTK site selection should include locations representative of local communities, in addition to locations for compliance monitoring of certified aircraft noise emissions. Evidence supporting whether this is already in place at the airport has not been identified.	ANOMS shows data for correlated noise levels and events.
Monitoring	Condition 10 3.6	NTK	NTK shall be compatible with multiple NMT (portable and fixed) The existing system is compatible with 8 NMT, and similar systems at other airports are compatible with a greater number of NMT.	25 fixed NMTs and seven portable NMTs, in total 32 NMTs
Monitoring	Condition 10 3.6	NTK	NTK shall monitor aircraft within a radius of 40-45 miles of the airport	ANOMS monitors beyond 45 miles radius of Dublin Airport
Monitoring	Condition 10 3.8 & ISO 20906:2009+A1:2013	NTK	NTK shall measure noise every 1/2 second, 24 hours a day, 365 days a year. The Envirosuite (formerly EMS Bruel & Kjaer) NTK at the airport has capabilities to continuously measure sound levels at half- or one-second intervals, with one or two frequency weightings.	NMT measure noise every 0.5 seconds, 24/7, year-round.

Category	Requirement	System	ANCA's Comments	Dublin Airport
Monitoring	ISO 20906:2009+A1:2013	NTK	NMT should confirm to Class 1 IEC 61672-1, with one-third octave band spectral measurement capability, and specified sound pressure level and linear operating ranges. The NMT associated with the Envirosuite (formerly EMS Bruel & Kjaer) NTK are type approved to Class 1 IEC 61672-1	All NMT are Class 1 IEC 61672-1 NMTs with one-third octave band capability and specified SPL ranges.
Monitoring	ISO 20906:2009+A1:2013	NTK	NTK shall record maximum and average sound pressure levels. The Envirosuite (formerly EMS Bruel & Kjaer) NTK measures maximum, and average sound pressure levels, including Ln values, such as LA90 and LA10.	All NMT record maximum and average sound pressure levels including Ln values, such as LA90 and LA10.
Monitoring	ISO 20906:2009+A1:2013	NTK	NMT should have a clock within 2-second of actual time and should record hourly meteorological conditions. The existing NTK system at the airport records meteorological concurrently with noise data.	NMTs include a real time clock and five NMTs equipped with auxiliary weather station, in addition to the METAR feed.
Analysis	Condition 10 3.1	NTK	NTK shall identify the individual flight path taken to and from the airport. Evidence supporting whether this is already in place at the airport has not been identified.	ANOMS identify all individual flight paths to and from the airport.
Analysis	Condition 10 3.2	NTK	NTK should integrate primary and secondary radar data, meteorological and noise data. Evidence supporting whether this is already in place at the airport has not been identified.	ANOMS records this data
Analysis	Condition 10 3.6	NTK	NTK shall record an aircraft's origin, destination, operator, time sequence, flight path, and elevation. Evidence supporting whether this is already in place at the airport has not been identified.	ANOMS records this data
Analysis	ISO 20906:2009+A1:2013	NTK	NTK should measure aircraft and non-aircraft noise events to gain and understanding of ambient sound levels. The existing NTK system at the airport records meteorological data, concurrently with noise data attributed to aircraft and attributed to 'normal human activity'.	ANOMS records this data
Analysis	ISO 20906:2009+A1:2013	NTK	NTK should allow recognition of incomplete or corrupted data. Evidence supporting whether this is already in place at the airport has not been identified.	NMT alerts Envirosuite if there is a calibration failure
Analysis	ISO 20906:2009+A1:2013	NTK	NTK should ensure that the uncertainty of the cumulated sound exposure level of all aircraft events is less than 3 dB, and at least 50% of aircraft sound events are correctly classified. Evidence supporting whether this is already in place at the airport has not been identified.	The NTK system is calibrated daily with automated alerts, supported by manual pre/post-deployment checks and event reviews by the noise team to ensure classification accuracy and maintain uncertainty below 3 dB.
Reporting	Condition 10 3.4 Benchmark	CET	System to support GIS, for use in community complaints management. Not currently in place at the airport	System supports GIS integration for community complaints management.

Category	Requirement	System	ANCA's Comments	Dublin Airport
Reporting	Condition 10 3.4 Benchmark	CET	System to assist in the definition of noise contours leading to the creation of NPR. Evidence supporting whether this is already in place at the airport has not been identified.	Creation of NPR does not require noise contour data but system support data output for the contour and system can create NPR for flight track monitoring.
Reporting	Condition 10 3.6	CET	System to assist noise mapping and noise contouring. Evidence supporting whether this is already in place at the airport has not been identified.	System does support noise mapping and contouring.
Reporting	Condition 10 3.11	CET	System that records all noise complaints. Evidence supporting whether this is already in place at the airport has not been identified.	System records all noise complaints.
Reporting	ISO 20906:2009+A1:2013	CET	System that reports separate individual and cumulative aircraft event data. Evidence supporting whether this is already in place at the airport has not been identified.	System reports individual and cumulative aircraft event data separately.
Reporting	Existing System	CET	System that supports customisable reporting, including annual, 6-monthly and monthly performance reports. Evidence supporting whether this is already in place at the airport has not been identified.	ANOMS assists in customisable reports.
Reporting	Benchmark	CET	Historical data to accessible, and to be recorded in GIS. Evidence supporting whether this is already in place at the airport has not been identified.	Historical data is accessible and recorded in GIS.
Engagement	Condition 10 3.1	CET	System will provide data in a format suitable to inform noise policy development. Evidence supporting whether this is already in place at the airport has not been identified.	All relevant noise and flight track data accessible on system.
Engagement	Condition 10 3.6	CET	System shall assist in complaint management and analysis. Evidence supporting whether this is already in place at the airport has not been identified.	ANOMS assists in noise complaint management and analysis.
Engagement	Condition 10 3.9	NFPMS	System is equipped with the best form of aircraft management available anywhere in the world, and will enable proactive management and operation of aircraft, whilst minimising impact on the community. Evidence supporting whether this is already in place at the airport has not been identified.	Envirosuite (ANOMS, WebTrak, InsightFull) and Maploom combined are world leading systems for NTK and CET.
Engagement	Condition 10 3.9	NFPMS	System will assist noise level targets to be set and identify ways in which noise abatement procedures may be set. Evidence supporting whether this is already in place at the airport has not been identified.	System can support.
Engagement	Condition 10 3.11	CET	Complaints about noise disturbance to contribute to Dublin Airports Noise Abatement Policy. Evidence supporting whether this is already in place at the airport has not been identified.	Complaints about noise disturbance do contribute to Dublin Airports Noise Abatement Policy.

7.0 Comparative Measurements at Dublin Airport

This section responds to the community's Wave Dynamic Report, which provides results of noise monitoring at nine homes on or near flight paths at Dublin Airport.

daa welcomes the positive and constructive initiative by the local community to provide their insights into the noise environment of their homes. Our review aims to place the findings in context and ensure that conclusions drawn are balanced and evidence based.

7.1 Background

In late 2024, a local resident group made a submission to FCC in response to the Operational Application[2] made by daa. This submission, titled "Submission on Behalf of St Margaret's The Ward Residents Group," is available on the Fingal Planning Portal[3].

Appendix F of the submission is a Technical Note prepared by Wave Dynamics Acoustic Consultants (dated 18/12/2024). It presents the results of noise measurements at nine homes, mostly under or near the flight paths of aircraft departing from Runway 28R, at locations ranging from two to 10 km from the North Runway.

The Wave Dynamics measurements were conducted over the 92-day summer period from 16 June to 15 September 2024 inclusive. The report focused on the Leq 16hr (07-23h) comparing the levels with the noise contour provided by daa in its December 2023 Infrastructure Application[4], which was based on a forecast of 40mppa (million passengers per annum).

It referred to nine individual reports on the measurements taken, but these were not included in the planning submission and daa have not had access to their detailed reports. It is stated that these reports have full details of the unattended noise monitoring, including methodology, equipment details, calibration, monitor height and location, subjective noise environment and impact of weather.

[2] Fingal Reg. Ref. F25A/0094E, providing a 'no works' application to grow Dublin Airport to 36mppa. The application is now 'deemed withdrawn'.

[3] Dublin Airport to 36mppa

[4] Fingal Reg. Ref.: F23A/0781

7.2 Wave Dynamics Report Results

The report summarises the measured Leq16h levels at the nine homes and compares each with the corresponding noise level obtained from daa's forecast Leq16h contour map from the December 2023 Infrastructure Application (i.e. at 40mppa). The forecast data is extrapolated from colour bands on the contour map where each home was located and contained within the IA planning documentation. For context, these colour bands span three decibels (for example, original label of the band "60-62 dBA" in the legend covers "60.0-62.9").

The findings of the Wave Dynamics Report were that at seven of the homes, measured levels were generally 1-4dB higher than in the forecast contour band in the IA. At one home, the measured level matched the contour range, while another fell outside the 51 dBA outermost contour.

The Wave Dynamics report interprets these results as evidence that daa's predicted noise levels are typically around 3dB lower than actual measurements.

7.3 Comments on Report and its Conclusions

In our view, there are several potential issues with the data presented in the Wave Dynamic Report. Some of these questions may be answered by information contained within the detailed reports for the nine homes, but daa does not have access to these.

Firstly, the installed height of the microphone is important. The ISO standard requires that aircraft noise is measured at a minimum height of six metres. This is to avoid extra noise from reflections from the ground and other solid surfaces. Microphones installed at lower height can report noise levels several decibels higher than a properly installed microphone. All of daa's permanent NMT installations comply with this minimum height.

Secondly, the NMTs used to inform the measurements in the Wave Dynamics report were unattended during the period. The noise equipment was set up and left unattended to collected noise data for 92 days without anyone present to witness the noise sources. No information is provided on how the noise levels recorded at the microphones were screened to remove contributions from non-aircraft noise sources such as people, animals, ground vehicles, weather and non-Dublin Airport air traffic. This information was not provided in the main report.

In contrast, the daa system integrates NMT readings with flight radar data to exclude noise data from so-called "Community Noise" sources. Noise events detected by the microphones must match the time and location of aircraft in flight so that the noise can be counted as noise from aircraft operating in or out of Dublin Airport. The flight radar data contains flight information such as origin and destination, enabling the exclusion of non-Dublin Airport air traffic.

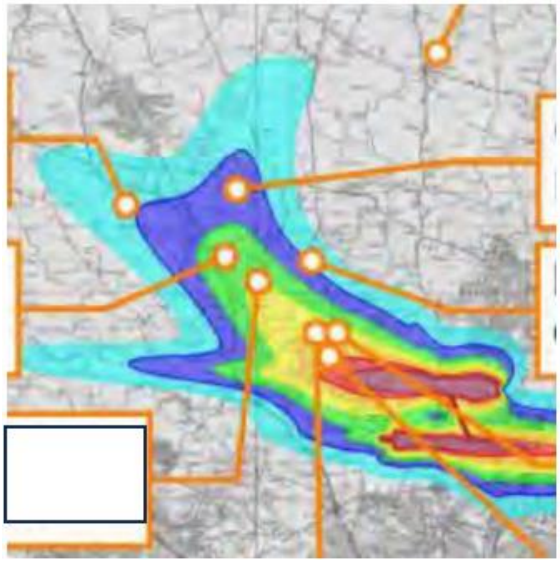
Noise data that includes aircraft and community noise is called Total Noise. Examples of measured total noise are included the Dublin Airport's Quarterly Noise and Flight Track reports available on the website. Unless there is absolutely zero Community Noise, Total Noise is always greater than aircraft noise. At high noise areas close to the airport, the difference between Total and Aircraft noise may be less than one decibel but could be several decibels. Further from the airport, in lower aircraft noise areas, this difference can be much higher such as five to 10 decibels or more, depending on proximity or occurrence of other noise sources.

The lack of explanation regarding how Wave Dynamics removed community noise from its measurements, suggests that they may be reporting Total Noise rather than Aircraft Noise. Combined with microphones which may have been too near the ground and reflecting surfaces, this could explain why Wave Dynamics noise measurements appear higher than the daa ANOMS NTK system.

In August 2025, daa provided the 2024 Annual Contour Report to ANCA including the modelled contours for the 92-day summer of 2024. This is shown below next to the IA contour referred to in the Wave Dynamics report (shown with homeowner names redacted.) The shapes and sizes of the two contours are very much the same, with the actual 2024 contour being slightly larger in extent.

The slightly higher actual Summer Leq16h levels might also partly explain the higher levels reported by Wave Dynamics.

Extract from Wave Dynamic report with IA forecast contour



Extract from Actual 2024 92-day summer Leq16h contour

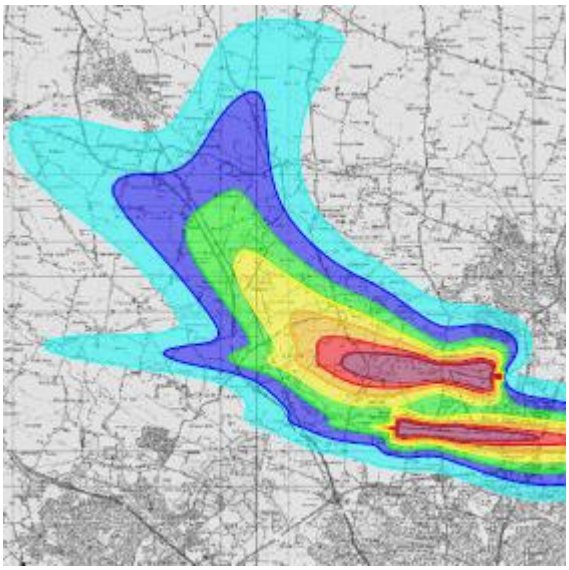


Figure 16 Noise contours Actual 2024 92-day summer compared to Wave Dynamics report.

7.4 Conclusion

The data in the Wave Dynamics report requires further evaluation in the context of the above concerns and we encourage readers to approach their results with caution. We remain confident in both the daa Airport Noise Monitoring data and on the published daa noise contours, which our view remains valid for the following reasons:

- We calibrate our equipment regularly to maintain accuracy.
- We verify that microphone placement complies with ECAC Doc 29 standards.
- We check for obstructions (trees, buildings) that could distort readings.
- We maintain power and data connectivity for continuous monitoring.
- We apply correct event time synchronisation for aircraft event logging.
- We validate data integrity by cross-checking with flight radar records.

The Wave Dynamics' conclusion has been referred to by Councillors in the FCC chamber, accompanied by calls for another authority such as the Environmental Protection Agency (EPA) to conduct the measurements instead of daa.

daa's NMT methodologies comply with international standards for airport noise measurement, from equipment and calibration to data processing and reporting. This has been evidenced throughout this report. (See Sections 2 through 6 and the referenced appendices.)

Similarly, noise contours are modelled in compliance with the relevant standards required by international and European regulations, which cover equipment specification, physical installation and location, calibration, data screening and use of measured for informing the modelling and noise contours calculations.

The comparison of the daa's noise contours and measured noise levels (see the Quarterly Noise and Flight Track Monitoring reports) should also provide confidence in the methodologies and data. NMT data is consistent with the noise contours. It should be expected that the modelled (i.e. calculated) noise contour levels should be slightly higher if not equal to the NMT data.

We commend the initiative taken by the local community to retain independent assessment. For a meaningful and robust comparison, it is essential that we have available the full dataset including detailed methodology, assumptions and findings, which were not available in this case. This will enable all stakeholders to assess differences objectively and ensure that the conclusions are evidence-based and aligned with best practice. daa remain available to review and comment on the detail supporting the Wave Dynamics Report and will use any such data to inform improvements in the NTK system where appropriate.

8.0 Conclusions and Future Strategy

This section outlines the progress daa has undertaken to improve the NTK and CET system, and vision for the future.

8.1 2025 Position Summary

Since 2019, daa has advanced its environmental noise monitoring and community engagement at Dublin Airport. These improvements were initiated following publication of *ANCA's Report*, which identified several areas for development in the NTK and CET systems.

daa has implemented a structured programme of upgrades focused on expanding the NTK network, improving data integration, enhancing public access to information, and evolving engagement with the local communities. These changes have been carried out within the framework of existing regulatory requirements, including:

- The Aircraft Noise (Dublin Airport) Regulation Act 2019; specifically, Section 19;
- Condition 10 of the North Runway Planning Permission (PL 06F.217429);
- ISO 20906:2009 +A1:2013, the international standard for unattended aircraft noise monitoring;
- ECAC Doc 29, which sets out the methodology for noise contour modelling;
- and criteria specifically listed in the Report.

Through these actions, daa has moved from a position of partial alignment with best practices, to one where its systems now meet and exceed key technical and regulatory standards. The 2025 position reflects measurable progress in monitoring coverage with more quality data, as well as public transparency with a suite of CET available for the public. This provides a strong foundation for the next phase of development, as set out in the 2025-2030 outlook.

System Expansion

As of 2025, Dublin Airport operates 32 NMTs – 25 fixed, seven portable units. This marks a near fourfold increase since 2019 and exceeds the ANCA-recommended range of 11 to 18 NMTs and the requirements directed by ANCA in 2022. The NMTs are distributed across a 45 km radius and were sited based on the ANCA Direction, ISO 20906 criteria, and community feedback through engagement forums such as DAEWG and CLG.

Community Engagement

Significant progress has also been made in the development of CET. Since 2021, the public has had access to WebTrak[5], a near real-time portal for tracking flight and noise data and submitting complaints. This was followed by the launch of the online Noise Information Portal[6] in 2025, a postcode-specific platform that allows users to analyse aircraft activity, noise measurements, and complaint statistics relevant to their area. The website has also been enhanced by tools like Maploom[7] that allows residents to check their eligibility for insulation or dwelling purchase schemes. Complaints can now be submitted through multiple channels[8] including telephone, web[9], and post, with account profiles in place to reduce repeat data entry and improve ease of use.

In terms of reporting, daa publishes monthly, quarterly, and annual outputs that cover aircraft operations, complaint trends, noise and flight track-keeping performance, and compliance with noise mitigation measures. This information is publicly available and structured to support both community transparency and regulatory oversight.

Benchmarking and Regulatory Compliance

Dublin Airport's current NTK and CET systems now perform above many international peers. It has the highest ratio of NMTs to air traffic movements amongst other benchmarked airports, and its monitor density places it above the international average. The functionality of its community engagement tools is comparable to, and in some respects more accessible than, those used at major European hubs including Heathrow, Schiphol, and Frankfurt.

These developments align with Condition 10 of the North Runway planning permission, ISO 20906 for unattended aircraft noise monitoring, ECAC Doc 29 for noise contour modelling, and the Aircraft Noise Regulation Act 2019. The systems are not only technically aligned with these frameworks but are actively supporting reporting and policy requirements under each.

[5] https://eu.webtrak.aero/dub1
[6] Dublin Airport Insightfull
[7] https://maploom.daa.ie/eligibility
[8] https://www.dublinairport.com/corporate/environmental-social-governance/noise/aircraft-noise/make-a-complaint
[9] https://viewpoint-app.emsbk.com/dub10/login

8.2 Strategic Outlook 2025–2030

Looking ahead, daa's strategy for 2025 to 2030 is focused on maintaining progress in noise and flight track monitoring, and stakeholder and community engagement while preparing for future operational and regulatory developments. We are committed to taking advantage of digital advancements to drive innovation, improve accuracy and enhance noise mitigation and measuring. The aim is to ensure that Dublin Airport continues to meet evolving standards in environmental management, while responding to community concerns with transparency and accountability.

A key element of this strategy involves the ongoing development of the NTK system. daa plans to increase the number of portable NMTs from seven to 10, which will enhance the flexibility of the network and support temporary monitoring in areas identified through community feedback or emerging operational needs. Upgrades are also planned for several fixed NMT sites to improve equipment resilience, calibration, and data reliability.

In parallel, daa is exploring opportunities to expand the scope of its noise and flight track monitoring through a series of research projects. These include investigations into the potential to monitor reverse thrust on landing, APU usage, and landing gear deployment. While these projects are at an exploratory stage and may not result in full operational deployment, they reflect daa's intent to better understand specific sources of noise and their impacts. The outcomes of these studies will help inform any future technical or policy decisions in this area.

daa is also integrating ADS-B, transponder-based flight data into the NTK system. This would supplement existing radar feeds and improve the spatial resolution of aircraft tracking, particularly at low altitude or areas with limited radar coverage.

On the community engagement side, daa will continue to enhance its CET platforms to improve accessibility and ease of use. This includes ongoing updates to WebTrak and InsightFull, broader use of postcode-specific noise profiles, and improvements to self-service noise complaint tracking and visualisation tools. Feedback from the RED C community sentiment reports will help inform communication strategies and engagement priorities.

Reporting practices will also evolve to reflect best practice across the sector. While the current structure of monthly, quarterly, and annual reporting will continue, daa aims to improve analytical depth, and public understanding of published data.

A new Noise Mitigation Plan was recently published on the daa website. This document provided greater detail on daa's future priorities, mitigation measures, and long-term commitments, building on the foundation established in this benchmarking response.

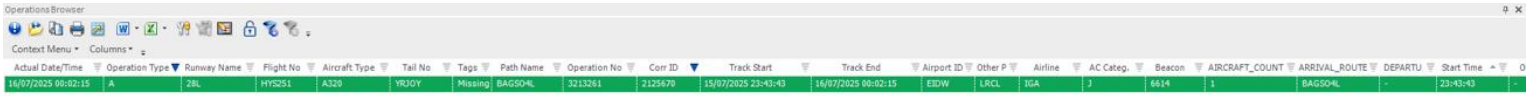
Overall, daa is holding a positive outlook on the future of noise assessment and mitigation. daa will continue to engage with local communities, incorporating their feedback into our plans. daa will also strive to maintain and improve further on their current global position becoming a leader in noise related matters. daa's strategy recognises the need for flexibility and forward-planning in the face of regulatory and operational change. As new environmental standards emerge and passenger growth places greater pressure on infrastructure, the NTK and CET systems must remain adaptable. By investing in scalable technology, improved data analytics, and sustained engagement with stakeholders, daa aims to ensure that Dublin Airport remains a leading example of responsible airport noise management through to 2030 and beyond.

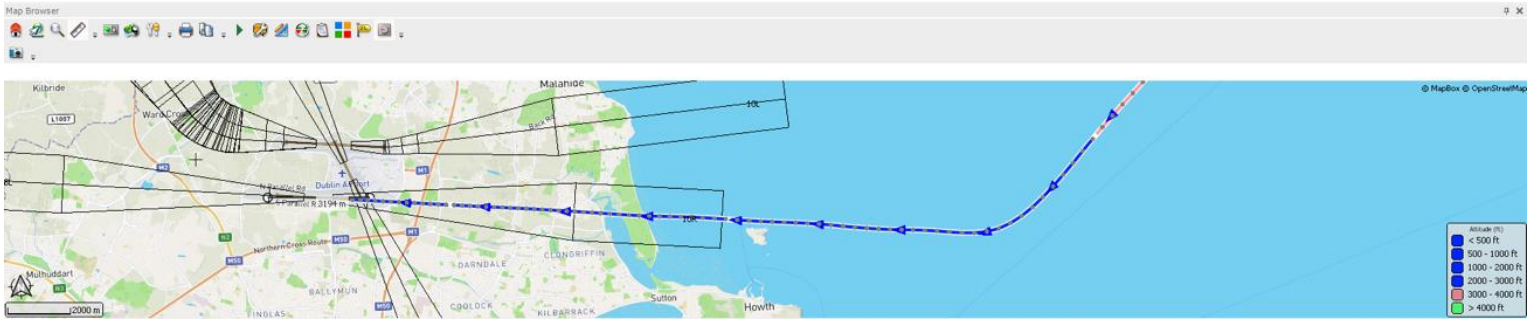
9.0 Appendices

9.1 Appendix 1

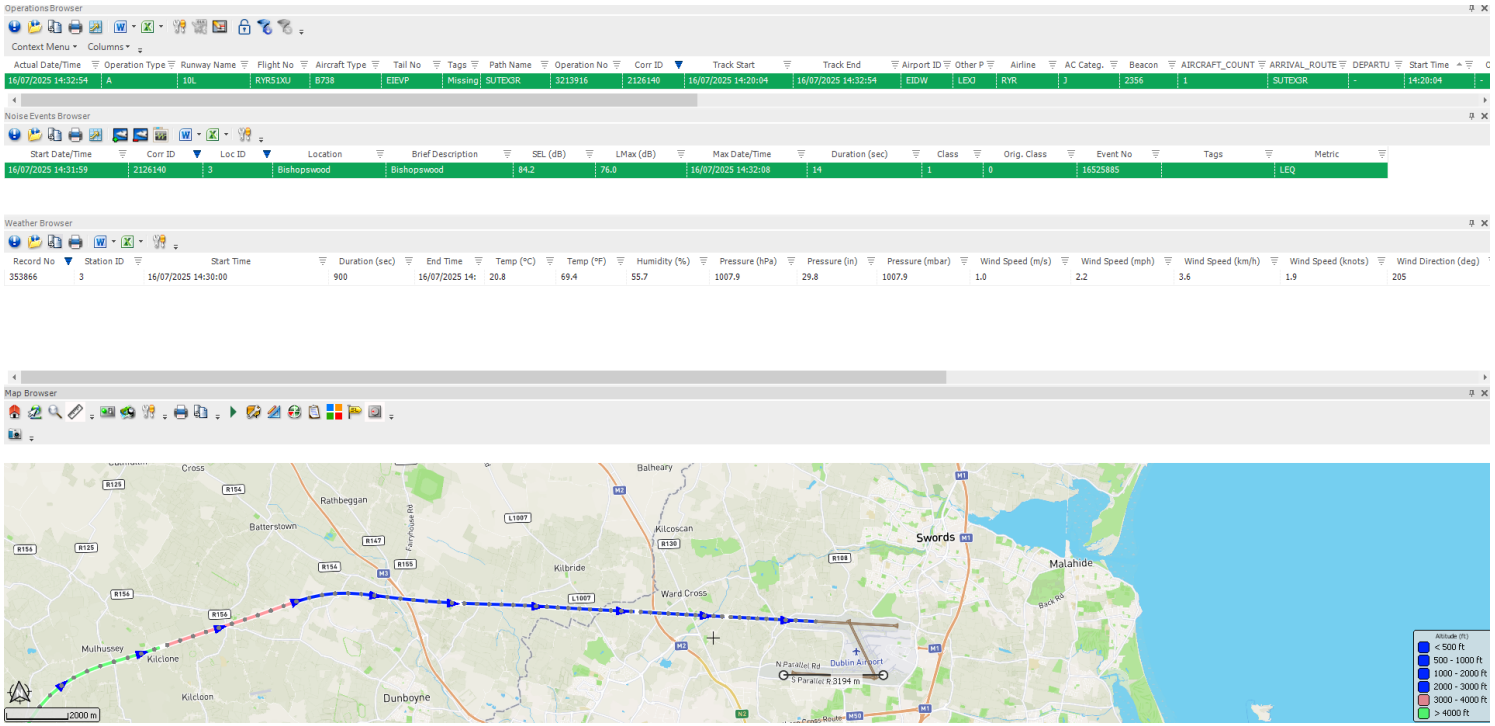
<table>
<tr><th>Section</th><th>Requirement Summary</th><th>Evidence for section</th></tr>
<tr><td>3.1.1</td><td>Continuous NTK Operation</td><td>System uptime report page 9 Quarterly Noise and Flight Track Monitoring Report Jan-Mar 2025
<table>
<tr><th>Title</th><th>Ticket Number</th><th>Priority</th></tr>
<tr><td>DUB - Missing radar data since 12 Dec 2024</td><td>18344940</td><td>P1</td></tr>
<tr><td>DUB - NMT1 missing noise data from 07 Jan 2025</td><td>18621523</td><td>P2</td></tr>
</table>
Two examples of tickets raised when missing data (noise and radar).
Note: Back up radar feed channel was in use whilst the main feed channel was down. There was no disruption to data loading to ANOMS.
Note: NMT1 was back operational after approximately one hour.</td></tr>
</table>

Section	Requirement Summary	Evidence for section
3.1.2	Flight Path & Ambient Noise	Sample event log showing aircraft ID, noise level and ambient noise level. Show page 12 Quarterly Noise and Flight Track Monitoring Report Jan-Mar 2025

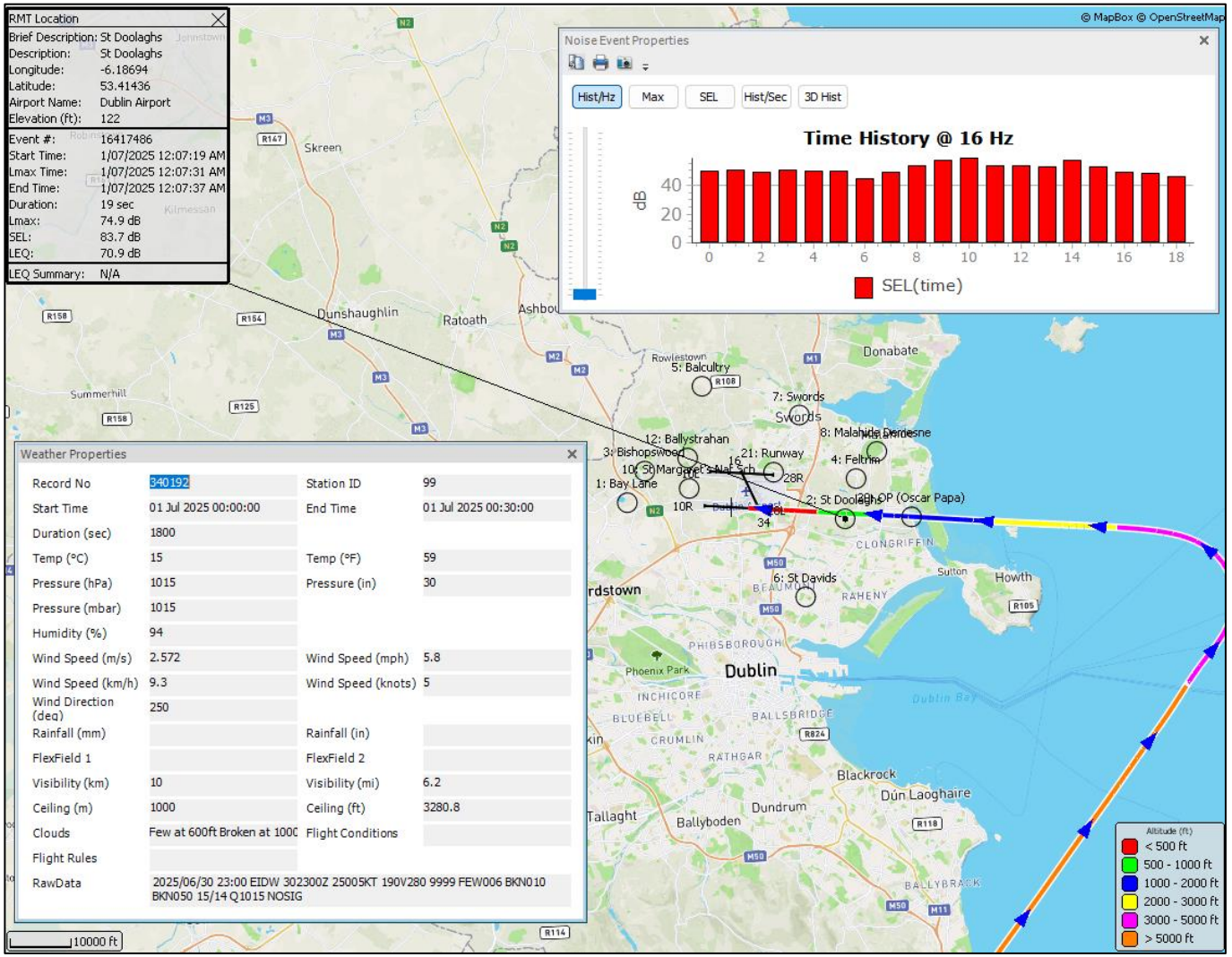




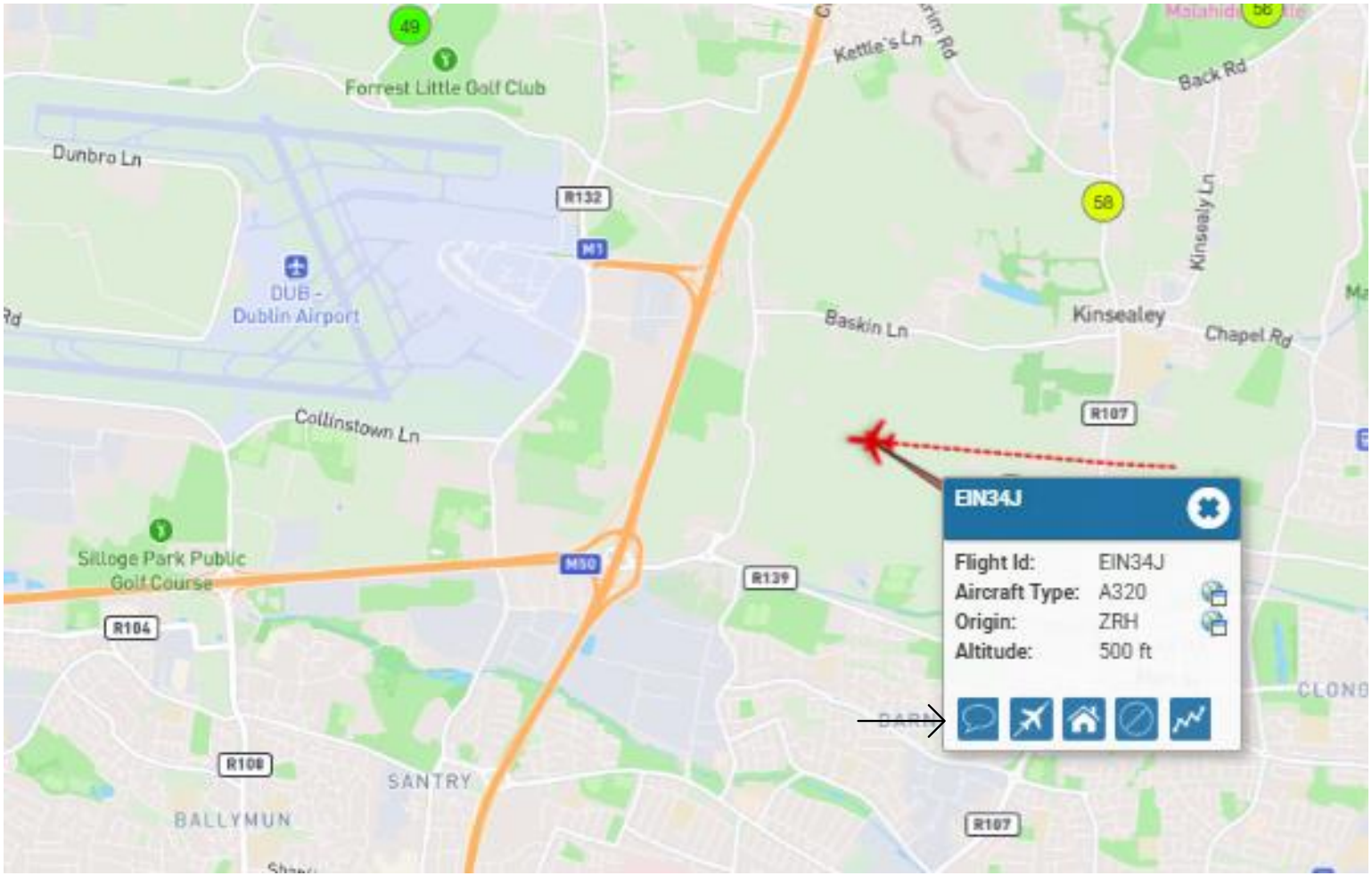
Source: ANOMS

Section	Requirement Summary	Evidence for section
3.1.3	Radar & Weather Data Integration	Screenshot of integrated radar, weather and noise event  Source: ANOMS

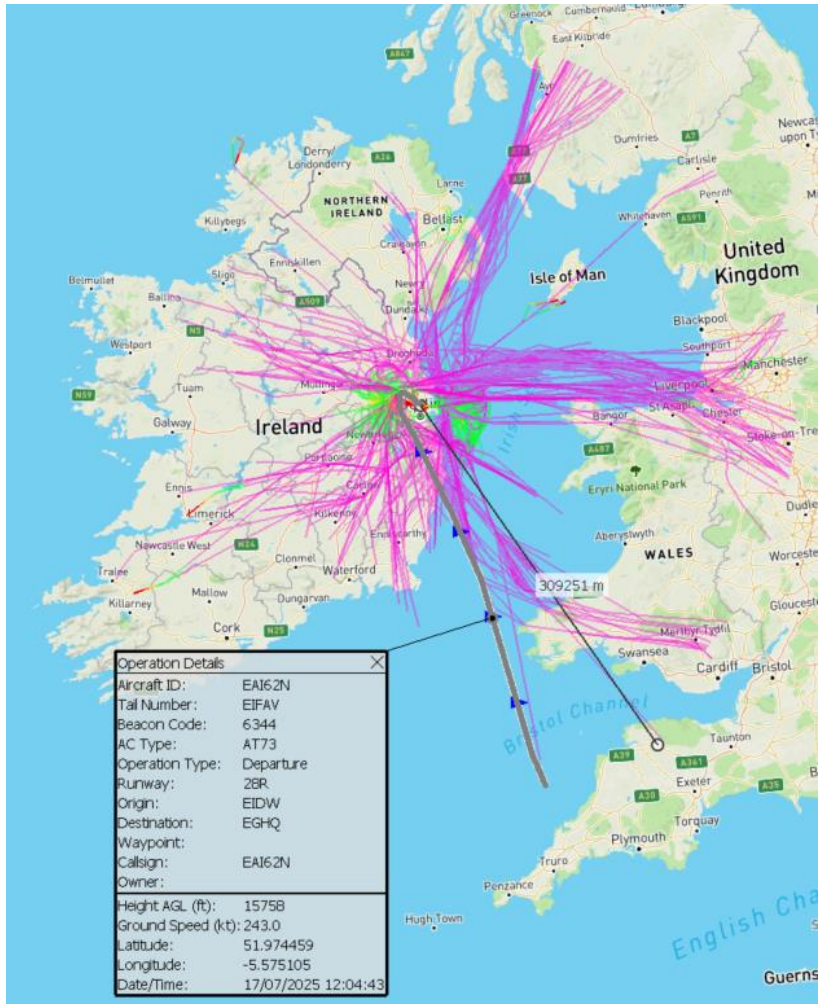
Section	Requirement Summary	Evidence for section



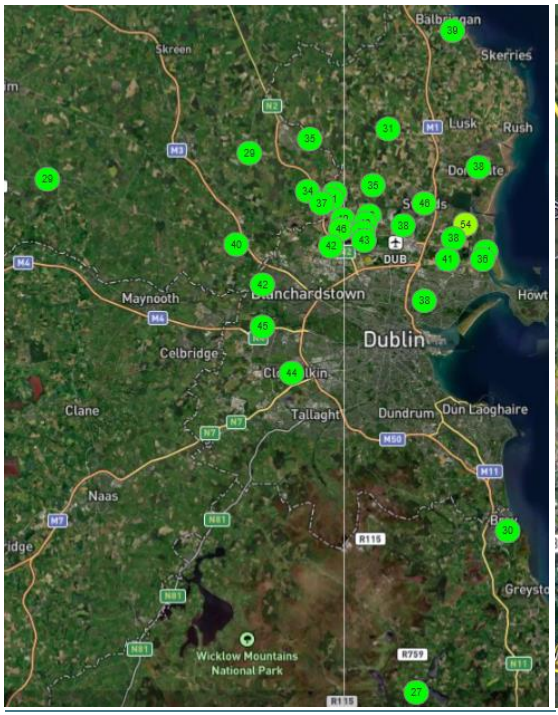
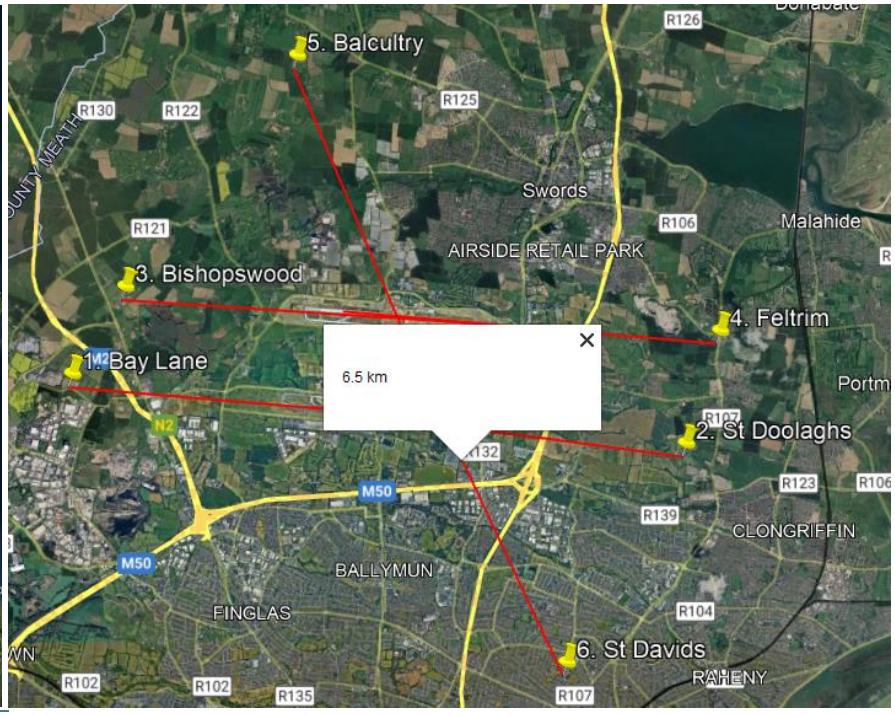
Section	Requirement Summary	Evidence for section
3.1.4	GIS & Complaints	WebTrak screenshot showing complaint submission linked to flight path: Source: WebTrak



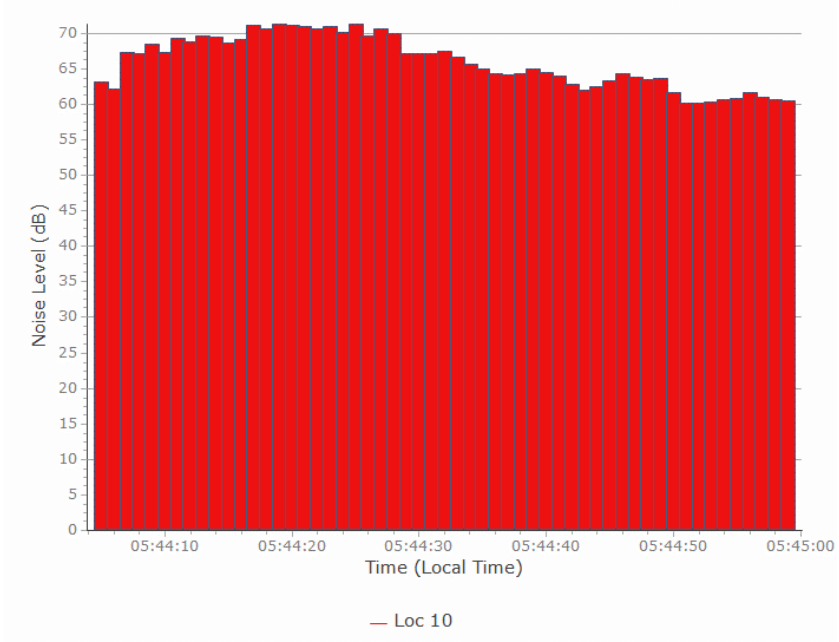
Section	Requirement Summary	Evidence for section
3.1.5	Monitoring Radius & Aircraft Data	Radar coverage map showing 40–45 mile radius and aircraft metadata: say it is up to 300km.



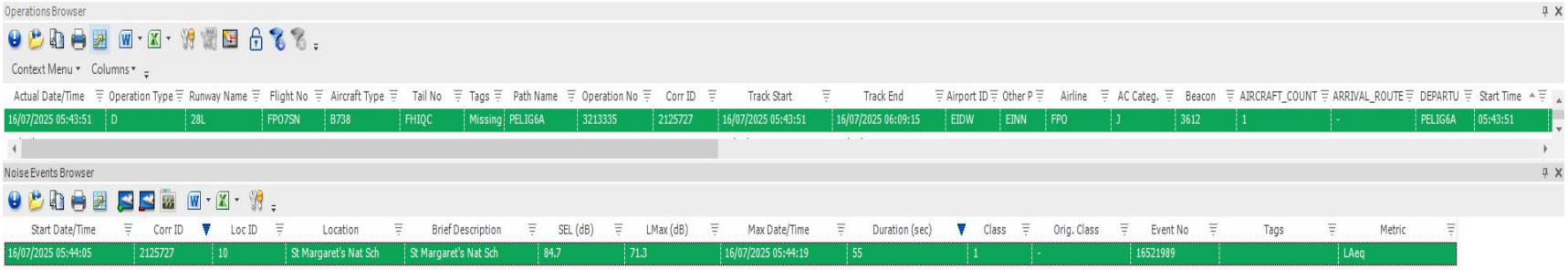
Source: ANOMS

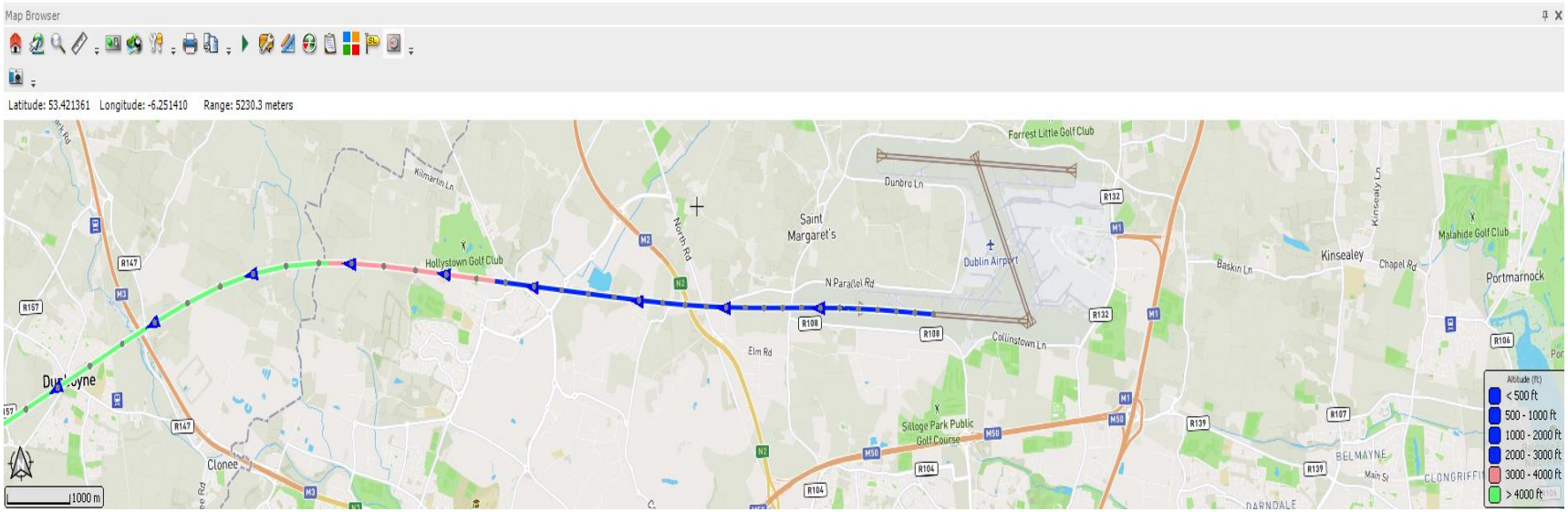
Section	Requirement Summary	Evidence for section
3.1.6	NMT Deployment	32 NMTs are shown.   Source: WebTrak
3.1.7	High-Frequency Measurement	NMT technical datasheet showing 0.5-second interval and IEC compliance: NMT Type 3639 Datasheet NMT Type EMU3680 Datasheet

Section	Requirement Summary	Evidence for section
3.1.8	Proactive Noise Management	Statement from Envirosuite: Airport Noise Monitoring Systems | Airport Noise Report | ANOMS **ANOMS NoiseDesk** The world leading software for airport noise monitoring systems, airport noise reporting, and flight tracker technology.
3.1.9	Policy Development	Excerpt from Noise Abatement Policy showing data-driven thresholds: Page 5 of the Noise Abatement Objective Report **1.3 Measuring the Objective** The NAO will be primarily measured through the number of people highly sleep disturbed and highly annoyed in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}. These measures describe those chronically disturbed by aircraft noise. These metrics help articulate the effect of aircraft noise on health and quality of life. Further to these metrics, the following will also be used to help identify priorities i.e., where noise exposure results in the populations experiencing the harmful effects. These are the number of people exposed to aircraft noise above: • 55 dB L_{night} (a level of night-time noise exposure described by the WHO as representing a clear risk to health) • 65 dB L_{den} (where a large proportion of those living around Dublin Airport can be considered highly annoyed) In order to measure performance, these metrics shall be completed using a noise model prepared in accordance with the methodology described in Directive 2015/996 (European Civil Aviation Conference (ECAC) Doc.29 4th Edition or as amended). The noise model shall be validated using local noise and track keeping performance data from Dublin Airport's systems.

Section	Requirement Summary	Evidence for section
3.1.10	Complaint Logging	Monthly complaint summary with number, location, and type of issue: Page 8-10 Dublin Airport Monthly Noise and Operations Report
3.1.11	Reporting Requirements	Annual Compliance Report 2023 Quarterly Noise and Flight Track Monitoring Report Jan-Mar 2025 Dublin Airport Monthly Noise and Operations Report
3.1.12	ECAC Doc 29 Compliance	Summary table showing ≥50 valid measurements per aircraft/track with ≥10 dB difference from ambient:  Source: ANOMS

Section	Requirement Summary	Evidence for section

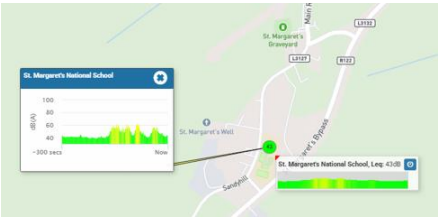




Section	Requirement Summary	Evidence for section
3.2.1	NMT Site Selection Criteria	Site selection feasibility reports: ANCA decides where NMTs should be deployed, Dublin Airport has put greater numbers of NMTs than directed to do so, some feasibility reports are attached in appendix 1asupplementary document. 5 NMT with justification, pictures and snapshot of WebTrak

St. Margaret

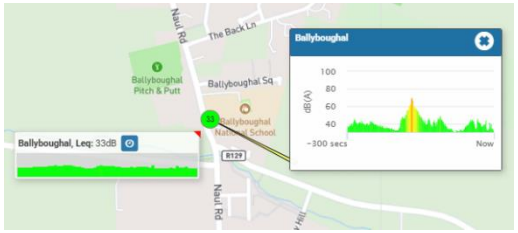
Description	Details
Address	St Margaret's National School, Sandyhill, St Margaret's, Co Dublin
GPS	53.43046227675225, -6.300430701520868
Proposed installation location	Equipment inside boiler room, external mast with brackets on the tower
Access to mains power	Yes. Simple and short cable run required
4G Reception	Yes
4G signal strength (RSSI) – average over 3 measurements	-75dB Suitable, however external antenna recommended
Risk of background noise sources	R122 road is relatively busy and 50m from site. Some small trees 10 – 20m from site
Background noise measurement	LAF90 = 55dB
Aircraft noise measurement (Departures)	LAFMax = 78dB B763 @ 1,200ft
Identification of potential reflecting surfaces	Small trees 10 – 20m away Top of tower is 7m high and 3m square. Roof of the building has significant slope away from microphone
Road access and access to site	Yes
Type of structure	Old but stable masonry tower with pebbledash surface
Area security	Secure site, however recommend lower bracket is mounted 2m+ high to prevent climbing.
Maintenance suitability	Sufficient space identified to enable lowering of mast for calibration
Comments	Good location. Aircraft noise easily discernible from background



Section	Requirement Summary	Evidence for section

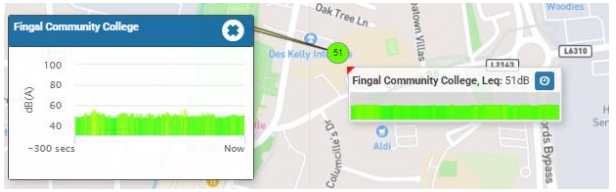
Ballyboughal National School

Description	Details
Address	Ballyboughal National School Ballyboughal, Co Dublin
GPS	53.52091157228559, -6.266211078468226
Proposed installation location	On top of Link building using ballast mast
Access to mains power	Yes. Simple and short cable run required
Cellular Reception	Yes
4G signal strength (RSSI) – average over 3 measurements	-90dB External antenna recommended
Risk of background noise sources	Children playing. Houses 10m away
Background noise measurement	LAF90 = 39dB
Aircraft noise measurement	LAFMax = 51dB B738 @ 10,500ft
Identification of potential reflecting surfaces	None
Road access and access to site	Yes
Type of structure	Concrete / Masonry
Area security	Secure site
Maintenance suitability	Sufficient space identified to enable lowering of mast for calibration
Comments	Good location with easy access



Fingal Community College

Description	Details
Address	Fingal Community College Seatown Road, Swords Co Dublin
GPS	53.46064166447553, -6.217583000768111
Proposed installation location	Rear of school on side wall. Bottom tiltable mast
Access to mains power	Yes. Power available from Boiler Room
Cellular Reception	Yes
4G signal strength (RSSI) – average over 3 measurements	-66dB
Risk of background noise sources	Urban area, children and traffic noise apparent
Background noise measurement	LAF90 = 49dB
Aircraft noise measurement	LAFMax = 53dB B738 @ 9,800ft
Identification of potential reflecting surfaces	Some buildings in the vicinity. Commercial premises next door
Road access and access to site	Yes
Type of structure	Concrete / Masonry
Area security	Secure site
Maintenance suitability	Sufficient space identified to enable lowering of mast via bottom pivot for calibration and maintenance
Comments	Good location with easy access, limited background noise differential

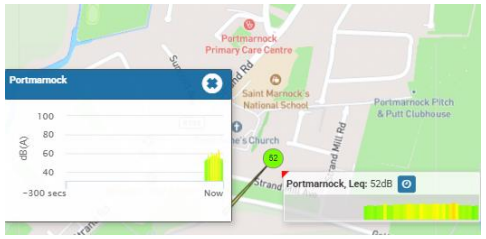


Malahide Castle

Description	Details
Address	Malahide Castle Malahide, Co Dublin
GPS	53.44295717706041, -6.158334080994829
Proposed installation location	Pavilion Club House or on light or CCTV pole in car park
Access to mains power	Yes – cable run from inside Pavilion Club House
Cellular Reception	Yes
4G signal strength (RSSI) – average over 3 measurements	-57dB
Risk of background noise sources	Children's playground within 40m
Background noise measurement	LAF90 = 42dB
Aircraft noise measurement	LAFMax = 54dB A320 @ 3,100ft
Identification of potential reflecting surfaces	Trees within 30m
Road access and access to site	Yes
Type of structure	Pavilion is a timber frame building with metal sheet panels. Timber structure may need strengthening to take brackets. Car Park has 6m lighting poles, simple to install microphone on pole.
Area security	Publicly accessible location, but good CCTV coverage. Bottom bracket to be placed >2m
Maintenance suitability	Pivoting pole installation
Comments	Good location

St Marnocks National School

Description	Details
Address	St Marnocks National School Strand Road Burrow, Portmarnock
GPS	
Proposed installation location	Roof of school building
Access to mains power	Yes, cable run from school power supply
Cellular Reception	Yes
4G signal strength (RSSI) – average over 3 measurements	-86dBA
Risk of background noise sources	Slight traffic noise from Strand Road Slight noise impact from playground field
Background noise measurement	LAF90 = 49dB
Aircraft noise measurement	LAFMax = 62dB
Identification of potential reflecting surfaces	Roof is 8m above ground and well away from any trees
Road access and access to site	Good road access and roof is accessible from school premises
Type of structure	Concrete and roofing felt surfaced flat roof
Area security	Secure location. Roof can only be accessed from within school
Maintenance suitability	Pivot mast required for maintenance and calibration
Comments	Good location in quiet environment



Section	Requirement Summary	Evidence for section

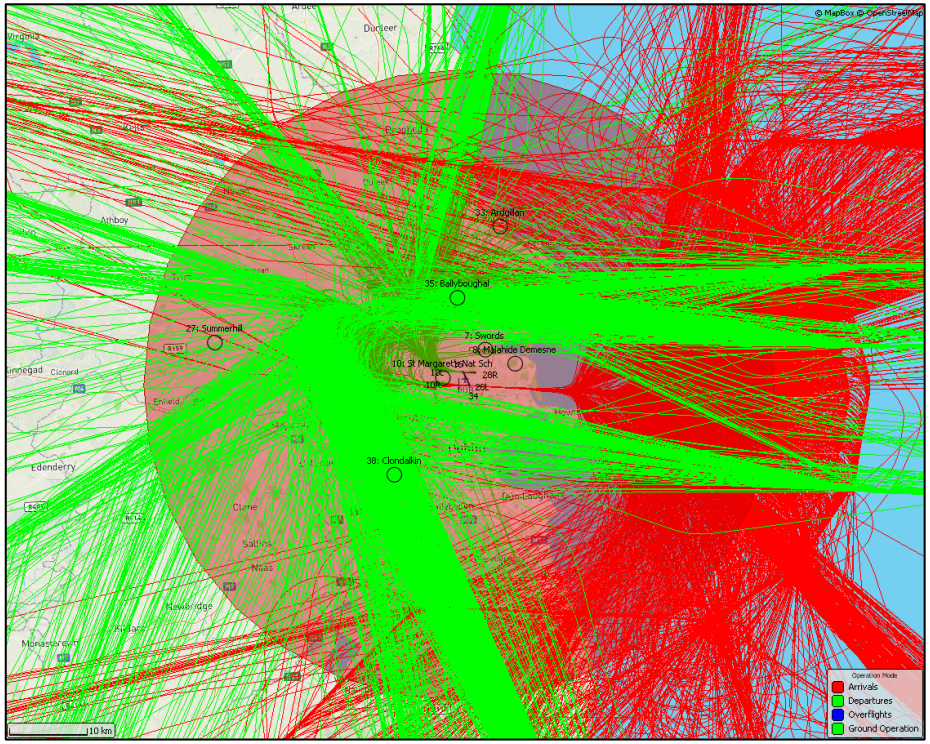
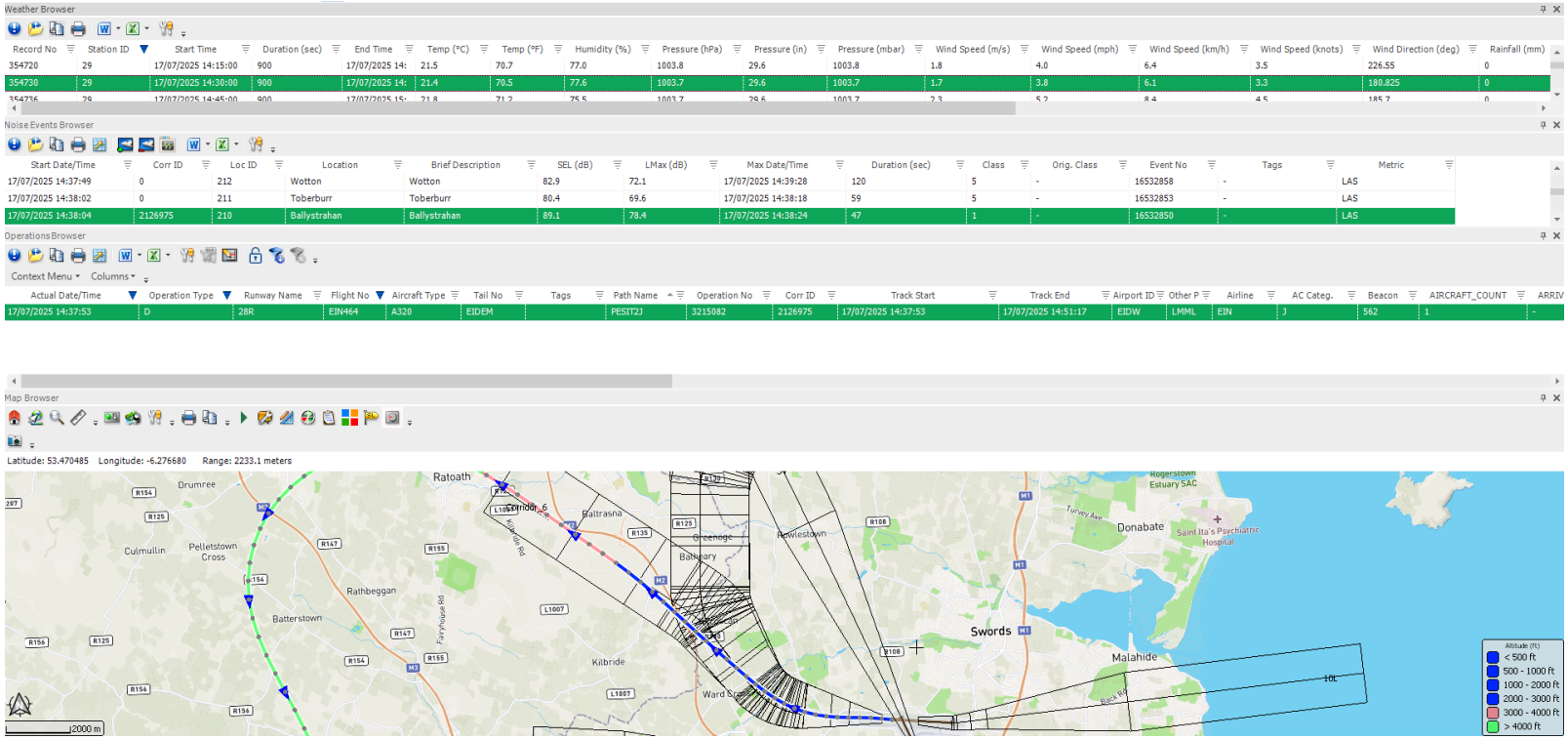


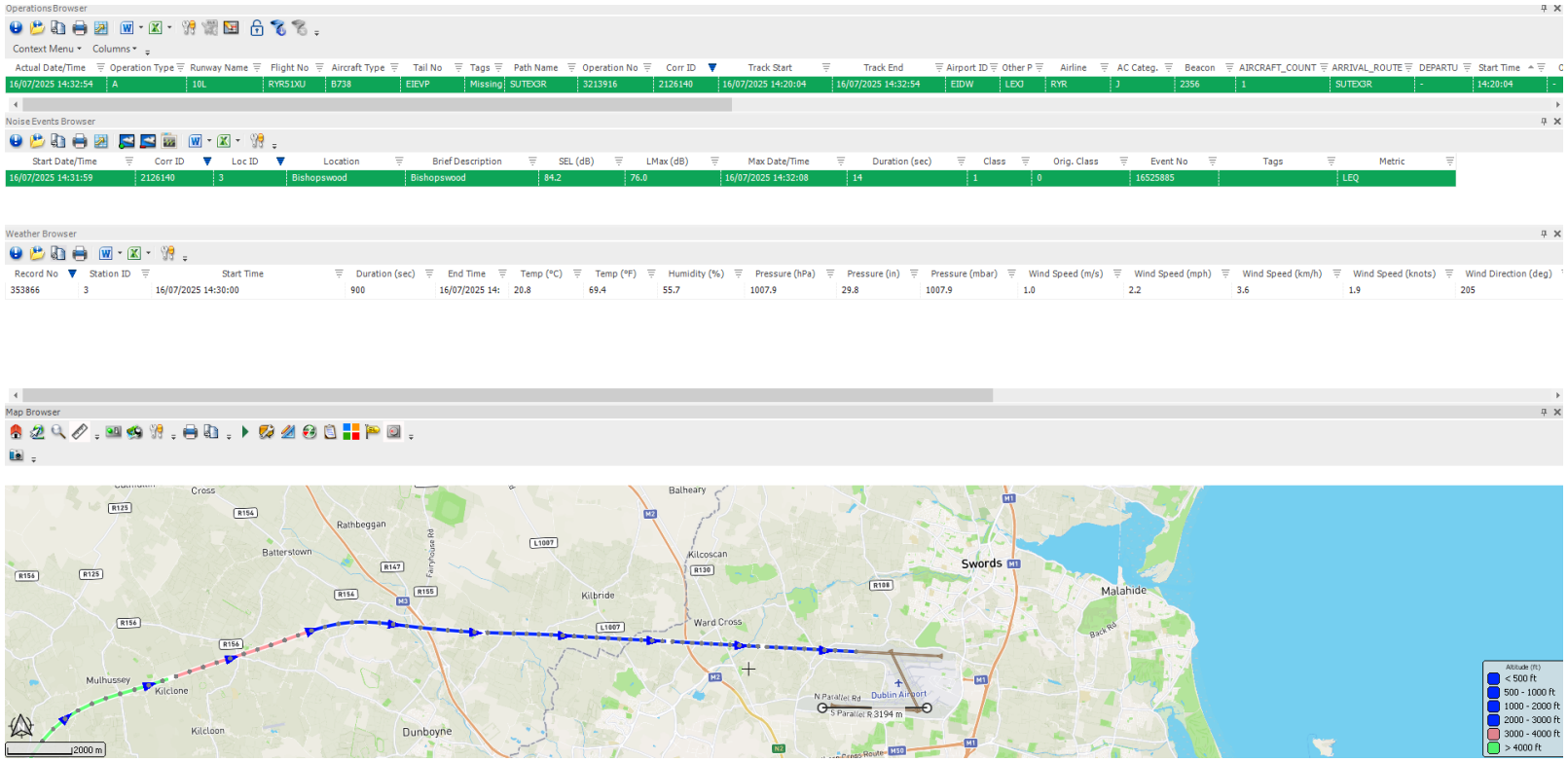
Image of 7 NMTs, within a 40KM radius of DUB airport, with arrivals and departures.

Section	Requirement Summary	Evidence for section
3.2.2	Avoidance of Obstacles	Picture of Ashbourne fixed NMT away from reflective surfaces and 6m high 
3.2.3	Class 1 Equipment & Spectral Capability	Manufacturer's datasheet confirming IEC 61672-1 Class 1 compliance and spectral capability in appendix 1a supplementary document.
3.2.4	Max & Avg Sound Pressure Levels	Manufacturer's datasheet confirming Lmax and Leq values are recorded in appendix 1a supplementary document.
3.2.5	Clock Accuracy & Meteorological Data	Screenshot of NMT time sync status and weather station data log in appendix 1a supplementary document.

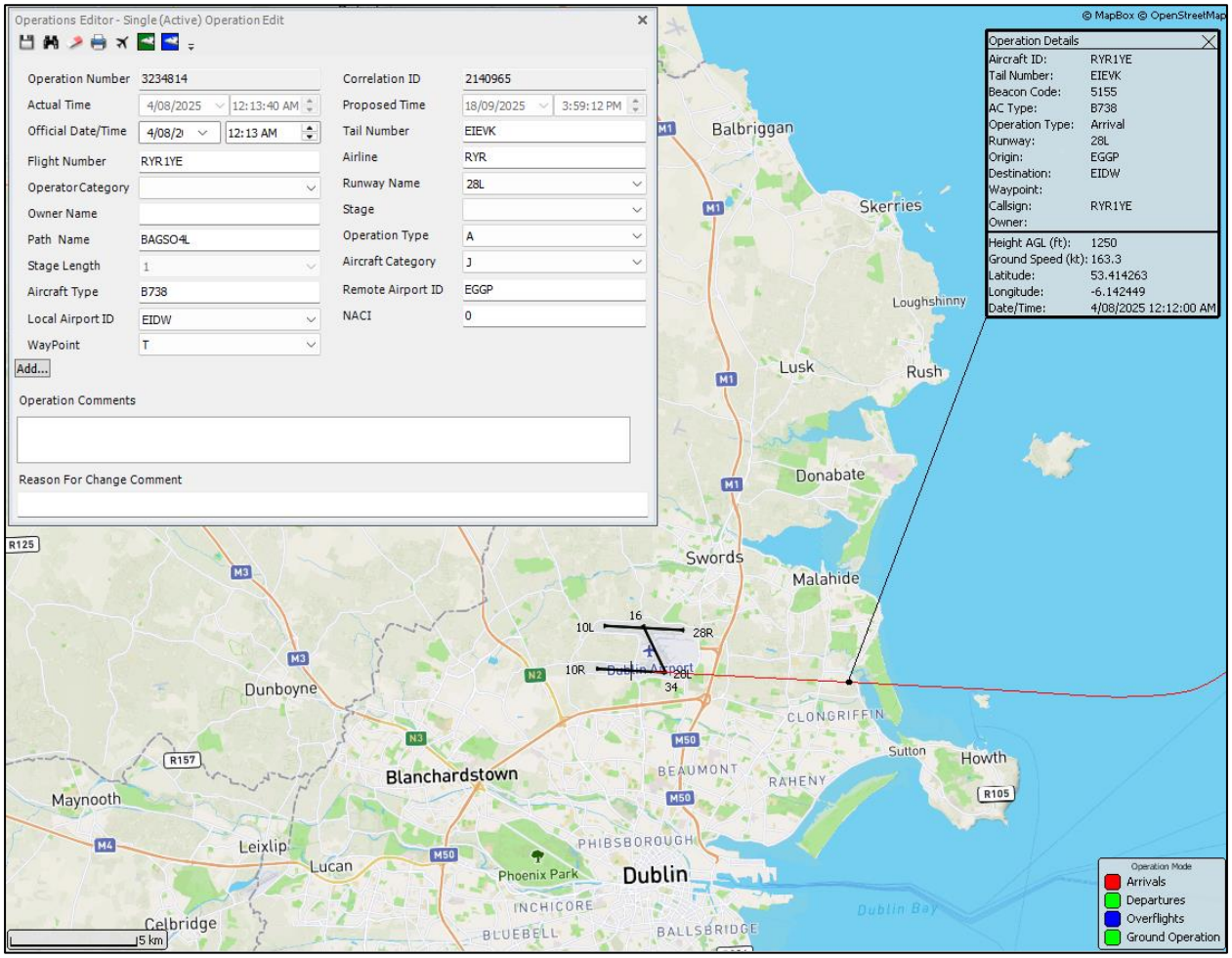
Section	Requirement Summary	Evidence for section
3.2.6	Flight Path Identification	Screenshot of radar-correlated flight path with noise event: Source: ANOMS



Section	Requirement Summary	Evidence for section
3.2.7	Radar, Meteorological & Noise Integration	System architecture diagram showing radar, weather, and noise data integration: Source: ANOMS

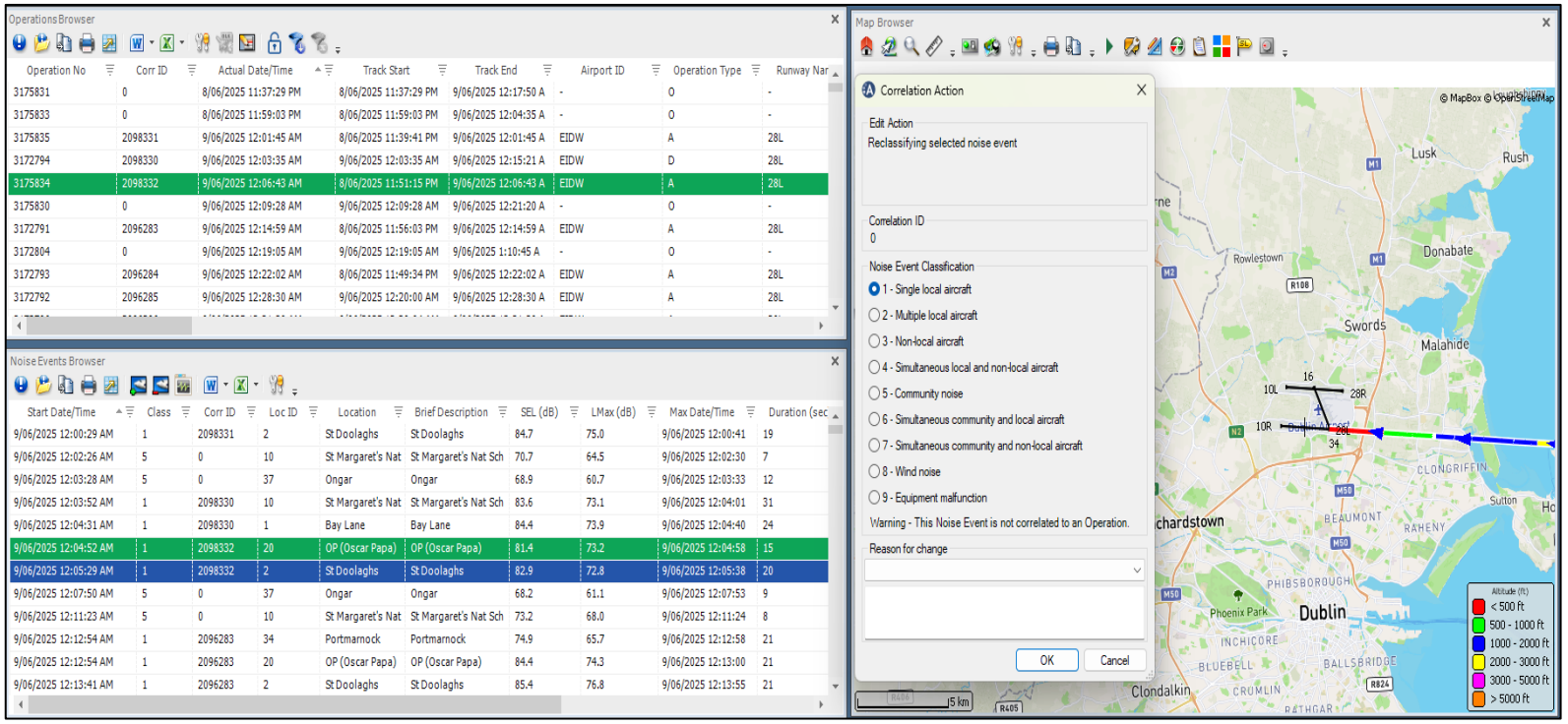


Section	Requirement Summary	Evidence for section
3.2.8	Aircraft Metadata Recording	Sample metadata log showing origin, destination, operator, and altitude:



Source: ANOMS

Section	Requirement Summary	Evidence for section
3.2.9	Aircraft & Non-Aircraft Noise Events	Event classification table showing aircraft vs. non-aircraft noise:



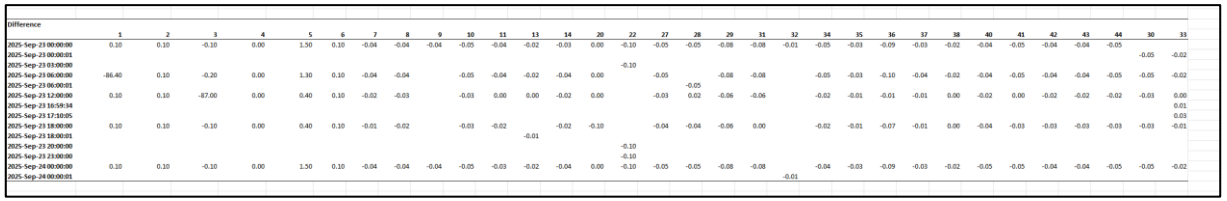
Source: ANOMS

Section	Requirement Summary	Evidence for section
3.2.10	Detection of Incomplete/Corrupted Data	Calibration reports on ANOMS show daily calibrations of Class 1 standard:

Calibrations - September 2025

Dublin Airport

Date	Time	Date Time	Location	Expected	Actual	Difference	Type	Status
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	1	86.40	86.50	0.10	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	2	85.90	86.00	0.10	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	3	87.00	86.90	-0.10	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	4	88.00	88.00	0.00	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	5	87.10	88.60	1.50	Auto	Error
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	6	88.40	88.50	0.10	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	7	-36.89	-36.93	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	8	-35.93	-35.97	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	9	-36.30	-36.34	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	10	-35.53	-35.58	-0.05	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	11	-36.16	-36.20	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	13	-36.15	-36.17	-0.02	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	14	-36.01	-36.04	-0.03	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	20	87.80	87.80	0.00	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	22	87.70	87.60	-0.10	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	27	-36.16	-36.21	-0.05	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	28	-35.93	-35.98	-0.05	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	29	-37.10	-37.18	-0.08	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	31	-36.68	-36.76	-0.08	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	32	-36.44	-36.45	-0.01	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	34	-36.51	-36.56	-0.05	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	35	-36.37	-36.40	-0.03	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	36	-36.09	-36.18	-0.09	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	37	-36.39	-36.42	-0.03	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	38	-35.93	-35.95	-0.02	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	40	-36.15	-36.19	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	41	-36.33	-36.38	-0.05	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	42	-36.08	-36.12	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	43	-36.27	-36.31	-0.04	Auto	Success
2025-Sep-23	00:00:00	2025-Sep-23 00:00:00	44	-35.78	-35.83	-0.05	Auto	Success



3.2.11 Classification Accuracy & Uncertainty

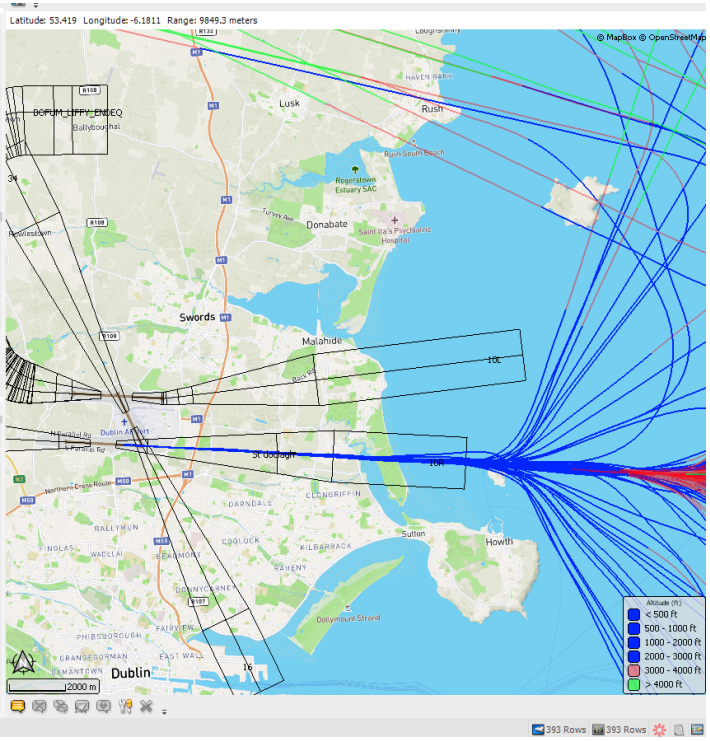
Below is noise events classified to aircraft movements confirming accuracy of the ANOMS system.

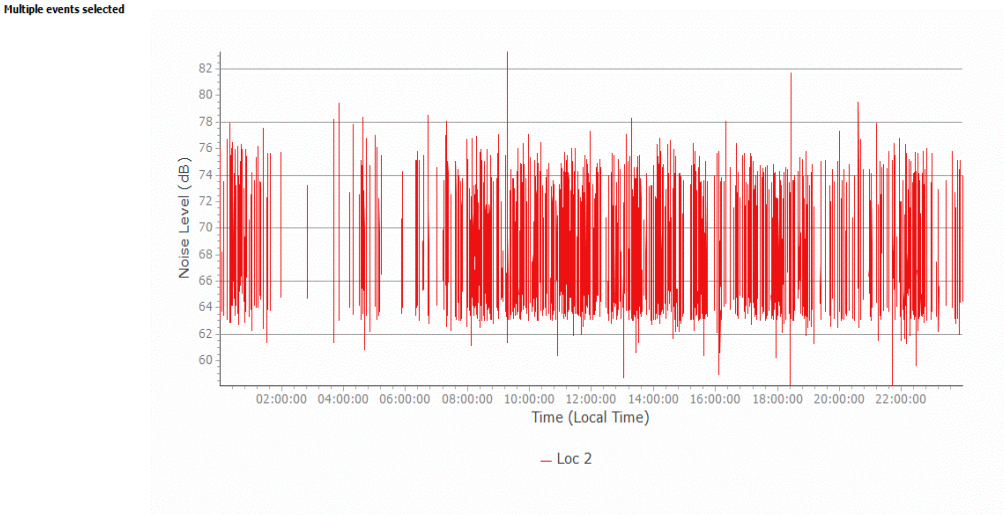
393 noise events from St. Doolagh's NMT for 393 arrivals on runway 28L for the date 06/08/2025:

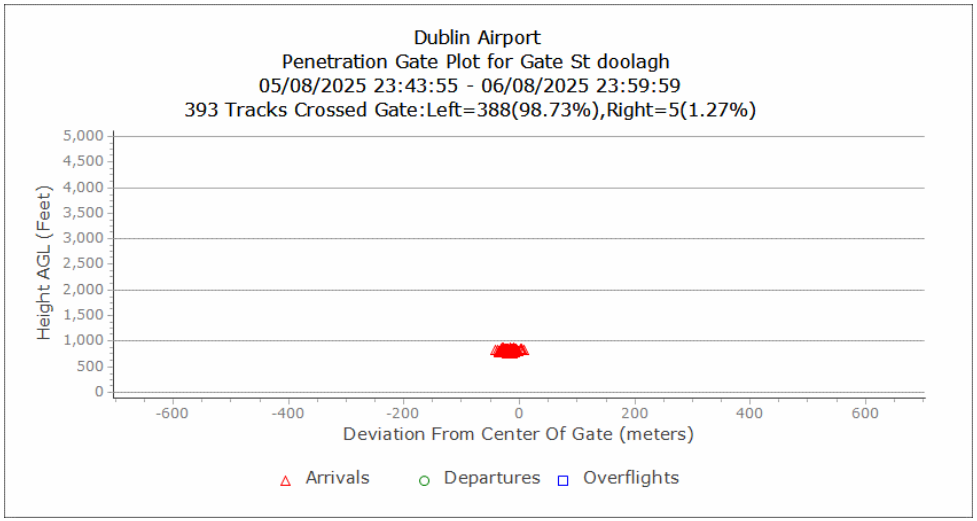
Actual Date/Time	Operation Type	Runway Name	Flight No	Aircraft Type	Tail No	Tags	Path Name	Operation No	Corr ID
06/08/2025 11:19:07	A	28L	ECA4US	C25C	DCEUS	Missing QC[-]	BUNED4L	3237182	2142849
06/08/2025 11:16:45	A	28L	RYR87UW	B738	EIEKT		BUNED4L	3237184	2142848
06/08/2025 11:14:30	A	28L	EIN960	A333	EIGAJ		OLAPO4L	3237174	2142847
06/08/2025 11:12:21	A	28L	EIN681	A320	EIDVK		VATRY4L	3237177	2142846
06/08/2025 11:10:38	A	28L	RYR47CE	B738	EIDYV		SUTEX4L	3237163	2142845
06/08/2025 11:09:13	A	28L	EAI51EL	AT73	EIFSL		NIMAT4L	3237183	2142842
06/08/2025 11:07:04	A	28L	EIN52X	A320	EIDVE		BAGSO4L	3237178	2142840
06/08/2025 11:05:25	A	28L	EIN1LK	A21N	EILRC		VATRY4L	3237181	2142838
06/08/2025 11:03:32	A	28L	RYR969E	B738	EIEKS		BAGSO4L	3237186	2142836
06/08/2025 11:01:54	A	28L	RYR8865	B738	9HQDX		VATRY4L	3237180	2142835
06/08/2025 10:59:44	A	28L	RYR413Q	B38M	EIIKO	Missing QC[-]	SOR28L	3237164	2142828
06/08/2025 10:58:01	A	28L	RYR8RX	B38M	EIIKC	Missing QC[-]	VATRY4L	3237179	2142834
06/08/2025 10:56:06	A	28L	OKCSL	TBM9	OKCSL	Missing QC[-]	BAGSO4L	3237172	2142833
06/08/2025 10:53:09	A	28L	EAI51C	AT73	EIHDI		NIMAT4L	3237185	2142832
06/08/2025 10:48:26	A	28L	ICE416	B752	TFFIV		OLAPO4L	3237151	2142830
06/08/2025 10:46:04	A	28L	RYR54YP	B38M	EIIGZ		VATRY4L	3237149	2142826
06/08/2025 10:43:20	A	28L	TAP13J	E190	CSTPW		SOR28L	3237143	2142824
06/08/2025 10:41:24	A	28L	XACHE	GLF4	XACHE	Missing QC[-]	SOR28L	3237130	2142823

Noise Events Browser

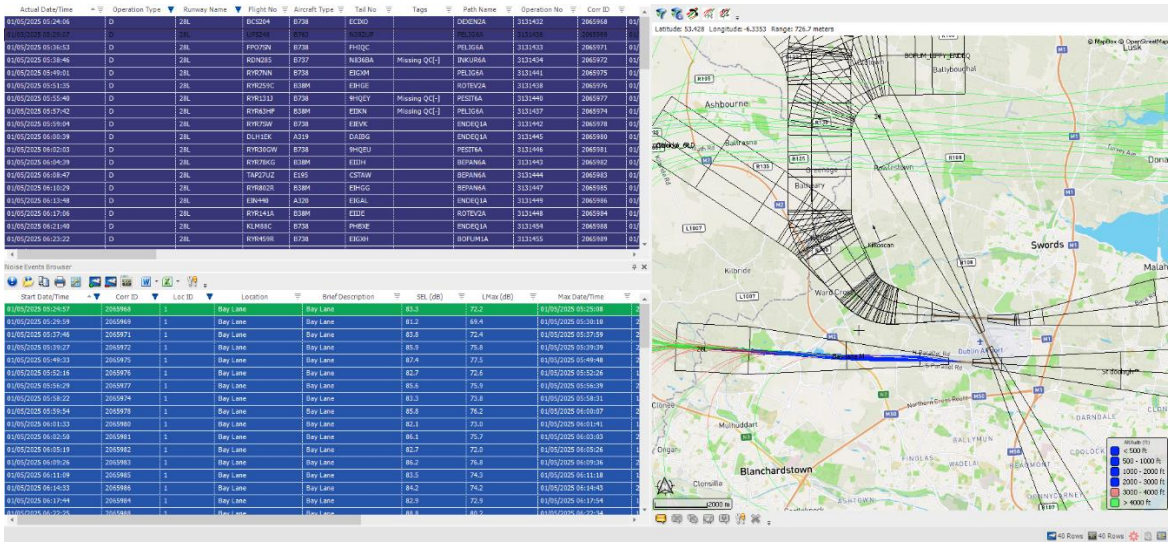
Start Date/Time	Corr ID	Loc ID	Location	Brief Description	SEL (dB)	LMax (dB)	Max Date/Time
06/08/2025 23:58:40	2143360	2	St Doolaghs	St Doolaghs	83.6	74.0	06/08/2025 23:58:52
06/08/2025 23:54:08	2143362	2	St Doolaghs	St Doolaghs	84.2	75.1	06/08/2025 23:54:16
06/08/2025 23:51:25	2143363	2	St Doolaghs	St Doolaghs	84.1	74.4	06/08/2025 23:51:37
06/08/2025 23:48:00	2143359	2	St Doolaghs	St Doolaghs	82.6	75.1	06/08/2025 23:48:07
06/08/2025 23:45:18	2143358	2	St Doolaghs	St Doolaghs	79.7	71.5	06/08/2025 23:45:26
06/08/2025 23:43:07	2143357	2	St Doolaghs	St Doolaghs	82.6	72.7	06/08/2025 23:43:16
06/08/2025 23:37:46	2143355	2	St Doolaghs	St Doolaghs	84.6	75.8	06/08/2025 23:37:54
06/08/2025 23:26:33	2143351	2	St Doolaghs	St Doolaghs	82.5	73.6	06/08/2025 23:26:38
06/08/2025 23:11:49	2143350	2	St Doolaghs	St Doolaghs	82.5	72.9	06/08/2025 23:11:59
06/08/2025 23:08:30	2143349	2	St Doolaghs	St Doolaghs	75.6	67.4	06/08/2025 23:08:33
06/08/2025 22:59:11	2143347	2	St Doolaghs	St Doolaghs	83.9	75.6	06/08/2025 22:59:18
06/08/2025 22:56:51	2143346	2	St Doolaghs	St Doolaghs	82.8	73.4	06/08/2025 22:57:00
06/08/2025 22:49:30	2143344	2	St Doolaghs	St Doolaghs	84.4	76.0	06/08/2025 22:49:41
06/08/2025 22:45:12	2143342	2	St Doolaghs	St Doolaghs	84.0	74.4	06/08/2025 22:45:27
06/08/2025 22:43:20	2143341	2	St Doolaghs	St Doolaghs	81.7	73.3	06/08/2025 22:43:27
06/08/2025 22:41:15	2143340	2	St Doolaghs	St Doolaghs	84.8	75.8	06/08/2025 22:41:29



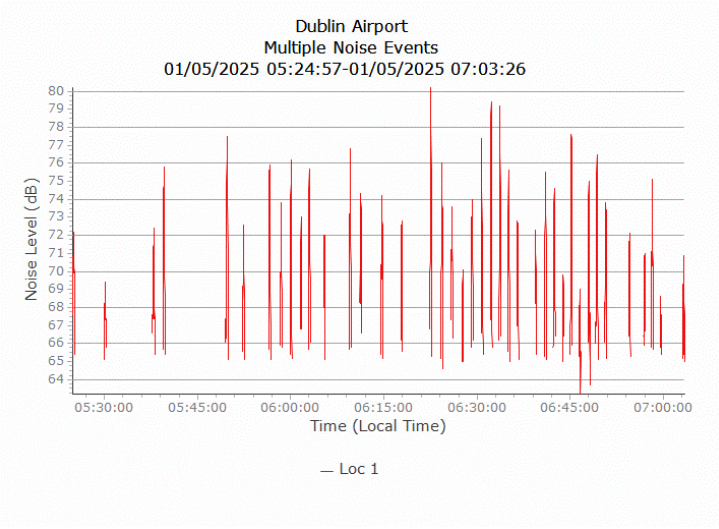


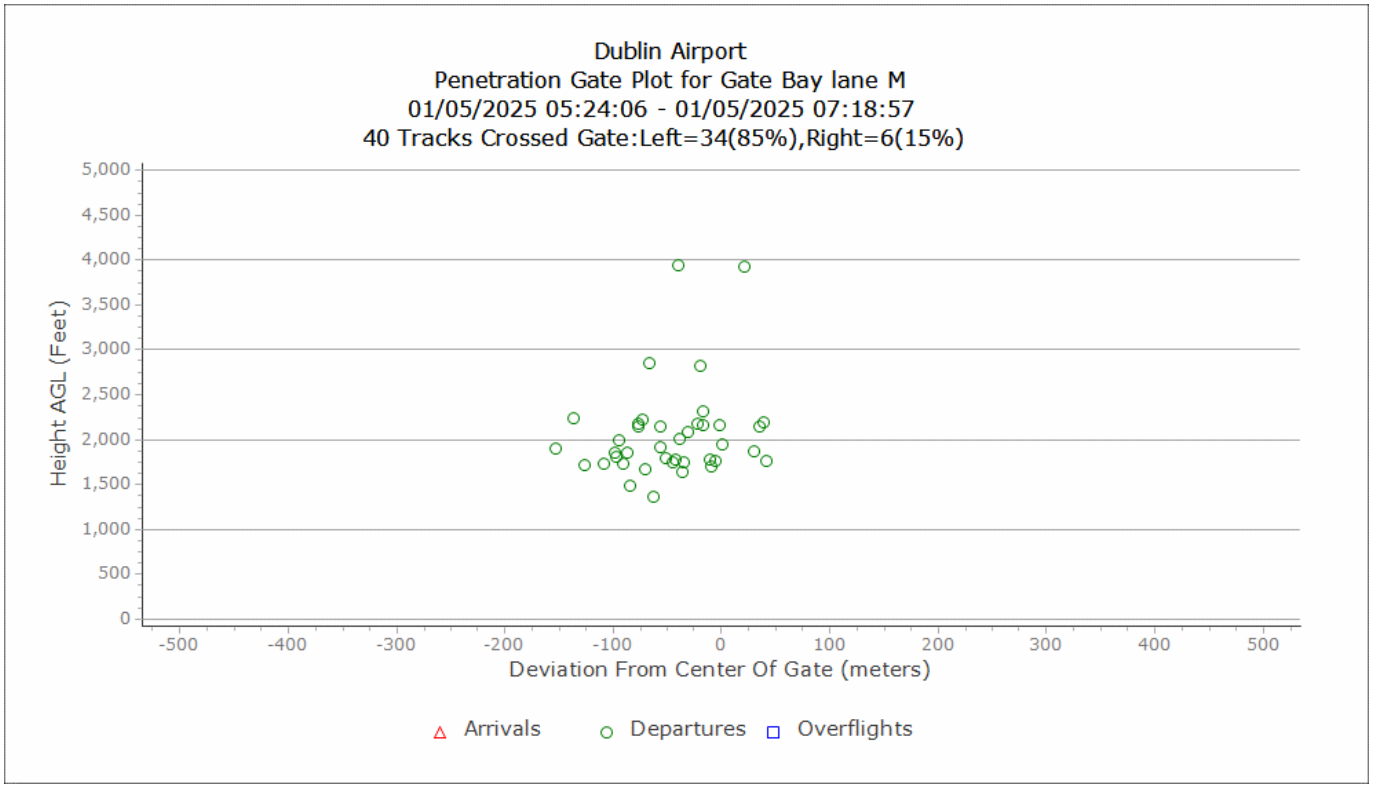


40 noise events from St. Doolagh's NMT for 40 departures on runway 28L for the date 01/05/2025:

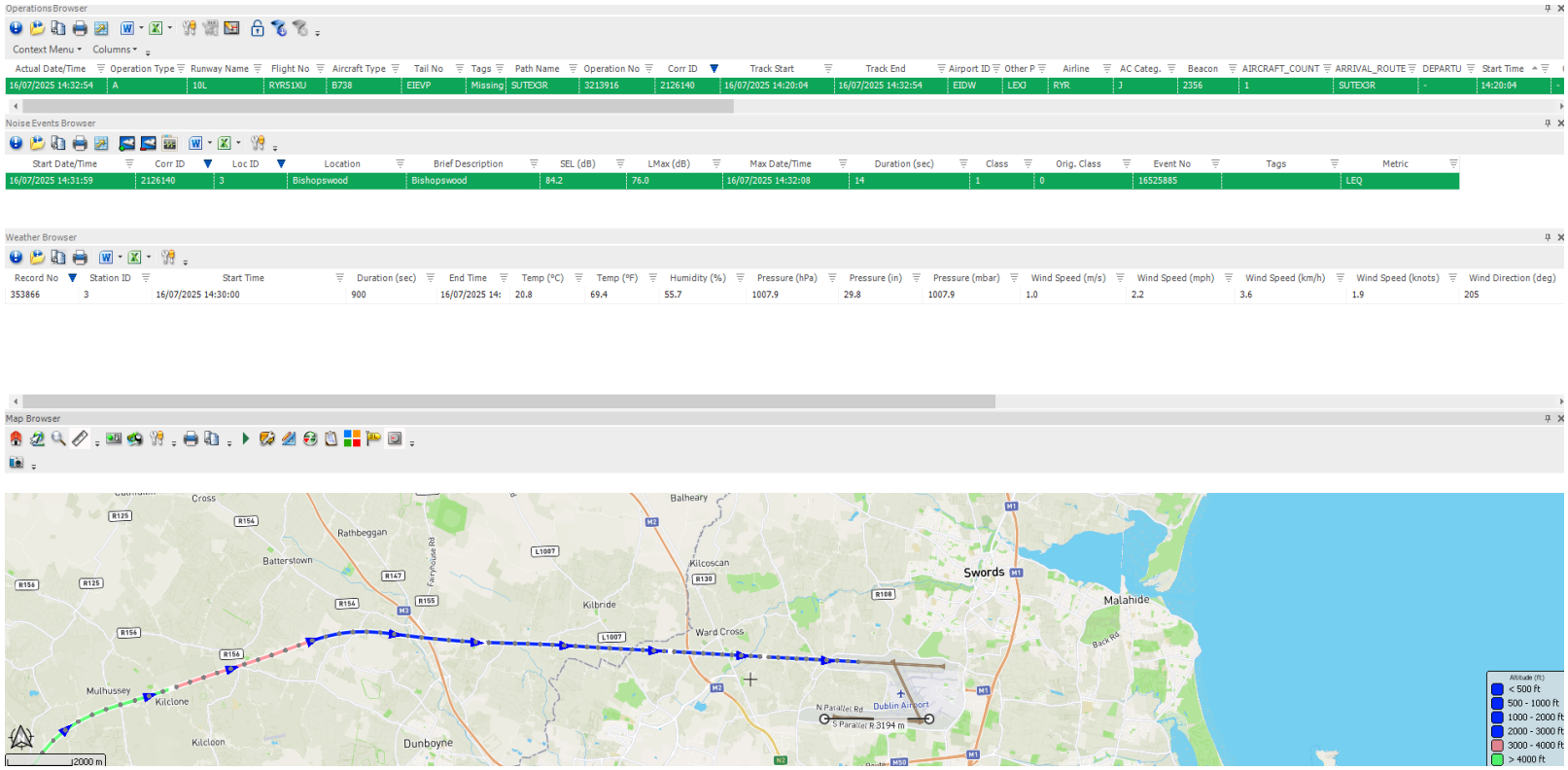


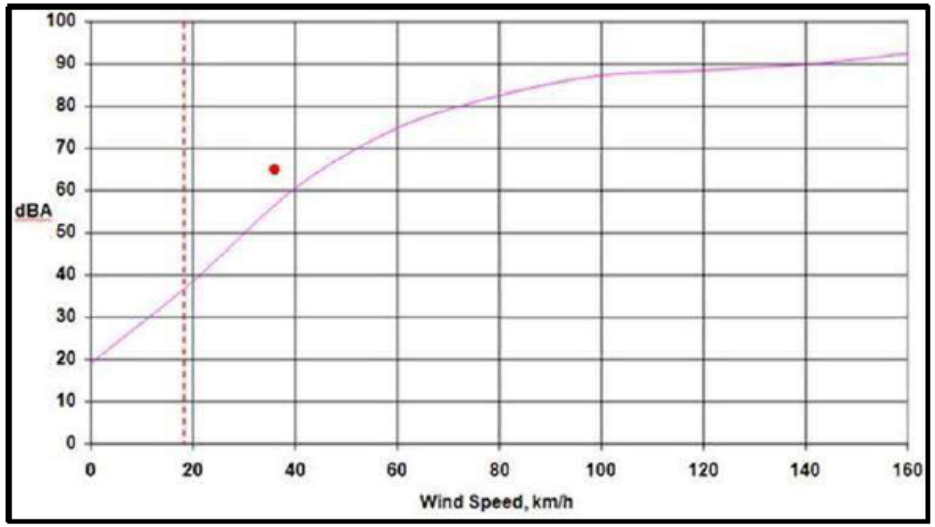
Multiple events selected

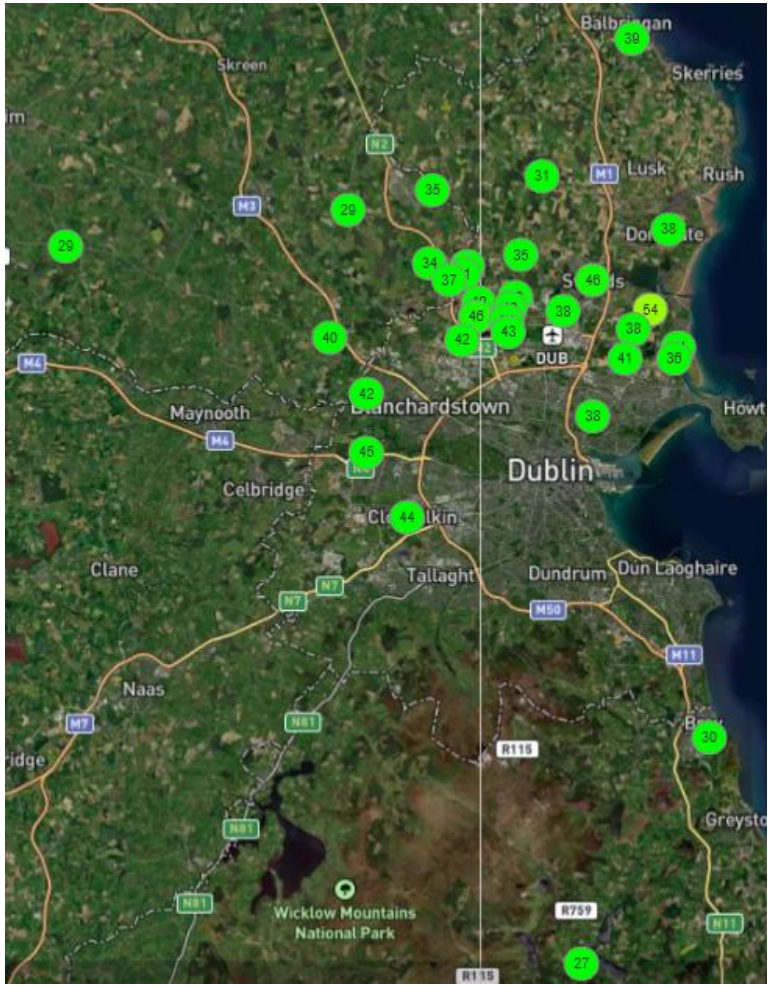



Dublin Airport
Penetration Gate Plot for Gate Bay lane M
01/05/2025 05:24:06 - 01/05/2025 07:18:57
40 Tracks Crossed Gate:Left=34(85%),Right=6(15%)
Height AGL (Feet)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
-500
-400
-300
-200
-100
0
100
200
300
400
500
Deviation From Center Of Gate (meters)
Arrivals
Departures
Overflights

Section	Requirement Summary	Evidence for section
		Calibration shown in 3.2.10
3.2.12	Reporting of Individual & Cumulative Events	Excerpt from monthly report showing both individual and cumulative noise data: Cumulative aircraft events in the report: Quarterly Noise and Flight Track Monitoring Report Jan-Mar 2025



Section	Requirement Summary	Evidence for section
3.2.13	Windscreen Performance	Datasheet shows windscreen performance at 10 m/s: 11 Performance Notes 11.1 Wind Noise The A-weighted one-minute equivalent continuous sound pressure level resulting from wind sound with a wind speed of 10 m/s does not exceed 65 dB. A typical graph of wind-induced noise with relation to wind speed with the windscreens used by our NMTs (using either 4952 or 4184/4184-A) is shown here (the red dot indicates the ISO 20906 requirement; the red dashed line indicates 5 m/s wind speed):  *Figure 11.1-1 Wind Induced Noise* A minimum 5 dB signal to noise ratio is recommended to prevent significant impact from wind noise. Thus, at 5 m/s, levels below ca 42 (ca 37+5) dB will be significantly affected by wind-induced noise. Source: Envirosuite
3.2.14	Calibration & System Checks	Calibration certificate from accredited lab of calibrator and 5 calibration examples of NMT's can be found on the supplementary Appendix 1a

Section	Requirement Summary	Evidence for section
3.3.1	Recommended Number of NMTs	32 shown below (fixed and portable), exceeding the 11-18 recommendation.  Source: WebTrak

Section	Requirement Summary	Evidence for section
3.3.2	Community Input on portable NMTs	Meeting minutes from DAEWG showing community engagement and regular liaison on input of portable NMT Dublin Airport Environmental Working Group Community Liaison Group| North Runway | Dublin Airport
3.3.3	Customisable Reporting Frequency	Annual Compliance Report 2023 Quarterly Noise and Flight Track Monitoring Report Jan-Mar 2025 Dublin Airport Monthly Noise and Operations Report
3.3.4	Historical Data & GIS Integration	WebTrak showing historical noise data with GIS overlay and internal usage of Maploom for RNIS: WebTrak: Dublin Airport Dublin Airport Authority Noise Insulation Scheme Platform

9.2 Appendix 2

Evidence for section
Bi Annual Report July – December 2019
Aircraft Noise (Dublin Airport) Regulation Act 2019
Dublin Airport Noise Compliance Report 2019
Press Release – daa Seeks Amendments to North Runway's Mode of Operation
Section 19 Annual Compliance Report 2020
Press Release – Dublin Airport Launches WebTrak Flight Monitoring Service
Quarterly Report January – March 2021
Airport Plans & Reports | Dublin Airport
September Monthly Report 2021
CLG daa Update December 2021
Noise and Flight Track Report January - March 2025
North Runway News – Dublin Airport's South Runway to Close for Four Nights for Essential Maintenance
Supplementary Noise Monitoring Report 2023
CLG daa Update February 2024
Noise and Flight Track Report October - December 2024
CLG daa Update September 2023
Local Community and Dublin Airport Sentiment Report 2024

Evidence for section
daa NIS Platform
Maploom News – Dublin Airport Authority Noise Insulation Scheme Platform
CLG daa Update February 2024
CLG daa Updates January 2025
FCC Post – Aircraft noise information portal launched by daa
Routes Article – Dublin Airport launches new noise information portal for local community
Irish Independent Article – Dublin Airport launches new noise information portal for the public
The Irish Times Article – Dublin Airport operator launches noise information for residents
Irish Examiner – Dublin Airport launches ‘noise information service’ for local community
British Aviation Group – Dublin Airport launches new noise information portal for the public
CAPA – daa launces online noise information portal for Dublin Airport
Flying in Ireland – Dublin Airport Launches New Noise Information Portal
Dublin Insight Full Website
CLG daa Updates January 2025
Press Release – Strong community backing for Dublin Airport growth confirmed by new independent research