

Noise MONITORING BROCHURE 2023

INFORMING OUR
COMMUNITY



CHRISTCHURCH
AIRPORT

Under the Christchurch District Plan, Christchurch International Airport Ltd (CIAL) is required to assess noise from aircraft using Christchurch Airport.

This assessment generates an Annual Aircraft Noise Contour (AANC) based on recent aircraft movement data.

Noise generated from aircraft using the Airport must not exceed the 65 decibel (dB) Level Day Night (Ldn) contour (called the Operative Air Noise Contour) in the District Plan.

In addition, Christchurch Airport must comply with certain district planning regulations relating to:

Noise level restrictions associated with noise generated by on-aircraft engine tests.

Ensuring properties where noise generated by aircraft and on-aircraft engine testing reaches a certain threshold are provided acoustic treatment.

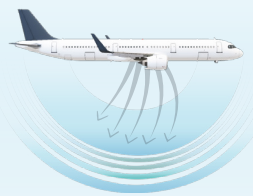
The purpose of this brochure is to present the outcomes of the 2023 noise monitoring assessment and calibration report, where Christchurch Airport was found to be compliant with District Plan requirements.

Look out for the 2024 Noise Monitoring Brochure soon!

DID YOU Know?

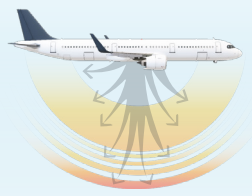
Meteorological conditions can change the way that noise is experienced.

Cooler Temperature



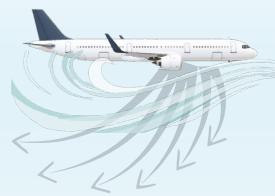
Colder air tends to absorb greater levels of noise **reducing** the spread of sound from an aircraft as it climbs or approaches an airport

Warmer Temperature



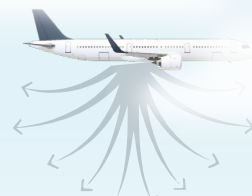
Atmospheric absorption of aircraft noise is lowest with sound travelling **further** in high humidity and high temperature conditions

Wind



Wind speed and direction influence air flow and turbulence levels which significantly influence noise **distribution patterns**

Overcast Sky



Greater levels of refraction, inversion and reflectivity characteristics during overcast conditions can spread sound from an aircraft over **larger** distances

WHAT IS operational noise?

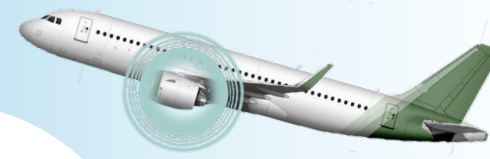
As defined in the Christchurch District Plan, aircraft operational noise includes:

The landing and take-off of aircraft and aircraft flying along any flight path associated with a landing or take-off. Operational noise excludes aircraft operating in an emergency for medical or national/civil defence reasons, air shows, military operations, Antarctic operations, helicopter operations, aircraft using the Airport as an alternative to a scheduled airport elsewhere and aircraft taxiing.

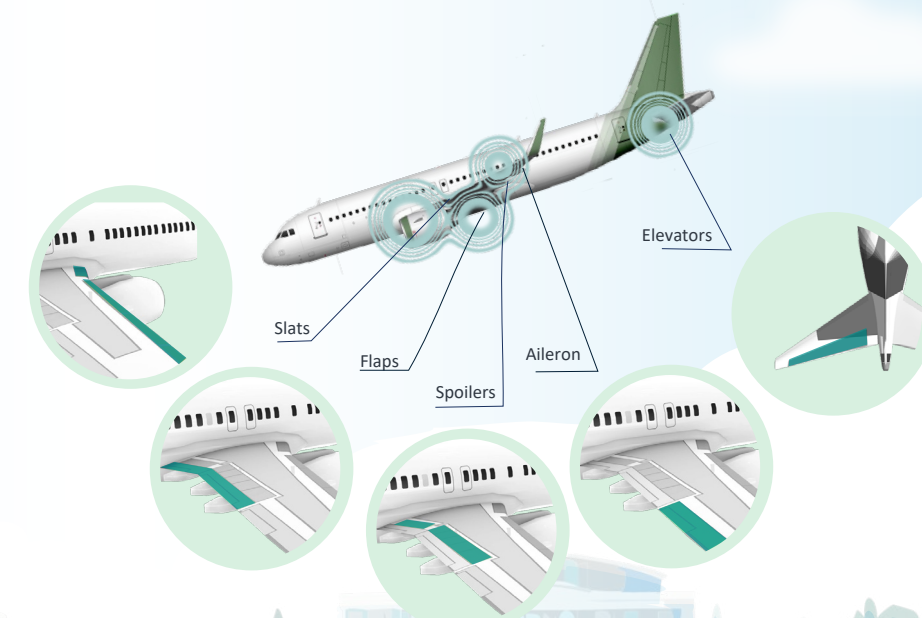
The **three** main components of aircraft noise are:

1. The engine components.
2. The aerodynamic drag or resistance of airflow around the aircraft's fuselage or wings.
3. The deployment of nose and main wheel landing gear from the undercarriage and aircraft control surfaces (i.e., flaps, slats, ailerons and elevators).

ENGINE NOISE (Departure & Climb-Out)



AIRCRAFT CONTROL SURFACE NOISE (Arrivals & Final Approach)



WHAT is....

THE OPERATIVE AIR NOISE CONTOUR?

Like many other countries, New Zealand uses noise contour maps produced through noise modelling as a basis for town planning to manage aircraft noise exposure.

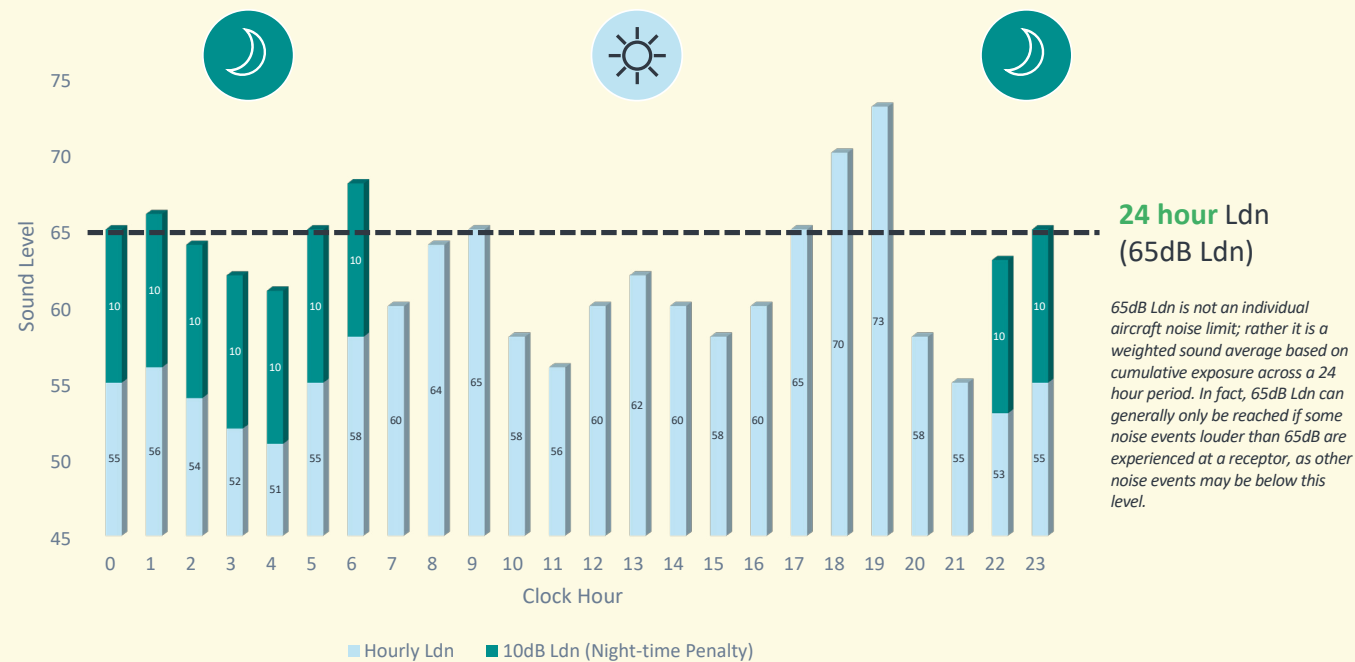
Noise contours show the extent of exposure to aircraft noise and the areas where higher levels of aircraft noise occurs. New Zealand Standard NZS 6805: 1992 Airport Noise Management and Land Use Planning recommends using noise contours and guides this process.

The Christchurch District Plan depicts the 65dB Ldn Operative Air Noise Contour, around the Airport. This contour is based on the calculated ultimate capacity of the airport, at approximately 200,000 annual aircraft movements. Within this area, aircraft operations must be managed such that aircraft noise exposure does not exceed 65dB Ldn.

THE LDN METRIC?

The New Zealand Standard NZS 6805: 1992 Airport Noise Management and Land Use Planning uses the Ldn metric for airport noise contours. This is an equivalent sound level used to reflect a person's cumulative exposure to sound over a 24 hour period and includes an additional 10dB Ldn imposed during night-time hours, Night-time hours are 10pm to 7am. This night weighting accounts for people's increased sensitivity to noise at night.

The Ldn takes into account both the amount of noise from each aircraft operation as well as the total number of operations flown throughout the day. This means a small number of relatively loud operations can result in the same Ldn as a large number of relatively quiet operations. The graph below depicts a hypothetical example of the Ldn concept.

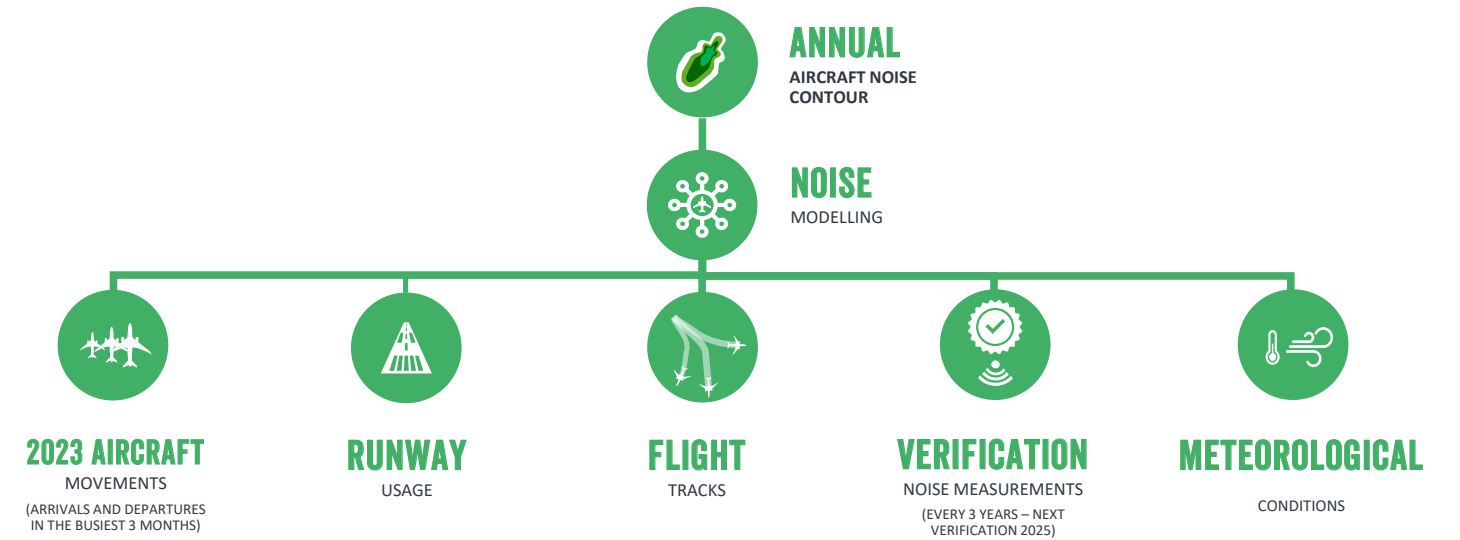


THE ANNUAL AIRCRAFT NOISE CONTOUR (AANC)?

The Annual Aircraft Noise Contour, is based on the total noise produced by all aircraft movements during a typical day, evenly measured over a rolling 90 day (3 month) busy period from the previous 12-months. This is to ensure the AANC is based on aircraft movements from the busiest time of year for the airport and also to account for variations in aircraft movements over a period of time. This is in accordance with the New Zealand Standard NZS 6805:1992 "Airport Noise Management and Land Use Planning".

HOW IS NOISE Modelled?

Calculation of the AANC is based on actual operations, fleet mix, time of day, runway usage, flight path usage and environmental conditions such as temperature, wind and humidity.

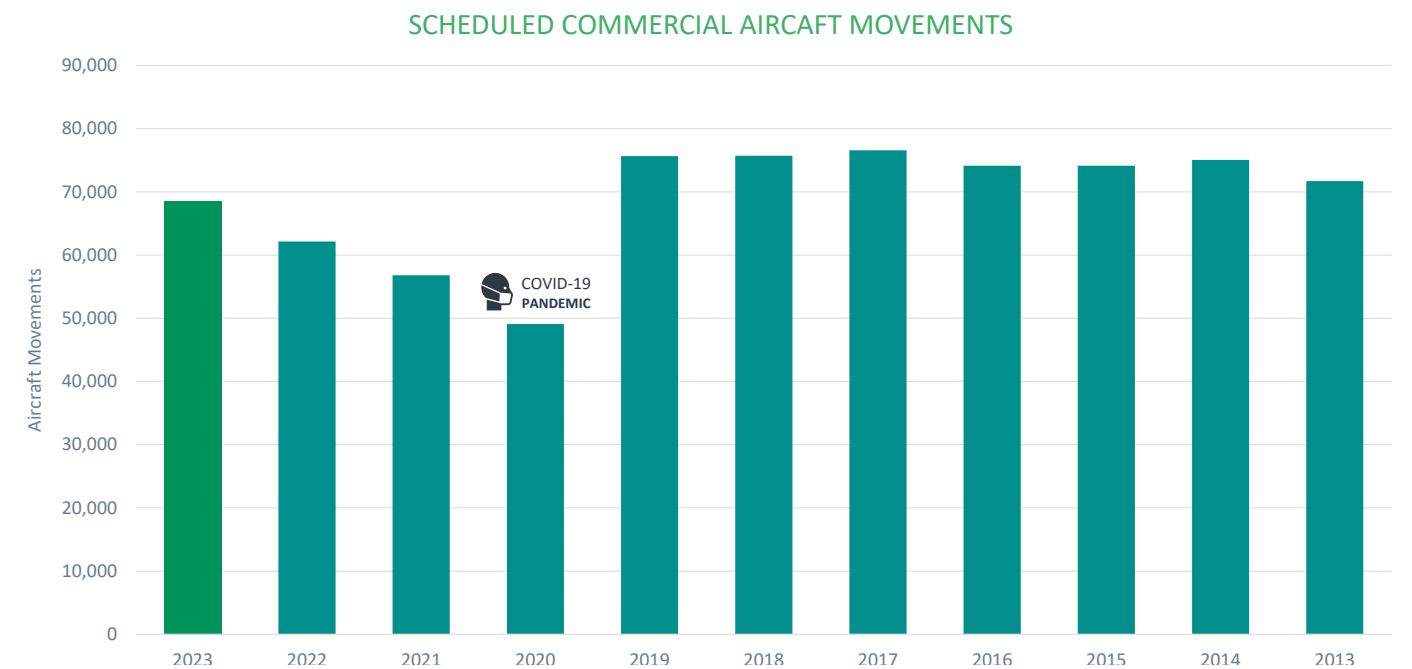


SUMMARY OF OPERATIONAL AIRCRAFT MOVEMENTS AND FLEET MIX

Prior to COVID-19, Christchurch Airport had between 80,000 and 110,000 aircraft movements annually. Aircraft movements include both arrivals and departures. Of these around 75,000 to 80,000 were scheduled commercial movements. Based on information provided by Airways, for the year 2023 there were;

- 68,521 scheduled commercial aircraft movements, and
- 90,890 total aircraft movements.

Scheduled commercial movements over the last 10 years are as shown below:



ON-AIRCRAFT ENGINE Testing

Under the District Plan CIAL is required to monitor and manage noise from on-aircraft engine testing within the 65 dB Ldn (7- day Ldn) and the 55dB Ldn (7 day Ldn) engine testing contours and the 75 dB LAFmax (22:00 to 7:00 only) at the edge of the residential zone³. The Engine Testing Management Software (ETMS) is used to calculate noise levels emitted from on-aircraft engine testing and calculate a 7-day rolling average.

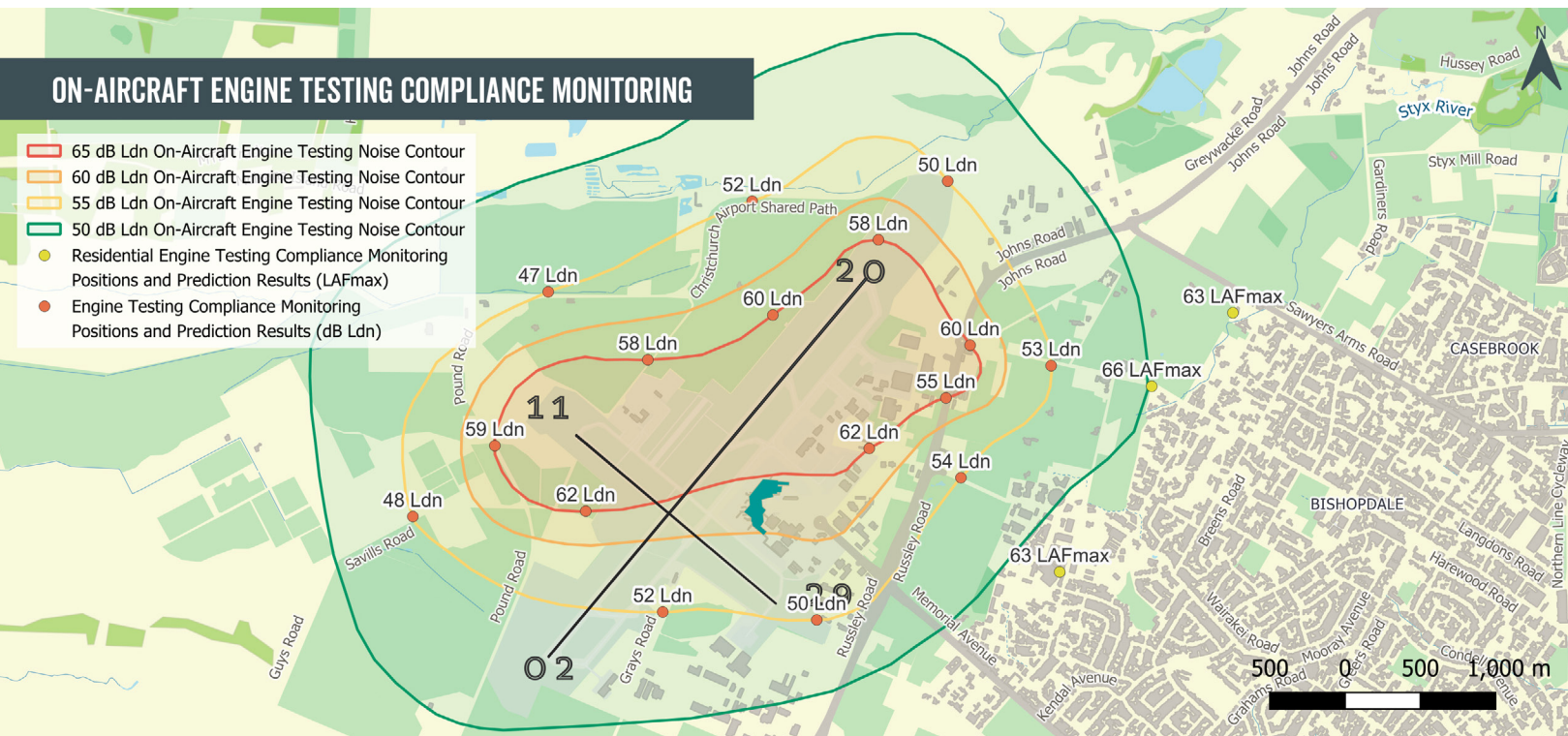
Additionally, the District Plan requires that the ETMS is reviewed every 5 years⁴ and the engine testing calculation is verified with Noise Monitoring Terminals every 2 years⁵. In 2023 both of these were required and the reviews demonstrated:

1. the ETMS is an appropriate tool to use for engine testing compliance analysis at Christchurch Airport with no changes being recommended, and
2. the calculated noise levels for 2023 generated from the ETMS are compliant and do not exceed the noise limit at each Engine Testing Compliance Monitoring Positions locations as verified with the Noise Monitoring Terminals.

(3) <https://districtplan.ccc.govt.nz/?t=doc&docId=GOTGBz9f31c%3D> rule 6.1.6.2.6a(i)

(4) in accordance with rule 6.11.14(a)(ii)(D)

(5) as specified in rule 6.1.6.2.6(a)(v)(B)



ACOUSTIC TREATMENT Programme

CIAL has developed an Acoustic Treatment Programme where dwellings existing as of 6 March 2017 within the Rural Urban Fringe and Rural Waimakariri zones become eligible for acoustic treatment. There are three circumstances when owners are to be offered the opportunity for acoustic treatment:

- Dwellings located within the 65 dB Ldn Annual Aircraft Noise Contour;
- Dwellings located within the 65 dB Ldn Engine Testing Contour; and
- Dwellings located within the 60 to 65 dB Ldn Engine Testing Contour (eligible for mechanical ventilation only).

WITHIN ENGINE TESTING CONTOUR

The Engine Testing Contour has been fixed by the District Plan and no new dwellings are allowed within the contour. Therefore, there is no change to the number of eligible dwellings inside these noise contours. For engine testing there are ten dwellings eligible for the installation of mechanical ventilation.

WITHIN THE AANC CONTOUR

The 2023 65dB Ldn AANC incorporates no additional dwellings from the previous year.

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GOT QUESTIONS OR CONCERNS
ABOUT AIRCRAFT NOISE?
GET IN TOUCH!

If you have any questions about this information booklet or wish to make a formal complaint about a specific aircraft noise event please contact us via the QR link below, [noise complaint feedback form](#) or contact us 24 hours a day on +64 3 353 7700.



2024 Noise
Monitoring
Brochure
coming soon!

This document has been prepared by Airbiz at CIALs request with reference to the following reports
 - 2023 Noise Monitoring Report
 - 2023 Noise Monitoring Report - AANC Calibration
 - 2023 Engine Testing Management Software Review
 These reports can be found at: <https://www.christchurchairport.co.nz/about-us/sustainability/noise/>

