

Public NOISE MONITORING

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.

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).

Meteorological conditions can change the way that noise is experienced.

NOISE MONITORING FOR VERIFICATION OF THE MODELLING SOFTWARE

Noise modelling is used to generate the AANC. Every three years modelling inputs are required to be verified using noise monitoring equipment. The noise monitoring equipment is located near runway ends and gathers real time aircraft noise data from actual aircraft events. The data is applied to the technical modelling for verification purposes.

For this AANC noise monitoring was required and monitors were installed between 14 October and 6 December 2022 at two monitoring sites close to the 65 dB Ldn Air Noise Compliance Contour at each end of the main runway. Both noise monitors were also placed under the recently introduced Divergent Missed Approach Procedures (DMAPs) 15/15 departure flight paths.

The measured Ldn noise levels attributed to aircraft at the two monitors shows that compliance was achieved at both locations.

	LOCATION	MEASUREMENT DATES	AVERAGE DAILY L _{DN} FOR TRIGGERED EVENTS
Noise monitor 1	Shipleys Road	14/10/22 – 6/12/22	63.1
Noise monitor 2	Pound Road	14/10/22 – 6/12/22	62.4

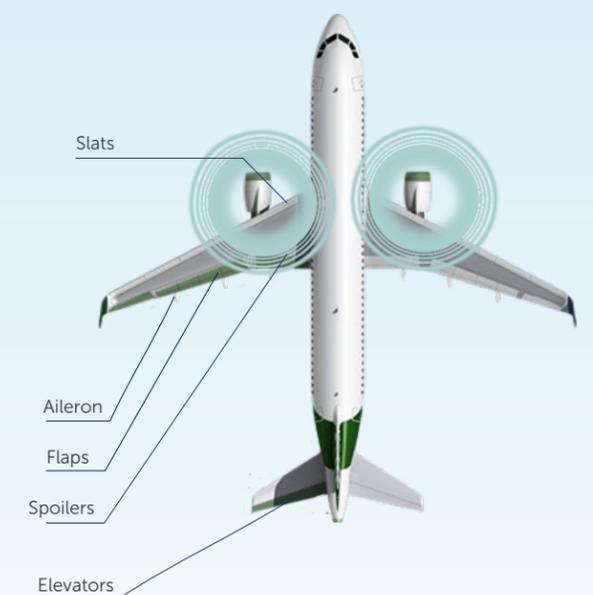
ENGINE NOISE
(Departure & Climb-Out)



AIRFRAME & ENGINE NOISE
(Arrivals & Final Approach)



AIRCRAFT CONTROL SURFACE NOISE
(Arrivals & Final Approach)



WHAT is...

THE OPERATIVE AIR NOISE CONTOUR?

In New Zealand, like other countries, town planning to account for aircraft noise exposure is based on contour maps which are created by noise modelling.

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 and mean one night-time flight is equivalent to 10 flights during the day. This night weighting accounts for people's increased sensitivity to noise at night.

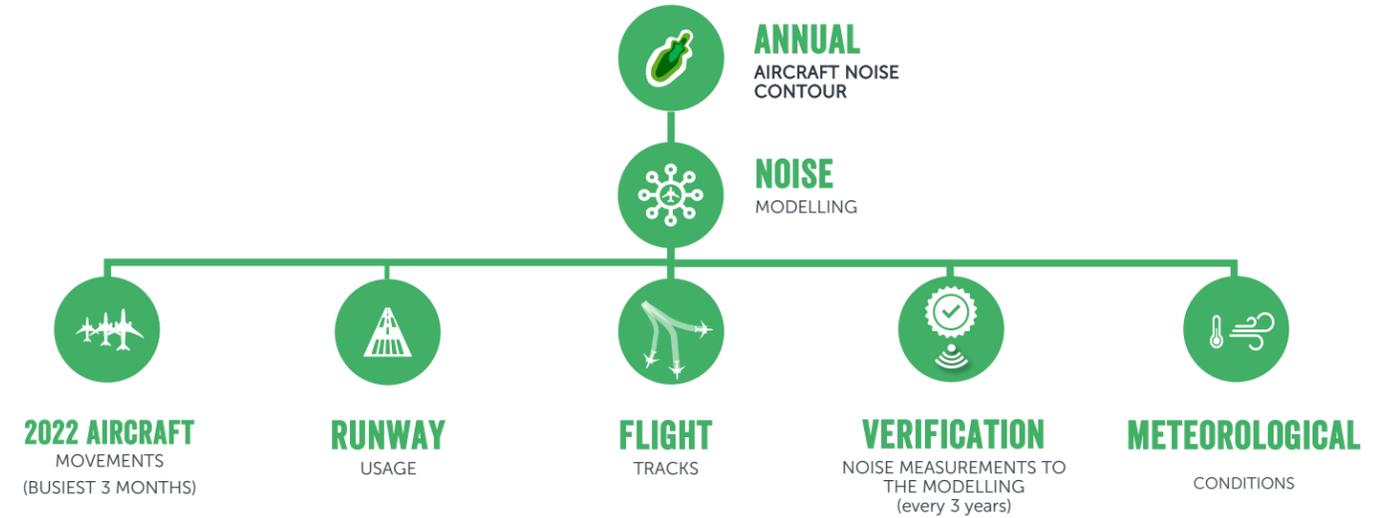
The Ldn takes into account both the amount of noise from each aircraft operation as well as the total number of operations flown throughout the day. This means a small number of relatively loud operations can result in the same Ldn as a large number of relatively quiet operations.

THE 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".

METHODOLOGY

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

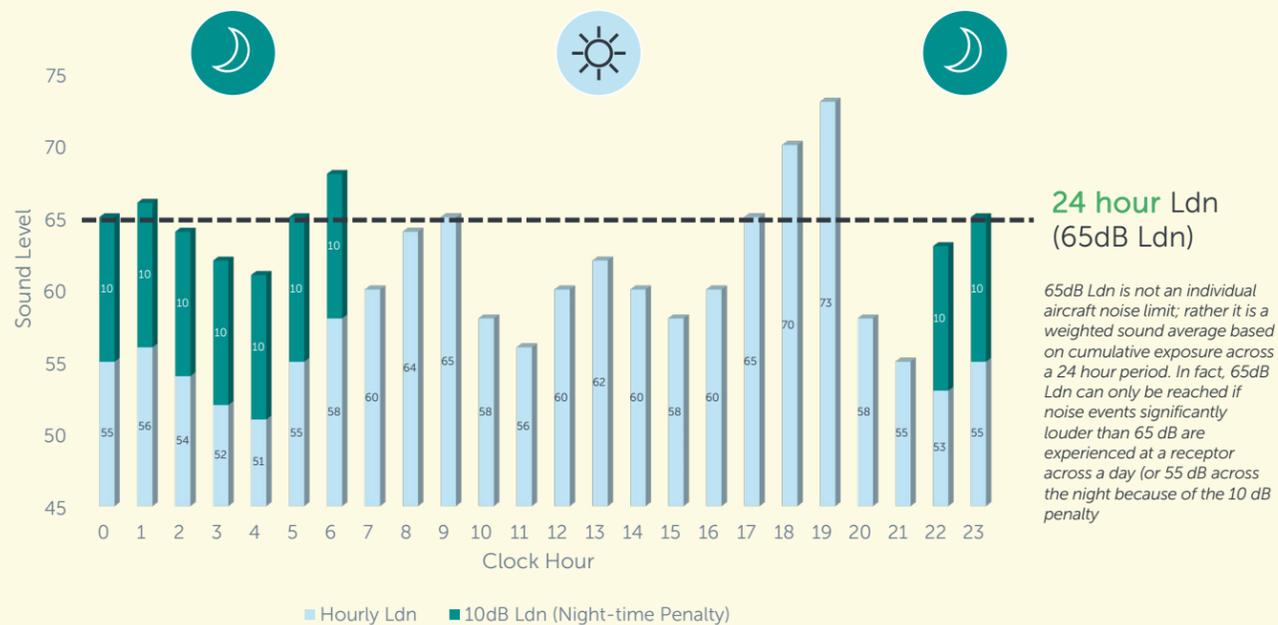
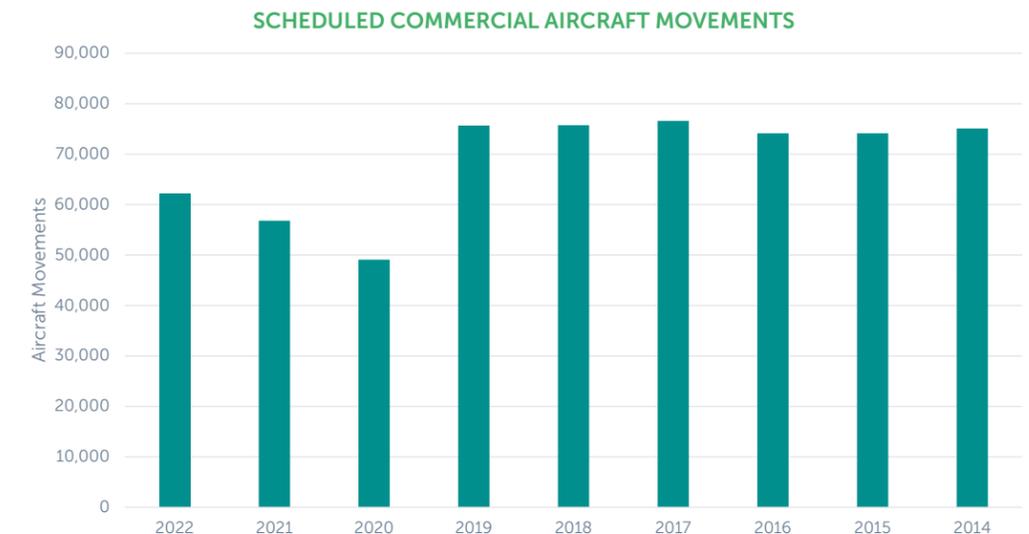


SUMMARY OF OPERATIONAL AIRCRAFT MOVEMENTS

Prior to COVID-19, Christchurch Airport has had a total number of aircraft movements of 80,000-110,000 per year. Of these around 75,000 to 80,000 were scheduled commercial movements. Based on information provided by Airways, for the year 2022 there were:

- 62,143 scheduled commercial aircraft movements, and
- 84,330 total aircraft movements.

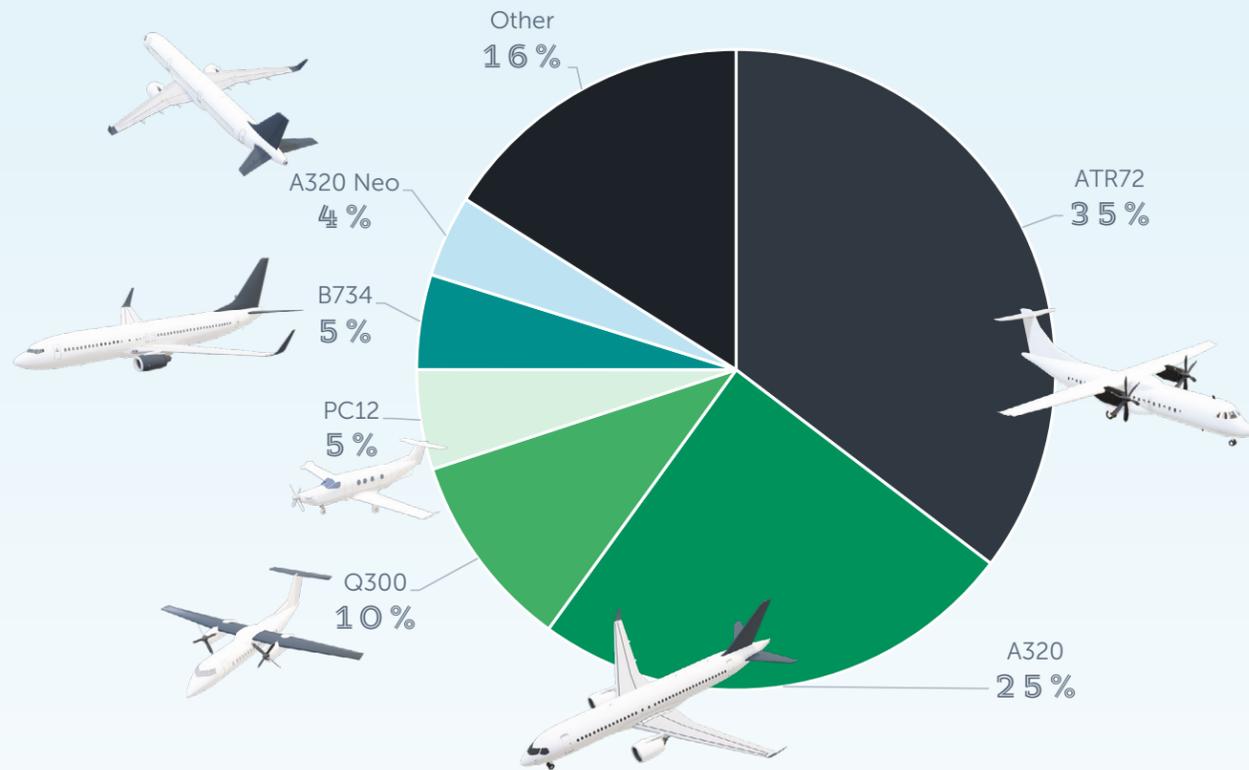
Scheduled commercial movements over the last 9 years are as shown below:



2022 FLEET MIX

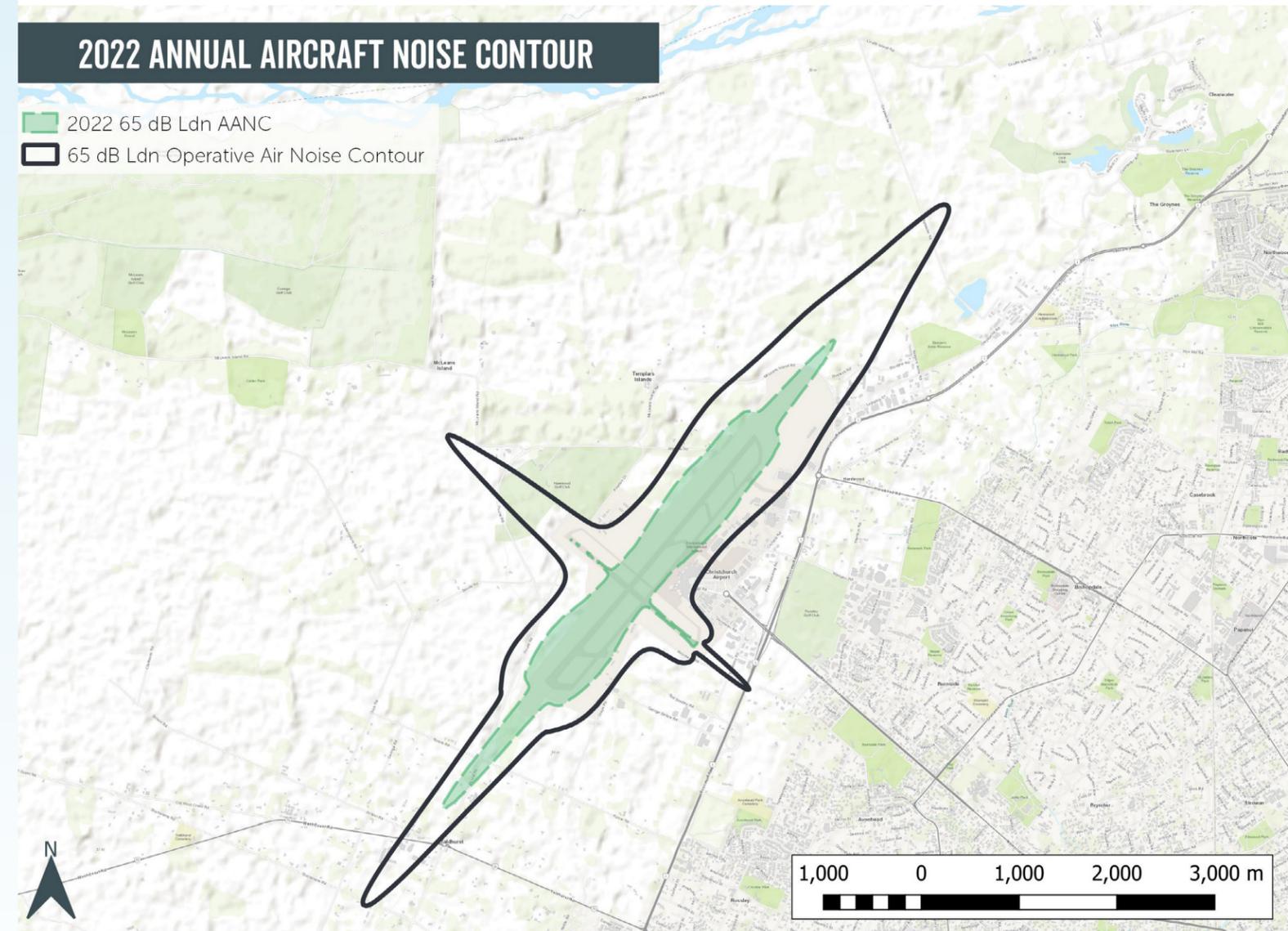
The overall makeup of the fleet of aircraft is considered when modelling noise contours because each type of aircraft has a different noise profile. The top aircraft types operating at Christchurch Airport based on information provided by Airways for the year 2022 are broken down in the **chart below**.

TOP AIRCRAFT



2022 ANNUAL AIRCRAFT NOISE *Contour* (AANC)

Overall, the calculated 2022 AANC demonstrates that aircraft operations comply with the 65 dB Ldn Operative Air Noise Contour. Towards the north-east of Runway 02/20, the 2022 AANC is 4 dB Ldn less than the Christchurch District Plan Operative Air Noise Contour. Towards the south-west of Runway 02/20 the 2022 AANC is 3 - 4 dB Ldn less than the Christchurch District Plan Operative Air Noise Contour. On the Runway 11/29 on centreline the 2022 AANC is 5 or more dB Ldn less than the Operative Air Noise Contour.

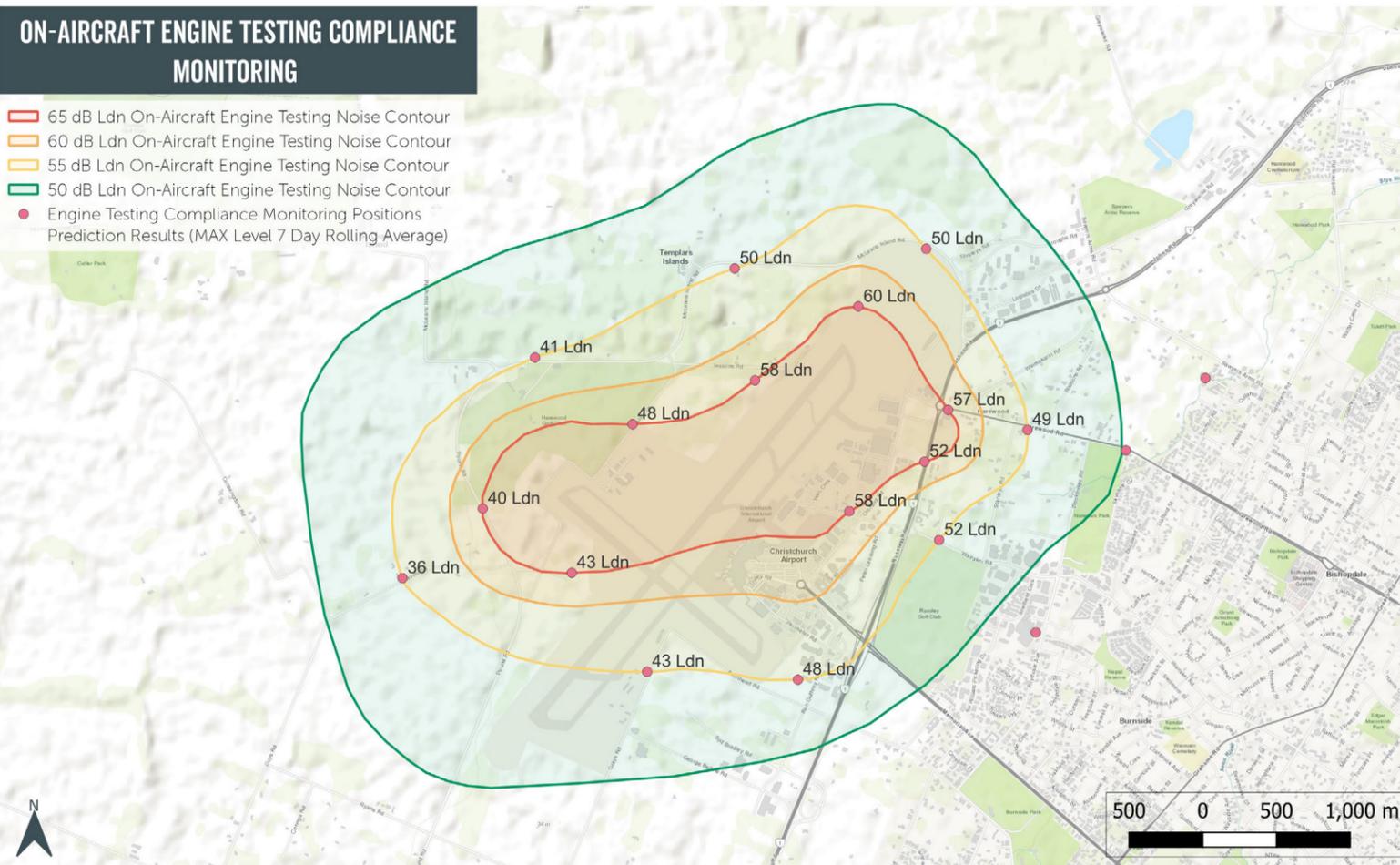


ON AIRCRAFT ENGINE Testing

The Engine Testing Management Software (ETMS) is used to calculate noise levels emitted from on aircraft engine testing and calculate the 7-day rolling average. CIAL have used the ETMS since 2010 and has a requirement to calculate the 7-day rolling average and additionally the engine testing calculations "shall be verified by measurements undertaken with reference to at least four Engine testing compliance monitoring position (ETCMPs) for a sample of at least two different on-aircraft engine test configurations" at least once every two years.

The last engine testing measurements were conducted in 2021, so there was no requirement to repeat the measurements in 2022.

Calculated noise levels for 2022 generated from the Engine Testing Management Software are compliant and do not exceed the noise limit at the ETCMP locations.



ACOUSTIC TREATMENT Programme

CIAL has developed an Acoustic Treatment Programme whereby dwellings existing as of 6 March 2017 within 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 (mechanical ventilation only).

ENGINE TESTING

The Engine Testing Contour has been fixed by the District Plan. 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.

AANC CONTOUR

The 2022 AANC incorporates no additional dwellings compared with the 2020 and 2021 AANC. This is because both the 2022 and 2021 AANC are smaller than the 2020 AANC. Therefore, no additional acoustic treatment is required this year.

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WHAT TO DO IF I EXPERIENCE AIRCRAFT NOISE”

If your enquiry is in relation to a specific aircraft noise event, or you wish to make a formal complaint, please contact Christchurch Airport.

Christchurch Airport manages complaints and enquiries about aircraft noise and a link to their service can be found here [noise complaint feedback form](#) or contact us 24 hours a day on +64 3 353 7700.

This document has been prepared by Airbiz at CIALs request and uses material prepared by Marshall Day Acoustics from the 2022 Noise Monitoring Report which can be found at <https://www.christchurchairport.co.nz/about-us/sustainability/noise/>

