Fact SHEET 4

OUTCOME OF THE PEER REVIEW PROCESS – UPDATES TO THE 2021 DRAFT UPDATED NOISE CONTOURS

AIRBIZ AIRWAYS making your world possible MARSHALL DAY Acoustics chapman tripp CHRISTCHURCH AIRPORT

INTRODUCTION

As outlined in *Fact Sheet 3: Overview of the air noise contour remodelling and peer review process,* CIAL's experts prepared the *2021 Draft Updated Noise Contours* which were then peer reviewed by an Independent Expert Panel appointed by Environment Canterbury. The peer review process has concluded and 2023 Updated Noise Contours are presented in this report. The peer review process resulted in refinements to some of the assumptions and modelling inputs previously used to produce the 2021 Draft Noise Updated Contours. Adjustments made following the peer review process mean the shape and size of the 2023 Updated Noise Contours are different, but ensure that the 2023 Updated Noise Contours are based on the most appropriate technical evidence at this time. The main drivers of change are explained below.

MAIN DRIVERS OF CHANGE

DEPARTURE FLIGHT TRACKS:

The departure flight tracks used for modelling the 2021 Draft Updated Noise Contours were assumed to match the then-current published departure procedures, as advised by Airways. Published procedures are documented on the Aeronautical Information Publication (AIP) New Zealand and are used by pilots for navigation purposes.

During the peer review process, the Airways radar data for Christchurch Airport was revisited. It was observed that while, on departure, some aircraft maintain the published procedure, most aircraft initially followed these procedures and then leave the defined flight tracks at various points.

Airways advised that this is common practice at Christchurch Airport and could be expected to continue in the future. Airways also advised that, in the future, it may progressively design and publish a range of new departure procedure tracks which may more closely align with the common flight paths actually flown. It was important to take this information into account, as the air noise contour remodelling process also determines the parameters of noise compliance at Christchurch Airport.

In light of that analysis and Airways' updated advice, the 2023 Updated Noise Contours are based on selected published departure procedures (where analysis of radar data showed there is a sufficient volume of flights that follow these) and also radar data for Christchurch Airport to define a range of other commonly used alternative flight paths. Based on Airways' updated advice this represents the best available view of current and likely future flight paths and:

- Is representative of where aircraft are likely to fly when or if new departure procedure tracks are published in the future;
- Includes a selection of movements based on current published departure procedure tracks; and
- Excludes those parts of the published departure procedure tracks which are not currently followed for the full length nor are they expected to be in the future.

This change in approach required a detailed analysis by Airbiz of initially one month and later 12 months of radar data obtained from Airways to update the departure flight tracks Airways then reviewed the revised departure tracks for the noise model.

The Independent Expert Panel also reviewed and provided feedback on the revised departure tracks and further refinements were made. This required a great deal of detailed revision to ensure the flight track assumptions were robust and were reflected appropriately in the modelling.

Why don't aircraft always follow published departure procedures for their full length?

Aircraft flying from one airport to another go through three general phases of flight:

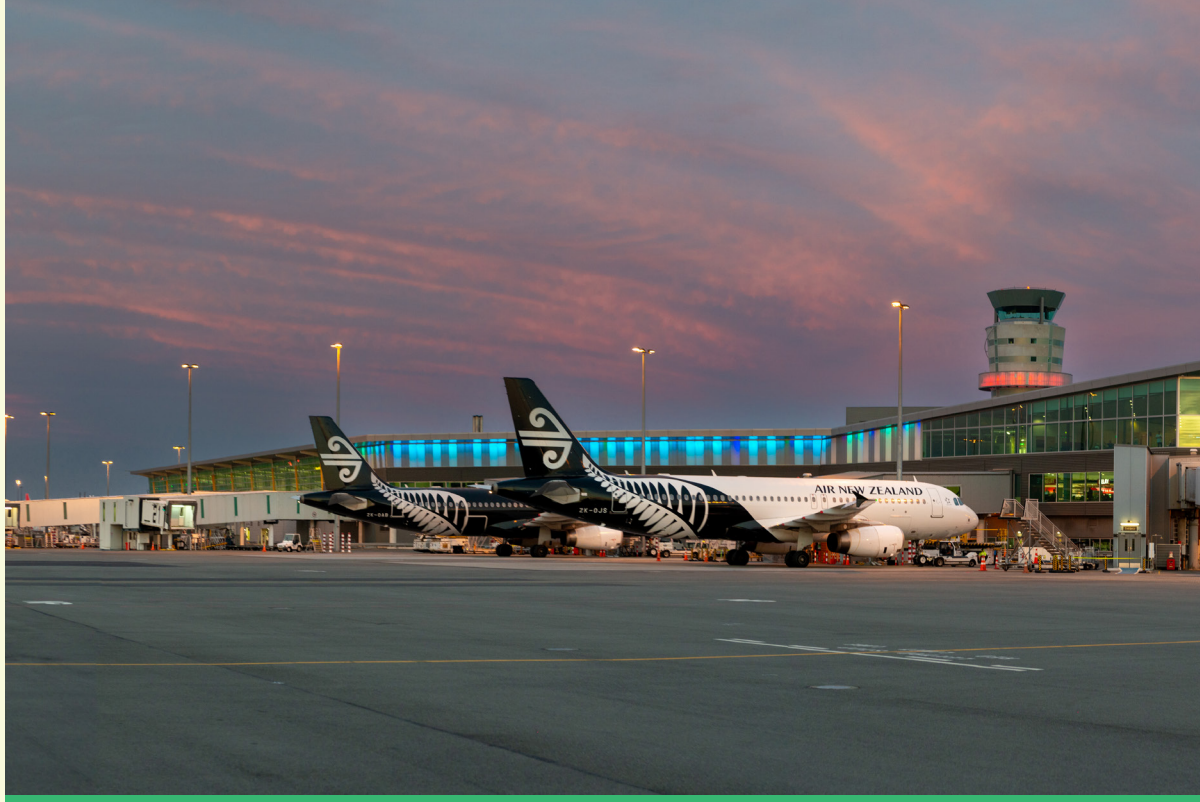
- A 'departure' phase - where the aircraft departs the runway and then navigates the airspace around an airport using a specific departure procedure. For the majority of jet and turbo-prop aircraft that depart Christchurch Airport these departure procedures are identified as Standard Instrument Departures (SIDs).
- An 'enroute' phase - where aircraft proceed towards a destination either via a published air route or, if no published route exists, via a flight planned route.
- An 'arrival' phase – where the aircraft enter the arrival route structure of the destination airport and join a specific arrival procedure to land on the nominated runway. An arrival phase is considered to start from where the aircraft leaves its cruising altitude. For the majority of jet and turbo-prop aircraft that use Christchurch Airport these published arrival procedures are called a Standard Terminal Arrival Route.

It is important for safety and runway capacity reasons that aircraft in the airport's airspace operate in a safe, orderly and predictable way so air traffic control can direct them to proceed towards a runway for landing in a safe and efficient manner. In the arrival phase, examination of Airways radar data demonstrates that aircraft do typically follow published arrival procedures as they get closer to Christchurch Airport and land on the nominated runway.

In the departure phase, analysis of Airways departure radar data showed that aircraft take-off from the runway using published procedures but that they often diverge from the published procedure. Diverging from a defined SID (track, altitude or speed) may be at pilot request to air traffic control or initiated by air traffic control for reasons such as route efficiency, weather avoidance, better noise or emissions outcomes and tactical separation with other aircraft. Aircraft will eventually either re-join the published procedure or will connect with the enroute network at a later waypoint.

This practice is typically referred to as a "cancellation of a Standard Instrument Departure" or "cancelled SID". Airways has confirmed this as common practice at Christchurch Airport, and also at busy airports throughout the world, and can be expected to continue to occur.

Based on these refinements, the 2023 Updated Noise Contours reflect the updated departure flight tracks.



FLEET MIX:

During the peer review process, it was identified that in the medium to long term some regional routes e.g. Christchurch-Hamilton would be expected to have narrow-body jet aircraft (e.g. A320Neo) flying on them rather than smaller turbo-prop aircraft (e.g. ATR-72). As a result, the predicted future aircraft fleet mix for several regional routes was updated to introduce jet aircraft where there are currently only turbo-prop aircraft flying.

This type of aircraft fleet change is driven by the airlines as they seek to align passenger demand with aircraft capacity i.e. where the regular passenger demand on a route increases to a point where it is better met by using a larger capacity aircraft. This fleet change can occur for the busiest times of the day, on certain days of the week, seasonally or at all times when passenger demand on a particular route reaches a sufficient threshold.

Future fleet mix assumptions for regional routes where annual passenger demand was forecast to grow high enough, such as Christchurch-Dunedin, were updated to include a portion of jets in place of turbo-props. For other regional routes, such as Christchurch-Marlborough, the turbo-prop assumption was retained in full.

This resulted in a higher proportion of regional jet movements and a lower proportion of turbo-prop movements overall.

OTHER DRIVERS OF CHANGE

Several other updates occurred during the review process, although these had less impact on the size and shape of the 2023 Updated Noise Contours compared to Flight Track and Fleet Mix changes outlined above.

MODELLING SOFTWARE:

The INM was used to prepare all inputs (runway geometry, flight tracks, schedule of operations etc) for the 2021 Draft Updated Noise Contours. These were then imported into the most recent software, the AEDT, to produce the 2021 Draft Updated Noise Contours.

To reflect current best practice and to include current aircraft types available in AEDT and not INM, a new 2023 AEDT model was developed from the 'ground-up'. This new model also included the revised track data.

ULTIMATE CAPACITY:

The Existing Noise Contours and the 2023 Updated Noise Contours for Christchurch Airport are based upon what the projected aircraft noise exposure in the vicinity of Christchurch Airport operating at its ultimate runway capacity.

Globally, there are a range of definitions of ultimate capacity and approaches to calculating ultimate capacity. Through the peer review process CIAL's experts gained acceptance of the adopted methodologies from the Independent Expert Panel.

In consultation with Airways, the ultimate runway capacity has been assessed based on a reasonable understanding of current and future airspace and airfield operations, and air traffic management procedures. Reasonably expected improvements to these that could increase the future ultimate capacity of the airfield have also been applied, as agreed with Airways.

During the peer review the Independent Expert Panel noted that there are other potential improvements that might increase runway capacity further. However, it was ultimately agreed that those potential enhancements should not be applied as there is no firm evidence base for alternative assumptions. The 2023 Updated Noise Contours use the best available local information and projections at this time, including the assessment of when the runway approaches ultimate practical capacity. This ensures the appropriate balance between safeguarding Christchurch Airport, an irreplaceable and vital national and regional transport connectivity infrastructure asset, and unreasonable levels of land use restrictions.

This approach was discussed and agreed between CIAL's experts and the Independent Expert Panel.