Australian Government
Department of Infrastructure, Transport, Regional Development, Communications and the Arts

October 2023

Western Sydney International (Nancy-Bird Walton) Airport

Noise assessment

The new Western Sydney International (Nancy-Bird Walton) Airport (WSI) is set to open for domestic and international travellers, and freight by late 2026.

The draft Environmental Impact Statement (EIS) for the preliminary flight paths for WSI is now on public exhibition. The draft EIS examines the impact of the proposed flight paths on the environment and the community. The public is invited to make submissions on the draft EIS by visiting wsiflightpaths.gov.au/make-a-submission.

This brochure explains how noise assessments are undertaken and how to interpret the information in the Aircraft Overflight Noise Tool.

View the preliminary flight paths

Designing flight paths is highly technical work. The work involves thorough validation and review to ensure aircraft can use the flight paths. The design has to balance the needs of the community, environment, industry and users of the Greater Sydney airspace, while maintaining safety as the priority.

You can view the preliminary flight paths and the predicted impacts on the Aircraft Overflight Noise Tool, via **wsiflightpaths.gov.au**. We understand you may have a wide range of questions about the preliminary flight paths. To answer your questions, we will be available to speak with you at our Community Information and Feedback Sessions. You can also email us your questions or call us on the number below.

Have your say

You can have your say on the preliminary flight paths and draft EIS by making a submission.

Submissions can be provided:

- Online at **wsiflightpaths.gov.au**
- By email to eis.submissions@infrastructure.gov.au
- By mail to Attn: WSI Flight Paths Team, GPO Box 594, CANBERRA ACT 2601

Find out more

Visit the **Aircraft Overflight Noise Tool** to view the preliminary flight paths in more detail at **wsiflightpaths.gov.au**

View the draft EIS and project information on our **Online Community Portal: wsiflightpaths.gov.au**

Email us your questions at **wsiflightpaths@infrastructure.gov.au**

Call us on **1800 038 160**

Attend our Community Information and Feedback Sessions to find out more and speak to a member of our team

You can register to attend via **wsiflightpaths.gov.au/visit-us**

Scan this QR code to access our Online Community Portal.

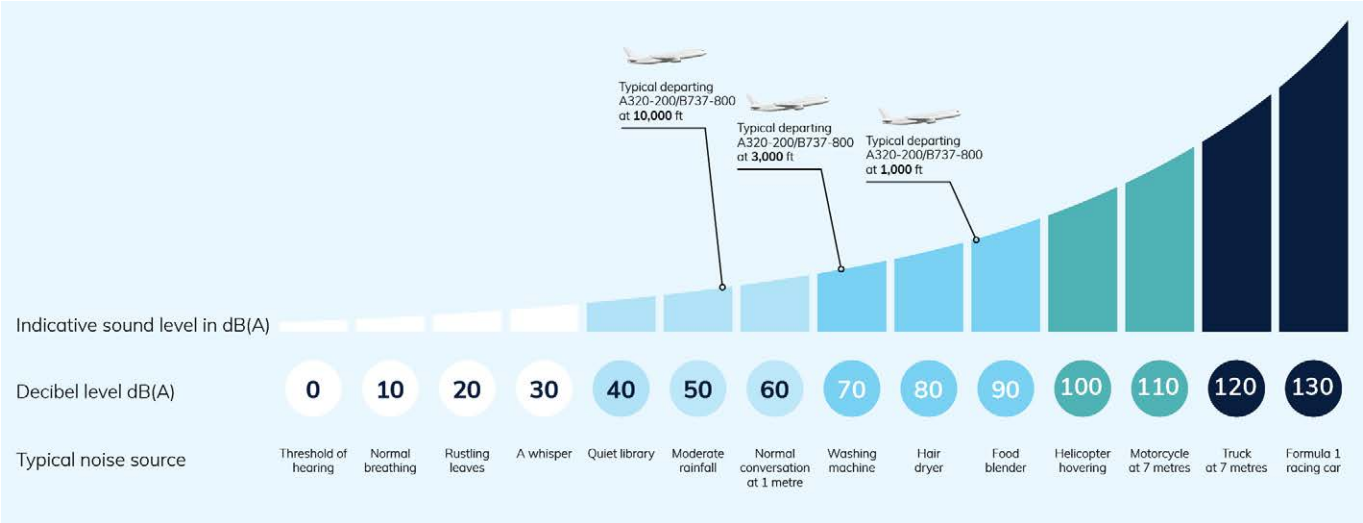
How is sound measured?

Sound is measured using a unit called decibels (dB). Decibels are used to describe the loudness or intensity of sound. The louder the sound, the higher the number of decibels.

To understand dB, it helps to have a comparison point. The quietest sound that the average human can hear, which is called the threshold of hearing, is assigned a value of 0 decibels (0 dB).

Every increase of 10 dB represents a doubling in perceived loudness.

The sound level of typical daytime activities can vary between 50 dB (the sound of a quiet office or rainfall) and 90 dB (food processor or motorcycle). To understand how noise is measured in decibels, see the noise scale below.



What is aircraft noise?

The level of noise heard from an aircraft during take-off, landing and flight varies. Aircraft noise is affected by a number of different factors, including:

The weather

Noise varies significantly depending on the wind speed and direction, the season, and cloud cover. For example, temperature and humidity affect an aircraft's ability to gain height; wind direction affects the direction a plane will fly because aircraft land and take off into the wind; and cloud cover and temperature inversions (a layer of warmer air in the atmosphere) will refract sound waves, making aircraft noise seem louder.

The height of an aircraft

The higher an aircraft is, the less noise is generally heard on the ground.

Changes in engine thrust

The thrust used affects the amount of wind resistance and noise experienced.

Type of aircraft

Different planes produce different noise levels dependent on their size, engine types and design characteristics.

The shape of the land

Sound from aircraft bounces off valleys and mountains and affects the noise experienced.

How is aircraft noise modelled and assessed?

Noise modelling and assessment for the preliminary WSI flight paths has been undertaken in accordance with the EIS Guidelines issued under the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth) (the EPBC Act), and with regard to Airservices Australia's Environmental Management of Changes to Aircraft Operations National Operating Standard.

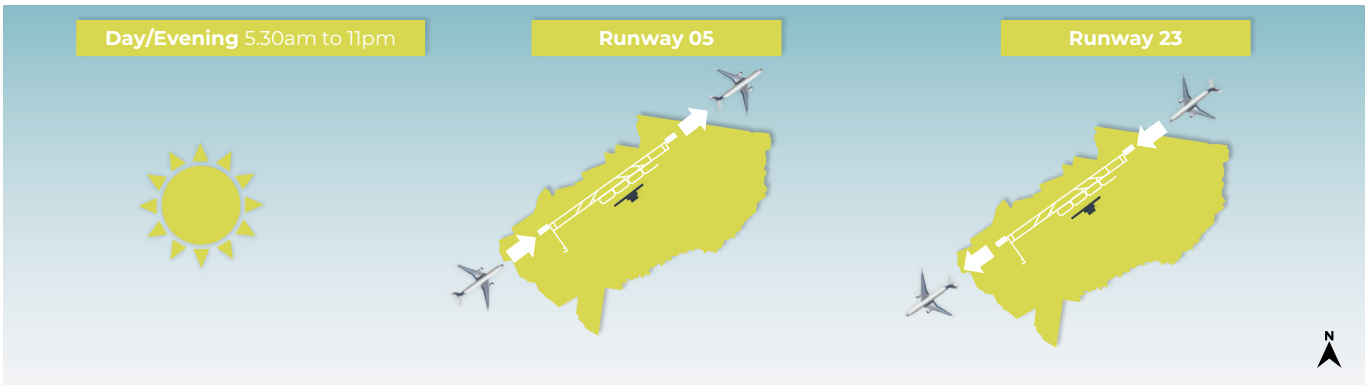
Aircraft noise modelling for the WSI preliminary flight paths uses specialised technical software – the Aviation Environmental Design Tool (AEDT). The AEDT is an internationally-recognised aircraft noise and emissions calculation program developed by the United States Federal Aviation Administration.

Modelling of aircraft noise is based on the best available historical information and modelling technology available at the time. The noise metrics modelled for the WSI preliminary flight paths represent a forecast and do not represent guaranteed noise levels.

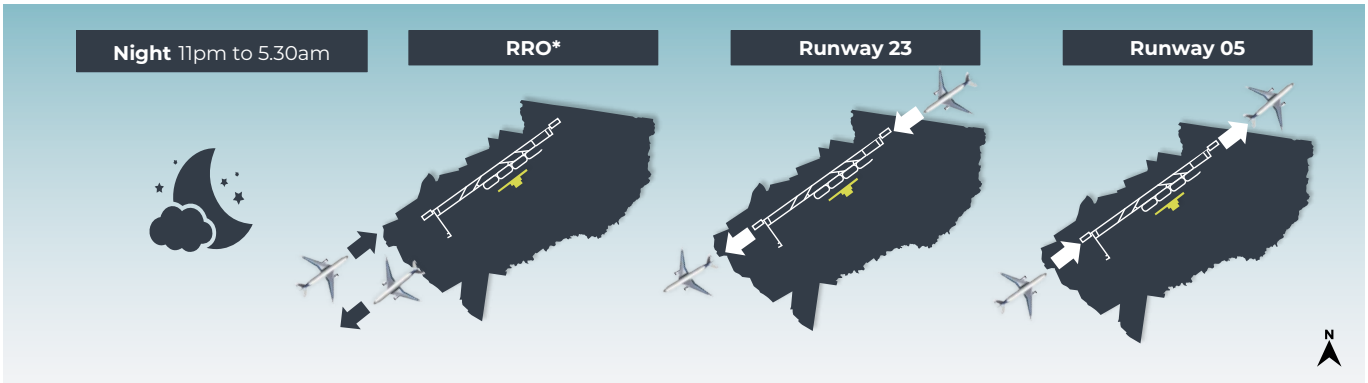
The noise modelling process involves entering defined assumptions and inputs into the AEDT, which then generates noise modelling results and noise contour charts. The main assumptions and inputs used are:

- **Runway modes of operation**: This refers to the ways that the runway can be used. For WSI, there are 5 modes: Runway 05 and Runway 23 during day/evening operations; Runway 05 and Runway 23 at night; and reciprocal runway operations (RRO) at night. Please refer to the **Flight Paths brochure**, available at **wsiflightpaths.gov.au/resources**, for more information about the runway modes of operation.

WSI Day/Evening (5.30am to 11pm) runway modes of operation



WSI Night (11pm to 5.30am) runway modes of operation



**RRO is suitable only at night (11pm to 5.30am) when air traffic demand levels and weather conditions permit.*

In the online Aircraft Overflight Noise Tool, select the different runway modes to show flight paths relevant to each mode.

- **Runway operating scenarios**: Different scenarios for using the runway are modelled to demonstrate how much flexibility there is in the proposed flight paths.

  Prevailing weather conditions, such as crosswinds or tailwinds, dictate which runway(s) are selected for use by air traffic control. These conditions are used to estimate how often a runway direction could be used and to model the associated noise impacts.

  Up to certain operational limits, air traffic control could give preference to a particular runway direction, e.g. by landing with a small tailwind instead of relying on the prevailing weather to dictate the runway direction. These scenarios are also used to model noise impacts and estimate how often a particular runway direction could be used.

  Runway preferences are applied to allow pilots to plan operationally for departure or arrival from an aerodrome. It also allows air traffic control to effectively sequence arriving and departing aircraft into and out of an aerodrome.

In the online Aircraft Overflight Noise Tool, you can change the preferred runway direction to show noise results for each operating scenario.

- **Air traffic forecasts**: Flights to and from WSI are expected to increase over time after it opens by late 2026, and forecasts have been developed to predict this future demand. The increased air traffic influences how flight paths are designed, and also impacts noise modelling by increasing the expected frequency of flights at certain locations. Modelled noise forecasts for the following key reference years are available in the Aircraft Overflight Noise Tool to show the effects of growth in air traffic over the first 30 years of operations at WSI:
  - **2033** – 7 years after opening, when passenger numbers at WSI reach the planned design capacity for the initial Stage 1 terminal development of 10 million passengers per year.
  - **2040** – representing continued growth at WSI, at a point when the airport reaches 15 million passengers per year.
  - **2055** – representing the point when single runway at WSI is expected to reach capacity at around 37 million passengers per year.

  Modelled impacts for all reference years are set out in the draft Environmental Impact Statement that is now on public exhibition.

In the online Aircraft Overflight Noise Tool, change the year to show how increasing air traffic affects the noise modelling results between 2033, 2040 and 2055.

- **Aircraft fleet mix**: This refers to the types of aircraft that are forecast to operate at WSI. Different aircraft produce different levels of noise, with newer generations of aircraft producing less noise than older aircraft.

In the online Aircraft Overflight Noise Tool, single event noise contours can be selected for 3 common aircraft types – a narrow body jet (domestic jet), a wide body jet (international jet) and a smaller turbo-prop aircraft.

- **Flight paths**: Different sets of arrival and departure flight paths are designed for daytime and night-time use. This means that there will be changes in the distribution of aircraft, and resulting aircraft noise, between arrival and departure flight paths during the day/evening and night.

In the online Aircraft Overflight Noise Tool, change between day-evening mode and overnight mode to see the different flight paths.

- **Noise sensitive receivers**: Projected sound levels from WSI aircraft operations are calculated from the AEDT noise model for specific noise sensitive locations, such as schools, hospitals, aged care centres and recreation areas (referred to as noise sensitive receivers). In addition, noise monitoring terminals have been installed to measure existing ambient noise levels at locations across Western Sydney, which are also included in noise projections.

Full details of noise monitoring locations and sensitive receivers are available in the draft EIS for the flight paths.

- **Terrain data:** The height of the ground relative to aircraft altitude affects the aircraft noise received on the ground. The effects of higher and lower terrain are taken into account in modelling the noise contours.

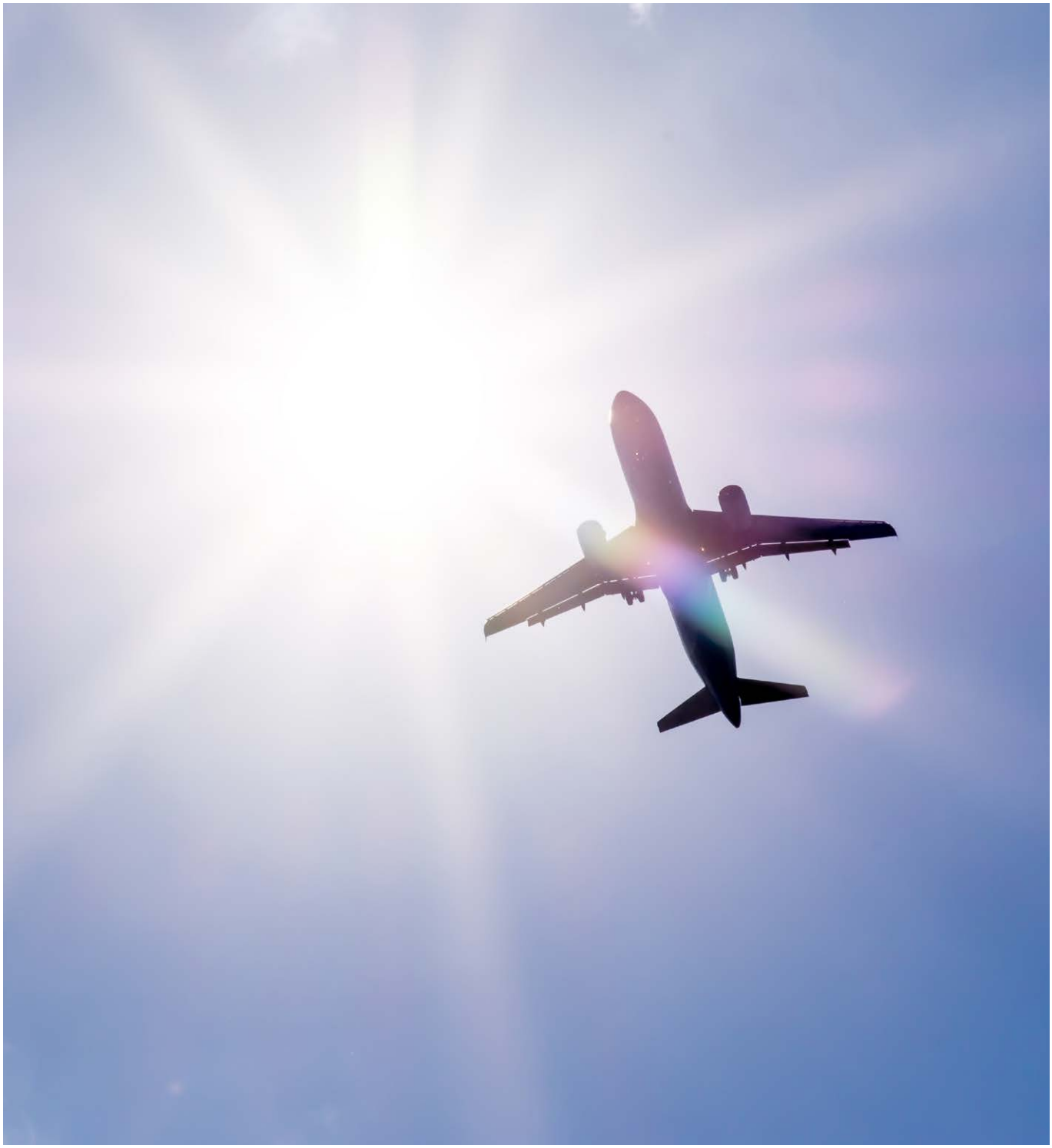
Noise metrics modelled

The **Aircraft Overflight Noise Tool**, which can be accessed via **wsiflightpaths.gov.au**, shows different noise metrics and contours to describe aircraft noise forecasts from the noise modelling.

Each noise metric tells a different part of the aircraft noise story. To gain a full understanding of the level, intensity and frequency of aircraft noise forecast at different locations you should refer to all of the noise metric charts presented.

The Aircraft Overflight Noise Tool shows cumulative noise contours and single event noise contours.

- **Cumulative noise contours** provide an assessment associated with the sustained exposure to aircraft noise, and relate to either the number of events above a noise level threshold (N-above) or Australian Noise Exposure Concept (ANEC).
- **Single event noise contours** provide information about the maximum sound level likely to be experienced by receptors at ground level from a specific aircraft along a flight path. The Aircraft Overflight Noise Tool provides single event noise contours for a selection of representative aircraft types.



ANEC (Australian Noise Exposure Concept)

An ANEC is a cumulative noise measure which:

- illustrates aircraft noise exposure based on operating scenarios
- shows expected exposure levels from an average day's anticipated aircraft movements, calculated over a 12-month period.

An ANEC was first developed as part of the original 1985 proposal for an airport on the Badgerys Creek site. An updated ANEC for WSI was generated for the 2016 WSI Stage 1 Development EIS, based on the runway direction and indicative 'proof of concept' flight paths presented in that EIS. ANEC charts have been used to guide land planning around the Badgerys Creek site for decades and have been incorporated into State and Local Government land planning guidelines.

It is important to note that the units of measurement on the ANEC chart are not decibel measurements. Experience at existing airports in Australia has shown that, while the ANEC noise contours can provide a general indication of aircraft noise impacts and are useful for land use planning purposes near airports, they are not necessarily an indicator of individual experience of aircraft noise. To better understand the day-to-day impacts of aircraft noise, please refer to the N-above and LAmax noise metrics on the following pages.

Use the ANEC contours to:

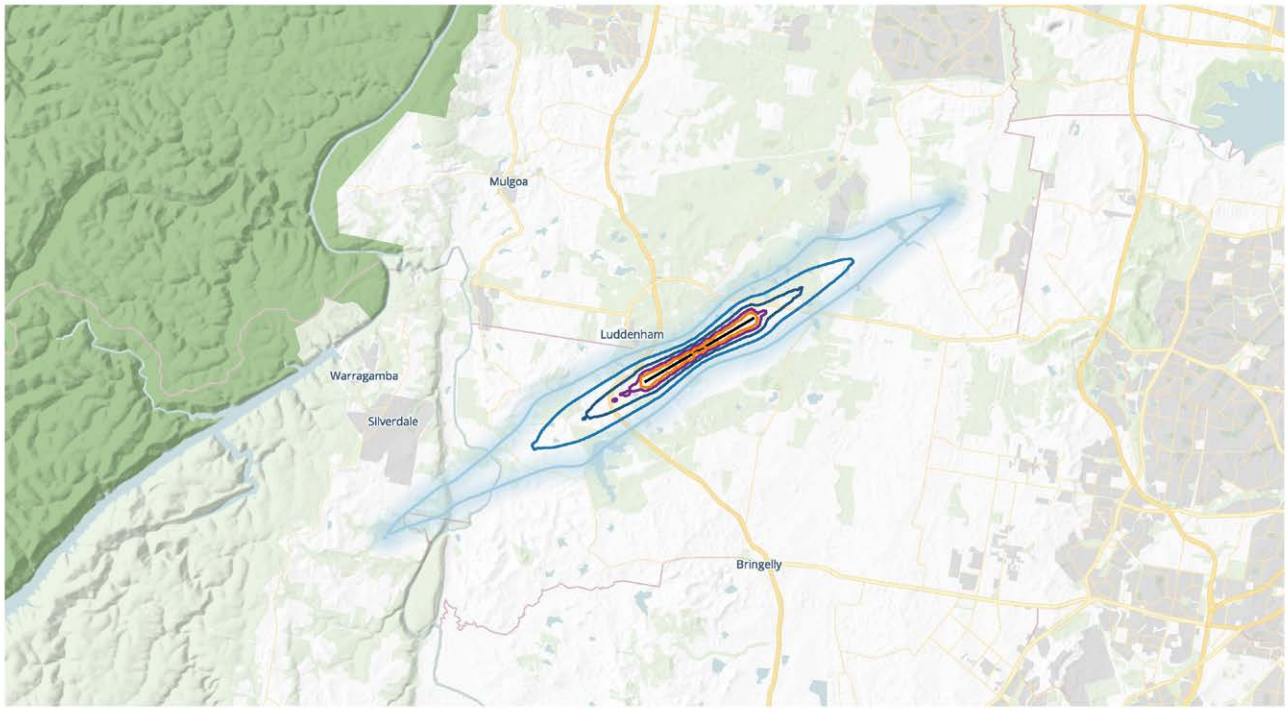
- understand those areas that will be most exposed to aircraft noise.
- understand the modelled noise contours that are used by State and Local Government to guide land use planning decisions.

Be aware that the ANEC contours:

- do not measure noise exposure in decibels and do not give a direct indication of aircraft noise experienced.
- do not give an indication of the number of aircraft overflights.

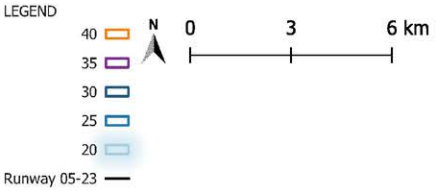
The online Aircraft Overflight Noise Tool shows ANEC contours for the 2033, 2040 and 2055 reference years and for each of the 3 runway operating scenarios.

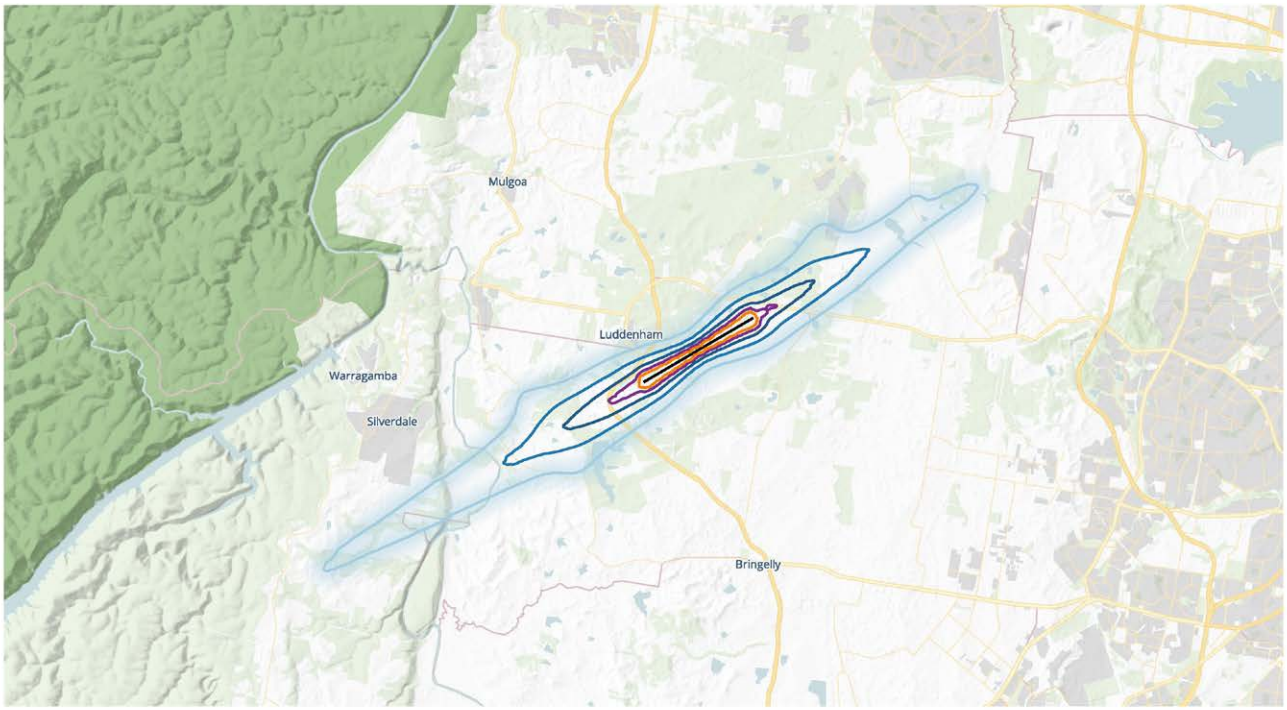
The following images show the composite ANEC for all 3 operating scenarios for the reference years 2033, 2040 and 2055. The number thresholds for the movements that are defined as significant and shown in the legends come from the Airservices Australia National Operating Standard for Environmental Management of Changes to Aircraft Operations.



Reference year 2033
ANEC

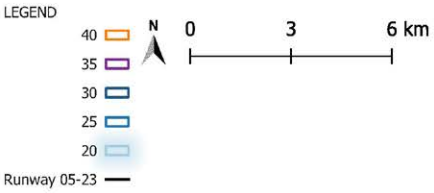
Composite runway operating scenarios

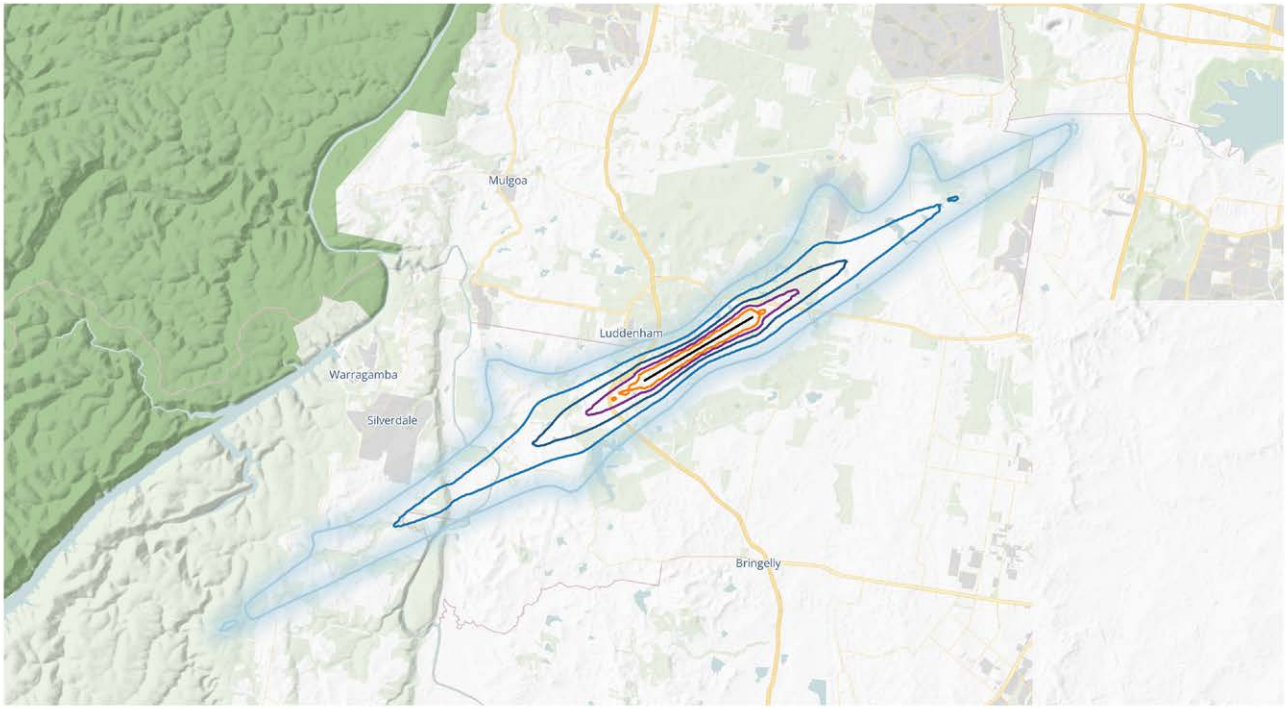




Reference year 2040
ANEC

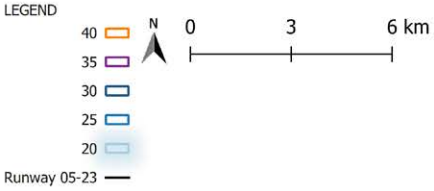
Composite runway operating scenarios





Reference year 2055
ANEC

Composite runway operating scenarios



Number above ('N-above') contours – N70 and N60

The 'N' measure is based on the intensity and number of individual aircraft noise events experienced on an average day (over a 24-hour period), and is intended to convey information in a way that communities may understand better than ANEC charts. This measure is presented in decibels and indicates how many aircraft noise events are forecast to exceed a particular decibel level each day. For example, the N60 or N70 measures show the number of events at or above 60 or 70 decibels that would be experienced on an average day.

N70 is a typical level that is used for modelling aircraft noise during the day. It's chosen because outdoor sound levels of 70 decibels can lead to indoor sound levels around 60 decibels, enough to disturb a normal conversation. N60 is more useful during night – it reflects an indoor noise level of 50 decibels with windows open. 50 decibels is comparable to moderate rainfall.

It is important to note that the N contour estimates how many aircraft events will exceed the relevant noise level. For example, a location in the N70 contour, forecast to receive 10-19 aircraft overflights events in a day, could receive 19 aircraft overflights well in excess of 70 decibels. It may also receive any number of aircraft overflights that are less than 70 decibels, or receive less than 10 aircraft overflights that exceed 70 decibels.

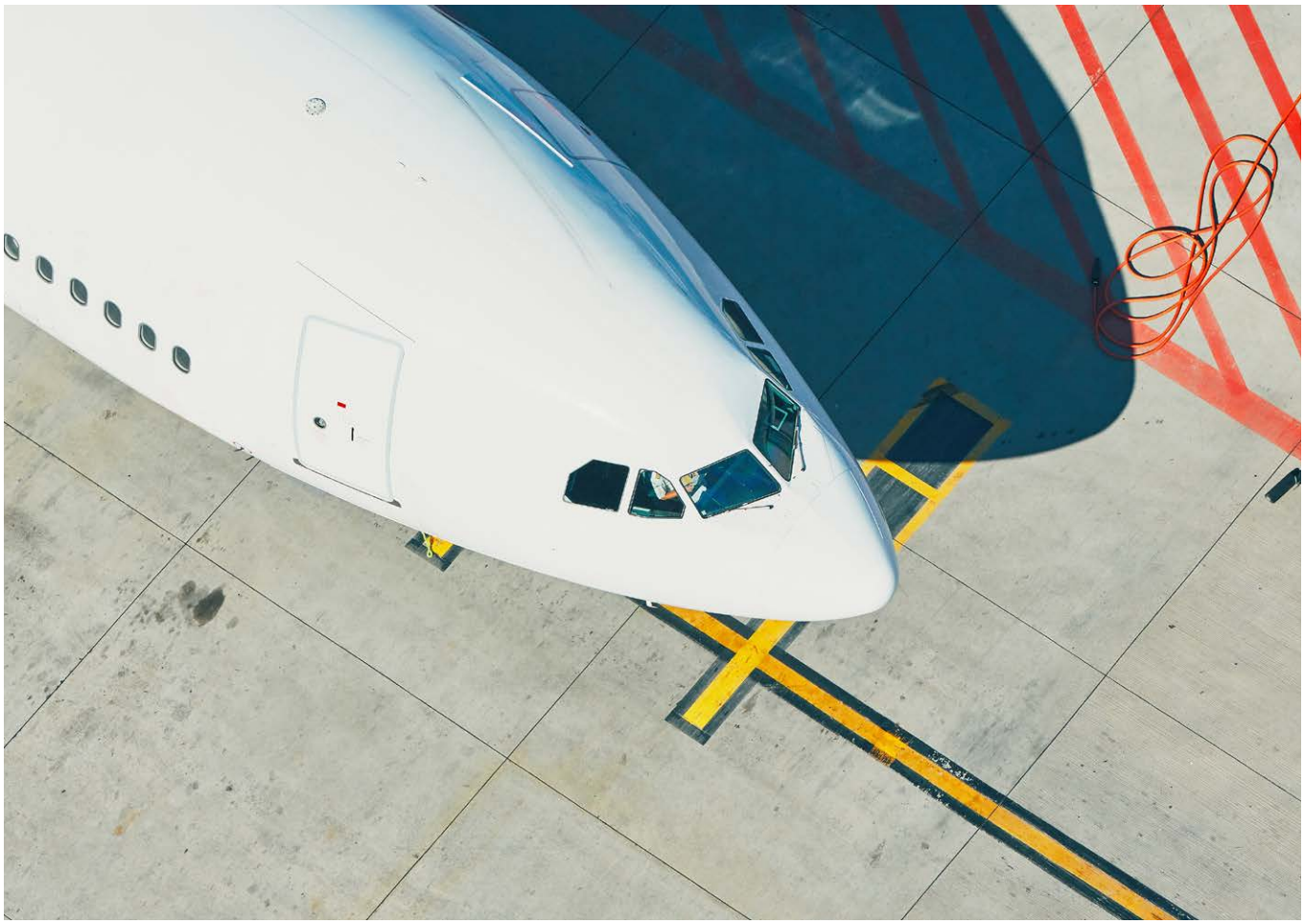
Use the N60 and N70 contours to:

- better understand the aircraft noise events forecast to be experienced at a specific location, including the frequency of aircraft noise events.

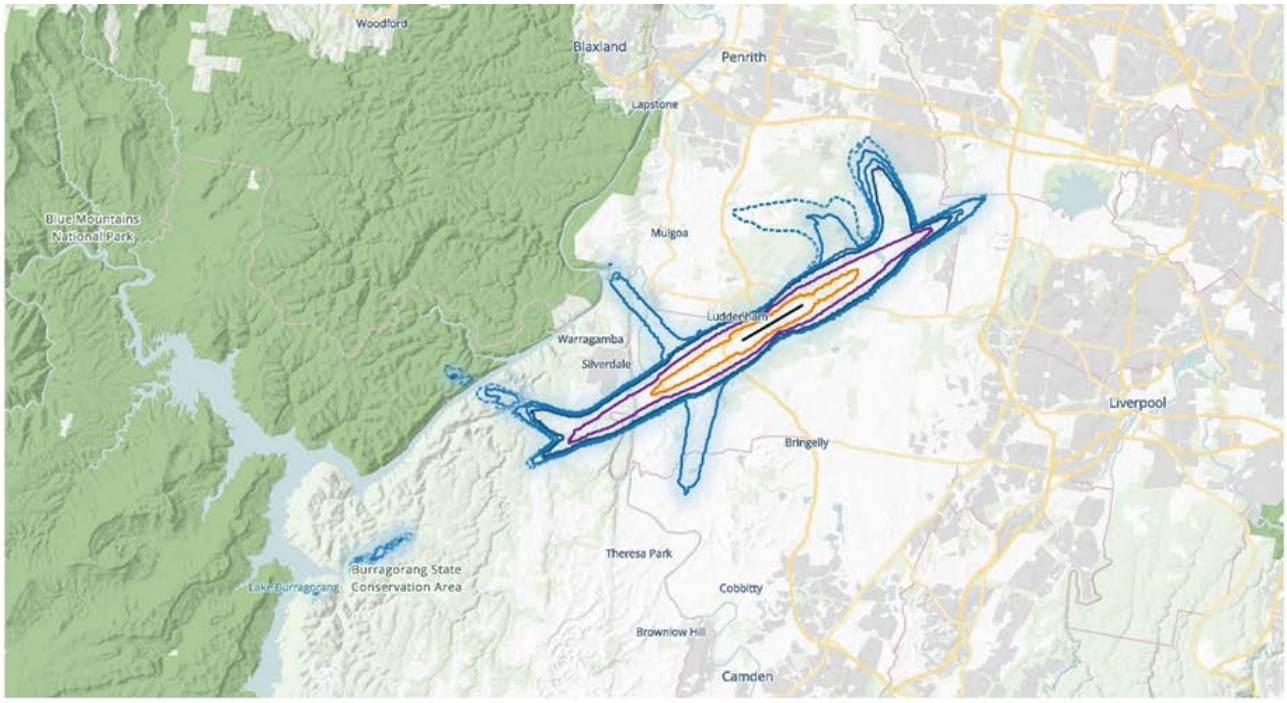
Be aware that the N60 and N70 contours:

- do not provide an upper limit on the level of aircraft noise that may be experienced.
- do not give an estimate of aircraft movements that might be experienced below the relevant noise threshold (either at or below 60 or 70 decibels).

The online Aircraft Overflight Noise Tool shows N60 and N70 contours for the full day period (24-hours) and an N60 contour for the overnight period (11pm – 5.30am). These have been prepared for reference years 2033, 2040 and 2055 across the 3 operating scenarios.

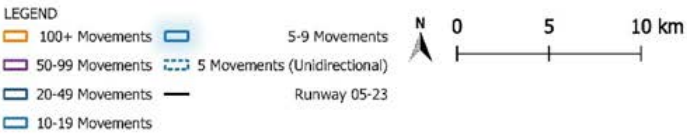


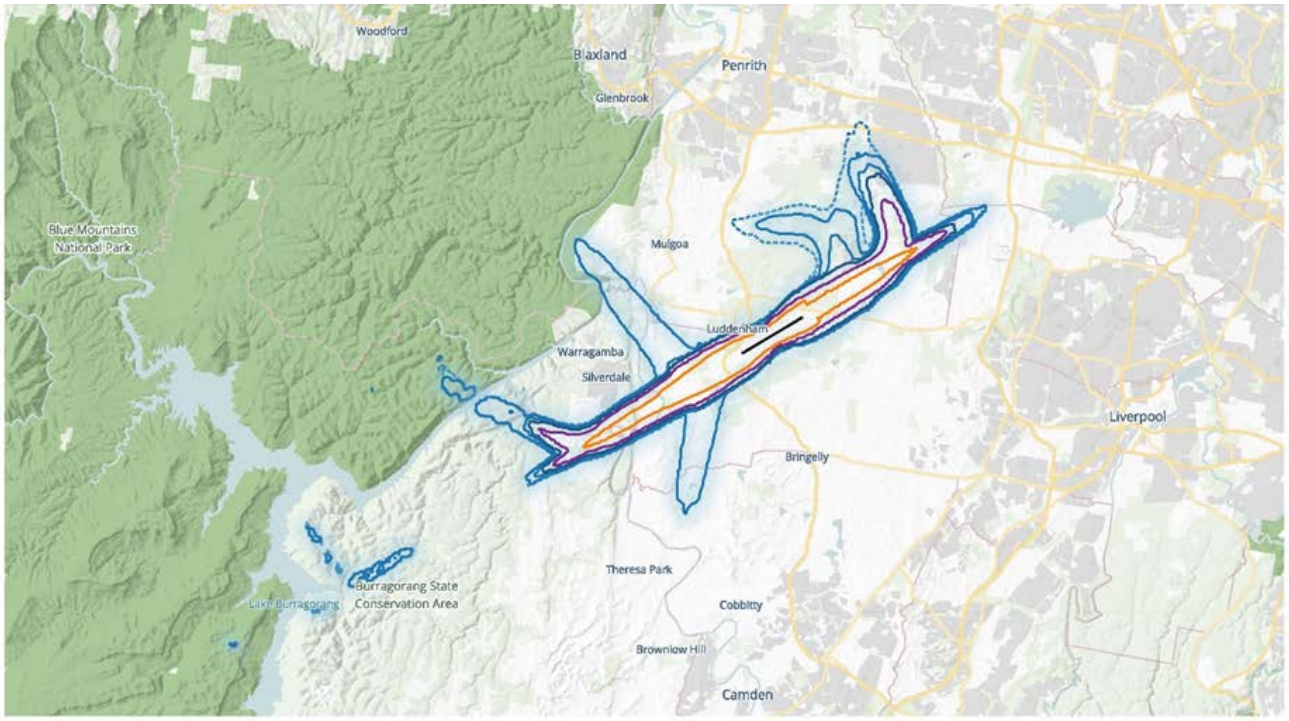
The following images show the N70 contour for a 24-hour period for all 3 operating scenarios for the 2033, 2040 and 2055 reference years. The number thresholds for the movements that are defined as significant (defined with reference to the EPBC Act) and shown in the legends come from the Airservices Australia National Operating Standard for Environmental Management of Changes to Aircraft Operations.



Reference year 2033
N70 – 24 Hours

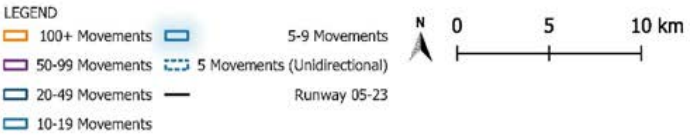
Composite runway operating scenarios

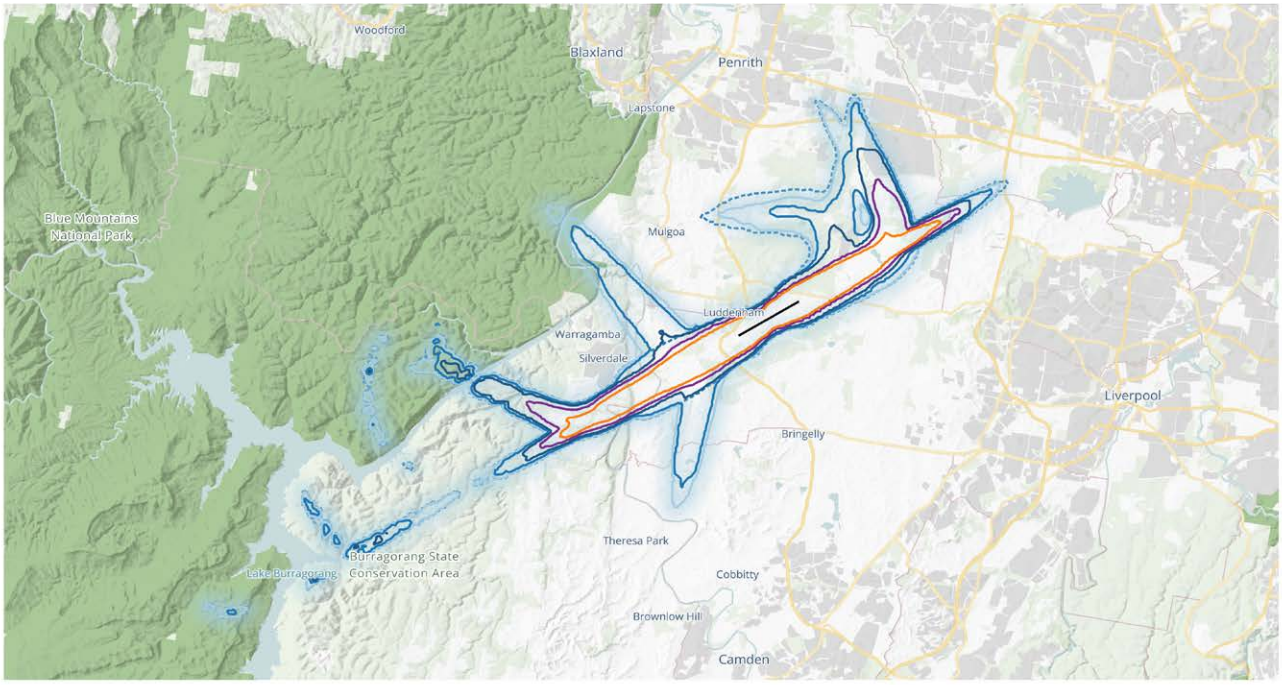




Reference year 2040
N70 – 24 Hours

Composite runway operating scenarios





Reference year 2055
N70 – 24 Hours

Composite runway operating scenarios

Single Event Maximum Noise Level (LAmax)

The LAmax measure shows the maximum expected sound level in decibels that would be experienced during overflight of certain aircraft types. The LAmax contours have been developed based on the types of aircraft that are expected to operate at WSI, and based on the expected typical arrival and departure routes that these aircraft would use.

It is important to note that LAmax contours only give an indication of what may be heard during a single arrival or departure. They do not provide any context on the frequency of operation of a particular flight path.

Use the LAmax contours to:

- understand the modelled worst-case noise impacts for specific aircraft types.

Be aware that the LAmax contours:

- do not give an indication of the frequency of aircraft movements on a particular flight path during day-to-day operations.
- do not give an indication of the number of aircraft overflights.

Please visit the online Aircraft Overflight Noise Tool to view the LAmax contours for three common aircraft types – a narrow body jet, a wide body jet and a smaller turbo-prop aircraft – across the time periods for each runway mode of operation.

Aircraft Overflight Noise Tool

To view the preliminary flight paths and noise modelling information on your desktop or mobile please visit the Aircraft Overflight Noise Tool at **wsiflightpaths.gov.au**.

The Aircraft Overflight Noise Tool shows the aircraft arrival and departure flight paths and allows you to search an address to see the proposed indicative altitude of the flight paths, forecast number of flights, and noise mapping, including the estimated aircraft noise in decibels, at different locations.

The Aircraft Overflight Noise Tool displays noise contours that reflect the noise modelling and assessment undertaken for the EIS. However, noise from aircraft movements based on the new preliminary WSI flight paths may be experienced beyond the noise contours shown.

Next steps

Use the **Aircraft Overflight Noise Tool** at **wsiflightpaths.gov.au** to view preliminary WSI flight paths and how they are likely to affect specific addresses or places of interest.

Go to the WSI airspace and flight path design **Online Community Portal** at **wsiflightpaths.gov.au** to view the draft EIS and for more information on the draft EIS process, flight path design process, videos and details of upcoming community engagement events.

View the draft noise insulation and property acquisition policy and draft EIS on preliminary flight paths on the **Online Community Portal** at **wsiflightpaths.gov.au**, and make a formal submission.

Attend our Community Information and Feedback Sessions to find out more and speak to a member of the team. Visit the **Online Community Portal** at **wsiflightpaths.gov.au** to view upcoming community information events near you. You can also call **1800 038 160** for details of events.

Have your say

If you would like to make a formal submission on the preliminary flight paths and the draft EIS, you can do so via:

- The **Online Community Portal** at **wsiflightpaths.gov.au**;
- **Email** eis.submissions@infrastructure.gov.au
- **Mail** Attn: WSI Flight Paths Team, GPO Box 594, CANBERRA ACT 2601.

Your feedback will be considered in finalising the EIS.

The final EIS must take account of any comments received during the exhibition period and contain a summary of comments and how comments have been addressed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

The draft EIS is available on the **Online Community Portal** at **wsiflightpaths.gov.au**. If you would like to stay informed about the WSI flight paths and receive notifications about the project, you can sign up for email updates by scanning the QR code.

Find out more

Visit the **Aircraft Overflight Noise Tool** to view the preliminary flight paths in more detail at **wsiflightpaths.gov.au**

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Information in your language

Translating and Interpreting Service (TIS National)

If you require the services of an interpreter, please contact the Translating and Interpreting Service on **131 450** and ask them to call the WSI Flight Paths team on **1800 038 160**.

Nếu quý vị cần thông dịch viên, vui lòng gọi cho Dịch vụ Thông Phiên dịch (Translating and Interpreting Service) qua số **131 450** và yêu cầu họ gọi cho đội ngũ phụ trách Đường bay Sân bay Quốc tế Western Sydney (Western Sydney International Airport Flight Paths) qua số **1800 038 160**.

如果您需要口译服务，请致电 **131 450** 联系笔译与口译服务署（Translating and Interpreting Service），并请他们拨打 **1800 038 160** 联系西悉尼国际机场飞行路径团队（Western Sydney International Airport Flight Paths）

यदि आपको दुभाषिए की सेवाओं की ज़रूरत है, तो कृपया **131 450** पर अनुवाद और दुभाषिया सेवा (Translating and Interpreting Service) से संपर्क करें और उनसे **1800 038 160** पर पश्चिमी सिडनी अंतरराष्ट्रीय हवाई अड्डा उड़ान पथ (Western Sydney International Airport Flight Paths) टीम को कॉल करने का अनुरोध करें।

إذا كنت بحاجة لخدمات الترجمة الشفوية، فيرجى الاتصال بخدمة الترجمة الكتابية والشفوية (Translating and Interpreting Service) على الرقم **١٣١ ٤٥٠** وأطلب منهم الاتصال بالفريق المعني بمسارات الطيران في مطار سيدني الغربية الدولي (Western Sydney International Airport Flight Paths) على الرقم **١٨٠٠ ٠٣٨ ١٦٠**

Kung kailangan mo ng mga serbisyo ng isang tagasaling pasalita (interpreter), mangyaring makipag-ugnayan sa Serbisyo ng Pagsasaling Pasulat at Pasalita (Translating and Interpreting Service) sa **131 450** at hilingin sa kanila na tawagan ang pangkat ng Mga Landas ng Paglipad sa Paliparang Internasyonal ng Western Sydney (Western Sydney International Airport Flight Paths) sa **1800 038 160**.

View this brochure in languages other than English

Please scan this QR code to view information in languages other than English.

Vui lòng quét mã QR này để xem thông tin bằng các ngôn ngữ khác ngoài tiếng Anh.

请扫描二维码查看中文信息。

अंग्रेज़ी के अलावा अन्य भाषाओं में जानकारी देखने के लिए कृपया यह QR कोड स्कैन करें।

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