

A Guide to Understanding Aviation Noise and Noise Forecasts Bankstown Airport Preliminary Draft Master Plan

Sound is a normal part of every day life. It provides a vast array of functions in our life and is often not given a second thought, until the sound becomes annoying, unpleasant or unwanted, at which it is referred to as "noise".

Noise in general is a complex and subjective issue, and aircraft noise is no different. Many of the ways used to describe sound itself rely on complex terms such as non-linear metrics and is often not easily understood.

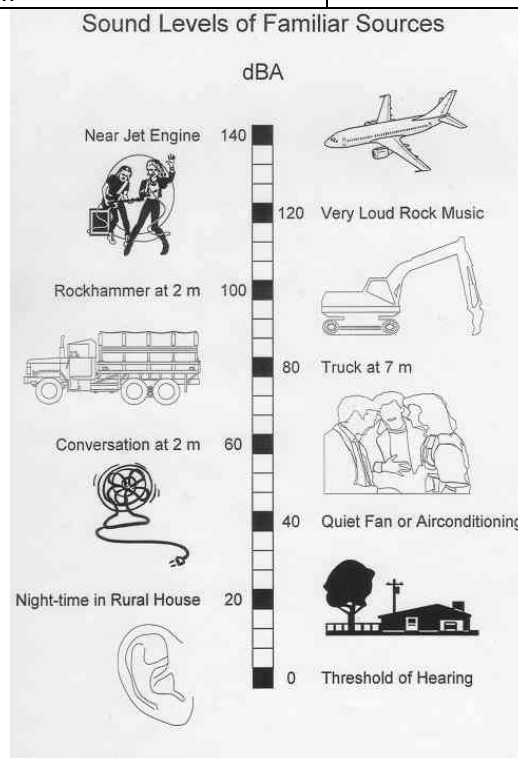
The decibel (dB) is used to measure sound level. The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an "A-weighting" filter that has a frequency response approximately equivalent to a typical human ear.

Different sources having the same dBA level generally sound about equally loud. A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness.

How noisy and annoying a sound is depends not only on the physical properties of the sound, but also on human auditory characteristics and individual sensitivity. As a result, human reaction to noise varies widely from individual to individual.

The table below shows the sound levels typically associated with some common activities:

Activity	Typical Noise Level dBA
Quiet Room	28 – 33
Background Music/Radio	50
Rainfall	50
Microwave Oven	55 – 60
Washing Machine	65 – 70
Inside Car, Windows Closed, 50km/h	68 – 73
Main Road	70
Vacuum Cleaner	85 – 90
Circular Saw	100 – 104



Australian Noise Exposure Forecast

The traditional tool for noise forecasting in Australian Airport Master Plans is the Australian Noise Exposure Forecast (ANEF). ANEF is a **forecast** based on the anticipated mix of aircraft that will be operating at the Airport 20 years in the future.

The ANEFs are forecast noise levels in 20 years time, taking into account many components of noise such as intensity, duration, number of noise events with a penalty for events at night, as well as aircraft type and flight paths, amongst other factors.

The ANEF is the Government endorsed measure used for land use planning, indicating the type of new development activity allowed in an area close to an airport using Australian Standards AS 2021-2000.

This Australian Standard places restrictions on the type of **new** development which can be built in the ANEF contours. It is **not retrospective** and existing developments are not affected by changes to the ANEF contours when there are revisions to Airport Master Plans.

The ANEF system is a “one size fits all” approach to planning, with criteria for acceptable” land usage being the same whether the land is in the vicinity of a major international jet airport or a small regional non-jet aerodrome. The system makes no allowance for local conditions, with an airport on a “greenfield” site treated the same as one already “built out”.

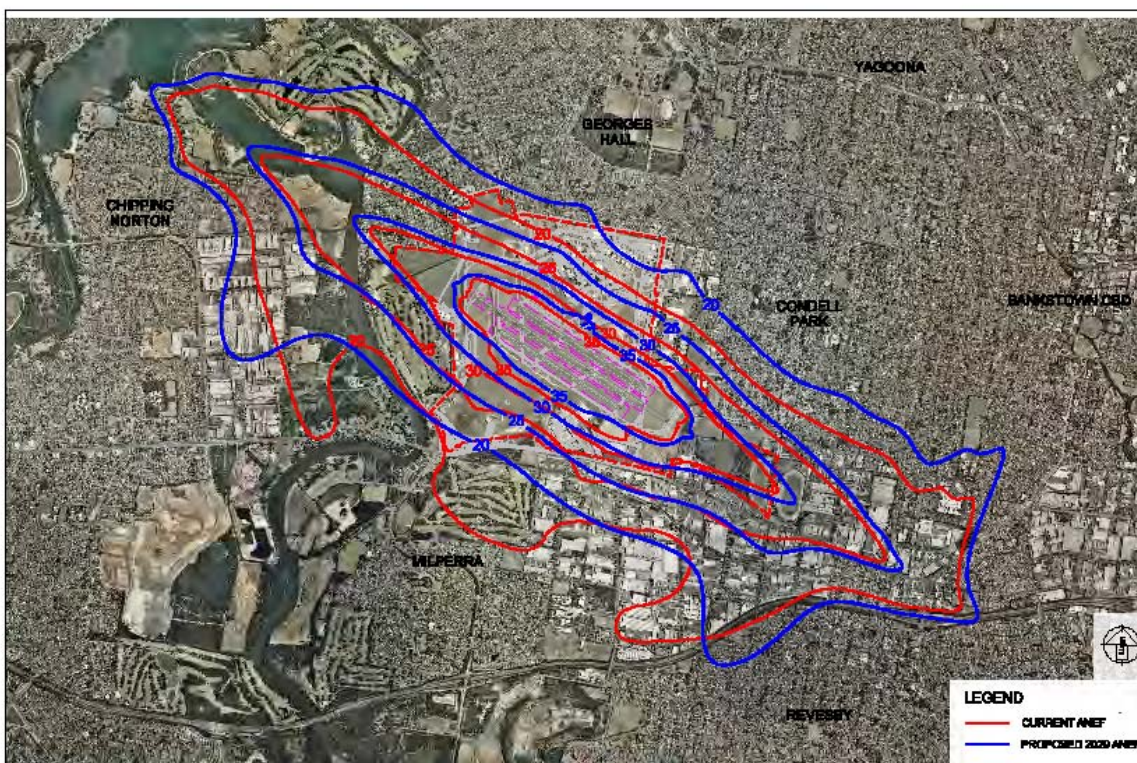
The Bankstown Preliminary Draft Master Plans include comparative ANEFs diagrams in both the current approved Master Plan (2005) and the forecasts in the Draft Plans (2010). The Draft Plans (2010) also show aircraft flight paths, which is a recent legislative requirement.

Building Type	Acceptable	Conditional	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF1	20 to 25 ANEF2	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF1	20 to 25 ANEF2	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF1	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF1	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Note 1: The actual location of the ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

Note 2: Within 20 to 25 ANEF some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A of AS2021-2000).

Note 3: There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (eg an office in an industrial building). In these cases, Table 2.1 (above) should be used to determine site acceptability but internal design noise levels within the specific spaces should be determined by using Table 3.3 of AS2021-2000.



BANKSTOWN AIRPORT MASTER PLAN 2010 Figure 29: ANEF Comparison (2024/25 - 2029/30)

N60

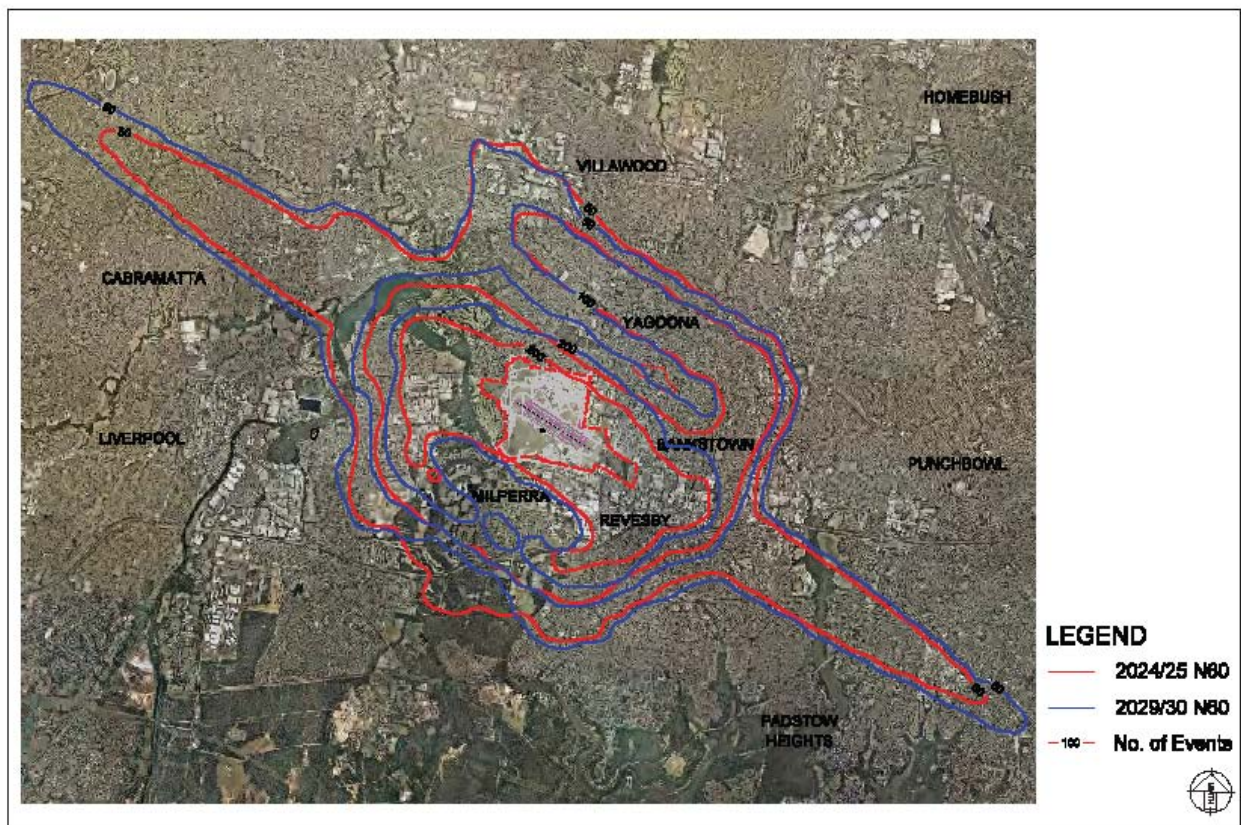
The Preliminary Draft Master Plans also include a more effective noise modelling tool, the N60. It is not required by the legislation to include this noise measure in the Preliminary Draft Master Plan and is considered to be best practice.

This tool, the N60 map is often more easily understood, as it shows the number of events per day that are 60 decibels or higher for example, the way a person perceives the noise event, rather than complex combined effects of the ANEF. This is a noise level which is equivalent to normal conversation. This noise modelling tool was used effectively in the current approved Master Plan (2005) and the Preliminary Draft Master Plans include comparative diagrams of the N60 contours.

The contours on an N60 chart indicate the number of aircraft noise events (for example 50 or 100 events) louder than 60 dBA respectively which are expected to occur on the average day.

It is easier for most people to conceptualise noise impact using “number above” contours like the N60 because they represent aircraft noise in the way a person perceives it - as a series of events, some of which are perceptibly intrusive.

The Preliminary Draft Master Plan includes N60 contours based on the 2029/30 ANEF.



BANKSTOWN AIRPORT MASTER PLAN 2010 Figure 30: N60 Comparison (2024/25 - 2029/30)

Changes in noise contours from the 2004/05 Master Plan

There have been changes to the shape and extent of the 2029/30 ANEF contours when compared with the ANEF contours for 2024/25 contained within the current 2004/05 Master Plan. There have also been changes, but to a lesser extent, in the N60 contours.

Other than a change in the helipad location from the south of the airport (as proposed in the 2024/25 Master Plan) to remain in its existing location, no changes to the assumed types of aircraft or flight tracks have been made. The changes in the ANEF reflect a small increase in General Aviation and some extra passenger aircraft movements but are primarily related to:

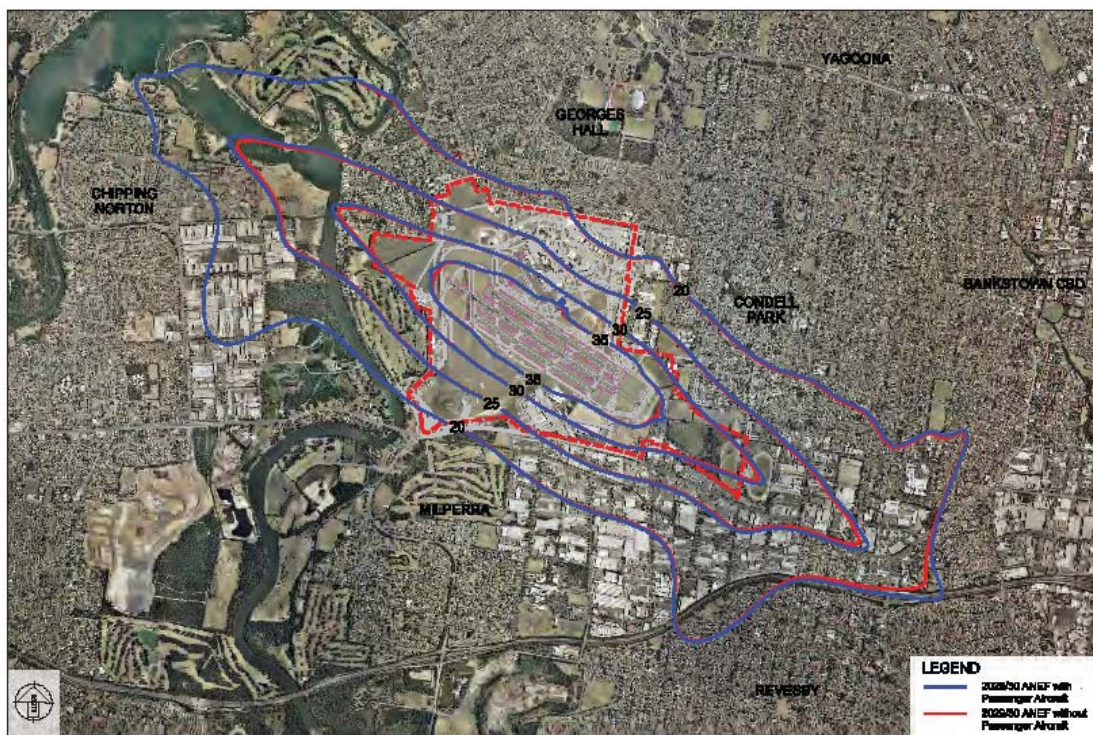
- The use of improved forecasts for traffic and aircraft type.
- Software advances in the Integrated Noise Model including improved noise profile information for aircraft and helicopters.
- Improved modelling techniques including the dispersion of training circuit tracks to account for aircraft deviations from flight paths.
- Modelling based on the most conservative approach, as current aircraft types have been used. By 2030, older aircraft will have been replaced by newer, more advanced aircraft that are significantly quieter.

- For Bankstown, modelling of the effect of topography on noise levels on the ground and the change in the location of the helipad from the south to the existing location in the northern precinct of the Airport.
- An increase in aircraft movements in 2029/30 which will increase the ANEF contours forecast for 2029/ 30

Scheduled Passenger Operations

The Preliminary Draft Master Plan is a refresh of this approved Master Plan 2004/05 MP (as amended by the 2008 Minor Variation for Bankstown) and expands on the concept of scheduled passenger operations at Bankstown Airport.. The Draft Plan **does not** support any intention to bring in larger jets, such as the passenger aircraft, Boeing 737 or A320, flown by Jetstar and Tiger Airways. Nor does the Draft Plan outline any intention by Bankstown Airport to become Sydney's second airport. Bankstown Airport sees its role primarily as NSW's premier General Aviation airport.

The Preliminary Draft Master Plan forecasts 16 to 32 passenger movements (take-offs or landings) per day. This is an increase of 12 movements per day in the current approved Master Plan 2005. The Airport has increased the number of movements from the 2005 Plan to attract a viable commercial operation from Bankstown to select destinations. For the traffic forecast for 2029/30, Scheduled Passenger Services would be only 2.5% of the total aviation traffic. The diagram below shows the ANEF contours with and without Scheduled Passenger Operations.



BANKSTOWN AIRPORT MASTER PLAN 2010 Figure 31: 2029/30 ANEF with and without Passenger Aircraft

Aircraft Noise Reduction Technologies

The ANEF included in the Preliminary Draft Master Plan has been calculated based on the assumption that the same types of aircraft will be operating in 20 years time operating at Bankstown Airport today. The 2029/30 ANEF contours shown in this Preliminary Draft Master Plan therefore represent a “worst case” expectation for aircraft noise in 20 years time.

Sydney Metro Airport Bankstown has developed a Noise Management Plan, as well as a Pilot Education Program, the Fly Friendly initiative, to encourage pilots to consider the local community when taking off and approaching the Airport. The Airport has also regulated ground running to minimise the noise impact from ground based aircraft operations such as maintenance checks.

The Airport works with local governments such as Bankstown City Council, Liverpool City Council and Fairfield City Council to advise them of the land affected by aircraft noise to ensure any new developments in these areas comply with Australian Standards AS 2021-2000.

The Airport continues to monitor noise complaints and report routinely to the Bankstown Airport Community Consultative Community (BACCF) as a means of identifying areas of concern and investigating solutions in consultation with the community. ⁱ

ⁱ References

- 1) Sydney Metropolitan Airport – Bankstown Noise Management Plan, September 2007
- 2) Sydney Metropolitan Airport – Bankstown Noise Management Plan Overview and Supporting Information, September 2007
- 3) Discussion Paper – Expanding Ways to Describe and Assess Aircraft Noise, March 2000, Department of Transport & Regional Services.