

ANEF & Flight Paths

Within the Archerfield Airport Preliminary Draft Master Plan 2011 (PDMP), Archerfield Airport Corporation (AAC) proposes a number of initiatives to improve the usability of the airport and assist its development as Brisbane's Metropolitan Airport. The changes are neither radical nor urgent but will assist in the development of a significant resource of South-East Queensland that is currently underutilised. The following information provides a number of diagrams along with an explanation of ANEF contours to assist in their interpretation.

Quick facts

- An ANEF, or Australian Noise Exposure Forecast, is a scientific measure of aircraft noise exposure around aerodromes depicted by contour lines.
- The old ANEF was based on predicted aircraft movements in 2019.
- The new ANEF is based on a 'Practical Capacity' model which assumes maximum possible movements.
- 'Practical Capacity' means that Archerfield would become significantly busier than both Jandakot and Bankstown airports. This is highly unlikely but a worst possible case scenario has been adopted for planning purposes.
- The change in secondary grass runway direction will alter aircraft movements slightly for daytime activities only.
- There will be no directional change to aircraft movements for night operations.
- Small Regular Passenger Transport aircraft have been incorporated in both the old and new ANEF's to cater for domestic travel in the future.
- Small freight aircraft movements have been incorporated in the ANEF to cater for potential operations from local businesses requiring delivery of urgent parts to mining sites etc.

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What is an ANEF?

An ANEF, or Australian Noise Exposure Forecast, is a scientific measure of aircraft noise exposure around aerodromes depicted by contour lines. It is developed using a sophisticated computer model that simulates aircraft noise based on a wide range of variables such as: number of aircraft movements; aircraft type; model of engine; pitch of propeller blade; rate of climb; predicted flight paths; thrust setting; height of aircraft above ground level; time of flight; acoustic directivity and other environmental factors.

An ANEF's objective is to give an indication of predicted noise levels at a given future date and to prevent incompatible development occurring in the vicinity of an airport which might ultimately impact on the airport's development and/or affect its viability. It is based on the Australian Standard *AS 2021—2000 Acoustics—Aircraft noise intrusion—Building siting and construction*.

Airservices Australia is responsible for the endorsement of ANEFs which now fall under one of the following categories:

- 'Standard' ANEF (a forecast of noise exposure levels up to a maximum of 20 years);
- 'Long Range' ANEF (a forecast of noise exposure levels beyond 20 years); or
- 'Practical Capacity' ANEF (a forecast of noise exposure levels likely if an airport is operating at its practical capacity)

AAC has adopted the use of the 'Practical Capacity' model to ensure that a worst possible case scenario is depicted. This is to enable stakeholders to gauge likely impacts on new/existing developments in the unlikely event that this situation arises in the future.



Figure 3.1 – 2019 ANEF and 'Practical Capacity' ANEF

The previous ANEF for Archerfield Airport was a 'Standard' ANEF endorsed in the year 2000 and was based on the then predicted noise levels for the year 2019. This ANEF catered for a maximum of approximately 340,000 fixed-wing aircraft movements/annum in addition to a small number of freight and Regular Passenger Transport (RPT) flights.

The new ANEF is a 'Practical Capacity' ANEF and is based on the maximum number of movements that the airport is physically capable of achieving taking into account runway, taxiway and airspace limitations. This number has been determined by experts to be around 425,000 fixed wing aircraft movements/annum. Figure 3.1 compares the old ANEF (blue - depicting predicted movements in the year 2019) to the new ANEF (orange - depicting the 'Practical Capacity' movements figure).

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The new ANEF also caters for up to 6 night-time freight flights between the hours of 7pm to 7am which are represented by the Westwind IAI 1125 Astra light jet. These flights have been included to accommodate potential future freight services that may be required by surrounding businesses such as those supplying critical parts to the mining industry. Also included are 10 daily RPT flights and 2 night-time RPT flights at 6am and 8pm. The RPT flights are a mixture of aircraft similar to the Dash 8 - Q400 turboprop and the modern Embraer 170 jet. These flights have been included to accommodate the future potential growth areas of Springfield, Ipswich and surrounding areas whose occupants would find travel to Archerfield closer and more convenient than Brisbane Airport.



Figure 3.2 – 'Practical Capacity' ANEF with existing runways

Archerfield is currently catering for around 150,000 movements/annum but movements have been as high as 300,000+ in the late 1980's and were in the mid to high 200,000's in the 1990's. (see Fact Sheet – 'Current Operating Procedures and Movement Statistics' for further details)

Figure 3.2 is representative of the 'Practical Capacity' ANEF and is based on the existing runway configuration. As is noted in

the 'Grass Runway Realignment' Fact Sheet, the direction of the secondary 04/22 runways is proposed to be realigned on a bearing of 01/19. This is expected to occur around the year 2015 and will alter the 'Practical Capacity' ANEF slightly. Figure 3.3 shows the changes in the ANEF contours along with the direction and location of the new secondary runways.

These ANEF's are representative of 24 hour movements with the airport operating at physical capacity. This is a highly unlikely event and for this to occur, Archerfield would have significantly higher aircraft movements than both Jandakot and Bankstown airports. Contours to the north of the airport, associated with the proposed 01/19 runways, represent noise that would only exist during the daytime as these



Figure 3.3 – 'Practical Capacity' ANEF with proposed runways

runways are grass and so will not be used at night. It should be noted that all aircraft flights conducted at night-time, 7pm - 7am, are associated with a 4-fold increase in noise levels within the design of the ANEF. This is to ensure noise issues associated with night-time movements are taken into account and represented in the final contours.

Flight tracks and aircraft movements

ANEFs are modeled from theoretically ideal flight tracks associated with an aircraft's movements.¹ These tracks take into account the various types of aircraft that may be used, the movement type associated with each aircraft and all possible runway combinations associated with a particular movement. AAC engaged technical experts who, in collaboration with Airservices Australia, designed appropriate tracks taking into account these various combinations. Comparative diagrams were drawn to ascertain the differences that would result in the proposed changes to the secondary grass runways from an alignment of 04/22 to 01/19. The diagrams below represent these changes for each movement type.

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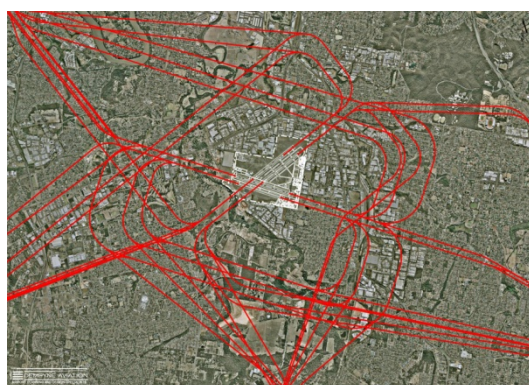


Figure 3.4a – Existing approach tracks



Figure 3.4b – Proposed approach tracks

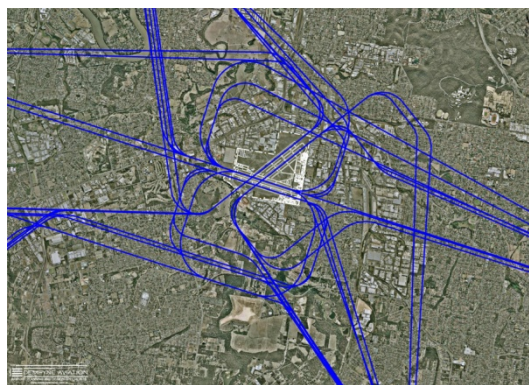


Figure 3.5a – Existing departure tracks

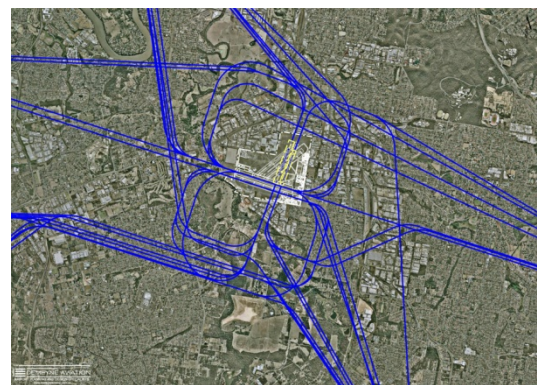


Figure 3.5b – Proposed departure tracks

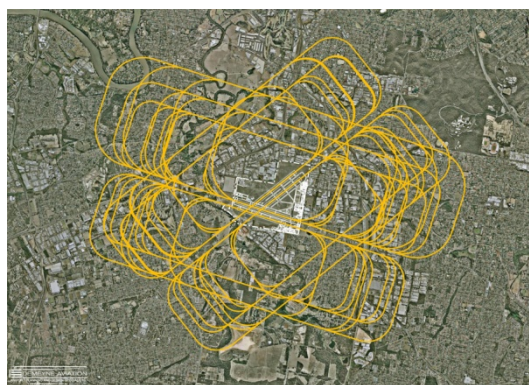


Figure 3.6a – Existing circuit tracks

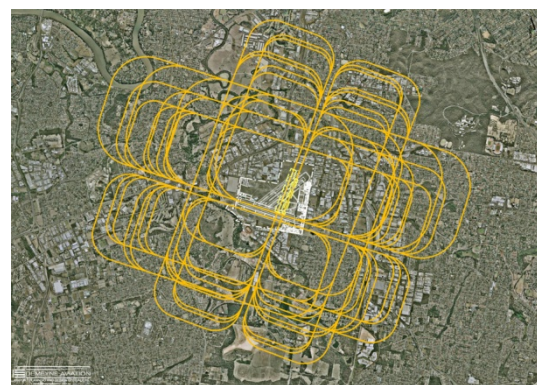


Figure 3.6b – Proposed circuit tracks

1. It should be noted that these theoretically ideal flight tracks will vary slightly in practice

To determine the approximate number of aircraft using a particular track, average movement numbers for the years 2005-2009 from the Fact Sheet 'Current Operating Procedures and Movement Statistics' can be used.

For example, to determine how many aircraft flights using runway 04R would occur on a typical Saturday over areas covered by the circuits diagram above, the following table can be used.

	Average movements / week	Average movements / Saturday	Average movements from 04R on Saturday	Average Circuits from 04R on Saturday	Result
Day	150,000 / 52 = 2,885	= 2,885 x 11% = 317	= 317 x 4% = 13	= 13 x 40% = 5	= Approximately 5 flights
Night	150,000 / 52 = 2,885	= 2,885 x 11% = 317	= 317 x 0% = 0	= 0 x 40% = 0	= 0 flights

Table 3.1 – Average circuit flights from 04R on Saturdays between 2005 and 2009

The above information will help to determine the approximate number of flights over a particular area based on average movements recorded over the past five years at Archerfield. However, this information does not take into account the height, type of aircraft or predicted noise associated with a particular flight. The Fact Sheet 'N70 Noise Contours' provides a number of noise related diagrams, along with an explanation of N70 contours, and takes this information into account in the development of each diagram.

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