



MARSHALL DAY
Acoustics 

AIRCRAFT NOISE STRATEGY
HORSLEY PARK URBAN INVESTIGATION AREA

Rp 001 20200802 | 20 April 2021

Project: **Aircraft Noise Strategy: Horsley Park Urban Investigation Area**

Prepared for: **Fairfield City Council**
PO Box 21
Fairfield NSW 1860

Attention: **Elizabeth Workman**

Report No.: **001 20200802**

Disclaimer

Reports produced by Marshall Day Acoustics Limited are based on a specific scope, conditions and limitations, as agreed between Marshall Day Acoustics and the Client. Information and/or report(s) prepared by Marshall Day Acoustics may not be suitable for uses other than the specific project. No parties other than the Client should use any information and/or report(s) without first conferring with Marshall Day Acoustics.

The advice given herein is for acoustic purposes only. Relevant authorities and experts should be consulted with regard to compliance with regulations or requirements governing areas other than acoustics.

Copyright

The concepts and information contained in this document are the property of Marshall Day Acoustics Limited. Use or copying of this document in whole or in part without the written permission of Marshall Day Acoustics constitutes an infringement of copyright. Information shall not be assigned to a third party without prior consent.

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Final	-	Issued	20 April 2021	A. Morabito	L. Deen

TABLE OF CONTENTS

1.0	INTRODUCTION.....	4
2.0	LITERATURE REVIEW.....	4
2.1	Australian Standard AS 2021	4
2.2	State Environmental Planning Policy (SEPP) – Western Sydney Aerotropolis (WSA)	5
2.3	Key differences and discrepancies	6
3.0	RECOMMENDATIONS FOR AN AIRCRAFT NOISE STRATEGY	7

APPENDIX A REFERENCES

APPENDIX B SUMMARY OF LITERATURE REVIEW

APPENDIX C SOUND INSULATION (INFORMATIVE)

1.0 INTRODUCTION

In April 2019, Fairfield City Council endorsed a preferred Structure Plan to enable increased residential density within Horsley Park Urban Investigation Area (UIA). Aircraft noise was identified as a matter requiring further investigation, as a portion of the land would be subject to future aircraft noise associated with the to be built, Western Sydney Airport.

Local planning provisions in New South Wales allow for residential development near airports and within relevant land use planning control boundaries, where an Aircraft Noise Strategy is in place and demonstrates that noise from the airport operations is not incompatible with the residential development.

Fairfield City Council has retained Marshall Day Acoustics Pty Ltd (MDA) to provide input into the development of an Aircraft Noise Strategy for the Horsley Park UIA.

This document outlines a recommended strategy for aircraft noise land use planning for the Horsley Park Urban Investigation Area (HPUIA).

2.0 LITERATURE REVIEW

A literature review of Australian and State government policies concerning land use planning and development requirements in the vicinity of airports affected by aircraft noise has been undertaken.

The review considered the following:

- Planning Provisions for local government areas (LGA) surrounding the existing Sydney (Kingsford Smith) Airport as well as the to be constructed Western Sydney (Nancy Bird Walton) Airport;
- Local planning provisions and requirements in other Australian states and territories; and
- Airport Masterplan requirement for Australia federally leased airports.

This section provides an overview of the key findings, with further details contained in Appendix B.

2.1 Australian Standard AS 2021

The literature review has identified the Australian Standard AS 2021 *Acoustics — Aircraft noise intrusion — Building siting and construction* (AS 2021) as the primary tool for land use planning in the vicinity of Australian airfields.

AS 2021 refers to the Australian Noise Exposure Forecast (ANEF) system, which is used in conjunction with published ANEF contours for a given airfield to:

- Assess whether proposed development in the vicinity of an airfield is acceptable, conditionally acceptable, or unacceptable
- Determine the sound insulation performance required for proposed building sites in conditionally acceptable locations, and
- Provide guidance on the type of constructions needed to achieve appropriate aircraft noise reductions for proposed development sites.

AS 2021 describes the 'acceptability' or otherwise for a proposed development, based on its location relative to the ANEF zone, outlined in Table 1.

Table 1: AS 2021 building site acceptability based on ANEF zones

Building Type	ANEF Zone of Site		
	Acceptable	Conditionally Acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	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		

With regards to areas within the 20 to 25 ANEF contours, proposed residential land uses are conditionally acceptable provided a building is designed to meet the indoor design sound levels, likely through the inclusion of appropriate building envelope sound insulation measures.

Importantly, AS 2021 primarily relates to land use planning and the acceptability of new residential development, or changes to an existing residential land use (e.g. subdivision of residential land or extensions to an existing residential structure), and is not a test of acceptability of aircraft noise levels at existing residential sites.

2.2 State Environmental Planning Policy (SEPP) – Western Sydney Aerotropolis (WSA)

The *State Environmental Planning Policy (SEPP) – Western Sydney Aerotropolis (WSA)* (the SEPP) came into effect on 1 October 2020.

The following planning controls apply to properties within the Australian Noise Exposure Concept (ANEC) 20-25 contours of the Western Sydney Airport:

- Applications for the construction of a dwelling on a vacant parcel of land can only be accepted if the parcel already existed (was part of an approved subdivision) before 1 October 2020 or a development application for construction of a dwelling had been submitted to Council prior to 1 October 2020
- ‘Noise sensitive development’, including residential accommodation (dwellings, secondary dwellings and dual occupancy) and other categories (childcare centres, schools, places of worship and hospitals) are prohibited after 1 October 2020 subject to concessions listed under the previous dot point.

In addition to the above, the SEPP also states/requires that properties affected by the Obstacle Limitation Surface (OLS) from 26 April 2021 will require the following insulation measures for new residential development (including alterations to an existing house):

- Preparation of an acoustic report by a qualified consultant
- Compliance with the indoor design sound levels in *Australian Standard 2021:2015 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction*.

The SEPP requirements are inconsistent with the planning provisions in LGA surrounding the Western Sydney (Badgerys Creek) airport site. Specifically, where planning provisions are provided in respective Local Environment Plans (LEP), the planning authority is to consider the use or potential future use of the Badgerys Creek site as an airport and that proposed noise-sensitive development be designed and constructed appropriately. The LEP refers to AS 2021 as the primary tool for guidance on land use planning in the vicinity of the Badgerys Creek site, and notes that development consent for residences is required where the proposed development is within the ANEF 20 contour for the proposed airport. The construction of residential dwellings is prohibited in land where the ANEF is above 25.

Where a proposed development within LGA surrounding the Western Sydney Airport (development application for construction of a dwelling submitted to Council after 1 October 2020) sits as well as within the relevant land control boundaries defined in the SEPP, it is not clear which planning control would take precedence, i.e. the SEPP or the LEP.

2.3 Key differences and discrepancies

The findings of the literature review have identified inconsistencies in the approach outlined in the SEPP when compared with existing, long-established planning policies for development in areas around Australian airfields that experience aircraft noise.

- AS 2021 and the ANEF system is the primary tool for land use planning in the vicinity of Australian airfields.
 - where a proposed residential development is located within an ANEF 20-25 contour, AS 2021 identifies this ‘zone’ as conditionally acceptable, i.e. Although a portion of the population may find that the land is not compatible with residential or educational uses, land use authorities may consider development appropriate provided that the incorporation of noise control features in the construction of the buildings to achieve the indoor design sound levels outlined in AS 2021
 - The SEPP however restricts residential development (proposed after 1 October 2020) within the ANEC 20-25 contours of the Western Sydney Airport
- There is no precedence to support the use of an OLS for aircraft noise land use planning
 - The OLS is defined in *Part 139 (Aerodromes) Manual of Standards 2019* (MOS 139) as follows:
 - ... a series of planes, associated with each runway at an aerodrome, that defines the desirable limits to which objects or structures may project into the airspace around the aerodrome so that aircraft operations at the aerodrome may be conducted safely The OLS identifies the airspace to be protected for aircraft operating during the initial and final stages of flight, or when manoeuvring in the vicinity of the airport
 - Aircraft noise is typically centred around flight tracks, due to the directionality and high level of attenuation at sideline locations to flight tracks
 - The proposed 13 km OLS buffer is therefore too conservative and a significant constraint on development in areas north and south of the Western Sydney Airport site; and
 - Conversely, the OLS buffer does not extend as far as the ANEC in line with the proposed runway alignment (east-west)

3.0 RECOMMENDATIONS FOR AN AIRCRAFT NOISE STRATEGY

The following considerations are provided as part of the development of the Aircraft Noise Strategy for the Horsley Park UIA:

- Adopt the endorsed Western Sydney Airport ANEF (once finalised and published) and provisions of Australian Standard 2021 *Acoustics – Aircraft Noise Intrusion – Building Siting and Construction* (AS 2021) as the primary assessment tool for assessing new noise sensitive development in the vicinity of the Western Sydney Airport
 - The land use planning control boundary shall be based on the endorsed 20 ANEF contour for Western Sydney Airport to be used in conjunction with Section 2 of AS 2021
 - Development applications for the construction of a dwelling or other noise sensitive development within the ANEF should be accompanied by an acoustic report prepared by a qualified consultant to demonstrate the proposed use can be designed to achieve the indoor design sound levels in AS 2021
 - Where a proposed development site, including a subdivision, is intersected by relevant land use contours, the following applies (as per Western Australia State Planning Policy 5.1 - Land use planning in the vicinity of Perth Airport):
 - For a site with an area less than 1,000 m², the noise exposure zone for the whole site shall be deemed to be the level to which most of the site is subject; and
 - For a site with an area greater than 1,000 m², the noise exposure zone shall be determined separately for the individual parts of the site into which it is divided by the relevant noise exposure contour(s).
 - Adopt the extent of N-contours and thresholds recommended in the *National Airports Safeguarding Framework* Guideline A to inform on a buffer zone as current interim guidance until such time that an ANEF is published. This would be in lieu of the OLS currently noted in the SEPP
- Where a dwelling or other noise sensitive development is proposed within one (1) or more of the following contours, an acoustic report prepared by a qualified consultant should be prepared to demonstrate the proposed use can be designed to achieve the indoor design sound levels in AS 2021:
- The 20 ANEC contour(s) (as outlined in the Environmental Impact Statement (EIS) for the Western Sydney Airport), refer Figure 1; or
 - 20 or more daily events greater than 70 dB L_{Amax} (N70 20 events contour); or
 - 50 or more daily events greater than 65 dB L_{Amax} (N65 50 events contour); or
 - 100 or more daily events greater than 60 dB L_{Amax} (N60 100 events contour); or
 - 6 or more events greater than 60 dB L_{Amax} between 11 pm and 6 am (N60 6 events night contour).

The Section 5 of the Western Sydney Airport EIS, Volume 4, Appendix E1, only presents N70 and N60 night contours for the two (2) runway operating modes, reproduced in Figure 2 to Figure 5 below. Reference N65 50 events and N60 100 events contours are not available. With reference to the other threshold contours, half of the Horsley Park UIA is covered by the N60 6 events night contour (approximated from the available contour sets), and that a small portion of the UIA is covered by the N70 20 event contours.

- Land titles for sites within any of the ANEF or NASF guideline contours described above should feature an aircraft noise disclosure statement. The aim is to help noise sensitive persons avoid finding themselves in a situation where they are unknowingly exposed to aircraft noise associated with future aircraft operations at Western Sydney Airport

Historically, there have been instances where developers of new residential estates in the vicinity of airports have prepared an Aircraft Noise Exposure Statement for future lot and dwelling owners in response to such land title disclosure statements. An example is provided below:

This property is situated in the vicinity of Western Sydney Airport and may be affected in the future by aircraft noise. Noise exposure levels are likely to increase in the future as a result of an increase in aircraft using the airport, changes in aircraft type or other operational changes. Further information about aircraft noise is available from the Western Sydney Airport website. Information regarding development restrictions and noise insulation requirements for noise affected property is available on request from the relevant local government offices.

Figure 1: Long term ANEC 20 contour coverage of the Horsley Park UIA site

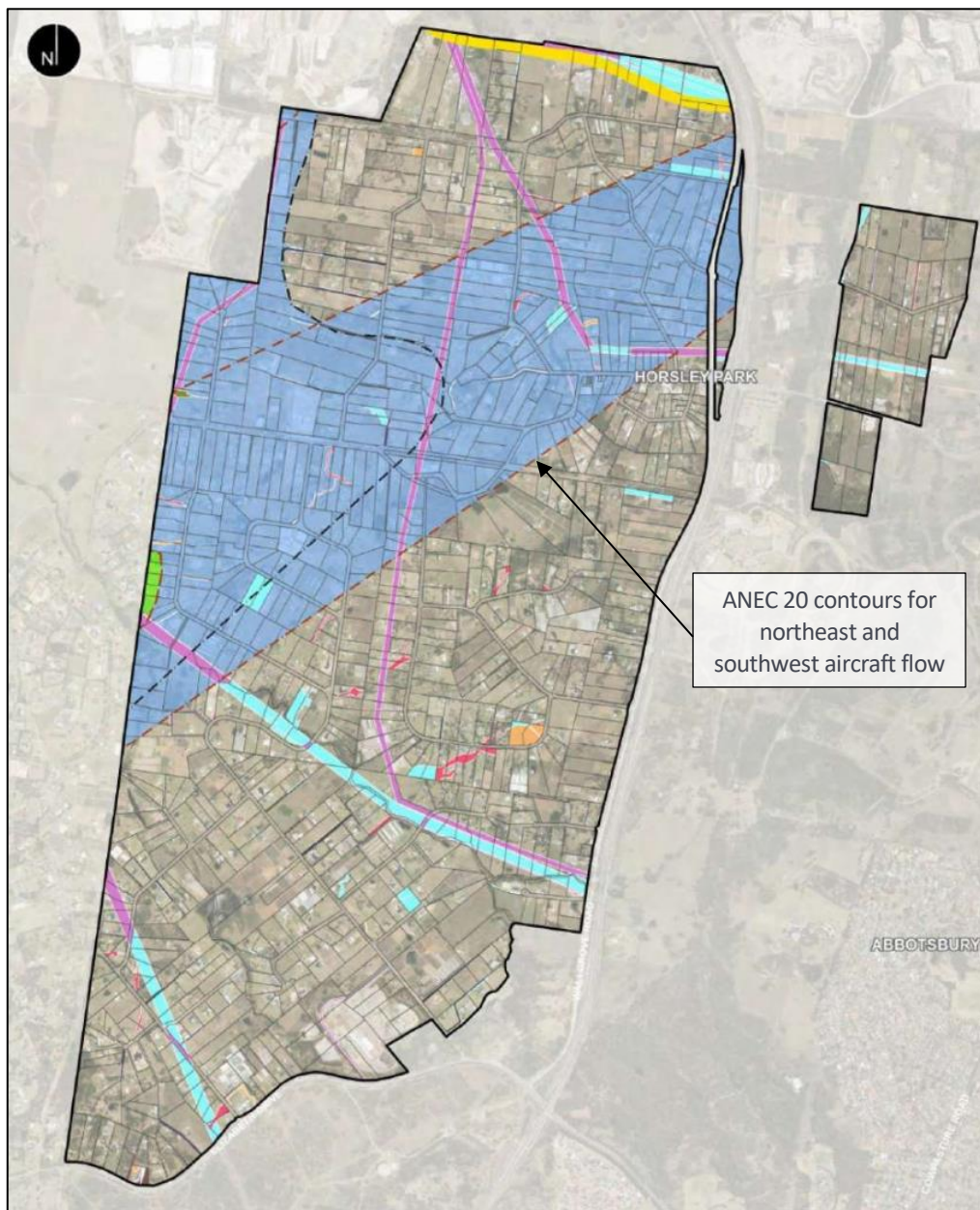


Figure 2: N70 contours – Long term Operating Strategy Prefer 05, Horsley Park UIA site coverage

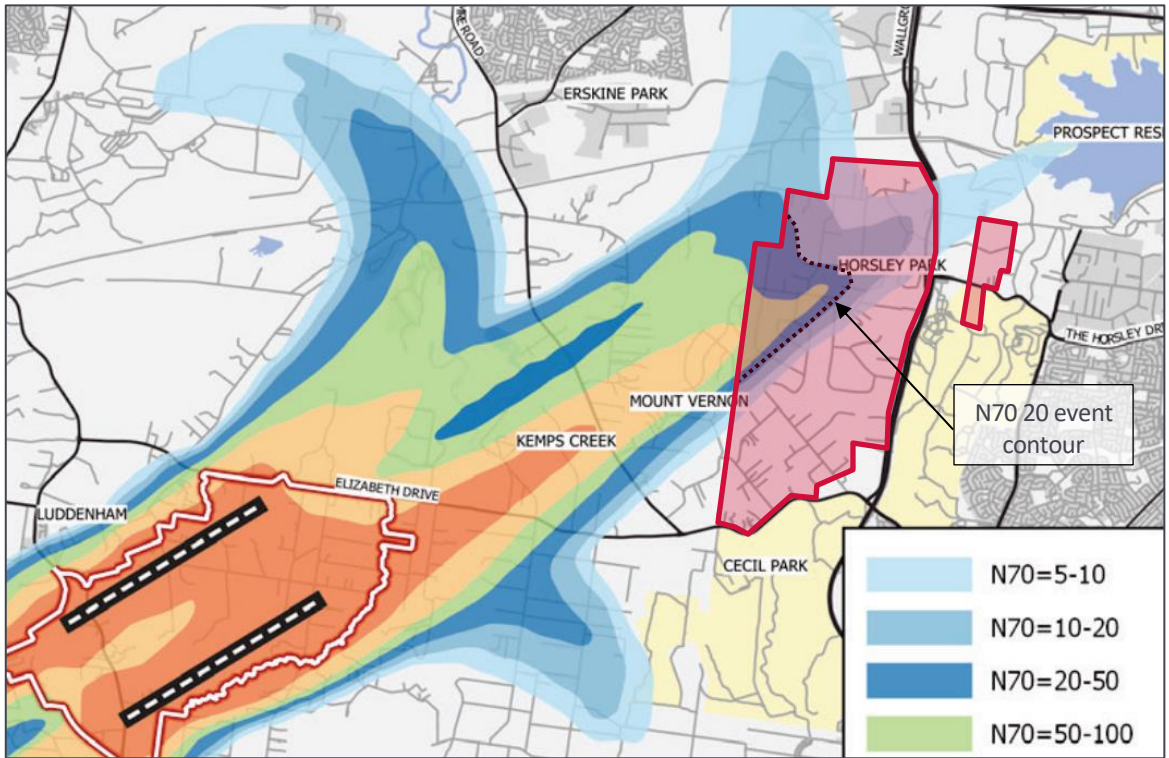


Figure 3: N70 contours – Long term Operating Strategy Prefer 23, Horsley Park UIA site coverage

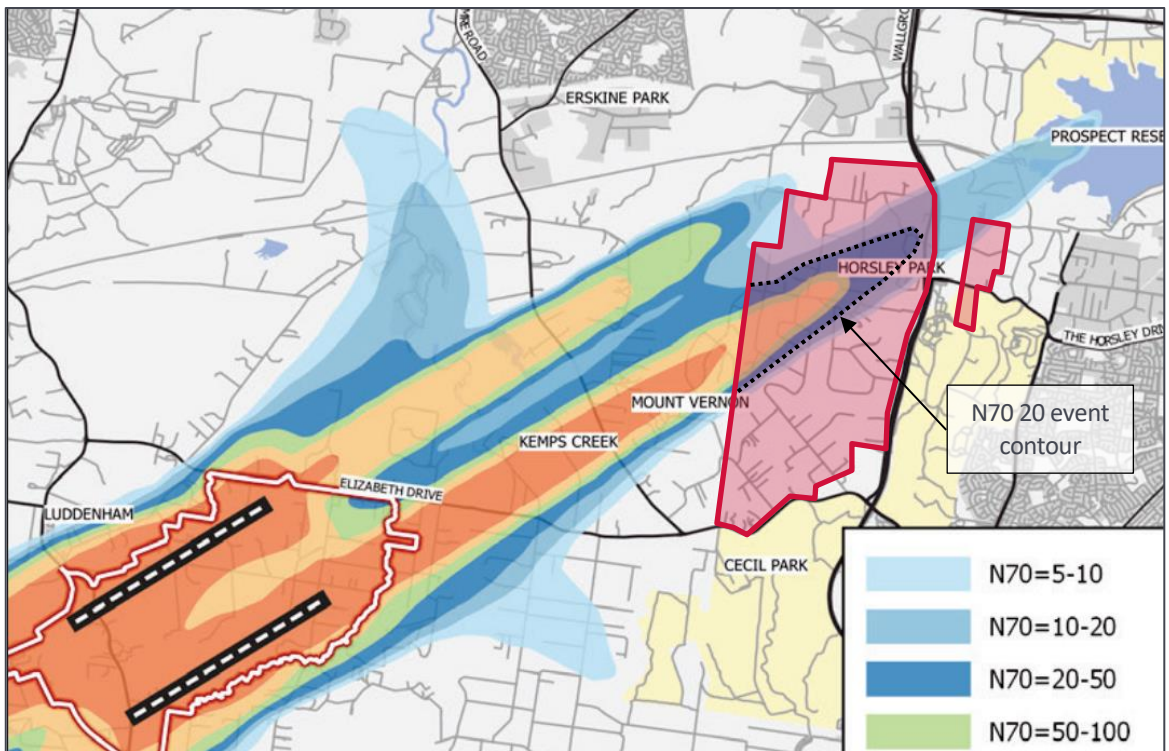


Figure 4: N60 night contours – Long term Operating Strategy Prefer 05, Horsley Park UIA site coverage

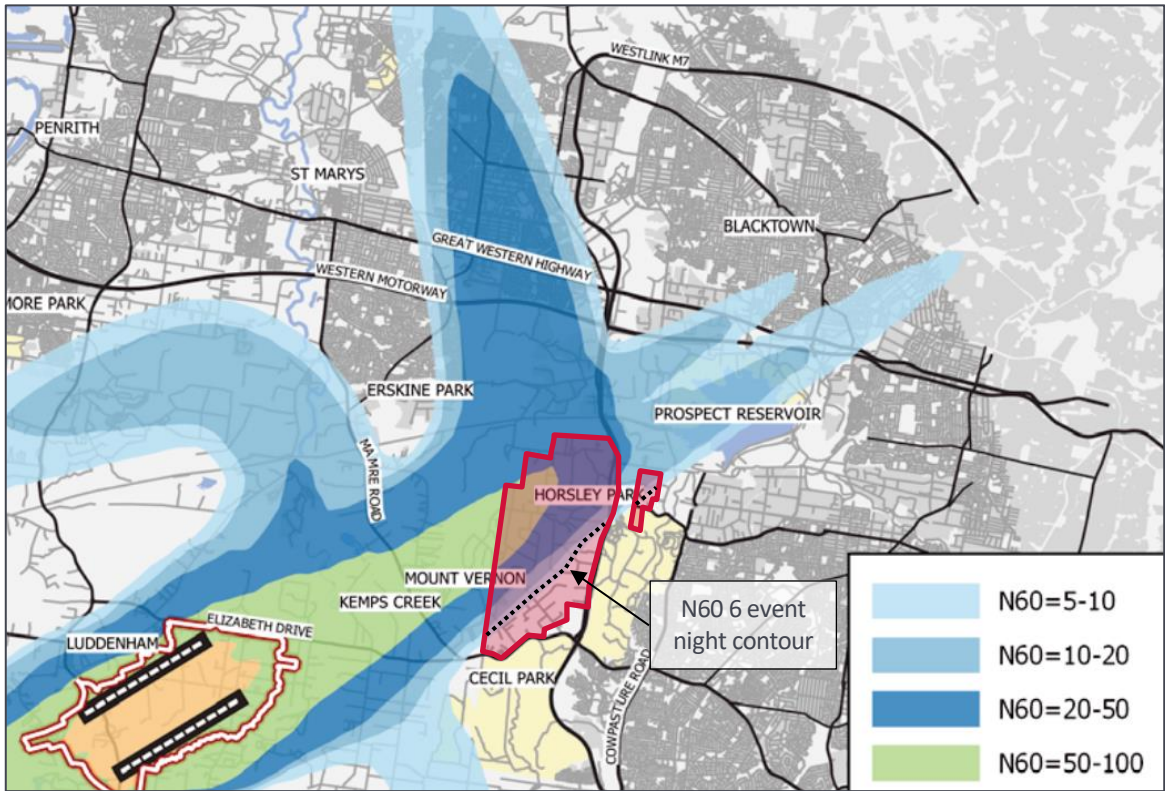
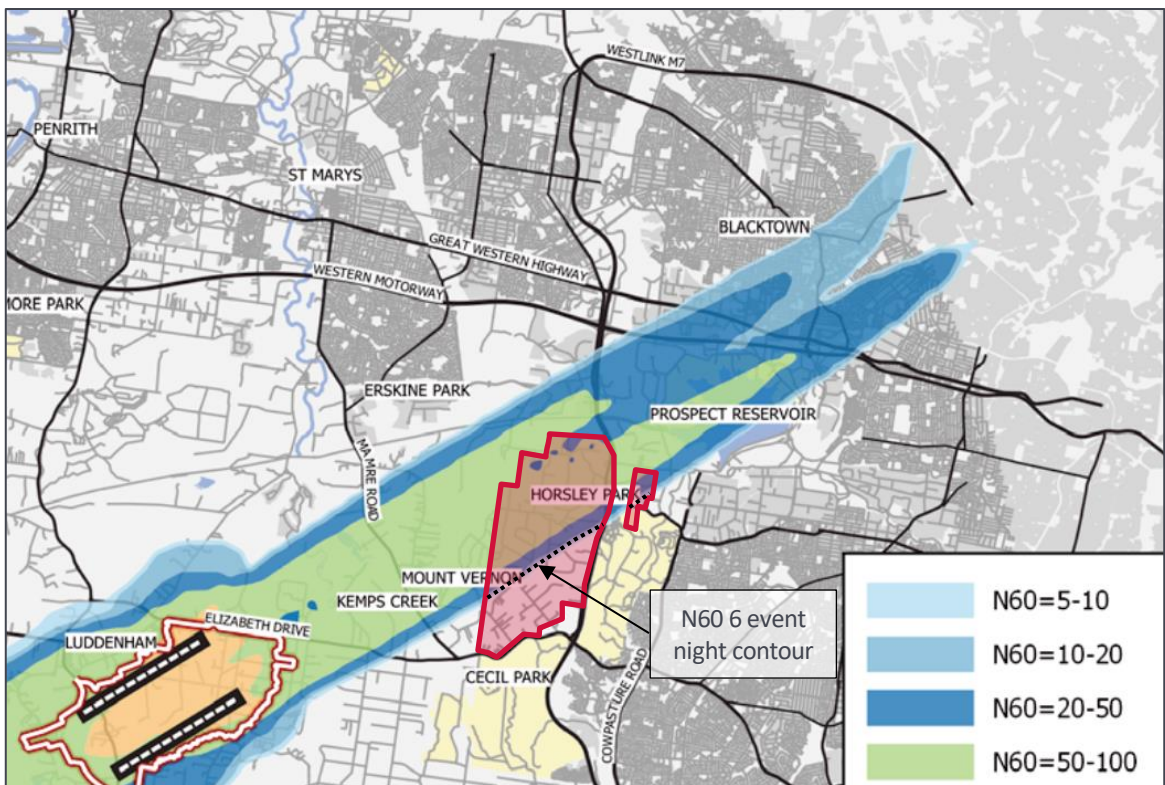


Figure 5: N60 night contours – Long term Operating Strategy Prefer 23, Horsley Park UIA site coverage



APPENDIX A REFERENCES

Airports Act 1996 (Cwth.)

Department of Environment, Land, Water and Planning, *Victorian Planning Provisions*

Department of Infrastructure, Transport, Cities and Regional Development (Department of Transport and Regional Services), 2000, *Discussion Paper: Expanding Ways to Describe and Assess Aircraft Noise*

Department of Infrastructure, Transport, Cities and Regional Development (then Department of Transport and Regional Services), 2003, *Going Beyond Noise Contours – Local Approaches to Land Use Planning Around Smaller Australian Airports – Discussion Paper*

Department of Infrastructure, Transport, Cities and Regional Development (then Department of Transport and Regional Services), 2003, *Guidance Material for Selecting and Providing Aircraft Noise Information*

Department of Infrastructure, Transport, Cities and Regional Development (then Department of Infrastructure, Transport, Regional Development and Local Government), 2009, *National Aviation Policy White Paper 2009: Flight Path to the Future*

Department of Infrastructure, Transport, Cities and Regional Development, 2016, *Principles for a National Airports Safeguarding Framework Guideline A – Measures for Managing Impacts of Aircraft Noise, The National Airports Safeguarding Advisory Group (NASAG)*

Department of Planning, Lands and Heritage, 2015, *State Planning Policy 5.1 - Land use planning in the vicinity of Perth Airport*

Department of Planning, Transport and Infrastructure, *Charles Sturt Council Development Plan*, consolidated 14 January 2021

Department of Planning, Transport and Infrastructure, *West Torrens Council Development Plan*, consolidated 21 May 2020

New South Wales Department of Planning, Industry and Environment, *Local Environmental Plans* (various)

Northern Territory Government, 2020, *The Northern Territory Planning Scheme (NTPS)*

NSW Government, 2020, *State Environmental Planning Policy (SEPP) – Western Sydney Aerotropolis*

Standards Australia, 2015, *Acoustics—Aircraft noise intrusion-Building siting and construction*, AS 2021-2015, Standards Australia, Sydney

Tasmanian Planning Commission, 2018, *Tasmanian Planning Scheme – State Planning Provisions*

The State of Queensland, Department of State Development, Manufacturing, Infrastructure and Planning, 2017, *State Planning Policy – state interest guidance material Strategic airports and aviation facilities*

Wilkinson Murray, 2016, *EIS Aircraft Overflight and Operational Noise*, Report No. 14168 Version E, Western Sydney Airport Environmental Impact Statement Volume 4, Appendix E1

APPENDIX B SUMMARY OF LITERATURE REVIEW

B1 Overview

The literature review has considered the following:

- Planning Provisions for local government areas (LGA) surrounding the existing Sydney (Kingsford Smith) Airport as well as the to be constructed Western Sydney (Nancy Bird Walton) Airport;
- Local planning provisions and requirements in other Australian states and territories; and
- Airport Masterplan requirement for Australia federally leased airports.

B2 New South Wales' Local Government Areas (LGA)

Planning provisions for local government areas (LGA) surrounding the existing Sydney (Kingsford Smith) Airport as well as the to be constructed Western Sydney (Nancy Bird Walton) Airport have been reviewed.

Planning provisions for the consideration of aircraft noise in these local government areas (LGA) are detailed within respective Local Environment Plans (LEP). The planning provisions contained within most local environment plans (LEP) indicate a consistent approach for land use planning in areas in the vicinity of the airport and affected by aircraft noise. Specifically, the approach adopted by the LGA for new or alteration to residential buildings is that a proposed development is to be consistent with Australian Standard AS 2021 *Acoustics—Aircraft noise intrusion—Building siting and construction (AS 2021)* as outlined in Table 2.

Table 2: Summary of LGA aircraft noise planning provisions for residential development

LGA	Aircraft noise planning provisions included in LEP	Consistent with AS 2021
<i>Surrounding Sydney Airport</i>		
Marrickville	Yes	Yes
Botany	Yes	Yes
Rockdale	Yes	Yes
Leichhardt	Yes	Yes
City of Sydney	Yes	Yes
Sutherland Shire	Yes	Yes ⁽¹⁾
<i>Surrounding Western Sydney Airport</i>		
Penrith	Yes	Yes
Liverpool	Yes	Yes
Blacktown	No	N/A
Fairfield	No	N/A
Camden	Yes	Yes
Campbelltown	No	N/A

Notes: (1) Allows for a new dwelling, or any alteration of or addition to an existing dwelling, on land in ANEF between 20 and 29 (inclusive) provided the building is designed in accordance with AS 2021

Local planning authorities around Western Sydney Airport

Where planning provisions are provided in respective LEP, the planning authority is to consider the use or potential future use of the Badgerys Creek site as an airport and that proposed noise-sensitive development be designed and constructed appropriately. The LEP refers to AS 2021 as the primary tool for guidance on land use planning in the vicinity of the Western Sydney Airport site, and notes that development consent for residences is required where the proposed development is within the ANEF 20 contour for the proposed airport. The construction of residential dwellings is prohibited in land where the ANEF is above 25.

Importantly, an ANEF for Western Sydney Airport has not been endorsed by Airservices Australia, and conditions of approval for the Airport, state:

The airspace and flight path design for the Airport, once developed, must include or be accompanied by noise modelling of a range of realistic airport capacity and meteorological scenarios

In contrast to the above, planning rules introduced by the NSW State Government under *State Environmental Planning Policy (SEPP) – Western Sydney Aerotropolis*, outline restrictions for ‘noise sensitive development’ (including residential development) in areas affected by the Australian Noise Exposure Concept (ANEC) 20-25 of the Western Sydney Airport, as well as aircraft noise insulation requirements for future residential development located within the extent of the Obstacle Limitation Surface (OLS) of the airport.

The State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 (30 September 2020) states:

Development consent must not be granted to noise sensitive development if the development is to be located on land that is in an ANEF or ANEC contour of 20 or greater

However, it does note that:

...development consent may be granted to development for the purposes of dwelling houses on land that is in an ANEF or ANEC contour of 20 or greater if, immediately before the commencement of this Policy, there were no dwellings on the land, and development for the purposes of dwelling houses was permitted on the land...

And also that:

Development consent must not be granted to noise sensitive development on the following land unless the consent authority is satisfied the development will meet the indoor design sound levels—

(a) land shown on the Land Application Map that is not in an ANEF or ANEC contour of 20 or greater,

(b) land shown on the Obstacle Limitation Surface Map.

B3 Other Australian States and territories

Victoria

Planning provisions for areas surrounding Melbourne Airport are controlled using the Melbourne Airport Environs Overlay (MAEO). The MAEO is used as a planning tool for appropriate land use and development in the noise-affected areas surrounding the airport. Development principles are guided by AS 2021.

The extent of the MAEO is generally aligned with the relevant ANEF for Melbourne Airport, with planning requirements dependent on whether the development is within MAEO2 (broadly corresponding to the ANEF 20 contour) and MAEO1 (broadly corresponding to the ANEF 25 contour). However, as ANEF contours are updated every 5-10 years while the MAEO is not updated, there are instances when the precise extents of the two overlays and latest endorsed ANEF 20 and 25 contours may contradict, at which point the application and interpretation of the MAEO in lieu of the latest ANEF becomes a planning matter.

Also of note in Victoria is the inclusion of references the National Airports Safeguarding Framework (refer Appendix B5) within the planning system. This has implications in that alternative noise metrics (known as N-Contours or 'Number Above' contours) may also be considered in conjunction with ANEF contours when making certain planning decisions, e.g. rezoning of greenfield areas, where there is potential for future uses to be unnecessarily exposed to aircraft noise.

The N-contours are based on daily counts of aircraft movements that exceed given noise levels at a site, as opposed to the ANEF system which is based on a complex average of annual cumulative exposure to aircraft noise. Importantly though, the ANEF remains the primary noise metric applied in Victoria for statutory planning purposes through the Melbourne Airport Environs Overlay.

An Airport Environs Overlay also covers land surrounding Moorabbin Airport. Any new building constructed on land within the overlay must comply with any noise attenuation measures required by AS 2021.

Queensland

The main document covering land use planning around the Brisbane Airport is the *State Planning Policy – state interest guidance material Strategic airports and aviation facilities* (SPP) and applies to land in the vicinity of airports but does not apply to those airports or aviation facilities themselves.

The requirements of the SPP are that developments and associated activities are to be compatible with forecast levels of aircraft noise, using the ANEF system. Specifically, development within the 20 ANEF contour or greater is to be consistent with the provisions outlined in AS 2021.

The SPP states consideration is to be given to using both ANEF contours and alternative noise contours (e.g. N-contour and Australian Noise Exposure Concept mapping) *to inform strategic decisions*. The alternative noise contours are complementary tools that provide information of the frequency and loudness of aircraft noise events. However, the SPP notes they should not be used as a development assessment tool, as they may not have been subject to the same level of scrutiny from relevant authorities compared with the established ANEF system, including ANEF contours reviewed and endorsed by Airservices Australia.

South Australia

Planning provisions for local government areas (LGA) surrounding Adelaide Airport have been reviewed. Adelaide Airport is in the City of West Torrens, as is most of the land within the extent of the ANEF for the airport.

The two primary LGAs, City of West Torrens and City of Charles Sturt, and their respective development plans both require development within areas affected by aircraft noise to be consistent with the provisions of Australian Standard AS 2021 – *Acoustics - Aircraft Noise Intrusion – Building Siting and Construction*.

Of note however, is that the 'Areas affected by aircraft noise' shown in the City of West Torrens Development Plan overlay map is not aligned to the current ANEF for Adelaide Airport, which typically extends further. Therefore, there are instances where the ANEF contours and the overlay are not commensurate.

Western Australia

The main document covering land use planning around the Perth Airport is the *State Planning Policy 5.1 - Land use planning in the vicinity of Perth Airport* (SPP 5.1). The requirements within SPP 5.1 are based on the requirements outlined in AS 2021, with controls applying to land within the 20 ANEF noise contour. There is no restriction on zoning or development within noise exposure zones identified as *acceptable* (less than ANEF 20).

Specifically, for proposed residential development identified as *conditionally acceptable* (within ANEF 20-25), local planning schemes also require a 'notice on title' advising the potential site occupant of the potential for noise nuisance from the airport as a condition of any subdivision or planning approval.

Where a site is intersected by one or more noise exposure zones, the zoning is determined as follows:

- Where the site has an area less than 1,000 m², the noise exposure zone for the whole site shall be deemed to be the level to which most of the site is subject; and
- Where the site has an area greater than 1,000 m², the noise exposure zone shall be determined separately for the individual parts of the site into which it is divided by the relevant noise exposure contour(s).

Planning provisions for LGA surrounding Perth Airport have been reviewed, including local planning policies, the majority of which directly refer SPP 5.1.

Tasmania

Clauses C16.5 and C16.7 of the Tasmanian Planning Scheme State Planning Provisions refer to 'airport noise exposure areas' which are defined by overlay maps in the relevant Local Provisions Schedule. Decision makers are to also refer to the requirements of any airport masterplans and advice from the airport operator or Airservices Australia.

Section E25 of the *Clarence Interim Planning Scheme 2015* described the Airport Buffer Zone that applies around Hobart Airport. Section E25.1(b) implies that residential development within the ANEF 20 contour may be permitted, as the stated purpose of the zone is to:

identify land within the 20 ANEF Noise Forecast contour as an area which is or will be subject to high levels of aircraft noise, and to assist in shielding people from such noise by ensuring appropriate noise attenuation measures in houses;

Section E12 of the *Northern Midlands Interim Planning Scheme 2013* presents the Airports Impact Management Code that applies to Launceston Airport. When considering noise impacts, the objective of the Code is to ensure that noise impacts on use within the ANEF contours from aircraft and airports are appropriately managed, noting specifically that all new buildings are to 'comply' with AS 2021 and that:

Sensitive use (whether ancillary to other use or development or not) must not occur within the 25 ANEF contour.

Northern Territory

Local planning and development controls in the Northern Territory (NT) are outlined in *The Northern Territory Planning Scheme (NTPS) 2020*. The NTPS came into effect on 31 July 2020.

The main airfield in the NT is RAAF Base Darwin, a Royal Australian Air Force (RAAF) military air base, that also shares its runway with Darwin International Airport, for civil aviation purposes.

Part 3 of the NTPS outlines relevant overlays which identify areas of land that have specific development requirements. Part 3.5 discusses the LPA (Land in Proximity to Airports) overlay, with a purpose to:

..minimises the detrimental effects of aircraft noise on people who reside or work in the vicinity of an airport..

The LPA overlay applies to land that subject to an Australian Noise Exposure Forecast (ANEF) 20 value or greater as defined on the [current] ANEF, produced by the Department of Defence.

Where the overlay applies, the use and development of land requires consent, and in determining an application for the development of land, the consent authority is to have regard to the 'Building Site Acceptability Based on ANEF Zones' (Table 2.1) in AS 2021.

B4 Airport Masterplans

A high-level review has been undertaken of select Airport Masterplans prepared for Australian federally leased airports as required by Airports Act 1996.

The masterplans refer to ANEF contours which are to be used in conjunction with AS 2021 to inform land use planning around the airports. Reference is also made to the National Airports Safeguarding Framework for providing additional information on aircraft noise around the airport.

Of note for Canberra Airport is a draft planning direction under Section 117 of the Environmental Planning and Assessment Act 1979 requiring that no new residential development be approved within the ANEF 20 contour. However, the then Minister for Planning and the Environment, advised (June 2014):

"I have determined not to proceed with its [draft planning direction under Section 117] finalisation ... I am confident that planning pathways currently available will deliver an equivalent outcome without the need to introduce a new regulatory imposition via a minister direction".

In the latest Canberra Airport Masterplan, reference is made that the airport hopes to work with NSW Planning, Industry and Environment in the preparation of a Ministerial Direction to ensure "rezonings for large scale urban release within the Australian Noise Exposure Forecast 20 for Canberra Airport" do not occur into the future.

B5 National Airports Safeguarding Framework

The Commonwealth Government's National Airports Safeguarding Advisory Group (NASAG) has been responsible for the development of a *National Airports Safeguarding Framework* (the Safeguarding Framework). The Safeguarding Framework was endorsed by the Standing Council on Transport and Infrastructure in May 2012.

The Safeguarding Framework's stated purpose is:

To enhance the current and future safety, viability and growth of aviation operations at Australian airports

The Safeguarding Framework was prepared to provide guidelines to assist local governments in regulating and managing a range of issues including aircraft noise intrusion. Guideline A of the Safeguarding Framework, titled *Measures for Managing the Impact of Aircraft Noise*, states how the guidelines should be used, and notes:

Some States/Territories already have planning guidelines or policies in place and this document provides guidance for any reviews of those documents. For those without policies in place, these Guidelines (in addition to the associated Safeguarding Framework) will provide guidance for new policies.

Notwithstanding the above, the Safeguarding Framework provides specific guidelines relevant to:

- Rezoning of greenfield areas to permit noise sensitive uses;
- Rezoning of brownfield areas to permit noise sensitive uses; and
- Assessment of new development applications for noise sensitive uses within existing residential areas.

The Safeguarding Framework proposes the use of supplementary metrics for defining the extent of noise effects around airports in the form of Number Above values consistent with guidance provided by the Australian Department of Infrastructure, Transport, Cities and Regional Development (2000, 2003, 2009) and AS HB 149. The Number Above values referred to in the Safeguarding Framework include the N60, N65 and N70 values along with details of the number of such events.

The Safeguarding Framework does not supersede the ANEF system, but instead provides guidance in instances where policies do not currently exist, or for States/Territories conducting a review of established policies. The proposed guidelines apply to areas within:

- The ANEF is greater than 20;
- There are 20 or more daily events greater than 70 dB L_{Amax} (N70 20 events);
- Or 50 or more daily events greater than 65 dB L_{Amax} (N65 50 events);
- Or 100 or more daily events greater than 60 dB L_{Amax} (N60 100 events); and
- Or 6 or more events greater than 60 dB L_{Amax} between 11 pm and 6 am.

The Safeguarding Framework provides guidelines for general aviation airports or airports with low frequencies of scheduled flights. It notes that whether an ANEF is prepared for these airports, land use planning should take account of flight paths, the nature of activity on airports and/or 'number above' contours if available.

APPENDIX C SOUND INSULATION (INFORMATIVE)

C1 Overview

This section provides information on the likely nature of the sound insulation requirements of noise sensitive development in Horsley Park UIA.

The information provided references the Stage 1 (short-term), 2050 (medium term) and parallel runway (long term) ANECs in the Western Sydney Airport EIS.

This section is informative only, and future assessments of aircraft noise and building sound insulation measures must consider the latest available information for future Western Sydney Airport operations and specific future aircraft noise level predictions at the location under review.

Section 3.0 of AS 2021 presents a method of establishing the sound insulation requirements for spaces within a building. The method considers three key parameters:

- Aircraft noise level;
- Indoor design sound level; and
- Aircraft Noise Reduction.

C2 Aircraft noise levels

AS 2021 provides a procedure for determining the maximum aircraft noise levels at a development site based on a database of typical Australian aircraft and their estimated noise emissions at locations relative to an airport.

For future aircraft noise levels at Horsley Park, noise level estimates have been made based on aircraft types included in the noise technical report of the Western Sydney Airport EIS. Figure 6 presents an extract of the aircraft types and estimate of the number of daily movements in the short, medium and long term forecast assessments.

Figure 6: Extract of aircraft types and movements assumed in the Western Sydney Airport EIS Volume 4, Appendix E1

Table 2-3 shows predicted total aircraft movements per day for each EIS assessment year, while Table 2-4 shows a breakdown by aircraft family. Figure 2-3 shows the predicted number of movements for each hour of the day.

Note that because the synthetic schedules represent a typical busy day, the number of movements is slightly greater than an annual average for the relevant scenario. For example, in Stage 1 the estimated 63,000 movements per year represents an annual average of approximately 173 per day, compared with 198 in the schedule. This provides some conservatism in estimates of noise exposure.

Table 2-3 Total Predicted Daily Aircraft Movements by Type by Year

Assessment Year	Movements Per Day		
	Freight	Passenger	Total
Stage 1	28	170	198
2050	74	480	554
Lonh Term	104	1006	1110

Table 2-4 Predicted Daily Aircraft Movements by Aircraft Family by Year

Aircraft Family	Movements Per Day		
	Stage 1	2050	Long Term
Passenger Movements			
Airbus A320	100	176	378
Airbus A330	18	128	286
Airbus A380	-	4	8
Boeing 737	28	104	196
Boeing wide-body general	-	20	40
Boeing 777	4	26	78
DeHaviland DHC8	8	12	10
Saab 340	12	10	10
Freight Movements			
Airbus A330	2	2	2
Boeing 737	2	6	6
Boeing 747	10	28	38
Boeing 767-400	4	8	10
Boeing 767-300	-	4	6
Boeing 777-300	-	2	4
Boeing 777-200	-	4	6
Small Freight	10	20	32

For estimates of future aircraft noise levels at Horsley Park, reference is made to straight arrival and departure flight tracks that follow the extended runway centre lines. Figure 7 shows the indicative flight tracks relative to the site.

A range of noise levels have been predicted for sites immediately underneath a flight track (shown as a solid red line) and sites offset 1,000 m to the side of a flight track (shown as a dashed red line).

Figure 7: Assumed flight paths

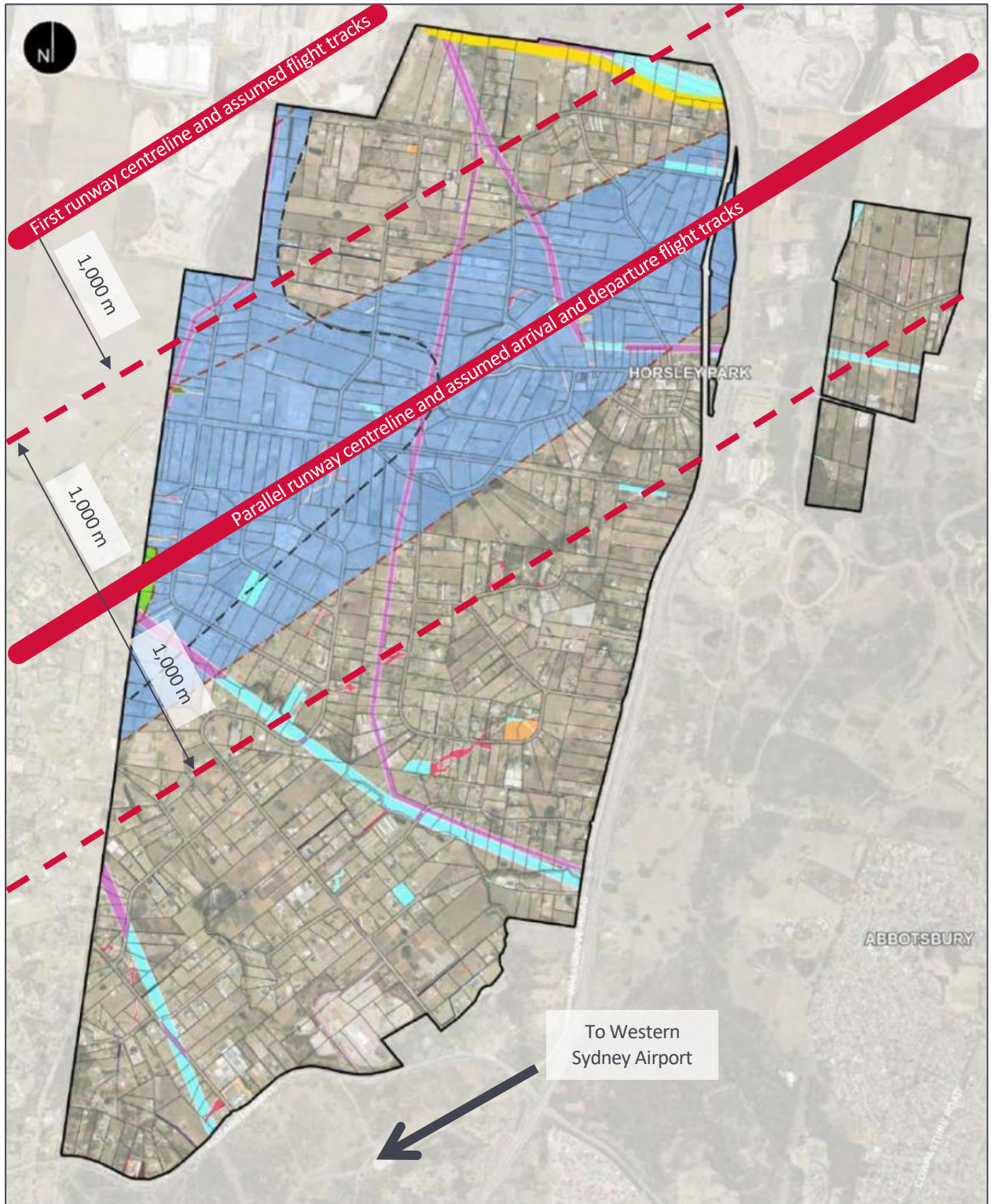


Table 3 presents the AS 2021 estimates of the range of aircraft noise levels that could be expected within 1,000 m of a flight track over Horsley Park. Noise levels at the higher end of the range occur directly below a flight path, and noise levels at the lower end of the range are representative of those locations at a sideline distance of 1,000 m from a flight track.

Table 3: AS 2021 estimated range of aircraft noise levels within 1,000 m of an arrival or departure flight track

Aircraft type	Arrival, dB L_{Amax}	Departure, dB L_{Amax}	Comments
Boeing 747-400 (long haul)	67 - 79	74 - 83	Likely to be the loudest aircraft type, but is being phased out of operation in Australia and will operate relatively infrequently
Boeing 767-300	65 - 77	73 - 77	Predicted noise levels anticipated to form the basis of building envelope sound insulation design.
Boeing 777-300	63 - 75	70 - 76	Similar noise levels to the Boeing 767
Airbus A330-301	63 - 74	70 - 75	Expected to be the loudest of the frequently occurring aircraft types
Airbus A380-841 (long haul)	70 - 74	70 - 75	Representative of noise levels from future large aircraft types other than the Boeing 747
Boeing 737-800	62 - 74	69 - 73	Third most common aircraft type
Airbus A320	59 - 70	62 - 67	Most commonly occurring aircraft type
SAAB 340	57 - 68	57 - 59	Propeller-driven aircraft type
DASH 8-300	50 - 61	50 - 53	Propeller-driven aircraft type

The highest predicted aircraft noise levels at the site are due to Boeing 747 movements, which was also predicted by the EIS. However, the EIS also notes in several places that Boeing 747 operations are being phased out at Australian airports and is likely to be replaced by quieter aircraft types, and that its inclusion in the EIS was a conservative approach to the assessment.

The predicted range of maximum noise levels, 70 – 75 dB L_{Amax} associated with large wide body jets is therefore likely to be representative of the typical highest noise levels experienced within 1,000 m of future aircraft flight tracks over Horsley Park.

This range of maximum noise levels have been considered as the basis of further discussion on insulating against aircraft noise intrusion.

C3 Indoor design sound level

AS 2021 recommends indoor design sound levels due to aircraft flyovers for different building types. The indoor design sound levels relevant to residential uses, including dwellings, temporary lodgings and nursing homes, are detailed in Table 4.

Table 4: AS2021 indoor design sound levels for noise sensitive uses

Building type and activity	Indoor design sound level, dB L_{Amax}
<i>Houses, home units, flats and caravan parks</i>	
Sleeping areas, dedicated lounges	50
Other habitable spaces	55
Bathrooms, toilets, laundries	60
<i>Hotels, motels, hostels</i>	
Relaxing, sleeping	55
Social activities	70
Service activities	75
<i>Hospitals, nursing homes</i>	
Wards, theatres, treatment and consulting rooms	50
Laboratories	65
Service areas	75

AS 2021 explicitly states that the indoor design sound levels are not intended to be used for measurement of adequacy of construction. Further, it notes that the indoor sound levels are intended for the sole purpose of designing adequate construction against aircraft noise intrusion and are not intended to be used for assessing the effects of noise. Reactions to noise levels are highly variable and subjective.

C4 Aircraft Noise Reduction

The Aircraft Noise Reduction (ANR) is a calculated or measured sound insulation value. For design purposes, it is the arithmetic difference between the predicted external aircraft noise level at a site and the indoor design level.

Based on the external and indoor design noise levels, the calculation for the Aircraft Noise Reduction (ANR) required by AS 2021 is shown in Table 5.

Table 5: ANR calculation

Building type and activity	Aircraft noise level, dB L _{Amax}	Indoor design sound level, dB L _{Amax}	ANR, dB
<i>Houses, home units, flats and caravan parks</i>			
Sleeping areas, dedicated lounges	70 - 75	50	20 - 25
Other habitable spaces	70 - 75	55	15 - 20
Bathrooms, toilets, laundries	70 - 75	60	10 - 15
<i>Hotels, motels, hostels</i>			
Relaxing, sleeping	70 - 75	55	15 - 20
Social activities	70 - 75	70	<10
Service activities	70 - 75	75	<10
<i>Hospitals, nursing homes</i>			
Wards, theatres, treatment and consulting rooms	70 - 75	50	20 - 25
Laboratories	70 - 75	65	5 - 10
Service areas	70 - 75	75	<10

Table 6 presents comments regarding achieving the ANR ratings shown in Table 5.

Table 6: Achieving ANR ratings

ANR	Comment
20 - 25	An ANR of 20 - 25 can be readily achieved with standard construction but will require the performance ratings of individual building envelopes to be verified. Sound insulation measures may include one or a combination of the following: <ul style="list-style-type: none"> – Higher density or multiple plasterboard ceiling linings – Higher density plasterboard or additional mass linings such as plywood or cement sheet to internal wall linings where lightweight facade construction is nominated for external walls. No additional treatment is expected to be necessary for masonry construction – Single or double glazing with a rating up to approximately R_w 35, such as 10 mm laminate single glazing or 6mm/12mm cavity/6 mm laminate double glazing, fitted with seals – External doors with perimeter seals
10 - 20	An ANR of 10 - 20 can be readily achieved by a modern building of basic construction with external windows and doors closed. No specific sound insulation measures likely to be necessary.
< 10	An ANR of 10 or lower can be achieved in a room with an open window. Therefore, no specific sound insulation measures likely to be necessary.

Regarding achieving the ANR for internal spaces, Section 3.3 of AS 2021 states:

In general, this will require that external windows and doors be kept closed since if these are opened for ventilation purposes the aircraft noise reduction of the building will be significantly reduced. If it is necessary to close windows and doors to comply with this Standard, building ventilation should be in accordance with the National Construction Code on the assumption that windows and doors are not openable.

External windows and doors are required to be closed to achieve ANR >10. Specialist advice should be sought from a mechanical engineer and building surveyor regarding the ventilation requirements of buildings. Any air intake or discharge paths associated with the ventilation system would need to be appropriately treated so that the overall sound insulation of the facade is not compromised.