

Aircraft noise management *summary*



Perth Airport

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Introduction

Perth Airport operates 24 hours a day, seven days a week, and is one of the most important public transport facilities in Western Australia. The airport is operated by Perth Airport Pty Ltd, under a 50-year lease with a 49-year option granted by the Commonwealth Government in 1997.

We are a private company with approximately 80 percent of our shares held for the benefit of Australian superannuants and Australian citizens. We are Australia's fourth largest airport in terms of passenger numbers and the principal international, interstate and intrastate airport in Western Australia.

Perth Airport plays an important role in Western Australia's economy, actively supporting much that is close to the hearts of Western Australians such as employment opportunities, tourism and leisure – connecting people, places and services.

Noise from aircraft operating at Perth Airport is an unavoidable impact in the provision of air services.

All areas of Perth will have aircraft from Perth Airport, Jandakot Airport or RAAF Base Pearce flying overhead from time to time and will experience aircraft noise at various levels. Although aircraft and engine technological improvements continue to result in new aircraft being quieter, the growth in both the number of aircraft movements and the size of the Perth metropolitan region means many communities are exposed to aircraft noise.

Perth Airport, Airservices Australia (Airservices) and airlines work together with the Commonwealth, State and Local Governments to manage the impacts of aircraft noise on surrounding communities. We are committed to ensuring that the community and stakeholders are fully informed and aware of flight paths and associated noise impacts surrounding Perth Airport.

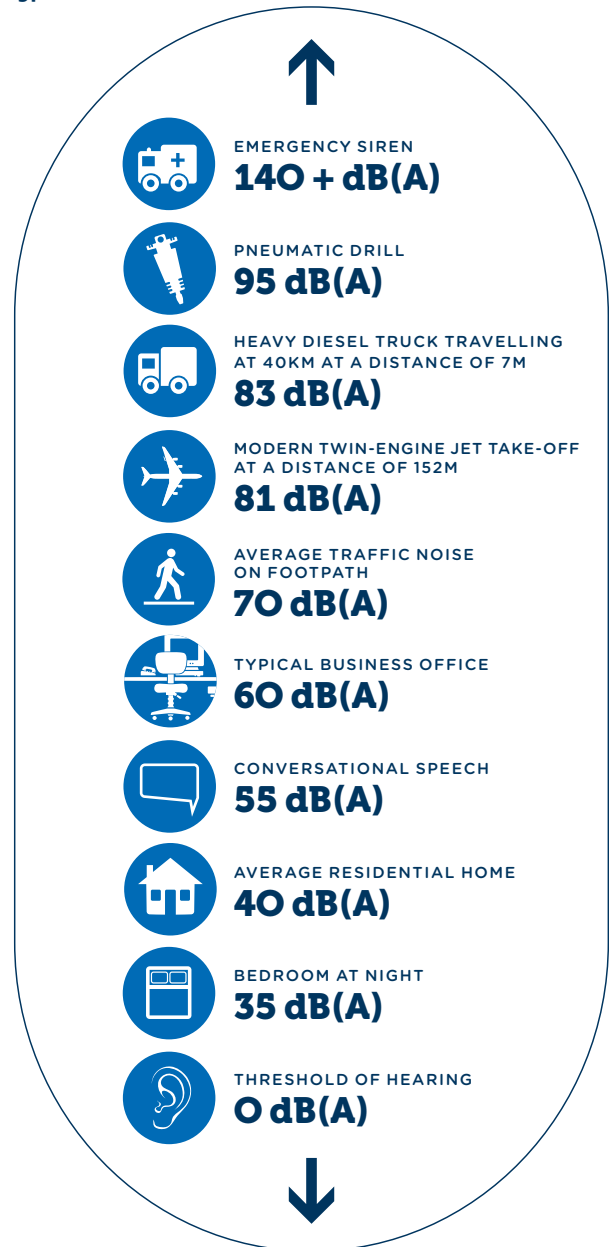
This booklet and Perth Airport's online 'Interactive Aircraft Noise Information Portal' will help you gain a better understanding of how aircraft noise may affect you. Visit perthairport.com.au/noise

What is noise?

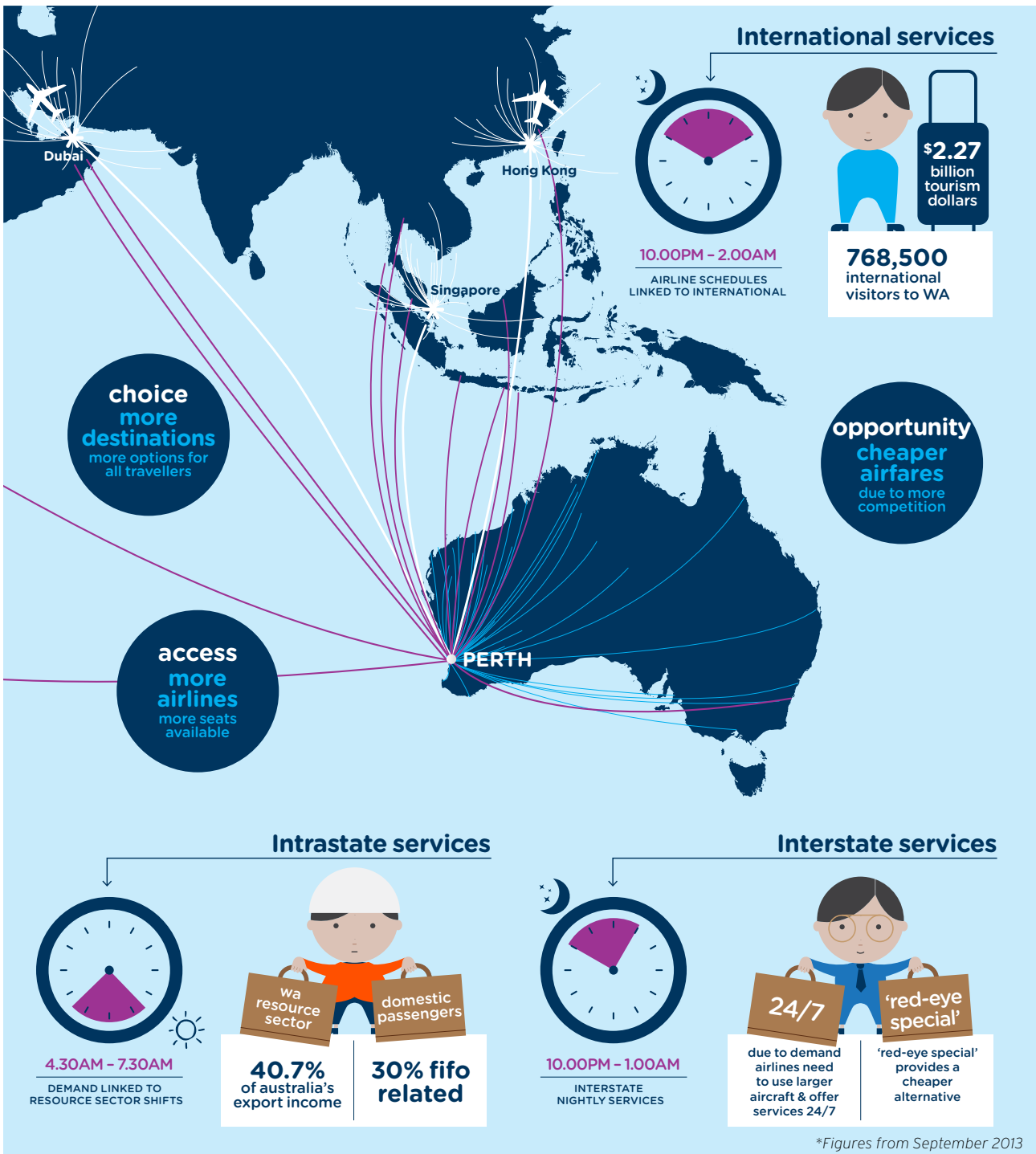
Sound is vibrations through the air that are received and interpreted, or 'heard', by a person, whereas noise can be defined as 'unwanted' or unpleasant sound.

A decibel or dB(A), is a standard unit of measure to indicate sound pressure levels to account for the relative loudness perceived by the human ear. It is commonly used to measure environmental and industrial noise.

Typical sound levels



Why Perth Airport operates 24/7



Maintaining operational flexibility is critical to supporting Western Australia's economy. We are part of a national and global aviation network and, as such, flight times and schedules are not directly controlled locally. The viability of many of Perth's international air services depends on linking with connecting networks through hub airports such as Dubai and Singapore. Any restrictions on the operations of Perth Airport would lead to a significant loss of air services,

which may result in a reduction of service levels and a possible increase in the cost of flying for all travellers.

International aircraft seats are the lifeblood of the State's international tourism business and the many jobs directly and indirectly generated by that industry. The reduced level of international air services that would arise from restrictions on Perth Airport would have profound impacts on tourism and all those who depend on that industry.

Who is responsible for aircraft noise management?

Perth Airport has adopted the International Civil Aviation Organisation's (ICAO) recommended 'balanced approach' to aircraft noise management for managing noise in the vicinity of the airport. The balanced approach consists of identifying the noise issue at an airport and then analysing the various measures available to reduce noise.

The four principal elements of the ICAO balanced approach are:

- reduction of noise at source,
- land use planning and management,
- noise abatement operational procedures, and
- operating restrictions.

Perth Airport also believes it is important to communicate aircraft noise information in an uncomplicated, easy to understand manner.

To achieve the balanced approach, a range of organisations have different roles and responsibilities in relation to aircraft noise management.

Perth Airport only has direct control over the management of ground-based aircraft noise. The Civil Aviation Safety Authority (CASA) is responsible for the administration and regulation of Australian-administered airspace under the *Airspace Act 2007*, while Airservices is the agency responsible for managing the airspace around Perth Airport. This includes the design of flight paths as well as the management of noise generated from airborne aircraft.

Perth Airport's commitment to managing aircraft noise is contained in our 'Aircraft Noise Management Strategy' (ANMS), which takes into account aircraft taking off, departing, approaching, landing and manoeuvring on the airfield, including engine testing within the airport site.

Our ANMS not only adopts the ICAO balanced approach, it also includes community consultation and engagement and appropriate infrastructure planning as principal elements that are adapted to the Perth environment.

This strategy includes six key themes that establish a framework to assist Perth Airport to effectively manage the impacts of aircraft noise on surrounding communities.

- Theme 1 – Identify opportunities
Work with Airservices, aircraft operators, industry stakeholders and the community to identify opportunities for improvement and achieve better outcomes in a cost effective manner,
- Theme 2 – Land use planning
Facilitate change to land use planning and policy that directs inappropriate land uses away from the airport while encouraging compatible land uses in the intervening areas to protect operational flexibility and 24/7 operations,
- Theme 3 – Engage and communicate
Engage and communicate with the community to ensure they are fully informed and that their concerns and priorities are considered in guiding aircraft noise management outcomes,
- Theme 4 – Improve understanding
Continually seek to improve our understanding of aircraft noise and its impacts to ensure effective noise management,
- Theme 5 – Infrastructure planning
Apply best practice aircraft noise management practices where relevant in the development of new airport infrastructure, including thorough design and community consultation, and
- Theme 6 – Best practice benchmarking
Understand what best practice is and learn lessons from other airports and industries on how to manage the impacts of aircraft noise and community engagement.

This framework is reflective of global best practice.



The management of aircraft noise is the responsibility of a range of organisations. Perth Airport is committed to working with Airservices, airlines, Commonwealth, State and Local Governments to manage adverse impacts of aircraft noise on the community.

Organisation	Roles and Responsibilities
International Civil Aviation Organisation (ICAO)	<ul style="list-style-type: none"> establishes strict noise certification standards for new aircraft provides guidance on noise management strategy australia is a member state of ICAO
Civil Aviation Safety Authority (CASA)	<ul style="list-style-type: none"> independent statutory authority with responsibility for regulation of civil aviation operations in Australia provides overriding consideration to air safety responsible for airspace regulation through the Office of Airspace Regulation
Department of Infrastructure and Regional Development (DoIRD)	<ul style="list-style-type: none"> advises the Commonwealth Government on the policy and regulatory framework for Australian airports and the aviation industry provides policy advice to the Minister on the management of aircraft noise provides regulatory oversight of the 'Air Navigation (Aircraft Noise) Regulations 1984' as they apply to aircraft which do not meet Australian aircraft noise standards
Airservices Australia (Airservices)	<ul style="list-style-type: none"> provides Air Traffic Control (ATC) services manages and maintains aircraft navigation, surveillance and noise monitoring infrastructure establishes flight paths at Perth Airport manages noise complaints and enquiries through the Noise Complaints and Information Service provides information on aircraft movements, runway and flight path usage and noise impacts using a range of noise descriptors conducts noise monitoring in communities surrounding Perth Airport reviews and endorses the Perth Airport Australian Noise Exposure Forecast (ANEF) for technical accuracy implements Noise Abatement Procedures
Airlines and aircraft operators	<ul style="list-style-type: none"> operate and maintain aircraft that meet the ICAO noise certification requirements implement Noise Abatement Procedures principles for flight operations
Aircraft Noise Ombudsman (ANO)	<ul style="list-style-type: none"> oversees the handling of aircraft noise issues by Airservices and the Department of Defence conducts independent reviews of noise complaint handling makes recommendations for improvements and changes where necessary and feasible
State and Local Government	<ul style="list-style-type: none"> State Government develops land use planning frameworks to prevent developments that are inappropriate, having regard to aircraft noise Local Government implements State Government land use planning frameworks
Perth Airport	<ul style="list-style-type: none"> manages operations at the airport develops and maintains infrastructure to support aircraft operations publishes a Master Plan with an associated ANEF at least every five years develops a management plan for managing aircraft noise intrusion in areas forecast to be subject to exposure above significant ANEF levels applies an engine ground running management plan engages with the Perth Airport Community Forum (PACF), previously the Perth Airport Community Aviation Consultation Group (CACG), the Planning Coordination Forum (PCF) and the Perth Airport Aircraft Noise Technical Working Group and broader community
Perth Airport Community Forum (PACF)	<ul style="list-style-type: none"> works collaboratively to recognise and enhance: <ul style="list-style-type: none"> the long-term sustainability and growth of Perth Airport Perth Airport's reputation as a responsible corporate citizen within the local and broader community, and Perth Airport's role as a major economic contributor for Western Australia
Planning Coordination Forum (PCF)	<ul style="list-style-type: none"> supports effective engagement between Perth Airport and Commonwealth, State and Local Government agencies on strategic planning issues, including land use and aircraft noise impacts
Perth Airport Aircraft Noise Technical Working Group	<ul style="list-style-type: none"> enables industry to initiate and evaluate operational changes while ensuring that the noise impact of those changes is considered and opportunities to improve noise outcomes are explored

How does Perth Airport operate?

The runway system at Perth Airport consists of two intersecting runways. The first runway is 3,444 metres in length, runs north/south and is referred to as 'Runway 03/21' (or the main runway). All aircraft, including the large Airbus A380, can depart and arrive on this runway.

Our second runway is 2,163 metres in length, runs northeast/southwest and is referred to as 'Runway 06/24' (or the cross runway). Not all large aircraft can operate from this runway as some need a longer distance for take-off.

Runway selection

The selection of a runway to be used for aircraft landing (arrivals) or for take-off (departures) is based on many considerations including the weather, the impact on surrounding communities, traffic demand and local airspace.

Aircraft are designed to take-off and land into the wind, so the weather, and in particular wind speed and direction, is generally the main factor in determining which runways and flight paths are used.

When a runway is selected, it needs to be available for an extended period of time to allow pilots to plan their descent, approach and landing.

Runway selection at Perth Airport

The nature of the resource sector's fly-in fly-out (FIFO) workforce and connections to international flights, sees Perth Airport experience significant peak periods. In the early

morning, there is a departures peak that can result in up to 35 aircraft departing each hour for a two to three hour period. In the afternoon, there is an arrivals peak which sees up to 24 aircraft arriving each hour for a two to three hour period.

Runway selection decisions are made by Airservices, the national air navigation service provider. For the majority of time, the two runways are used dependently, meaning that the separation of aircraft considers other aircraft operating on each runway. This increases the required separation between aircraft. The two runways can be used in various configurations. Weather conditions, including wind speed and direction, may not allow the use of the two runway configurations therefore, a single runway is used.

Additionally, restricted airspace associated with RAAF Base Pearce can impact on runway selection or require coordination.

Generally, aircraft at Perth Airport operate in either a North Flow or a South Flow runway configuration.

North Flow – aircraft land in a northerly direction flying over Queens Park and Redcliffe on arrival, and take-off over Guildford and Bellevue on departure.

South Flow – aircraft land in a southerly direction flying over Guildford and Bellevue on arrival, and take-off over Queens Park on departure. In certain wind and weather conditions, aircraft will occasionally take-off on Runway 06/24 over Redcliffe.



What are noise abatement practices and procedures?

Managing the noise impact on surrounding residents is a consideration when determining the runway selection. Noise abatement practices and procedures can provide noise relief to communities around airports from both arriving and departing aircraft, however the safety of aircraft still remains the number one priority.

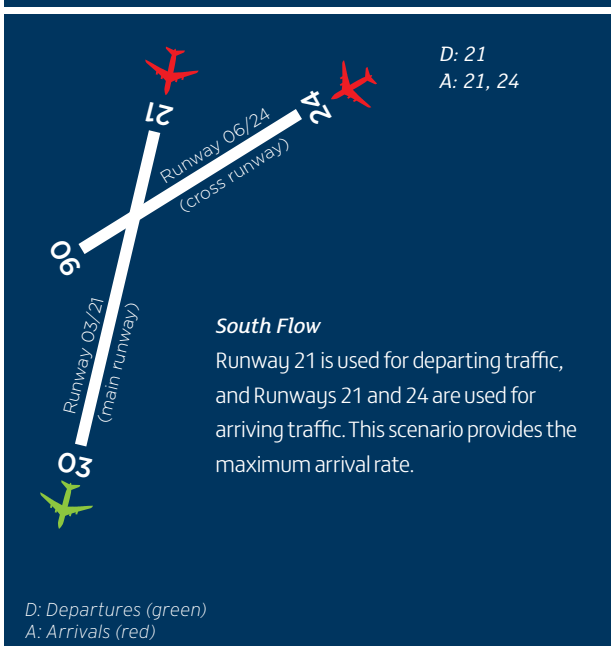
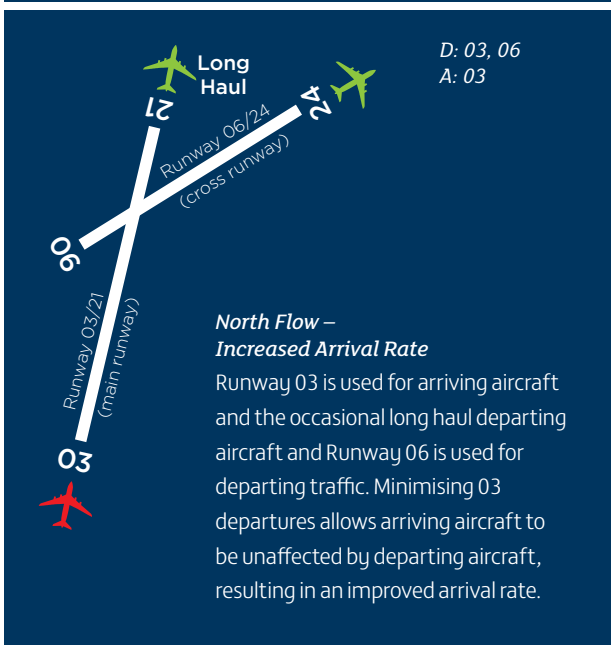
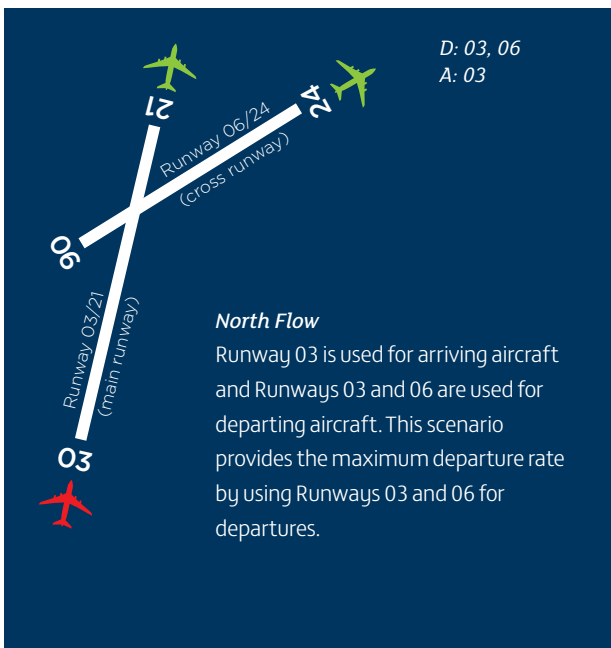
There are certain constraints that prevent or hinder the implementation of noise abatement practices and procedures. Operational procedures must consider issues such as:

- the capacity requirements of the airport and airspace,
- the configuration of the airport and the local community characteristics,
- the trade off between noise and emissions, and
- whether aircraft are equipped with the necessary sophisticated flight management systems.

At Perth Airport, our noise abatement practices include:

- climb profiles that are designed to get aircraft higher over residential areas. Noise abated climb procedures apply to all runways at Perth Airport,
- Continuous Descent Arrival (CDA) procedures that reduce the need for aircraft to level off during the descent and approach. CDAs reduce noise compared to conventional descents because aircraft stay higher for longer and require significantly less engine thrust,
- minimum use of reverse thrust after landing,
- flight track dispersion/concentration. Flight tracks are designed to avoid populated areas as much as possible,
- restrictions to training flights, and
- engine ground running procedures that have been established for Perth Airport to minimise the impact of engine ground running noise.

*Noise Abatement Procedures that guide pilots are documented in the Aeronautical Information Package (AIP)/Departure Approach Procedures, published by Airservices.



What will the new runway mean to me?

Important planning work for a new runway has commenced.

National Air Traffic Services (NATS), the United Kingdom's air navigation service provider, was engaged to assist Perth Airport with determining when the new runway should be constructed. Based on their analysis and comprehensive interaction with Airservices and airlines, work has commenced towards the construction of the new runway (03R/21L) by the end of the decade, subject to actual demand during the period. During the next two to three years, extensive community consultation will be undertaken on the New Runway Project and approvals will be sought in accordance with the *Airports Act 1996*. An additional period of approximately two years will be required to construct the new runway, assuming approvals are granted.

Where will the new runway be located?

The new runway will be 2,700 metres long, 45 metres wide, and will run parallel to the existing main runway (which will then be renamed 03L/21R). It will be located between Terminal 1 (T1) and Abernethy Road. The development includes an extensive system of taxiways that integrate the new runway into the current airfield. Other associated airfield infrastructure and systems for the safe and efficient use of the new runway are also required, such as lighting, navigation and an additional firefighting and rescue station.

How will the new runway operate?

In 2013, NATS was engaged to support Perth Airport and Airservices in developing a Concept of Operations (CONOPS) for a three-runway system. The impacts on the airspace in the Perth basin (including Jandakot Airport and RAAF Base Pearce airspace) were considered to ensure optimal utilisation in ground movement and airspace.

NATS was highly credentialed to complete the CONOPS, having completed the Airport Capacity Enhancement (ACE) program at Australia's large airports, as well as having extensive international experience in the technical planning for additional runway infrastructure in some of the world's most complex environments.

The CONOPS study provided a high level view of the optimal operation of Perth Airport in terms of ground movements and airspace design, focusing on the handling of arrivals, departures and missed approach scenarios. The CONOPS considered the particular operations at Perth Airport including the fleet mix, destinations and origins, and apron locations to maximise efficiency and capacity.

The CONOPS study identified that:

- as the runways are located 2,000 metres apart, independent twin Instrument Landing System (ILS) approaches can be used, which means that each runway will cater for both arrivals and departures at the same time,
- aircraft should be allocated to the runways based on terminal arrivals and compass departures. A terminal arrival means that aircraft will land on the runway closest to the terminal that they operate from. For example, an aircraft operating at T3 or T4 will land on the main runway (03L/21R). A compass departure means that the runway is allocated according to the direction that the aircraft is going. The main runway (03L/21R) will generally cater for aircraft operating to destinations south and west. The new runway (03R/21L) will generally cater for aircraft operating to destinations north and east,
- simulation modelling showed the runways could support around 60 arrivals during the peak arrivals hour, 70 departures in the peak departures hour and up to 100 movements during a balanced arrivals and departures hour,
- use of the cross runway (06/24) during peak periods would reduce the efficiency and the available runway capacity, and
- the new runway will require the approval of CASA and its use will require the establishment of appropriate civil and military airspace arrangements which will involve Commonwealth civil and military aviation agencies.

*Please note, the CONOPS are subject to change throughout the approvals process for the Major Development Plan.

Due to growth, construction of the new runway has been brought forward, and it is anticipated that it will be operational by the end of the decade, subject to actual demand.

Location of Perth Airport's proposed new parallel runway



Aircraft Noise Information Portal

Perth Airport is committed to ensuring the community and key stakeholders are fully informed and aware of where aircraft fly and the associated noise impacts. To ensure public access to as much information as possible, we have developed a model for presenting information, that focuses on specific addresses. This is presented through the 'Aircraft Noise Information Portal'.

The Aircraft Noise Information Portal includes information on:

- aircraft noise,
- flight paths around an address,
- land planning restrictions relating to aircraft noise,

- noise events and impacts related to an address,
- how aircraft noise in a home may be managed, and
- information on runway closures and flight path trials.

The Portal also enables a report to be developed that summarises aircraft noise impacts for individual addresses and includes information on how to make an enquiry or complaint about aircraft noise.

The Aircraft Noise Information Portal can be viewed at perthairport.com.au/noise

The screenshot shows the Perth Airport logo at the top left. The main heading is "INTERACTIVE AIRCRAFT NOISE INFORMATION PORTAL". Below this is a welcome message: "Welcome to the Perth Airport interactive aircraft noise information portal." The text explains that Perth Airport operates 24 hours a day and is a major public transport facility in Western Australia. It notes that noise from aircraft is an unavoidable impact. The portal's purpose is to help users understand flight paths and noise impacts for their property. It also provides information on how to report noise and mentions that the portal is best viewed using Mozilla Firefox or Google Chrome. The page features six navigation tiles: "Understanding aircraft noise" (with an image of an engine), "Aircraft noise management" (with an image of people around a puzzle), "Frequently asked questions" (with an image of question marks), "Noise in your area" (with a map and a "Read more" button), "Future noise impacts" (with an image of an airplane at night), and "Stay informed" (with an image of a hand holding a newspaper).

Are there any restrictions on land use around Perth Airport?

Perth Airport works with Airservices, CASA and Commonwealth, State and Local Governments to be proactive in effectively coordinating land use planning and management.

Like many airports, a *push-pull* strategy has been implemented where incompatible land uses, such as residential development, are directed away from areas that are, or will be, exposed to aircraft noise; while land uses that are less sensitive to aircraft noise, such as industrial developments, are encouraged in areas surrounding the Perth Airport estate.

This is controlled through the development of an 'Australian Noise Exposure Forecast' (ANEF) for Perth Airport.

What is the Australian Noise Exposure Forecast?

The Australian Noise Exposure Forecast (ANEF) system is a tool used for land use planning in Australia. It illustrates the impact of aircraft noise in an area using visual contours. The ANEF forms part of the 'Australian Standard 2021 (AS2021), Acoustics – Aircraft Noise Intrusion – Building Siting and Construction', which provides guidance on the acceptability of new building sites within an ANEF zone. This information is used to help authorities determine what type of land use or development should proceed, based on the extent of aircraft noise in the area.

In addition to its role in determining land use and development, the AS2021 also provides information on construction methods and materials that minimise noise intrusion in developments that fall within ANEF contours.

The ANEF system was developed through a major socio-acoustic survey carried out in the vicinity of a number of Australian airports in 1980. The ANEF system incorporates a weighting for the period 7.00pm to 7.00am,

as the study showed that this gave the best correlation between noise dose and community reaction.

The acceptability criterion varies depending on the type of land use. AS2021 specifies that land within an aircraft noise exposure level of less than 20 ANEF is acceptable for the building of new residential dwellings. The 20 ANEF contour corresponds to approximately 10 percent 'seriously affected' level and 30 percent 'moderately affected' level in the dose/response relationship that was established by the 1980 socio-acoustic survey.

Perth Airport developed its first ANEF as part of the 1985 Master Plan, nearly 30 years ago. Since that initial noise forecast which included the three runway system, the overall footprint of the noise exposure forecast is relatively the same.

An important point to recognise is that, since 1983, there has been considerable development and infill in and around Perth Airport. During that time the published ANEF referred to in each subsequent Master Plan every five years has not changed significantly. The image on page 13 shows what Perth looked like in 1983 and overlays the lines of each ANEF since that time.

The State Government has acted to restrict inappropriate development, mostly residential, in the vicinity of Perth Airport by adopting the Perth Airport ANEF into 'State Planning Policy 5.1 – Land Use Planning in the Vicinity of Perth Airport'.

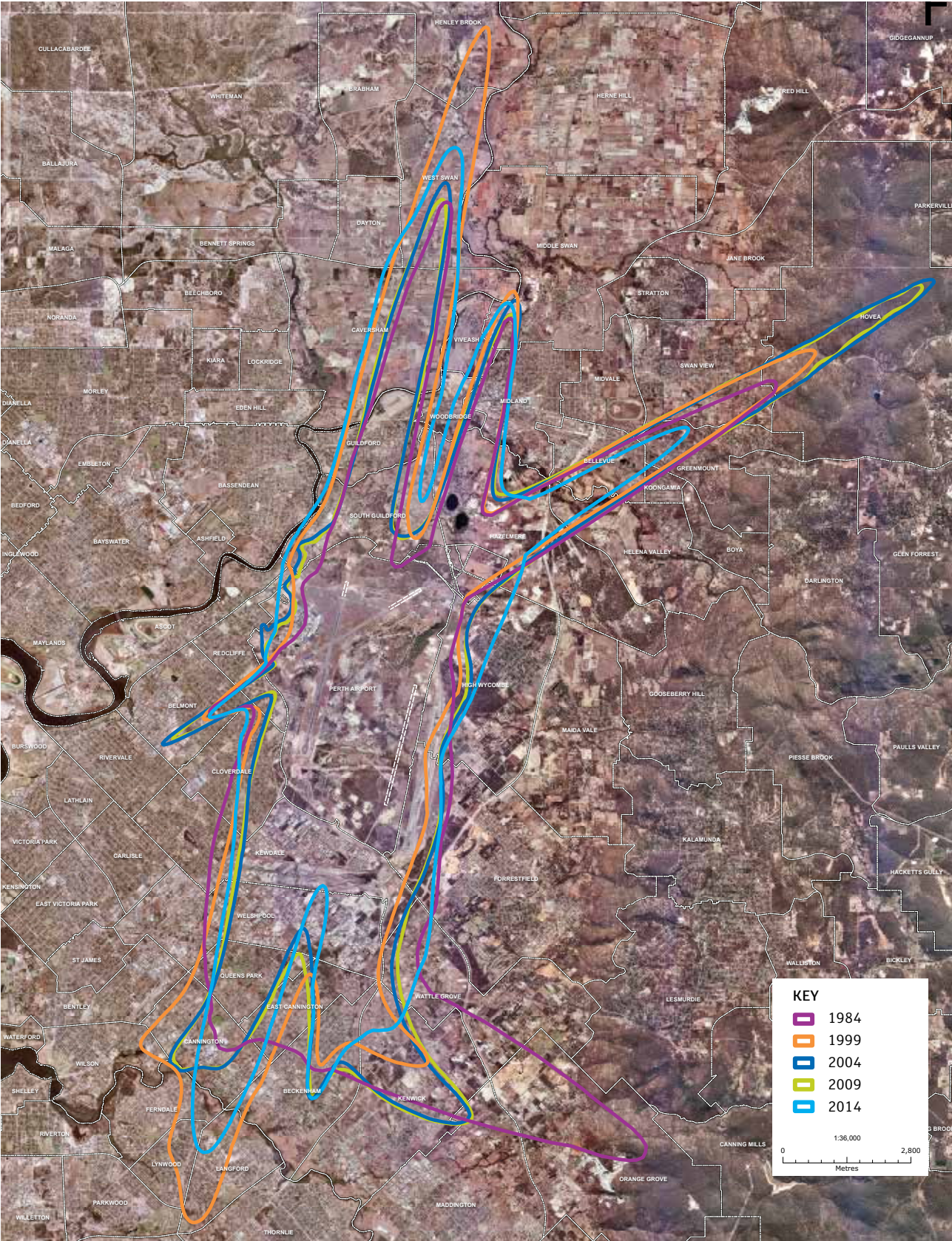
New or increased density residential development close to the airport, and in particular those areas located within an aircraft noise exposure level of greater than 20 ANEF, should not occur.

We continue our practice of objecting to new or increased density residential development close to the airport in order to minimise public exposure to aircraft noise.

Building type	Forecast noise exposure level (ANEF)		
	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 25 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 30 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		

Building site acceptability table based on ANEF zones (AS2021)

Perth Airport has been undertaking long-term planning to protect the future infrastructure needed to support aviation growth in Western Australia. Detailed ANEFs have been made public since 1983 to assist State and Local Governments in land use planning. Perth Airport's airfield planning has remained relatively constant for the past three decades.



Comparison of ANEF MASTER PLANS 20 - 25 Zone Contours overlaid on 1983 Aerial Image

Development of the Ultimate ANEF (2014)

As part of the Perth Airport Master Plan 2014, we developed a revised Ultimate ANEF. The Ultimate ANEF considers the following factors:

- current and future aircraft types and mix,
- number of aircraft movements,
- runway layout and runway selection,
- current and future concept flight paths,
- aircraft destinations or origins which determine how heavy an aircraft is, as well as the noise profile of that particular aircraft,
- day and night split of operations,
- terrain elevation, and
- weather conditions, including wind velocity and temperature information.

The 'Manner of Endorsement for Australian Noise Exposure Forecasts' released by the Department of Infrastructure and Regional Development outlines the projected timeframes that an ANEF can cover:

- a Standard ANEF (a forecast of noise exposure levels up to a maximum of 20 years),
- a Long-Range ANEF which specifies a year (a forecast of noise exposure levels up to and beyond 20 years), or
- an Ultimate Practical Capacity ANEF (a forecast of noise exposure level likely if an airport was operating at its ultimate practical capacity).

If land use planning in the vicinity of Perth Airport was based on a 20-year/Standard ANEF (a smaller contour) rather than the Ultimate ANEF, this could result in inappropriate development in areas surrounding the airport. In the long-term, this could result in more extensive aircraft noise exposure and restrict the ultimate capacity of the airport.

Therefore, since 2004, an Ultimate ANEF based on 350,000 annual aircraft movements has been developed in consultation with State and Local Governments. This level of annual aircraft movements is consistent with the following being undertaken:

- the anticipated level of activity once the airport is starting to reach capacity during the peak periods,
- the airfield fully developed (including extensions to existing runways), and
- the construction of the new runway (03R/21L).

In developing the revised Ultimate ANEF, we adopted a 'Composite' ANEF which reflects a combination of three scenarios (referred to as Australian Noise Exposure Concept or ANEC) to ensure the existing and potential future runway operating scenarios leading up to the ultimate airfield layout scenario are also considered.



The Composite ANEF was created by taking the worst case (outer contour lines) of the three ANECs.

2018 ANEC

The first ANEC (2018 ANEC) is based on approximately 179,000 aircraft movements per year and reflects the existing runway system at capacity. After this time additional runway infrastructure is required to meet demand, either by an extension of the cross runway (06/24) or the construction of the new runway (03R/21L).

2022 ANEC

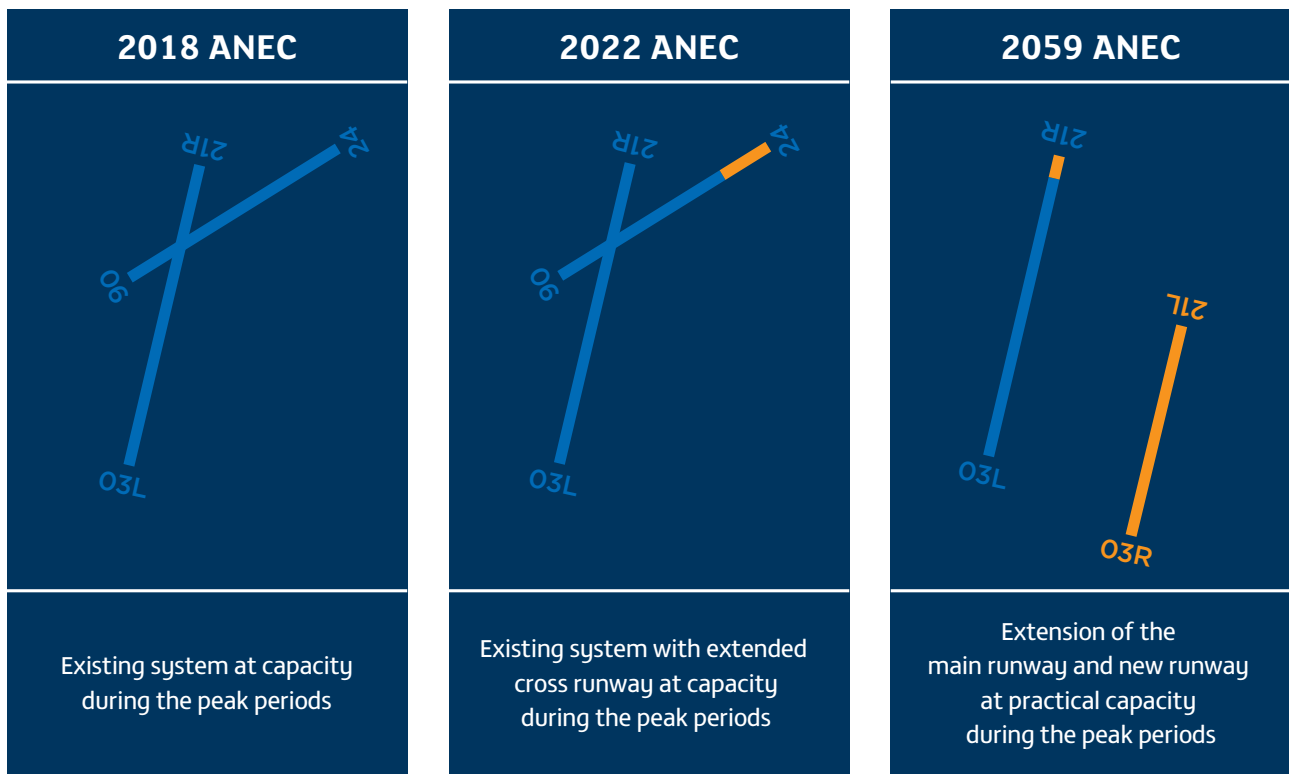
The second ANEC (2022 ANEC) considers the extension of the cross runway (06/24) and looks at when this operating mode would reach capacity. This ANEC provides a capacity

of approximately 190,000 aircraft movements per annum and is reached in 2022. This would also be when the maximum movements on the cross runway (06/24) is reached. In 2023, additional runway infrastructure is again required, leading to the third ANEC.

2059 ANEC

The third ANEC (2059 ANEC) is based on the long-term airfield layout, including the extension to the main runway (03L/21R) and construction of the new runway (03R/21L). This scenario can accommodate 350,000 annual aircraft movements and is consistent with the anticipated level of activity once the airport is again starting to reach capacity during the peak period.

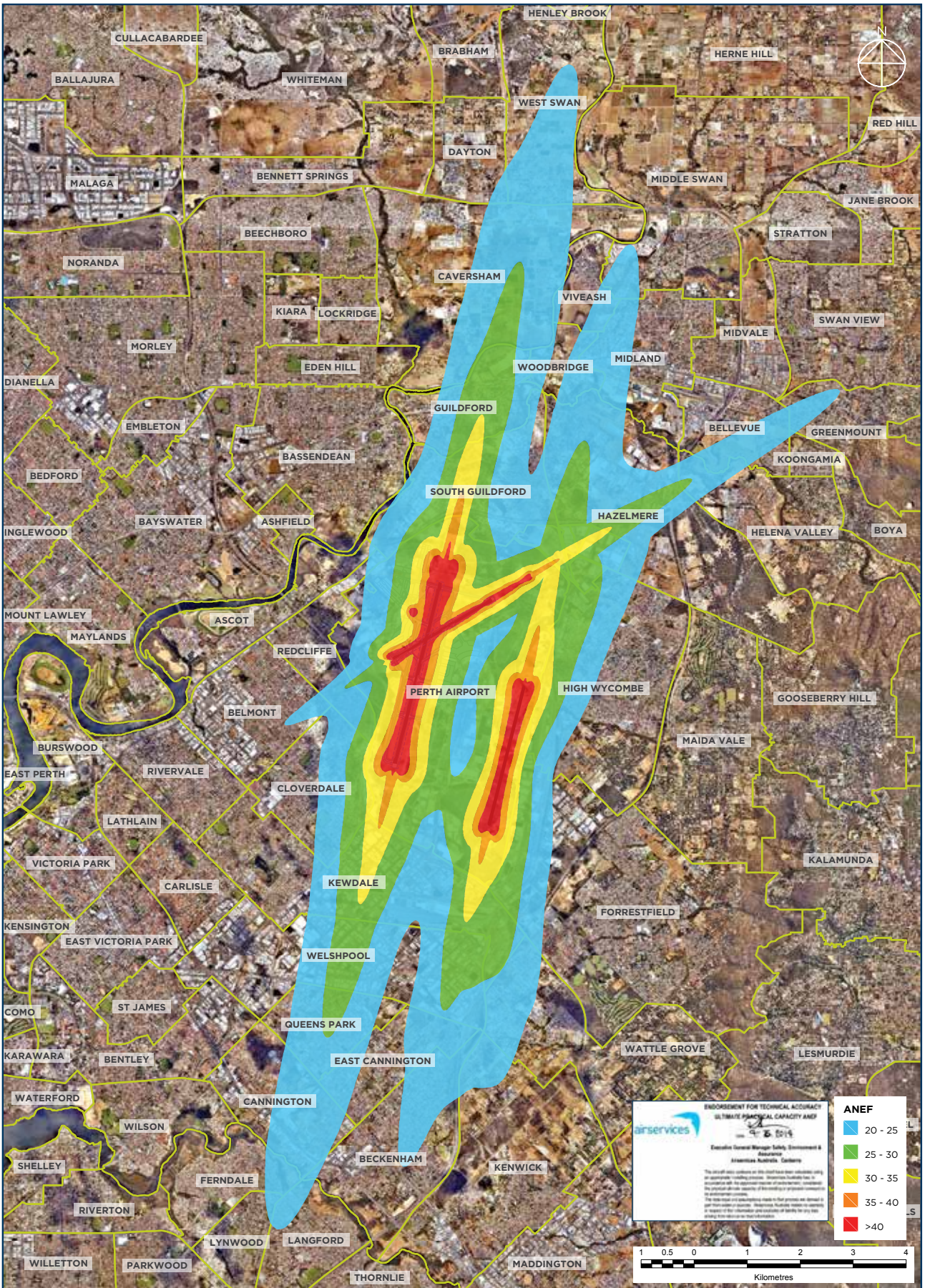
2018, 2022 and 2059 ANEC runway scenarios



The Composite ANEF is created by taking the worst case (outer contour lines) of the three ANECs.

The Perth Airport Ultimate ANEF was endorsed by Airservices for technical accuracy on 4 June 2014 and it has been adopted into 'State Planning Policy 5.1 – Land Use Planning in the vicinity of Perth Airport'.

Perth Airport Ultimate ANEF



This ANEF represents areas with expected high concentrations of aircraft noise, however all areas of Perth will have aircraft from Perth Airport, Jandakot Airport or RAAF Base Pearce flying overhead from time to time and will experience noise of varying levels.

How many aircraft will fly over my house?

It is recognised that the ANEF is a land use planning tool and does not convey the impact of aircraft noise and aircraft noise exposure. Perth Airport uses two illustrations to describe where aircraft fly around Perth Airport: flight path diagrams and 'Number Above' contour plans.

What is a flight path diagram?

Flight paths can be considered 'highways in the sky'. They define three-dimensional routes that aircraft use to arrive at, or depart from an airport.

All flight paths are developed and implemented by Airservices as the national operator of civilian airspace management across Australia. However, the airspace operated by Airservices is approved and regulated by the Office of Airspace Regulation, which is part of CASA.

In developing flight paths, consistent with international standards, Airservices takes into account:

- safety, and minimising the risk of aircraft conflicting in the sky,
- minimising air track miles,
- fuel consumption and associated carbon impact, and
- noise impact on urban areas.

Airservices will determine additional options to maintain and have approval, through the Office of Airspace Regulation, of as many routes as possible to provide appropriate operational flexibility.

Flight paths are often shown as a single line on a map, however, unlike a train on a railway line or a car on a highway, it is not always possible for aircraft to follow

precisely along the line depicted. In practice, a flight path can vary up to several kilometres or more. This occurs for a range of reasons, including:

- weather conditions,
- requirement to keep a safe distance between aircraft in the sky, and
- pilot and aircraft performance.

Perth Airport plans for a flight path based on a nominal spread around a central path called a 'corridor'. This corridor is then combined with altitude information and presented as a 'flight path diagram'.

A flight path diagram illustrates flight paths in two ways:

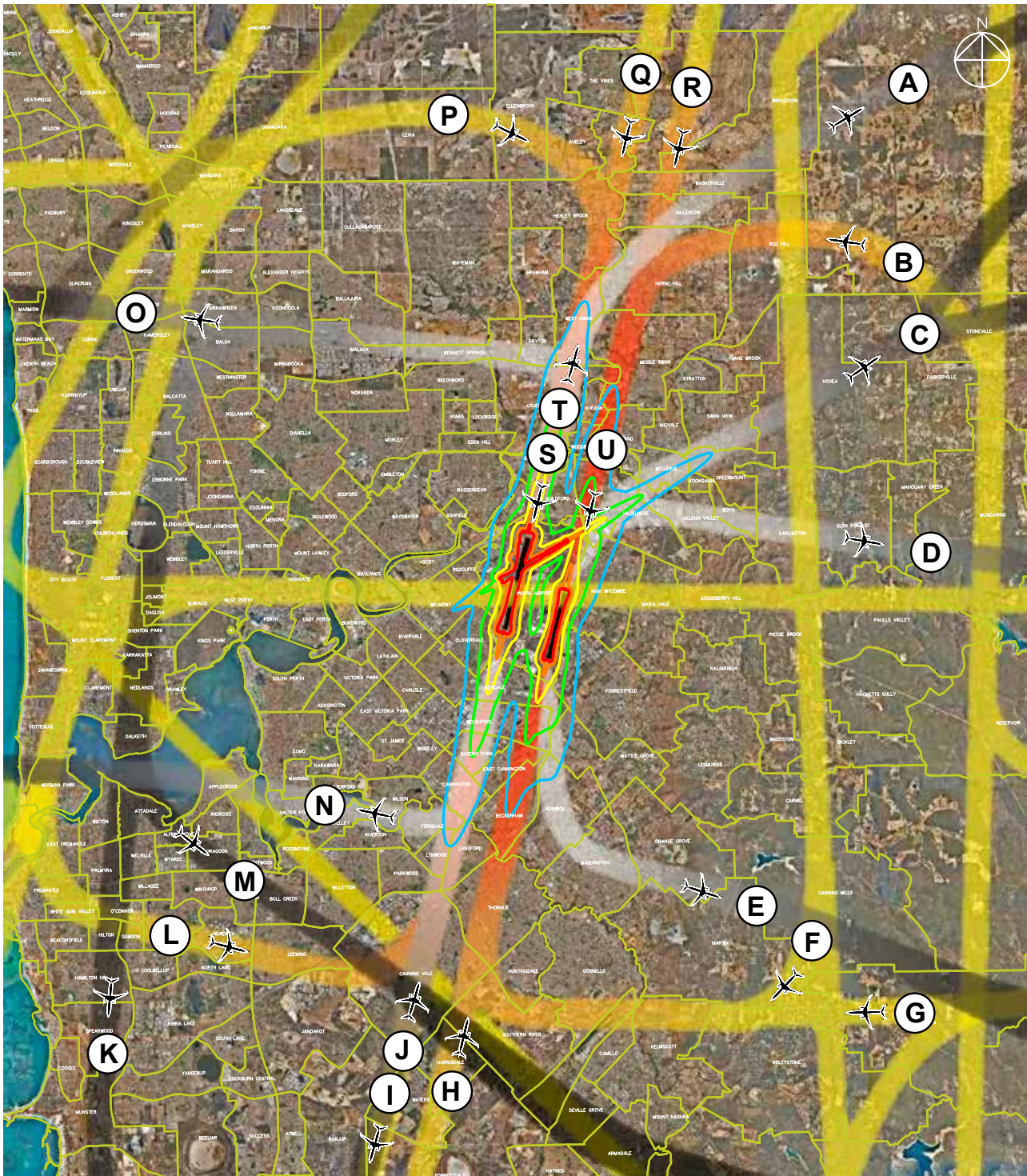
1. A chart that visually shows:
 - if the flight path is used for arriving or departing aircraft, shown by different colours,
 - the approximate height of the aircraft, shown as a colour gradient, and
 - the potential width of the flight path.
2. A data table below the chart that shows:
 - the average number of times an aircraft is likely to use the flight path during the day (7.00am-7.00pm) and at night (7.00pm-7.00am).

The following flight path diagram is an example that shows the inputs used to develop Perth Airport's Ultimate ANEF and reflects the ultimate layout of the airport, including the new runway and an extension to the existing main runway.

Additional flight path diagrams are available in the Perth Airport Master Plan 2014 available at perthairport.com.au/masterplan



2059 ANEC arrivals and departures flight path diagram

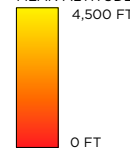


2059 Average Day							
Flight path	Operation	Average No. of Jet Movements		Flight path	Operation	Average No. of Jet Movements	
		Day	Night			Day	Night
A	Departure	2	2	L	Arrival	54	<1
B	Arrival	30	<1	M	Departure	<1	<1
C	Departure	64	29	N	Departure	71	28
D	Departure	<1	<1	O	Departure	62	33
E	Departure	73	29	P	Arrival	31	<1
F	Arrival	33	<1	Q	Arrival	38	48
G	Arrival	26	<1	R	Arrival	40	44
H	Arrival	<1	19	S	Arrival	69	48
I	Departure	3	2	T	Departure	64	35
J	Arrival	<1	34	U	Arrival	70	44
K	Departure	<1	<1				

ALTITUDE KEY

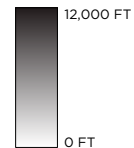
ARRIVALS

MEAN ALTITUDE



DEPARTURES

MEAN ALTITUDE



ANEF

20 - 25

25 - 30

30 - 35

35 - 40

>40

These flight paths represent where the majority of aircraft will fly, however all areas of Perth will have aircraft from Perth Airport, Jandakot Airport or RAAF Base Pearce flying overhead from time to time.

What are 'Number Above' noise contours?

To improve how aircraft noise is communicated to the public, 'Number Above' (or 'N') noise contours were developed by the then Commonwealth Department of Infrastructure and Transport.

The 'Number Above' noise contours illustrate the average number of events per day that exceed a certain sound level. This measure is closer to how a person typically perceives noise. The 'Number Above' or 'N65 contour maps' combine information on single event noise levels with aircraft movement numbers.

The N65 contour map for Perth Airport illustrates the average number of events per day over 65 decibels [65 dB(A)] for a particular area. This corresponds to an outdoor sound level of 65 decibels [65 dB(A)] and an indoor noise level of approximately 55 decibels [55 dB(A)]. This is considered the sound level at which conversation is disturbed.

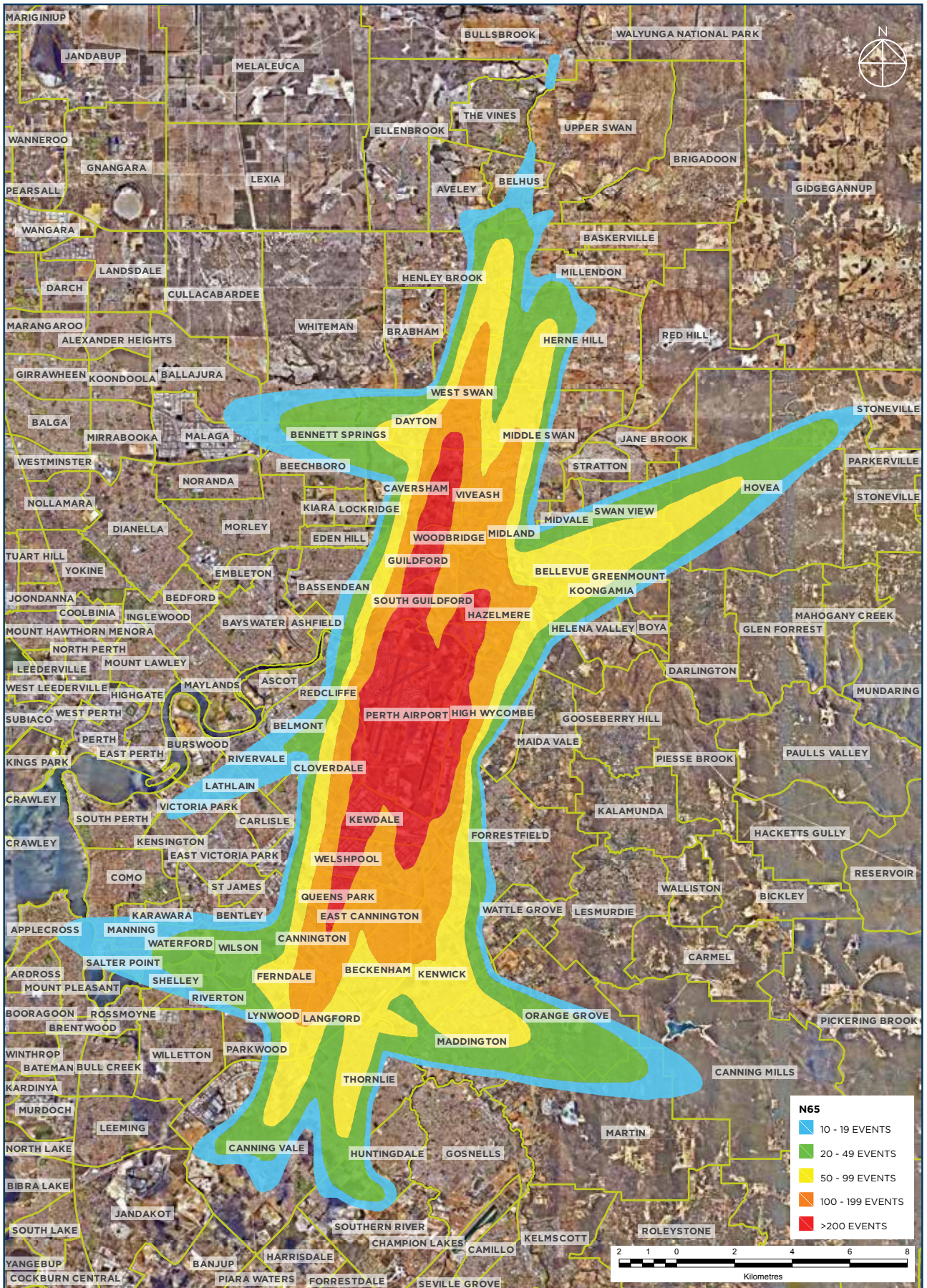
It should be noted, that the N65 contour map represents an average day and not a typical day. On a typical day more events may actually be experienced than the N65 contours suggest. This is because the traffic at Perth Airport varies significantly from season to season, day to night, weekdays to weekends and even from Monday to Wednesday.

The N65 Contour map shows how many times on an average day that 65 dB(A) is exceeded at that location.



While the National Airports Safeguarding Framework identifies the N70 mapping as a standard, Perth Airport has chosen to use the lower threshold of N65 noting that people in Perth tend to have their windows open and spend more time outdoors than those in other cities.

Perth Airport Ultimate N65 contour



This N65 represents where the majority of aircraft will fly, however all areas of Perth will have aircraft from Perth Airport, Jandakot Airport or RAAF Base Pearce flying overhead from time to time.

Some common questions

Thinking of buying a house near the airport?

If you are thinking of moving into an area surrounding Perth Airport, it is important to understand how aircraft noise could affect you.

Not everybody is affected by noise in the same way. How aircraft noise may affect you personally will depend upon many things. Some things to consider include:

- are you sensitive to noise?
- are you easily disturbed or do you wake up often?
- is the home in an otherwise peaceful area, well away from major traffic and other noises that could mask aircraft noise?
- is the home close to the airport or directly below regular aircraft flight paths?
- is the home lightweight or poorly insulated from noise?
- are you usually at home during the day?
- do you regularly entertain outside?
- do you usually sleep with the bedroom windows open?

If you answered yes to a number of these questions then you are more likely to be disturbed by aircraft noise.

Will aircraft noise affect my health?

A number of research studies have been undertaken to investigate the effect of noise on human health and wellbeing. These studies need to be considered collectively, and in context, if drawing any conclusions about the potential impact of aircraft noise on areas surrounding Perth Airport.

To help people understand the true impact of aircraft noise on human health and wellbeing, the Department of Environment has produced a leaflet, 'Aircraft Noise and Its Effects'. A copy of the leaflet is available at perthairport.com.au/noise_health

There are planning measures in place around Perth Airport aimed at protecting residents from being adversely affected by aircraft noise.

What can I do to minimise the impact of aircraft noise inside my home?

If aircraft noise is a problem for you in your home, or if you are thinking of renovating, you may wish to consider making sound proofing improvements to your home. Some ways to improve a building include:

- installing acoustic insulation to ceilings,
- enclosing the eaves,
- upgrading windows and doors, and
- sealing up openings in the walls and roof.

A booklet with practical information about what you can do to reduce aircraft noise in your home – 'Reducing Aircraft Noise in Existing Homes' – is available at perthairport.com.au/noise_faq

Does living near the airport affect development on my land?

For land use planning purposes in Australia, aircraft noise impact is illustrated using the ANEF system.

The ANEF plans indicate the anticipated noise contours for the most likely or preferred development and forecasts for an airport. The ANEF is a central component of the AS2021 regarding land use planning in the vicinity of airports.

At Perth Airport an ANEF plan for the long-term airport capacity of 350,000 aircraft movements a year has been produced. It is expected that 350,000 movements will be achieved in approximately 50 years. The contours show the average daily aircraft noise exposure associated with the long-term airport development, including extensions to, and construction of new runways.

Perth Airport currently has approximately 145,000 aircraft movements per year and this is expected to grow to 222,000 by 2034.

The implications for development of your land are summarised within the Western Australian Planning Commission's (WAPC) 'State Planning Policy No. 5.1 – Land Use Planning in the Vicinity of Perth Airport'. If your property is located within the ANEF 20 contour and above, then there can be zoning and development restrictions placed on your land. This protects against inappropriate or low structural quality development being built in areas most likely to be affected by aircraft noise. The extent to which you can subdivide your property may also be affected. In some cases you may find there is a notification on your land title, which is intended to forewarn future purchasers about the likely presence of aircraft noise.

Conditions such as noise insulation may also be a requirement of planning approval. Advice on noise insulation is given in the WAPC's publication 'Aircraft Noise Insulation for Residential Development in the Vicinity of Perth Airport'.

For information about land use planning policy in the vicinity of Perth Airport, please contact the Planning Department at your local council or telephone the WAPC on 6551 9000. A copy of the 'State Planning Policy No. 5.1 – Land Use Planning in the Vicinity of Perth Airport' and the 'Aircraft Noise Insulation for Residential Development in the Vicinity of Perth Airport' publication is available at: planning.wa.gov.au (publications).

To find out more about the ANEF plan, view the Perth Airport Master Plan 2014 at perthairport.com.au/masterplan A hard copy of the ANEF plan is also available from Perth Airport by calling 9478 8888.

How can I report concerns about aircraft noise?

Airservices manages enquiries and complaints regarding aircraft noise through the Noise Complaints and Information Service (NCIS).

If you would like to make a complaint, you should first contact Airservices by:

- using WebTrak - an online tool that displays surrounding suburbs within 55 kilometres of Perth Airport and allows you to view information about noise levels and arriving and departing aircraft, from 40 minutes to three months ago. WebTrak also has an option to lodge a complaint. For further information visit: webtrak.bksv.com,
- completing the online form available at: **airservicesaustralia.com** (aircraft noise/making a complaint),
- contacting the Airservices NCIS hotline on 1800 802 584, 9am – 5pm EST,

- emailing ncis@airservicesaustralia.com, or
- writing to Noise Complaints and Information Service GPO Box 367, Canberra ACT 2601.

For more information visit: airservicesaustralia.com

If you feel your issue has not been effectively addressed, or you believe you have not been provided with adequate information, you may lodge a complaint with the Aircraft Noise Ombudsman (ANO) by:

- emailing ano@ano.gov.au,
- completing the online form available at **ano.gov.au** (making a complaint/online complaint form),
- contacting the ANO on 1800 266 040, or
- writing to the ANO GPO Box 1985, Canberra ACT 2601.

For more information visit: **ano.gov.au**

Where can I find more information regarding aircraft noise and its management?

Resource	Web Address
Aircraftnoise.com.au	aircraftnoise.com.au
<i>Airports Act 1996</i>	comlaw.gov.au
Airservices Australia	airservicesaustralia.com
Aircraft Noise Ombudsman	ano.gov.au
<i>Air Services Act 1995</i>	comlaw.gov.au
Commonwealth Aircraft Noise Regulations	infrastructure.gov.au
Commonwealth Government Department of Infrastructure and Regional Development	infrastructure.gov.au
International Civil Aviation Organisation	icao.int
National Airport Safeguarding Framework	infrastructure.gov.au
Noise and Flight Path Monitoring Reports	airservicesaustralia.com
Perth Airport	perthairport.com.au/noise
Perth Airport Master Plan 2014	perthairport.com.au/masterplan



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