

# 16 Airport Safeguarding



## 16.1 Introduction

The safety of air services arriving and departing Perth Airport daily and the capacity of Perth Airport to expand to meet aviation demand can be compromised by inappropriate land use and activities in the vicinity of the airport.

The Australian Government recognises that the current and future viability of aviation operations at Australian airports can be impacted by inappropriate developments in areas beyond the airport boundary. The National Airports Safeguarding Advisory Group (NASAG), comprising high-level Federal, State and Territory transport and planning officials, has developed the National Airports Safeguarding Framework (NASF). The NASF is a national land use planning regime that aims to safeguard airports and the communities in their vicinity. The purpose of the framework is to enhance the current and future safety, viability and growth of aviation operations at Australian airports, by supporting and enabling:

- the implementation of best practice in relation to land use assessment and decision making in the vicinity of airports
- assurance of community safety and amenity near airports
- better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions
- the provision of greater certainty and clarity for developers and landowners
- improvements to regulatory certainty and efficiency, and
- the publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports.

The NASF currently comprises nine guidance documents:

- **Guideline A**  
Measures for Managing Impacts of Aircraft Noise
- **Guideline B**  
Managing the Risk of Building Generated Windshear and Turbulence at Airports
- **Guideline C**  
Managing the Risk of Wildlife Strikes in the Vicinity of Airports
- **Guideline D**  
Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation
- **Guideline E**  
Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports
- **Guideline F**  
Managing the Risk of Intrusions into the Protected Airspace of Airports
- **Guideline G**  
Protecting Aviation Facilities – Communications, Navigation and Surveillance
- **Guideline H**  
Protecting Strategically Important Helicopter Landing Sites, and
- **Guideline I**  
Managing the Risk in Public Safety Areas at the ends of Runways.

### 16.1.1 NASF and the WA Planning Framework

The Western Australian Government is responsible for establishing the State's planning policy and determining how the NASF guidelines are applied within the State framework.

Currently, the State Government has adopted one NASF guideline into planning requirements. Since 2020, it is required that NASF Guideline D (Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation) be considered for wind turbine proposals (see Section 16.5).

A review of the implementation of NASF guidelines was undertaken by the NASAG in 2019. A key recommendation from the implementation review is for all state and territory governments to implement the NASF principles and guidelines in their planning regimes by 2027.

Perth Airport encourages the implementation of the safeguarding measures into the State planning framework and continues to engage with the Western Australian government on safeguarding initiatives.

Landgate, the State Government's land information authority, has included Perth Airport aircraft noise modelling in its Property Interest Reports since 2015.

16.2 Aircraft Noise

16.2.1 Introduction

Noise from aircraft approaching and departing Perth Airport and from their operations on the airfield is an unavoidable consequence of the provision of critical and safe air services.

From time to time, aircraft from Perth Airport—as well as Jandakot Airport and RAAF Base Pearce - will fly over most of the Perth metropolitan region.

The noise generated by aircraft has two main sources: air passing over the aircraft airframe, and the aircraft engines. The air passing over the airframe (fuselage and wings) causes friction and turbulence, which results in sound waves. More noise is generated when the aircraft's landing gear and wing flaps are used, as these create more wind resistance. Some studies indicate that 30 to 50 per cent of the noise at take-off and landing can be caused by wind friction. Engine noise is created by the sound of the moving engine parts and that of air being expelled at high speed (or in the case of propeller-driven aircraft and helicopters, the sound from the rotating blades cutting through air).

The aircraft noise heard at ground level is influenced by a range of factors, including:

- aircraft type and size —fuselage design, type of engines and the specific aircraft performance all impact on the noise being generated
- the way the aircraft is being flown by the pilot
- the aircraft weight and rate at which it climbs—longer flights generally require more fuel on departure, resulting in higher thrust settings and a slower climb due to the weight, and
- meteorological conditions—temperature, wind speed and direction, humidity, rain and cloud-cover all impact on the reverberation of sound waves.

Aircraft have been getting progressively quieter due to advances in aerodynamic design and engine technology. Australia has one of the most modern aircraft fleets in the world.

16.2.2 Aircraft Noise Management

The management of aircraft noise is shared across a range of international, national and local organisations. The various roles and responsibilities in relation to aircraft noise management at Perth Airport is shown in Table 16-1.

Perth Airport acknowledges that there are communities which are exposed to aircraft noise; however, this exposure is balanced against the broader community and economic benefit that arises from operating 24 hours per day, seven days a week.

In recognition of aircraft noise impacts, Perth Airport is committed to working with Airservices Australia, government authorities and the aviation industry to actively manage aircraft noise exposure and its effect on the community, while balancing the need for critical and safe air services. This has the benefits of:

- providing guidance for achieving appropriate land use outcomes in the vicinity of the airport
- enabling the community to make informed decisions about aircraft noise exposure
- managing, mitigating and, where possible, working towards improved noise outcomes, and
- protecting Perth Airport's 24-hour seven days a week operation.

Australia has one of the most modern aircraft fleets in the world.

Organisation	Roles And Responsibilities For Aircraft Noise Management
International Civil Aviation Organization (ICAO)	Develops policies, standards and recommended practices for the global aviation industry Establishes noise certification standards for new aircraft Provides guidance on aircraft noise management
Civil Aviation Safety Authority (CASA)	Independent statutory authority with responsibility for regulation of civil aviation operations in Australia Sets standards and safety outcomes for pilots, aircraft, airports and airspace in Australia Responsible for airspace regulation through the Office of Airspace Regulation
Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts (DITRDCA)	Advises the Australian 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 <i>Air Navigation (Aircraft Noise) Regulations 1984</i>

Organisation	Roles And Responsibilities For Aircraft Noise Management
Airservices Australia	Australia's air navigation service provider responsible for providing safe, secure, efficient, and environmentally sustainable services to the aviation industry Manages and maintains aircraft navigation, surveillance, and noise monitoring infrastructure Designs and implements flight paths, including at Perth Airport Consults with the community and aviation industry on proposed flight path and airspace changes Manages noise complaints and enquiries through the Noise Complaints and Information Service Provides information to the community on aircraft movements, runway and flight path usage and aircraft noise 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 Considers environmental impacts (including noise) of air traffic management
Department of Climate Change, Energy, the Environment and Water	Assesses proposed changes to aircraft operations that trigger 'significance' under the <i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>
Federal Minister for the Environment	Provides advice on proposed changes to aircraft operations assessed under the EPBC Act Provides advice to the Federal Minister for Infrastructure on airport Major Development Plans for new/changed runway infrastructure
Federal Minister for Infrastructure	Considers aircraft noise and community consultation processes when deciding whether to approve or refuse Perth Airport Master Plans and Major Development Plans for new or changed runways
Airlines and aircraft operators	Operates and maintains aircraft that meet the ICAO noise certification requirements Conducts flight operations in accordance with published operational and noise abatement procedures
Aircraft Noise Ombudsman (ANO)	Oversees the handling of aircraft noise issues by Airservices and the Department of Defence Conducts independent reviews of noise complainants and complaint handling Makes recommendations for improvements and changes
National Airports Safeguarding Advisory Group (NASAG)	Develops the National Airports Safeguarding Framework (NASF) guidelines to provide guidance to state and local governments on planning and development around airports, including measures for managing the impacts of aircraft noise
Western Australian Government	Develops land use planning policy and frameworks Determines implementation of the NASF guidelines into State planning policy
Local governments	Implements the State's land use planning frameworks Plans and manages land use in areas surrounding the airport
Perth Airport	Manages operations at the airport Develops and maintains infrastructure to support aircraft operations Publishes a master plan with a new ANEF 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 Run Management Plan Engages on aircraft noise through the Perth Airport Community Briefing Group, Planning Coordination Forum, Perth Airport Aircraft Noise Technical Working Group, and broader community
Perth Airport Community Briefing Group (CBG)	Considers community issues and opinions regarding the planning, development and operation of Perth Airport
Perth Airport Planning Coordination Forum (PCF)	Supports effective engagement between Perth Airport and Federal, State and local government agencies on strategic planning issues, including land use and aircraft noise
Perth Airport Aircraft Noise Technical Working Group (PAANTWG)	Enables the aviation 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

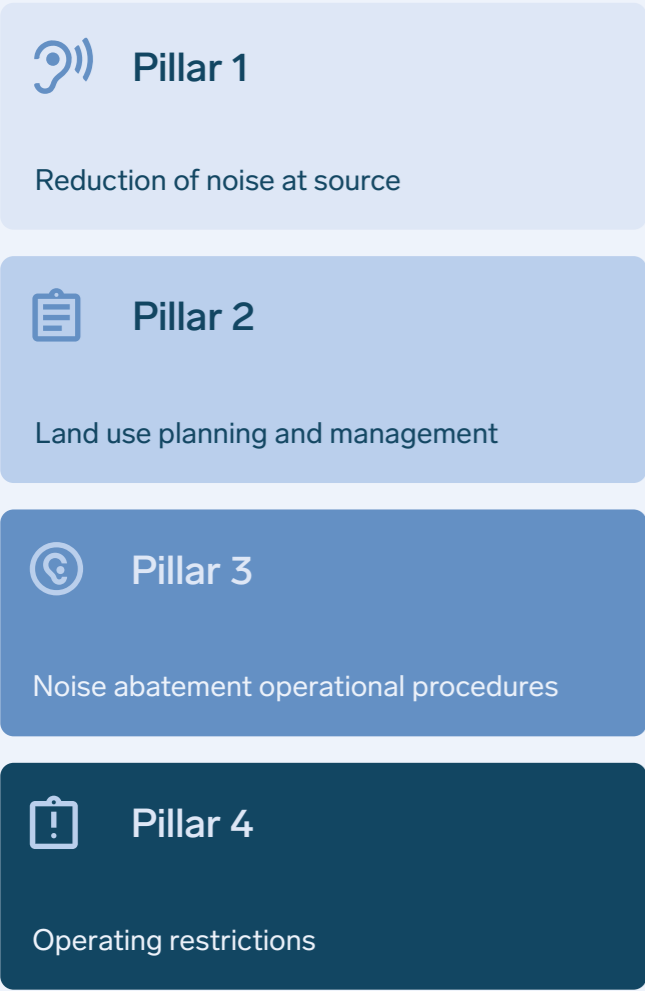
Table 16-1 Organisations responsible for aircraft noise management  
Source: Perth Airport

16.2.2.1 ICAO Balanced Approach to Aircraft Noise

The International Civil Aviation Organization (ICAO) is a specialised agency of the United Nations established in 1944 to serve as the global forum for international civil aviation. Australia is a member state of ICAO and was one of the first states to ratify the Convention on International Civil Aviation which came into force on 4 April 1947. The Convention established certain principles and arrangements for international civil aviation to be able to develop in a safe and orderly manner. The legal instrument that gives effect to this in Australia is the Air Navigation Act 1920 (Cth).

ICAO develops policies and standards, undertakes compliance audits, and performs studies and analyses to support and enable a global air transport network.

One of ICAO’s objectives is to minimise the adverse environmental effects of civil aviation activities. ICAO’s Balanced Approach to Aircraft Noise Management (ICAO Doc 9829) is the only globally recognised policy for managing aircraft noise. It consists of identifying the noise problem and analysing various measures available to reduce noise at a specific airport through the exploration of four principal elements, namely:



This work includes investigations into emerging noise reduction technologies, noise impacts from new aircraft concepts, environmental aspects of airport land use planning, and good practices on airport community engagement.

In 2019, the ICAO Assembly resolved to acknowledge community engagement as a cross-cutting element to support the four pillars of the Balanced Approach, with the goal of identifying practical solutions which includes community feedback, whenever possible. The goal of ICAO’s Balanced Approach is to address noise problems on an individual airport basis and to identify the noise-related measures that achieve maximum environmental benefit most cost-effectively, using objective and measurable criteria. Continuous work is being conducted by ICAO to ensure the currency of the technical basis underpinning the ICAO Standards, guidance and policies associated with reducing aircraft noise. This work includes investigations into emerging noise reduction technologies, noise impacts from new aircraft concepts, environmental aspects of airport land use planning, and good practices on airport community engagement. Perth Airport has adopted ICAO’s Balanced Approach to Aircraft Noise Management and monitors ICAO initiatives and advice on aircraft noise matters.

16.2.2.2 Perth Airport Aircraft Noise Management Strategy

Perth Airport’s commitment to managing aircraft noise is guided by the Aircraft Noise Management Framework as shown in Figure 16-1.

This framework takes into account aircraft taking off, departing, approaching, landing and manoeuvring on the airfield, including engine testing within the airport site.

Effective mitigation of aircraft noise often requires several small, incremental improvements to result in a noticeable reduction in aircraft noise. Perth Airport works with Airservices, aircraft operators, industry stakeholders and the community to identify opportunities for improvement and achieve better outcomes where possible.

Noise improvement proposals can arise from a variety of sources, including Airservices reviews and analysis, the Aircraft Noise Ombudsman, aviation industry and community feedback. The *Air Services Act 1995* (Cth) requires the safety of air navigation to be the most important consideration, and each initiative is therefore assessed first and foremost for its impact on safety. If there are no safety implications, further assessment will consider noise and community, efficiency, environmental and operational principles. These considerations are detailed in Airservices’ Flight Path Design Principles, available at <https://engage.airservicesaustralia.com>.

Where an initiative is deemed to provide an improvement, a trial of the proposal may be conducted to verify the initial findings. This involves advertising and widespread consultation with all stakeholders, including the community. The results of the trial, including community feedback, are assessed and a decision made on whether to permanently implement the procedure or discard it. If implemented, a post implementation review is usually conducted to verify the success of the change. Post implementation reviews are published by Airservices on its website, [airservicesaustralia.com](https://engage.airservicesaustralia.com).

Between 2010 and 2015, Airservices considered more than 30 proposed noise improvement opportunities for the greater Perth area. As a result, eight changes related to Perth Airport operations were able to be implemented.

Perth Airport continually seeks to improve understanding of aircraft noise and its impacts to ensure effective noise management. In 2018, Perth Airport commissioned a review of relevant literature relating to the health impacts of aircraft noise, including research, reviews and guidelines. The assessment considered 168 published articles, including large research projects undertaken in areas close to some of the major international airports, such as Heathrow and Munich. While nearly every study suggested that further research into potential health impacts was needed, the review has encouraged Perth Airport to focus on noise management strategies which can assist in reducing the health consequences of aircraft noise exposure. These include appropriate land planning around airports, careful route planning, noise abatement procedures, provision of clear and comprehensible information about the likely exposure to aircraft noise, as well as information to assist those affected by the noise to undertake amelioration measures that can reduce noise penetration into homes.

Perth Airport continues to invest in understanding aircraft noise, impacts, and ways to engage and communicate. Perth Airport also participates in a number of national forums and working groups focused on aircraft noise. By participating in forums such as the Perth Aircraft Noise Technical Working Group and the Australian Airports Association’s Planning Working Group, Perth Airport can discuss and consider aircraft noise-management initiatives both in Australia and at airports around the world.

Perth Airport seeks to 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.

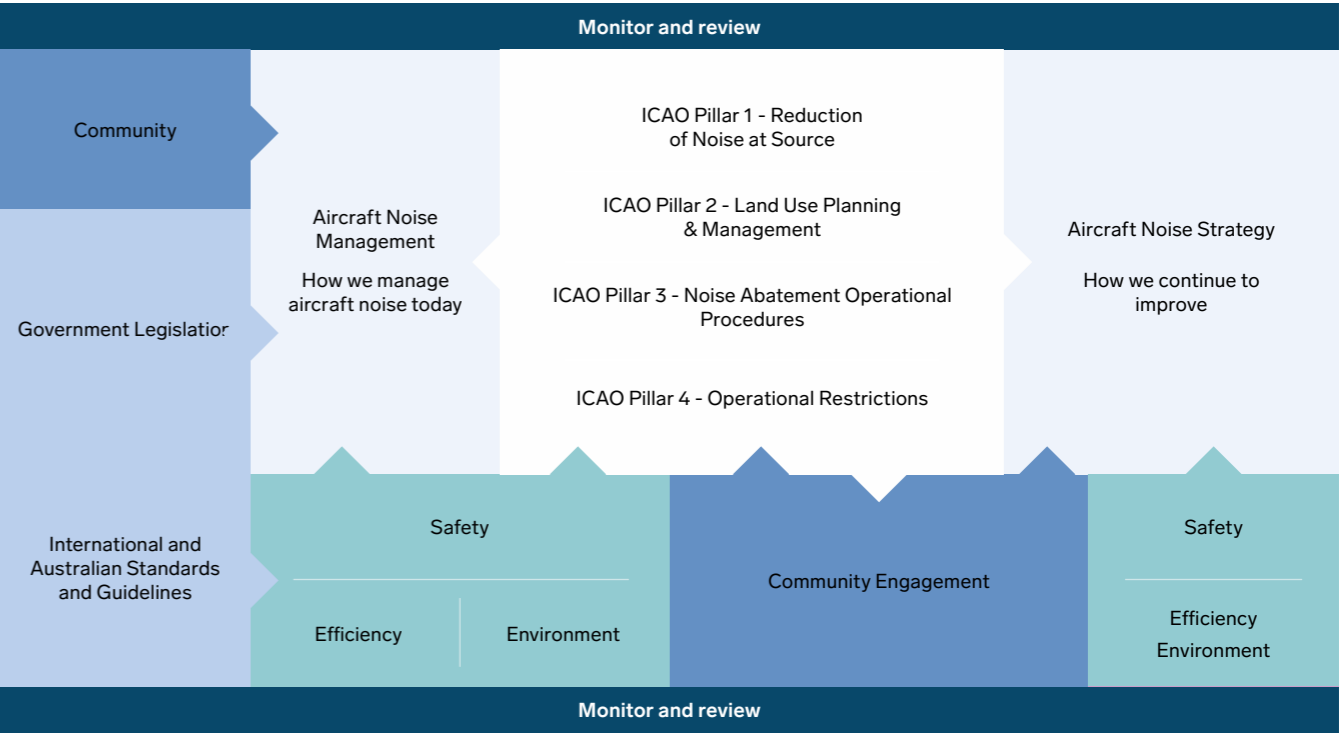
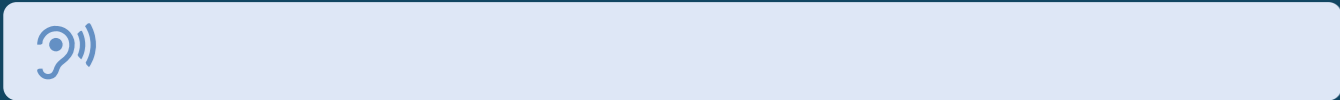


Figure 16-1 Perth Airport Aircraft Noise Management Framework  
Source: Perth Airport

ICAO Pillar 1—Reduction at Source



The first pillar of ICAO’s Balanced Approach to Aircraft Noise Management is the reduction of noise at source.

Aircraft noise has been controlled since the 1970s by the setting of noise limits for aircraft in the form of standards and recommended practices contained in Annex 16 to the Convention on International Civil Aviation. Over the years, ICAO has set progressively tighter certification standards, referred to as ‘chapters’, which set noise level compliance criteria for different types of civil aircraft during take-off and landing. The primary purpose of noise certification is to ensure that the latest available noise reduction technology is incorporated into aircraft design.

The Australian Government has established the *Air Navigation (Aircraft Noise) Regulations 2018* (Cth) which require aircraft operating in Australian airspace to comply with the noise standards and recommended practices set out in ICAO Annex 16 Volume I. Under the Regulations, only aircraft that comply with the ICAO Chapter 3, Chapter 4 and Chapter 14 standards are permitted to operate in Australia. Chapter 2 aircraft were banned from operating in Australia in 2002. Chapter 2 aircraft retrofitted with a ‘hush-kit’ to meet Chapter 3 standards were banned from operating at major Australian airports in 2010. Aircraft that are verified as complying with the ICAO standards are issued with a noise certificate by Airservices. (State aircraft and propeller driven aircraft designed and used exclusively for aerobatics, firefighting, or agricultural operations, are not subject to the Regulations and are not required to hold a noise certificate.)

The ICAO Chapter 14 standards were established in 2014 and are expected to remain the mainstay ICAO standard for aircraft noise for the coming years. All new passenger aircraft designs certified since 2017, including the Boeing 737 MAX, Boeing 787 Dreamliner, Airbus A320neo, Airbus A350 and Airbus A330neo, meet the stringent Chapter 14 noise standards.

ICAO Chapter 14 compliant aircraft operate at Perth Airport and their use will continue to grow, with the two largest airlines, Qantas Group and Virgin Australia, both making significant investment in new aircraft. Qantas Group has commenced a multi-billion-dollar investment in the next generation of aircraft, with 182 new aircraft expected to be delivered over the next decade.

This includes orders for 158 Airbus A220-300 and A320 family aircraft to replace the existing Boeing 717s and Boeing 737s, 12 Airbus A350ULR (ultra long range) aircraft to predominantly service non-stop flights to Europe and the east coast of North America, and 12 Airbus A350LR (long range) and 12 Boeing 787 Dreamliners which will progressively replace the current Airbus A330 fleet. Virgin Australia is adding 31 new Boeing 737MAX aircraft to its fleet over the next few years, which will bring its fleet of latest generation aircraft to 39.

Figure 16-2 shows the actual and projected proportion of movements at Perth Airport operated by ICAO Chapter 14 compliant aircraft.

Table 16-2 summarises the ICAO Pillar 1 actions in place at Perth Airport.

Aircraft noise has been controlled since the 1970s under ICAO international standards.

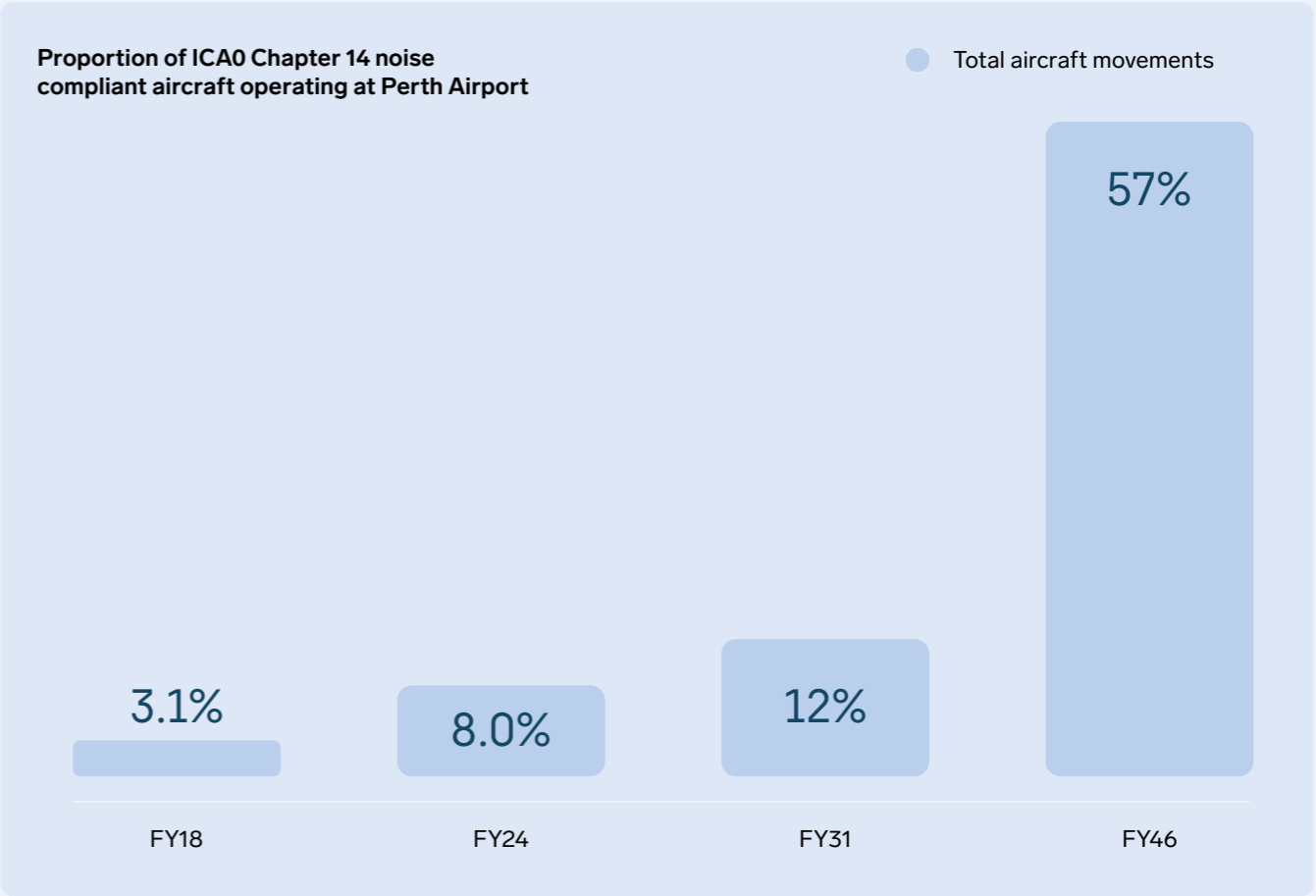
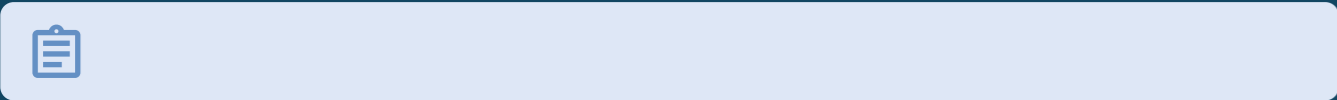


Figure 16-2 Current and forecast proportion of ICAO Chapter 14 noise standard compliant aircraft at Perth Airport  
Source: Perth Airport

ICAO Pillar 1 (Reduction Of Noise At Source) Actions at Perth Airport				
International Civil Aviation Organization (ICAO)	Australian Government	Airservices Australia	Airlines and aircraft operators	Perth Airport
Develops aircraft noise certification standards for civil aircraft	Establishes the <i>Air Navigation (Aircraft Noise) Regulations 2018</i> which require aircraft operating in Australian airspace to comply with the ICAO noise standards and recommended practices	Issues Noise Certificates for aircraft complying with the ICAO standards	Determines which aircraft types to purchase	Develops airfield and terminal infrastructure suitable for new generation aircraft types

Table 16-2 ICAO Pillar 1 (Reduction of Noise at Source) actions at Perth Airport  
Source: Perth Airport

ICAO Pillar 2—Land Use Planning and Management



Land use planning and management is the second pillar of ICAO’s Balanced Approach to Aircraft Noise Management.

Perth Airport works with Federal, State and local governments to coordinate land use planning and management both within the airport estate and the areas surrounding the airport. Land use planning and development proposals are discussed through the Perth Airport Planning Coordination Forum (see Section 5.4.1.1), and specific land use and development proposals are referred to Perth Airport for comment and advice by government authorities.

The NASF Guideline A Measures for Managing Impacts of Aircraft Noise provides guidance to Federal, State and local government decision makers to manage the impacts of noise around airports, including assessing the suitability of developments. The guideline applies the Australian Noise Exposure Forecast (described in Section 16.2.3.4) and Number-Above (described in Section 16.2.3.5) noise modelling metrics to recommended criteria for rezoning and development assessments.

An initiative of the Australian Government’s Aviation White Paper (detailed in Section 4.3.2) is to improve land use planning outcomes near airports, to seek to avoid further development that is inappropriate for the noise level, and to protect airport operations from potential safety risks, through:

- updating the NASF Guideline A by 2027 to describe best-practice approaches for including aircraft noise exposure notifications on property titles for new developments. This will provide a basis for state and territory governments to adopt aircraft noise exposure notifications into relevant planning schemes so that future purchasers of newly developed properties affected by aircraft noise can make fully informed decisions
- supporting implementation of the recommendation from the 2021 NASF Implementation Review to improve education on the NASF for local planning officials, and
- applying to Standards Australia to review Australian Standard 2021:2015 Acoustics—Aircraft Noise Intrusion—Building Siting and Construction, and consider incorporating the Standards Australia Handbook 149:2016 Acoustics—Guidance on Producing Information on Aircraft Noise guidance into the standard.

The Australian Noise Exposure Forecast (ANEF) has been used for land use planning purposes in Australia since 1982. It is a central component of the Australian Standard 2021:2015 Acoustics—Aircraft Noise Intrusion— Building Siting and Construction (AS2021). In conjunction with the ANEF contours, AS2021 provides guidance to development control authorities (for example, state and local governments) on the acceptability of certain types of land use or development in areas near airports, based on the ANEF level. It also provides detail regarding construction methods and materials to minimise noise intrusion to development within ANEF contours. AS2021 considers residential development to be ‘acceptable’ in areas with ANEF lower than 20, ‘conditionally acceptable’ in areas with ANEF between 20 and 25, and ‘unacceptable’ in areas with ANEF greater than 25. In conditionally acceptable areas, AS2021 recommends that new buildings incorporate acoustic treatment to achieve specified internal noise levels. The building type acceptability for ANEF zones is shown in Table 16-3.

The application of AS2021 encourages incompatible land uses—such as residential development—to be directed away from areas that are, or will be, exposed to significant aircraft noise, while land uses that are less sensitive to aircraft noise—such as industrial developments—are encouraged in areas surrounding an airport.

Building Type	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		

Table 16-3 Building type acceptability table based on Australian Noise Exposure Forecast contours  
Source: Australian Standard 2021:2015 Table 2.1

Local government guidance regarding development in the vicinity of Perth Airport is provided by the State Planning Policy 5.1 Land Use Planning in the Vicinity of Perth Airport (SPP 5.1), described in Section 4.4.13. It applies Perth Airport’s ANEF and AS2021 Table 2.1 Building Site Acceptability Based on ANEF Zones to guide land use zoning and the acceptability of various development types within each of the Perth Airport ANEF contours. The policy measures include:

- consideration of noise insulation for certain developments
- notification of aircraft noise on land titles for building types determined to be ‘conditionally acceptable’ in the AS2021 building type acceptability table, and
- advice about potential for noise nuisance to be provided to prospective purchasers of noise-sensitive premises.

SPP 5.1 requires the Western Australian Planning Commission and local government authorities to refer certain land use and development proposals to Perth Airport for comment and advice.

Perth Airport developed its first ANEF 40 years ago as part of the Master Plan 1985. Since that initial noise forecast, which included the new parallel runway, the overall footprint of the ANEF contours have remained relatively the same. However, there has been considerable residential development and infill within the Perth Airport ANEF contours since the 1980s.

Perth Airport developed its first ANEF 40 years ago as part of the Master Plan 1985.

Perth's new runway, expected in 2028, has been designed with best-practice aircraft noise management in mind.

Standards Australia also published a handbook, SA HB 149:2016 (HB149), Acoustics—Guidance on producing information on aircraft noise and how to meaningfully present information on the impact and nature of aircraft noise to the public, and to assist in land use planning and building assessments. HB149 recognises that ANEF charts are not intended for use as an informational tool for the presentation of aircraft noise to the general public, and recommends the presentation of aircraft noise information through alternative metrics such as N-contour maps. Perth Airport has produced N-contour maps for all airport master plans since 2009.

Since 2015, the Perth Airport ANEF and N65 N-contour maps have been included in the Property Interest Report available through Landgate.

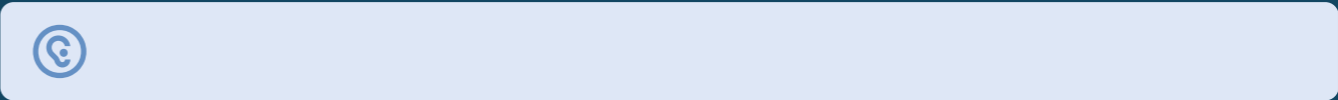
Perth Airport continues to advocate for the Western Australian Government to follow the Queensland and Victorian governments in adopting the NASF guidelines, including the N-contours, into the State planning framework.

Perth Airport is responsible for managing the use and development of land within the airport estate. Perth Airport applies best practice aircraft-noise management practices where relevant in the development of new airport infrastructure. The design of airport infrastructure, including runways, taxiways and engine run up facilities can impact on the aircraft noise exposure around an airport. The design of Perth's new runway, expected to be operational in 2028, and the associated infrastructure has considered best practice aircraft noise management practices. Table 16-4 summarises the ICAO Pillar 2 actions in place at Perth Airport.

ICAO Pillar 2 (Land Use Planning and Management) ACTIONS at Perth Airport			
Australian Government	State Government	Local Government	Perth Airport
Sets the legislative requirement for airports to prepare an updated ANEF for each new master plan Established the National Airports Safeguarding Advisory Group to develop the National Airports Safeguarding Framework, including Guideline A Measures for Managing the Impacts of Aircraft Noise Developed the Aviation White Paper which outlines recommendations for land use planning in the vicinity of airports Participates in the Perth Airport Planning Coordination Forum	Prepares State Planning 5.1 Land Use Planning in the Vicinity of Perth Airport (SPP 5.1), which applies the Perth Airport ANEF to provide guidance on the acceptability of certain types of land use or development in areas near Perth Airport, including requirements for noise attention measures and notification on title Makes the Perth Airport ANEF and N-contour noise map information available through Landgate Property Interest Reports Participates in the Perth Airport Planning Coordination Forum	Considers SPP 5.1 when assessing land use and development proposals Participates in the Perth Airport Planning Coordination Forum which discuss aircraft noise and land use planning	Prepares an updated ANEF for each new master plan Produces N-contour noise maps Convenes the Planning Coordination Forum to discuss on- and off-airport land use and development proposals Manages the use of land within the airport estate Designs and develops new airport infrastructure, including runways and taxiways

Table 16-4 ICAO Pillar 2 (Land Use Planning and Management) actions at Perth Airport  
Source: Perth Airport

ICAO Pillar 3—Noise Abatement Operational Procedures



The third pillar of ICAO’s Balanced Approach to Aircraft Noise Management is noise abatement operational procedures.

ICAO assists on the development and standardisation of low noise operational procedures that are safe and cost-effective. The possibilities include noise preferential runways and routes, and noise abatement procedures for take-off and landing. The appropriateness of any of these measures depends on the physical lay-out of the airport and its surroundings, but in all cases must give priority to safety considerations.

Every major airport in Australia has noise abatement procedures (NAPs) which are designed to reduce the impact of aircraft noise on the community. The NAPs are developed and reviewed by Airservices, in consultation with airlines and other aircraft operators, airports, community aviation consultation groups, and other stakeholders. NAPs are implemented by Air Traffic Control and aircraft operators.

The use of NAPs is subject to ensuring that the safety and efficiency of the airport are not compromised. Air traffic controllers or pilots may not be able to use them in certain situations due to weather conditions, traffic complexity, or the specific operating requirements of individual aircraft.

The NAPs for Perth Airport were first established in 1998 and define which runways and flight paths are preferred for use to achieve noise abatement. They were substantially updated in 2014 following a review of their effectiveness by Airservices. The NAPs are available online through the Departure and Approach Procedures published as part of Airservices’ Aeronautical Information Package ([airservicesaustralia.com/aip/](https://airservicesaustralia.com/aip/)).

Currently, runway 06 is the least preferred runway for landings and runway 24 is the least preferred runway for departures, with the other runway directions all equally preferred. This does not mean that they are equally used, but rather that there is no preference in the use of the runways, as the environmental conditions of the day (such as weather and operational requirements) will determine the preferred runway.

Noise abatement operational procedures also include the use of flight departure and approach routings such as noise preferential routes, standard instrument arrival and departure procedures for each runway, dispersed flight tracks, and automated arrival and departure procedures based on modern technology and on-board flight management systems. The current NAPs for Perth Airport include preferential flight paths for certain arrival routes and types of operations, with pilots required to use standard instrument departure and arrival procedures where available. In 2015, Airservices introduced a smart tracking flight path for suitably equipped aircraft arriving from the north and east and landing onto runway 03 (southern end of the main runway).

The NAPs for Perth Airport will be reviewed and updated as part of the final airspace design for Perth's new runway and new parallel runway operations (see Section 13.4.1.3).

In response to Initiative 33 from the recently released Aviation White Paper (see Section 4.3.2), Airservices is expected to begin publishing a quarterly report on noncompliance with an airport’s published NAPs.

New aircraft technologies and capabilities present opportunities for noise abatement.

New aircraft technologies and capabilities present opportunities for noise abatement. Required Navigation Procedures—Authorisation Required (RNP-AR) procedures provide more flexibility in route design and more accurate navigation. An arrival procedure using this technology was implemented at Perth Airport for main runway 03 in September 2015 for use by suitably equipped aircraft and qualified crew.

Airline and aircraft operators will also have their own specific procedures that can include measures for noise abatement such as reduced power/drag techniques (which delay wing flap extension and landing gear deployment as much as possible) and continuous descent approaches (which reduce overall thrust, and therefore noise on the ground) by keeping the aircraft higher for longer during the initial descent.

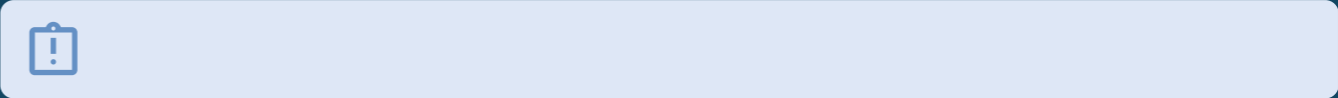
The Perth Airport Aircraft Noise Technical Working Group, which comprises representatives from Perth Airport, Airservices and airlines and local aircraft operators, discusses a range of aircraft noise and operational topics, including NAPs and other noise abatement measures.

The ground-based operational procedures in place at Perth Airport include aircraft engine ground running management and measures to reduce auxiliary power unit use (discussed further in Section 16.2.2.3). Table 16-5 outlines the ICAO Pillar 3 (Noise Abatement Operational Procedures) actions at Perth Airport.

ICAO Pillar 3 (Noise Abatement Operational Procedures) ACTIONS at Perth Airport		
Airservices	Perth Airport	Aircraft operators
Design and implement flight paths at Perth Airport	Establish and manage engine ground-running procedures	Apply the Perth Airport NAPs for flight planning and operations wherever possible
Develop, publish and review the NAPs for Perth Airport	Supply fixed power for ground power units on terminal aprons	Equip aircraft and pilots to be able to use Required Navigation Performance – Authorisation Required (RNP-AR) procedures
Develop and implement Air Traffic Control procedures at Perth Airport	Work with Airservices, aircraft operators and other stakeholders through the Perth Aircraft Noise Technical Working Group	Establish operational procedures for the use of reduced power/drag techniques and continuous descent profile approaches
Publish a quarterly report on noncompliance with an airport’s NAPs (not yet implemented)	Work with Airservices, aircraft operators and other stakeholders to develop the NAPs for Perth’s new runway	Reduced use of auxiliary power units through fixed power and other ground support equipment alternatives

Table 16-5 ICAO Pillar 3 (Noise Abatement Operational Procedures) actions at Perth Airport  
Source: Perth Airport

ICAO Pillar 4—Operating Restrictions



The fourth pillar of ICAO’s Balanced Approach to Aircraft Noise Management deals with operating restrictions.

Operating restrictions are a noise-related action that limits or reduces an aircraft’s access to an airport. Examples of operating restrictions are a movement cap, a curfew to restrict aircraft movements between certain hours, or a restriction on the nature of flights during certain hours.

The Balanced Approach identifies that operating restrictions should only be considered as a last resort, following assessment of the benefits gained from the first three pillars. Given the outcomes achieved through the wide range of actions and initiatives currently in place to manage aircraft noise at Perth Airport, operating restrictions are not used at Perth Airport.

Maintaining operational flexibility at Perth Airport is critical to supporting Western Australia’s economy. Perth’s isolation means that it relies on air travel for passengers and cargo more than any other Australian city does.

Perth Airport is part of a national and global aviation network; consequently, 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. 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 negative impacts on tourism and all those who depend on that industry.

The 24/7 operations at Perth Airport are also critical to maintaining and supporting an effective freight and logistics industry. A multitude of industries from minerals such as gold and diamonds, primary produce such as seafood and meat and a variety of specialist imports, rely on the extensive dedicated freight and passenger plane ‘belly freight’ to support industry. Any operational restriction would adversely and materially impact the industries which rely on overnight and well-connected international routes.

A study undertaken in 2015 showed that Western Australia would suffer a \$46.1 billion economic hit and the loss of 27,000 jobs up to 2040 if a night curfew was introduced.

Maintaining operational flexibility at Perth Airport is critical to supporting Western Australia’s economy.

**ICAO Cross-Cutting Element—Community Engagement**

The ICAO acknowledges community engagement as a cross-cutting element which supports the four pillars of the Balanced Approach.

Perth Airport is committed to ensuring the community is fully informed and that their concerns and priorities are considered in guiding aircraft noise management outcomes.

The Perth Airport Community Briefing Group provides a forum for the community and organisations to raise issues and express opinions regarding Perth Airport, particularly with regard to planning, development and operations. The group includes representatives from Perth Airport, Airservices, local governments, local business groups, community members and First Nations peoples.

Runway closures for upgrades and regular maintenance can result in temporary changes to the flight paths being used. These works are advised to the community through the Perth Airport website (<https://www.perthairport.com.au/Home/corporate/planning-and-projects/runway-works>) and social media channels.

The Perth Airport master plans and major development plans (MDPs) are an important part of engaging with the community on current and predicted aircraft noise exposure. Perth Airport prepares a new master plan every five years, while an MDP is prepared for specific types of development, including new or extended runways and taxiways. The Airports Act requires the airport master plan to include an Australian Noise Exposure Forecast (described in Section 16.2.3.4), the flight paths at the airport, and the plans for managing aircraft noise intrusion in areas forecast to be subject to significant noise exposure (see Section 16.2.3.4). An MDP must detail the effect that the proposed development would have on flight paths, aircraft noise exposure, and the plans for managing aircraft noise intrusion in areas forecast to be subject to significant noise exposure. Master plans and MDPs are required to undergo extensive consultation throughout the preparation of the documents, including a 60-business day formal public consultation process (see Section 5.4.3).

**Perth’s New Runway**

The construction of Perth’s new runway (see Section 13.4.1.3), expected to be operational in 2028, will require the design of new flight paths. Designing flight paths for new infrastructure is a complex process that requires extensive consultation—often over many years—between Airservices, the airport, aircraft operators, government, aviation regulators and the local community.

General airport planning consultation activities on the new runway began in the 1970s as part of the joint Australian and State Government enquiry into future aviation needs for the Perth region, which determined the need for a future parallel runway. All Perth Airport Master Plans since 1985 have included the planning and aircraft noise modelling for the new runway.

In 2018, Perth Airport prepared an MDP for the new runway. The MDP presented indicative flight corridors which were developed by specialist airspace consultants in consultation with Airservices to guide the assessment of impacts and the final airspace and flight path design. The MDP, approved by the Federal Minister for Infrastructure in November 2020, was subject to one of the most extensive public consultation programs ever undertaken for new infrastructure in WA. A copy of the approved MDP is available at <https://www.perthairport.com.au/Home/corporate/planning-and-projects/major-development-plans>.



Artists impression of Perth’s new runway

1

Perth’s new runway is considered a Level 1 change proposal under the Airservices Standard, as it involves a suite of new flight paths and changes in airspace operation.

The formal airspace detailed design for the new runway will take approximately three years and is being completed by Airservices, as Australia’s air navigation service provider. Once the final airspace design is completed, Perth Airport will revise the aircraft noise modelling and flight path communications materials, including the online Aircraft Noise and Information Portal. A Stakeholder Engagement Plan will be developed to ensure the community is informed of the updated flight path and aircraft noise information.

In response to the Aviation White Paper (described in Section 4.3.2), the Federal Minister for Infrastructure has advised airports that, when considering whether to approve or refuse a new Master Plan that includes development which involves changes to flight paths, the Minister will have regard to the Master Plan’s consistency with Airservices’ Community Engagement Standard. The Community Engagement Standard for Flight Path and Airspace Change Proposals was published by Airservices in September 2023 to provide a clearly defined process for public engagement on flight path and airspace changes of various scope, scale and complexity.

Perth’s new runway is considered a Level 1 change proposal under the Airservices Standard, as it involves a suite of new flight paths and changes in airspace operation. While the new Standard states that proposals in development at the time of publication are not expected to apply the Standard retrospectively, Perth Airport has considered the elements of the Airservices Standard for the new runway. The alignment of Airservices’ requirements to Perth’s new runway is shown in Table 16-6.

Airservices Community Engagement Standard		Perth's New Runway	
Step 1 – Engagement Planning	Engagement with stakeholders that are representative of the wider community to support understanding of affected stakeholders and local area	✔	<p>Extensive stakeholder and community engagement undertaken for all Perth Airport Master Plans (1985, 1999, 2004, 2009, 2014 and 2020) which have included indicative flight paths and noise modelling for the new runway</p> <p>Consultation with State and local government authorities on the ANEF and future aircraft noise, including for the new runway, since 1985 as part of the ANEF endorsement process for each new Master Plan</p> <p>Consideration of future aircraft noise forecasts for the new runway in land use zoning and development proposals since 1997 under State Planning Policy 5.1 Land Use Planning in the Vicinity of Perth Airport</p> <p>Telephone survey of 300 residents within a 10-kilometre radius of Perth Airport undertaken by Patterson Research Group in 1998 to identify perceptions of aircraft noise</p> <p>Development of a web-based interactive Aircraft Noise Information Portal (<a href="http://perthairport.com.au/aircraftnoise">perthairport.com.au/aircraftnoise</a>) in 2014 to provide information on current and predicted flight paths and aircraft noise in relation to specific properties or areas, with upgrades undertaken in 2019 and 2025 to enhance functionality and incorporate updated information</p> <p>Engagement with stakeholders and the community through regular Perth Airport Community Briefing Group (previously Perth Airport Community Forum), Planning Coordination Forum and (now discontinued) Perth Airports Municipalities Group meetings</p> <p>Focus groups held with community members in 2017 to improve how information on flight paths and aircraft noise is presented</p>
	Publish engagement plan	✔	<p>Stakeholder Engagement Plan for the New Runway Project MDP developed with Airservices input</p> <p>Public comment consultation activities and available resources detailed in each Perth Airport Master Plan and the New Runway Project MDP</p>
	Baseline awareness survey	✔	<p>More than 2,600 people within a 30-kilometre radius of Perth Airport participated in a 2018 survey undertaken by Patterson Research Group to identify community attitudes towards infrastructure development, including aircraft noise and Perth's new runway. Four out of five of the people surveyed either 'support' or 'strongly support' the new runway, with four per cent opposed to the project</p>



Airservices Community Engagement Standard		Perth's New Runway	
Step 2 – Develop and Assess Options	Seek feedback on options development methodology and assessment criteria Engage stakeholders in the iterative development of design options	✔	<p>UK NATS engaged to support Perth Airport and Airservices in developing a Concept of Operations (CONOPS) for the new runway</p> <p>Development of a draft Airspace Management Plan through extensive consultation with stakeholders to determine the expected airspace architecture and management framework for the future airfield configuration, including modelling and analysis to review potential flight paths. Workshops involving Perth Airport, Airservices and the Department of Defence investigated various options to facilitate the air routes</p>
	Publish preferred and shortlisted design options 12-week public engagement	✔	<p>60-business day (12 week) public comment period undertaken for Perth Airport Master Plans in 1999, 2004, 2009, 2014, 2020 and 2026, which displayed aircraft noise modelling and indicative current and future flight paths, in accordance with the Airports Act</p> <p>Review and comment on the exposure draft version of the New Runway Project MDP by Federal, State and local governments and key stakeholders</p> <p>60-business day (12 week) public comment period undertaken in 2018 for the New Runway Project MDP in accordance with the Airports Act, including briefings on the noise modelling and preliminary airspace design to community groups, state and local governments, and other stakeholders</p>
	Community awareness survey (general survey to gauge percentage of population with awareness of the proposal and engagement in the process)	✔	<p>Extensive interaction with the community during the 60-business day public consultation period for the New Runway Project MDP (while not a survey, these interactions provide a gauge of public awareness of the proposal and engagement) including:</p> <ul style="list-style-type: none"><li>• introduction letter mailed to 308,595 residences in the Perth metro area</li><li>• 44,649 unique visitors to <a href="http://newrunway.com.au">newrunway.com.au</a> and 8,275 downloads of documents</li><li>• 8,958 visitors to the online Aircraft Noise Information Portal</li><li>• interactions with 7,300 people at new runway information stands held across 19 shopping centres</li><li>• targeted social media posts reaching 448,786 people with 5,403 interactions</li><li>• 2,030 public comment submissions received, of which 2,000 were from the community</li><li>• 815 attendees at Community Information Expos and the Perth Airport Experience Centre</li><li>• 212 phone calls to new runway project information phone line</li><li>• 129 articles about the new runway across print, radio and online media</li></ul>
Step 3 – Engage	Publish proposed design and environmental assessment 12-week public engagement	🕒	<p>The final flight paths for the parallel runway system will be designed by Airservices during the detailed design phase before the new runway opens. This phase also includes the development of air traffic management procedures and noise abatement procedures.</p> <p>Perth Airport will revise aircraft noise modelling and flight path communications materials, including the online Aircraft Noise and Information Portal.</p> <p>Extensive engagement will be undertaken with industry, regulators, stakeholders and the community</p>
	Community awareness survey	🕒	<p>Survey will be conducted to gauge the level of community awareness of the change proposal</p>
Step 4 – Update and Submit	Publish engagement report	🕒	<p>A community engagement report will be published to show how the design has considered consultation feedback</p>
	Re-engagement with affected stakeholders if the final design creates new impacts not identified previously	🕒	<p>Re-engage with affected stakeholders if the final design identifies any substantive changes from the information provided during Step 3</p>
Step 5 – Implement and Review	Inform all affected stakeholders of implementation timing	🕒	<p>Stakeholders and community will be kept informed about the new runway project through the regular engagement forums (PCF and CBG as a minimum), Perth Airport website, media, and social media sources</p>
	Engage stakeholders in the Post Implementation Review	🕒	<p>Post Implementation Reviews are conducted by Airservices a minimum of 12 months after implementation of the change to assess if the anticipated impacts and benefits of the original proposal are as expected</p>

Table 16-6 Consistency of new runway planning with Airservices Community Engagement Standard  
Source: Perth Airport

Aircraft Noise Information

A key focus of Perth Airport’s engagement is to communicate aircraft noise information in a manner that is uncomplicated and easy to understand.

Perth Airport provides a range of material to inform and engage the community about aircraft noise and flight paths. This includes the ANEF contours, N-above contours (described in Section 16.2.3.5), published material on aircraft noise, and an online Aircraft Noise Informational Portal.

Launched in 2014, the web-based interactive Aircraft Noise Information Portal was developed by Perth Airport to provide information on flight paths, the ANEF and N-above contours and how they apply to a property a person resides in or may be looking to purchase. The portal, shown in Figure 16-3, provides information on current and future operations at Perth Airport and is available at [perthairport.com.au/aircraftnoise](http://perthairport.com.au/aircraftnoise). The Portal was upgraded in 2019 and 2025 to enhance functionality and incorporate updated noise information.

Since 2015, the Perth Airport ANEF and N-Above (N65) contours have been made available through Landgate Property Interest Reports which provide details of the interests that may impact the use and enjoyment of a specific property within Western Australia.

Section 5.4 details Perth Airport’s ongoing consultation and education mechanisms. They include a Planning Coordination Forum to foster planning discussions with Australian, State and local government representatives, and the Perth Airport Community Briefing Group, which provides a forum for the community and stakeholders to discuss the planning, development and operation of Perth Airport.

In 2016, an Australian initiative was led by Perth Airport and resulted in the publication of a booklet titled Reducing Aircraft Noise in Existing Homes. The booklet provides information about practical modifications that can reduce noise levels and is available from [perthairport.com.au/aircraftnoise](http://perthairport.com.au/aircraftnoise).

Perth Airport has also engaged with community members through focus groups that are asked to provide feedback about how information on flight paths and aircraft noise is perceived. This has aided Perth Airport to provide clear, concise and meaningful information which assists the community in making informed decisions.

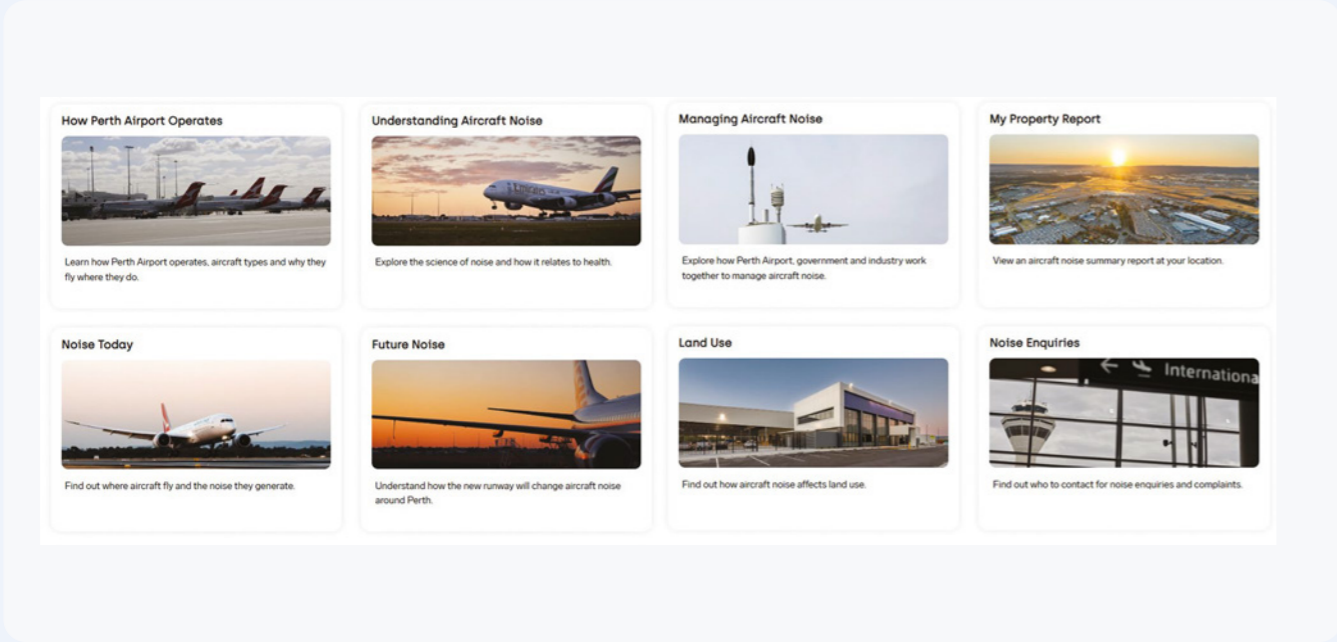


Figure 16-3 Perth Airport Noise Information Portal  
Source: Perth Airport

Airservices Australia

Airservices, as Australia’s air navigation service provider, also engages with the community on aircraft noise and related issues for the community. Airservices uses provides information about aircraft operations at Perth Airport, including:

- The Airservices Noise Complaints and Information Service is the main interface on civil aircraft noise and related issues for the community. Airservices uses complaints and enquiries to help identify operations of concern and possible opportunities for improvement,
- WebTrak ([www.airservicesaustralia.com/webtrak](http://www.airservicesaustralia.com/webtrak)) which provides information about individual flights and allows users to submit aircraft noise enquiries and complaints,

- Noise monitoring, which is undertaken by Airservices to provide accurate information about aircraft noise to stakeholders and the community, as well as for the assessment of proposed procedure changes. Airservices collects noise and operational data from six noise monitors located around Perth Airport. Noise monitoring results are available to view through WebTrak ([www.airservicesaustralia.com/webtrak](http://www.airservicesaustralia.com/webtrak)), and
- Aircraft in Your Neighbourhood (<https://aircraftnoise.airservicesaustralia.com/>), which provides information about flight paths and runway use for Perth Airport specific to a person’s selected location.

Table 16-7 outlines the ICAO cross-cutting element (Community Engagement) actions at Perth Airport.

ICAO cross-cutting element (Community Engagement) actions at Perth Airport		
Australian Government	Airservices Australia	Perth Airport
Establishes consultation requirements for airport Master Plans and Major Development Plans through the <i>Airports Act 1996</i>	Responds to aircraft noise enquiries and complaints through its Noise Complaints and Information Service	Convenes the Perth Airport Community Briefing Group to discuss the development and operation of the airport
Publishes the Airport Development Consultation Guidelines and the Community Aviation Consultation Group Guidelines to guide consultation processes at the leased federal airports	Provides information about individual flights and noise monitor readings through the WebTrak online portal	Provides detailed information about aircraft noise and flight paths through the online Perth Airport Noise Information Portal
	Provides information about flight path and runway use at Perth Airport through the Aircraft in Your Neighbourhood online portal	Undertakes public consultation on airport Master Plans and Major Development Plans
	Undertakes community consultation on flight path and airspace change proposals in accordance with its Community Engagement Framework	Publishes the Reducing Noise in Existing Homes Brochure to provide information about practical modifications that can reduce noise levels
	Participates in the Perth Airport Community Briefing Group	Keeps the community informed of runway works through the Perth Airport website ( <a href="https://www.perthairport.com.au/Home/corporate/planning-and-projects/runway-works">https://www.perthairport.com.au/Home/corporate/planning-and-projects/runway-works</a> ) and social media channels

Table 16-7 ICAO cross-cutting element (Community Engagement) actions at Perth Airport  
Source: Perth Airport

16.2.2.3 Ground-based Noise

Perth Airport has limited control of noise generated by aircraft on the ground.

An essential safety measure following maintenance of aircraft is to perform engine testing, known as ‘ground running’. Perth Airport does not have major airline maintenance facilities and consequently has less ground running than other major airports. There is, however, a continuing requirement for aircraft operators to carry out engine ground running at Perth Airport.

Perth Airport acknowledges that engine ground running can contribute to the overall noise created at an airport. To manage engine ground running activities and reduce potential noise impacts, Perth Airport has an Engine Ground Run Management Plan that places restrictions on the time of day, location and maximum power settings for these activities. Aircraft operators must seek approval from Perth Airport if a proposed engine run cannot be conducted in accordance with the defined constraints. Perth Airport regularly reviews its Engine Ground Running Management Plan to assess opportunities for improved noise management.

There are other ground-based aircraft noise sources on the airfield, such as the use of auxiliary power units which supply electrical and pneumatic power to aircraft systems when the main engines are not operating. One measure adopted by Perth Airport to reduce ground noise sources has been the installation of fixed electrical ground power units at aircraft parking positions to minimise the use of auxiliary power units and mobile ground power units.

Perth Airport is also working with airline partners and their ground handling agents to support the introduction of electric ground services equipment which can help reduce ground-based noise.

The management of other sources of ground-based noise is discussed in Section 11.5.

16.2.3 Aircraft Noise Modelling

Aircraft noise modelling is undertaken to understand and evaluate the actual and predicted aircraft noise exposure. Modelling results are used to inform the design of airfield infrastructure and flight paths, as well as provide useful information to the community about current operations and potential future changes.

A range of metrics is available to describe the level of aircraft noise in an area, each being useful for a different purpose. Consistent with the NASF Guideline A, the metrics presented in this Master Plan 2026 are the ANEF and N-Above contours.

The ANEF system comprises the following three noise exposure indicators that, although they use the same noise metric for calculation, are based on different inputs and vary in purpose:

- 1. Australian Noise Exposure Forecast (ANEF)—show the anticipated noise contours for the most likely or preferred development and forecasts for an airport. Only one ANEF can be in place at the one time and is the basis for Australian Standard 2021:2015 Acoustics—Aircraft Noise Intrusion—Building Siting and Construction

Perth Airport is also working with airline partners and their ground handling agents to support the introduction of electric ground services equipment which can help reduce ground-based noise.

- 2. Australian Noise Exposure Concept (ANEC)—a planning tool used to test changes to noise exposure resulting from proposed changes to airport operations. Several ANECs may be produced based on a range of scenarios, and
- 3. Australian Noise Exposure Index (ANEI)—noise contours based on actual aircraft movement data and show actual noise exposure for a previous period, typically a year. The ANEI is mostly developed to compare with the ANEF and ANECs to highlight differences in anticipated noise exposure.

The Airports Act requires a master plan to provide an ANEF for the areas surrounding the airport. An ANEF must be formally endorsed for technical accuracy by Airservices. In addition, the master plan must specify the airport’s plans, developed through a consultative process with airline partners and local government authorities in the vicinity of the airport, for managing aircraft noise intrusion in areas forecast to be subject to exposure above significant ANEF levels. Significant ANEF levels are defined as the 30 ANEF contour and above.

The N-above system of describing aircraft noise was developed by the Australian Government through industry and community consultation. N-above modelling illustrates the average number of aircraft noise events per day that exceed a specified noise level. The NASF Guideline A recommends the use of N-above modelling to provide more comprehensive and understandable information about aircraft noise to communities.



16.2.3.1 Modelling Software

The noise modelling for this Master Plan 2026 has been prepared using the Aviation Environmental Design Tool (AEDT) software, developed by the US Federal Aviation Administration. AEDT is the most modern noise simulation software package used for aircraft noise modelling. AEDT version 3e has been used in accordance with Airservices’ requirements for technical endorsement.

The AEDT contains a database of current civil passenger and military aircraft along with their performance and typical noise characteristics.

Input data for the AEDT noise modelling includes the following variables:

- types of aircraft (aircraft fleet mix)
- movement volume
- configuration of the runways and allocation to respective operations
- arrival and departure tracks flown, along with ascent and descent profiles and flight track dispersal to consider the spread on the track by aircraft operations
- aircraft destinations or origins (stage lengths) to take into consideration track allocation
- day/night split of operations
- terrain data, and
- normalised wind velocity and temperature information.

16.2.3.2 Noise Modelling Inputs

Movement Scenarios

The Manner of Endorsement for Australian Noise Exposure Forecasts, published by the Australian Government, outlines

the three projected timeframes that an ANEF can cover. These are:

- a standard ANEF— forecast noise exposure levels up to a maximum of 20 years
- a long-range ANEF which specifies a year—forecast noise exposure levels up to or beyond 20 years, or
- an ultimate practical capacity ANEF—forecast noise exposure level likely if an airport was operating at its ultimate practical capacity.

Consistent with Perth Airport’s 1999, 2004, 2009, 2014 and 2020 master plans, Master Plan 2026 has also adopted an ultimate practical capacity ANEF.

The composite ANEF for this Master Plan 2026 comprises four ANEC scenarios:

- ANEC 0 – actual FY24 aircraft operations on the existing main runway 03/21 and cross runway 06/24
- ANEC 1—existing main runway 03/21 and cross runway 06/24 with their planned future extensions
- ANEC 2—future parallel runway operations for the existing main runway 03/21 and the new runway, operating at their theoretical ultimate capacity, and
- ANEC 3 – future three-runway operations for the existing main runway 03/21 and cross runway 06/24 with their planned future extensions, as well as the new runway, operating at their theoretical ultimate capacity.

The composite ANEF is created by taking the outer contour lines of all ANECs.

Associated aircraft movement tables for each ANEC can be found in Section 18.

Runway Use

The runway direction in use is primarily determined by seasonal wind patterns because aircraft take off and land into the wind for safety and performance. Therefore, as the wind direction changes, the runway in operation may also have to be changed, depending on the strength of the wind.

Wind patterns at Perth Airport can be characterised by a distinct daily pattern. In the mornings, winds are predominantly easterly or northeasterly, while the afternoons are characterised by predominantly westerly or south-westerly winds.

The main runway (03/21) is used in runway 03 direction (departing to the north and arriving from the south) for a north-easterly wind, and runway 21 direction (departing to the south and arriving from the north) for a south-westerly wind. The prevailing sea breeze from the south-west limits availability of runway 03 in the afternoon and evening. Conversely, the prevailing land-to-sea breeze limits availability of runway 21 during the night and morning. This is most pronounced during the warmer months of October through March.

The new runway will be located parallel to the existing main runway and will therefore have the same runway direction usage as that of the main runway.

Winds from the east or west will have crosswind components, and the cross runway is typically used during periods when crosswinds exceed 20 knots. Refer to Figure 16-4 for aircraft operating flows at Perth Airport.

The noise abatement procedures (described in Section 16.2.2.2) also influence runway use.

For noise modelling purposes, future runway use was determined by considering 10 years of Bureau of Meteorology meteorological data for Perth Airport and applying the rules set out in the Manual of Standards Part 172 – Air Traffic Services (Cth).

Flight Paths

Flights paths can be considered ‘highways in the sky’. They define three-dimensional routes that aircraft use to arrive at or depart from an airport. Flight paths are often shown as a single line on a map; however, in practice, a flight path can vary up to several kilometres or more. This occurs for a range of reasons, including:

- weather conditions
- aircraft performance
- separation distances and air traffic management requirements, and
- type of aircraft operation (instrument flight rules or visual flight rules).

For visual presentation of flight paths, the path shown is based on a nominal spread around a central corridor that represents where the majority of aircraft are expected to be. A flight path diagram illustrates flight paths in two ways:

- as 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
  - the potential width of the flight corridor
- in a data table that shows:
  - the average and typical number of times that an aircraft is likely to use the flight path during day (6am-7pm), evening (7pm-11pm), night (11pm-6am) and 24-hour periods
  - the percentage of days where no flights are predicted (based on the modelling) for day, evening night and 24-hour periods.

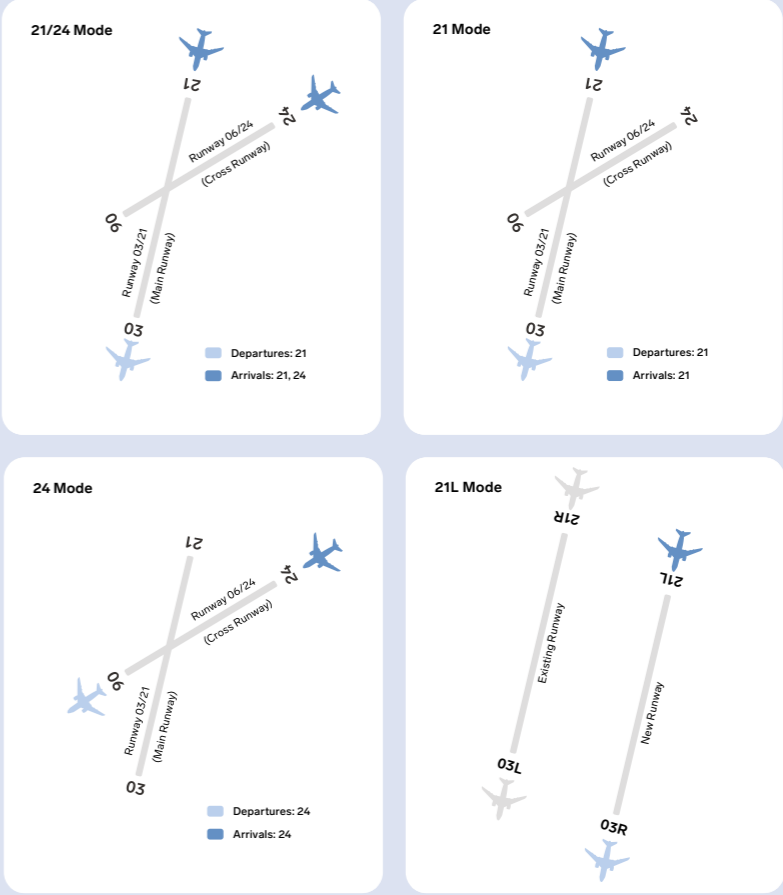
Flight paths for Perth Airport are designed around military airspace to the north, west and south, and Jandakot Airport airspace to the south. The close proximity of RAAF Base Pearce to the north means that air traffic controllers at Perth Airport have to coordinate their actions with RAAF controllers, including those for changes of runway direction.

Jet arrivals into Perth are generally aligned with the runway at least 10 kilometres from the airport. From this point they will fly towards the runway in a straight line. Departure flight paths allow aircraft to maintain the runway heading for a short time until they are stabilised in flight, and then to turn towards the route that will take them to their destination.

There have been no changes to flight paths at Perth Airport since Airservices introduced a smart tracking flight path for suitably equipped aircraft arriving from the north and east and landing onto runway 03 (southern end of the main runway) in September 2015.

Indicative flight path diagrams for each operating flow are shown in Figure 16-5 to Figure 16-8.

South Flow



North Flow

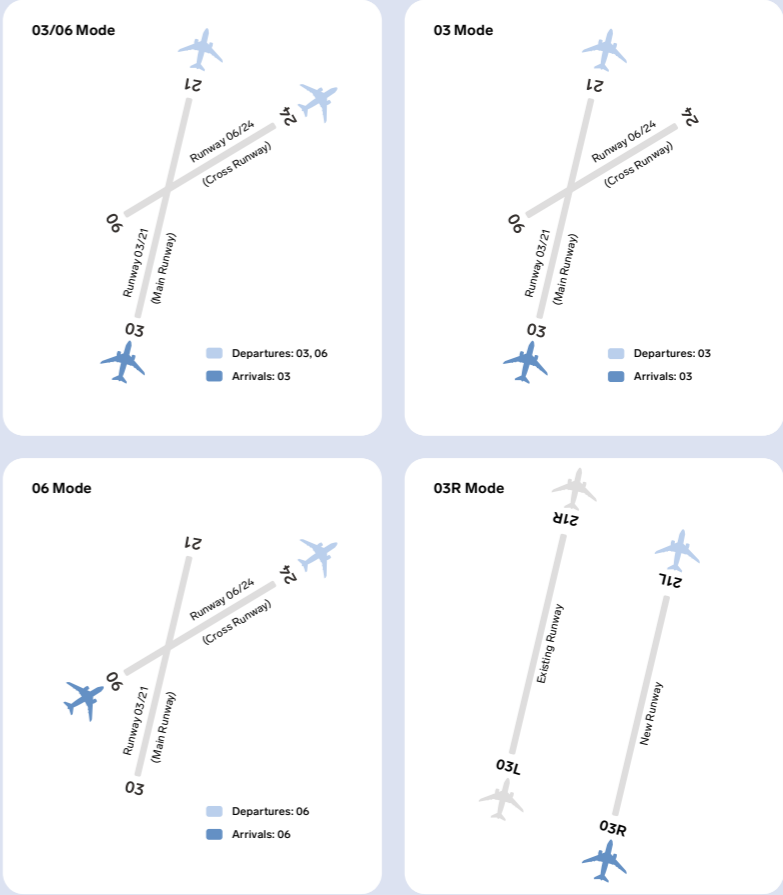


Figure 16-4 Perth Airport aircraft operating flows  
Source: Perth Airport



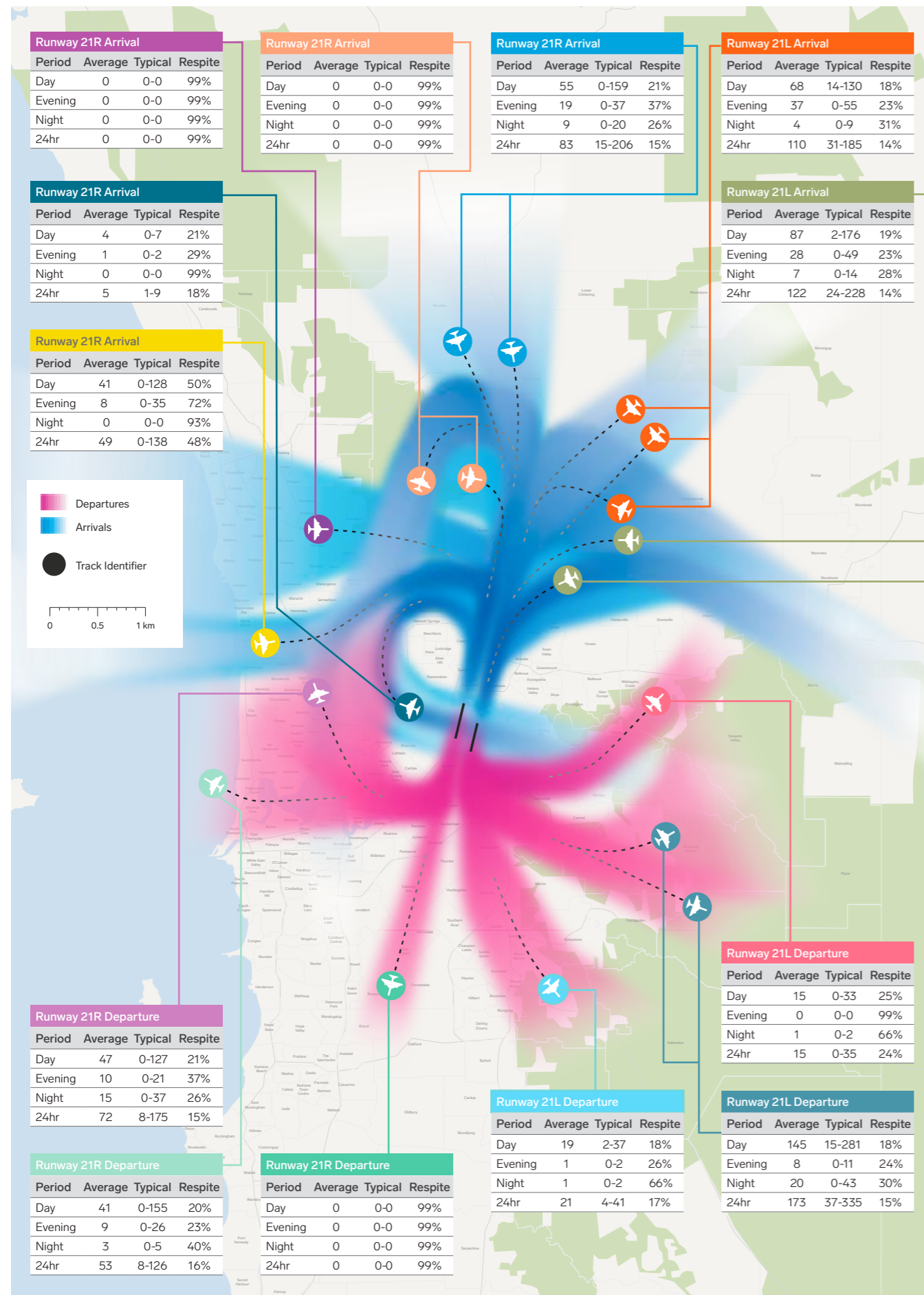


Figure 16-7 Future parallel runway operations south flow arrivals and departures flight path diagram

Source: Perth Airport

This movement data is based on Perth Airport's projected movements at ultimate capacity.

Based on the forecasts used in this Master Plan, Perth Airport will theoretically reach capacity around 2080.

The displayed flight path corridors represent the preliminary airspace design for the new runway operations.

The final airspace design will be completed prior to the opening of the new runway

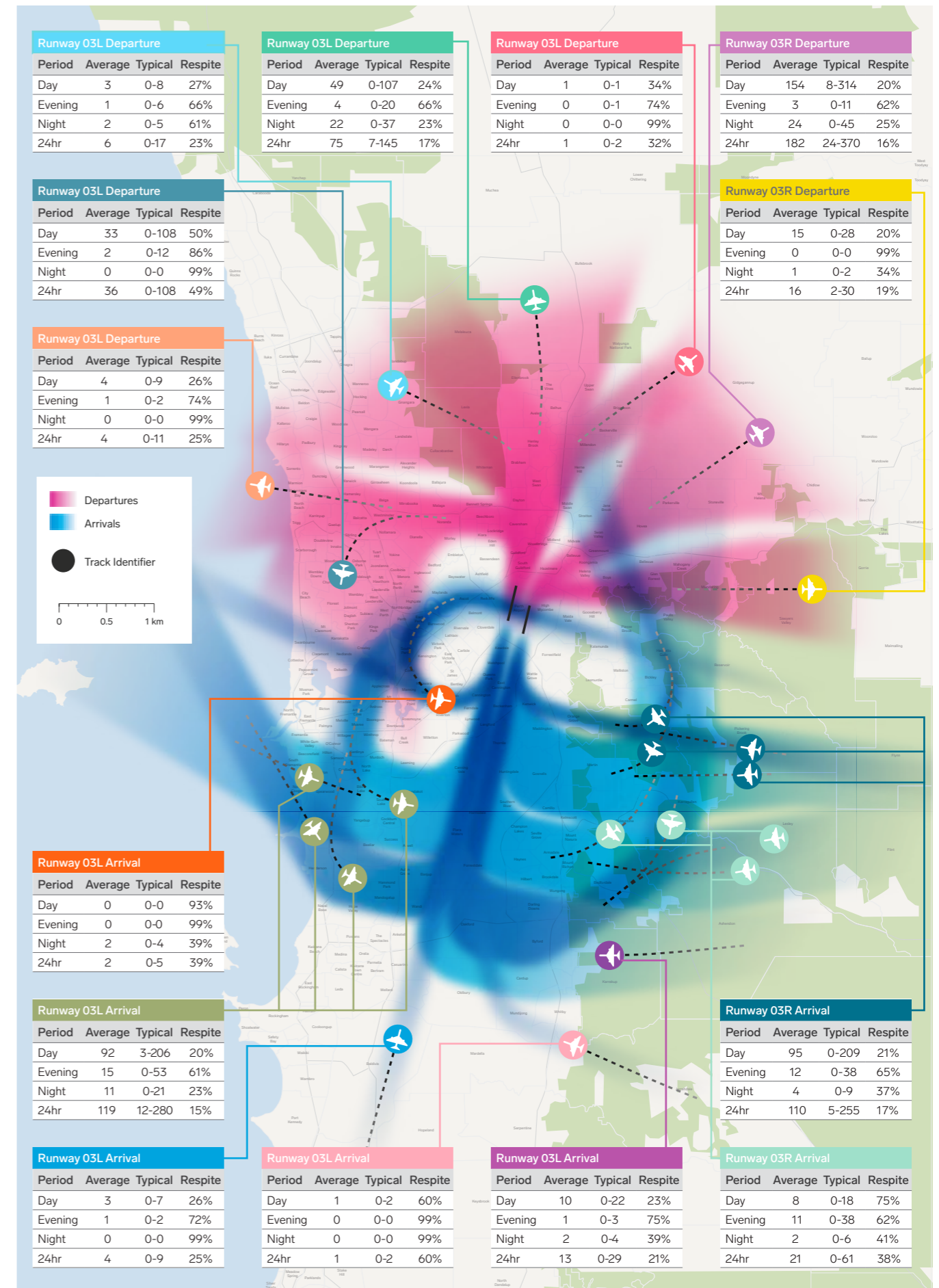


Figure 16-8 Future parallel runway operations north flow arrivals and departures flight path diagram

Source: Perth Airport

16.2.3.3 Australian Noise Exposure Index (ANEI)

The ANEI is shown in Figure 16-9 and displays the average daily aircraft noise exposure based on aircraft movements for the year 2023.

16.2.3.4 Australian Noise Exposure Forecast (ANEF)

The Master Plan 2026 Ultimate Capacity ANEF, endorsed by Airservices for technical accuracy on 22nd September 2025, is shown in Figure 16-10.

Overall, the Master Plan 2026 ANEF is fairly consistent with the Master Plan 2020 ANEF. The outer ANEF contour (ANEF 20) has reduced on all runway ends except Runway 06 which has extended slightly. These changes are attributable to:

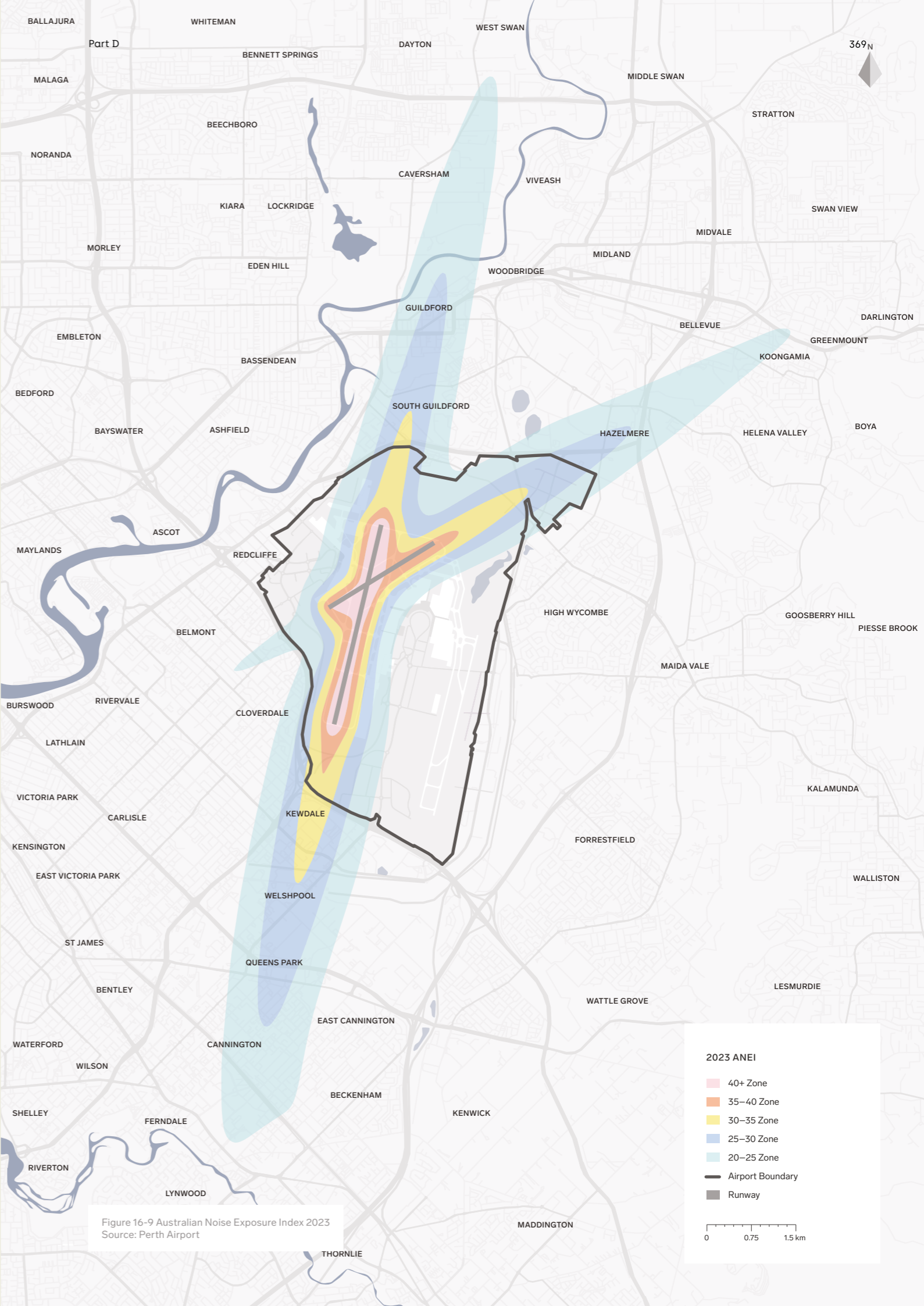
- Updated movement volume forecasts
- Updated runway and track allocation assumptions, and
- Updated aircraft mix that incorporates recent airline fleet changes and future planning for quieter new-generation aircraft types.

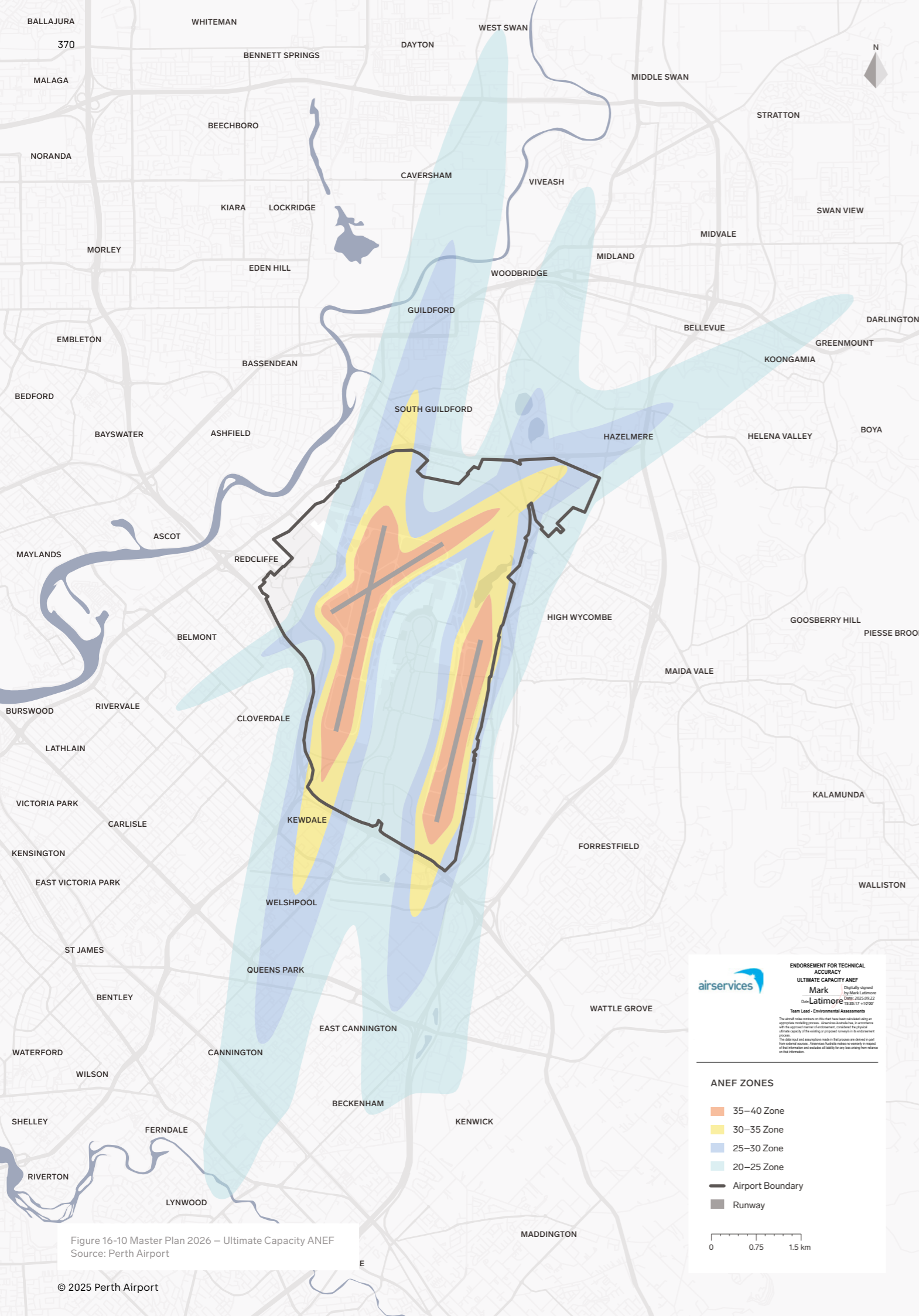
Houses within the 30 ANEF Contour

The Airports Act requires a master plan to provide plans, developed in consultation with airlines and local government bodies within the vicinity of the airport, for managing aircraft noise intrusion in areas forecast to be above the significant ANEF (ANEF 30) levels.

There are 31 dwellings in South Guildford that sit within the ANEF 30 contour.

The net difference between the ANEF charts published in Master Plan 2020 and this Master Plan 2026 is a decrease of seven dwellings with exposure above the significant ANEF levels (ANEF 30 contour).Perth Airport works closely with Airservices, aircraft operators, and Federal, State and local governments to manage aircraft noise, with a focus on houses located within the 30 ANEF contour. The range of measures in place to manage aircraft noise at Perth Airport are discussed in Section 16.2.2.2.





### 16.2.3.5 Number-Above Contours

AS2021 recognises that the ANEF does not capture all high noise affected areas around an airport and is not necessarily an indicator of the full spread of noise impacts. The frequency of over-flight and the sound level of a single aircraft are typically the two factors that determine how a person will perceive noise, and these are not clearly translated by the ANEF system.

To improve how aircraft noise is communicated to the public, the Australian Government developed Number-above (or N-above noise) contours. This system of describing aircraft noise was developed through industry and community consultation and is described in the discussion paper *Expanding Ways to Describe and Assess Aircraft Noise* (Department of Infrastructure and Regional Development, 2020). The use of N-above contours for communicating and assessing aircraft noise exposure is also outlined in the *Standards Australia Handbook SB HB 149:2016 (Acoustics—Guidance on producing information on aircraft noise)* and *NASG Guideline A*.

N-above contours illustrate the average number of aircraft noise events (single aircraft movements) per day that exceed a specified sound level.

The volume (loudness) of a sound depends on its sound-pressure level, which is expressed in decibels (dB). For measurement purposes, A-weighted decibels (dBA) are generally used because they take into account varying sensitivity of the human ear to different frequencies of sound.

The most commonly used N-above noise descriptors are N70, N60 and N65 contours.

The N70 contours represent the average daily noise events above 70 dBA. A noise level of 70 dBA outside a building will generally result in an internal noise level of approximately 60 dBA, if windows are open to a normal extent. This is considered the sound level at which conversation and other indoor activities can generally be disturbed.

N60 is typically used for the assessment of aircraft noise at night. The N60 contours represent the number of average daily noise events exceeding 60 dBA external to a building, which would typically result in a maximum noise level of 50 dBA within a building having windows open to a normal extent. This is considered close to the point at which noise could cause awakening, or sleep disturbance.

Perth Airport recognises that residents of the region enjoy an outdoor lifestyle, supported by a mild climate and an abundance of warm weather and sunshine during the summer months, which is often reflected in building construction. As a result, Perth Airport has historically adopted an outdoor sound level of 65 dBA for noise

modelling, which correlates to an indoor noise level of approximately 55 dBA and is the sound level at which conversation may be disturbed. This is a conservative approach compared to other Australian airports, to account for the anticipated prevalence of outdoor living.

N-above contours are presented for five or more events per period. This threshold is adopted because it represents a level above which aircraft noise would be considered a regular feature of the noise environment. N-above values of five or more are considered appropriate for describing aircraft noise in areas that currently experience aircraft noise, as well as areas which would be newly affected. Furthermore, they provide sufficient resolution to describe the change in aircraft noise for both existing and newly exposed areas.

The N-above noise contours represent an average day and not a typical day. Traffic at Perth Airport varies significantly from weekdays to weekends and depending on the runway being used at any particular time, and residents may experience more events or fewer events than the N-above contours suggest.

The Perth Airport N65 and N60 contour plans, based on 2023 aircraft movements and the ultimate capacity forecast, are provided in Figure 16-11 to Figure 16-14.

As outlined in Section 16.2.2.2, Perth Airport has developed a web-based portal to allow community members and representatives to more easily understand current and anticipated aircraft noise exposure. The portal allows users to identify the noise contours applicable to a specific property address or area. The portal is available through Perth Airport's website at [perthairport.com.au/aircraftnoise](http://perthairport.com.au/aircraftnoise).

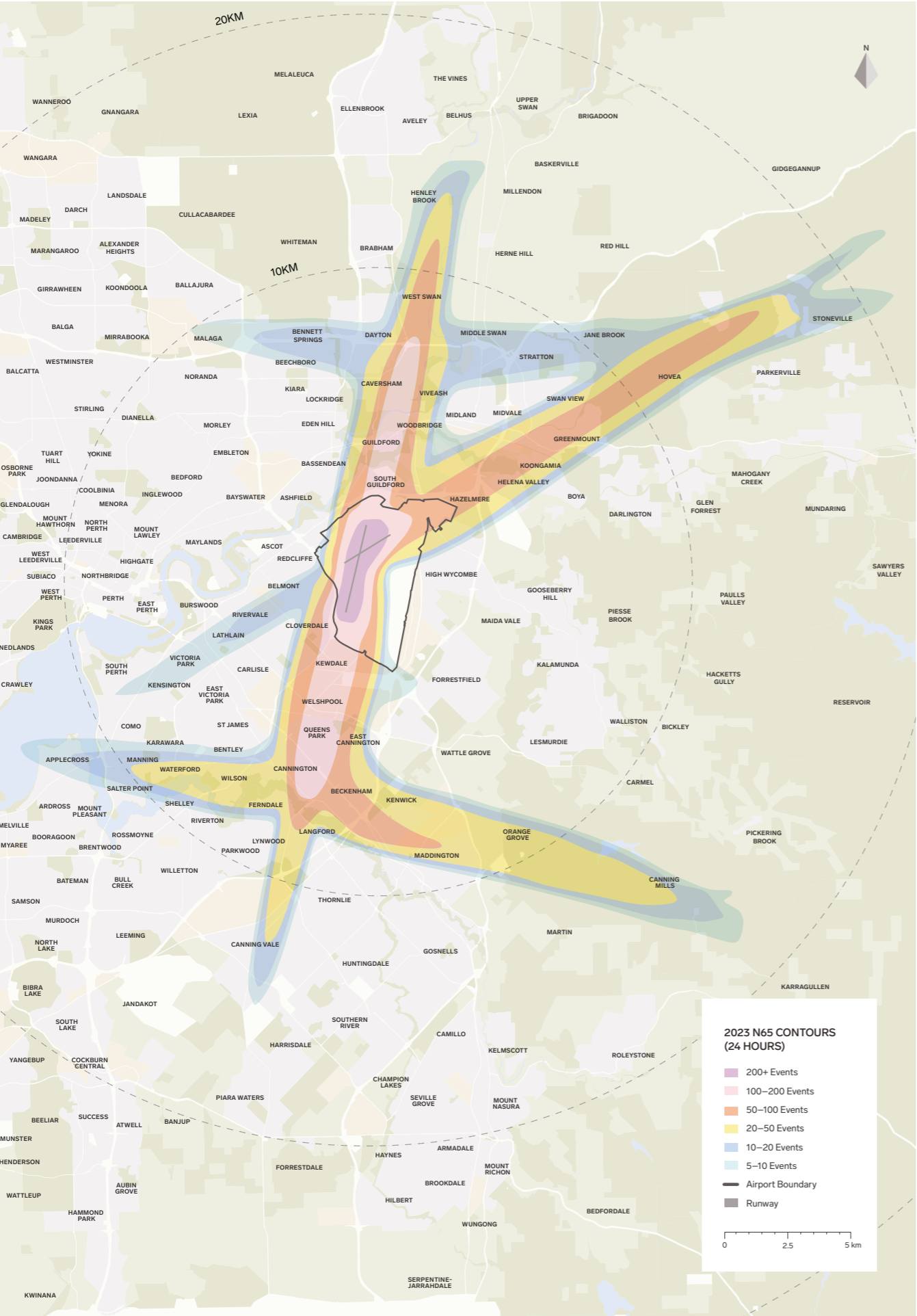


Figure 16-11 Perth Airport N65 contours (24 hours) – 2023  
Source: Perth Airport

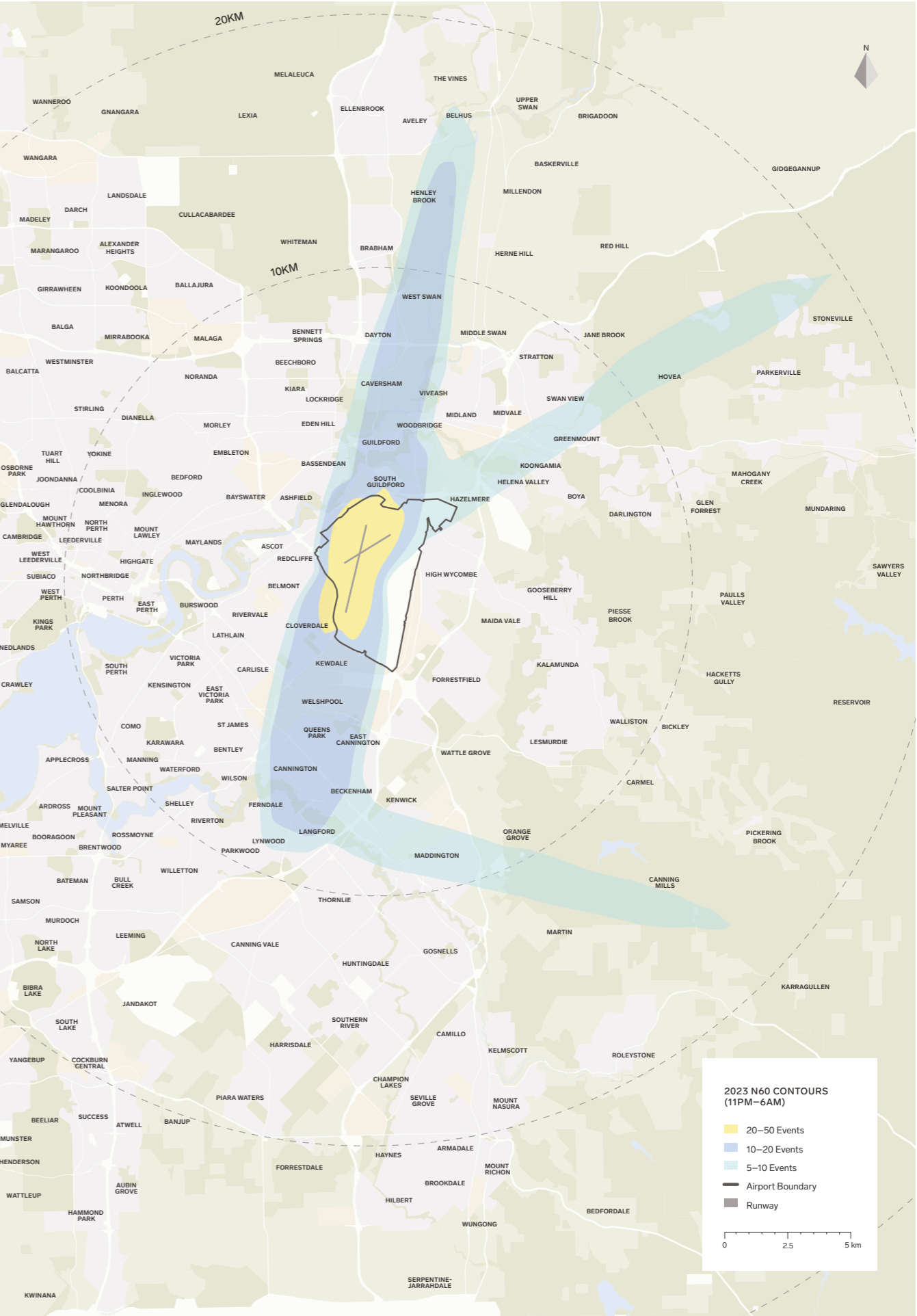


Figure 16-12 Perth Airport N60 contours (11pm-6am) – 2023  
Source: Perth Airport

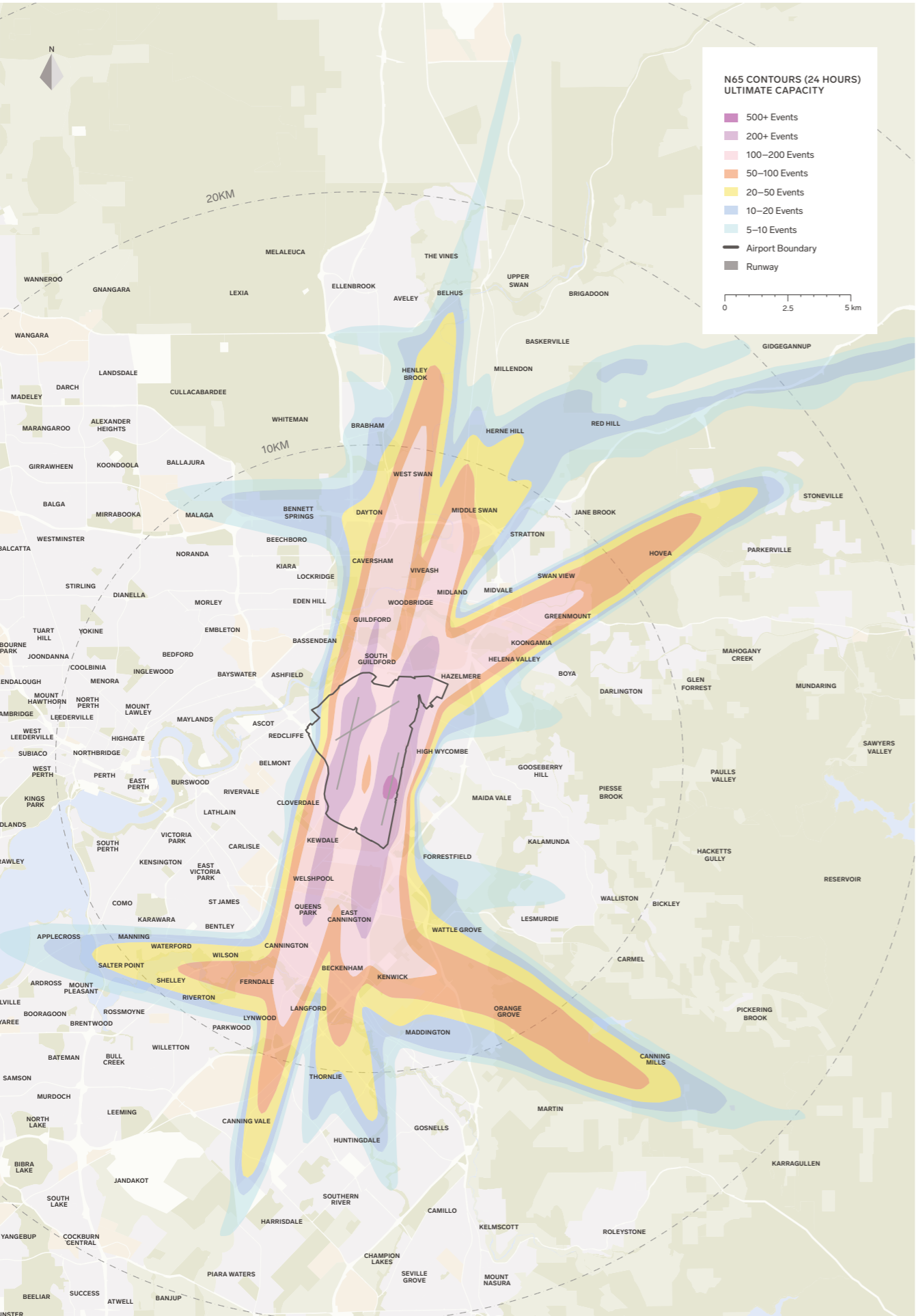


Figure 16-13 Perth Airport N65 contours (24 hours) – Ultimate Capacity  
Source: Perth Airport

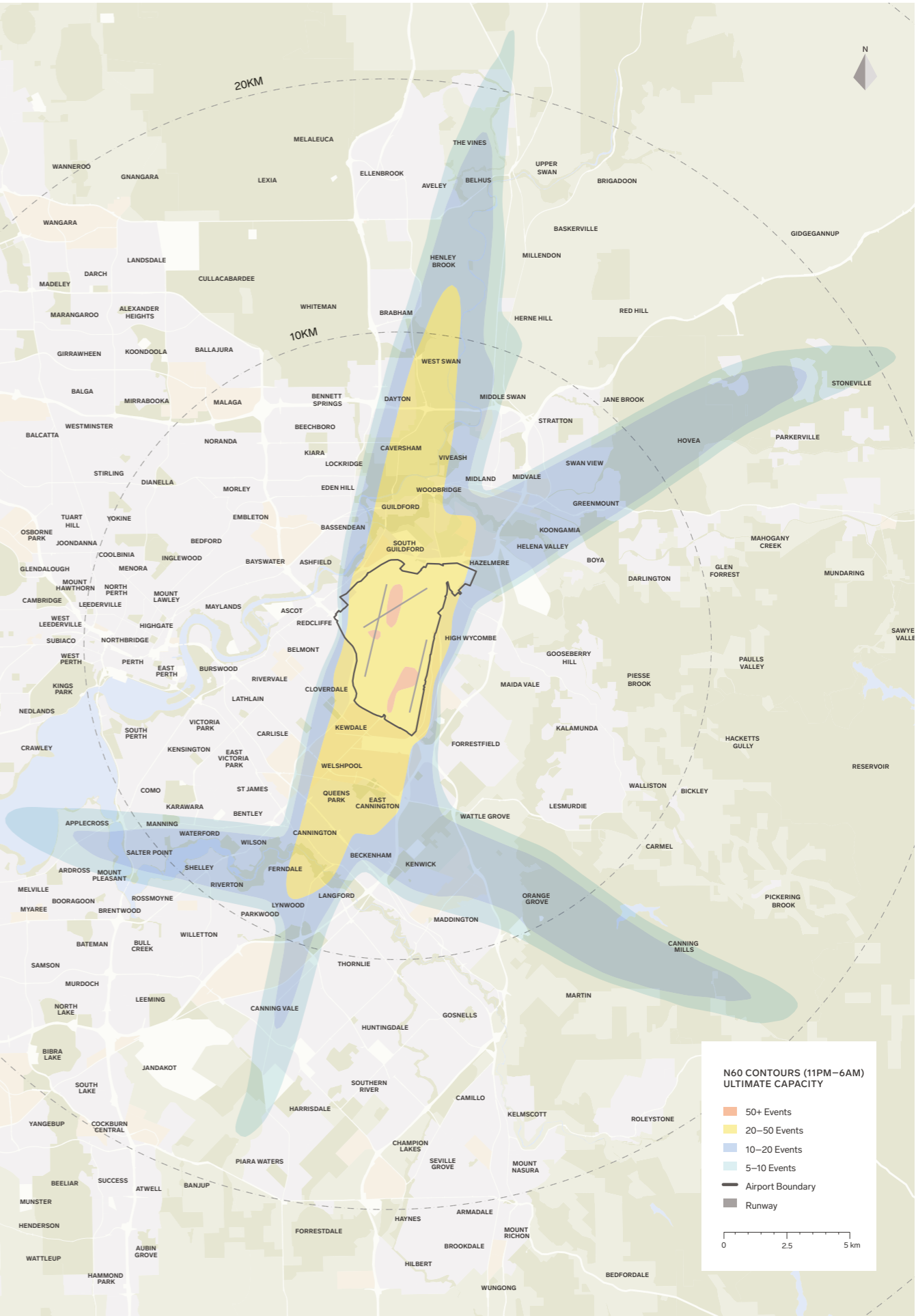


Figure 16-14 Perth Airport N60 contours (11pm-6am) – Ultimate Capacity  
Source: Perth Airport

### 16.3 Building Generated Windshear and Turbulence

The risk of windshear (a change of wind speed and/or direction over a relative short distance) created from a large building or terrain located in the vicinity of a runway, is a critical consideration for safe airport operations.

Windshear poses the greatest risk on approach, landing and take-off when an aircraft’s speed is low and the pilot’s ability to respond is more limited.

Building-generated windshear becomes critical to safety when a significant obstacle, such as a building, is upwind of the approach path to an operational runway. In such circumstances, wind flow may be diverted around and over the building, causing the wind speed and direction to vary along the approach path.

The NASF Guideline B Managing the Risk of Building Generated Windshear and Turbulence at Airports provides a framework for a staged assessment of building generated windshear and turbulence. First, Guideline B defines an area based on distances from the extended runway centreline and runway ends within which buildings and other obstacles are considered to pose a safety risk in terms of windshear and turbulence. This area is referred to as the ‘trigger assessment area’. The second stage of assessment is to test the 1:35 rule against single buildings or obstacles within the trigger assessment area. The 1:35 rule proposes that buildings with a perpendicular distance to a runway centreline that is less than 35 times the height of the building should be further assessed, and that aerodynamic modelling may be required. The rule is noted as being very conservative and any building that passes the 1:35 rule test is considered not to create unsafe wind effects.

The windshear trigger assessment areas for Perth Airport are shown in Figure 16-15. These areas consider the existing runway layout as well as the new runway and the potential future extensions of the main and cross runways.

Perth Airport’s development approval process considers NASF Guideline B. When determining the siting of potential buildings within the trigger assessment areas, the prevailing wind conditions are considered to gain an understanding of how often the building(s) will be upwind of the approach path to the runway. Developments off-estate located in the windshear trigger assessment areas are to follow the above assessment, which Perth Airport can assist with if required. If a development is proposed to exceed the 1:35 elevation it will trigger windshear assessments, including wind tunnel testing, as per the Guideline. Proponents will require a specialist consultant to undertake that testing and share the results with Perth Airport.

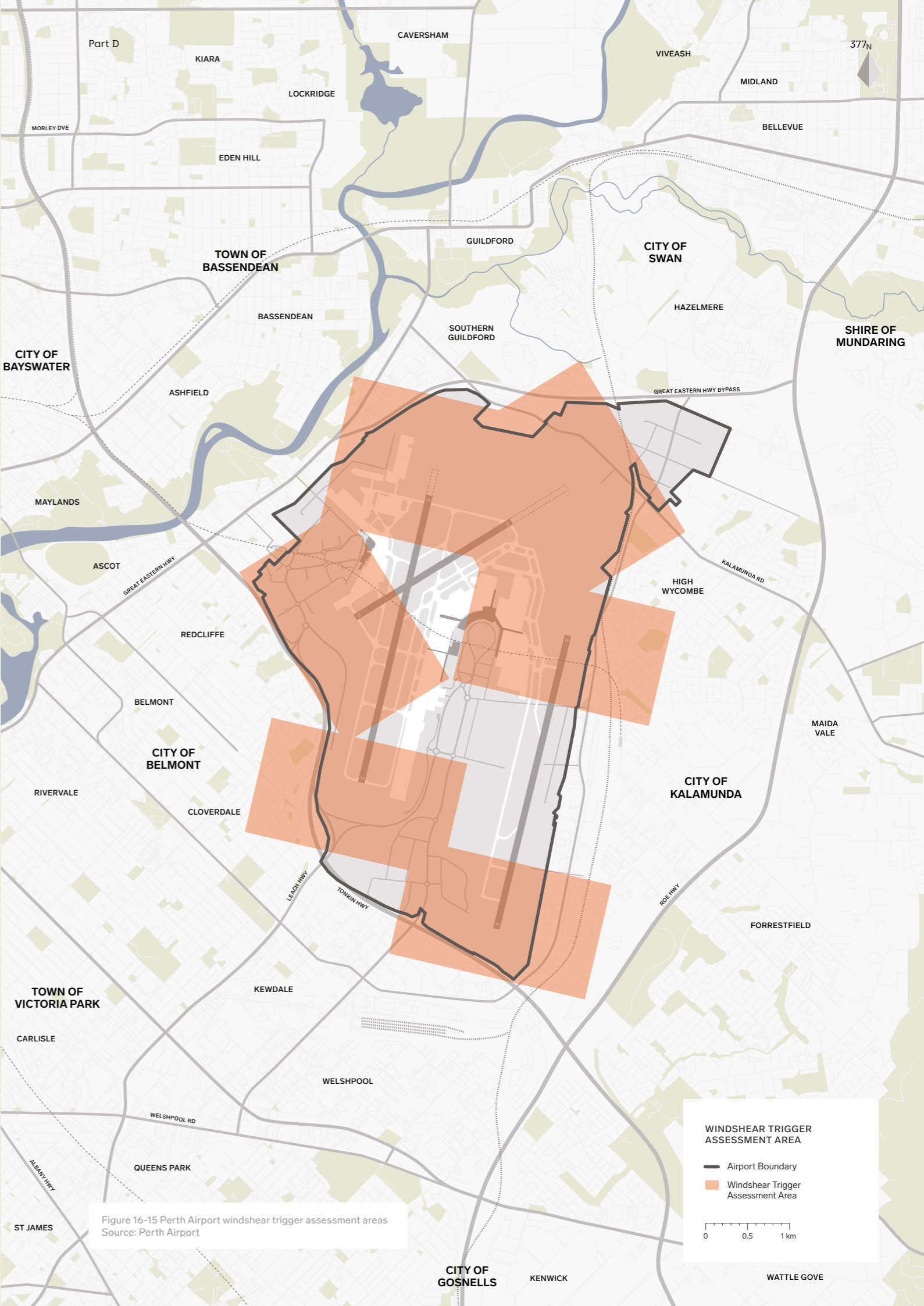


Figure 16-15 Perth Airport windshear trigger assessment areas  
Source: Perth Airport

Wildlife around aerodromes can present serious hazards to aircraft operations. The most obvious of these is the presence of birds, but other animals can also present a hazard.

Under the *Civil Aviation Safety Regulations 1988* Part 139, Perth Airport is required to control the risk of wildlife striking operating aircraft. Perth Airport has a comprehensive Wildlife Hazard Management Plan that incorporates monitoring, assessment, reporting, and control methods for bird and animal hazards. Perth Airport is committed to undertake regular reviews of the Wildlife Hazard Management Plan's operational policies and procedures updated, including risk management processes and reporting frameworks.

Perth Airport also manages vegetation and open waterways across the airport estate to minimise the attraction of species that may pose a risk to aircraft safety.

Bird and wildlife strikes are an aviation safety incident and are required to be reported to the Australian Transport Safety Bureau. Bird and wildlife strike data is published at [atsb.gov.au/national-aviation-wildlife-strike-dashboards](https://atsb.gov.au/national-aviation-wildlife-strike-dashboards). The main species involved in strikes with aircraft at Perth Airport since 2019 have been the Nankeen Kestrel, Welcome Swallow, black cockatoo, galah, rabbits and bandicoots.

NASF Guideline C Managing the Risk of Wildlife Strikes in the Vicinity of Airports provides advice to State and local governments about wildlife-attracting land uses in the vicinity of an airport. It applies three wildlife buffer zones and describes the level of risk of specific types of land uses within each buffer zone and the triggers for adopting active measures to mitigate the risk.

Guideline C applies three wildlife buffer zones—three-kilometre, eight-kilometre and 13-kilometre radius from the airport—and describes the level of wildlife attraction risk associated with specific types of land uses, as well as triggers for adopting active measures to mitigate the risk. These buffer zones are shown in Figure 16-16. The land uses with moderate or high wildlife attraction risk are shown in Table 16-10.

Perth Airport works with State and local planning authorities to monitor conflicting land uses or changing waste disposal strategies, such as landfills, that may cause wildlife and birds to pass or roost in the vicinity of the airport.

The Perth Airport Bird and Animal Hazard Management Advisory Committee (described in Section 5.4.1.7) comprises representatives from Perth Airport, Federal, State and local governments, airlines, airport tenants and ornithological consultants who meet to discuss on- and off-airport wildlife hazard management issues.



Perth Airport is committed to undertake regular reviews of the Wildlife Hazard Management Plan's operational policies and procedures updated, including risk management processes and reporting frameworks.

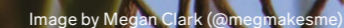


Figure 16-16 Perth Airport wildlife hazard zones  
Source: Perth Airport

Land Use	Wildlife Attraction Risk	Actions For Existing Developments			Actions For Proposed Developments/ Changes To Existing Developments		
		3km radius	8km radius	13km radius	3km radius	8km radius	13km radius
Cattle/dairy farm	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Fish processing/ packing plant	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Food/organic waste facility	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Food processing plant	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Fruit tree farm	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Golf course	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Park/ playground	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Piggery	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Picnic/ camping ground	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Poultry farm	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Racetrack/ horse riding school	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Showground	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Turf farm	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor
Wildlife sanctuary/ conservation area— dryland	Moderate	Mitigate	Monitor	Monitor	Mitigate	Mitigate	Monitor
Wildlife sanctuary/ conservation area— wetland	High	Mitigate	Mitigate	Monitor	Incompatible	Mitigate	Monitor

Table 16-8 Land uses with moderate/high wildlife attraction risk  
Source: National Airports Safeguarding Framework Guideline C Attachment 1

16.5 Wind Turbine Farms as Obstacles

Wind turbine farms can be hazardous to aviation as they are tall structures with the potential to come into conflict with low-flying aircraft. There is also the possibility for wind turbines to cause turbulence which is noticeable up to 16 rotor diameters downwind of the turbine.

The NASF Guideline D—Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation provides guidance to proponents of wind farms and planning authorities to help identify any potential aviation safety risks posed by wind turbine and wind monitoring installations. It recommends that proposed wind turbines greater than 150 metres above the ground and within 30 kilometres of an aerodrome should be referred to the Civil Aviation Safety Authority (CASA) and Airservices (or the Department of Defence for a military aerodrome).

The probability of a wind farm or turbine of this scale being proposed within 30 kilometres of Perth Airport is very low and the majority of aircraft operations at Perth Airport would not be considered low-flying.

The WA Government’s Position Statement: Renewable Energy Facilities (March 2020) requires proponents of wind turbine proposals to refer to NASF Guideline D to determine any potential aviation safety risks and possible mitigation measures.



The probability of a wind farm or turbine of this scale being proposed within 30 kilometres of Perth Airport is very low and the majority of aircraft operations at Perth Airport would not be considered low-flying.



16.6 Lighting Distraction To Pilots

The specific patterns of aeronautical ground lights during inclement weather and outside daylight hours are designed to enable pilots to align their aircraft with the runway in use and land the aircraft at the appropriate part of the runway. Glare from ground lights or large reflective surfaces in the vicinity of the runways have the potential to obscure vision or cause confusion and distraction for pilots and air traffic controllers.

Guidance for managing the risk of distractions to pilots from lighting near airports is provided in the NASF Guideline E—Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports.

Part 139 of the *Civil Aviation Safety Regulations 1988* and the Manual of Standards Part 139, specify ground lighting intensities (measured at three degrees above the horizontal) within four light zones which surround a runway. These zones reflect the degree of interference ground lights can cause as a pilot approaches to land, with the closest zone the most onerous.

The lighting zones for Perth Airport are shown in Figure 16-17.

CASA has the authority, through Regulation 94 of the *Civil Aviation Regulations 1988*, to require interfering lights to be extinguished or modified. Lights within six kilometres of an airport are most likely to be subjected to the provisions of Regulation 94.

The fact that a certain type of light fitting already exists in an area is not necessarily an indication that more lights of the same type can be added to the same area. Coloured lights are likely to cause conflict, irrespective of their intensity, as coloured lights are used to identify different aeronautical facilities at the airport.

Even though a proposed installation is designed to comply with the zone intensities, proposals requiring significant lighting (such as freeways, stadium flood lighting and construction projects) should be referred to CASA as there may be overriding factors which require more restrictive controls.

The regulations pertaining to lighting intensity also address sources of glare that may distract pilots. This has become increasingly important as the popularity of solar panels continues to grow. Perth Airport will continue to work with CASA in the assessment of relevant solar panel applications.

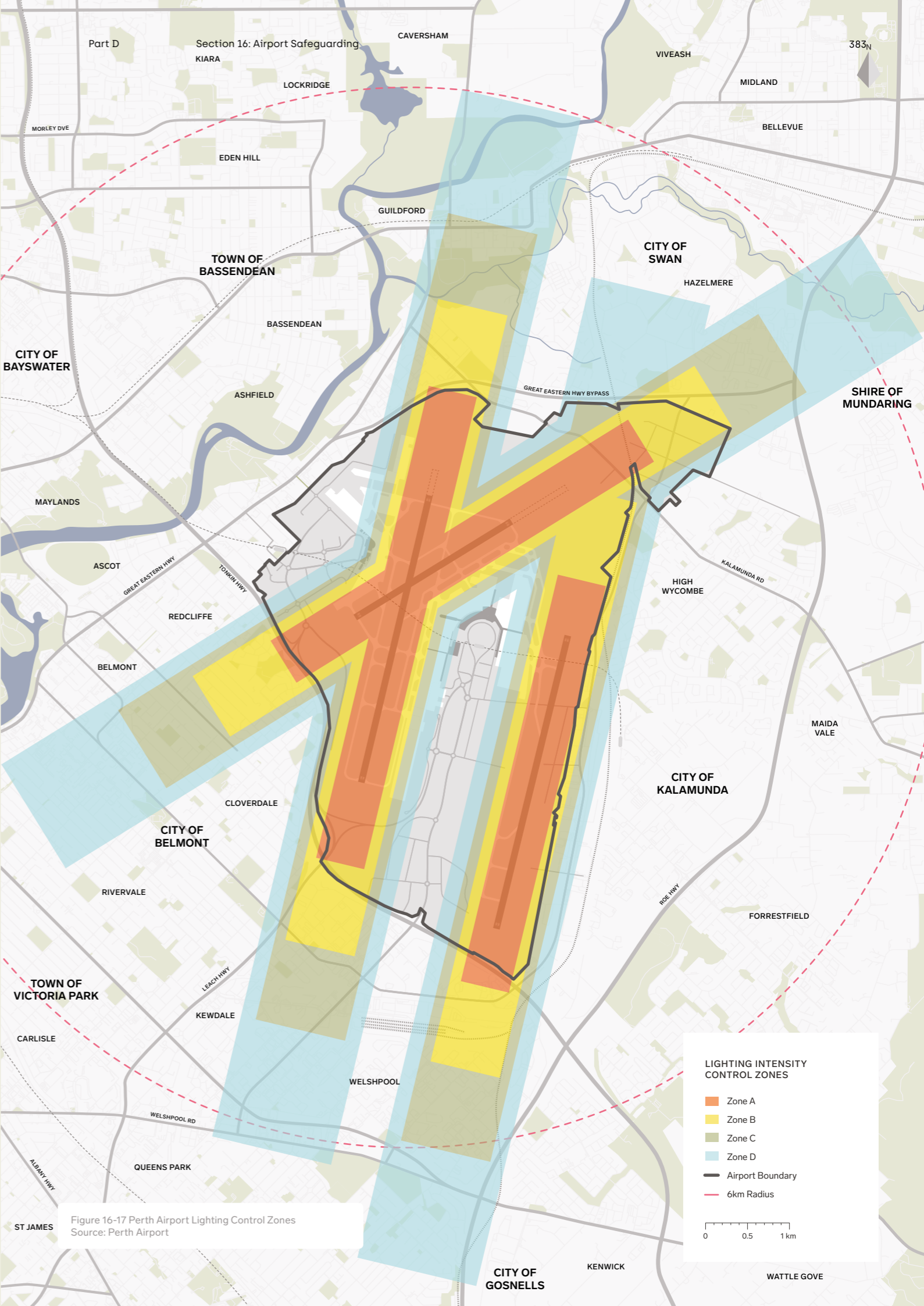


Figure 16-17 Perth Airport Lighting Control Zones  
Source: Perth Airport

16.7 Protected Airspace

Protection of airspace required for Perth Airport’s current and future needs is essential to provide a safe, predictable environment for the arrivals and departures of aircraft using Perth Airport in all weather conditions.

NASF Guideline F Managing the Risk of Intrusions into the Protected Operational Airspace of Airports provides Guidance to planners and decision makers about working within and around airport’s airspace and how the airspace can be better integrated into local planning processes.

The Airports Act and the *Airports (Protection of Airspace) Regulations 1996* (APA Regulations) establish a framework for the protection of airspace at federally leased airports.

The Australian Government is currently reviewing a number of legislative instruments due to sunset (automatic repeal after a fixed period) on or before 1 April 2025, including the APA Regulations. As a result of the review, it is expected that new airspace protection criteria will be established for implementation during the period of this Master Plan 2026.

16.7.1 Prescribed Airspace

Prescribed airspace comprises the airspace above the lower of two sets of defined invisible surfaces above the ground, referred to as the Obstacle Limitation Surfaces (OLS) and Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS) surfaces. The design of these surfaces is determined by criteria established by the International Civil Aviation Organization (ICAO).

The OLS relates to visual operations or the visual stages of an instrument flight procedure. While this airspace should ideally be kept free of obstacles, the purpose of the OLS is not to restrict or prohibit all obstacles but to ensure that existing or potential obstacles are examined for their impact on aircraft operations and that their presence is properly considered.

PANS-OPS surfaces define the airspace related to instrument flight procedures, whereby pilots rely solely on navigation equipment. Minimum safe altitudes are established for each segment of an instrument flight procedure.

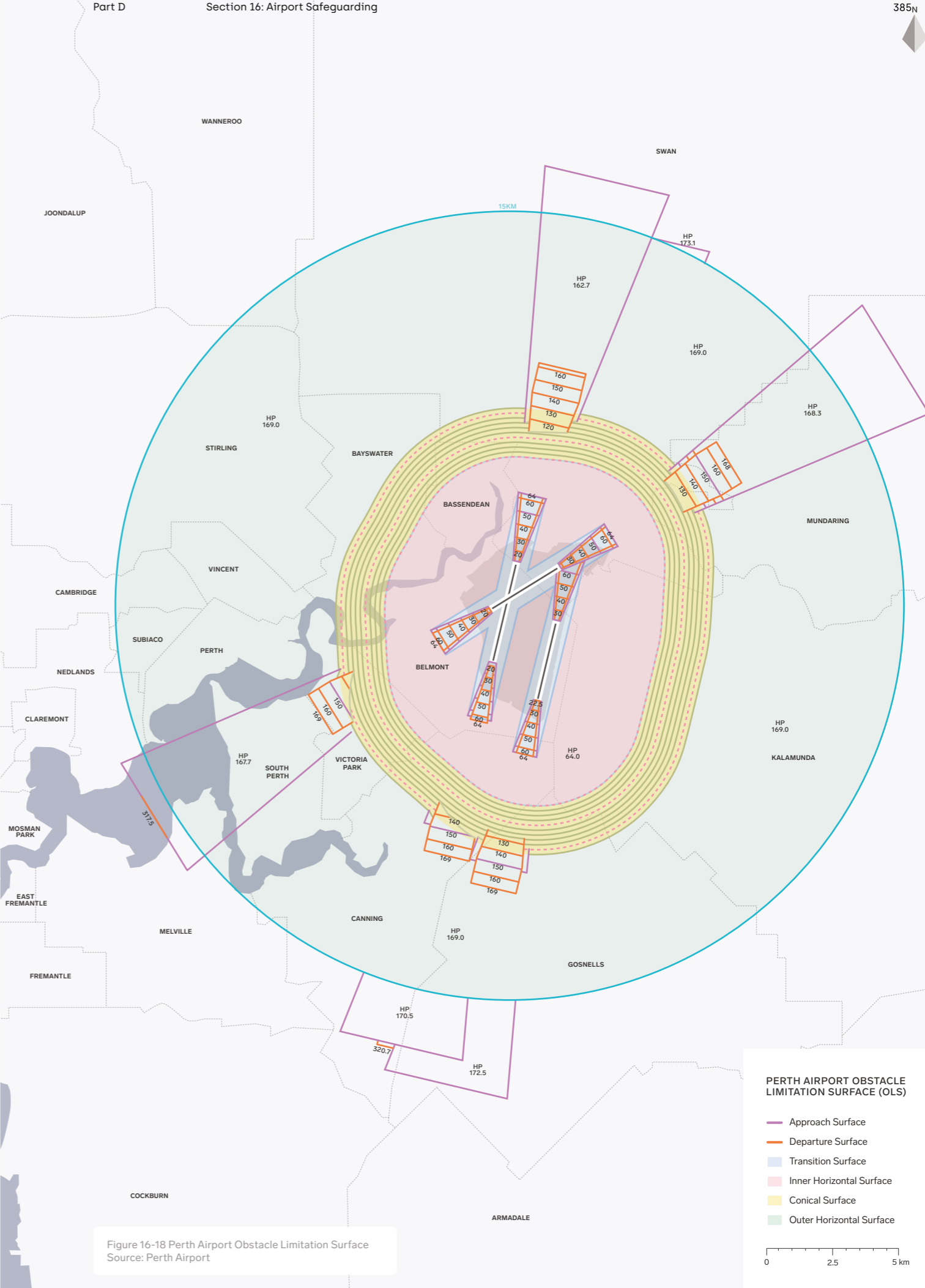
Changes to airfield infrastructure or flight path procedures may require amendment of the OLS or PANS-OPS surfaces. In 2001, Perth Airport declared airspace that included the new runway at 2,700 metres long. Due to changed design standards for runway approach lighting, the new runway length was extended from 2,700 to 3,000 metres and the changed length was reflected in the Master Plan 2014 Minor Variation, Major Development Plan for the New Runway Project and Master Plan 2020. The airspace declaration for the future runway infrastructure, including a 3,000-metre new runway (outlined in Section 13.4.1.3), was completed in December 2023 following engagement with Jandakot Airport, RAAF Base Pearce, the Department of Planning, Lands and Heritage, 21 local government authorities and DevelopmentWA.

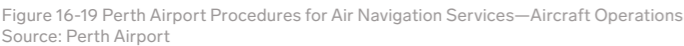
The long-term OLS for Perth Airport is shown in Figure 16-18 and the long-term critical PANS-OPS surface for Perth Airport is shown in Figure 16-19. Both plans are intended to safeguard the current and future airfield configuration and the associated airspace against any proposed long-term or permanent development which could impact on its operation.

The updated airspace protection charts are published on the Perth Airport website, <https://www.perthairport.com.au/Home/corporate/planning-and-projects/airspace-protection>.



Protection of airspace required for Perth Airport’s current and future needs is essential to provide a safe, predictable environment for the arrivals and departures of aircraft using Perth Airport in all weather conditions.





The Airports Act defines certain activities that could result in an intrusion into an airport's protected airspace to be 'controlled activities' and requires that controlled activities cannot be carried out without approval under the Regulations.

The following activities are considered controlled activities if they intrude into prescribed airspace:

- construction or erection of any permanent or temporary structure, such as a building, communications tower or construction crane
- an activity attached to or on the ground, such as transient objects including trucks, machinery and equipment
- an activity that results in artificial or reflected light that exceeds acceptable light intensities or is capable of blinding or confusing pilots
- an activity that results in air turbulence
- an activity that results in the emission of smoke, dust, or other particulate matter, and
- an activity that results in the emission of steam or gas.

DITRDCA, which administers the Airports Act and APA Regulations, has published guidance on processing applications under the APA Regulations for operators of federal airports. Details of proposed controlled activities are required to be provided to Perth Airport to be assessed against the OLS and PANS-OPS. Any controlled activity found to infringe the prescribed airspace is referred to Airservices and CASA for assessment and then submitted to DITRDCA for approval or refusal.

Perth Airport can approve infringements of the OLS that are short-term (less than three months), such as cranes, following the assessments by Airservices and CASA. Infringements of the PANS-OPS surfaces will only be approved by DITRDCSA if the activity is short-term (less than three months) and does not pose an unacceptable effect on the safety or existing or future aircraft operations. Long-term infringements of the PANS-OPS surfaces are not permitted. Conditions may be imposed on a controlled activity approval which will be monitored by Perth Airport, with any breach reported and rectification required.

For proposals within the airport estate, controlled activities are identified and addressed through Perth Airport's development approval and consent processes. For proposals outside of the airport estate, government agencies and proponents are required to refer applications for developments or structures that may constitute a controlled activity to Perth Airport for assessment.

Perth Airport has prepared Height Control plans that indicate the height at which a building or structure triggers the need for a referral to Perth Airport for assessment. There are areas identified immediately adjacent to the airport, and particularly in the final approach and take-off areas, where the airport requires all development and structures to be referred for assessment.

Perth Airport has developed an online system for the assessment and management of crane applications and permanent structures. The Protected Airspace Assessment

Tool (PAAT) automatically issues a permit if no airspace infringement is detected. Perth Airport receives notification of any assessments that would result in an airspace infringement, and relevant applications are then issued to Airservices, CASA and DITRDCSA as required.

Access to PAAT, copies of the various Height Control plans, and airspace protection charts are available online at <https://www.perthairport.com.au/Home/corporate/planning-and-projects/airspace-protection>.

Exhaust plumes of significant vertical velocity (plume rise) can emanate from ground activities, such as vents and stacks, and can interfere with aircraft operations in various stages of flight.

Under the *Civil Aviation Safety Regulations 1988* Part 139, CASA may determine that an exhaust plume having a velocity in excess of 4.3 metres per second is, or will be, a hazard to aircraft operations because of the velocity or location of the efflux.

Any plumes with velocity exceeding 4.3 metres per second should be referred to CASA via CASA Form 1247 by the proponent, ideally copying in Perth Airport. Via this form, the proponent must provide relevant characteristics of the plume, such as velocity, temperature, composition of the effluence and any particulate matter.

Perth Airport works with local planning authorities to ensure they are informed of the risk from exhaust plumes and encourages information about off-airport developments that include exhaust plume(s) to be submitted to Perth Airport for assessment.

16.8 Communication, Navigation and Surveillance Facilities

There are several communications, navigation and surveillance (CNS) systems on or near Perth Airport which are critical to the safe and efficient operation of aircraft. These facilities enable communications between pilots and Air Traffic Control, instrument navigation by pilots, and monitoring of aircraft movements by Air Traffic Control.

While many of these facilities are located on-airport, some can be located considerable distances from an airport. Inappropriate development in the vicinity of these facilities can compromise their effectiveness.

The CNS systems in operation at Perth Airport are generally installed and maintained by Airservices and the Bureau of Meteorology. These include:

- Instrument Landing System (ILS) (localiser and glideslope)
- VHF Omnidirectional Range (VOR) and Distance Measuring Equipment (DME)
- high frequency and very high frequency data links
- terminal area radar
- surface movement radar, and
- anemometers.

NASF Guideline G Protecting Aviation Facilities—Communication, Navigation and Surveillance (CNS), provides guidance to land use planners when considering development proposals that have the potential to cause interference to these facilities. Interference can be caused by obstructions such as structures or trees located between transmitting and receiving devices, electromagnetic emissions and plume rises. Guideline G also identifies when assessment of a development proposal is required by Airservices, CASA, and/or the Department of Defence.

Development and construction proposals on the airport estate, or that are off airport and are referred to Perth Airport by surrounding local governments, are assessed in consultation with Airservices to ensure the performance of CNS facilities remains acceptable and that current and future anticipated systems are suitably protected in accordance with the *Civil Aviation Safety Regulations 1988*. This includes the protection of land for equipment installations and required services, such as fibre optic communication systems, and any potential airspace required for its operation. CASA has authority under Section 21 of the *Civil Aviation Act 1988* to request the removal or modification of any equipment or structure that is or may be causing interference to CNS facilities.

Perth Airport continues to work with Airservices to assess and introduce new technologies that may improve safety, performance, economics and efficiency of Perth's air traffic and airspace. As part of works associated with the new runway project (see Section 13.4.1.3), a glide path and Advanced Surface Movement Guidance and Control System link (between the Air Traffic Control System and airfield) will be relocated in 2025.

Perth Airport's CNS protection surfaces for the current and future configuration are shown in Figure 16-20 and published online at <https://www.perthairport.com.au/Home/corporate/planning-and-projects/airspace-protection>.

16.9 Strategically Important Helicopter Landing Sites


A strategically important helicopter landing site is an off-airport helicopter landing site that has been declared by a state or territory to be of critical need to the provision of helicopter services, such as for a hospital or an elevated landing site located within a populated area.

The safety, viability and efficient operation of helicopters at a landing site can be compromised by development, including permanent buildings and temporary structures such as cranes, gaseous plumes, telecommunication towers, overhead wires and power lines, and landscape features such as trees. Potential hazards are obstacles encroaching into flight paths, lighting that distracts or causes interference with night operations, noise mitigation requirements, risk of remotely piloted aircraft systems (drone) operation and strike, risk of bird and wildlife strike, and building induced windshear or air turbulence.

NASF Guideline H—Protecting Strategically Important Helicopter Landing Sites, provides guidance to State and local government decision makers, as well as the owners or operators of identified strategically important helicopter landing sites, to ensure that the use of these sites is not compromised by proposed developments.

There are multiple helipads within Perth airspace, including the Royal Perth Hospital, Fiona Stanley Hospital, Perth Children's Hospital and Fremantle Heliport. There are regular helicopter movements between Perth Airport and the Fremantle Helipad, particularly during the summer months, and occasional movements between Perth Airport and hospital helipads.

The Royal Perth Hospital helipad was upgraded in 2022 and the hospital is seeking introduction of its flight paths into the City of Perth planning framework to protect the continued operation of critical aeromedical services.



There are multiple helipads within Perth airspace, including at Royal Perth Hospital, Fiona Stanley Hospital, Perth Children's Hospital, and Fremantle Heliport.

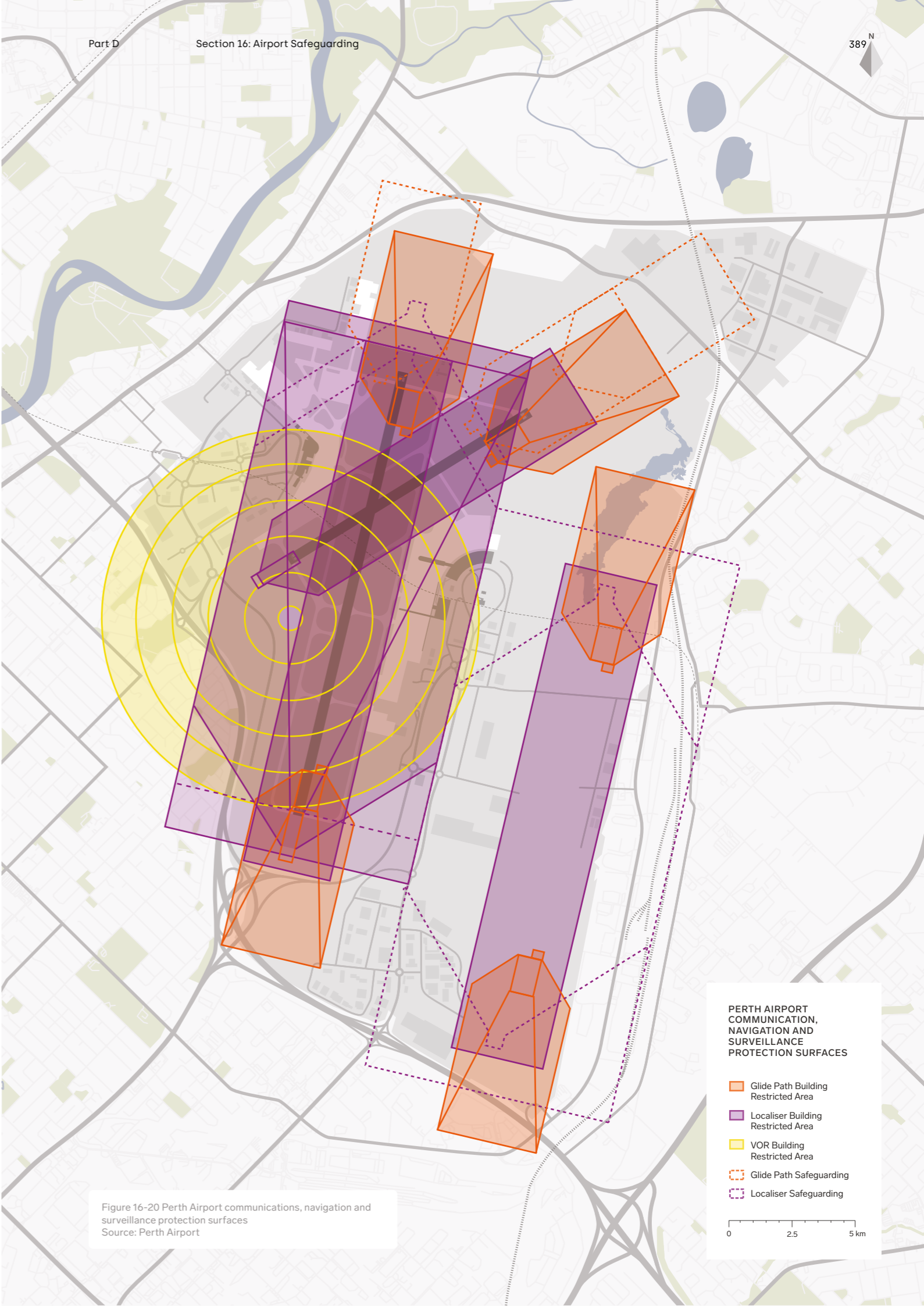


Figure 16-20 Perth Airport communications, navigation and surveillance protection surfaces  
Source: Perth Airport

16.10 Public Safety Areas

Public Safety Areas (PSA) are areas of land at the ends of the runways, identified by quantifiable risk contours, within which development is restricted in order to control the number of people on the ground at risk of death or injury in the event of an aircraft accident on take-off or landing. PSA risk contours are developed based on runway use statistics correlated against international crash data. These provide an objective basis for precautionary planning decisions in those areas of highest risk.

Perth Airport has adopted the United Kingdom approach to public safety as detailed in NASF Guideline I— Managing the Risk in Public Safety Areas at The Ends of Runways.

Under the UK model, the PSA is generally broken into two areas representing 1-in-10,000 and 1-in-100,000 probabilities of being killed or injured per year from an aircraft accident. Although the boundary of a PSA generally corresponds with the 1-in-100,000 contours, the predicted level of risk within this area may be higher.

The model considers the maximum tolerable level of individual third-party risk of being killed as a result of an aircraft accident, as 1-in-10,000 per year. Any occupied residential properties, or commercial and industrial properties occupied as normal all-day workplaces, within the 1-in-10,000, are not recommended.

In the remaining PSA between the 1-in-10,000 and 1-in-100,000 individual risk contours, developments which involve a low density of people working or congregating are considered acceptable. For example, this may include car parking, open storage or certain types of warehouse development. According to the NASF Guideline I, new residential buildings should not be permitted within this area of the PSA; however, existing developments may remain. The compatibility for new developments is shown in Table 16-11. Perth Airport has developed PSA contours that reflect the ultimate development and demand of the airport at approximately 362,000 movements per year, of which the 1-in-10,000 and 1-in-100,000 areas are shown in Figure 16-21.

PSA	Compatible uses	Incompatible uses/activities
INNER AREA—1 in 10,000	<div>Long stay and employee car parking (where the minimum stay is expected to be in excess of six hours)</div> <div>Built development for the purpose of housing plant or machinery and would require no people on site on a regular basis, such as electricity switching stations or installations associated with the supply or treatment of water</div> <div>Golf courses, but not club houses (provided appropriate mitigation measures are in place to reduce wildlife attraction risk—see NASF Guideline C)</div>	<div>Accommodation activities: includes dwelling houses, multiple dwellings, resort complexes, tourist park, hostels, retirement villages or other residential care buildings</div> <div>Community activities: educational establishment, community centres, hospitals, theatres, childcare and playgrounds, detention facilities, place of worship</div> <div>Recreation activities: includes parks, outdoor recreation and sport, major sport and entertainment facilities</div> <div>Entertainment and centre activities: shopping centres, service stations, showrooms, markets, hotels, theatres, tourist attraction, garden centres</div> <div>Industrial and commercial uses involving large numbers of workers or customers: intensive uses such as high-impact, medium- and low-impact industry, warehousing, services industry</div> <div>Manufacture or bulk storage of flammable, explosive or noxious materials</div> <div>Public passenger transport infrastructure: includes bus, train and light rail stations</div>
OUTER AREA—1 in 100,000	<div>Long stay and employee car parking (where the minimum stay is expected to be in excess of six hours)</div> <div>Shorter stay car parking (with a safety case – depends on intensity of use)</div> <div>Built development for the purpose of housing plant or machinery and would require no people on site on a regular basis, such as electricity switching stations or installations associated with the supply or treatment of water</div> <div>Golf courses, but not club houses (provided appropriate mitigation measures are in place to reduce wildlife attraction risk)</div> <div>Open storage and types of warehouses with a very small number of people on site. The planning authority could consider imposing conditions to prevent future intensification of the use of the site and limit the number of people to be present on the site</div> <div>Developments which require few or no people on site on a regular basis such as buildings housing plant or machinery</div> <div>Low intensity public open space</div>	<div>Accommodation activities: includes dwelling houses, multiple dwellings, resort complexes, tourist park, hostels, retirement villages or other residential care buildings</div> <div>Community activities: educational establishment, community centres, hospitals, theatres, childcare and playgrounds, detention facilities, place of worship</div> <div>Recreation activities: includes parks, outdoor recreation and sport, major sport and entertainment facilities</div> <div>Entertainment and centre activities: shopping centres, service stations, showrooms, markets, hotels, theatres, tourist attraction, garden centres</div> <div>Industrial and commercial uses involving large numbers of workers or customers: intensive uses such as high impact, medium and low impact industry, warehousing, services industry</div> <div>Manufacture or bulk storage of flammable, explosive or noxious materials</div> <div>Public passenger transport infrastructure: includes bus, train and light rail stations</div>

Table 16-9 Public Safety Area compatibility for new developments  
Source: National Airports Safeguarding Framework Guideline I

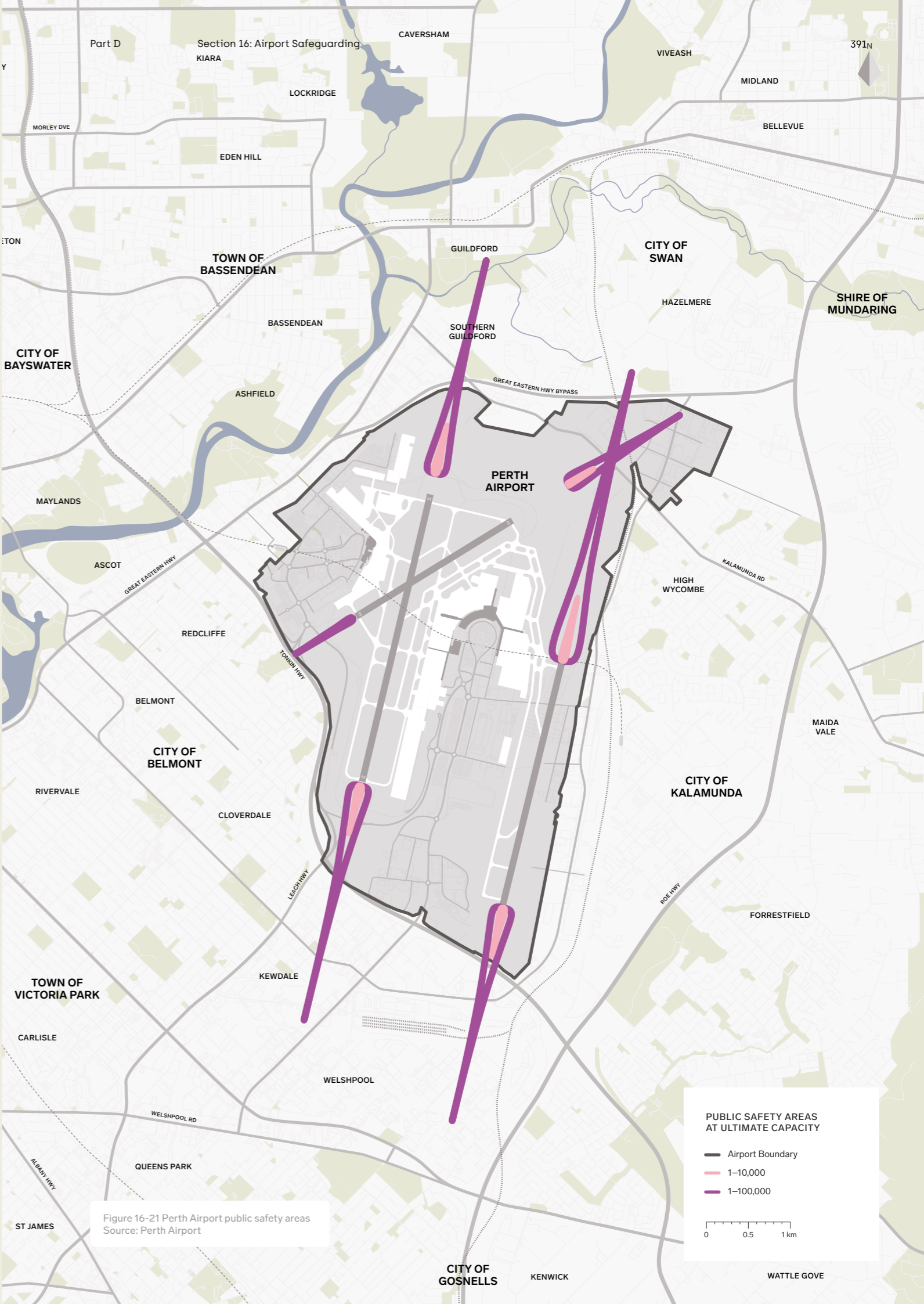


Figure 16-21 Perth Airport public safety areas  
Source: Perth Airport