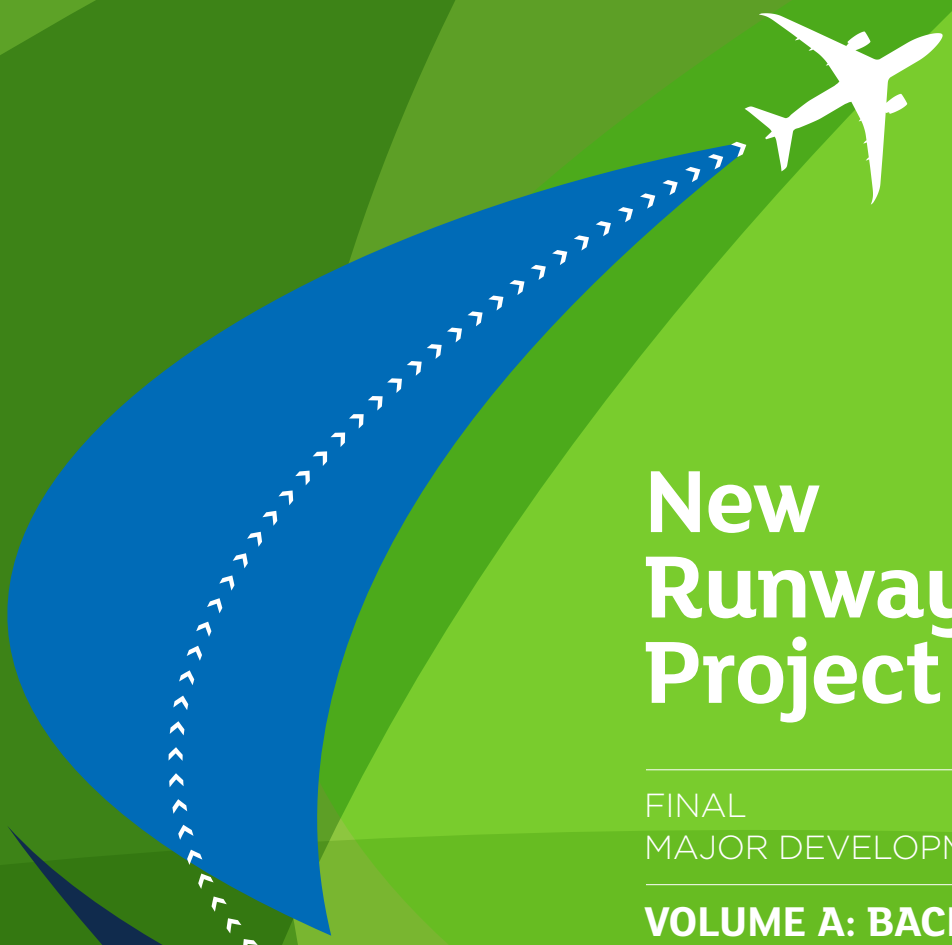
Perth Airport | New Runway Project



New Runway Project

FINAL
MAJOR DEVELOPMENT PLAN

VOLUME A: BACKGROUND AND NEED SECTIONS 1-7
FEBRUARY 2021

New Runway Project

FINAL
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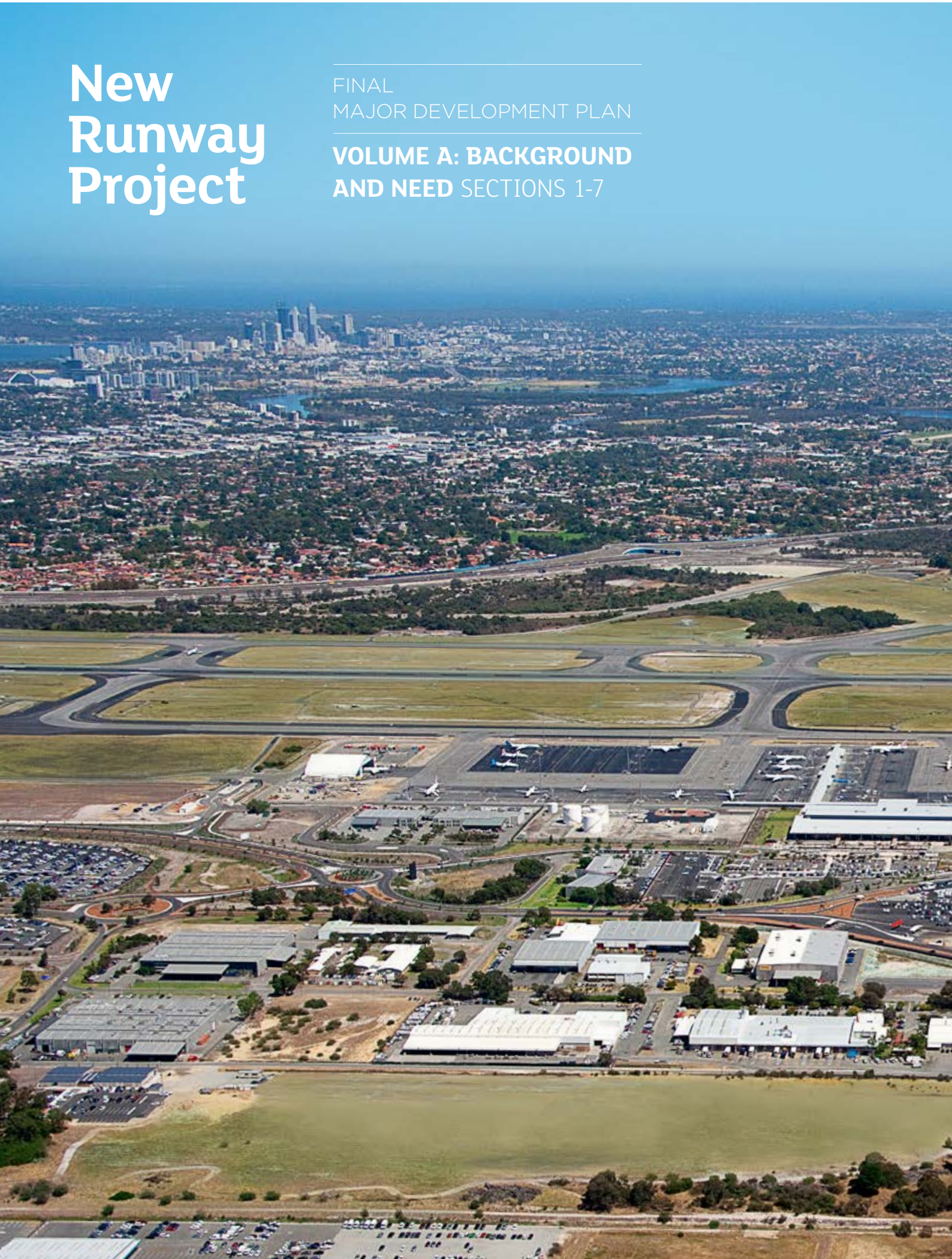

Volume A sets the scene for the New Runway Project. It describes the background and need for the new runway, alternative options that have been considered, as well as provides a description of the project and how it will be constructed.

The Final Major Development Plan for the New Runway Project is presented in four volumes:

- Executive Summary
- Volume A: Background and Need (Sections 1-7) – this volume
- Volume B: Environment, Heritage and Traffic Assessment (Sections 8-18)
- Volume C: Airspace Management Plan (Sections 19-26)

This volume should be read in conjunction with all other volumes.

This Final Major Development Plan for the New Runway Project has been prepared by Perth Airport Pty Ltd (Perth Airport) (ABN 24 077 153 130) to satisfy the requirements of the *Airports Act 1996* (Cth).

While all care has been taken in the preparation of this Final Major Development Plan for the New Runway Project:

- it is based on certain forecasts and assumptions, and Perth Airport makes no claim as to the accuracy or completeness of any of the information or the likelihood of any future matter,
- it should not be relied upon by any other party for any purpose,
- it does not commit Perth Airport to any particular development, and
- Perth Airport accepts no liability whatsoever to any person who in anyway relies on any information in this Final Major Development Plan for the New Runway Project (including making any decision about development or any other activity on or off Perth Airport).

ACKNOWLEDGEMENT OF COUNTRY
Hello, this is Whadjuk Country! Perth Airport operates on the traditional lands of the Whadjuk people of the Noongar Nation. We respect their ongoing cultural connection to this region. We value the insights and guidance of the Noongar signatories to the Perth Airport Partnership Agreement, as we work together to preserve and honour this connection.

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Volume A: Background and Need

01
Introduction

This section provides an overview of the New Runway Project (NRP) which will see the construction and operation of a new runway at Perth Airport.

Detail is also provided on the following areas:

- What does the project involve?
- What is the regulatory environment that the project will be planned, developed and operated within?
- What is the approval process for the project and how were submissions made?
- Who is Perth Airport and how does the airport operate?
- What is the history of the planning for the NRP?
- How does the new runway fit into the future planning for Perth Airport?

1.1 Project Overview

This Major Development Plan (MDP) outlines the case for the construction and operation of a new runway, referred to as the New Runway Project (NRP), at Perth Airport. The MDP is presented in accordance with the requirements for a MDP as prescribed by the Commonwealth *Airports Act 1996* (Airports Act) and subsequent assessment of the on-ground environmental impacts under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The MDP has also been prepared to meet the requirements for aviation airspace-management changes under the EPBC Act.

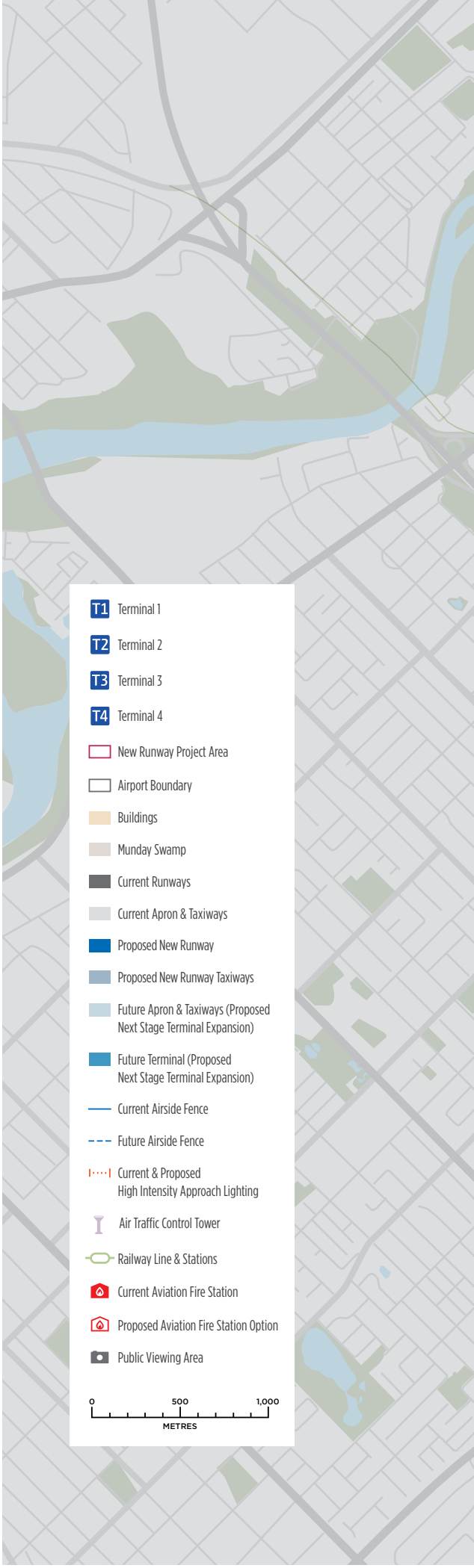
The New Runway Project (NRP) includes:

- construction, including clearing and site preparation, of a new runway up to 3,000 metres long with associated infrastructure, and
- development of an airspace management plan that will cater for the changes to current airspace and flight paths to accommodate operations of the new runway.

To meet future capacity demand, the new runway is expected to be operational between 2023 and 2028, subject to actual demand and a commercial agreement with airlines being reached. To meet this timeframe, Perth Airport is seeking to complete the approvals process for the new runway in 2021 to be ready for the construction and commissioning phase to begin.

The new runway will occupy 293-hectares and will be located parallel to the existing main runway with a two-kilometre separation so that both runways can be used independently. The location of the NRP is shown in Figure 1-1.

The location of the NRP is consistent with that identified in the Perth Airport Master Plan 2014 approved in January 2015, and the subsequent Master Plan 2014 Minor Variation approved in June 2017.



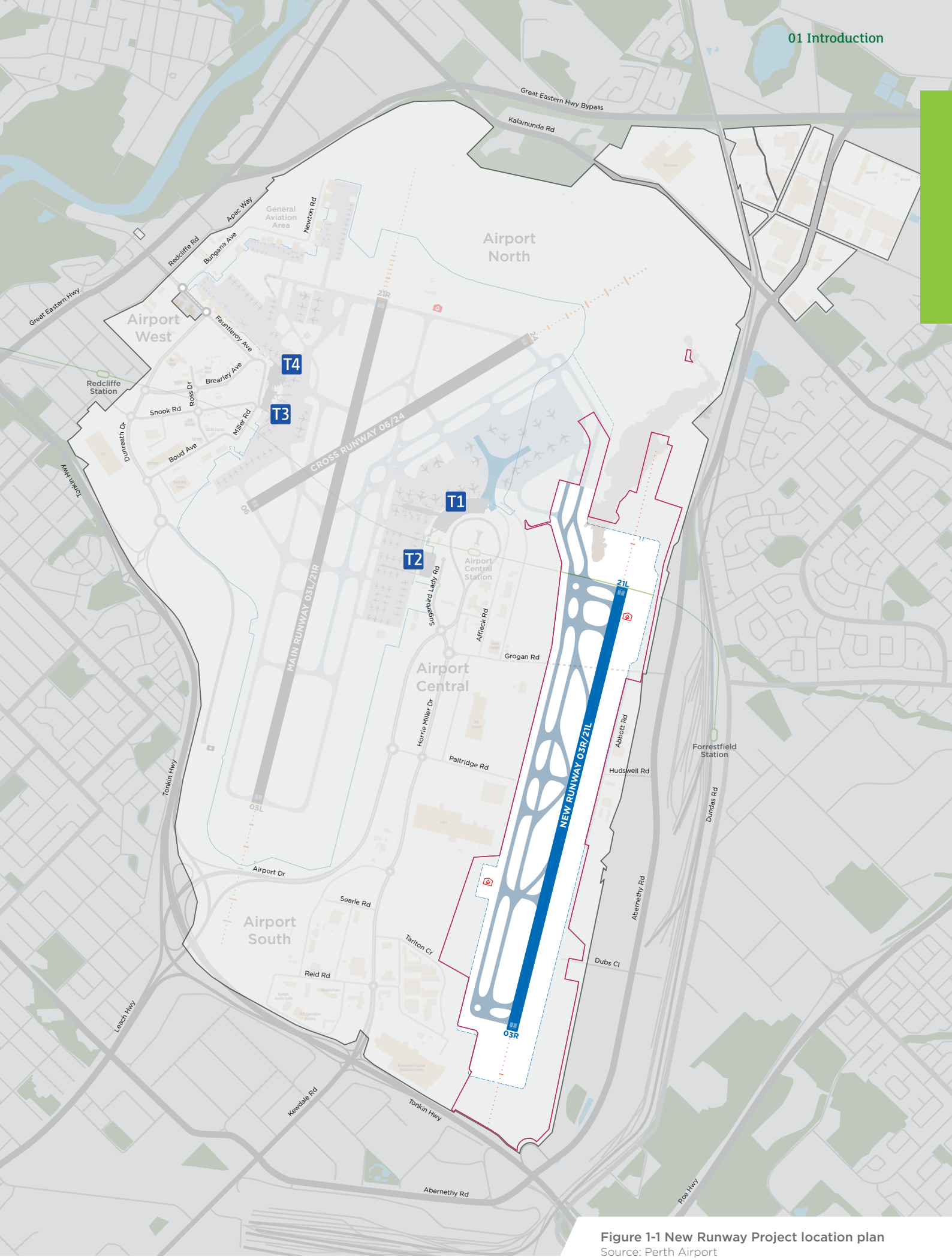


Figure 1-1 New Runway Project location plan
Source: Perth Airport

1.2 Major Development Plan

The NRP MDP has been prepared to address the various legislative approvals required for a new runway at Perth Airport and provides a combined approvals document to ensure a whole of project is represented.

The MDP is a detailed approvals document that has been structured and prepared to meet regulatory requirements of the Airports Act and the EPBC Act.

1.2.1 Approval Process

The legislative approvals process for the NRP is shown in Figure 1-2.

Further detail about the regulatory framework is provided in Section 1.3.

1.2.2 Major Development Plan Structure

The NRP MDP is presented in four volumes:

- Executive Summary
- Volume A: Background and Need Sections 1-7 (this volume)
- Volume B: Environment, Heritage and Traffic Assessment Sections 8-18
- Volume C: Airspace Management Plan Sections 19-26

This volume should be read in conjunction with the Executive Summary, Volume B: Environment, Heritage and Traffic Assessment and Volume C: Airspace Management Plan.

Table 1-1 provides details of the content and scope of each of the volumes of the MDP.

1.2.3 Public Comment

In accordance with the requirements for a major development plan, under the Airports Act, Perth Airport released a Preliminary Draft MDP for 60 business days of public consultation. The public comment period ran from 31 May 2018 to 5pm (WST) 24 August 2018.

Further information on the consultation process is provided in Section 7.

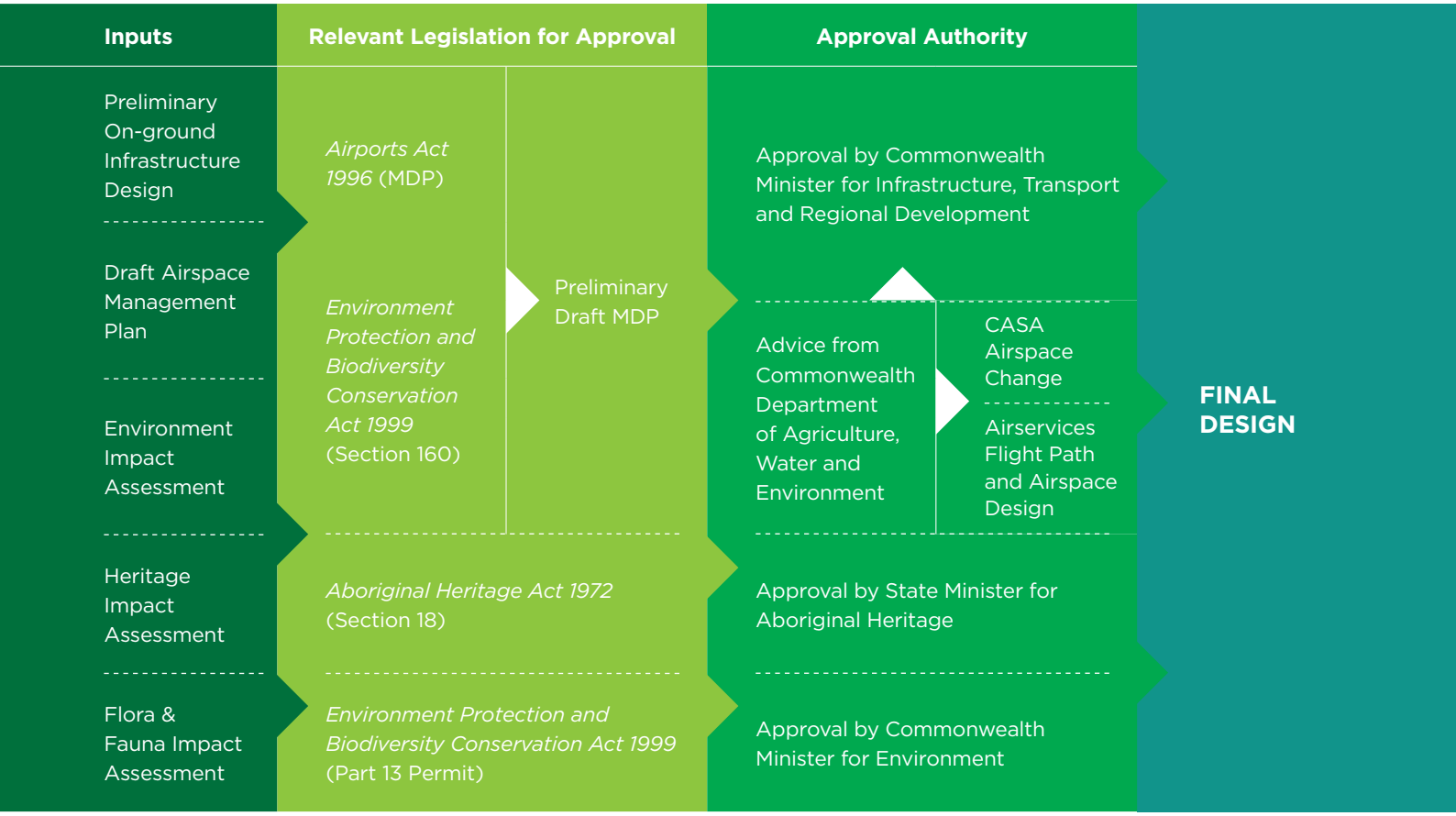


Figure 1-2 Legislative approvals process for the New Runway Project
Source: Perth Airport

Section	Description	Scope
Executive Summary		
Volume A: Background and Need		
01	Introduction	Volume A sets the scene for the project. It describes the background and need for the new runway, alternative options that have been considered, as well as provides a description of the NRP and how it will be constructed.
02	Need for additional capacity	
03	Options and alternatives	
04	Benefits of the New Runway Project at Perth Airport	
05	Consistency with State and Local government planning	
06	Project description and construction	
07	Consultation	
Volume B: Environment, Heritage and Traffic Assessment		
08	Environment, Heritage and Ground Transport Introduction	Volume B describes the initial conditions, impacts and mitigation strategies associated with the on-ground construction and operation activities of the NRP. It also provides details for environment, heritage and traffic management for the project.
09	Geology and soils	
10	Wetlands and hydrology	
11	Flora and vegetation	
12	Fauna	
13	Ground-based noise	
14	Air quality and greenhouse gas (ground)	
15	Landscape and visual	
16	Heritage	
17	Environment and heritage management	
18	Ground transport	
Volume C: Airspace Management Plan		
19	Airspace management plan introduction	Volume C outlines the plan for airspace management. It also describes the impacts and mitigation strategies proposed as a result of the operation of the new runway.
20	Background and existing airspace management	
21	Airspace management plan	
22	Aircraft noise	
23	Air quality and greenhouse gas (air based)	
24	Health	
25	Social	
26	Hazards and risks to airport operations	

Table 1-1 Content and scope of the New Runway Project Major Development Plan
Source: Perth Airport

1.3 Regulatory Framework

Perth Airport is located on land owned by the Commonwealth of Australia and, although the day-to-day management of Perth Airport was privatised in 1997, the Commonwealth Government continues to play an important regulatory and oversight role through the Airports Act and associated regulations. This statutory regime ensures that the public interest is protected.

Perth Airport is governed by Commonwealth legislation and the key legislation applicable to planning, land use, and development of the NRP comprises the:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*,
- *Airports Act 1996*,
- Airports Regulations 1997,
- Airports (Building Control) Regulations 1996,
- Airports (Protection of Airspace) Regulations 1996,
- Airports (Environment Protection) Regulations 1997,
- *Airspace Act 2007*,
- *Aviation Transport Security Act 2004*,
- *Civil Aviation Act 1988*,
- Civil Aviation Regulations 1988,
- Civil Aviation Safety Regulations 1998,
- *Environment Protection and Biodiversity Conservation Act 1999*,
- Environment Protection and Biodiversity Conservation Regulations 2000, and
- *Native Title Act 1993*.

Although Perth Airport is located on Commonwealth land, State legislation may apply under the provisions of the *Commonwealth Places (Application of Laws) Act 1970*. This is typically for activities for which Commonwealth legislation does not exist, such as for bushfire and Aboriginal heritage management. Where State and Commonwealth legislation conflict, Commonwealth legislation takes precedence. The State legislation relevant to the NRP is the:

- *Aboriginal Heritage Act 1972*,
- *Bush Fires Act 1954*, and
- *Dampier to Bunbury Pipeline Act 1997*.

1.3.1 *Airports Act 1996*

The Airports Act is the principal statute regulating the ownership, management and operation of leased Commonwealth airports. Part 5 and Part 6 of the Airports Act prescribe controls over land use planning, environment management and development at airports, including the requirements of a final airport Master Plan and major development plans.

1.3.2 Perth Airport Master Plan

Under Section 70 (1) of the Airports Act, each airport is required to produce a final Master Plan. The final Master Plan is one that has been submitted to the relevant Commonwealth Minister as a draft Master Plan and approved by the Minister. Prior to submitting a draft Master Plan to the Minister, the airport is required to consider public comments. Subsequent developments at the airport must be consistent with the final Master Plan.

Section 70 of the Airports Act states that the purposes of a final Master Plan for an airport are to:

- establish the strategic direction for efficient and economic development at the airport over the period of the plan,
- provide for the development of additional uses of the airport site,
- indicate to the public the intended uses of the airport site,
- reduce potential conflicts between uses of the airport site, and to ensure that the uses of the airport site are compatible with the areas surrounding the airport,
- ensure that all operations at the airport are undertaken in accordance with relevant environmental legislation and standards,
- establish a framework for assessing compliance at the airport with relevant environmental legislation and standards, and
- promote the continual improvement of environmental management at the airport.

The Airports Act was amended in 2012 to include a five-year horizon Environment Strategy and Ground Transport Plan in airport master plans. Prior to this, the environment strategy was a separate requirement.

A new Master Plan must be developed at least every five years (Section 77) and relate to a planning period of 20 years (Section 72).

The current Master Plan 2014 was approved by the [then] Commonwealth Minister for Infrastructure and Regional Development, the Hon. Warren Truss, on 9 January 2015. A minor variation to the Master Plan 2014, which included an extension of the new runway from 2,700 metres to 3,000 metres, was approved by the [then] Commonwealth Minister for Infrastructure and Transport, the Hon. Darren Chester MP, on 15 June 2017.

Detailed information on the new runway configuration as outlined in the current and previous master plans is provided in Section 3. The NRP is consistent with the Master Plan 2014 and the Master Plan 2014 Minor Variation including location, concept of operation and potential impacts including aircraft noise.

To meet the five-year review timeframe, prior to submitting the next Draft Master Plan to the Minister for consideration, Perth Airport released a Preliminary Draft Master Plan for public comment in July 2019 and this Master Plan was subsequently approved in April 2020, and is known as the Perth Airport Master Plan 2020. Even though a more recent Master Plan has been enacted prior to the publication of this Final MDP, the 2014 Master Plan is the basis of this MDP given that the 2014 plan was current during MDP development and public consultation activities. Notwithstanding this, it is worth noting the NRP MDP is also consistent with Master Plan 2020.

Section	Airport Act Requirement	MDP Section
(1)	A major development plan, or a draft of such a plan, must set out: (a) the airport-lessee company's objectives for the development;	Section 6
	(b) the airport-lessee company's assessment of the extent to which the future needs of civil aviation users of the airport, and other users of the airport, will be met by the development;	Section 2 and 4
	(c) a detailed outline of the development;	Section 6
	(ca) whether or not the development is consistent with the airport lease for the airport;	Section 1
	(d) if a final Master Plan for the airport is in force—whether or not the development is consistent with the final Master Plan;	Section 1
	(e) if the development could affect noise exposure levels at the airport—the effect that the development would be likely to have on those levels;	Section 22
	(ea) if the development could affect flight paths at the airport—the effect that the development would be likely to have on those flight paths;	Section 20, 21 and 22
	(f) the airport-lessee company's plans, developed following consultations with the airlines that use the airport, local government bodies in the vicinity of the airport and—if the airport is a joint user airport—the Department of Defence, for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels;	Section 22
	(g) an outline of the approvals that the airport-lessee company, or any other person, has sought, is seeking or proposes to seek under Division 5 or Part 12 in respect of elements of the development;	Section 1, 16 and 21
	(ga) the likely effect of the proposed development that are set out in the major development plan, or the draft of the major development plan; (i) On Traffic flows at the airport and surrounding the airport;	Section 18
	(ii) Employment levels at the airport;	Section 4
	(iii) The local and regional economy and community, including an analysis of how the proposed developments fit within the local planning scheme for commercial and retail development in the adjacent area;	Section 4 and 5
	(h) the airport-lessee company's assessment of the environmental impacts that might reasonably be expected to be associated with the development;	Section 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 22, 23, 24 and 25
	(j) the airport-lessee company's plans for dealing with the environmental impacts mentioned in paragraph (h) (including plans for ameliorating or preventing environmental impacts);	Section 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 22, 23, 24 and 25
	(k) if the plan relates to a sensitive development – the exceptional circumstances that the airport-lessee company claims will justify the development of the sensitive development at the airport;	N/A
	(l) such other matters (if any) as are specified in the regulations.	Section 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,21, 22, 23, 24, 25 and 26
(4)	In specifying a particular objective or proposal covered by paragraph (1)(a) or (c), a major development plan, or a draft of such a plan, must address the extent (if any) of consistency with planning schemes in force under a law of the State or Territory in which the airport is located; and if the major development plan is not consistent with those planning schemes – the justification for the inconsistencies.	Section 5
(6)	In developing plans referred to in paragraph (l)(f), an airport-lessee company must have regard to Australian Standard AS2021—1994 ('Acoustics—Aircraft noise intrusion—Building siting and construction') as in force or existing at that time.	Section 22

Table 1-2 Summary of Major Development Plan requirements
Source: Perth Airport

1.3.3 Major Development Plan

Section 90 of the Airports Act states that an airport-lessee company must not carry out a major airport development unless the development is in accordance with an approved MDP.

An MDP is required for the NRP as it meets criteria defined in Section 89 (1) (a) of the Airports Act, being to construct a new runway.

Section 91 of the Airports Act outlines the required contents of a MDP. Table 1-2 summarises how the MDP addresses the relevant provisions of the Airports Act.

A MDP is subject to community consultation, including a 60 business day public comment period and Ministerial approval. Section 91 of the Airports Act requires the major development plan to be consistent with the approved Master Plan.

This MDP details the development of a new runway of up to 3,000 metres in length, consistent with the approved Master Plan 2014 and Minor Variation to the Master Plan 2014.

1.3.4 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act provides the Commonwealth framework for, amongst other things, protecting and managing nationally and internationally important flora, fauna, ecological communities and heritage places that are defined in the EPBC Act as 'matters of national environmental significance'.

The EPBC Act also confers jurisdiction over actions that have the potential to make a significant impact on the environment where the actions affect, or are taken on, Commonwealth land or are carried out by a Commonwealth agency. Section 160 of the EPBC Act requires advice to be sought from the relevant Commonwealth Minister for the:

- adoption or implementation of a major development plan (as defined in the Airports Act), and
- adoption or implementation of a plan for aviation airspace management involving aircraft operations that have, will have, or are likely to have a significant impact on the environment.

The environmental impacts of the NRP considered by the Minister responsible for the EPBC Act include aircraft and on-ground noise, air quality, heritage, flora and vegetation, fauna, geology and soils and hydrology.

1.3.4.1 Matters of National Environmental Significance

The EPBC Act considers nine matters of national environmental significance (MNES). These are:

- world heritage properties,
- national heritage places,
- wetlands of international importance (listed under the Ramsar Convention),
- listed threatened species and ecological communities,
- migratory species protected under international agreements,
- Commonwealth marine areas,
- the Great Barrier Reef Marine Park,
- nuclear actions (including uranium mines), and
- a water resource, in relation to coal seam gas development and large coal mining development.

These are considered as part of the impact assessment of the NRP.

1.3.4.2 Part 13 Permit

A permit under Part 13 of the EPBC Act is required for any activity which may kill, injured, take, trade, kept or move a member of a Commonwealth listed threatened species or ecological community, a member of a listed migratory species, or a member of a listed marine species in or on a Commonwealth area.

Permits will only be issued by the Minister if the activity:

- contributes significantly to the conservation of the listed threatened species or ecological community, the listed migratory species, or the listed marine species concerned, or other listed migratory or marine species,
- the impact of the activity on a member of a listed threatened species or ecological community, a member of a listed migratory species, or a member of a listed marine species concerned is incidental to, and not the purpose of, the taking of the activity,
  - the taking of the activity will not adversely affect the survival or recovery in nature of the listed threatened species or ecological community or the conservation status or population of the listed migratory species or the listed marine species and
  - the taking of the activity is not inconsistent with a recovery plan that is in force for the listed threatened species or ecological community or a wildlife conservation plan that is in force for the listed migratory species or the listed marine species and
  - the holder of the permit will take all reasonable steps to minimise the impact of the activity on the listed threatened species or ecological community, the listed migratory species, or the listed marine species,
- the specified activity is of particular significance to indigenous tradition, and will not adversely affect the survival or recovery in nature of the conservation status of the listed threatened species or ecological community, the listed migratory species (including any population), or the listed marine species concerned, or
- the specified activity is necessary in order to control pathogens, and is conducted in a way that will, so far as is practicable, keep to a minimum any impact on the listed threatened species or ecological community, the listed migratory species, or the listed marine species concerned.

The NRP will see the clearing of Commonwealth listed threatened species or ecological community as outlined in Section 11 and 12.

Applications for Part 13 permits are placed on the Department of Agriculture, Water and Environment's website for 10 business days for public consultation. The Department of Agriculture, Water and Environment placed the Part 13 permit application on its website between 17 June 2018 and 28 June 2018.

1.3.4.3 Adoption of the Major Development Plan Process

A MDP is required to be referred to the Minister responsible for the EPBC Act (Commonwealth Minister for the Environment) for their advice, pursuant to Section 160 of the EPBC Act, by the Minister administrating the Airports Act (Commonwealth Minister for Infrastructure, Transport and Regional Development). This advice is to determine the assessment methodology required for the environmental aspects of the MDP.

Perth Airport, in conjunction with the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC), the Civil Aviation Safety Authority (CASA) and Airservices Australia, referred the NRP project under Section 160 of the EPBC Act for consideration in October 2017. The referral was considered in two parts:

- on-ground environmental assessment, and
- airspace management plan

On-ground Environmental Assessment

The new runway will require the construction, including clearing and site preparation, of the new runway and associated infrastructure. In accordance with Section 160 of the EPBC Act, the Minister for the Environment is required to provide advice to DITRDC before construction can commence.

The on-ground infrastructure component of the project was referred to the Department of Agriculture, Water and Environment (DAWE).

A referral decision (EPBC 2017/8081) was made on 20 February 2018, outlining that advice was required under subsection 160 (2) (c) the adoption or implementation of a major development plan (as defined in the Airports Act). The referral notice also outlined that the proposed action required assessment and advice under subdivision A of Division 4 of Part 11 of the EPBC Act.

The DAWE advised that the proposed action is to be assessed by an accredited assessment process through a major development plan under the Airports Act.

The detail provided in this MDP allows the environmental impacts to be assessed by an accredited assessment process under the Airports Act. Volume B has been prepared to provide a level of information equivalent to what could be expected for an environmental impact statement, including the assessment of environmental impacts and an outline of the management and mitigation measures.

Airspace Management Plan

The operation of the new runway will require the airspace to change, both in terms of flight paths and volume (airspace classification). In accordance with Section 161 of the EPBC Act, the Minister for the Environment is required to provide advice to Airservices and CASA before the changes to airspace can be adopted and implemented.

The airspace component of the project was referred to DEE.

A referral decision (EPBC 2017/8082) was made on 2 February 2018, outlining that advice was required under subsection 160 (2) (b) of the EPBC Act, which covers the adoption or implementation of a plan for aviation airspace management involving aircraft operations that have, will have or are likely to have a significant impact on the environment. The referral notice also outlined that the proposed action required assessment and advice under subdivision A of Division 4 of Part 11 of the EPBC Act.

The DAWE advised that the proposed action is to be assessed by an accredited assessment process through a major development plan under the Airports Act.

The information provided in this MDP is based on a preliminary airspace design that has been agreed in principle with Airservices. To ensure sufficient detail is provided for the Minister for the Environment to assess the impacts and provide advice to Airservices and CASA, the preliminary airspace concept is based on likely flightpath options, approach and departure procedures and operating modes.

1.3.5 *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

Australia's state and territory governments are generally responsible for the recognition and protection of Australia's Indigenous heritage places. All states and territories have laws that protect various types of Indigenous heritage.

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1994* enables the Commonwealth to respond to requests to protect important Indigenous areas and objects that are under threat if it appears that state or territory laws have not provided effective protection.

There are no nationally protected heritage sites on Perth Airport.

1.3.6 *Native Title Act 1993*

The *Native Title Act 1993* recognises and protects native title rights and interests. Native Title refers to the communal, group or individual rights and interests of Aboriginal peoples or Torres Straight Islanders in relation to land or waters.

In the case for Perth Airport, native title is extinguished by the issue of Crown leases.

1.3.7 *Civil Aviation Act 1988*

The *Civil Aviation Act 1988* establishes a regulatory framework for maintaining, enhancing and promoting the safety of civil aviation, including the design and operations of Perth Airport.

Australia's Civil Aviation Safety Authority (CASA) is responsible under the Civil Aviation Act for developing and disseminating appropriate aviation safety standards. Perth Airport, as the airport operator licenced by CASA, is responsible for the safety of the aerodrome in accordance with the Civil Aviation Safety Regulations 1998 Part 139 – Aerodromes. These regulations are supported by a Manual of Standards Part 139 – Aerodromes (MOS 139), which prescribes the technical standards for aerodromes used for air transport operations.

As detailed in Section 6, the new runway, taxiways and associated infrastructure have been designed in respect to the MOS 139 criteria.

1.3.8 *Airspace Act 2007*

Changes to the existing airspace architecture associated with the future operation of the new runway will require an airspace change approval under the *Airspace Act 2007* and Airspace Regulations 2007. This approval is required prior to the new runway becoming operational for flights.

Although approval for the airspace change for the new runway cannot be obtained until final detailed design has been completed (i.e. closer to completion of the project), Airservices has agreed in principle to a preliminary airspace design that outlines the projected flight-path corridors and predicted airspace changes that are:

- consistent with Airservices and CASA planning requirements, and
- appropriate for use in the preparation of this MDP and public consultation.

Volume C details the changes to the airspace required for the operation of the new runway.

Following MDP approval, and when the final design of infrastructure is complete, the formal airspace detailed design will be completed by Airservices.

The Office of Airspace Regulation will consider safety implications, environmental considerations, consultation, government policy, and the promotion and fostering of civil aviation. The assessment will be based on the advice of the Minister for the Environment provided under Section 160 of the EPBC Act, the environmental impacts detailed in this MDP, as well as a safety case undertaken closer to the completion of the construction of the runway.

The final design needs to be consistent with the preliminary design and assessment considered by the Minister as part of this MDP. Any significant differences may require a subsequent EPBC Act referral or assessment.

1.3.9 *Aviation Transport Security Act 2004*

The security of Perth Airport is managed in accordance with the *Aviation Transport Security Act 2004* and Aviation Transport Security Regulations 2005. As a security controlled airport, Perth Airport is required to implement and manage a Transport Security Program (TSP) which is designed to meet aviation security obligations and safeguard against unlawful interference with aviation. The TSP also defines the airside and landside boundary, known as the Airside Security Zone.

The NRP will be constructed outside of the Airside Security Zone until the taxiway connections into the current airfield system are required to be built. At this time Perth Airport's TSP will be updated to reflect the new Airside Security Zone incorporating the new runway and its associated facilities that must be protected.

1.3.10 State Legislation

Perth Airport is located on Commonwealth land and State legislation will generally only apply for activities for which Commonwealth legislation does not exist. The key State legislation applicable to the NRP are the:

- *Aboriginal Heritage Act 1972*,
- *Bush Fires Act 1954*, and
- *Dampier to Bunbury Pipeline Act 1997*.

1.3.10.1 *Aboriginal Heritage Act 1972*

The *Aboriginal Heritage Act 1972* (AH Act) provides for the preservation, on behalf of the community, of places and objects customarily used by the original inhabitants of Australia or their descendants. In the absence of any prescriptive Commonwealth legislation, this Act bears direct relevance to the NRP, particularly where the State Department of Planning, Lands and Heritage (DPLH) (previously Department of Aboriginal Affairs) site register indicates the presence of sites.

The NRP impacts on two listed Aboriginal Heritage sites which are detailed in Section 16. An application under Section 18 of the AH Act to develop, maintain and operate the new runway was submitted in June 2017.

The application was subsequently approved by the State Government in May 2018.

1.3.10.2 *Bush Fires Act 1954*

The *Bush Fires Act 1954* establishes the requirements for the preparedness, prevention and management of bush fires within the State. Relevant to the NRP are the provisions for establishing firebreaks, activity and equipment restrictions during fire bans, and burning on Commonwealth lands.

The final new runway design and operating protocols will be consistent with this Act.

1.3.10.3 *Dampier to Bunbury Pipeline Act 1997*

The *Dampier to Bunbury Pipeline Act 1997* (DBP Act) is administered by the State Department of Treasury, under the portfolio of the State Minister for Energy. The Dampier to Bunbury Natural Gas Pipeline (DBNGP) corridor is an area of land that houses the DBNGP, and sections of other high-pressure gas pipelines where they connect into the DBNGP. The DBNGP corridor is approximately 1,600 kilometres long extending from the town of Dampier through to the City of Bunbury, and traverses the Perth Airport estate along the length of the eastern boundary adjacent to the freight rail and Abernethy Road.

The DBNGP corridor is managed under the DBP Act, which establishes the management framework and ownership of the pipeline, as well as establishing the land within the DBNGP corridor and restrictions on its use. The land within the corridor is not to be used for any purpose without the approval in writing of the DBNGP Land Access Minister (appointed under the DBP Act).

This NRP does not require any works within the corridor, and is therefore consistent with the DBP Act. If during detailed design any works were required within the easement, these works would be consistent with this Act.

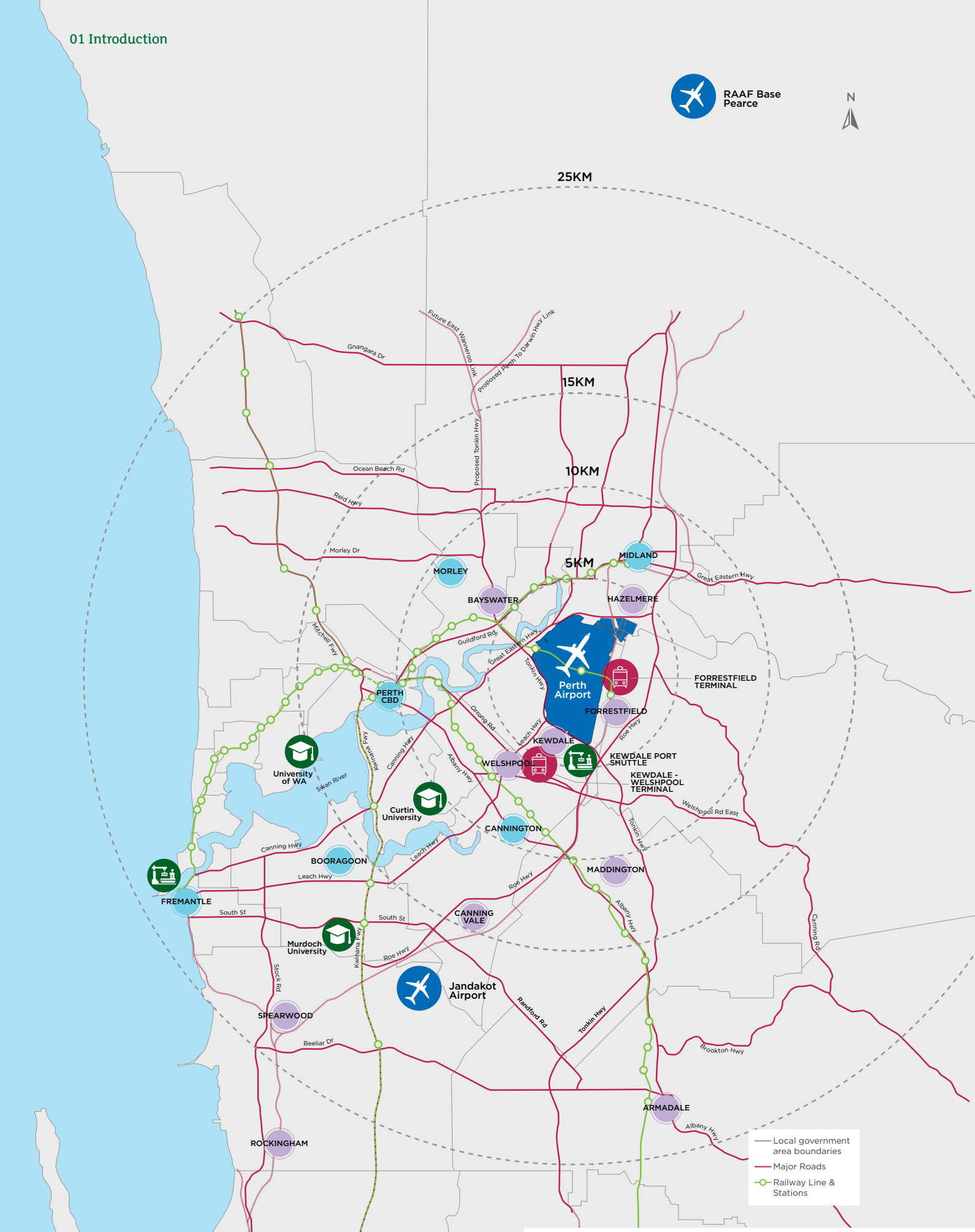


Figure 1-3 Perth Airport in relation to key infrastructure and local government boundaries
Source: Perth Airport Master Plan 2014

1.4 Perth Airport

Perth Airport is the premier international and interstate hub to Western Australia. It operates 24 hours a day, seven days a week, and is a vital public transport infrastructure facility.

The location of Perth in relation to other Australian capital cities, and the vast distances between major population centres, make air travel and Perth Airport indispensable to the people of Western Australia, and to the State's economic, social and cultural development.

As the fourth-largest domestic and international airport in Australia, Perth Airport is currently serviced by more than 30 international, intrastate and interstate airlines that operate to more than 50 destinations.

Within Australia, Perth Airport provides an access point to Western Australia from interstate locations and serves as the central transportation hub for regional destinations, such as significant mining regions and popular tourist destinations. The airport is a vital link in the Western Australian resources sector supply chain, providing connectivity for the fly-in fly-out (FIFO) workforce and for Western Australians who live in remote communities.

Internationally, Perth Airport is strategically located for access to Southeast Asia, the Middle East, Europe and Africa.

1.4.1 Site Context

Perth Airport is located 12 kilometres east of the Perth's Central Business District (CBD) and integrates with other transport infrastructure including the Kewdale rail freight facility, major highway networks and, via these roads, the port of Fremantle.

Perth Airport forms a critical hub of the eastern metropolitan region of Perth. The State Government's development of Tonkin Highway as a free-flow freeway from the centres of Ellenbrook through to Armadale means the airport is ideally centred. There are additional connections provided through Reid Highway to the north-west and Roe Highway to the south-west, both of which considerably expand the catchment area to service and access Perth Airport.

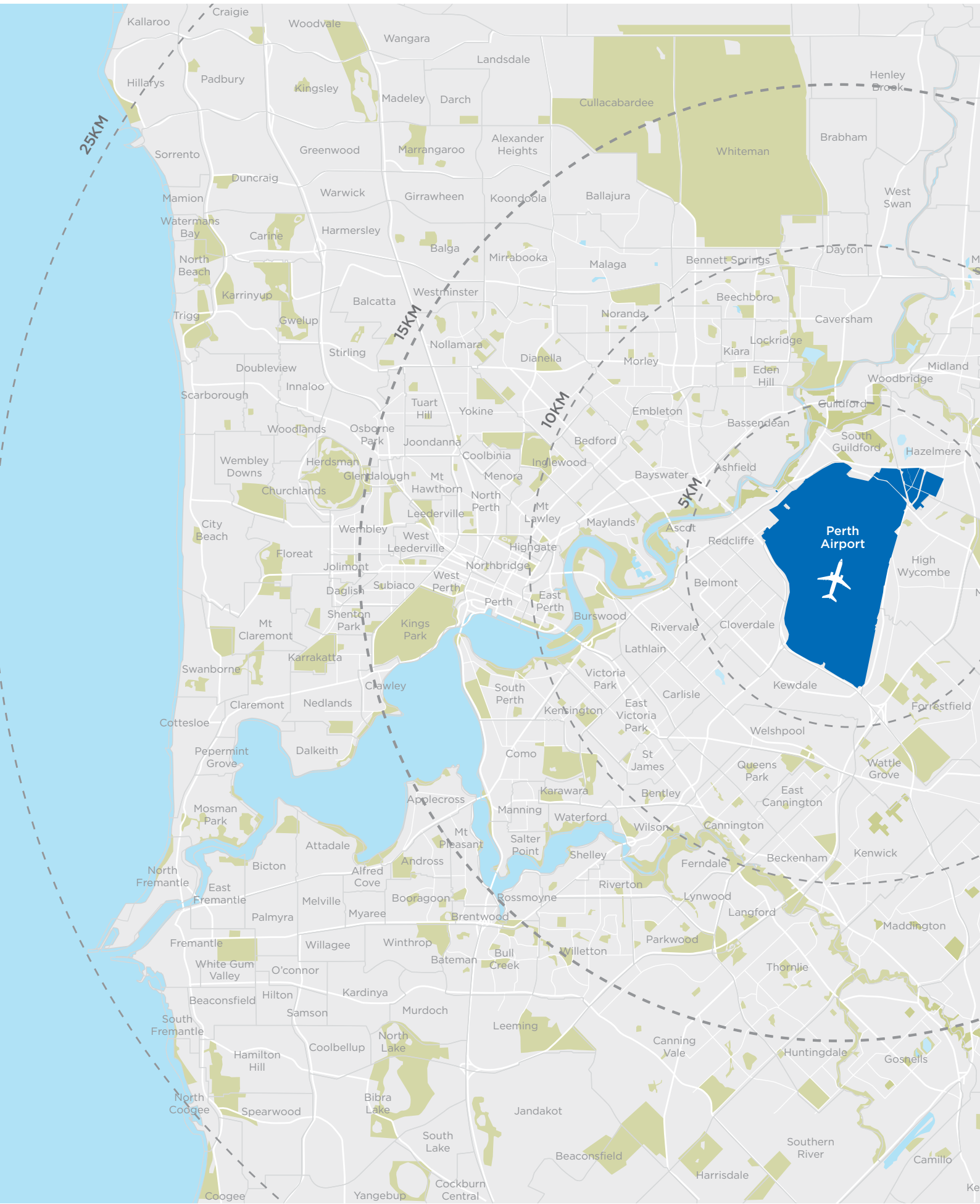
The development of the Forrestfield-Airport Link (FAL) rail project by the State Government, in addition to the following phase of metropolitan rail development associated with Metronet, also greatly enhances access to and from Perth Airport for a large part of the Perth metropolitan region.

The location of Perth Airport in relation to the Perth metropolitan region and other key landmarks is shown in Figure 1-3.

Perth Airport is surrounded by a variety of land uses in the eastern metropolitan region, including:

- to the south is Tonkin Highway and light industrial warehouses within the Kewdale industrial precinct. Beyond the industrial precinct are the residential suburbs of Queens Park, East Cannington, Beckenham and Kenwick,
- to the east is the Forrestfield logistics and freight distribution facilities along Abernethy Road, followed by residential areas of Forrestfield and High Wycombe within the foothills of the Darling Scarp,
- to the north is Great Eastern Highway and the residential areas of South Guildford, Guildford and the Swan Valley region. A light-industrial corridor is located to the north-east between High Wycombe and South Guildford that extends from the airport to Bellevue, and
- the west is predominantly occupied by residential development, including the suburbs of Cloverdale, Redcliffe, Ascot, Ashfield and Bassendean.

Figure 1-4 shows the estate in relation to its immediate surrounds.


25KM
15KM
10KM
5KM
Perth Airport
Kallaroo
Craigie
Woodvale
Wangara
Landsdale
Hillarys
Padbury
Kingsley
Madeley
Darch
Cullacabardee
Henley Brook
Brabham
Whiteman
Sorrento
Greenwood
Marrangaroo
Alexander Heights
Duncraig
Warwick
Girrawheen
Koondoola
Ballajura
West Swan
Mamion
Watermans Bay
Carine
Harmersley
Balga
Mirrabooka
Malaga
Bennett Springs
Dayton
North Beach
Karrinyup
Balcatta
Westminster
Beechboro
Trigg
Gwelup
Noranda
Caversham
Stirling
Nollamara
Dianella
Morley
Lockridge
Kiara
Eden Hill
Midland
Doubleview
Innaloo
Woodbridge
Scarborough
Tuart Hill
Yokine
Embleton
Guildford
Bassendean
Woodlands
Osborne Park
Joondanna
Bedford
South Guildford
Hazelmere
Wembley Downs
Herdsman
Coolbinia
Inglewood
Ashfield
Glendalough
Mt Hawthorn
Menora
Bayswater
Churchlands
North Perth
Leederville
Mt Lawley
Maylands
Ascot
City Beach
Wembley
West Leederville
Redcliffe
Floreat
Highgate
High Wycombe
Jolimont
Northbridge
Belmont
Subiaco
West Perth
Daglish
Perth
East Perth
Burswood
Shenton Park
Kings Park
Rivervale
Cloverdale
Mt Claremont
Lathlain
Karrakatta
Swanborne
Victoria Park
Kewdale
Clawley
South Perth
Carlisle
Claremont
Nedlands
Kensington
East Victoria Park
Forrestfield
Cottesloe
Welshpool
Pepermint Grove
Dalkeith
Como
St James
Queens Park
Wattle Grove
Karawara
Bentley
East Cannington
Applecross
Mosman Park
Manning
Waterford
Wilson
Cannington
Mt Pleasant
Salter Point
Attadale
Shelley
Beckenham
Kenwick
Andross
Ferndale
North Fremantle
Bicton
Alfred Cove
Riverton
East Fremantle
Melville
Booragoon
Rossmoyne
Lynwood
Palmyra
Myaree
Brentwood
Langford
Maddington
Fremantle
Willagee
Winthrop
Parkwood
Bateman
Bull Creek
Willetton
White Gum Valley
O'connor
Thornlie
Beaconsfield
Hilton
Kardinya
Samson
Murdoch
South Fremantle
Leeming
North Lake
Canning Vale
Coolbellup
Huntingdale
Gosnells
Hamilton Hill
North Coogee
Spearwood
Bibra Lake
Jandakot
South Lake
Beaconsfield
Southern River
Harrisdale
Camillo
Cockburn Central
Yangebup
Coogee

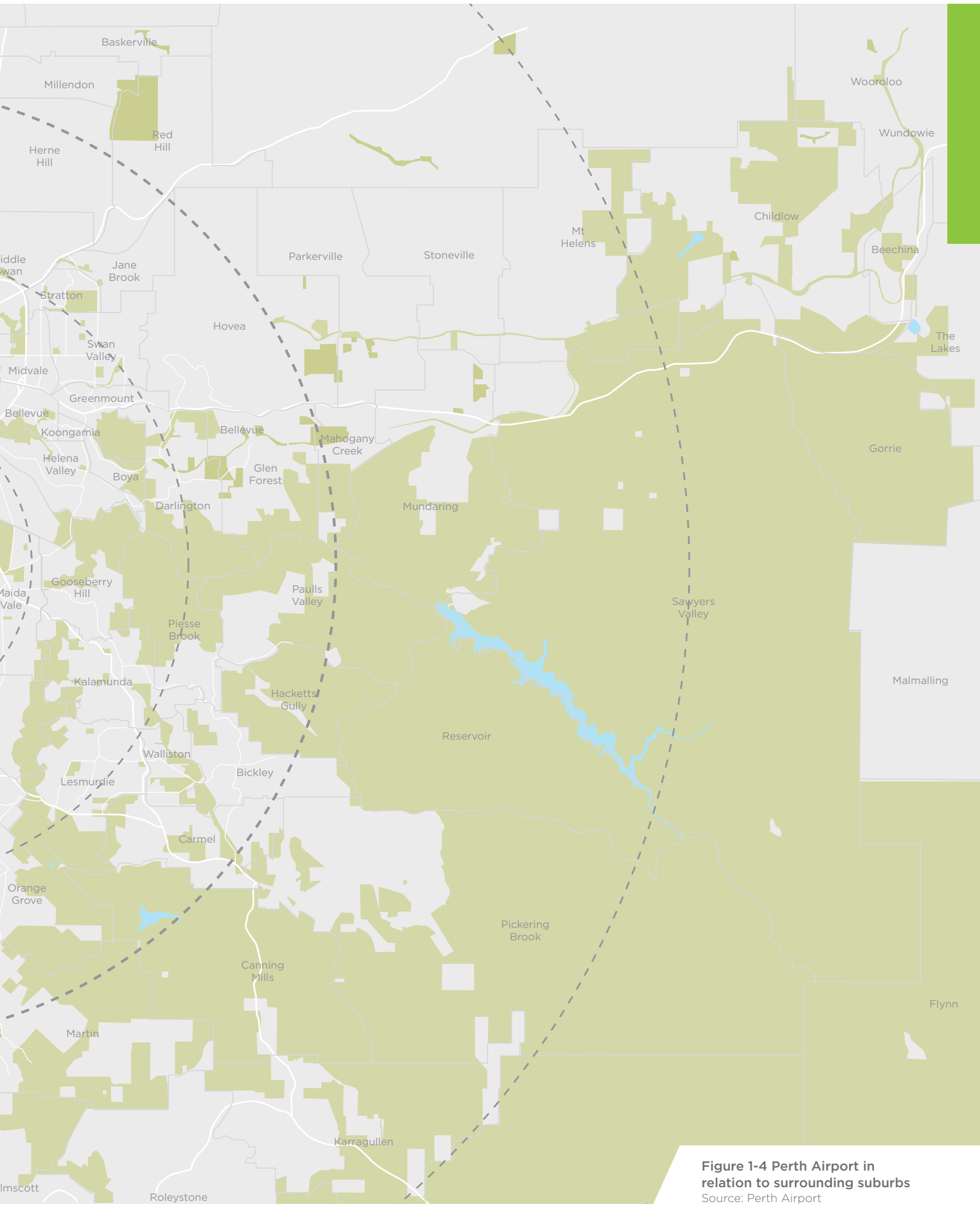


Figure 1-4 Perth Airport in relation to surrounding suburbs
Source: Perth Airport

Perth Airport is also situated proximate to several other aerodromes, as shown in Figure 1-5, including:

- Jandakot Airport, the metropolitan region's general aviation airport which handles smaller aircraft traffic. It is located 16 kilometres south of the CBD and 19 kilometres south-west of Perth Airport,
- the Royal Australian Air Force (RAAF) has two aerodromes in the Perth region. RAAF Base Pearce is 30 kilometres north of Perth Airport and RAAF Gingin is 54 kilometres north of Perth Airport. They share airspace with Perth Airport but are not available for commercial aviation, and
- other smaller aerodromes that service the Perth metropolitan aviation industry are located at Rottnest Island, Mandurah (Murray Field Airport), Northam and Serpentine.

1.4.1.1 Perth Airport Precincts

The estate itself is divided into five precincts that are akin to local government suburbs. These are:

- Airport West - serviced off the Tonkin Highway and Dunreath Drive interchange,
- Airport South - serviced off the Tonkin Highway and Horrie Miller Drive interchange,
- Airport North - centred on Kalamunda Road to the south of the Great Eastern Bypass,
- Airport Central - serviced off Airport Drive and to the east of the main runway, and
- Airfield Precinct - the location of existing and future runways, taxiways and associated aviation services.

As shown in Figure 1-6, the proposed new runway is located within the Airfield Precinct, and located east, and parallel, to the existing main runway (03L/21R) and staggered approximately one kilometre south.

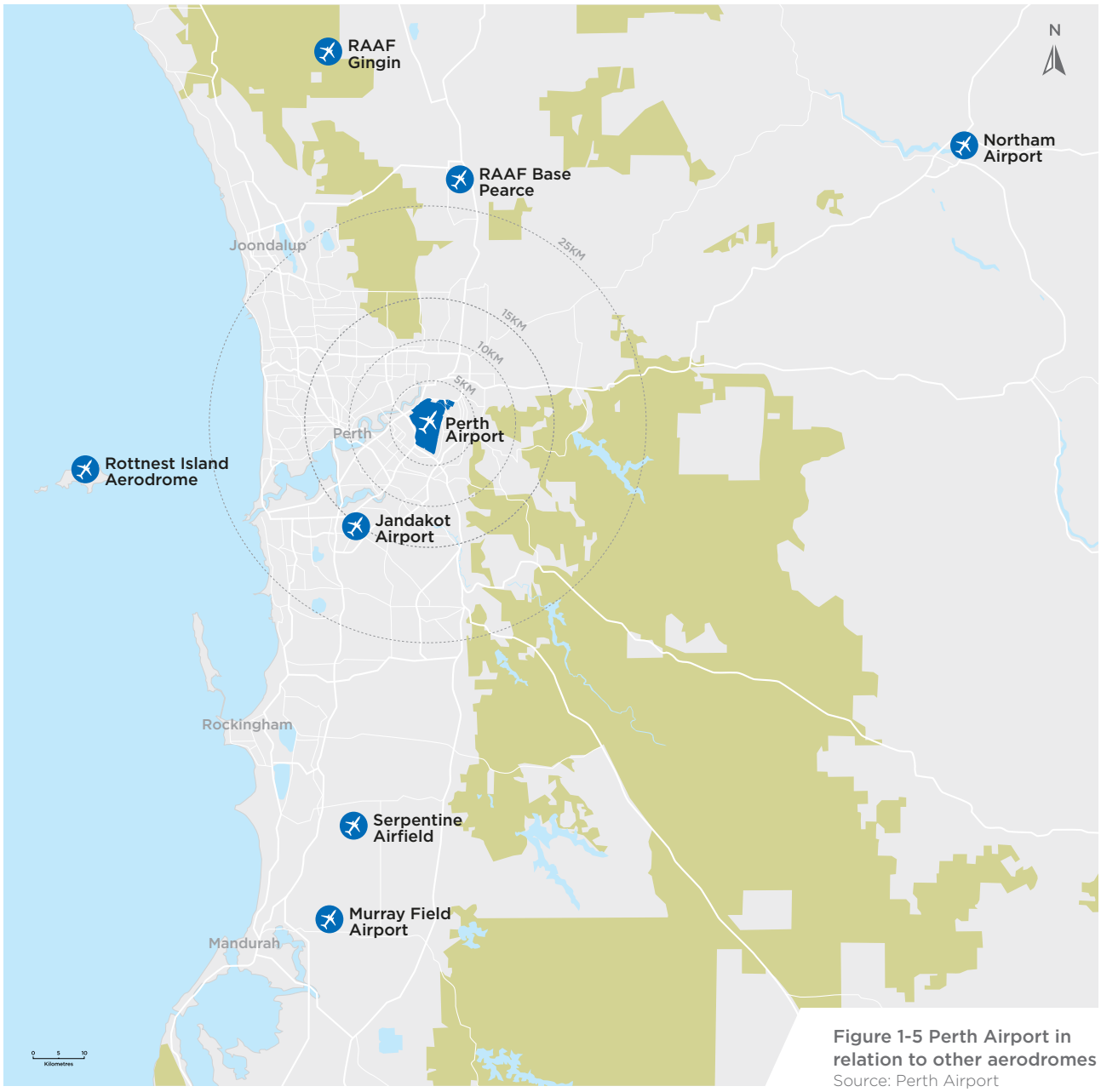


Figure 1-5 Perth Airport in relation to other aerodromes
Source: Perth Airport

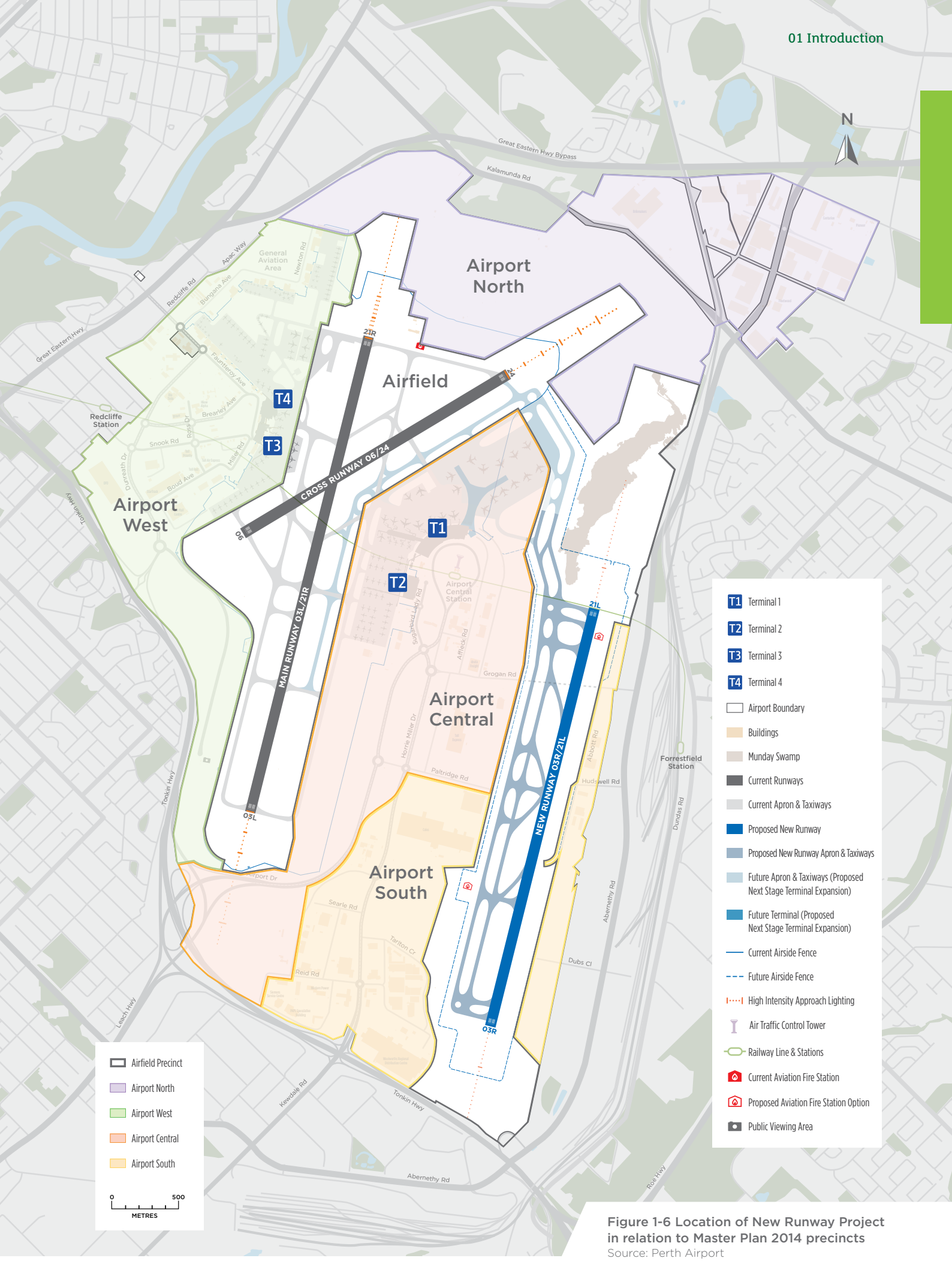


Figure 1-6 Location of New Runway Project in relation to Master Plan 2014 precincts
Source: Perth Airport

The Airfield Precinct comprises all infrastructure required for the current and future movement of aircraft, including runways, taxiways, navigation aids and future facilities for aviation firefighting and rescue services and covers approximately 760 hectares. There is sufficient land in the precinct to accommodate required aircraft movement infrastructure for the long-term configuration of Perth Airport. This includes the construction of the new runway (03R/21L) proposed under this MDP.

The NRP is consistent with the vision for the Airfield Precinct, given the primary purpose of the precinct is to provide for and protect the ultimate aviation capacity of the airport, including the development of runway, taxiways and associated aviation infrastructure, while managing the environment and cultural values of the area.

Within the precincts, there are four different zonings in place which reflect the desired land uses for each of the defined areas, in a similar fashion to the way Local Planning Schemes manage land use planning for Local Government areas. The four zones overlayed across the estate comprise of Airfield, Commercial, Airport Services, and Terminal and have an applicable Land Use Table to detail the desired land uses within the zones. Table 1-3 shows land uses within the Airfield Zone.

The proposed development is a permitted land use within the Airfield Zone, given the project is consistent with many of the land uses defined in the zoning table. The project involves the development of runways, taxiways and associated aviation infrastructure, meeting with the intent of the zone, and in line with the definitions listed in the zoning table of 'aviation activity', 'aviation support facilities', 'navigational aids' and 'utilities and infrastructure'.

1.4.2 Ownership and Funding

Perth Airport is operated by Perth Airport Pty Ltd. In 1997, the operation and management of Perth Airport was transferred from the Commonwealth of Australia to Westralia Airports Corporation under a 50-year lease with a 49-year option for extension. In 2011, Westralia Airports Corporation changed its trading name to Perth Airport Pty Ltd.

Perth Airport Pty Ltd is a wholly-owned subsidiary of Perth Airport Development Group Pty Ltd (PADG). The shareholders of PADG, as at July 2019, are shown in Table 1-4.

Perth Airport funds infrastructure development and maintenance investment through a mix of equity and debt from banks and capital markets.

Objective
• to provide for safe, secure and efficient airfield operations 24 hours a day, seven days a week, including aircraft take-off, landing and taxiing • to accommodate provision of facilities that support safe and efficient airfield operations, such as aviation fire-and-rescue services and aircraft navigational aids • to enable future expansion of the airport's operations, including additional runways, taxiways and associated aviation facilities • to integrate environmental outcomes in accordance with the EPBC Act Environmental Offset Policy (2012)

Directional Uses			
• animal establishment • aviation activity • aviation support facilities • car park • conservation	• driving training and education • helipad • heliport • industry – light	• industry – service • motor vehicle, boat or caravan sales • storage facilities • navigational aids	• rental cars • telecommunications • utilities and infrastructure • warehouse

Table 1-3 Airfield Zone land use at Perth Airport
Source: Master Plan 2014

Shareholders of Perth Airport Development Group Pty Ltd	Percentage Ownership
Utilities of Australia Pty Ltd ATF Utilities Trust of Australia (UTA)	38.26
The Northern Trust Company (TNTC in its capacity as custodian for Future Fund Investment Company No.3 Pty Ltd (FFIC3), a wholly owned subsidiary of The Future Fund Board of Guardians (FFBG)	30.01
Utilities of Australia Pty Ltd ATF Perth Airport Property Fund (PAPF)	17.34
Gardior Pty Ltd as trustee for The Infrastructure Fund	7.19
AustralianSuper Pty Ltd	5.25
Sunsuper Pty Ltd	1.95

Table 1-4 Perth Airport ownership (July 2019)
Source: Perth Airport

A breakdown of the shareholder representation highlights that superannuation funds make up over 50 per cent of the ownership. The investment strategies of superannuation funds, which include having funds allocated to long-term infrastructure investments, together with their continuing inflow of funds, makes them very suitable as shareholders for Perth Airport. Infrastructure projects, such as the new runway and other developments at Perth Airport, generally have a lifetime asset utilisation and return profile exceeding 40 years. Additionally, the continuing growth of superannuation funds means there is constant demand for investment opportunities that require capital funding, such as the new runway.

No Commonwealth or State funding is required for the construction of the new runway.

In addition to the Perth Airport investment, a new aviation fire station will be constructed by the government owned agency Airservices. The investment will require Airservices board approval and a separate funding process through agreement of the airlines who fund the agency through aviation charges.

1.4.3 Lease

Perth Airport Pty Ltd is the lessee of the 155 lots of land which make up the estate. The lease with the Commonwealth of Australia was executed on 1 July 1997. The term of the lease is for a period of 50 years, with an option of a further 49 years exercisable by the lessee.

The lease outlines that the lessee has obligations to develop the site and that the site must be operated as an airport site. In doing so, the lessee should have regard to:

- the actual and anticipated future growth in, and pattern of, traffic demand for the airport site,
- the quality standards reasonably expected of such an airport in Australia, and
- good business practice.

The lease also requires the lessee to provide access for, international, interstate and intrastate air transport at all times.

In addition to developing the estate, the lessee must maintain the 'environment' of the airport site in accordance with any obligation imposed on it by legislation. The lease defines the 'environment' of the airport site as:

- "this includes, without limitation, the water, ground water, soil, subsoils, air, biota or habitat and sites of heritage value on or above or below the airport site and structures".

Section 91 (1) (ca) of the Airports Act requires that a major development is consistent with the airport lease. The proposal for the NRP as outlined in this MDP is consistent with the Perth Airport lease, as the new runway provides capacity for the anticipated future growth in aircraft traffic, and is supporting the continuation of the use of the site as an airport. In addition, the obligations of Perth Airport to maintain the environment of the airport lease in accordance with legislation and associated government policy (such as the Commonwealth Offset Policy), have been addressed in Volume B dealing with surface water, ground water, soil, subsoils, air quality, flora and fauna and heritage.

The airport lease also requires that any development is in accordance with an approved Master Plan. As discussed in Section 1.3, the NRP is consistent with the Master Plan 2014.

1.4.3.1 Pre-Existing Interests

There are several pre-existing interests that provide for access and use of land within the estate which existed when the operation and management of Perth Airport was transferred from the Commonwealth on 2 July 1997.

In accordance with Section 91 (3) of the Airports Act and Section 5.04 of the Airports Regulations 1997, Perth Airport is required to address any obligations from pre-existing interests in the airport.

No pre-existing interests, as outlined in the approved Master Plan 2014, exist within the NRP area.

1.4.3.2 Pre-Existing Sub Leases

The NRP will impact on several current sub-leases and tenancies across the estate. The future development of the new runway was disclosed when the leases were first executed.

NRP works that are located adjacent to, or that may impact, existing sub-leases will require consultation and negotiation with existing lessors and tenancies. Perth Airport will ensure existing tenants continue to have the right to quiet enjoyment within their existing sub-lease framework or alternatively, agreement for relocation or finalisation of leases will be sought. Tenants within the NRP area are aware, through their lease terms and conditions, that they may be impacted by the runway construction, and therefore only await confirmation of timing. Tenants directly affected by the construction of the NRP that will require relocation include:

- Manheim,
- Driver Training Education Centre,
- Autocare Services,
- Telstra (telecommunications tower site), and
- Vodafone (telecommunications tower site).

1.4.3.3 Land Swap Agreement

The transfer of four parcels of land to consolidate the Perth Airport boundary is subject to an ongoing land swap arrangement with the State Government and included in the agreement is a 4.69-hectare easement located within the NRP area. It is anticipated that the transfer agreement will be completed prior to the construction of the new runway. If not, an agreement between State Government, Commonwealth Government and Perth Airport will be sought to ensure the land swap does not impact the construction timing.

1.4.4 Operations

The estate covers an area of approximately 2,105 hectares and currently comprises four terminals (T1, T2, T3 and T4) as well as a general aviation area. These terminals are supported by two intersecting runways and associated infrastructure. The main runway (03L/21R) is 3,444 metres long with a north-south orientation. The cross runway (06/24) is 2,163 metres long with a northeast-southwest orientation. The current infrastructure layout is shown in Figure 1-7.

The operations of Perth Airport are dependent on a wide range of functions that are undertaken by several organisations as outlined in Table 1-5.

Function	Description	Organisations/Agencies
Airport operator	Provides, operates and maintains the necessary airport infrastructure	Perth Airport
Airlines and aircraft operators	Provide aircraft, passenger and freight services	Currently over 30 commercial aircraft operators at Perth Airport
Air navigation service	Management of Perth Airport airspace, aeronautical information, aviation communications, and radio navigational aids	Airservices
Rescue and firefighting services	Response to aircraft and property emergencies on the estate	Airservices and/or State Department of Fire and Emergency Services
Fuel storage and aircraft refuelling operations	Provide fuel storage and aircraft refuelling operations	Joint User Hydrant Installation (JUHI)
Ground transport operators	Provide services for passengers and airport staff to access the airport	Various private operators on the estate
Border protection and security	Ensures that the airport is secure and that international operations are conducted in-line with relevant legislation	Commonwealth Department of Home Affairs, Department of Agriculture, Water and Environment, Australian Federal Police, Western Australian Police and private contractors
Retail and other commercial operations	Provide services for passengers and airport staff as well as providing non-aviation employment and services to the wider community	Currently over 120 tenants on the estate

Table 1-5 Organisation functions at Perth Airport
Source: Perth Airport

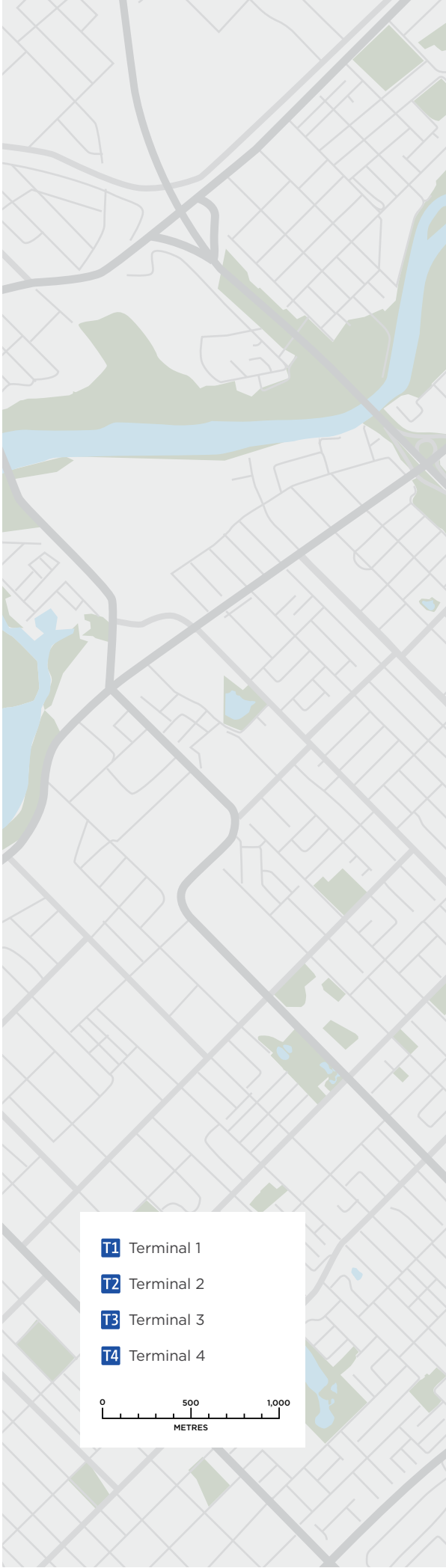


Figure 1-7 Aerial image of Perth Airport estate (2017)
Source: Perth Airport

4.30am – 7.30am
Demand linked to resource sector shifts

10pm – 1am
Interstate nightly services

10pm – 2am
Airline schedules linked to international

INTRASTATE

45.5%
of Australian export income

24%
of traffic is FIFO related

INTERSTATE

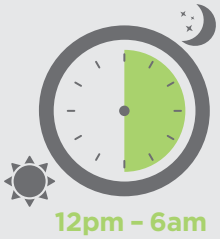
24/7
Due to demand airlines need to use larger aircraft & offer services 24/7

Red-eye special
provides a cheaper alternative

INTERNATIONAL

947,000
International visitors to WA

$2.39b
tourism dollars



12pm – 6am

OVERNIGHT FREIGHT

- Average of 36 tonnes of freight through Perth Airport each evening
- Supports express postage services online shopping

Figure 1-8 Importance of 24/7 operations at Perth Airport
Source: Perth Airport

1.4.5 Hours of Operations

Perth Airport operates 24 hours, seven days a week, providing an essential link for business and leisure travel, and meeting the needs of:

- regional communities and the resource sector,
- interstate domestic travel,
- international access to multiple global destinations, and
- freight, including express and time critical supplies.

Maintaining operational flexibility is critical to supporting Western Australia's economy. Perth Airport is part of a national and global aviation network and, as such, flight times and schedules are not determined locally. The viability of many of Perth's international air services depend on linking with connecting networks through hub airports, such as Dubai and Singapore. Any restrictions on the operations of Perth Airport would lead to a significant loss of air services, which may result in a reduction of service levels and a likely increase in the cost of flying for community members and businesses.

International services are the lifeblood of the State's international tourism industry and the employment it supports. A reduced level of international air services that would arise from restrictions on Perth Airport would therefore have profound impacts on tourism and all those who depend on that industry.

The operational conditions at Perth Airport are also critical to maintaining and supporting effective freight and logistics. 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. The period between 11.00 pm and 6.00 am currently represents 23 per cent of international flights, including freight services. Any operational restriction in these times would adversely and materially impact the industries which rely on overnight and well connected international routes.

A new growing market is that related to internet purchasing. This rapidly expanding source of freight and logistics is driven by significant consumer demand. Online retail is also driven by its time critical responsiveness, and similar to other sectors, operational restrictions will directly and adversely impact providers and consumers.

A study completed in 2015 found that without operational restrictions between the hours of 11.00 pm and 6.00 am over a 25-year horizon, Perth Airport operations would account for $43.4 billion in Gross Domestic Product (GDP), and approximately 19,000 jobs in Perth and 26,900 jobs across Western Australia.

Perth Airport acknowledges that there are communities which are affected by the 24 hour operation of the airport; however, this impact is balanced against the broader community and economic benefits that arise from these operations.

Figure 1-8 summarises the importance of 24 hour operations at Perth Airport.

1.4.6 Responsibilities

The main responsibilities of Perth Airport, as the airport operator, are:

- to provide and maintain aerodrome infrastructure for safe and secure operations,
- to provide airfield, terminal and other asset management and maintenance, including infrastructure for power, water, sewerage, drainage and communications services,
- future planning, development and administration of the estate,
- commercial development, including retail tenancy management, and
- overall environmental management of the estate.

1.4.6.1 Provision of Safe and Secure Operations

Under the Civil Aviation Safety Regulations 1998, Perth Airport is required to maintain an Aerodrome Certificate. The Aerodrome Certificate is the instrument by which government regulators ensure Perth Airport is managed and operated to international safety standards appropriate to the type of aircraft operations conducted at the airport.

Ensuring the safe operation of the aerodrome requires Perth Airport to manage a range of activities, including:

- constructing and maintaining the condition of airfield infrastructure to the required standards,
- regular inspections of the runways, airfield lighting and other infrastructure,
- bird and animal hazard control,
- the control and access of persons and vehicles within the airfield,
- managing the protection of airspace from temporary or permanent intrusions into the safe height limits, and
- ground management of emergency and low-visibility situations.

1.4.6.2 Airfield, Terminals and Other Assets

Infrastructure provided by Perth Airport includes terminals, roads, car parks, and the utilities network. A summary of the infrastructure is provided in Table 1-6.

1.4.6.3 Future Planning and Development Control

Every five years, Perth Airport is required to develop, for public comment, a Master Plan which sets out the framework for development of the estate for a 20-year planning horizon. The Master Plan allows governments, the community and other stakeholders to comment on the way in which the airport intends to grow and develop into the future. It addresses planning issues involving aviation activity, land use and development, environmental management and ground transport access.

The Master Plan 2014, applicable during the development and consultation conducted for this MDP, was approved by the Hon. Warren Truss MHR, the (then) Minister for Infrastructure and Regional Development on 9 January 2015, with a Minor Variation approved on 15 June 2017.

All building and development works within the estate are subject to a detailed assessment and approvals process by Perth Airport and the Commonwealth Government. To ensure that the use of land will not impact on, or limit, the future expansion of aeronautical operations, developments must be consistent with the land uses defined in the Master Plan.

1.4.6.4 Commercial Operations

The airport lease permits sub-leasing to tenants for both aviation and non-aviation uses.

There is an extensive mix of industrial, commercial, warehouse, showroom, storage and logistics buildings within the estate. The majority of these buildings are owned and maintained by the individual tenants.

The major airport sub-lease activities include:

- airlines, which require sites for engineering, catering, maintenance, freight handling and administrative services,
- air traffic management facilities, including the Air Traffic Control tower and Aviation Rescue and Fire Fighting station,
- fuel storage and aircraft refuelling operations,
- car-rental vehicle handling and processing bases,
- freight and cargo facilities,
- industrial uses such as a gold refinery and a brickmaking plant,
- distribution centres,
- administration offices, and
- retail including specialty stores and food and beverage outlets within terminals, and larger retail, such as the Direct Factory Outlet on Dunreath Drive.

1.4.6.5 Environmental Management

The environmental management of the estate is the responsibility of Perth Airport, airline operators, business partners, tenants, contractors and consultants. The Master Plan 2014 incorporates an Environment Strategy which details Perth Airport's areas of environmental focus in a five-year action plan. It also includes assessment and strategies for the management of identified issues over the 20-year planning period of the Master Plan.

Perth Airport has adopted a risk-based approach to environmental management and implements this through an Environmental Management Framework, which incorporates an environmental management system, as well as strategic policy and planning documents. This framework is detailed in Volume B.

Infrastructure	Responsibility
Terminals	Perth Airport is responsible for the operation and maintenance of T1, T2, T3 and T4.
Roads and car parking network	Perth Airport provides and maintains a large network of nearly 51 hectares of public access roads within the estate. All public car parks are owned and maintained by Perth Airport.
Utilities	Perth Airport plans, owns, operates and maintains the vast majority of the airport's utilities infrastructure for water, power, gas, sewerage, drainage systems and communications within the estate.
Airfield infrastructure	Perth Airport is responsible for providing and maintaining airfield infrastructure for aircraft operations, including: • runways and taxiways, • airfield lighting, signage and some navigational aids, and • aprons for aircraft manoeuvring and parking, docking facilities such as aircraft parking guidance systems and aerobridges.

Table 1-6 Perth Airport infrastructure summary
Source: Perth Airport

1.5 History and Development of Perth Airport

There is a long and rich history of activity on the Perth Airport estate, which is summarised below.

1.5.1 Pre-European

Leading archaeologists date Aboriginal activity in the Perth area to around 40,000 years ago. The land on which the estate is located forms part of the traditional network of communication routes, meeting places and camping sites of the Noongar people. A number of archaeological and ethnographic sites have been identified on the estate. As the traditional custodians, the Noongar people maintain a strong interest in the land use of the airport and its operations.

1.5.2 Early Airport Development

The first recorded flight in Western Australia occurred in 1911, when Joseph Hammond flew a biplane from a makeshift airstrip at the Belmont Racecourse over the city and Kings Park.

In 1919, Norman Brearley started operating demonstration flights and joy flights from the Western Australia Cricket Association ground in East Perth, before moving in 1920 to Langley Park, located along the Swan River adjacent to the Perth city centre. In 1925, Norman Brearley relocated his fledgling airline, Western Australian Airlines, to the newly constructed Maylands Aerodrome.

Maylands Aerodrome quickly grew with increasing air traffic movements and larger aircraft. To accommodate growth, the Dunreath Golf Course and market garden land was acquired in 1938 as the site of the new Guildford Aerodrome. In early 1942, this land was converted to a RAAF base and the first runway (the now closed runway 01/19), designed for RAAF aircraft, was built in 1943 by Western Australia's Main Roads Department. A second runway (the existing cross runway 06/24) was laid down a year later. Guildford Aerodrome continued to operate as a RAAF base until 1945. As Maylands Aerodrome was too small for the larger passenger aircraft now being used, the Government agreed, in 1944, to allow Australian National Airways and Qantas to share Guildford Aerodrome with the RAAF. The main runway (existing main runway 03/21) was constructed in 1949 and later extended and upgraded in 1966 to cater for larger jet aircraft such as the Boeing 707.

In 1952, Guildford Aerodrome was officially renamed Perth International Airport and facilitated its first international flight to South Africa. In the same year, the first international terminal was constructed with second-hand wartime materials at a cost of £180,000.

By the mid-1950s less than eight per cent of the Australian population had ever flown. Words like 'tour' and 'holiday' had begun to be included in the marketing of air travel and passenger numbers and demand for flights was rising rapidly. By the time Qantas flew the first Boeing 747 (jumbo) flight to Perth on 3 September 1971, the facilities at Perth Airport were battling to cope with the demand for domestic and international flights.

1.5.3 Airport Expansion

In 1973, a Joint State and Commonwealth Working Group completed a study which confirmed that the Perth Airport site would continue as the sole Regular Passenger Transport airport for the Perth region.

A final report on the aviation requirements for the Perth Region was released by the Commonwealth Department of Transport in 1979. The working group concluded that Perth Airport should be developed as the primary airport for the Perth metropolitan region and that it be based on a parallel runway system.

Following the Working Group's recommendations, additional land was acquired to the east to accommodate the long-term expansion of the airport, including a proposed parallel runway system.

During this period the main runway was also extended by 300 metres to its current length of 3,444 metres.

Formalising the planning from the Joint Working Group, the Commonwealth Department of Aviation released Perth Airport's first public Master Plan in 1985. The Master Plan 1985 outlined:

- the planning concept for consolidation of terminals into a central location,
- the alignment and location for a parallel runway system,
- an aircraft noise footprint, in the form of an Australian Noise Exposure Forecast (ANEF), for the future runway infrastructure options, and
- the need to ensure appropriate land-use development around the airport to minimise impact of future developments on surrounding communities.

On 25 October 1986, Prime Minister Bob Hawke opened a new $60 million International Terminal Complex (Terminal 1) on the eastern side of the airport, complete with a new Air Traffic Control tower.

The Federal Airports Corporation (FAC) was formed in 1988 to manage Australia's largest and busiest airports, including Perth Airport, as a self-funding commercial entity. In 1992, FAC continued compulsory acquisition of land for the long-term development of the Perth Airport site.

Figure 1-9 Perth Airport's vision for the future - consolidation to the Airport Central Precinct
Source: Perth Airport

1.5.4 Privatisation

As a result of the increasing cost of maintaining aging airfield infrastructure and the need for major redevelopment of airport facilities, the Commonwealth Government commenced the privatisation of the major Australian airports on a leasehold basis. As part of the first phase of privatisation of Australian airports, in 1997, control of Perth Airport was transferred to Perth Airport Pty Ltd (then Westralia Airports Corporation) under a 50-year plus 49-year option leasehold.

As a condition of the lease, Perth Airport was required to gain approval for a new Master Plan. The (then) Commonwealth Minister for Transport and Regional Services approved the Master Plan 1999 which outlined future developments on the estate. The approved Master Plan 1999 remained consistent with the earlier Master Plan 1985 that saw a central terminal precinct and a parallel runway system. Since privatisation, a revised Master Plan has been prepared by Perth Airport and approved by the Commonwealth Minister every five years.

1.5.5 Major Airport Development

In May 2008, Perth Airport released its 'Vision for the Future' which, through a staged major redevelopment, would see all commercial air services consolidated in new facilities within the Airport Central Precinct, as shown in Figure 1-9.

Perth Airport fully committed to the first stage of consolidation with a privately funded investment program worth more than $1 billion, including 92 projects each valued over $5 million.

Included in this program of works was significant airfield infrastructure projects. $250 million was invested in new taxiways, taxiway widening, enhanced lighting and approach equipment as well as runway overlays.

Key components of the investment program are described further in Figure 1-10. The final projects in this first stage of development were completed in 2016.

Perth Airport has also undertaken significant investment in commercial and industrial property development. The estate currently hosts more than 120 tenants. It is recognised as a prime location for transport, logistics and resource sector companies because it gives efficient access to multiple transport modes, coupled with high safety and security standards. The combination of extensive aviation-related and commercial developments has underpinned the transformation of Perth Airport from a pure aviation-support facility into an integrated transportation and logistics hub.

The co-location of Perth Airport operations, with transport dependent businesses on the airport estate and in the neighbouring Kewdale precinct, together with the rail freight hub and the supporting major road network, reflects very sensible long-term urban planning.

Perth Airport has invested significantly in commercial developments that provide employment opportunities and growth in the economic prosperity of the eastern metropolitan region of Perth and the State generally.

These include:

- office developments such as Alpha, Bravo, Echo 1 and Echo 2 (tenanted by Rio Tinto's remote mining operations centre),
- various warehousing and logistics facilities,
- the $140 million Direct Factory Outlet (DFO) major destination retail development undertaken through a joint venture with Vicinity Centres (ASX:VCX) which opened in October 2018, and
- the $55 million Costco large format retail warehouse which opened in March 2020

Project

New Domestic Terminal (T2)

T2, which opened in March 2013 next to T1, marked the first stage of consolidation when Alliance Airlines, Virgin Australia Regional Airlines (formerly Skywest) and Tigerair relocated from Terminal 3 (T3) into T2.

T2 has a gross floor area of approximately 21,500 square metres and aircraft parking for up to 36 aircraft.

VALUE
$121 M

Project

Terminal 1 (T1) International Arrivals Expansion

Transformation of the international arrivals experience, including substantially expanded and enhanced customs, baggage reclaim, biosecurity and duty free retail areas. The first stage opened in November 2013, with full completion in late 2014.

VALUE
$80 M

Project

T1 International Departures Upgrade

Outbound immigration, passenger security screening and retail areas expanded and renewed, with the project completed in 2015.

VALUE
$41 M

Project

T1 Domestic Pier and International Departures Expansion

The T1 Domestic Pier and International Departures Expansion project were completed in 2016. These projects allowed Virgin Australia to consolidate its services into Airport Central.

VALUE

$338 M

Project

Forecourt Upgrade

Landscaping of Terminal 1 Forecourt with native Western Australian species and materials to provide visitors with a glimpse of the unique landscape of the State.

VALUE

$22 M

Project

Airfield Projects

Upgrades to airfield infrastructure including new taxiways, to deliver increased efficiencies for aircraft moving around the airport, and lighting upgrades, allowing aircraft to land in low visibility when they would otherwise need to divert to another airport.

VALUE

$250 M

Figure 1-10 Capital investment program of major projects at Perth Airport
Source: Perth Airport

In addition to the Perth Airport funded projects, both the State and Commonwealth Governments have contributed significantly to fund infrastructure supporting the transformation of Perth Airport in recent years, including improving road access to the airport to support the consolidation of all commercial air services.

The most significant project completed was the $1 billion Gateway WA project (Western Australia's largest-ever road project) that greatly improved access to Perth Airport as well as improving the safety and efficiency of one of the State's most important freight transport corridors. The Commonwealth Government provided $676 million and the State contributed $310 million to fund the development, with Perth Airport supporting the project through the contribution of 30 hectares of land, financial contribution, and the construction of roadworks valued at $35 million within the estate.

The Gateway WA Project was completed in April 2016 and included:

- upgrading Tonkin Highway between Great Eastern Highway and Roe Highway to six lanes,
- a major freeway-to-freeway interchange at Tonkin Highway and Leach Highway, including a new primary access road to the Airport Central Precinct,
- a new interchange at Boud Avenue leading to T3 and T4 (known as the Dunreath Interchange),
- a new interchange at the Tonkin Highway, Horrie Miller Drive and Kewdale Road intersection,
- a new interchange at the Leach Highway and Abernethy Road intersection,
- upgrading Leach Highway between Orrong Road and Tonkin Highway to an expressway standard, and associated upgrades to local roads and intersections in the Kewdale area,
- upgrading the existing Tonkin Highway and Roe Highway interchange to a partial freeway-to-freeway interchange, and
- an extension to the principal shared cycling and pedestrian path network along Tonkin Highway and Leach Highway.

Gateway WA followed the jointly-funded Commonwealth and State Government $225 million upgrade and widening of the Great Eastern Highway, the main route between the Perth CBD and the airport, which was completed in 2013. These works included the widening of the road to six lanes (three in each direction), intersection upgrades and the provision of bus priority lanes at the major intersections.

1.5.6 Current Developments

In 2016, Perth Airport began a $36 million investment to upgrade its airfield infrastructure to a Category III (CAT III) aerodrome to allow landings in reduced runway visibility during adverse weather, such as fog. Although fog and periods of severe low visibility at Perth Airport occur infrequently each year, the upgrade improves Perth Airport's operational effectiveness and provides greater certainty to passengers and businesses by reducing the likelihood of air services requiring delay or cancellation, or worst case, diversion to alternative airports. The upgrade to Category III infrastructure, completed in 2018, involved:

- installation of transmissometers (completed in August 2016), which are highly accurate, laser-based instruments that measure and report on visibility at strategic points along the runway to air traffic control and pilots,
- installation of improved airfield ground lighting, and
- installation and commissioning of a Category III Instrument Landing System (ILS) by Airservices.

On 24 March 2018, Qantas commenced direct Perth-London flights using new Boeing 787-9 Dreamliner aircraft with the potential for additional ultra-long routes in the future. To facilitate these services and seamless passenger transfers from Qantas domestic flights, the existing Terminal 3 was upgraded to accommodate international operations until terminal consolidation occurs.

The way passengers arrive at Perth Airport is changing via the construction of the $1.86 billion Forrestfield-Airport Link. This project is an 8.5-kilometre underground extension of the Perth rail network from Bayswater to Forrestfield, of which 3.8 kilometres is located within the Perth Airport estate. The project is jointly funded by the Commonwealth ($490 million) and State Government ($1.37 billion) and is being delivered by the State Government. The rail link will form an integral component of Perth's long-term public transport network to meet existing and future public transport demand. The rail service will provide improved connectivity between Perth's eastern suburbs, Perth Airport and the Perth CBD, as well as providing a viable alternative to car travel between these destinations.

As part of the Forrestfield-Airport Link project, a rail station (Airport Central Station) is being constructed next to the Air Traffic Control tower and will give passengers access to T1 and T2 via an elevated walkway. The Forrestfield-Airport Link also provides two additional train stations outside the estate at Redcliffe (Redcliffe Station) and High Wycombe (Forrestfield Station). Perth Airport understands that these stations will provide centres for transit oriented development which will see a mix of commercial, office, retail and residential (off the estate) development. Works on the Forrestfield-Airport Link project commenced in October 2016 and are expected to be completed by the end of 2021.

1.5.7 Future Consolidation

Perth Airport is currently preparing for a $2.5 billion investment program over the next decade to support consolidation. Key projects include:

- expansion of international terminal facilities,
- consolidation of the Qantas Group to Airport Central, and
- construction of the new runway.

Perth Airport is committed to the consolidation of all commercial air services into Airport Central. The next stage of consolidation is the expansion of international terminal facilities. This stage will include terminal and airfield infrastructure, providing:

- additional departure and premium lounge capacity through a combination of expansion over the existing T1 building and new build into the midfield,
- construction of additional MARS (Multiple Aircraft Ramp System) configured contact bays,
- reconfiguration of existing Bay 55 to connect to the new build area,
- additional bag make-up capacity,
- landside Arrivals hall expansion,
- new international apron,
- construction of a parallel taxiway system to integrate with the existing airfield, new terminals and new runway,
- service diversions to enable proposed and future airfield expansion, and
- additional baggage reclaims facilities.

These works are expected to be completed in the mid 2020s, subject to commercial arrangements with airlines and demand. A separate MDP will be completed for this project.

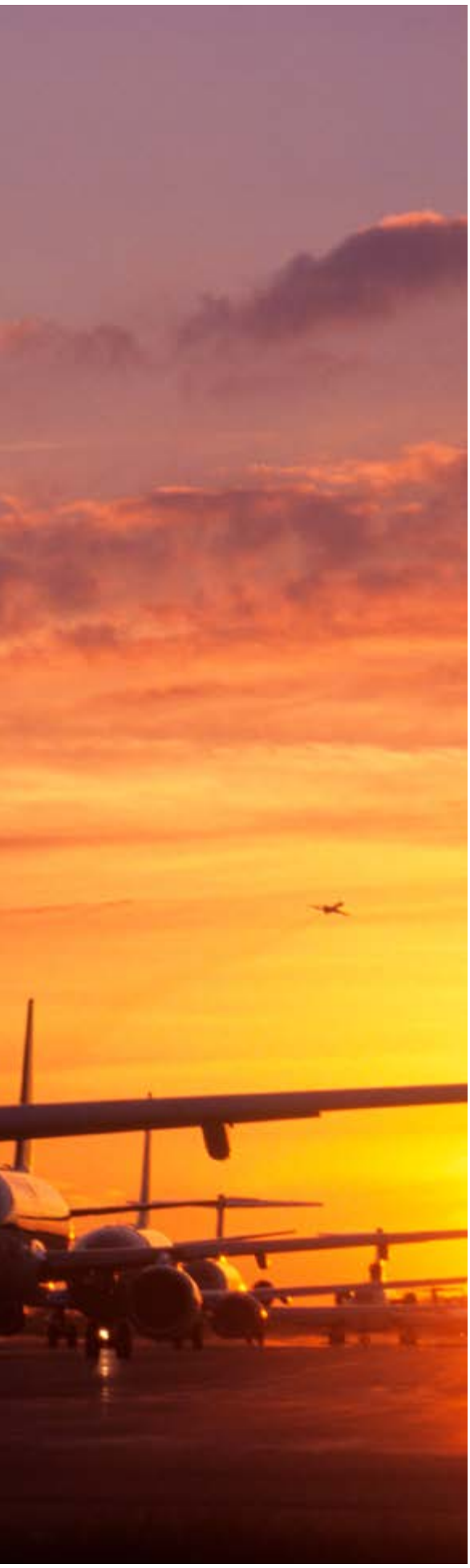
The final stage of consolidation is the relocation of Qantas from its existing location in T3 and T4, on the west of the airport, to expanded terminal facilities that are proposed to be constructed in Airport Central to the east of T1 (referred to as Future Domestic Expansion). Perth Airport is working with Qantas towards a consolidation by 31 December 2025, subject to commercial arrangements.

Figure 1-11 shows the location of the above projects in relation to current buildings at Perth Airport.

The new runway forms a key part of supporting the consolidation of operations into Airport Central.

Consistent with the first Master Plan released in 1985, and based on the extensive studies and reviews in the 1970's, consolidation was identified as a fundamental principle in achieving an effective primary airport to meet the needs of the Perth metropolitan region. The new runway, as part of a wide separated parallel runway system, is critical to enabling the full and intended operation of all RPT facilities from a centralised precinct. The additional infrastructure will support the new terminals by providing access for arrivals and departures to be equally balanced on either side of the terminal zones. The consolidation of passenger services into Airport Central will see appropriate long-term use of the Commonwealth and State Government's significant and prudent investments in the Gateway WA road project and the Forrestfield-Airport Rail Link. This will avoid ongoing and increasing airport related traffic demand on the Great Eastern Highway and ultimately a better experience for people using Perth Airport.

Figure 1-11 Airport Central concept plan
Source: Perth Airport



02
Need for Additional Runway Capacity

This section provides detail on the need for a new runway at Perth Airport.

Detail is also provided on the following areas:

- How many flights currently operate at Perth Airport and how many are expected to operate in the future?
- How is runway capacity and demand for more flights at Perth Airport forecast?
- Why is the new runway needed?
- When is the new runway needed?

2.1 Passenger and Aircraft Traffic at Perth Airport

Over the past decade, Perth aviation markets have experienced unprecedented growth. This growth has been underpinned by:

- a strong Western Australian economy, substantially contributed to by investment in the resource sector,
- strong commodity prices and a strong Australian dollar,
- increased presence of low-cost carriers both domestically and internationally,
- growing household incomes in Australia and overseas,
- declining real cost of airfares, and
- stimulus of domestic capacity increase, with wide-bodied trans-Australia aircraft seats increasing by 61.6 per cent from 2007 to 2017, including a surge of 52.4 per cent between 2011 and 2013.

The Perth aviation market is made up of international, interstate and intrastate sectors, with each sector being influenced by different factors. When combined, interstate and intrastate are referred to as domestic passengers.

Total passengers travelling through Perth Airport increased from 6.7 million passengers in 2005 to 14.9 million passengers in 2014. Since the peak in 2014, there has been a slowing in passenger numbers driven by a reduction in intrastate and interstate traffic with 2018 having 14.3 million total passengers.

Figure 2-1 shows the passenger movements at Perth Airport for 2005 to 2018.

2.1.1 International Passenger Activity

International passengers have typically represented a third of total passengers through Perth Airport.

In 2008, there were 2.5 million international passengers, increasing to 4.4 million in 2018. International passengers at Perth Airport have grown at an average annual rate of 5.8 per cent over the past ten years.

The main international destinations for residents departing Perth during FY2018 are shown in Figure 2-2. Asian destinations rank highly, with Indonesia (largely Bali) accounting for nearly 30 per cent of residents departing Perth. Of the longer-haul destinations, Europe and the UK account for 18.5 per cent. There has been little change in the international destination mix since 2013, with Indonesia still accounting for approximately 29 per cent. Europe and the UK have increased from 15.3 per cent and Thailand, previously the second most popular destination, dropping from 9.3 per cent.

The main markets for international visitors arriving at Perth Airport during 2018 are shown in Figure 2-3. The UK accounts for 15.4 per cent of visitor arrivals and Europe ex UK a further 12.9 per cent. Malaysia and Singapore account for 14.4 per cent and 13.6 per cent respectively. These top four markets combined account for 56.3 per cent of visitor arrivals at Perth. These same destinations occupied the top five countries in 2013, though they accounted for almost 63 per cent of visitor arrivals at that time. The change is due to a strengthening in the visitor arrivals from other countries rather than a decrease in passenger numbers from the top five.

Figure 2-4 shows the change in the composition of international passengers at Perth Airport for the period from July 2000 to February 2018.

The visitor share declined from 56 per cent in 2003 to 34 per cent in 2012 and 2014, but has since increased to 38 per cent.

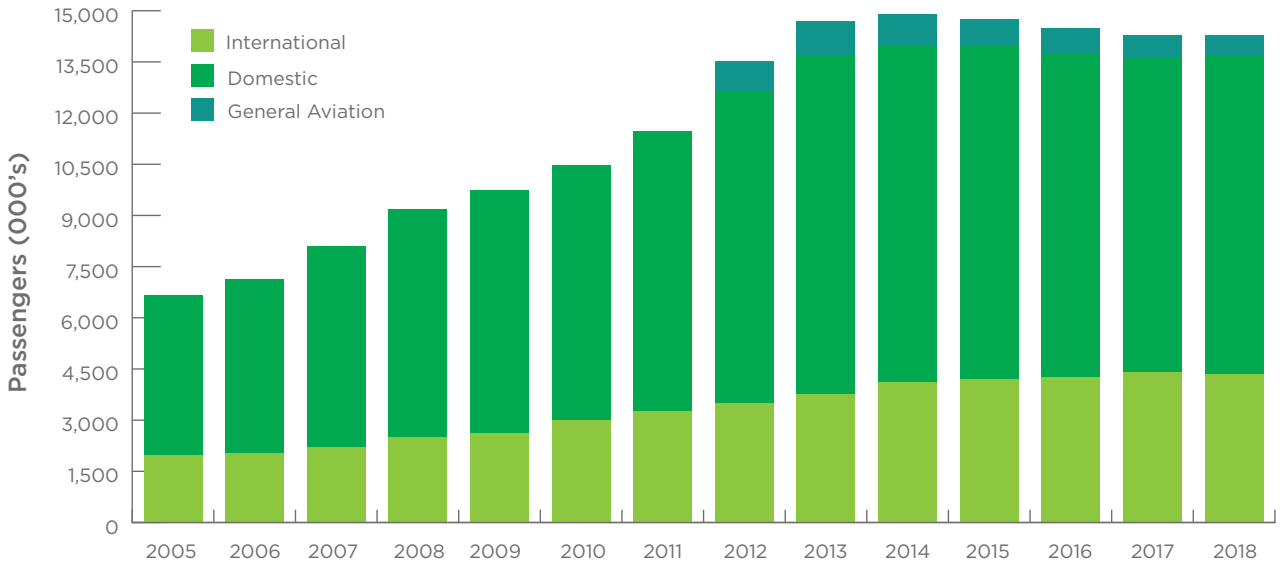


Figure 2-1 Passenger movements at Perth Airport 2005 to 2018
Source: Perth Airport

Note: General Aviation passenger number were not recorded until 2012 and are not shown for the years 2005 to 2011. Due to the addition of General Aviation passengers, the actual passenger number for FY13 is greater than reported in Master Plan 2014.

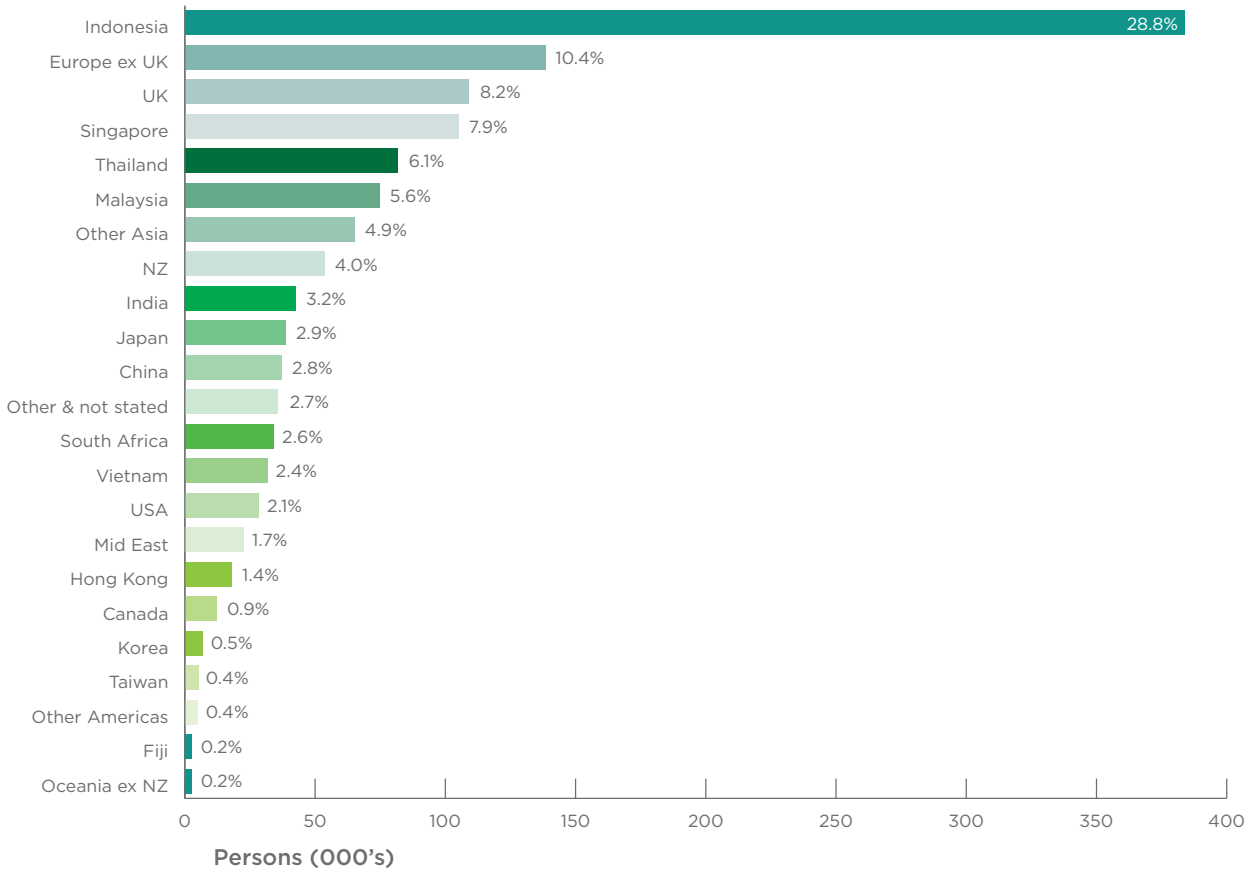


Figure 2-2 Main destination for residents departing Perth during FY18
Source: Tourism Futures International (based on Australian Bureau of Statistics data)

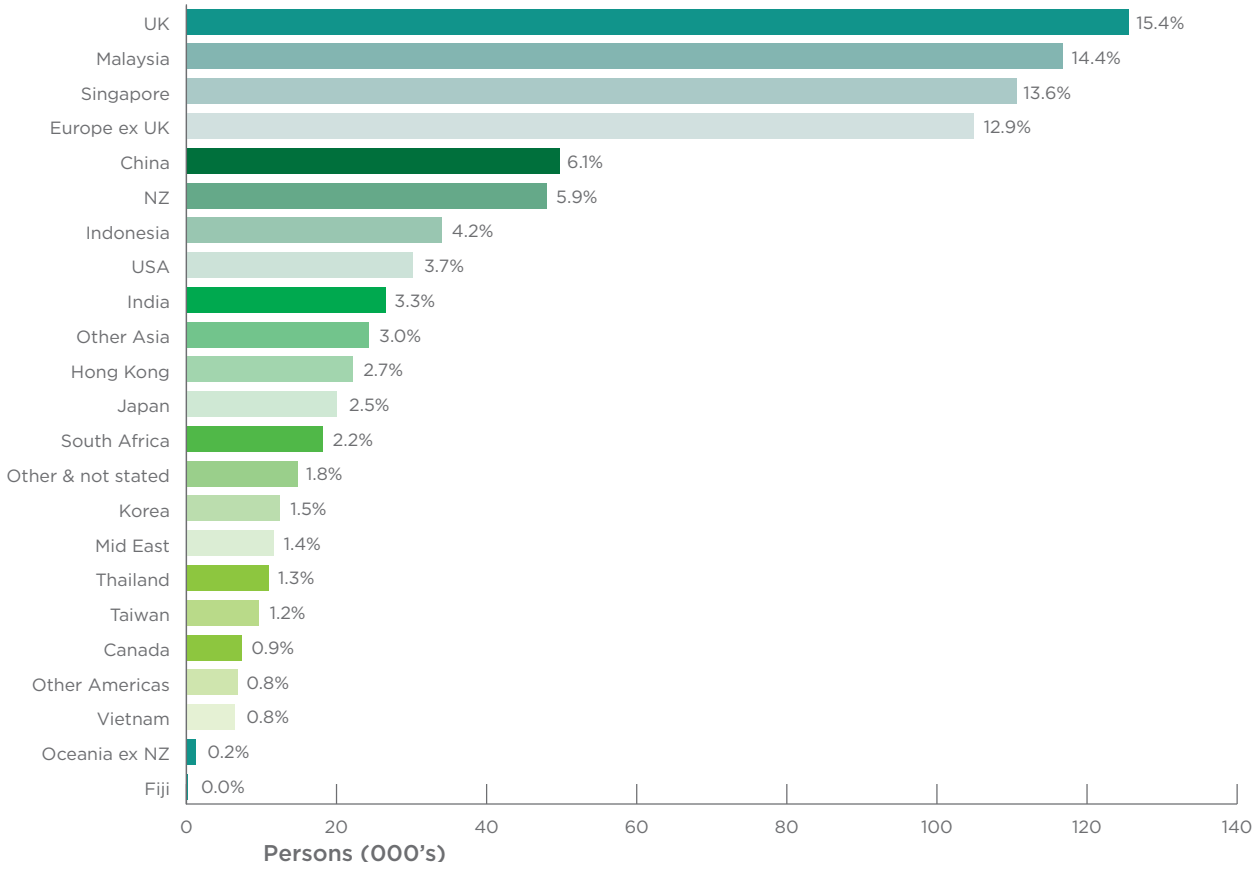
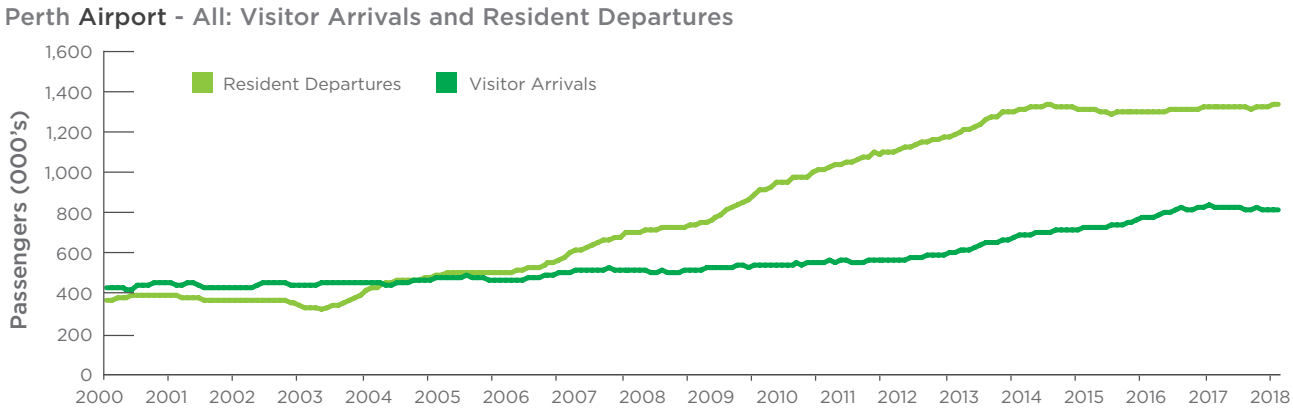


Figure 2-3 Main markets for visitors arriving at Perth Airport during FY18
Source: Tourism Futures International (based on Australian Bureau of Statistics data)

Figure 2-4 shows the change in the composition of international passengers at Perth Airport for the period July 2000 to July 2018.



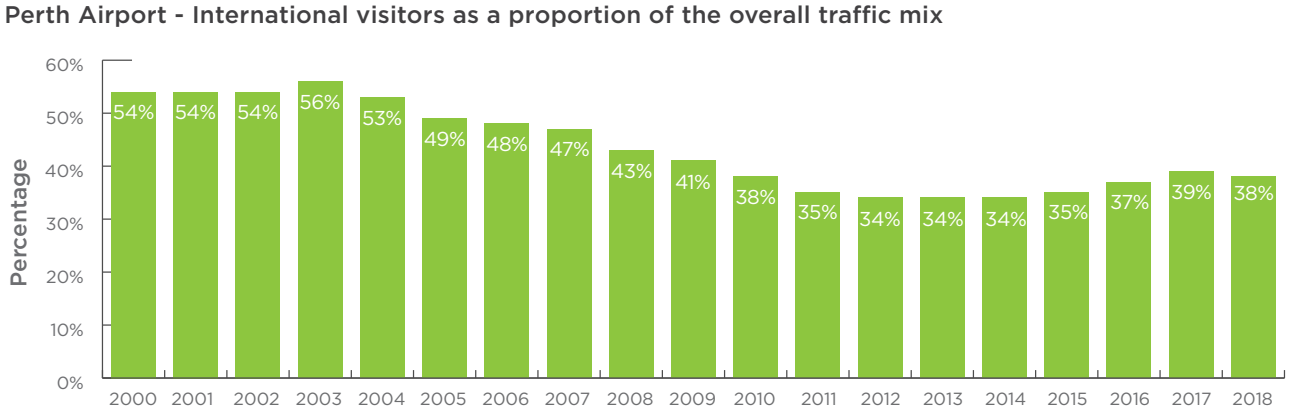
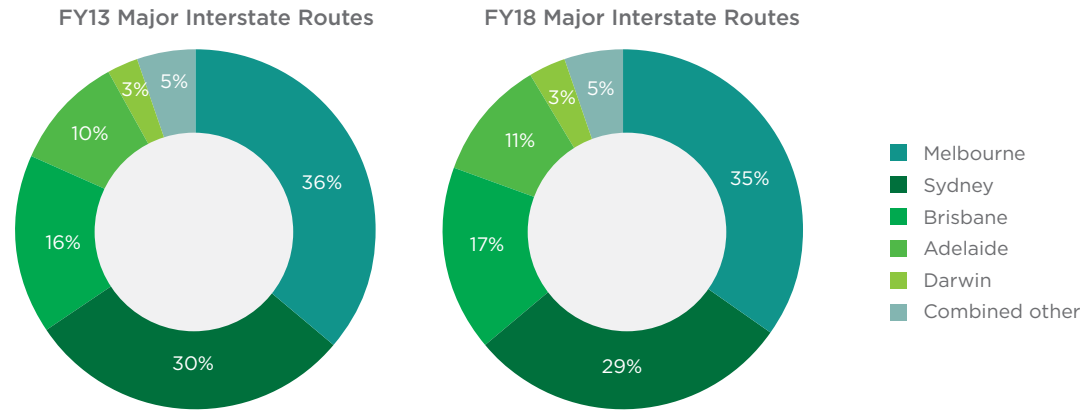


Figure 2-4 Growth in international resident departures and visitor arrivals at Perth Airport from July 2000 to June 2018
Source: Tourism Futures International (based on Australian Bureau of Statistics data)



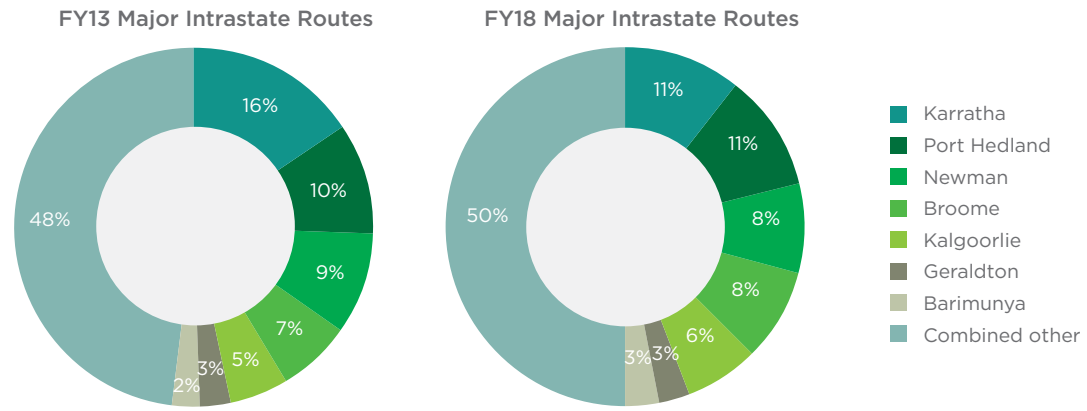


Figure 2-5 Comparison of major interstate and intrastate routes at Perth Airport with annual passenger levels for 2013 and 2018
Source: Tourism Futures International

2.1.2 Interstate and Intrastate Passenger Activity

During a period of rapid growth in total airport passenger traffic in the past ten years, domestic passenger numbers increased from 6.7 million in 2008 to 9.9 million in 2018, representing an average annual increase of just under 4.3 per cent.

Domestic passenger numbers grew strongly over the period from 2002 to 2013. This in part reflects the recovery from the Ansett collapse, the growth of low-cost carriers such as Virgin Blue and Jetstar, the strong economy and growth in resource industry passenger traffic The downturn into 2014 reflects the end of the resource investment boom and the easing of commodity prices.

Table 2-1 shows the top 20 Australian airports and their domestic passenger numbers in 2018, including the compound annual growth rates (CAGRs) for the ten-year period 2008 to 2018 and the five-year period 2013 to 2018. When just interstate and intrastate passengers are considered, based on Bureau of Infrastructure, Transport and Regional Economics (BITRE) data, Perth ranks as Australia's fourth largest airport.

As shown by Table 2-1, Perth Airport accounts for 7.2 per cent of domestic passenger numbers that travel through the top 20 Australian airports. When compared to all Australian airports, Perth Airport accounts for 7.1 per cent of total passengers. Perth's passenger growth amounted to a CAGR of 2.2 per cent for the ten years to 2018. Growth during the first five years to 2011 was well above the national average at 8.8 per cent, but fell in the latter five years to -2.4 per cent.

The three airports remaining in the top 20 which have a significant mining-related component - Perth, Mackay (central Queensland) and Karratha (regional Western Australia) - have previously experienced drops in traffic.

Intrastate traffic is influenced by major resource projects, with project sites serviced by either Regular Passenger Transport (RPT) airline services or general aviation[1] charters. Intrastate traffic saw a peak in 2013 of just over five million passengers. The routes of Karratha, Port Hedland, Newman, Broome, Kalgoorlie, Geraldton and Barimunya accounted for 52 per cent of all intrastate passengers. Since this time many mines have completed construction and moved into operation. This, combined with increasing automation of mining equipment, has seen a decrease in the number of people required on mine sites. By 2018, numbers had fallen to 4 million, a reduction of 19 per cent from the peak level.

Figure 2-5 shows the main interstate and intrastate routes at Perth Airport with annual passenger levels for 2013 (most recent peak for domestic) and 2018. Melbourne was the major route in 2018 accounting for 35 per cent of all interstate passengers. Sydney, the second largest route, accounted for 29 per cent of interstate passengers.

				CAGR	
Airport	RANK	FY18 Pax (000s)	Chg over FY17	FY08 to FY18	FY13 to FY18
Sydney	1	27,604	2.0%	2.2%	2.0%
Melbourne	2	25,535	2.4%	2.8%	2.6%
Brisbane	3	17,335	1.7%	1.9%	0.8%
Perth	**4**	**8,064**	**0.5%**	**2.2%**	**-2.4%**
Adelaide	5	7,275	3.2%	1.7%	2.4%
Gold Coast	6	5,471	2.2%	3.0%	2.1%
Cairns	7	4,297	1.1%	3.2%	3.4%
Canberra	8	3,086	4.6%	0.8%	0.5%
Hobart	9	2,596	6.4%	4.0%	5.1%
Darwin	10	1,779	-1.6%	2.5%	2.3%
Townsville	11	1,587	6.6%	1.5%	0.2%
Launceston	12	1,363	2.1%	2.1%	2.2%
Newcastle	13	1,265	1.2%	1.7%	1.4%
Sunshine Coast	14	1,175	12.2%	2.5%	7.9%
Mackay	15	783	4.3%	-0.7%	-6.8%
Alice Springs	16	615	-0.3%	-0.2%	0.6%
Rockhampton	17	564	-0.4%	-2.0%	-4.5%
Ballina	18	527	4.8%	5.2%	8.0%
Proserpine	19	470	33.1%	5.9%	14.9%
Karratha	20	433	-6.7%	1.1%	-11.9%
Top 20		**111,823**	**2.3%**	**2.3%**	**1.6%**
Total Australia		**120,608**	**2.4%**	**2.2%**	**1.4%**

Table 2-1 Top 20 Australian airports for domestic and regional passengers
Source: Tourism Futures International based on BITRE

Note: BITRE passenger data excludes general aviation and charter passengers

2.1.3 Aircraft Movements

The recent trends in aircraft movements are also important. An aircraft movement is defined as either an aircraft arriving to, or departing from, the airport.

In 2005, Perth Airport experienced 86,664 aircraft movements. This grew to a peak of 151,335 annual movements in 2013. Since this time, aircraft movements have decreased to 129,924 in 2017. Aircraft movements from 2005 to 2018 are shown in Figure 2-6.

Historical trends in aircraft movements can be summarised as follows:

- Western Australia experienced a resource construction boom from 2007 until its peak in 2013, which contributed to significant aircraft movement and passenger growth at Perth Airport. During this period, Perth Airport was the fastest growing airport in Australia with an average annual aircraft movement growth rate of 7.5 per cent, nearly twice as much as the next fastest growing airport (Brisbane). At the peak, airlines and passengers were experiencing significant delays which had a flow on impact to the many industries and wider Western Australian economy. Figure 2-7 shows annual average growth rates for RPT movements at Australian airports,
- Domestic and general aviation movements have declined at Perth Airport since 2013, mostly associated with a slowing of the economy and the Western Australian resource sector. However, this is a normalising of demand when considered in the context of the significant growth experienced between 2003 and 2015 when the Western Australian resource sector was in a strong construction phase, and
- International aircraft movements have shown relatively strong and stable growth with a CAGR of 8.2 per cent for the period 2008 to 2016. International aircraft movements declined in 2015 and 2016 as a result of airlines using larger aircraft. However, aircraft movements began to grow again from 2017 and 2018.

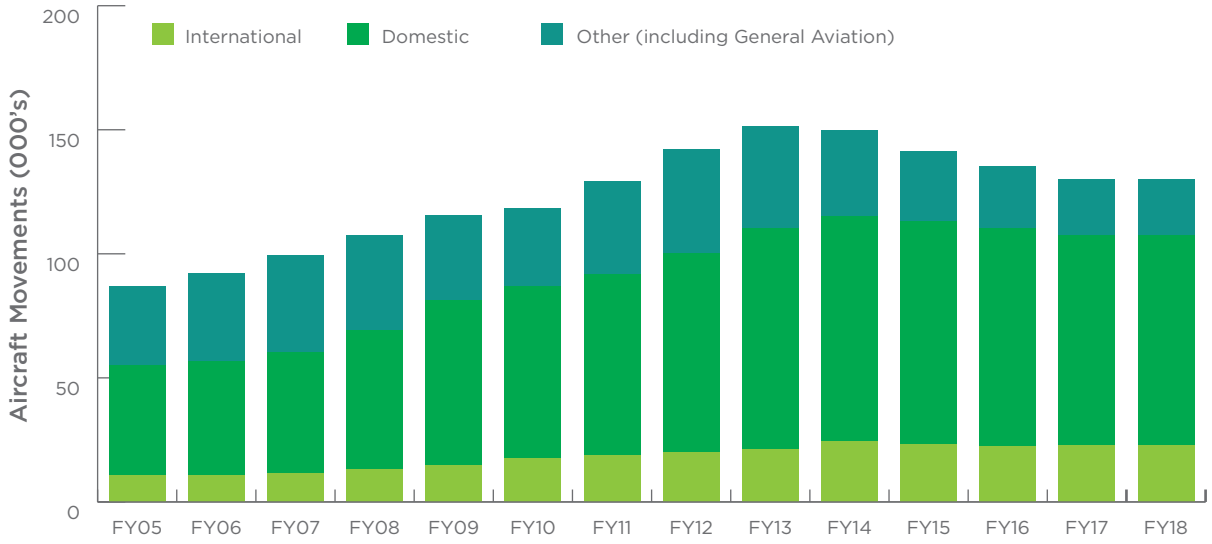


Figure 2-6 Aircraft movements at Perth Airport 2005 to 2018
Source: Perth Airport

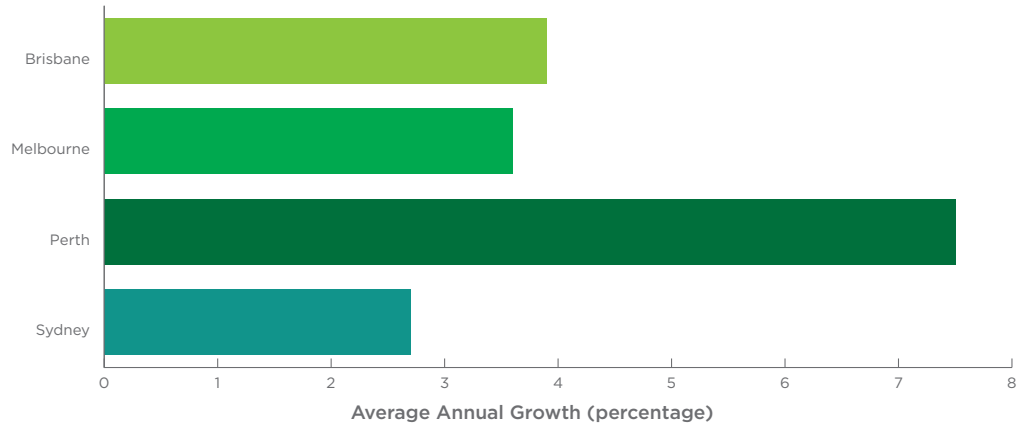


Figure 2-7 Domestic aircraft movement compound annual growth rate at Australian airports between 2007 to 2013
Source: Bureau of Infrastructure, Transport and Regional Economics (BITRE)

2.2 Activity Forecasts

Passenger and aircraft movements are not based on a single homogenous market and different factors influence the different sectors. Therefore, in preparing forecasts, a segmentation approach is applied to Perth Airport's markets to better understand and assess the significance of different traffic drivers for international, interstate and intrastate segments.

This approach allows for a clearer picture of the relative size and impact of each market segment, resulting in forecasts that are more responsive to events specific to a given market. Many factors influence the growth in air travel, the most significant ones being:

- gross domestic product on a national and regional level,
- disposable incomes of potential travellers (both the level of income and confidence that these levels will be maintained and grow are important),
- the price of air transport and the ground component of travel,
- the competitiveness (quality, product attributes and price) of a destination compared to alternative destinations,
- the supply of airline services, frequency, reliability, quality of service,
- the promotion of tourism by governments, airlines and industry bodies,
- consumer tastes and available time for travel, and
- one-off factors and shocks that impact travel such as the September 11, 2011 terrorist attacks in the USA and those in Bali in 2002 and 2005; the SARS outbreak in Hong Kong in March 2003, the collapse of an airline, such as Ansett in 2001 and large events such as the America's Cup and the Sydney Olympics.

2.2.1 Forecast Methodology

While many factors have an impact on air service demand, only some of these factors can be reliably measured and their impacts included in the forecasting models. Perth Airport forecasts are based on a number of elements, including:

- the segmentation of Perth's international and domestic markets to assess the significance of traffic drivers,
- a review of the air traffic history available for Perth Airport and an assessment of statistical trends, which include:
  - development of seasonal indices and time series forecasts. This is often found to provide a useful shorter-term view of future traffic behaviour,
  - development of a quarterly 'indicators' model that shows the movements in leading indicators relative to traffic, including stock market performance, company profits, average weekly earnings, and business and consumer confidence, and
  - analysis of Perth's air traffic responses to previous economic downturns and other traffic 'shocks',
- analysis of the general aviation and business environment and current airline schedules. This assists with developing assumptions and identifying qualitative factors that might influence traffic outcomes,
- models linking drivers and aircraft traffic:
  - macro models linking economic indicators and aircraft traffic, which are developed at the aggregate airport level,
  - micro models based on extensive statistical analysis and published studies, which are generally based on a market or travel purpose (for example, European holiday) or routes, and
  - final model outcomes based on an iterative process between the modelling approaches listed above, which are constantly being tested and updated, and
- a review of official tourism forecasts in Australia and elsewhere.

There are several approaches to the development of intrastate forecasts:

- linking intrastate activity to Western Australian Gross State Product (GSP) or associated economic measures such as Real Final Demand,
- reviews of major projects in the Western Australian resource sector against specific intrastate route performance. The Western Australian Resource Sector Outlook, published by the Western Australian Chamber of Minerals and Energy, has been used in previous Tourism Futures International forecasts.
- an approach which breaks traffic into three segments and establishes drivers for each:
  - Western Australian regional traffic for business, community and leisure - unrelated to the resource sector. Western Australian GSP is used as the main driver for this segment,
  - resource sector construction traffic - private construction investment activity is used as the main driver for mining-related construction activity, and
  - resource sector operational traffic - export growth is used as the main driver for this segment.

Perth Airport considers scenarios for high, central and low passenger and aircraft movement growth.

Perth Airport publishes detailed forecasts every five years as part of the Airport Master Planning process. Forecasts are also continually reviewed to assist with planning. The information that was used in the NRP technical assessments, and provided in this MDP, is based on forecasts prepared in May 2016 by TFI. TFI is a research-oriented company specialising in aviation, travel and tourism forecasting.

For the purposes of the MDP, Perth Airport has prepared forecasts that extend to 2045.

2.2.2 Forecast Passenger Demand

Key drivers for Perth Airport passenger traffic include:

- incomes growth (usually measured in terms of economic growth),

- economies of visitor markets which drive international inbound growth with the Australian and Western Australian economies, which also drive international travel by Australian residents,
- for interstate travel, the Western Australian economic performance drives outbound travel, with inbound visitation from other States driven by the performance of the other State economies,
- for intrastate traffic, Western Australian resource sector activity has a significant impact,
- Australian and overseas population growth and demographic factors, such as age and workforce participation, are important drivers of the propensity to travel. With the slowing of the Western Australian economy and an increase in the unemployment rate in Western Australian to over 6 per cent, net interstate migration for Western Australia can be expected to fall (in 2016 amounted to a reduction of 7,700 people),
- costs of travel overall, and costs relative to alternative travel options and destinations, impact on international and domestic travel. Thus, oil prices, airfares, accommodation costs and exchange rates have an impact, and
- supply side factors, particularly the supply of airline seat capacity, have a major role, particularly in the short to medium term.

Key issues currently in the business environment include:

- uncertainty surrounding international economic growth. Concerns remain given vulnerabilities in a number of emerging market economies, European debt issues, impact on the United Kingdom of Brexit, the re-emergence of the United States economy out of the Great Recession (2008 to 2015) and ongoing structural change in China,
- the Australian economy continues to adjust to the end of the mining investment boom and fall in commodity prices,
- the fall in the Australian dollar over recent years has encouraged international visitor growth, and should stimulate Australian domestic travel,
- strong growth in international travel to Australia from China is continuing. An increase in Chinese airlines providing capacity to an increasing number of international airports across Australia is a positive development that is likely to continue for some years,
- a major negative for domestic traffic activity across Australia is the continued delay in delivery of aircraft capacity by Qantas and Virgin. Both airlines are likely to be looking for signs of improvement in business traffic and yields before committing to substantial capacity increases,
- for Western Australia, the end of construction for several gas projects will see construction investment activity fall to its lowest level since 2006. New project investment and exploration activity is unlikely to increase substantially until there is a sustained improvement in iron ore and other commodity prices, and
- the impact of increasing unemployment, low consumer confidence and decreasing residential property prices in Perth is likely to reduce private consumption.

Key drivers for overseas visitors in the macro model include Organisation for Economic Cooperation and Development (OECD) GDP and exchange rates. For Australian resident travel, Western Australian GSP and exchange rates are key. Travel costs and airline capacity are most relevant when above or below long-term averages.

Key drivers for interstate travel include Western Australian GSP, Australian GDP, exchange rates, intrastate travel (heavily influenced by the mining sector) and airline capacity. Again, travel costs and airline capacity are most relevant when above or below long-term averages. While airline capacity growth is slowing, it was expected to recover strongly from 2018 when new aircraft types were to be delivered to both Qantas and Virgin. These deliveries, however, have now been delayed.

Key drivers for intrastate travel include Western Australian GSP and the resource sector. It is resource sector and particularly the resource sector investment and construction activity that contributed to the

Financial Year	International ('000,000)	Domestic ('000,000)	All ('000,000)
2014 (actual)	4.12	10.79	14.91
2015 (actual)	4.19	10.56	14.76
2016 (actual)	4.25	10.23	14.49
2017 (actual)	4.40	9.88	14.28
2018 (actual)	4.36	9.92	14.29
2023	5.61	12.51	18.12
2024	5.87	13.13	19.00
2025	6.15	13.76	19.91
2026	6.41	14.25	20.66
2027	6.65	14.76	21.41
2028	6.89	15.27	22.17
2045	12.01	23.34	35.35

Table 2-2 Perth Airport passenger forecasts central growth
Source: Perth Airport, Tourism Futures International

strong growth over the past decade. The response of the resource sector to commodity prices and the need to respond to market conditions also plays an important role in dictating demand from the sector. The largest impact of the resource investment slowdown was expected to be first felt in 2017 and extend into 2018 with the end of construction for two of the large LNG projects, Gorgon and Wheatstone. Looking forward, there is still a great amount of untapped potential in the resource sector across a range of commodities such as LNG, lithium, iron ore and gold which indicates that the next wave of investment could come relatively swiftly.

Considering all the factors above, and based on a central scenario with unconstrained growth, annual international passengers at Perth Airport are forecast to grow from 4.25 million in 2016 to 12.01 million in 2045. In the same period, annual domestic passengers are forecast to grow from 10.23 million to 23.34 million in 2045. Total annual passengers are therefore forecast to grow from 14.49 million in 2016 to 35.35 million in 2045 as shown in Table 2-2.

2.2.3 Forecast Aircraft Movements

Passenger forecasts are an important input to the aircraft movement forecasts. For RPT passenger services, airlines accommodate passenger increases through:

- an increase in passenger load per aircraft,
- changes to aircraft types (larger aircraft or increases in seats on existing aircraft types), and
- increases in the frequency of flights.

When developing aircraft movement forecasts the following are considered:

- the history of passenger and aircraft movements - examining the trade-off when passenger numbers increase, between growth in passenger seat factors, increased aircraft size and increased flight frequency,
- aircraft orders by Australia's domestic airlines and by overseas airlines, with anticipated future use of new aircraft types such as the Airbus A320/Airbus A321neo and Boeing 737MAX aircraft (narrow body aircraft mainly for domestic and shorter-haul international use) and the Boeing 787/Airbus A350 aircraft (mainly for international use) along with larger aircraft types such as the Boeing 777 and Airbus A380, and
- the trend for low cost carriers to have higher seat densities (numbers of seats per flight) than the full-service airlines for the same aircraft type.

As a result of these considerations, the forecasts have assumed a growth in overall average passengers per movement for international and domestic services which results in aircraft movements growing at a slower rate than passenger numbers.

General aviation aircraft movement forecasts are based on trend analysis in the industry sectors within which these operators contract. Freight and passenger aircraft movement forecasts are combined to produce the total aircraft movements forecast.

Based on a central growth scenario, annual international aircraft movements at Perth Airport are forecast to grow from 22,486 in 2016 to 42,447 in 2045. In the same period, annual domestic aircraft movements (excluding general aviation aircraft) are forecast to grow from 89,485 in 2016 to 157,669 in 2045. Total annual aircraft movements are forecast to grow from 135,220 in 2016 to 241,216 movements in 2045 when the 41,100 general aviation and freight movements are included. This is shown in Table 2-3.

	Actual ('000 movements)							Forecast ('000 movements)		
Financial Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2015**	**2016**	**2025**	**2030**	**2045**
International	19.8	21.2	24.4	23.0	22.3	22.6	22.8	27.7	30.9	42.4
Domestic Total	80.6	89.2	90.9	90.2	87.9	84.8	84.9	110.1	123.2	157.7
Freight	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.7	2.1	3.1
General Aviation	40.4	39.5	33.0	26.6	23.8	21.5	21.0	32.9	34.9	38
TOTAL	**142.1**	**151.3**	**149.7**	**141.3**	**135.2**	**130.1**	**129.9**	**172**	**191**	**241**

Table 2-3 Perth Airport aircraft movement forecasts central growth
Source: Perth Airport, Tourism Futures International

2.2.4 Forecast Sensitivities

Passenger and aircraft forecasts are based on many assumptions, the estimation of a number of factors, and how these factors will change in the future.

The actual growth in the passenger and aircraft movements will invariably differ from the forecasts. For this reason, lower and higher growth scenarios have also been developed to provide a sensitivity test on the forecasts.

A comparison of the low, central and high forecasts for passengers and aircraft movements are shown in Figure 2-8 and Figure 2-9.

A variation in the forecast growth rates does not change airport infrastructure plans, but rather the timing. If air traffic grows faster (high case) than the forecasts, infrastructure, such as the new runway, would be required earlier. Conversely, if air traffic grows at a slower rate (low case) than the forecast, the new runway would be required later.

2.2.5 Master Plan 2014 Forecasts

The passenger and aircraft movement forecasts presented in the Master Plan 2014 were developed in line with the methodology outlined in the previous section.

Forecasts underpinning the Master Plan 2014 identified that, based on a central scenario, annual international passengers at Perth Airport were forecast to grow from 3.76 million in 2013 to 8.57 million in 2034. In the same period, annual domestic passengers were forecast to grow from 9.9 million to 19.88 million. Total annual passengers were forecast to grow from 13.66 million in 2013 to 28.45 million in 2034.

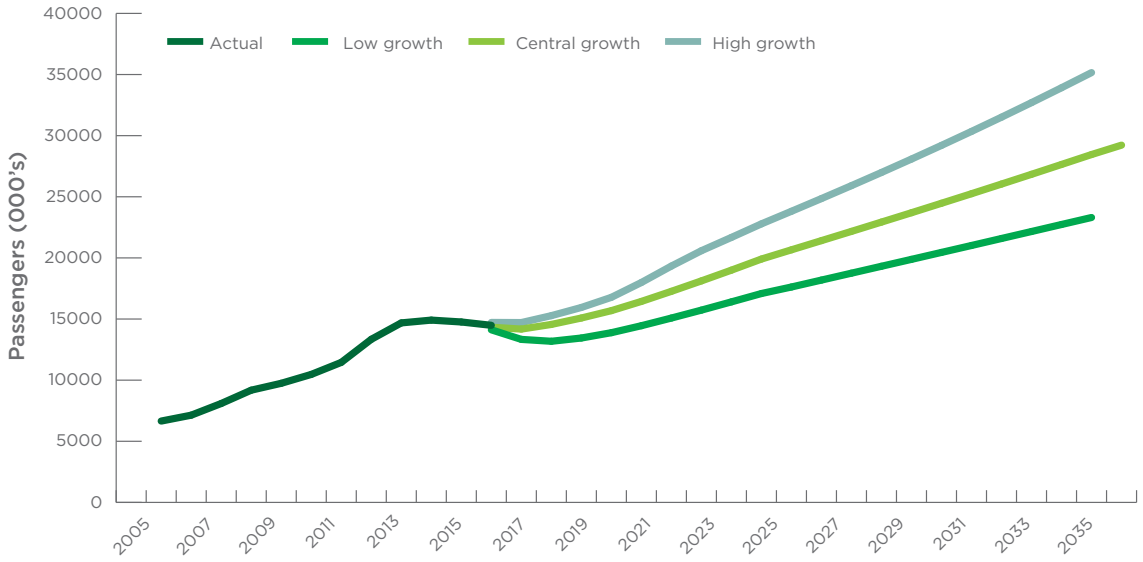


Figure 2-8 Perth Airport passenger forecast high, central and low growth
Source: Tourism Futures International

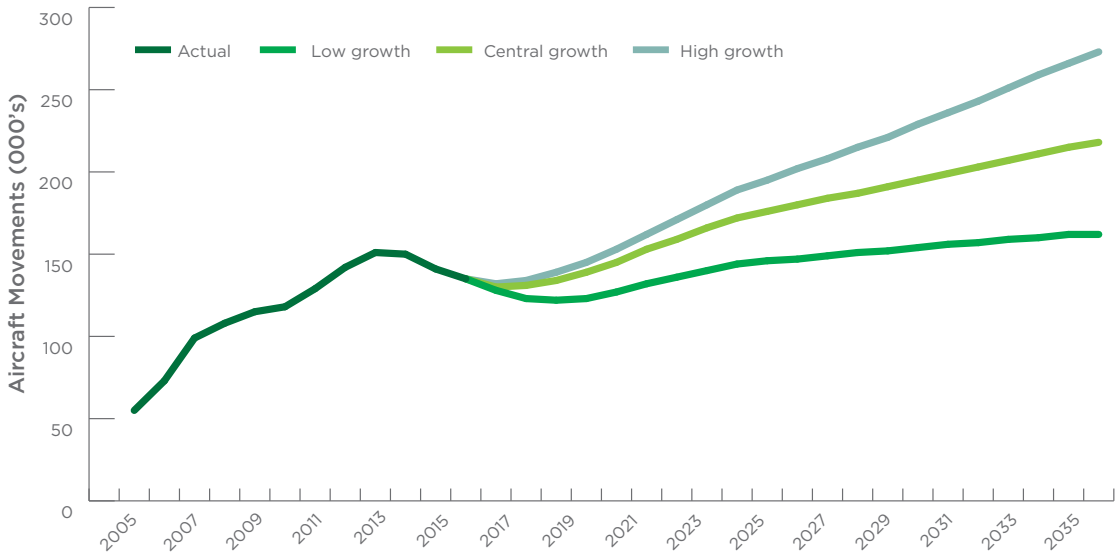


Figure 2-9 Perth Airport aircraft movement forecast high, central and low growth
Source: Tourism Futures International

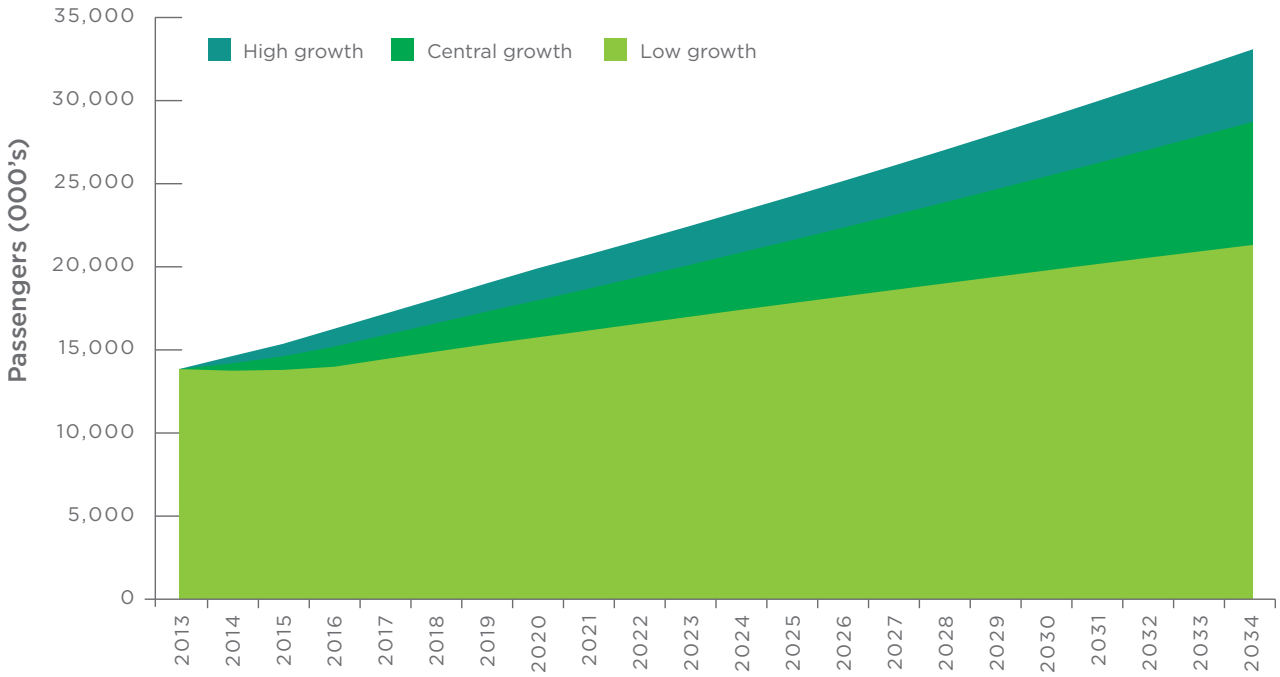


Figure 2-10 Master Plan 2014 passenger forecasts for Perth Airport
Source: Perth Airport Master Plan 2014 - Tourism Futures International (2014)
Note: Annual change to 2018, Five-year compounded annual growth rate for 2022 to 2034.

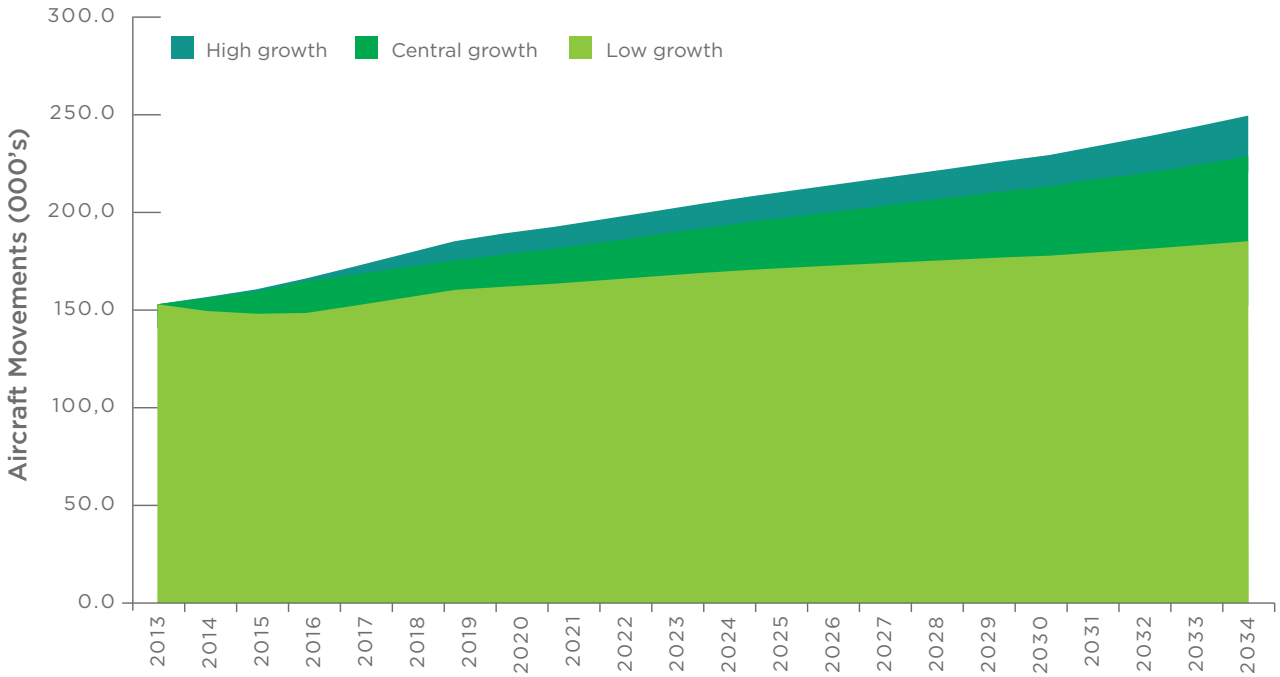


Figure 2-11 Master Plan 2014 total aircraft movement forecasts for Perth Airport
Source: Perth Airport Master Plan 2014 - Tourism Futures International (2014)
Note: Annual change to 2018, Five-year compounded annual growth rate for 2022 to 2034.

Figure 2-10 shows the Master Plan 2014 high, central and low passenger forecast.

Based on a central scenario, international aircraft movements were forecast to grow from 21,200 in 2013 to 33,800 in 2034. In the same period, annual domestic aircraft movements (excluding general aviation aircraft) were forecast to grow from 89,000 in 2013 to 138,000 in 2034. Total annual aircraft movements were forecast to grow from 151,300 in 2013 to 222,700 in 2034.

Figure 2-11 shows the Master Plan 2014 high, central and low aircraft movement forecasts.

Since forecasts for the Master Plan 2014 were prepared (in May 2013) there has been a softening in aviation demand. Additionally, forecasting undertaking for the Master Plan 2014 was conducted over a 20-year horizon covering the planning period 2014 to 2034.

Figure 2-12 and Figure 2-13 provide a comparison of the Master Plan 2014 and NRP forecasts.

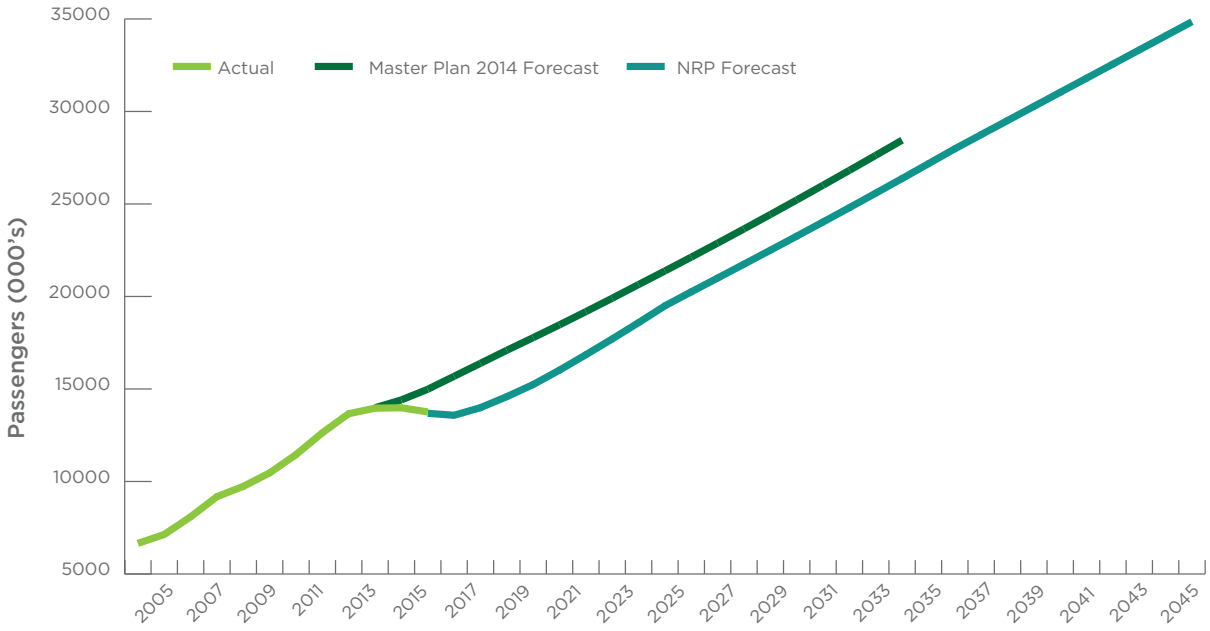


Figure 2-12 Comparison of New Runway Project and Master Plan 2014 passenger forecasts
Source: Perth Airport Master Plan 2014 - Tourism Futures International (2014)

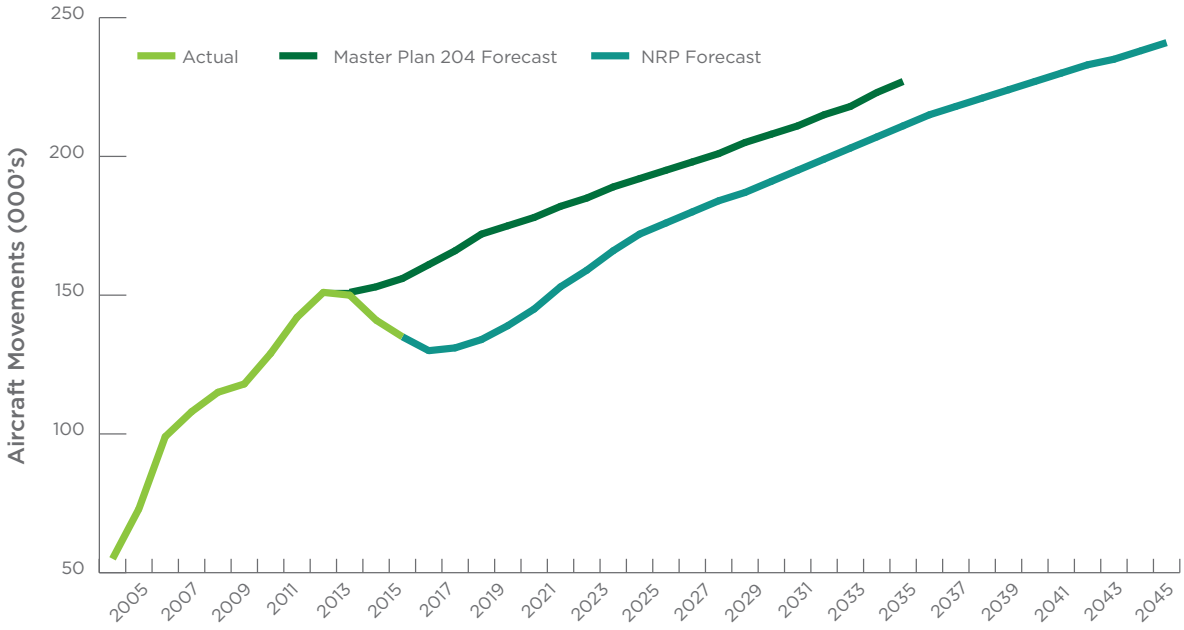


Figure 2-13 Comparison of New Runway Project and Master Plan 2014 aircraft movement forecasts
Source: Perth Airport Master Plan 2014 - Tourism Futures International (2014)

2.3 Aircraft Movement Profile at Perth Airport

Annual passenger forecasts are an important consideration in Perth Airport planning. The capacity of airport infrastructure needs to provide the targeted levels of efficiency and customer service in peak or busy demand periods.

The travel pattern of people, for both pleasure and employment, governs the peak periods for aircraft movements. Therefore, the number of passengers wanting to travel and the time that they want to travel at, influences the number of aircraft arriving and departing Perth Airport.

While schedules for international, interstate and intrastate airlines remain consistent across the year showing limited seasonal change, the daily movements can vary for a variety of operational reasons such as demand fluctuations, weather, and other network disruptions.

2.3.1 Existing Aircraft Movement Profile

In 2013, the airport experienced 576 aircraft movements on the busiest day, while in 2016 this fell to 477 aircraft movements on the busiest day. Figure 2-14 shows the number of aircraft movements for international, interstate and intrastate per day ranked from busiest day to least busiest day.

When looking at the weekday traffic profile, international and interstate traffic have consistent profiles and volumes whereas intrastate (including general aviation) traffic volumes are lower on Monday and Friday. The profile remains consistent across the weekdays as shown in Figure 2-15, Figure 2-16 and Figure 2-17.

Weekend traffic profiles sees differences between Saturday and Sunday. Although international and interstate traffic has similar volumes and profiles for Saturday and Sunday, the intrastate traffic has a morning peak on Saturday and an afternoon and evening peak on Sunday as shown in Figure 2-18, Figure 2-19 and Figure 2-20.

There is no significant difference in profile between Tuesday, Wednesday and Thursday (mid-week days) and Monday and Friday, with only a minor difference between Saturday and Sunday as shown in Figure 2-21, Figure 2-22 and Figure 2-23.

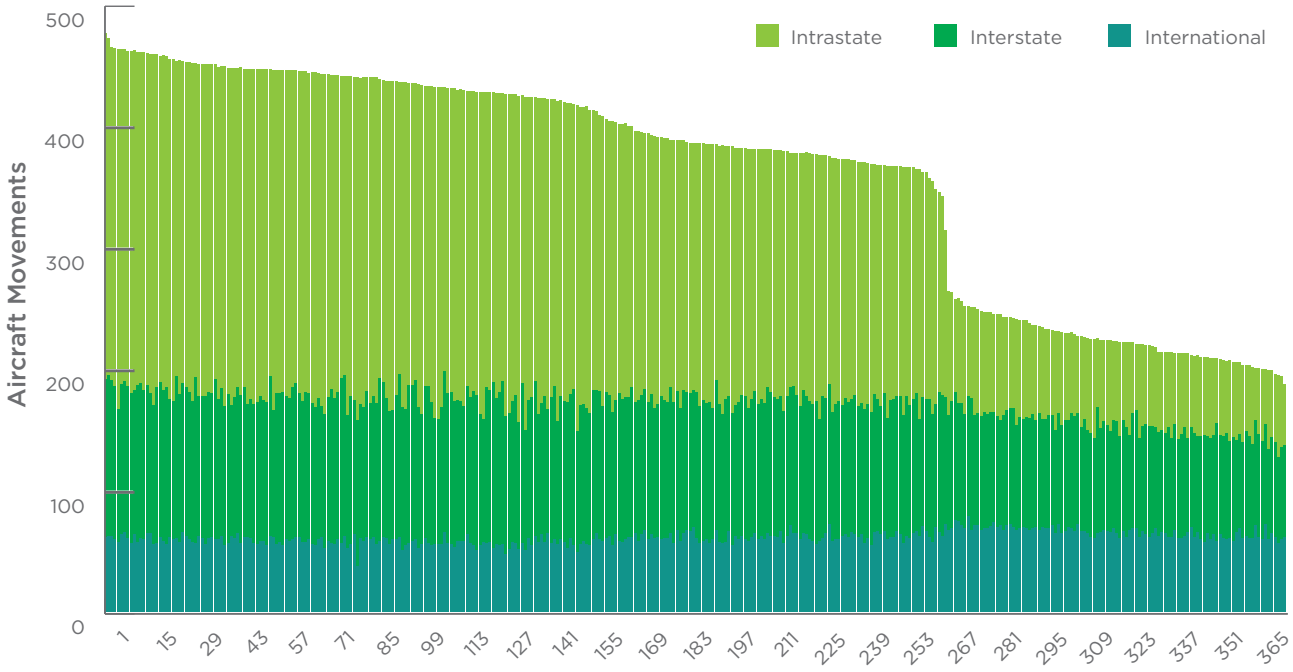


Figure 2-14 Ranked daily aircraft movements by sector at Perth Airport in 2016
Source: Airservices (Noise Flight Path Monitoring System)

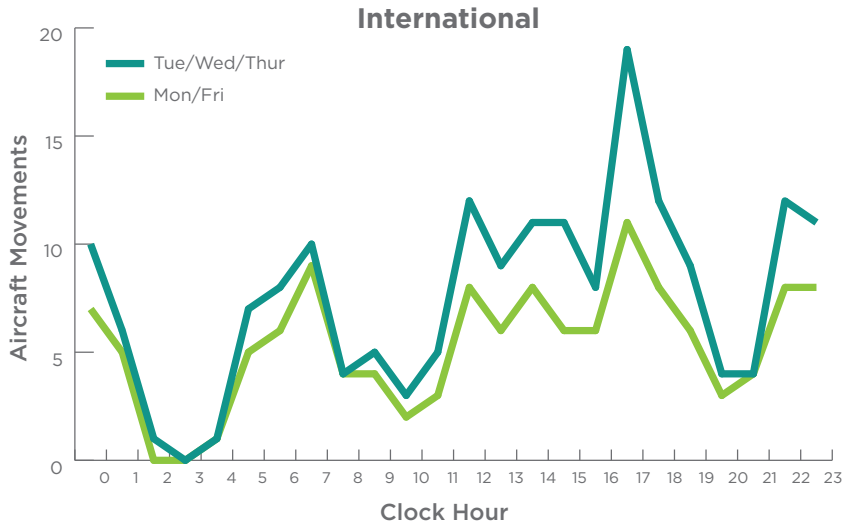


Figure 2-15 Weekday international traffic profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

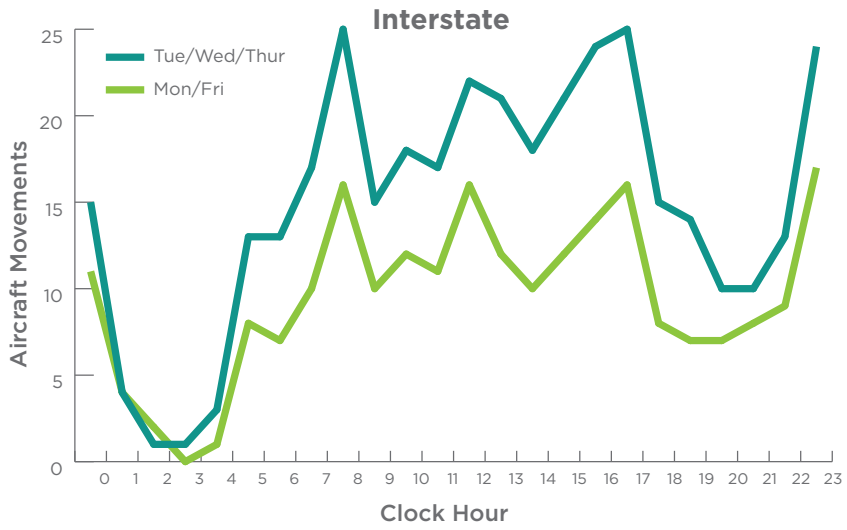


Figure 2-16 Weekday interstate traffic profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

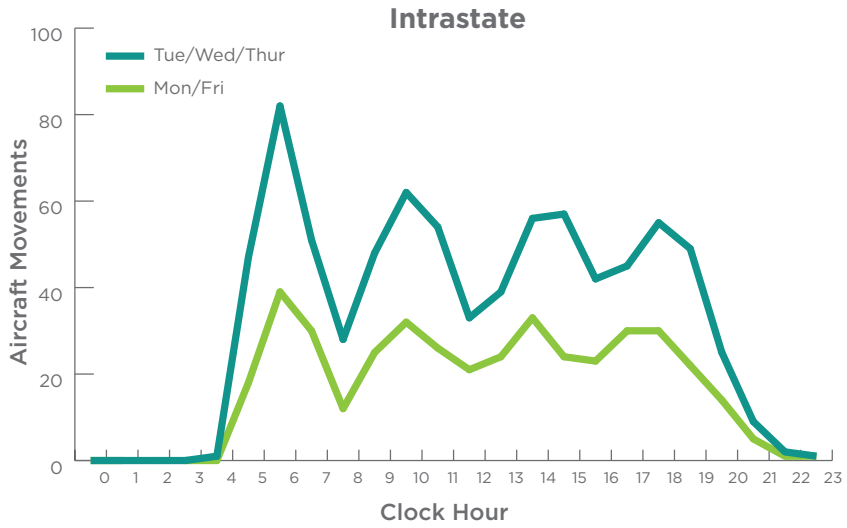


Figure 2-17 Weekday intrastate traffic profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

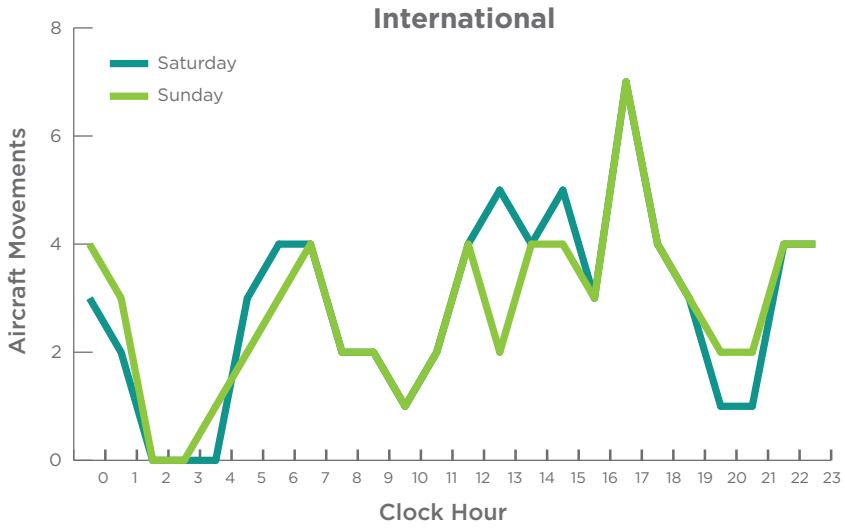


Figure 2-18 Weekend international traffic profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

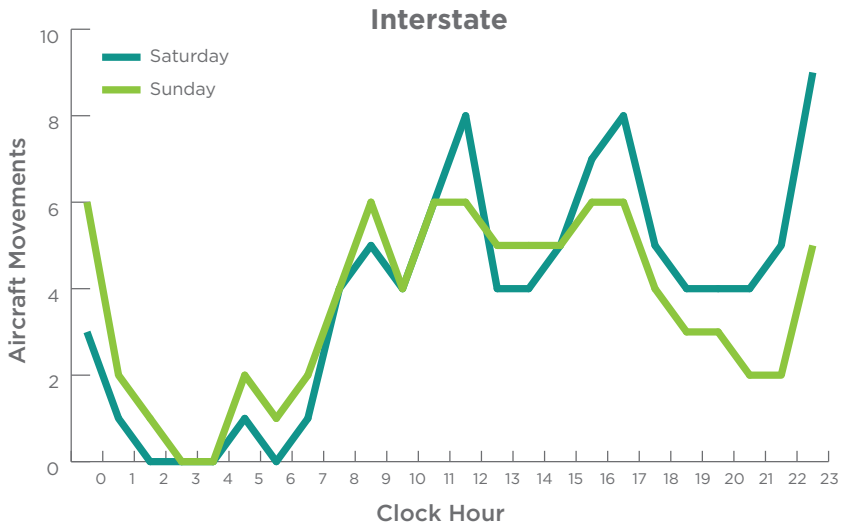


Figure 2-19 Weekend interstate traffic profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

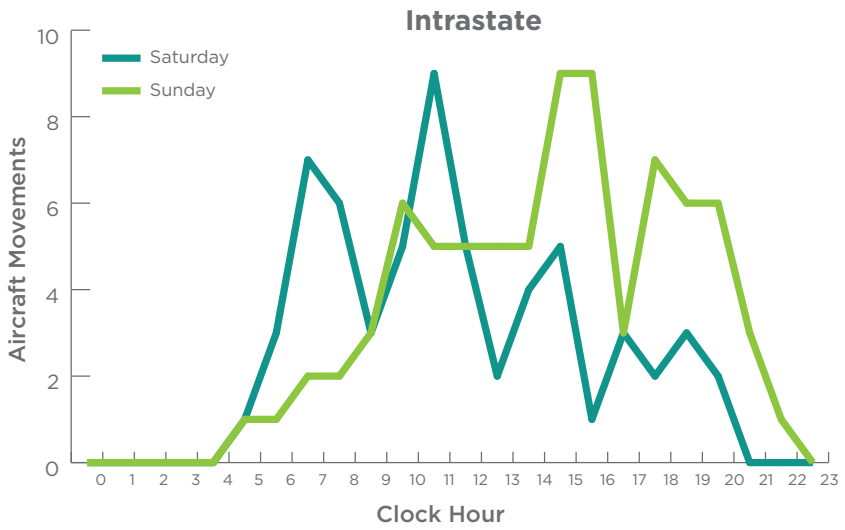


Figure 2-20 Weekend interstate traffic profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

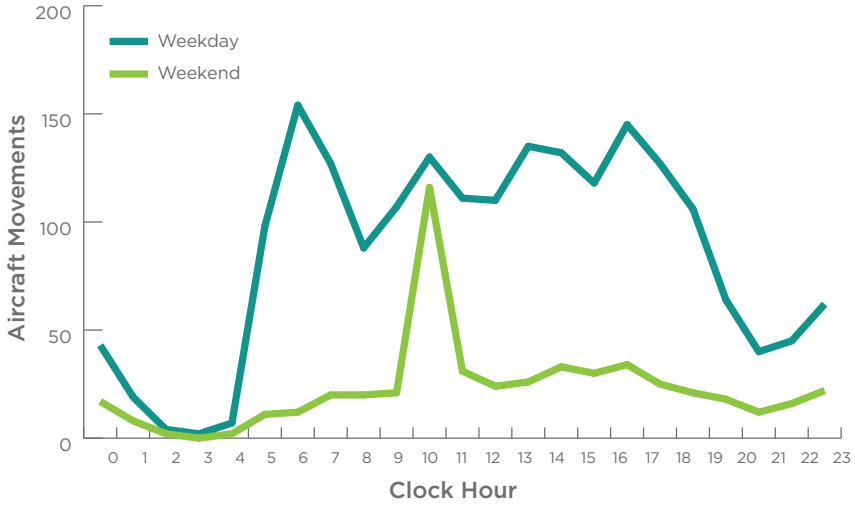


Figure 2-21 Comparison of weekday to weekend profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

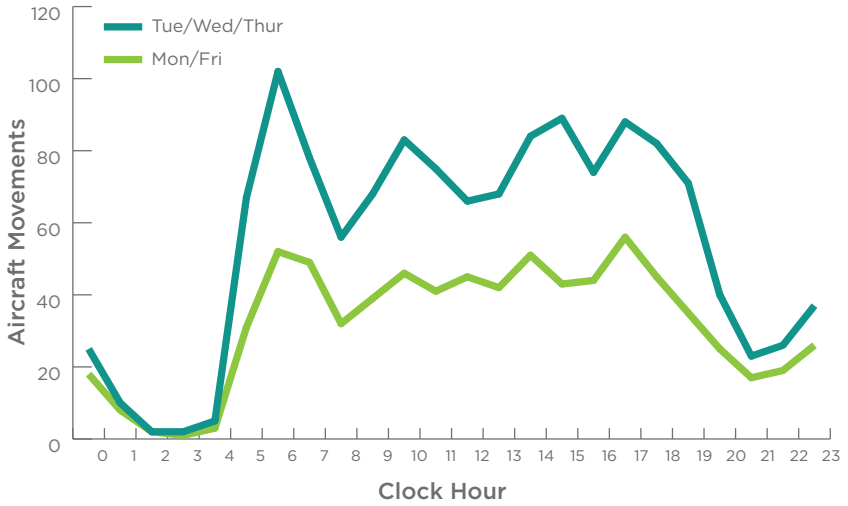


Figure 2-22 Comparison of midweek to Monday to Friday profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

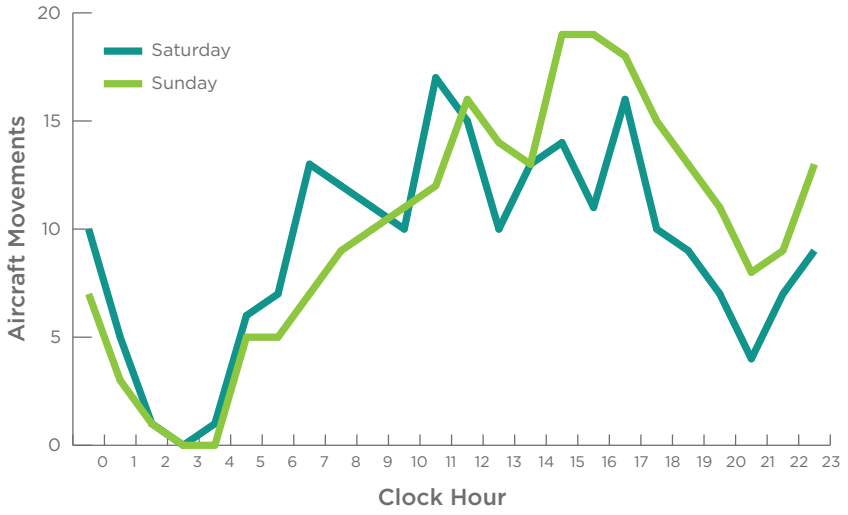


Figure 2-23 Comparison of Saturday to Sunday profile at Perth Airport
Source: Airservices (Noise Flight Path Monitoring System)

Therefore, in terms of daily movements:

- Tuesdays, Wednesday and Thursdays are the busiest weekdays, and are significantly busier then Mondays and Fridays,
- weekends have significantly lower aircraft and passenger movements with Sunday being the busier weekend day, and
- Saturday is the quietest day across the week.

These features are evident when comparing the total number of aircraft movements across a day, over a year period, ranked by day of the week, as shown in Figure 2-24.

Due to the nature of the resource sector's FIFO workforce scheduling and deployment requirements, and the need to time many international flights to connect to other services at hub airports, Perth Airport experiences significant peak periods of departures and arrivals demand at certain times of the day and night.

FIFO contributes significantly to the aircraft movement peaks at Perth Airport, FIFO is very aircraft movement intensive and resource companies require their services to operate in narrow windows to meet workforce mobilisation and rostering requirements. Approximately 80% of early morning peak period aircraft movements comprise of FIFO related traffic. At the height of the resource sector boom in 2013, this departure peak saw up to 40 aircraft departing each hour for a two to three-hour period. Thus, in preparation for the significant number of morning departures, there were more than 165 aircraft parked overnight at Perth Airport during this period. A study undertaken in 2013 by Perth Airport identified that Perth Airport had more mid-week departures between 6.00 am and 8.00 am than Sydney Airport, noting the pent-up demand at Sydney due to a curfew before 6.00 am and Sydney Airport being three times the size of Perth in terms of passenger numbers.

This departure peak is still evident today, however the duration of the departure peak has reduced. Figure 2-25 shows the number of departures per hour across a typical day in 2016.

Along with the morning departures wave servicing the resource sector in midweek mornings, there are also high arrival peaks in the mid morning and late afternoon periods as these aircraft return to Perth and combine with arriving interstate and international services. These arrival peaks are spread over a wider period than the departures peaks, as current airfield and airspace capacity permits fewer arrivals per hour than departures. Figure 2-26 shows the number of arrivals per hour across a typical day in 2016.

A combined arrival and departures profile, as shown in Figure 2-27, shows that Perth Airport experiences four peak periods across the day:

- 5.00 am to 7.59 am morning departure peak,
- 9.00 am to 11.59 am morning arrivals peak,
- 2.00 pm to 3.59 pm afternoon departures peak, and
- 6.00 pm to 6.59 pm early evening arrivals peak.

Similar data is also available for 2012 and shown in Figure 2-28. As can be seen the pattern of four peaks is still present but what is evident is the higher volume of traffic. This volume saw Perth Airport exceed the runway capacity for departures and arrivals at different times of the day.

Night-time traffic should also be considered in the daily profile. Although the daily profile changes across different days, the night time traffic profile remains consistent across all days. As shown in Figure 2-29, when comparing each day across 2016, the night traffic represents 31 per cent of traffic.

2.3.2 Future Aircraft Movement Profile at Perth Airport

Morning departure and evening arrival peaks are largely driven by the resource sector's workforce scheduling requirements, FIFO workers depart in the early morning to arrive in time to start their shift on the various mine sites in Western Australia's north and east. There is a corresponding arrival peak for workers returning to Perth.

International peaks arise from a complex array of constraints and influences which prevent airlines from scheduling any significant portion of flights outside of the peaks. Due to the proximity of Perth to the major Asian and Middle East airports, international peaks are driven by the demands and constraints of the major hub airports in this region, including:

- longer haul flights operating via Asia and the Middle East need to connect with flights in hub airports such as Singapore and Dubai so that passengers can be carried to their ultimate destinations. Flights that arrive in these hub airports need to arrive in sufficient time to connect with the bank of outgoing flights,
- slot limitations in Asia and Europe place a limit on when aircraft can arrive and depart from Perth Airport, and
- passenger preferences to commence or complete journeys at 'friendly' times of day (not too early in the morning or too late in the evening).

As the factors affecting Perth Airport's movement profile are long-term in their nature, it is not anticipated that the profile will undergo any significant changes in the future.

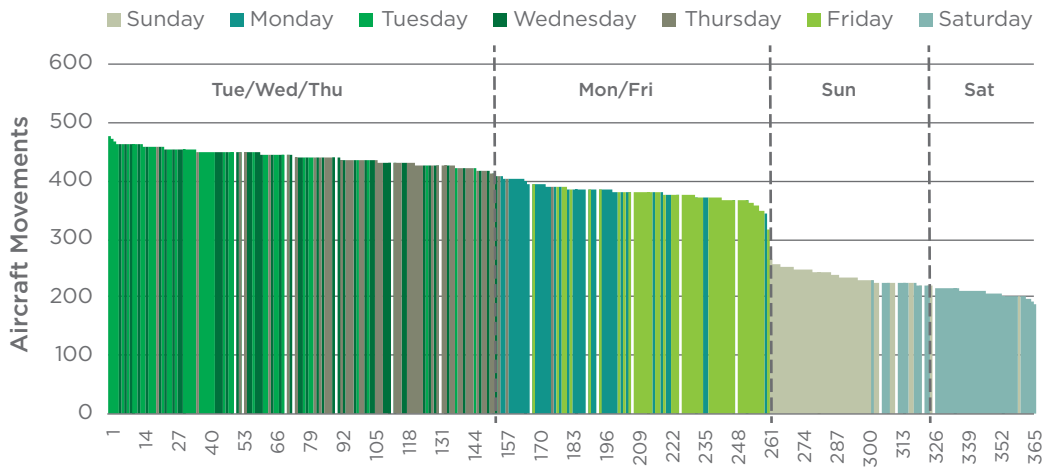


Figure 2-24 Ranked daily movements by day of the week in 2016
Source: Airservices (Noise Flight Path Monitoring System)

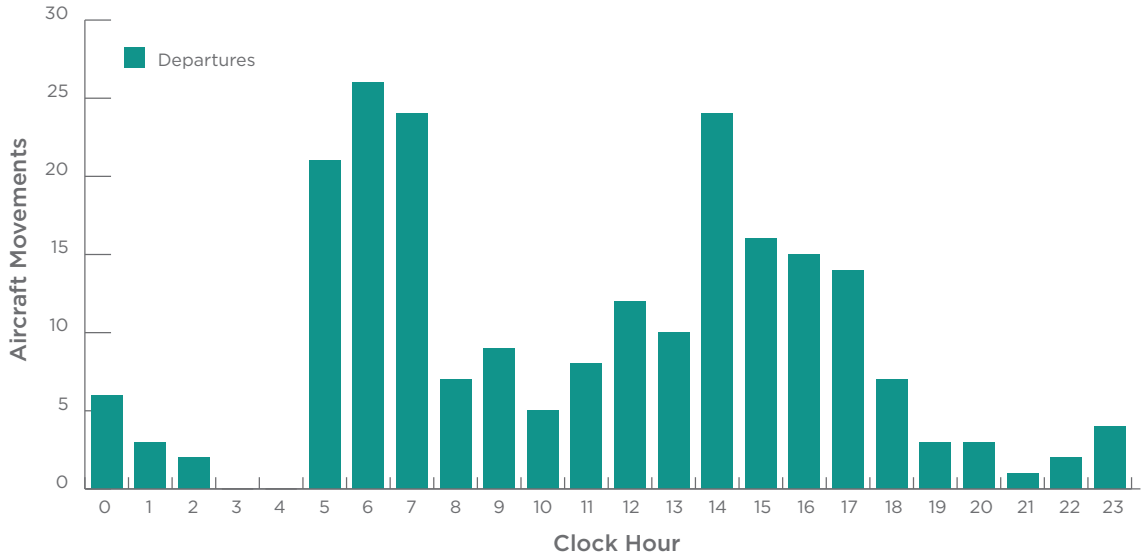


Figure 2-25 Number of aircraft departing Perth Airport each hour in 2016
Source: Airservices (Noise Flight Path Monitoring System)

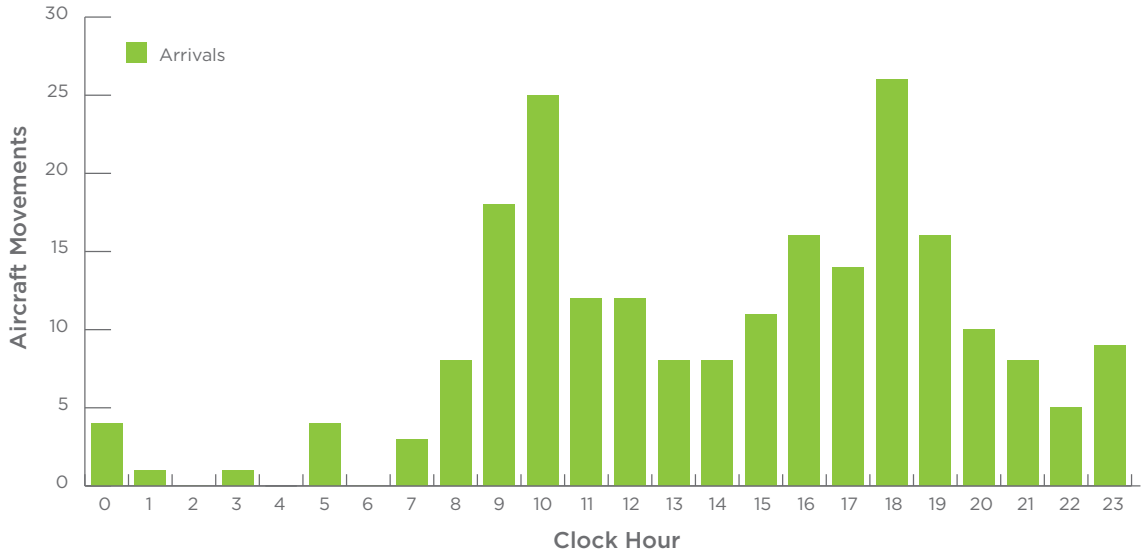


Figure 2-26 Number of aircraft arriving at Perth Airport each hour in 2016
Source: Airservices (Noise Flight Path Monitoring System)

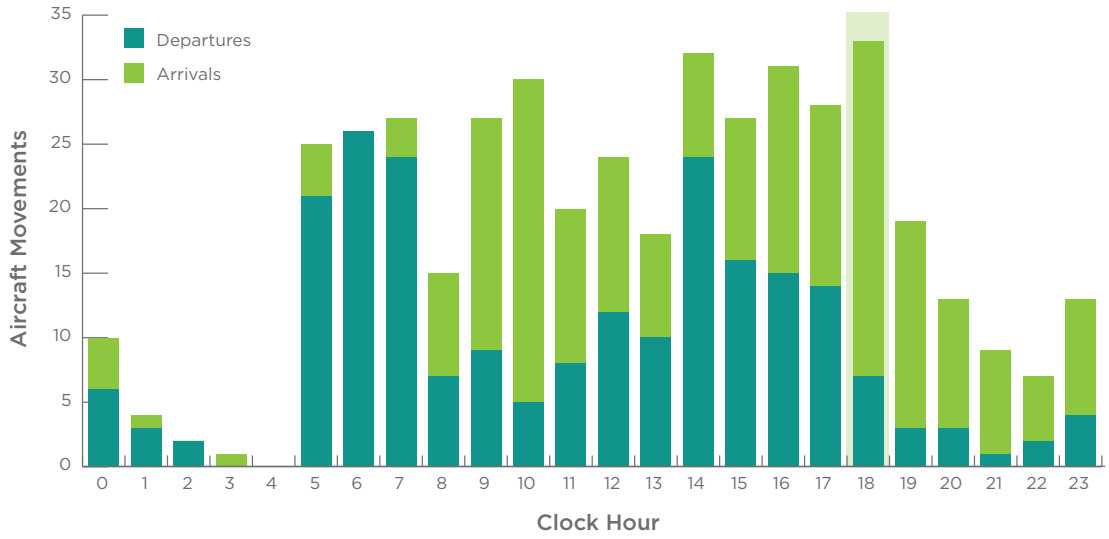


Figure 2-27 Number of departing and arriving aircraft at Perth Airport each hour in 2016
Source: Airservices (Noise Flight Path Monitoring System)

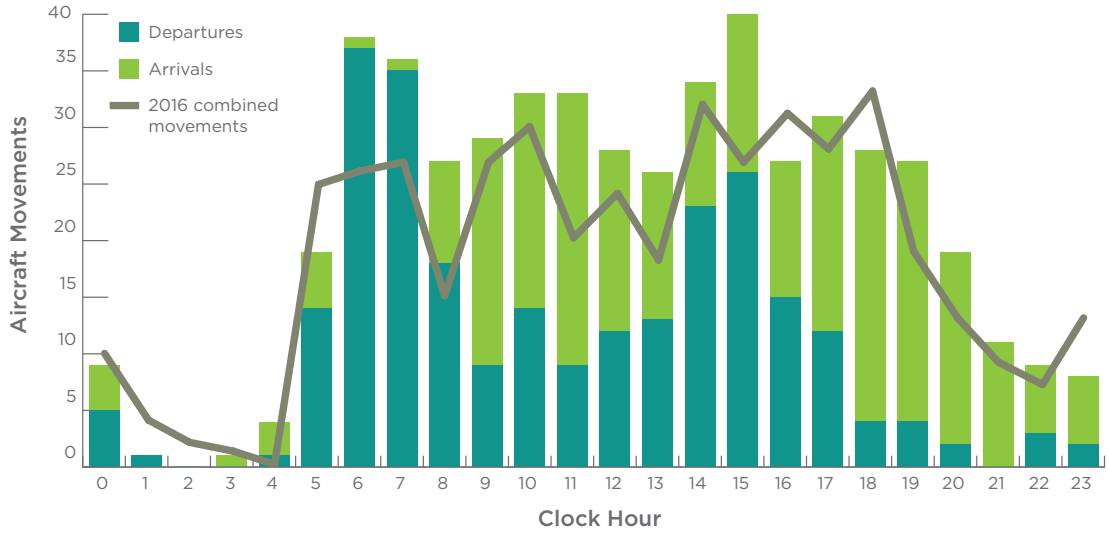


Figure 2-28 Number of departing and arriving aircraft at Perth Airport each hour in 2012
Source: Airservices (Noise Flight Path Monitoring System)

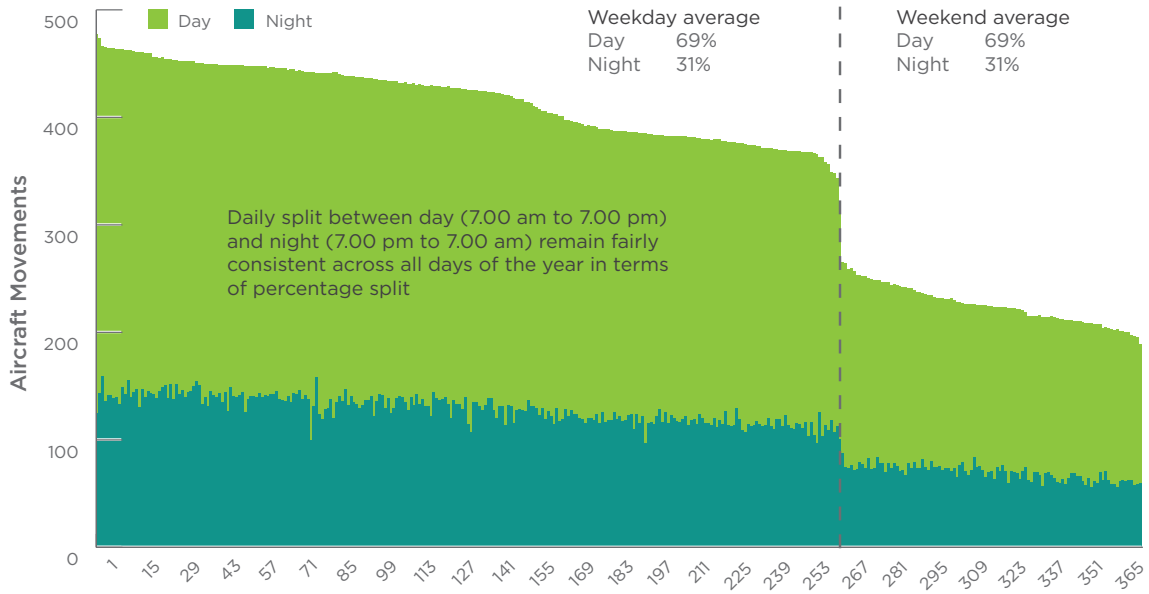


Figure 2-29 Ranked daily movements by day and night at Perth Airport in 2016
Source: Airservices (Noise Flight Path Monitoring System)

2.4 Runway Capacity

Runway capacity is a complex issue that relies on a range of factors. The rules that affect capacity vary from airport to airport and from country to country. The capacity of a runway system is determined by considering several factors during peak periods including:

- the aerodrome reference code, that considers runway length and width,
- runway geometry including the number of runways available for simultaneous use,
- aircraft traffic flow,
- aircraft types that use the airfield, and
- airspace available, which is influenced by proximity to other airports, topography and aircraft noise considerations.

2.4.1 Aerodrome Reference Code

Australia's Civil Aviation Safety Authority (CASA) is responsible, under the *Civil Aviation Act 1988,* for developing and disseminating appropriate aviation safety standards. Perth Airport, as the airport operator, is responsible for the safety of the aerodrome in accordance with Civil Aviation Safety Regulations 1998 (CASR) Part 139 – Aerodromes. These regulations are supported by a Manual of Standards Part 139 – Aerodromes (MOS 139), which prescribes the technical standards for aerodromes used in air transport operations. The specifications contained in MOS 139 are largely the same as the International Civil Aviation Organization (ICAO) standards, noting that there are some differences.

The ICAO and MOS adopt a code system known as the aerodrome reference code. The code comprises of a number and a letter. The number is based on the aircraft reference field length (runway length required) and the letter is based on the aircraft wingspan and the outer main gear wheel span.

The reference code provides a method of grouping aircraft with different characteristics which behave similarly when taking off, landing, taxiing and parking and is used in the planning of airport infrastructure (runways, aprons and taxiways). For instance, the length and width of a runway impacts on the type of aircraft that can use the runway and therefore which aircraft can serve an airport.

The existing main runway (03L/21R) and cross runway (06/24) are both classified as code 4E which means they can accommodate the Airbus A330, Boeing 777 and Boeing 787 Dreamliner. The Airbus A380 can also operate on the existing runways due to a grandfather clause in MOS 139 allowing the Airbus A380 aircraft to operate on existing 45-metre-wide runways (as it was built prior to January 2008), subject to the runway meeting requirements regarding shoulder pavements (pavement on the edge of a runway designed to protect the surface from erosion by engine jet blast). The Airbus A380 rarely uses the cross runway (06/24) for take-off because it is much shorter than the main runway and is therefore very restrictive on the aircraft's performance. On occasion the Airbus A380 has landed on the cross runway, this is achievable because the aircraft is lighter on arrival (due to fuel burn) making the runway length less restrictive.

2.4.2 Airfield Geometry

While the number of runways contributes to the capacity of an airfield, more importantly is the independency of the available runways. Fully independent runways operate without restrictions on each other, meaning that arrivals and departures can occur on each runway at the same time. Dependent runways operate with restrictions determined by the type of operations on adjacent runways, requiring aircraft separation between aircraft landing on each runway.

The existing Perth Airport layout consists of two intersecting runways (Figure 2-30). The main runway (03L/21R), with an orientation running north-south, is 3,444 metres long and 45 metres wide. The cross runway (06/24), with an orientation running northeast-southeast, is 2,163 metres long and 45 metres wide. Being an intersection dependent runway system, flight operations on one runway affect the flight operations on the other runway. The capacity from an intersection dependent runway system is higher compared to a single runway but less than an independent parallel system.

The location of the intersection of the runways also contributes to, or impacts, capacity. The intersection of the cross runway with the main runway is 2,418 metres from the 03L threshold, or approximately two thirds the way down the main runway. Because of the location of the intersection, and depending on the flow of traffic at the time, the rate at which aircraft can arrive and depart varies.

Generally, intersecting runways are constructed due to land constraints and to support flight operations in multiple prevailing wind directions. However, as aircraft technology has improved so has the ability of aircraft to handle multiple prevailing winds or cross wind components.

The location of taxiways also contributes to the number of aircraft movements within a given period as they determine how long an arriving aircraft occupies a runway before exiting. Consistent and predictable runway occupancy times assist air traffic controllers to plan for aircraft separation that maximises use of the runway.

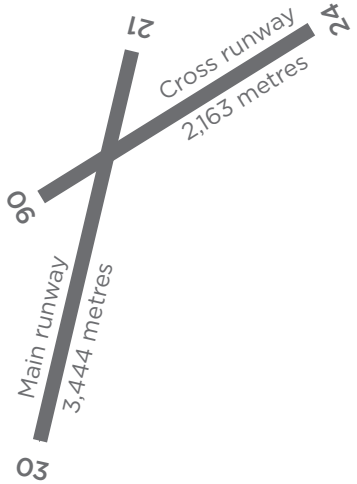


Figure 2-30 Existing runway layout at Perth Airport
Source: Perth Airport

2.4.3 Traffic Flow

The way that aircraft are managed also influences capacity. There are two main flows of traffic at Perth Airport, which are referred to as the North Flow and South Flow.

In North Flow, when aircraft arrive from the south over Queens Park and Welshpool, and take-off over Guildford and Bellevue, the departure rate is at its highest. This is because both main runway 03 and cross runway 06 can be used, in sequence one at a time, by departing aircraft. The location of the intersection means an aircraft departing on runway 06 only restricts the use of runway 03 until the departing aircraft crosses the 03 intersection. In North Flow, all arriving aircraft land on runway 03, allowing another aircraft to prepare to take-off on runway 06 while the arriving aircraft is landing on runway 03.

In South Flow, when aircraft arrive from the north over Guildford and Bellevue, and take-off to the south over Queens Park, the intersection location provides the highest arrival rate. Aircraft arriving on runway 21 will cross the runway 24 intersection shortly after touching down on the runway and at high speed, allowing arriving aircraft to be sequenced for the use of both runway 21 and runway 24 with less spacing than that required if the two aircraft are landing on the same runway. Departing aircraft will use runway 21, and can prepare to take-off while the arriving aircraft is landing on runway 24. The arrivals rate is occasionally reduced when, in certain wind conditions, runway 24 will need to be used by both arriving and departing aircraft.

The North and South Flow runway configurations, shown in Figure 2-31, are used at Perth Airport as much as possible, however poor weather conditions can mean the flows cannot operate at their peak rates all the time.

2.4.4 Aircraft Types and Airspace

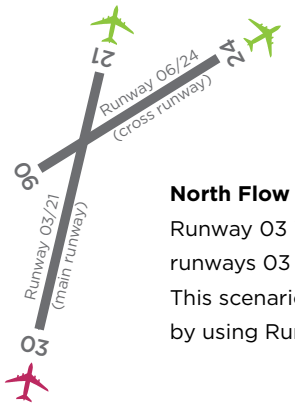
The aircraft type and airspace factors that contribute to the capacity of an airport include:

- performance and operating requirements of different aircraft types,
- pattern of arriving and departing traffic,
- operational mode (the runways being used for take-off and landing) which is dependent on weather, and the capacity of that mode,
- separation distances between aircraft on final approach,
- departure routes separation, and
- the proximity of other airports.

A runway system is most efficient, and therefore achieves the most capacity, when aircraft are of similar performance and there is a balance between departures and arrivals. An even spread of arrival and departing traffic would see a higher capacity than a pattern with peak periods of departures or arrivals, such as in Perth.

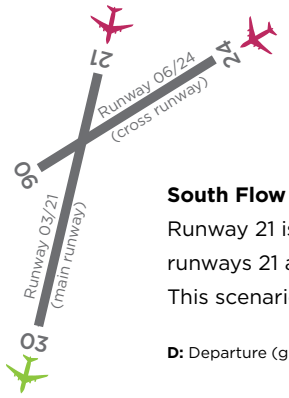
As discussed in Section 2.3, due to the nature of international, interstate, and intrastate schedules, Perth Airport experiences significant departure and arrival peaks. With a balanced pattern, the time spacing required between arriving flights is used for a departing flight therefore achieving a greater number of total aircraft movements. The imbalance between arrivals and departures during the peak times at Perth means that the capacity benefits of a balanced traffic flow pattern are not achievable.

The arrival rate is the most constrained as aircraft need to follow a narrow flight corridor, aligned to the runway centreline, for the final approach to touchdown, whereas with departures the aircraft can be spread out shortly after take-off and therefore allow more aircraft to depart. If the spacing between aircraft on final approach is not delivered consistently, the larger gaps will lead to increased levels of delay and lower runway throughput.



Departures: 03, 06
Arrivals: 03

North Flow
Runway 03 is used for arriving aircraft and runways 03 and 06 are used for departing aircraft. This scenario provides the maximum departure rate by using Runways 03 and 06 for departures.



Departures: 21
Arrivals: 21, 24

South Flow
Runway 21 is used for departing traffic, and runways 21 and 24 are used for arriving traffic. This scenario provides the maximum arrival rate.

D: Departure (green) **A:** Arrivals (pink)

Figure 2-31 North and South Flow runway operations at Perth Airport
Source: Perth Airport

The spacing between aircraft is also impacted by the size of the aircraft and their operating performance. Every aircraft type performs differently, depending on its total weight and engine type. A propeller-engine aircraft such as the De Havilland Canada Dash 8 has an approach speed of approximately 110 knots (200 kilometres per hour), while a large jet-engine aircraft such as the Boeing 787 has an approach speed of 153 knots (283 kilometres per hour). The differences in aircraft performance is a key consideration in planning for appropriate spacing and maximising the capacity of a runway.

The type and size of aircraft that operate at Perth Airport varies greatly from smaller propeller engine aircraft all the way to the largest passenger jet in service, the Airbus A380. The range of aircraft that operate at Perth Airport is shown Figure 2-32.

As Perth Airport is located between Jandakot and RAAF Base Pearce, the proximity of these aerodromes and their operation can impact on the airfield capacity at Perth Airport.

While the majority of flights from Jandakot Airport do not affect Perth Airport, some aircraft departing Jandakot in poor weather need to climb into Perth airspace to ensure safe flight above terrain. Depending on the runway available for use at Jandakot, aircraft arriving at Perth may be delayed to facilitate Jandakot departures. During South Flow operations, the Royal Flying Doctor Service medical priority flights can delay aircraft departing Perth, particularly when the weather is poor (low cloud and/or low visibility) as the priority aircraft need to climb into Perth airspace to ensure safe flight above terrain.

During North Flow operations in poor weather, aircraft descending until they achieve visual recognition with the runway use the same airspace, regardless of whether the aircraft is arriving at Perth or Jandakot. For air traffic control to maintain the minimum required radar separation of three nautical miles, aircraft arriving at Jandakot must be sequenced with aircraft arriving at Perth. As such, each Jandakot arrival uses an airspace 'slot' that could have been used for a Perth arrival, thus reducing the number of aircraft that can land at Perth in any given period.

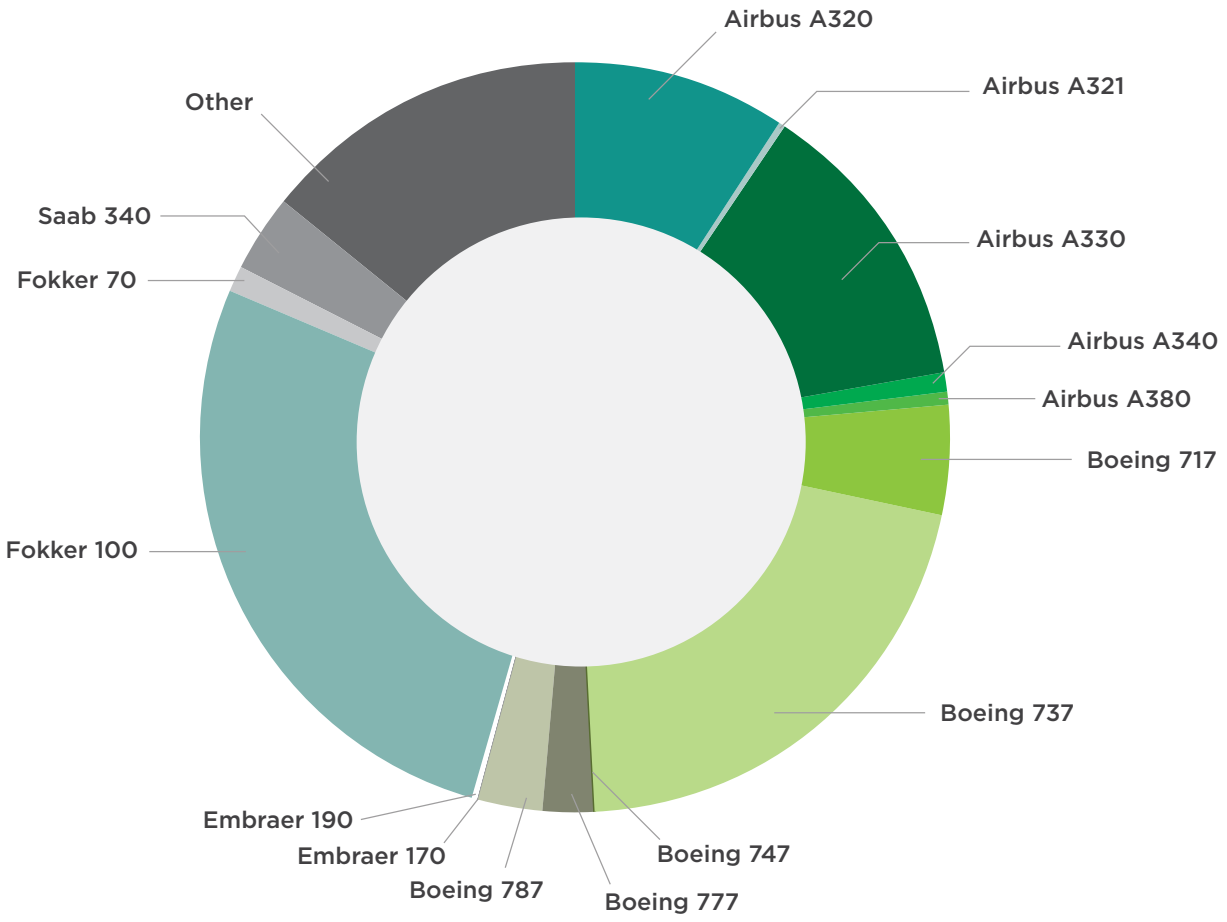


Figure 2-32 Aircraft movements by aircraft type at Perth Airport in 2018
Source: Perth Airport

2.4.5 Existing Capacity

A key factor when considering capacity is the amount of delay experienced by an aircraft. A delay is defined as the difference between the time taken for an aircraft to pass through the runway system when unconstrained compared to the constrained system.

The United States Federal Aviation Administration considers that at jet aircraft dominant airports, delay increases rapidly once demand exceeds an average delay of four minutes. Simulation modelling for Perth Airport has seen that delay increases rapidly once demand exceeds an average delay between five and seven minutes.

Perth Airport has undertaken extensive computer simulation modelling to determine the Airfield capacity at Perth Airport. This modelling has been undertaken using the Total Airspace and Airport Modeler (TAAM) which is an industry standard tool for modelling airspace and airports. The modelling took into account factors specific to Perth Airport: the airfield layout, fleet mix and profile of aircraft movements as described in Section 2.3. Future scenarios were modelled based on the movement forecasts from TFI. The modelling predicted that the maximum number of aircraft that could use the airport over a 24-hour period with an average six minutes' delay across the day was 545 aircraft movements.

Further simulation modelling demonstrated that using the minimum acceptable delay of five minutes, and an entire week's schedule (including weekends), just over 145,000 movements annually could be achieved. This number corresponds to far fewer than 545 daily movements because of the peaky profile of aircraft movements at Perth Airport. As the 145,000 movements are not distributed evenly across all days of the year, the 545 daily movement limit is reached on the busiest days when there are just 145,000 movements throughout the year overall.

Weekends at Perth Airport see much lower demand than weekdays, hence will have much lower delay. Therefore, the average delay figure is brought down by including the weekends and it is likely that on the busiest weekdays, average delay will be higher than the five-minute criterion. When the daily or annual capacity figure is reached, this does not mean the runway system will not operate, but rather further delays will be experienced, with delays being exacerbated during the peak periods.

To ensure that aircraft can be safely controlled and for airlines to understand potential constraints when considering scheduling additional flights, Airservices has established agreed hourly capacity rates for both departure and arrival at Perth Airport. This capacity considers operational limitations in terms of runways (length and layout configuration) as well as meteorological conditions. Arrival capacity is greater under visual conditions than under instrument conditions (low visibility due to rain, fog or low-level cloud).

For Perth Airport, the declared arrival and departure capacities are shown in Table 2-4.

These hourly capacities are regularly reviewed to ensure the rates can be achieved consistently during the peak periods.

2.4.6 Ultimate Capacity

Modelling undertaken during the development of the Master Plan 2014 was based on an ultimate airfield and runway capacity of 475,000 annual aircraft movements. The ultimate capacity is based on a combination of airfield and airspace capacity, and assumes the new runway is in service.

This translates to a capacity uplift to around 60 arrivals during the peak arrival hour, 70 departures in the peak departure hour and up to 100 movements during a balanced arrival and departure hour.

Mode	Arrivals (few departures) (movements per hour)	Departures (few arrivals) (movements per hour)
South Flow (21 departures, 21 arrivals & 24 arrivals)	26	40
North Flow (03 departures & 06 departures, 03 arrivals)	24	42

Table 2-4 Perth Airport aircraft movement hourly capacity
Source: Perth Airport and Airservices

Note: Rates above are per hour and cannot be added together. For example, there can be a maximum of 26 aircraft in an arrival period or a maximum of 40 aircraft per hour in a departure period. There is not a combined 26 arrival and 40 departures per hour.

2.5 Demand versus Capacity

Forecast demand of flights in peak or busy periods, when compared to the capacity of each individual element of the airport's infrastructure (for example runway capacity), informs the timing of specific developments.

Considering the existing capacity figures as described in Section 2.4 and the actual and projected demand, it is evident that additional runway capacity is required at Perth Airport.

2.5.1 Annual Movements

Additional runway capacity is needed when annual movements reach 145,000 movements (as outlined in Section 2.4. Annual aircraft movements peaked in 2013 with 151,335 movements. At this time, significant delays were experienced by airlines and passengers. Although annual aircraft movements have declined since 2013, it's reasonable to expect that the growth in demand could return at the same rate. As such, it is expected that 145,000 movements will be experienced again in the medium term as shown in Figure 2-33.

2.5.2 Daily Movements

Simulation modelling demonstrated daily capacity of 545 daily aircraft movements with no greater than an average six minutes delay (as outlined in Section 2.4). Since 2012, there have been days that exceeded this daily movement rate causing significant delays. All of these days have occurred in the mid-week period. In 2016, the busiest day was below of this limit, however it is expected that movement growth will see this number exceeded in the future.

2.5.3 Hourly Movements

As previously highlighted, due in part to the nature of the resource sector's FIFO workforce deployment, Perth Airport experiences significant peak periods of departures and arrivals demand.

As presented in the Master Plan 2014, the impact of the lack of capacity was being felt by intrastate, interstate and international airlines, and there was substantial evidence that if the capacity existed, airlines would prefer to schedule more services in peak periods. At the time of the Master Plan 2014, the agreed hourly capacity rate for departures was 38 movements. Due to efficiency gains (as discussed in Section 3) a revised rate of 40 departures is now considered the maximum hourly departure capacity. There is no change to the arrivals hourly capacity, which remains at 24 arrivals per hour.

For the winter 2013 season, airlines requested 88 slots in the peak morning departures hours while the declared number of slots available was 78. Figure 2-34 shows winter 2013 departures slot demand for Wednesday, which is typically the busiest day of the week. The demand for arrivals slots for the winter 2013 season also exceeded capacity in the morning and afternoon peaks as shown in Figure 2-35. In the rolling interval at 9.30 am, demand exceeded supply by 12 slots. Requests for slots exceeding capacity were for new services, not changes to existing ones.

When the departures and arrivals demand are combined, it is evident that demand exceeded capacity during peak periods of the day. This is particularly apparent on the Wednesday, which is typically the busiest day of the week, as shown in Figure 2-36.

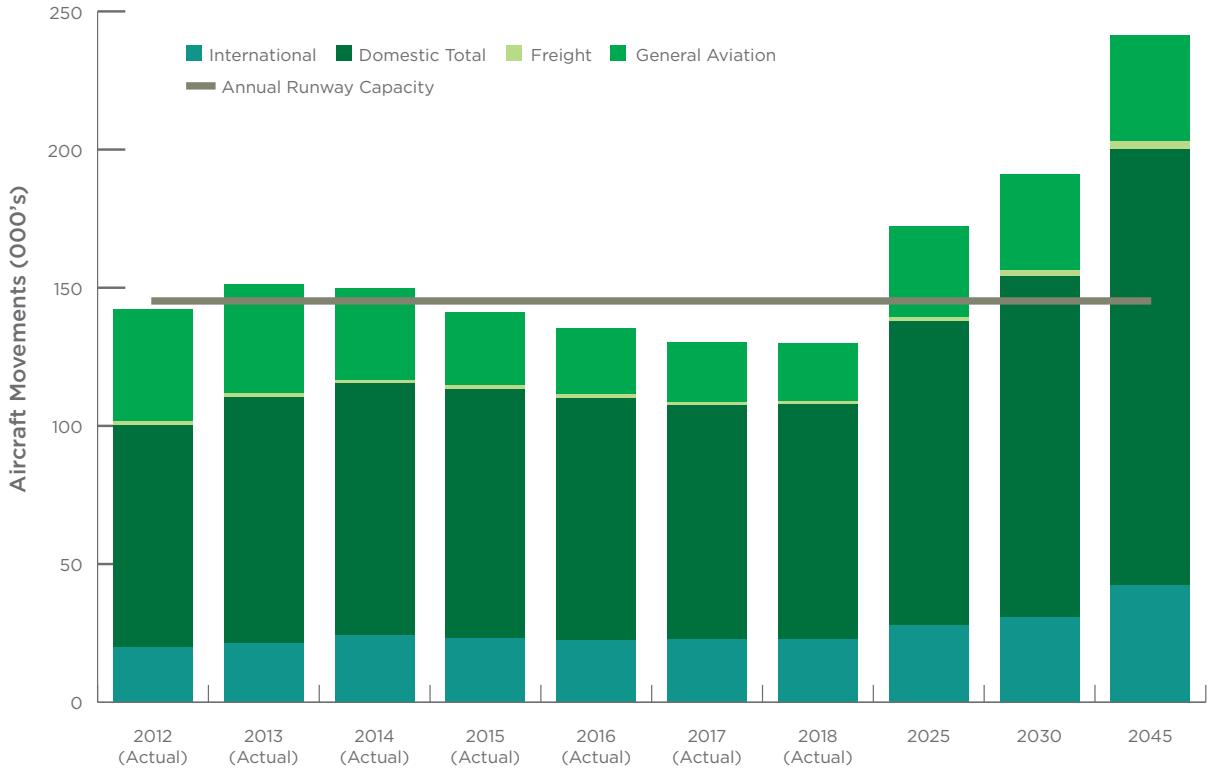


Figure 2-33 Historical and forecast aircraft movements compared against annual capacity at Perth Airport
Source: Perth Airport / Tourism Futures International

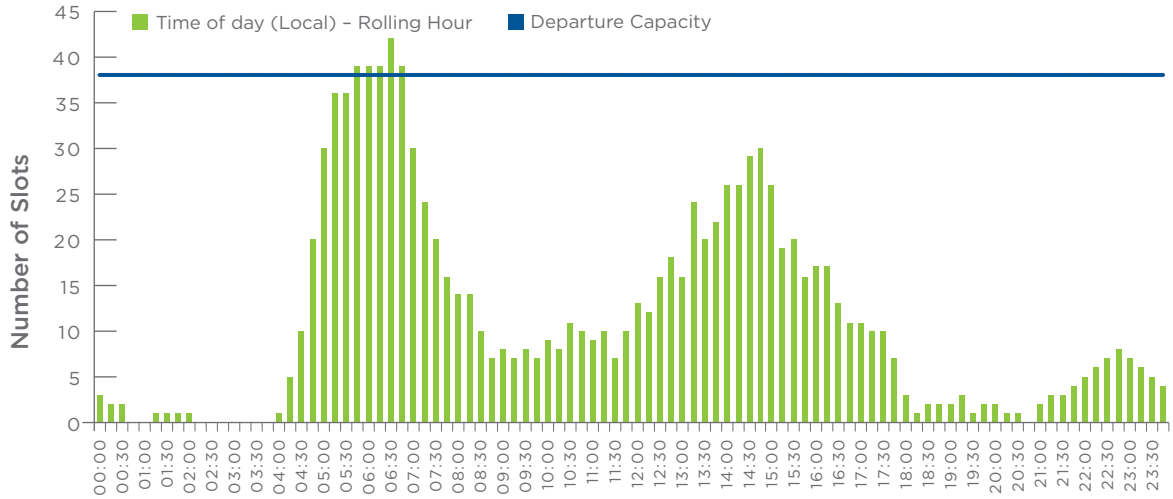


Figure 2-34 Wednesday departures slot demand - winter 2013 season
Source: Perth Airport Master Plan 2014, data sourced from Airport Coordination Australia

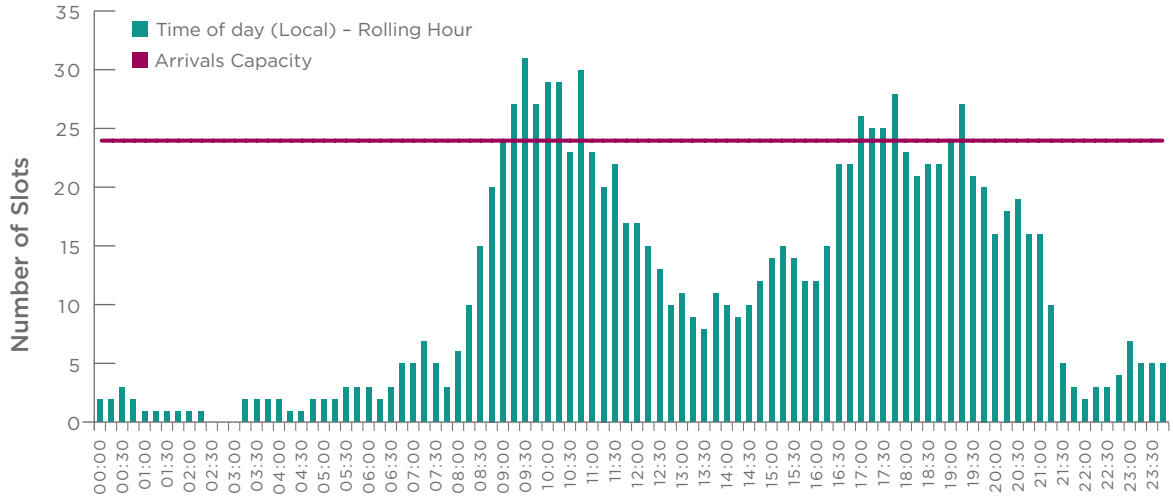


Figure 2-35 Wednesday arrivals slot demand - winter 2013 season
Source: Perth Airport Master Plan 2014, data sourced from Airport Coordination Australia

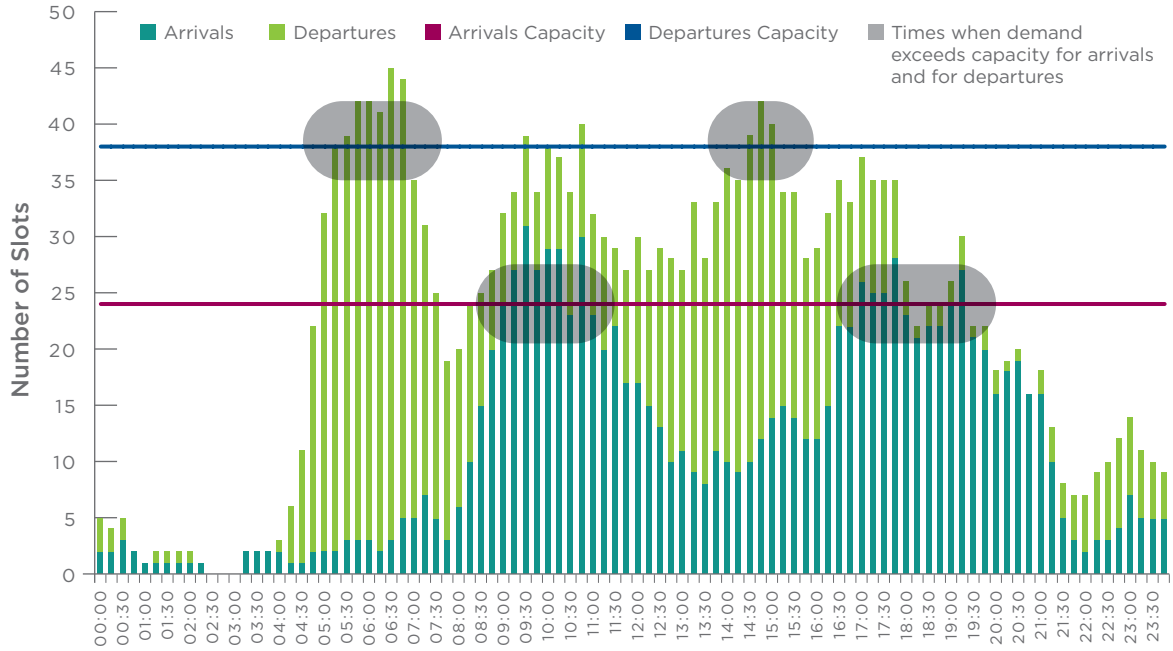


Figure 2-36 Wednesday total runway slot demand - winter 2013 season
Source: Perth Airport Master Plan 2014, data sourced from Airport Coordination Australia

Although aircraft movement numbers across the year and across the day have decreased since 2013, there remain periods in the day where demand exceeds available capacity and there are no arrivals or departures available at Perth Airport, either for an arrival or a departure.

Perth Airport continuously reviews its Notice of Capacity, a guide which sets out the apron capacity, international passenger arrival rates and international departure rates. Figure 2-37 highlights the current (2017) situation on availability and constraints. Despite movements and passengers falling after the resources boom between 2005 and 2013, there has been a rebound in traffic which is now reflected in an increasing trend of capacity in the international terminal being reached or exceeded. It is expected that the growth in use of the terminal will lead to an increase in need for runway capacity.

At the peak of the demand in 2012 and 2013, growth was constrained by the capacity at the airport and this was felt by the Western Australian economy. Figure 2-38 shows paper headlines from 2012 that reflected the level of public frustration at the delays caused by a lack of capacity.

Another example of the issues caused by a lack of airfield capacity is reflected in the on-time performance statistics. During 2012 Perth Airport's on time performance was the worst in Australia with only 69.7 per cent of aircraft departing on time.

2.6 New Runway Timing

As shown in Section 2.4, there are a range of triggers for when additional runway capacity is required at Perth Airport. Considering the annual, daily and hourly requirements and a low, central and high forecast aircraft movement growth scenarios (prepared in May 2016) the new runway is expected to be required between by 2023 and 2032 as shown in Table 2-5.

Forecast	Timing Year
High	2023
Central	2027
Low	2032

Table 2-5 New Runway Project forecast year of opening
Source: Perth Airport

Perth Airport has adopted a 'plan for high' and anticipate to 'deliver at central' approach to additional runway capacity. The development of a likely delivery range of 2023 to 2028 for the new runway allows industry to balance capital expenditure with appropriate levels of service and delays. However, as highlighted, delivery of the new runway may be later depending on actual demand and obtaining airline commercial agreement. Perth Airport will continue to review the timing of the new runway in consideration of the latest forecast information.

Undertaking the early stage planning, design and approvals processes for the NRP is a prudent approach to runway capacity at Perth Airport, having regard to the demonstrated volatility of demand and the significant adverse economic and societal impacts of running out of runway capacity in a State with such a high dependency on commercial aviation. Approval of the new runway positions Perth Airport to respond to increased demand in a timely manner.

NRP approvals and design are therefore being completed to allow additional runway capacity to be operational from 2023 at the earliest subject to actual demand and airline commercial agreement.

In February 2019, the Commonwealth Government released its latest infrastructure priority list. The list includes projects that are considered to be of national significance and identifies the NRP as a "Priority Initiative" that is required in the next five to ten years.

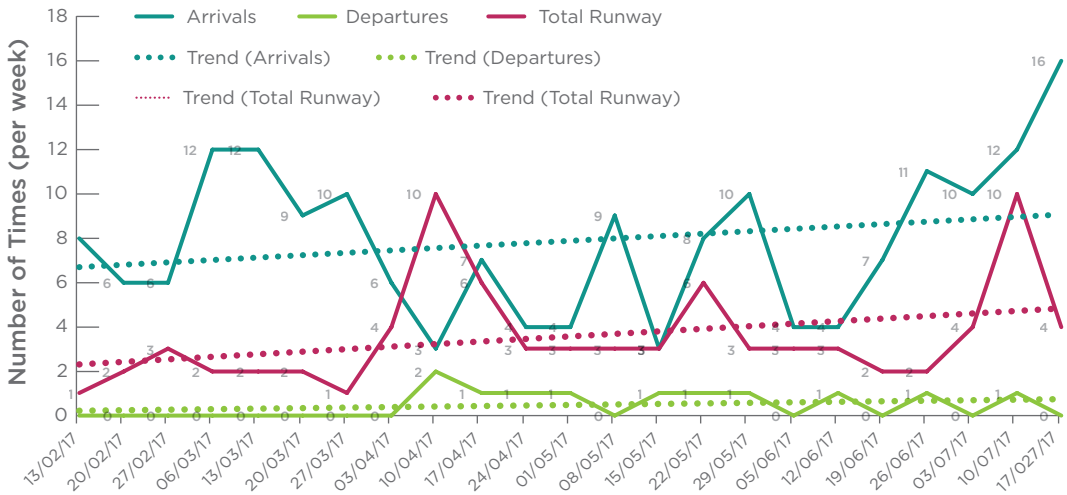


Figure 2-37 Notice of Capacity reached or exceeded at Perth Airport
Source: Perth Airport

Figure 2-38 News clipping from 2012 calling for additional runway capacity
Source: The West Australian

03
Options and Alternatives

This section provides detail of what options and alternative where considered when planning for the New Runway Project (NRP).

Detail is also provided on the following areas:

- What options were considered and why they are not viable?
- Why is the new runway the preferred option to meet the projected demand?

As part of the initial planning for the new runway, a number of options were identified and assessed before determining that the preferred new runway was the most appropriate development to meet the future demand for air services for Perth. The following options were considered:

- no-change scenario
- more from existing infrastructure at Perth Airport
- increased use of other airports
- Perth Airport aviation development plan options
- new runway alternate locations
- preferred new runway option

3.1 No-Change Scenario

The existing runway system reaches capacity during peak periods and this was most evident in 2013. Not constructing additional runway capacity and making no changes to the way in which the current runway system operates will:

- impact the efficient movement of aircraft and cause increasing delays for flights, and
- constrain growth, seeing a reduction in the number of people that would otherwise have travelled by air to and from Perth.

These impacts would have a flow-on effect and would result in economic losses to Perth and the wider state.

3.1.1 Delays Without the New Runway

The United States Federal Aviation Administration (FAA) considers a flight delayed if, for operational reasons, air traffic holds an aircraft at the gate, short of the runway, on the runway, on a taxiway, and/or in a holding configuration anywhere en-route. Therefore, by definition, a delay to an aircraft on the ground is the time taken for an aircraft to pass through the runway system (including airspace) unconstrained, compared to the time taken for an aircraft to pass through the system where constraints exist.

Delays to aircraft operations cause disruptions to the travelling public, increase costs to airlines and their customers (public and businesses) and reduce in passenger growth. Further information on delays is provided in Section 2.

Figure 3-1 shows the relationship between the likely average delay at Perth Airport and projected aircraft movements if no additional runway capacity is provided. Simulation modelling has shown that the average flight delay would increase from an average of a five-minute delay in 2016 to 34 minutes by 2045. With this being an annual average delay, in 2045 there would be some aircraft experiencing delays of several hours daily.

An average 34 minute delay is unacceptable to airlines, passengers and aviation dependant companies. Significant impacts are experienced when delays start to consistently average five to seven-minutes. Therefore, to reduce the likelihood of delay, airlines would need to either:

- change flight times to periods of lower runway demand,
- introduce larger aircraft to achieve higher volumes of passenger per aircraft movement, or
- discontinue services by repositioning aircraft to routes/ markets without the delays.

A decision to change the time of a flight at one port has a flow-on impact to fleet scheduling (how aircraft are allocated the roster of flights), passenger connections to other flights, and crewing and

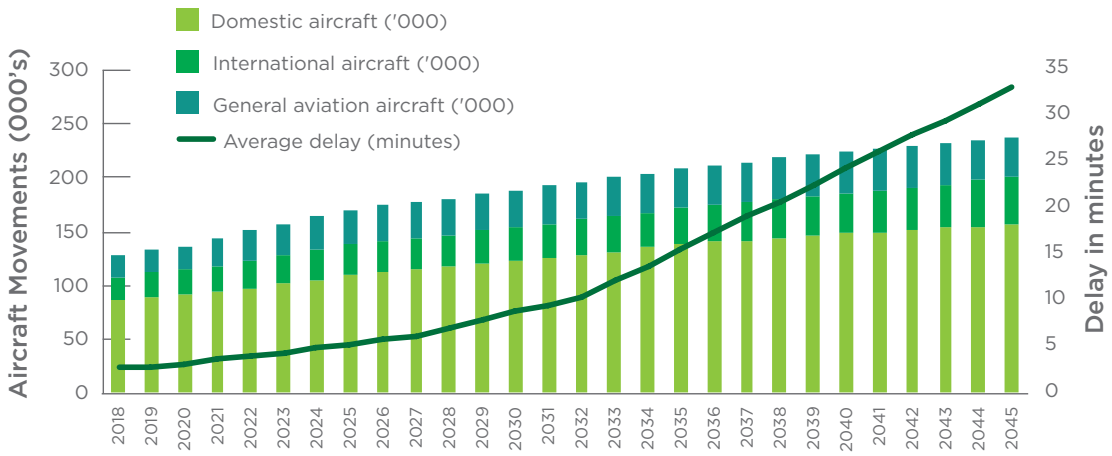


Figure 3-1 Comparison of likely average delay with aircraft movements
Source: NATS and Tourism Futures International

ground-handling staff rostering. Pilots and flight crews operate to strict rostering restrictions, and given the long flight distances to and from Perth, this can have a significant cost impact. Thus, airlines have limited scheduling opportunities or 'windows' within which Perth flights can be scheduled.

If airlines are unable to schedule services in response to market preference and wider logistical imperatives, the viability of the services is compromised, and flights are likely to be discontinued, either because they become loss making, or because it becomes more profitable to deploy the aircraft to other markets.

In addition, the competing operating environments of international, interstate and intrastate airlines dictate the need for flights to depart in line with set schedules. International airline schedules reflect both market preferences and the need to integrate with schedules in large hub airports in Asia and the Middle East and through to endpoint destinations, particularly Europe and UK. Interstate airline flight schedules reflect both market preference and the need to integrate with constraints at Australia's East Coast airports, particularly the night time curfew at Sydney Airport and time zone differences. Intrastate airline flight schedules reflect the strong market preference/requirement for air services that integrate with the operating logistics of resource operations (mines and LNG plants).

The impact on air services would differ in some respects for each market if Perth Airport does not have the capacity to meet airline scheduling preferences/requirements, however the following common impacts can be expected:

- loss of services (less choice for Western Australians in terms of where to fly and when to fly),
- higher airfares due to higher unit costs for remaining services and less supply of aircraft seats to meet the available demand, and
- loss of economic opportunity for Western Australia, reflecting the knock-on impact on tourism and resources companies.

These costs were quantified at the height of the mining boom when demand for capacity peaked. In 2012, a State Treasury report estimated that the impact to the airline industry and its passengers of delays was $72 million per year. Qantas publicly stated that it estimated that the annual impact of runway delays at Perth Airport amounted to $10.8 million per year, while the Chamber of Minerals and Energy Western Australia stated that a one-hour delay at a mine site cost approximately $100,000.

3.1.2 Constraints on Growth Without the New Runway

The no-change scenario would constrain the number of movements that can occur at Perth Airport. The extent to which airlines will forgo scheduling additional flights in the absence of additional runway capacity was modelled based on aircraft movement projections. Simulation modelling completed by Perth Airport shows that by 2045, without additional runway capacity being provided, approximately 140 aircraft movements will be forgone each day (or approximately 51,000 per year).

An economic impact assessment considered a more conservative capacity restriction of approximately 25,000 aircraft movements per year. This is shown in Figure 3-2.

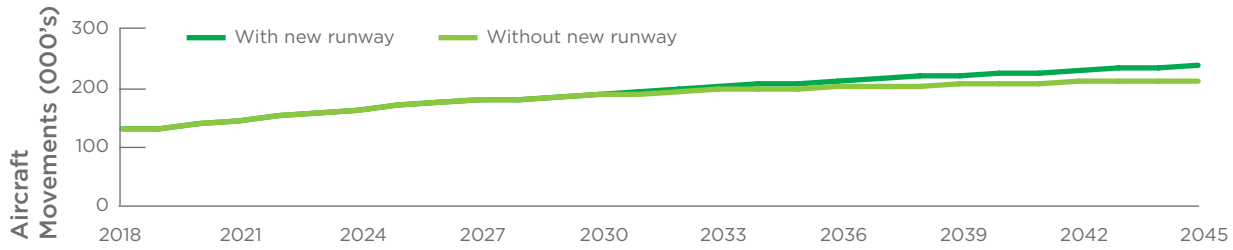


Figure 3-2 Comparison of annual total aircraft movements with and without the new runway
Source: ACIL Allen Consulting

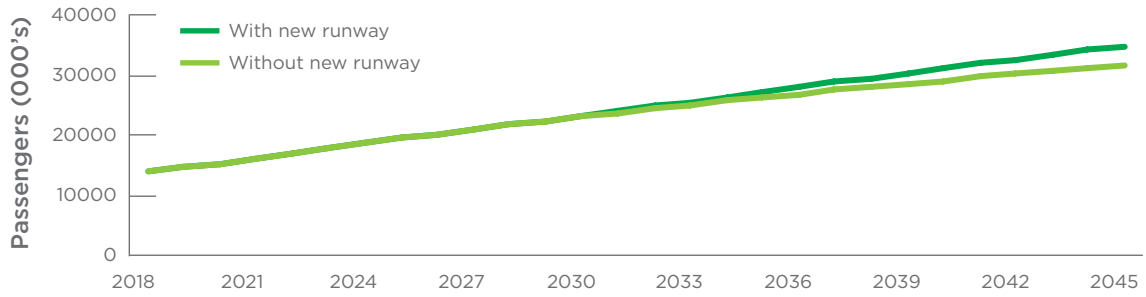


Figure 3-3 Comparison of annual total passenger numbers with and without the new runway from 2018 to 2045
Source: ACIL Allen Consulting

The total number of forecast domestic and international passengers at Perth Airport with and without additional runway capacity in each year to 2045 is shown in Figure 3-3. The passenger projections without additional runway capacity incorporate an 'up-gauging' factor whereby it is assumed that airlines will respond to the constraint, in part, by increasing aircraft size. Specifically, it is assumed that passenger movements per aircraft would grow at 0.3 per cent a year without additional runway capacity.

The unmet domestic and international passenger demand in the absence of additional runway capacity (the difference in passenger numbers with and without additional runway capacity) is shown in Figure 3-4. By 2045, total unmet passenger demand will exceed five million passengers per annum. Cumulatively, between 2025 and 2045, unmet passenger demand is expected to total approximately 41.8 million passengers.

3.1.3 Demand Management

If the new runway is not constructed, in an effort to ameliorate the adverse consequences of uncontrolled demand, including delays and congestion, demand management initiatives (both economic and regulatory) could be further explored. These initiatives include peak pricing and aircraft size restrictions. However, industry experience has shown these are not effective over a long period of time.

3.1.3.1 Peak (or Congestion) Pricing

Peak period pricing is a capacity allocation efficiency initiative which involves charging airlines a minimum price to use the airport in periods of high demand. In effect, the main benefit of peak period pricing is that it acts as a disincentive to smaller aircraft operators to operate in the peaks thereby freeing up capacity for larger aircraft carrying significantly more passengers, and allowing more effective use of the runway and taxiway systems in the peak periods.

It is also the case that many larger aircraft servicing international and interstate routes, and those aircraft servicing the resources sector, have to move their arrival and departure times. Many international carriers, for example, are constrained by the slot allocation at their points of origin and destination which in many cases will be busy international hubs such as Dubai, Doha, Singapore, Kuala Lumpur, Hong Kong and London Heathrow. Interstate RPT flights are similarly constrained by slot allocation and the aircraft utilisation requirements of the major airlines. Charters servicing the resources sector are constrained by the shift rosters of workers, with arrival and departure times dictated by the start and finish times of rosters. On the other hand, smaller intrastate charter and RPT flights do not have the same constraints or at least not the significant constraints under which other airlines or routes operate. Without a disincentive such as peak pricing, smaller or any aircraft which may have greater flexibility to move their arrival or departure time, might otherwise choose to operate in the peak period - increasing peak period demand, reducing the number of slots available to other airlines and reducing the overall efficiency of the airfield during peak periods. To the extent that Perth Airport is able to extract greater efficiencies from its existing runway, this allows significant capital investment for a new runway to be deferred thus keeping the cost of operating at Perth Airport lower for longer. Deferment of construction and ultimate operation of the new runway does not negate the need for early and timely approvals. As construction and commissioning of the new runway is likely to take five years, early approvals are required to ensure that construction can commence in a timely manner consistent with demand forecasts.

3.1.3.2 Aircraft Size Restrictions

Aircraft size restrictions is when an airport imposes minimum sizes for aircraft operating during a peak period. The effect of this policy would be to encourage airlines to use larger aircraft at peak times, thereby maintaining the level of passenger capacity but reducing the overall number of aircraft that use the runway. This would also require the destination or departure airport to be able to accommodate these larger aircraft, which could see many regional airports and air strips on mine sites needing to be upgraded or expanded.

Many of the flights that operate during the Perth Airport's peak periods service FIFO operations and regional Western Australia. As such, the demand management measures, if they were effective, would have greatest impact on regional Western Australian services which are serviced by smaller aircraft and commonly operate in the peaks. Therefore, the impact would be greatest for regional Western Australians who greatly depend upon aviation connections with Perth, and for the resource sector which generates significant economic benefits in Western Australia.

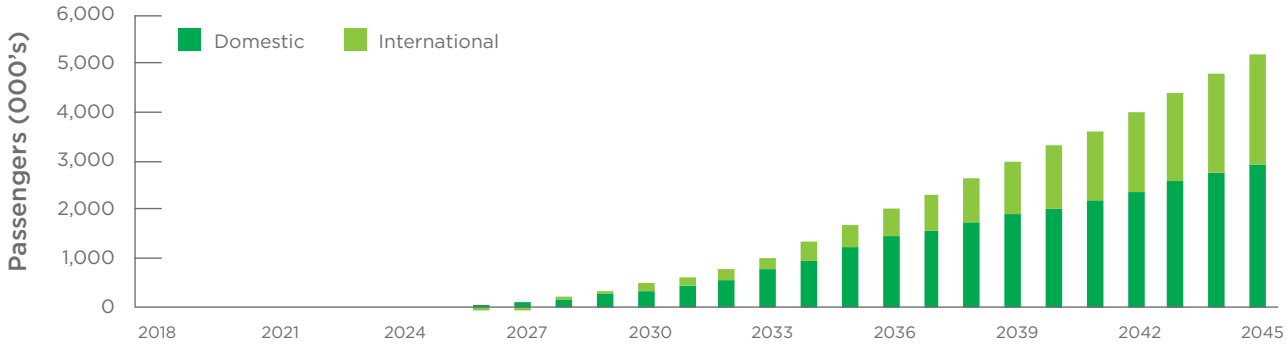


Figure 3-4 Unmet passenger demand without the new runway from 2018 to 2045
Source: ACIL Allen Consulting

3.2 Optimising Existing Infrastructure at Perth Airport

Perth Airport, in collaboration with Airservices, continually looks at opportunities to improve the efficiency and capacity of the existing runway system through operational processes or procedures and constructing additional airfield infrastructure. Any changes must be considered and balanced against any potential impacts on the safety, environment and surrounding communities.

Between 2008 and 2013, Perth Airport undertook a program of significant airfield infrastructure projects. $250 million was invested in new taxiways, taxiway widening, enhanced lighting and approach equipment as well as runway overlays.

Through a series of improvements, the existing peak-period hourly capacity has improved from 38 departures to 40 departures per hour. However, future meaningful capacity gains have now been exhausted.

In 2012, Airservices and Perth Airport engaged NATS, the UK's largest air-navigation service provider, to study Perth Airport operations to support the Airport Capacity Enhancement (ACE) program that was being undertaken at Melbourne, Sydney, Brisbane and Perth airports.

The ACE program focused on three main themes:

- **Harmonisation**: The steps taken to increase capacity needed to be in harmony with current Australian standards and practices, while providing sufficient room for the development of local procedures.
- **Collaboration**: Every moment matters and every second counts. Over many aircraft movements, the seconds add up to create additional capacity that can in turn reduce delays. The benefits are shared by all and can be achieved collaboratively.
- **Performance management**: Performance must be monitored and measured to tactically manage improvement in air traffic control and pilot performance. By measuring performance, new methods can be assessed and refined.

The ACE study identified several opportunities to enhance the existing airfield and airspace capacity and performance under the three main themes. Based on the three themes, 28 initiatives were considered and as of April 2018:

- 21 were closed or completed,
- 5 were ongoing or underway,
- 2 were delayed.

The ongoing or underway initiatives include improved runway occupancy and response times, increased access to military airspace, improved air traffic control supervisor coordination, increase arrival rate during periods of low departure demand and increase the arrival rate for the main runway.

Although initiatives are shown as ongoing or underway, most have been implemented with minimal further improvements possible. It is anticipated that a number of these initiatives will be closed out at the next review.

Perth Airport was responsible for assessing and delivering seven of the 28 recommendations. These were:

- the introduction of a schedule coordination system,
- an improve taxiway layout to allow more efficient movement of aircraft,
- amended the surface and airborne traffic flows as a result of Terminal 2 operations, toensure efficiency is maintained,
- addressing airfield-chokepoints including assessing the taxiway layout to improve effectiveness and support optimum traffic flows,
- consideration of a dedicated helicopter aiming point (which was determined not to be required),
- provision of a dual full-length runway entry points to optimise departures, and
- consideration of Rapid Exit Taxiways (RETs) to assist to reduce runway occupancy time.

Perth Airport considered, and where feasible, implemented changes to address the initiatives either via the introduction of new systems (as per the recommendation of a schedule coordination system) or constructing additional infrastructure.

Key ACE initiatives that were either explored or implemented are highlighted above.

3.2.1 Schedule Coordination System

Schedule coordination is a way of managing and balancing airport demand and capacity through the application of a set of rules that are put in place by an airport or by legislation. Coordination involves the allocation of airport capacity via 'slots' to airlines and other aircraft operators to ensure a viable airport and air transport operation. Coordination is a process to maximise the efficient use of airport infrastructure.

Prior to 2013, domestic airlines determined their own flight schedules. The delays had been relatively minor and were accepted by all in the industry as being similar to a freeway where delays occur during peak periods. However, the phenomenal growth of traffic at double the average national rate saw delay times escalating during peak periods. Major infrastructure upgrades are long term and the introduction of a scheduling system provided a short-term initiative to address the delays.

At the same time, international flights were being accepted based on a Notice of Capacity (NOC) that was issued by Perth Airport as a guide to the passenger processing capacity of T1 International. The NOC focused on the capacity of baggage processing and ignored factors such as parking stand availability and the variability in international flight times, which can see some flights arrive up to 90 minutes earlier than scheduled when there are strong tailwinds. The NOC also ignored the separation and sequencing requirements for aircraft using runways.

This allowed inappropriate scheduling of aircraft arriving or departing the airport resulting in lengthy flight delays and passenger processing times. As airport traffic continued to increase, it was clear that a schedule coordination system was needed for both domestic and international flights to manage the capacity of the runways, and parking stands.

In March 2013, Perth Airport introduced a non-regulated (airport managed) schedule coordination system to balance demand and supply, and to achieve a higher level of control in peak periods.

Under the schedule coordination system, an airline or aircraft operator (international or domestic) must have a slot allocated to it in accordance with the system before operating a flight into or out of Perth Airport. A slot is a permission given by Perth Airport in relation to a single aircraft for a planned operation to use (subject to the other relevant conditions of use) the full range of airfield infrastructure necessary to arrive at or depart from Perth Airport on a specific date and time. The total number of slots available to be allocated (coordination parameters) is set out by Perth Airport in its updated NOC which includes apron capacity, international passenger arrival rates and international departure rates. The NOC is periodically reviewed by Perth Airport, and considers acceptable delay to airlines and aircraft operators.

The introduction of schedule coordination has resulted in a vast improvement to on-time performance as reported by the Bureau of Infrastructure, Transport and Regional Economics, with Perth Airport regularly having the best results in the country. In its first year of operation the schedule coordination system reduced arrival and departure delay by approximately 60 per cent. It also provides the airlines and passengers with more certainty regarding departure and arrival times.

3.2.2 Altering Airfield Traffic Flows and Additional Infrastructure

The ACE review also assessed the layout of the runway and taxiway system to consider the impact that ground infrastructure and traffic flows have on arrival and departure capacity, and whether changes could accommodate increased traffic flows. It was concluded that changing where aircraft enter the runway would allow better sequencing of the departure order of flights and therefore improve capacity.

The change to traffic flow was addressed with:

- the opening of T2 in March 2013,
- an extension to taxiway Charlie (which opened June 2015), allowing aircraft from T1 or T2 to taxi directly to the Main Runway 03 threshold, removing the requirement to cross any runways, and
- the opening of T1 Domestic pier in November 2015.

These developments supported the relocation of airlines from the west of the main runway (03L/21R) to the east of the runway, in effect splitting the direction that aircraft were entering the runway. This splitting of the traffic, although not the reason for these investments, allowed better sequencing of departing aircraft, however, on their own, did not cause an increase in the capacity of the existing runway system.

In August 2016, Perth Airport installed transmissometers that help to assess the level of visibility on the airfield. This assists by providing lower approach minima and improved ground traffic flow during low visibility operations. Their use is awaiting Bureau of Meteorology approval.

Perth Airport also explored the construction of additional taxiway infrastructure, including RET. A RET is an exit point from the runway constructed at an angle that allows arriving aircraft to exit the runway at a higher speed. This reduces the time that the aircraft is on the runway.

The implementation of RETs on the existing main runway (03L/21R) was investigated in consultation with aircraft operators. Investigations showed that RET locations could not be optimised due to the geometry of the current runway intersection and legacy airfield infrastructure constraints, with consideration to terminal locations. It was agreed with aircraft operators and stakeholders that the cost of introducing RETs on the existing runways would not provide sufficient benefit.

Although the assessment determined that no additional infrastructure would provide improved efficiency or increase the runway capacity on its own, Perth Airport continues to periodically review and assess the need for additional taxiway infrastructure, including RETs.

3.2.3 Reducing Runway Occupancy Times

Another factor that affects movement rates is runway occupancy times (ROT). ROT is the time that an aircraft spends on the runway either for a departure or after landing. ROT is important for runway efficiency as the less time a landing aircraft spends on the runway, the faster a departing aircraft can be cleared for take-off. Even small reductions in the average time an aircraft spends on the runway can have a significant impact on the overall runway capacity.

The ACE review found line-up times and pilot reaction times when on the runway were below international benchmarks.

Experience at European airports has shown that just five seconds lost per aircraft can result in two missed runway slots per hour. These airports achieved improvements in runway capacity of between five and 15 per cent by reducing ROT. At busy airports, achieving minimum time on the runway is entrenched in pilot performance. To this end, as part of the ACE program, Airservices worked with Perth Airport and airlines to improve ROT.

Some initiatives included determining preferred taxiways to exit the runway after landing with the aim of reducing the amount of time on the runway rather than the previous practice of aircraft taxiing along the runway until reaching the most convenient taxiway to the required parking position, as shown in Figure 3-5. Also, an educational program was undertaken including publication and distribution of material to pilots such as airport efficiency procedures, as shown in Figure 3-6.

By March 2017, these initiatives saw the average ROT at Perth Airport improved by between six and 21 per cent, depending on the runway.

3.2.4 Airport Capacity Enhancement Achievements

In addition to the aforementioned improvements the following has been achieved:

- as at June 2016 Airservices noted that the ACE program has improved peak number of departures and arrivals per hour by 9.5 per cent and 2.9 per cent respectively, while average ROT (runway occupancy time) has decreased by 4.1 per cent,
- during 2013 the traffic holding was 30 minutes, and in December 2013 was reduced to 20 minutes. The reduction reflected the effectiveness of the ACE program, and in December 2014 was further reduced to 15 minutes. In December 2015, traffic holding during the peak shoulder periods was reduced to ten minutes,

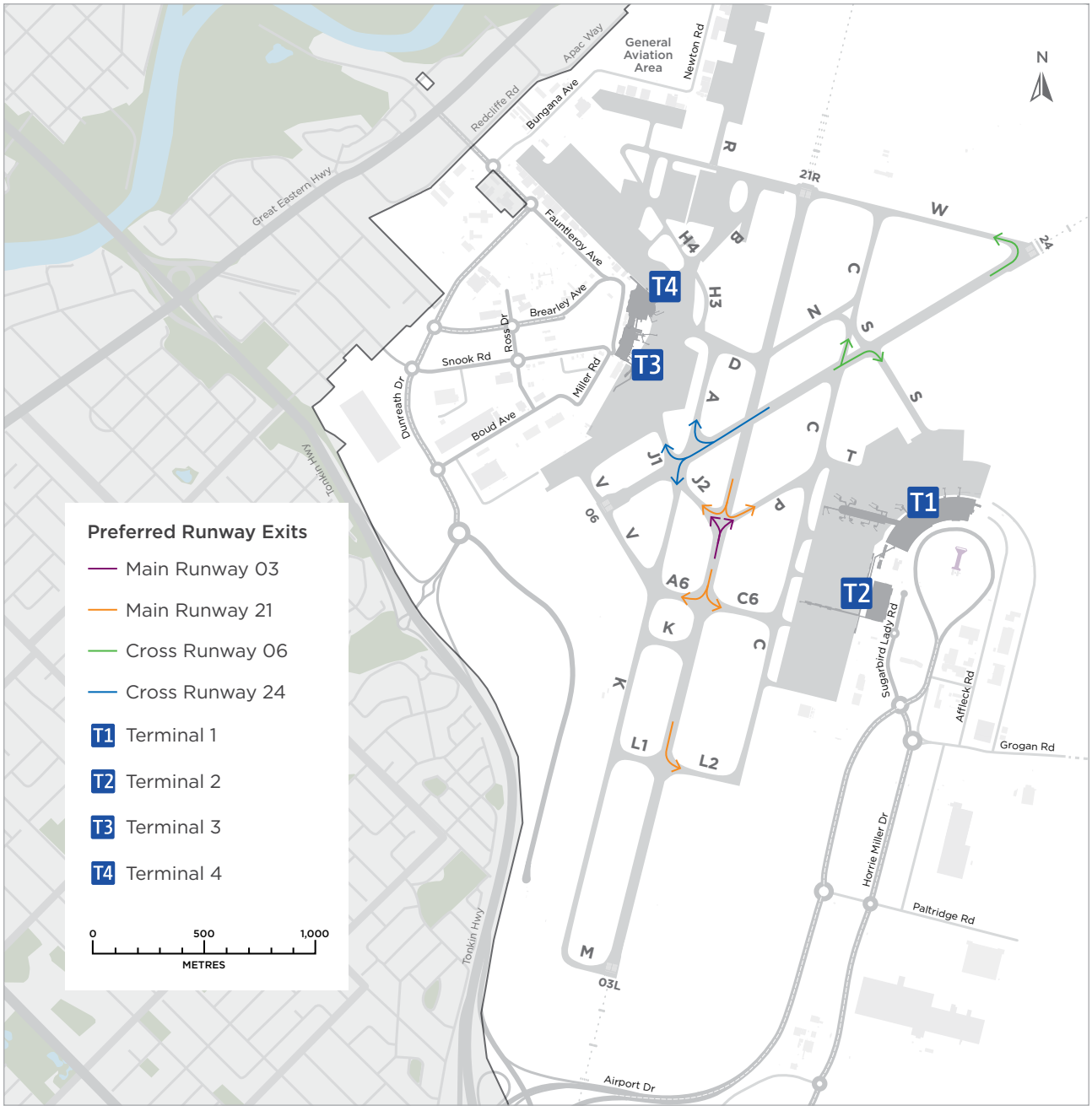


Figure 3-5 Perth Airport preferred runway exits as published by Airservices in 2012
Source: Airservices

- introduction of Standard Terminal Area Arrival Speeds (STAAS). This provides predictable spacing and speeds on final approach to an aerodrome which helps to optimise arrival sequencing and assist efficient departure management,
- improving Feeder Fix Flow to aid navigation and the efficiency with which aircraft can be flown between waypoints (Feeder Fix Flow is where aircraft are given a time to fly over a designated inbound waypoint to achieve a consistent and efficient flow of arriving aircraft), and
- introducing improved monitoring and reporting on airport performance, air traffic flow management compliance, average runway occupancy times and STAAS.

Further information on the ACE program, including a Strategic Plan and Roadmap for Perth, as well as progress reports, is provided at airservicesaustralia.com.

The ACE program has explored a range of areas to gain efficiencies from the existing infrastructure, with positive results. However, while the implemented measures have delivered some airfield and airspace efficiencies and contributed to a significant reduction in delays and congestion, they have not resolved the fundamental issue of demand exceeding capacity at certain times of the day or the ability of Perth Airport to provide for future air traffic demand.

The ACE study concluded that while substantial unused afternoon arrivals capacity could be realised, the extent of improvements in the midweek morning departures peak that can be realised is expected to be much more limited.

Airservices also estimated that the ACE initiatives could result in small capacity increases but not enough to meet demand without major investment in airport infrastructure.

Perth Airport has therefore largely exhausted efficiencies associated with the existing infrastructure and there are no further meaningful enhancements to the existing airfield configuration that could be implemented to increase the capacity of the airfield to meet demand in a cost-effective manner.

AIRPORT EFFICIENCY PROCEDURES

12 NOV 2015 **PERTH, WA (YPPH)**

1 – PERTH – DEPARTING AIRCRAFT

1.1 – Whenever possible, complete cockpit checks prior to lineup and keep any checks requiring completion on the runway to a minimum.

1.2 – On receipt of line up clearance, taxi into position as soon as possible. Do not backtrack.

1.3 – Pilots and ATC should endeavour to keep aircraft moving and avoid a standing start.

1.4 – Commence the take off roll as soon as take off clearance is issued.

Figure 3-6 Airport Efficiency Procedures published 12 November 2015
Source: Airservices published Departures and Approach Procedures

3.3 Increased Use of Other Airports

Another option to meet the growth in air traffic could be to expand the use of other airports.

Other than Perth Airport, there are no commercial aerodromes that support large passenger jet aircraft in the Perth region.

A significant factor to also consider when investigating the use of alternative airports is the design of airspace. Unlike other Australian capital city airports, Perth Airport has two major aerodromes in close proximity. Jandakot Airport is located approximately 16 kilometres south of Perth Airport and is one of the busiest pilot training airports in Australia, while RAAF Base Pearce is approximately 30 kilometres north of Perth Airport and requires a large portion of airspace for military operations. The proximity of these aerodromes greatly reduces the options available and limits where aircraft can fly.

In examining whether alternate airports could be used to ease capacity constraints the following airports and airfields were considered:

- Jandakot Airport,
- Cunderdin Airport,
- Busselton - Margaret River Regional Airport,
- other regional airfields,
- RAAF Base Pearce,
- a second Perth metropolitan airport, and
- relocation of Perth Airport.

3.3.1 Jandakot Airport

Jandakot Airport is located approximately 16 kilometres south-west of Perth Airport, as shown in Figure 3-7. It is the primary general aviation airport in the Perth metropolitan area and is one of the busiest airfields and pilot training bases in Australia in terms of aircraft movement numbers. The maximum theoretical operating capacity of Jandakot Airport, at its ultimate development (including a proposed fourth runway), was identified in the Jandakot Airport Master Plan 2014 as 460,000 fixed-wing movements and 66,000 helicopter movements per annum.

The airport was opened in 1963 and has a multi-runway configuration, comprising two parallel runways and a cross runway:

- 06L/24R is 1,392 metres in length and 30 metres wide,
- 06R/24L is 1,150 metres in length and 18 metres wide, and
- 12/30 is 990 metres in length and 30 metres wide.

The Jandakot Airport Master Plan 2014 notes that, due to runway and taxiway pavement characteristics, aircraft operating regularly at the airport are restricted to types with maximum take-off weight less than 5,700 kilograms (i.e. maximum 18 seats). While the runway lengths may be adequate for larger aircraft, the historic taxiway and apron system restricts use of significantly larger aircraft (such as those types used for regular passenger transportation) due to wingspan clearance requirements. Additionally, the airport has limited space to expand capacity due to the restricted amount of aviation land and proximity to residential properties.

In June 2016, the Commonwealth Government approved an extension of runway 12/30 and associated taxiways at Jandakot Airport. According to Jandakot Airport, the extension of runway 12/30 to 1,418 metres provides significant safety benefits by facilitating all code 2B aircraft types on this runway even in hot, wet or windy weather, thereby avoiding both delayed operations due to conflicting flight paths and complexities for air traffic controllers in managing concurrent aircraft operations across two runway directions. The expansion and alteration of taxiways was proposed to alter ground movements and improve safety of the airfield.

Even with the approved runway extension, Jandakot Airport is not a viable option to support future air traffic growth as it does not have the infrastructure to support the commercial aircraft types that use Perth Airport.

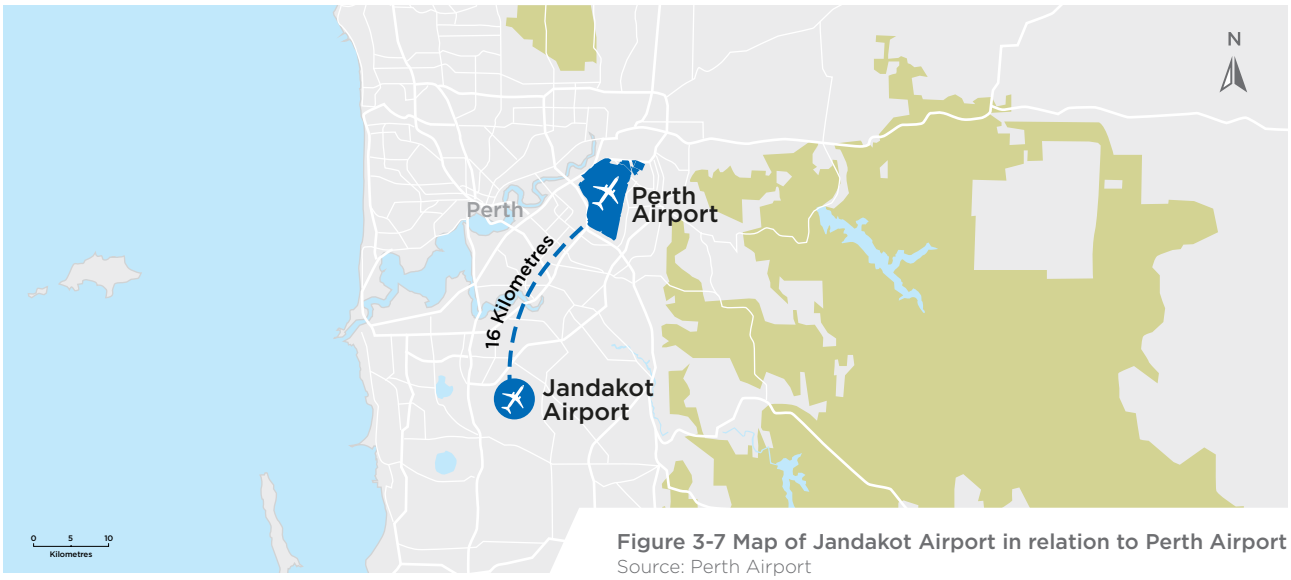


Figure 3-7 Map of Jandakot Airport in relation to Perth Airport
Source: Perth Airport

3.3.2 Cunderdin Airport

Cunderdin Airport is approximately 120 kilometres east of Perth Airport, or a two-hour drive by road, as shown in Figure 3-8. The airport was constructed early in World War II as an elementary training school for ab initio pilots for the Empire Air Training Scheme (EATS).

Cunderdin Airport currently houses the Gliding Club of Western Australia which was established in 1944 and is the longest established gliding Club in the State. The Club moved to the Cunderdin Airfield in 1959 and has been housed there ever since.

The airport has two runways:

- 05/23 is 1,841 metres long and 30 metres wide, and
- 14/32 is 1,509 metres long and 30 metres wide.

Private investors have proposed a $200 million investment to upgrade the runway to 2,600 metres long with appropriate lighting infrastructure to allow aircraft such as the Airbus A380 to operate. The purpose of the proposal is to allow for an alternate landing site if an aircraft needs to divert should it become impossible or inadvisable to land at Perth Airport or other aerodromes in Western Australia, typically due to weather.

In 2018, Perth Airport completed a $36 million upgrade of the high-intensity approach lighting and runway lighting on the main runway (03L/21R) from Category I to Category III. This gives domestic and international aircraft improved visibility in inclement weather and will therefore reduce the number of times that airlines would have to divert to an alternate airport.

At the time of preparing this MDP, it was unclear when, or if, the Cunderdin Airport proposal would proceed, and whether there will be terminal infrastructure with readily available public transport network to support the processing of passengers. It was also unclear if this would be an attractive alternative for passengers due to the considerable distance from Perth. Given this uncertainty and remote location, Cunderdin Airport is not seen as a viable alternate for easing capacity constraints at Perth Airport but rather supports the continued growth of Perth Airport as the major international airport.

3.3.3 Busselton-Margaret River Regional Airport

Busselton-Margaret River Airport is located approximately 180 kilometres south of Perth Airport, or a two-and-a-half-hour drive by road, as shown in Figure 3-9. There is currently a single runway that is 1,800 metres in length and 30 metres wide.

Busselton-Margaret River Regional Airport is currently undergoing a redevelopment that will see an extension of the existing runway as well as expansion of apron and terminal facilities. The $69.7 million project is designed to facilitate interstate flights to destinations including Melbourne and Sydney, and international passenger and freight opportunities to South East Asia and China.

Unlike the NRP which is privately funded by Perth Airport, the upgrade of Busselton-Margaret River Regional Airport is supported by a contribution of $59.95 million from the State Government's Royalties for Regions program, the State Department of Transport's Regional Airports Development Scheme (RADS), the City of Busselton South West Development Commission and Tourism Western Australia.

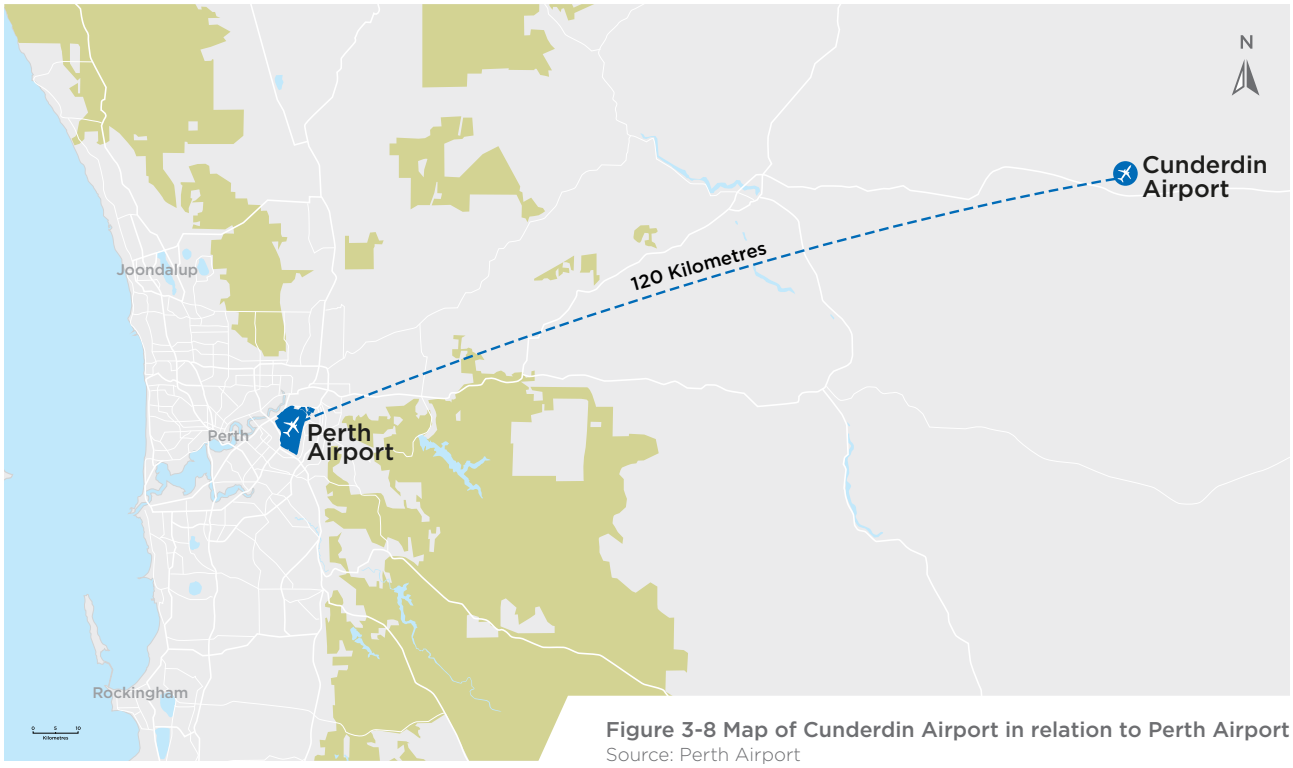


Figure 3-8 Map of Cunderdin Airport in relation to Perth Airport
Source: Perth Airport

The runway was extended to a length of 2,520 metres and is capable of supporting the arrival and departure of aircraft like the Boeing 737 and Airbus A320.

The terminal is also being upgraded for domestic operations by increasing terminal capacity from 140 passengers in a peak period to a capacity of more than 350 passengers in a peak period. However, it will not have the capabilities to process international passengers. The State Government recently announced that work on the $13 million terminal would cease until the City of Busselton could sign a deal with a major airline.

The redevelopment had been planned for three interstate flights per week at the time of opening, with this number increasing to nine interstate flights per week by 2031.

The combination of distance and the lack of facilities means Busselton-Margaret River Airport is not seen as a viable alternative to support intrastate, interstate and international growth for Perth.

3.3.4 Other Regional Airfields

While there are other smaller airfields such as Murray Field near Mandurah and Serpentine Airfield, these airfields do not have the infrastructure to support the mix of aircraft types or volumes anticipated. As such, they are not seen as viable alternate airports that could be used to support the projected growth of Perth air traffic.

3.3.5 Royal Australian Air Force (RAAF) Base Pearce

RAAF Base Pearce is a military base approximately 30 kilometres north of Perth Airport. It has three runways:

- 05/23 which is 1,691 metres long and 45 metres wide,
- 18L/36R which is 2539 metres long and 45 metres wide, and
- 18R/36L which is 1741 metres long and 30 metres wide.

RAAF Base Pearce is used as a staging base for Defence operations in the Indian Ocean and Western Australia. It also serves an important function as a major flight training school for the RAAF.

The possibility of using Pearce as an alternate airport for civil operations

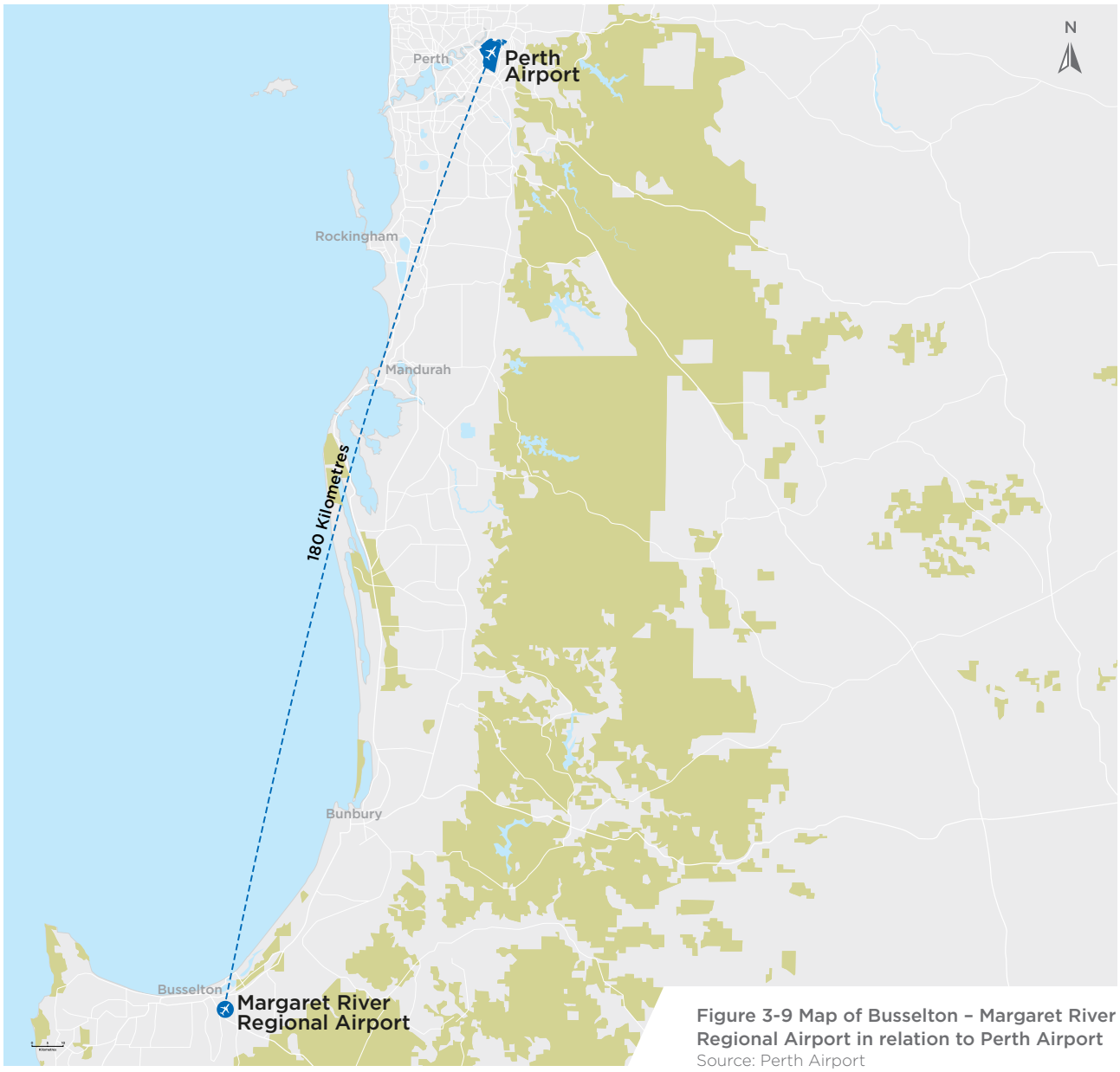


Figure 3-9 Map of Busselton – Margaret River Regional Airport in relation to Perth Airport
Source: Perth Airport

has been considered previously. In 1979, the Commonwealth-State Advisory Committee studied Western Australia's airport needs and considered the viability of Pearce Airbase for civilian use. The study noted that Pearce was unacceptable as a civil airport site owing to operational constraints imposed by the topography of the Darling Scarp.

Furthermore, the Commonwealth Department of Defence has publicly stated that Pearce is not a suitable alternative civilian airport because operations at the airfield were not compatible with civilian airline operations. Pearce is one of Defence's busiest and most complex airfields and it operates using very specialised air traffic procedures to allow for the large quantity and type of air traffic.

RAAF Base Pearce also does not have the necessary infrastructure to support civilian airline operations – including the ability to park civilian aircraft, off-load passengers, process baggage and refuelling.

Given its strategic location, available infrastructure, current use as a military base, and with no plans from the Commonwealth Department of Defence to change the designation of the base, RAAF Base Pearce is not a suitable alternate airport for Perth.

3.3.6 Second Perth Metropolitan Airport

Given the importance of air travel to Western Australia it has been prudent for the State and Commonwealth governments to consider alternate sites for a second airport to accommodate the long-term aviation needs of the state.

In 1972, a committee was established to examine the airport requirements for Western Australia. The joint Commonwealth and State Government committee handed down its final report in 1979.

A preliminary site investigation was undertaken that examined existing aerodromes and their potential development, land availability and existing land use, urban development, surface access (existing and future), environmental factors including noise intrusion and air quality, and airspace considerations.

The preliminary investigation identified a list of possible aerodrome sites within the Perth Region, including existing aerodromes, and this was reduced to a short list of sites which warranted further consideration. Each of the sites on the short list was the subject of a fact-finding study to ascertain road access distances, environmental considerations and airspace problems.

Aviation forecasts were developed based on population growth, passenger demand and the types of aircraft anticipated to be operating in the future. Estimates were then developed for airport capacity at existing airports for annual and peak periods.

Each site on the short list was evaluated to ascertain its potential for development as a primary or secondary airport. The forecast demand for aircraft movements

Figure 3-10 Map of RAAF Base Pearce in relation to Perth Airport
Source: Perth Airport

was compared with the potential capacity of a site to determine a date when saturation of operations would be reached. The airport sites were then grouped into combinations of airport development strategies for further evaluations.

These airport development strategies were then evaluated considering economic costs and benefits, surface access, environmental and land use planning considerations. For the preferred strategy, further consideration was given to existing land use and suggestions made of land-use planning necessary to preserve or improve the existing compatibility between airports and their neighbours.

Twelve potential aerodromes locations within the general regions of Seabird, Joondalup, Gnangarra, Parkerville, Berry Brow, Northam, Mangenup, Karnup, Pearce, Gingin, Perth and Jandakot were considered by the committee. Of these 12 locations. Perth, Jandakot, Mangenup, Karnup, Gingin and Berry Brow were identified as warranting further consideration.

The committee evaluated options based on the ability of the aerodromes to be:

- a single primary airport site, capable of development to accommodate two widely spaced parallel runways,
- one of a pair of primary airport sites, each accommodating a single main runway, and
- a secondary airport site.

As previously stated Pearce was discounted due to its proximity to the Darling Scarp. Gingin was discounted due to its proximity to Pearce and the needs of future training requirements by RAAF. This left Perth and Jandakot airports, Mangenup, Karnup and Berry Brow for further consideration.

The Committee found that Jandakot and Berry Brow offered limited development potential for dual full length parallel runways and that only Mangenup, Karnup and Perth Airport would be considered appropriate for further consideration.

Airport development strategies were drafted for the remaining short-listed airports before cost differences associated with the construction and operation of each airport were considered. The committee recommended that a site in Karnup be selected as a site for an additional secondary airport for the Perth Region and action be taken to secure a suitable site for future development when required.

In 2015, the Western Australian State Government released the State Aviation Strategy that addressed a range of issues, including a future second airport for Perth.

The Strategy highlighted the following key action regarding the development of a second airport:

"To provide security for the expansion of airport services for the Perth metropolitan area, the State Government will cooperate with Airservices Australia and other Commonwealth agencies in planning studies to locate suitable sites for a future second Perth metropolitan airport and a future second general aviation airport that integrate with regional Structure Plans."

In reference to the second airport for Perth, the Strategy notes that preliminary work is being undertaken by the State Department of Planning, Lands and Heritage (DPLH) (previously State Department of Planning) and State Department of Transport to identify a suitable site for a proposed second metropolitan airport. It highlights that experience in New South Wales strongly suggests identifying and protecting a suitable site for a second Perth metropolitan airport is prudent urban planning, even though the current airport is likely to meet Perth's requirements for the next 40 to 50 years or beyond.

Furthermore, the State Aviation Strategy confirmed the status of Perth Airport as the sole and principal 24-hour airport for the Perth metropolitan region.

In April 2018, the State Government announced it would be reviewing the strategy. The updated strategy is expected to be released in 2020.

With regards to the future site for an alternate airport, the Strategy notes that costs of establishing an emergency airport, or a secondary metropolitan airport, outweigh the benefits.

The State Aviation Strategy and the State Government have not announced the preferred location or provided any commitment or funding towards the projects. Additionally, due to timeframes to construct the runway, even if planning were to commence immediately, Perth Airport conservatively predicts a lead time of 10 years for approvals and construction associated with a new airport.

In the case of Western Sydney Airport, policy makers first considered the need for a second airport in Sydney in the 1940's. It wasn't until 1986, some 40 years later, that land began to be purchased at the Bagerys Creek site. An environmental impact statement was released for public comment in October 2015 with the final approval granted December 2016. Construction is scheduled to commence early 2018 and won't be complete until 2026, with an expected cost in excess of $2.4 billion.

Given Australia's most recent experience with planning for a second airport, it is unlikely that an airport would be constructed in time. This, combined with the cost of building the second airport, means this is not a viable option to meet the immediate growth needs or to meet forecast demand at Perth Airport.

3.3.7 Relocating Perth Airport

Given the billions of dollars in investment of both public and private funds that have gone into the development of the airport, closing Perth Airport would not be a viable solution and an alternative site has not been identified. Any current issues with noise from aircraft would not lessen but simply shift the areas where people are affected.

3.4 Perth Airport Aviation Development Plan Options

Expansion to the existing runway infrastructure at Perth Airport was also considered.

The Master Plan 2014 safeguards for extensions of the two existing runways. These being:

- extending the cross runway 06/24 to the north-east from the current 2,163 metres to a potential total length of 3,000 metres, and
- extending the main runway 03/21 to the north from the current 3,444 metres to a potential total length of 3,800 metres.

The impact and limitations of these options for runway capacity and operations, and why extending either runway would not provide capacity to cope with peak demand Perth Airport, are outlined below.

3.4.1 Extend the Cross Runway (06/24)

Extension of the cross runway (06/24) to 3,000 metres would enable the runway to accommodate all aircraft types, including large Code F aircraft (e.g. Airbus A380).

Simulation modelling undertaken by Perth Airport showed that extending the runway would allow for an increase in arrivals from the north/east and departures to the north/east. However, there would be very little increase in capacity when arriving from the south/west or departing to the south/west.

This increased capacity would be achieved by introduction of Land and Hold Short Operations (LAHSO). LAHSO is an air traffic control procedure for allowing aircraft to land on the cross runways and hold (stop) short of the intersection, thereby allowing concurrent use of both runways.

While the extension and LAHSO operations could increase capacity, it is expected that this additional capacity would only be sufficient to accommodate around 193,000 annual aircraft movements, after which further runway capacity would be required.

The Master Plan 1999 acknowledged that disadvantages associated with any extension of the existing cross runway 06/24 included an increased number of flights and noise impacts over suburbs to the north-east and that the uptake in airfield capacity would be marginal. Extension of the cross runway is not the preferred option as the new runway would still be required at some point in the future to provide additional capacity.

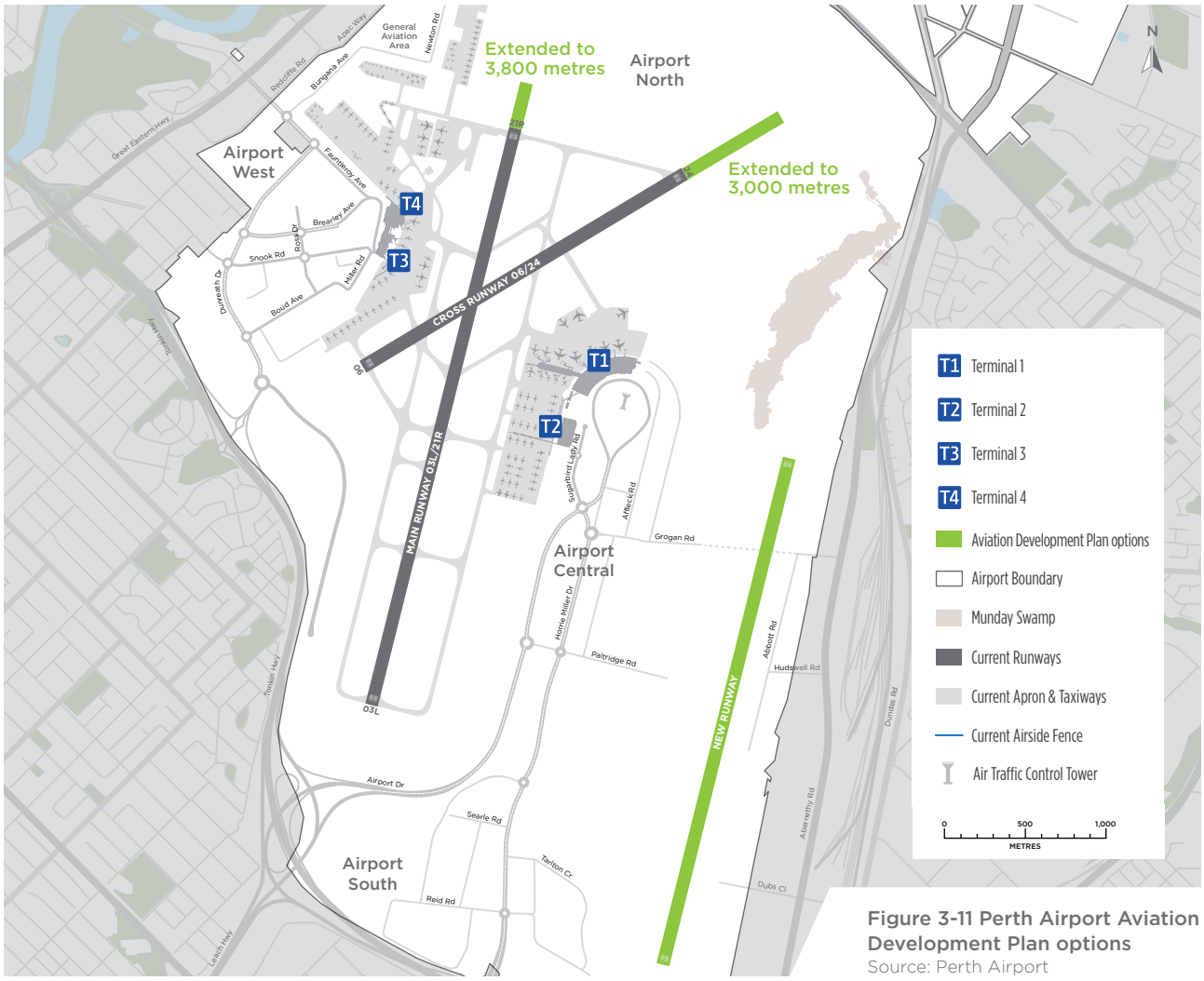


Figure 3-11 Perth Airport Aviation Development Plan options
Source: Perth Airport

3.4.2 Extending the Main Runway (03R/21L)

The ultimate length of the main runway (03L/21R) is planned to be extended by 356 metres to 3,800 metres. The benefit from increasing the length of the main runway (03L/21R) is to accommodate large aircraft at maximum take-off weight on ultra-long-haul flights in hot conditions. The planned extension is based on the expectation that future large aircraft types will have this extended flight range. The timing of the runway extension will depend on demand for ultra-long-haul flights and aircraft technology. It does not provide an increase in arrival and departure airfield capacity but simply caters for larger aircraft.

Qantas commenced direct flights between London and Perth in March 2018. Although the route is considered ultra-long haul, the Boeing 787-9 Dreamliner being used for this route is able to operate on the current main runway without any extension.

3.5 New Runway Alternate Locations

Prior to determining the preferred location of the new runway at Perth Airport, several options were explored.

When the parallel runway system was first planned for in the 1970's, Perth Airport had three operating runways, as shown in Figure 3-12. These were:

- main runway (03R/21L),
- cross runway (06/24), and
- an east-west runway with the designation 11/29 (now closed and used as a taxiway).

The following factors are key considerations when determining the location of a parallel runway system:

- maximise future capacity by allowing separation distances to ensure independent parallel instrument runway operations, with a minimum of 1,035 metres between centrelines,
- prevailing wind taking into consideration cross-wind and downwind aircraft allowances,
- land available,
- land uses surrounding the airport,
- other airport infrastructure, including the current and future location of terminal facilities, and
- airspace and other airports in the area.

In selecting the location for the parallel runway system, alternate parallel runway options were considered for:

- parallel to the cross runway (06/24),
- parallel to runway 11/29, and
- parallel to the main runway (03R/21L).

3.5.1 Parallel to Runway 11/29

Figure 3-12 shows the location of runway 11/29 on the estate and where a possible parallel runway could have been located. This location accounts for the location of the original terminal at Perth Airport (where T3/T4 is now) and ensuring that the parallel runway would be to the south of runway 11/29.

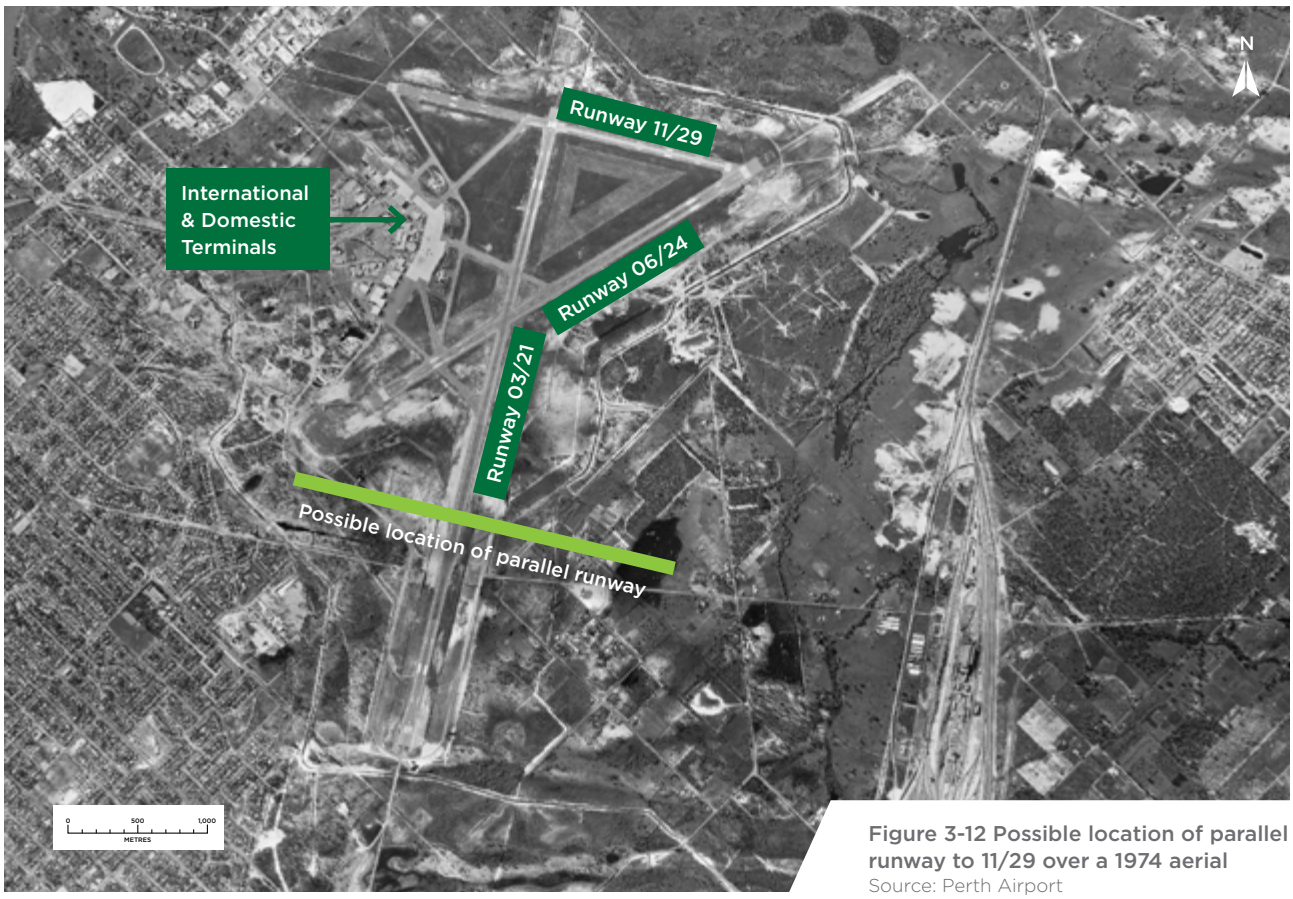


Figure 3-12 Possible location of parallel runway to 11/29 over a 1974 aerial
Source: Perth Airport

In this configuration, the preferred location would be two kilometres south of runway 11/29 to allow for independent parallel operations. At the time of considering the location of a parallel runway system, 11/29 was 1,758 metres long by 45 metres wide. An extension to runway 11/29 would also have been required.

Prevailing winds at Perth Airport are from a north-east or south-west direction. As such this meant that the use of 11/29 was very limited. It is this lack of usage that led to it being closed and converted to a taxiway in 2001. The Master Plan 1999 noted, "Runway 11/29 currently provides minimal advantages with respect to airfield capacity. Furthermore, circulation is complicated by the fact that the runway is also used as a taxiway."

Land use surrounding the airport at the time also did not support further extension of runway 11/29 as this would have seen more aircraft overflying already established residential areas compared to other options. To the east of Perth Airport there were limited expansion options with the railway line restricting how far the runway could be extended. At the time, the railway line that borders the east of the estate was being constructed, adding a further constraint that restricted the opportunities to extend this runway. Additionally, anecdotal evidence from pilots suggested that landing on runway 11/29 was affected by turbulence due to the proximity of the Darling Scarp to the east of Perth Airport. For these reasons a runway parallel to 11/29 was not considered a viable solution.

3.5.2 Parallel to Runway 06/24

Another location identified for a parallel runway was parallel and to the south of the cross runway (06/24) as shown in Figure 3-13.

This option would have suited the prevailing winds at Perth Airport as they are predominately north-east or south-west. However, expansion options for the runway would have been limited. As mentioned previously, at the time of considering the location for the runway the railroad was already being constructed to the east of the estate which limited possible expansion of the runway. Locating a runway in this location would also mean that more flights would overfly the established suburbs. Flights taking off to the north would also encounter issues with flying over the Darling Scarp as this location would put them closer to the hills.

This option would also make terminal planning and road access difficult. Given the location of the main runway (03L/21R), entry to the airport would need to come from the north, off what is now the intersection between Kalamunda Road and Abernethy Road. Ultimately the development of terminals would be restricted due to competing land uses and existing runway infrastructure.

For these reasons a runway parallel to runway 06/24 was not a viable option.

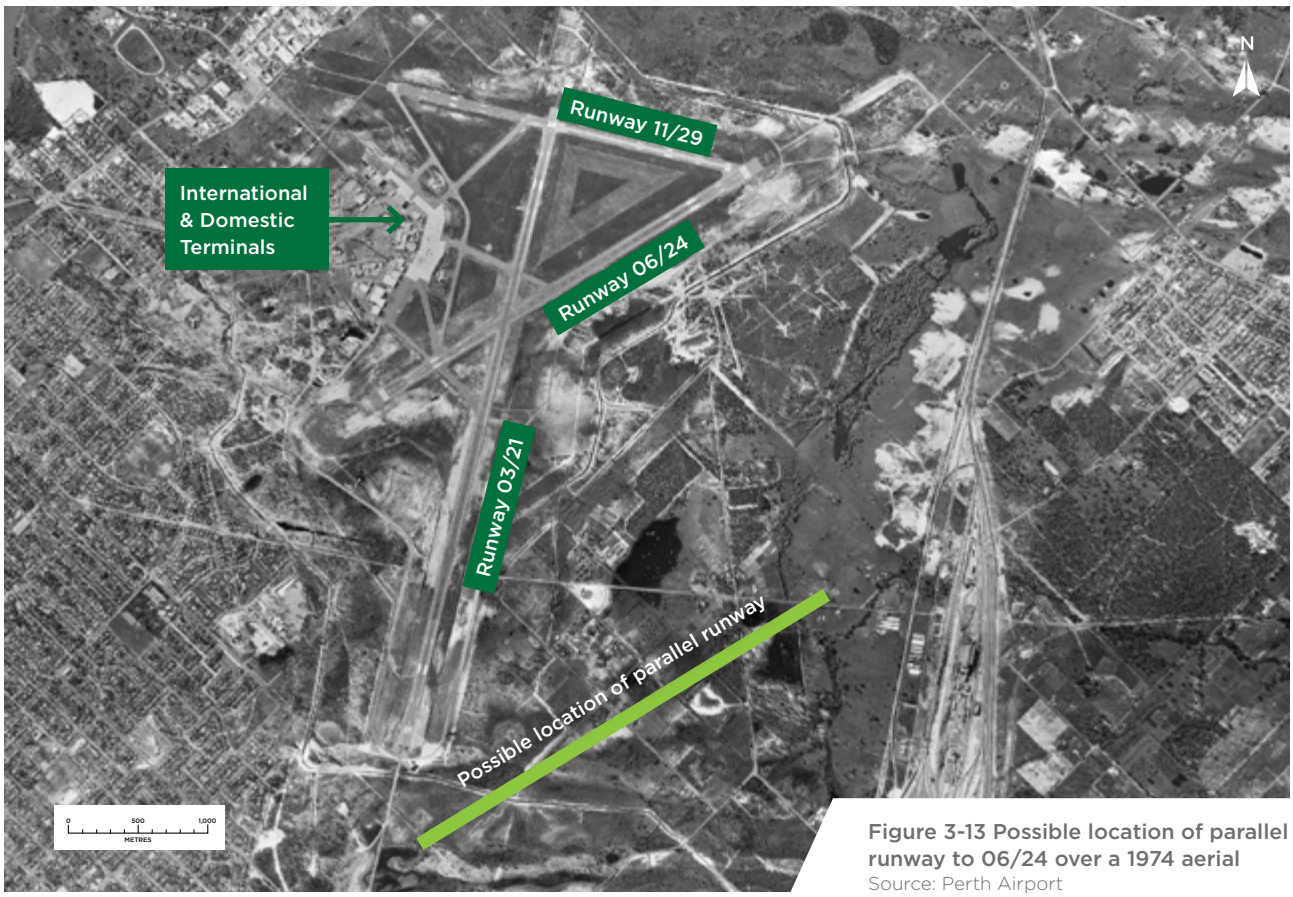


Figure 3-13 Possible location of parallel runway to 06/24 over a 1974 aerial
Source: Perth Airport

3.6 Preferred New Runway Option

In 1979, the Commonwealth-State Advisory Committee's study on Western Australian Airport Requirements considered airports that would be appropriate for a wide spaced parallel runway. The committee found that after weighing economic and environmental considerations, the existing Perth Airport should continue as the sole primary airport for the Perth Region.

When the preferred location for the parallel runway was being considered, land use to the north and south of the airport was primarily agricultural farming land or low-density housing. At the time this area was more sparsely populated and provided the opportunity for more appropriate development with sympathetic planning. The area immediately to the east of the estate was also primarily agricultural land and provided the opportunity to be purchased for the long-term use of the airport.

The original planned length was 3,800 metres which would run the full length of the eastern side of the estate and would have significantly impacted on the Munday Swamp heritage area. Figure 3-14 shows the proposed airfield layout from the Master Plan 1985.

The location to the east of the estate also provided for the future expansion of terminals and the commencement of consolidating all terminals into a single location that is now referred to as Airport Central. Over time, Airport Central will see all regular passenger transport operating from this precinct.

The layout for consolidation of terminals and the location of the parallel runway system was first released for public comment as part of the Master Plan 1985 planning process.

The Master Plan 1985, by the Department of Aviation, forecast that the new runway would be needed by 2004, so the process to acquire 284 hectares to be incorporated into the estate for the proposed new runway commenced.

The planning for the parallel runway system was revisited in the Master Plan 1999. The plan identified the new runway as the preferred runway expansion to "substantially improve the capacity of the airport and meet the demand generated by growth in the Perth region." At the time, aircraft movement forecasts predicted the existing runway infrastructure would be at capacity by 2018 and that several improvements to the airfield, including additional runway capacity, would be required.

In recognition of the heritage value of Munday Swamp, the location and length of the new runway was reviewed in the late 1990's.

Considering the trends in the type of aircraft operating at Perth Airport and emerging technologies at the time, the Master Plan 1999 proposed a reduction in the length of the new runway (03L/21R). The plan stated that "the planning analysis determined that the length of the proposed parallel runway only needs to be 2,700 metres in its ultimate development configuration to accommodate future aircraft movements."

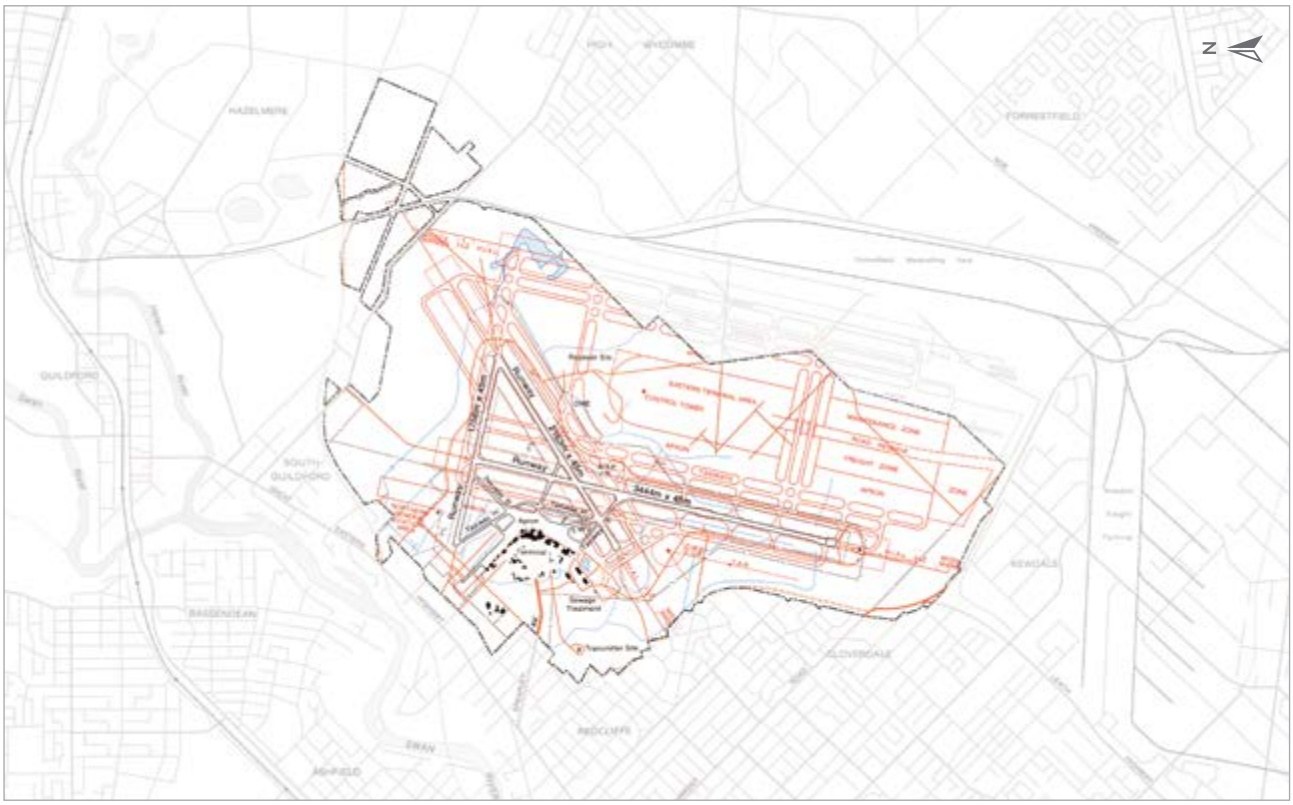


Figure 3-14 Master Plan 1985 runway configuration
Source: Perth Airport Master Plan 1985 (Department of Aviation)

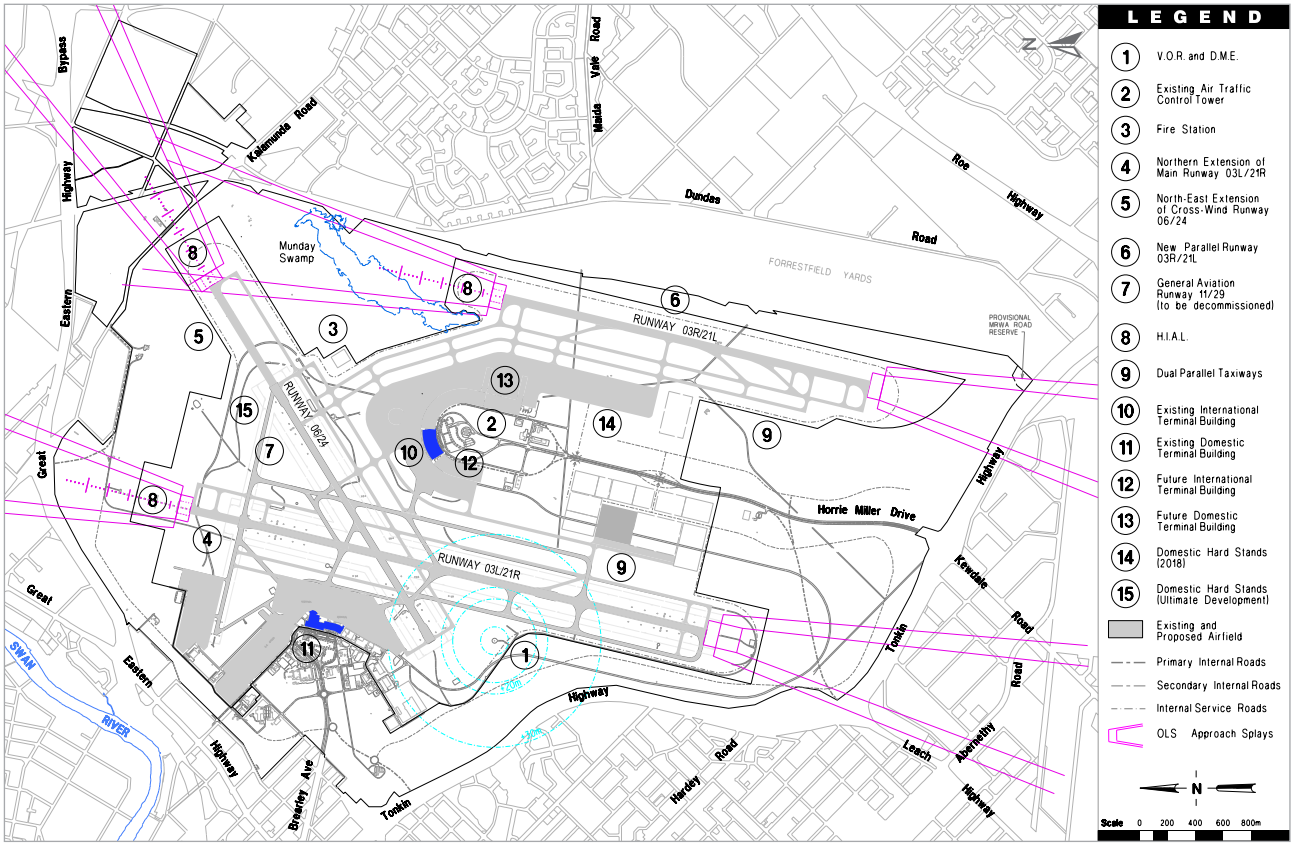


Figure 3-15 Master Plan 1999 runway configuration
Source: Perth Airport Master Plan 1999

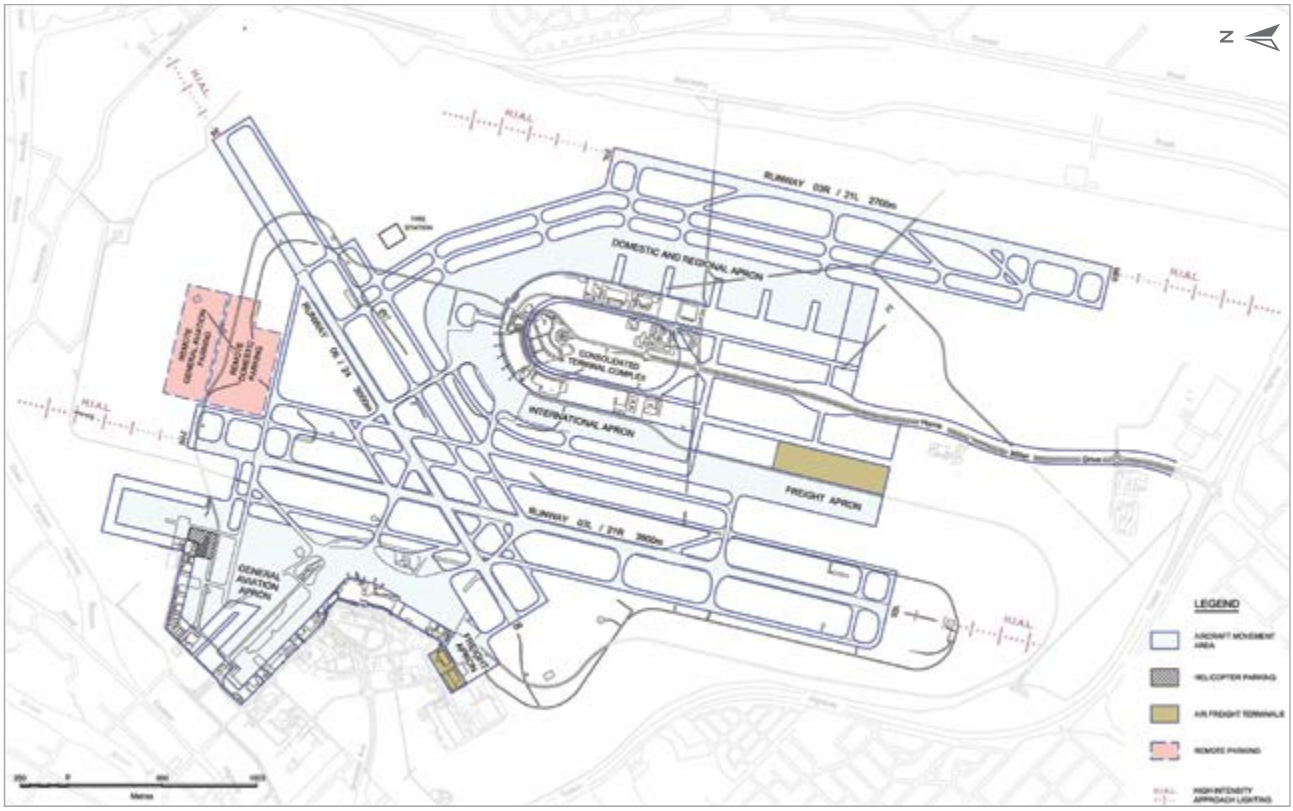


Figure 3-16 Master Plan 2004 runway configuration
Source: Perth Airport Master Plan 2004

The Master Plan 1999, as shown in Figure 3-15 also confirmed the separation distance of the parallel runway system stating: "For parallel instrument runways intended for simultaneous use, ICAO's (International Civil Aviation Organization) minimum required runway separation for independent parallel approaches under Instrument Flight Rules (IFR) is 1,035 metres. A 2,000-metre runway separation is proposed for Perth International Airport to enable independent parallel approaches, provide flexibility for future terminal expansion and supply adequate separation for parallel taxiway movement for future aircraft."

The Master Plan 1999 also stated that the preferred option for increasing airfield capacity in the future was the development of the new parallel runway.

In the 10-year period that covered Master Plans 2004 and 2009, a range of options were canvassed for expanding the airfield and safeguarding future capacity, as shown in Figure 3-16 and Figure 3-17.

This included the extensions to the main runway and the cross runway. Planned expansions of the taxiways and the General Aviation area were also considered. However, no changes were made to the location or length of the new runway. Both Master Plans identified that additional runway infrastructure would not be required for another 20 years or until after 2029 (based on 2009 forecasts). Forecasts accounted for the impact that several major international events such as the September 11 terrorist attack and the Bali bombing had on international aviation at the time, in addition to the Global Financial Crisis in 2007.

Following approval of the Master Plan 2009, Perth Airport experienced a significant increase in the number of aircraft movements from Perth Airport due to a range of factors, including the resource sector investment boom, strong domestic economic conditions and increased competition in a number of domestic and international air service markets.

Simultaneous to this growth was an increase in competition for interstate domestic services, evidenced through significant growth in capacity by the respective airlines, as well as the emergence of low-cost international carriers which led to a dramatic stimulation of the international market.

Concurrently, more than $250 million was invested in airfield infrastructure to cater for the forecast demand. However, this was not enough to meet the actual demand for Perth Airport. In view of the dramatic and unforecast growth in aircraft movements, Perth Airport brought forward a comprehensive review of the timing of the planned parallel runway.

In 2013, UK NATS (the UK's air navigation service provider) were engaged by Perth Airport to support Perth Airport and Airservices in developing a Concept of Operations (CONOPS) for a parallel runway system.

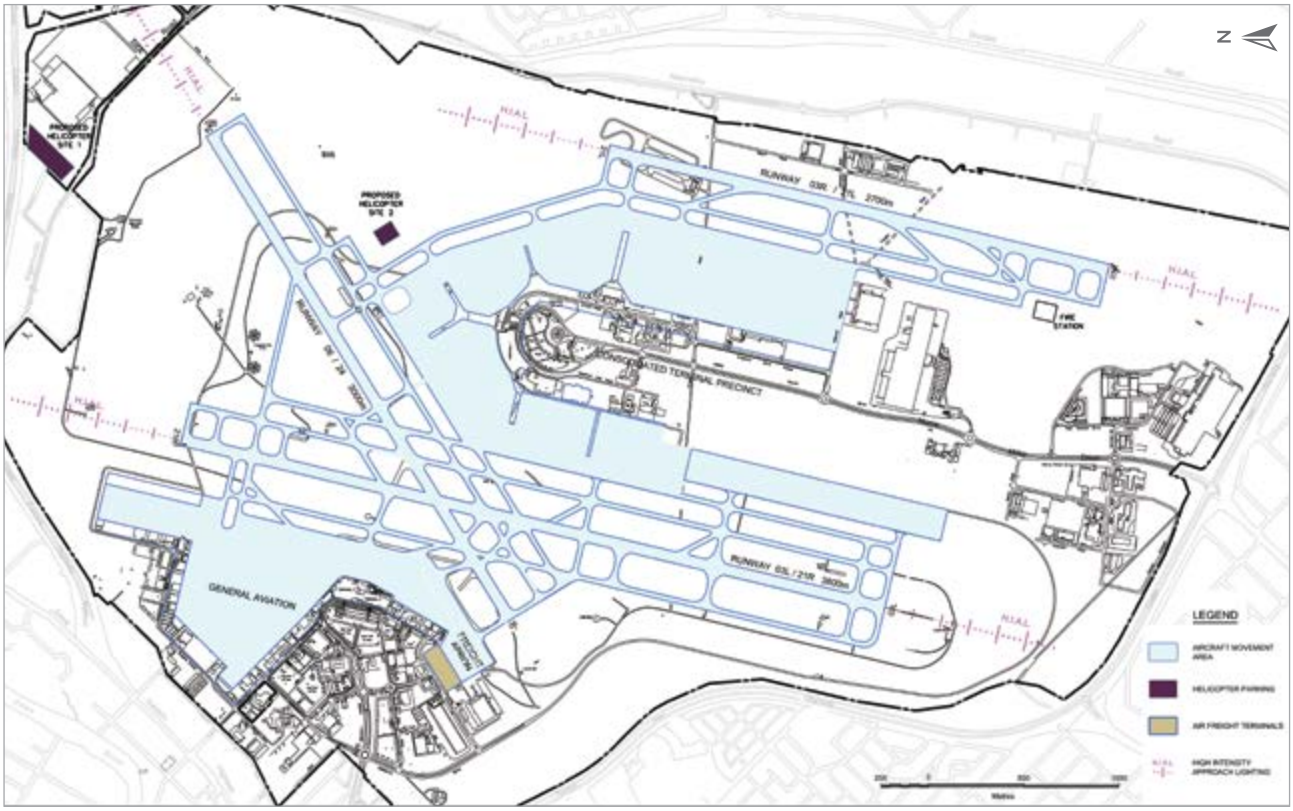


Figure 3-17 Master Plan 2009 runway configuration
Source: Perth Airport Master Plan 2009

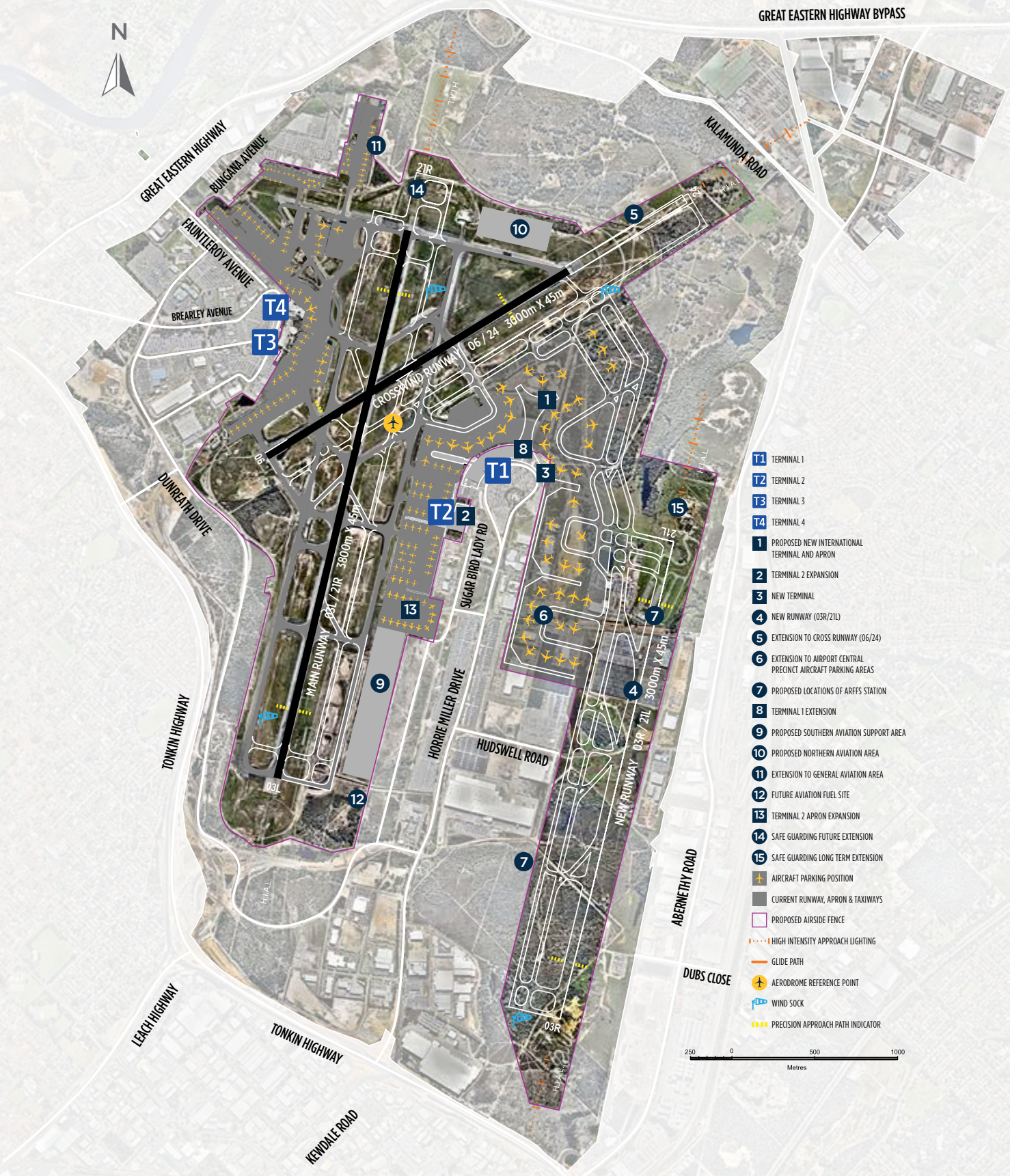


Figure 3-18 Master Plan 2014 Minor Variation runway configuration
Source: Master Plan 2014 Minor Variation

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

CONOPS also considered the location of airline operations at the airport now and into the future. The study also concluded that the use of the cross runway (06/24) would reduce efficiency and available runway capacity.

The Master Plan 2014 proposed the construction of the new runway as the preferred option to increase the capacity of Perth Airport and stated that the runway was required in the short term. In line with previous Master Plans, Master Plan 2014 stated that the new runway would initially be 2,700 metres long, 45 metres wide and located two kilometres east of the main runway.

Following approval of the Master Plan 2014, the Perth Airport Board of Directors approved a $45 million investment in pre-construction activities, including environmental and other approvals, preliminary airspace design and public consultation. In September 2015, Perth Airport appointed a joint venture between Aurecon and AECOM to undertake a preliminary design of the new runway and taxiways. The study considered major runway features including threshold locations, taxiways, lighting, drainage and support infrastructure. Additional information on the design can be found in Section 6.

During the preliminary design process for the new runway ground infrastructure, it was determined that recent changes to runway-lighting design standards could allow a shorter high intensity approach lighting system to be provided and therefore a longer runway accommodated within the Airfield Precinct as defined in the Master Plan 2014. Therefore, in 2017 Perth Airport proposed a minor variation to the Master Plan 2014 to provide for extension of the new runway by 300 metres to the south.

The longer runway length provides greater operational flexibility and redundancy for aircraft operations should the existing main runway become unavailable for use due to maintenance or an operational incident or emergency situation, and thereby providing a much wider benefit than previously planned.

A proposal to amend the new runway length from 2,700 metres to 3,000 metres via a variation to the Master Plan 2014 was approved by the then Commonwealth Minister for Infrastructure, Regional Development and Transport on 15 June 2017. The Aviation Development Plan as per the approved variation is shown in Figure 3-18.

The economic, social, and cultural benefits provided by Perth Airport to Perth and Western Australia will be significantly reduced unless the airport's capacity is expanded to meet expected demand in a timely manner. By 2045, this amounts to unmet passenger demand totalling 41.8 million passenger movements. Approximately, 51,000 aircraft movements per year would also be forgone if the new runway is not constructed. This would, in turn, restrict the development of Perth Airport as a major international airport in Australia.

While adoption of the ACE initiatives has delivered airfield and airspace efficiencies and contributed to a significant reduction in delays and congestion, they have not addressed the fundamental issue of demand exceeding capacity at certain times of the day, or the need to provide capacity for future demand.

Options have been considered for extending the existing runways. However, any extension will not provide the requisite runway capacity to meet excess demand. Recent experience at Perth Airport has highlighted:

- the volatility and unpredictability of air service demand in Western Australia associated with the resource sector,
- the relatively short lead times to respond to increased demand for airport infrastructure capacity, and
- the significant adverse consequences of having insufficient runway capacity at Perth Airport.

Perth Airport is the only commercial airport with suitable road access and terminal facilities to cater for the future demands in passenger traffic through Perth.

First planned for in the 1970s, the new runway, has remained consistent with long-term planning and consistent with the need to develop the runway as part of an independent parallel runway system.

As such, to prevent unacceptable delays in aircraft operations, provide for the increasing demand and to support economic growth in Western Australia, a major expansion of airfield capacity is needed. The only way this can be achieved is with the development of a parallel runway system at Perth Airport through the construction of the NRP.

Consistent with Master Plan 2014, the new runway will be located on the east of the Perth Airport estate. Perth Airport is seeking approval for a runway that is 3,000 metres long to meet the forecast growth in passenger and aircraft movements.

04
Benefits of the New Runway Project at Perth Airport

This section provides an overview of the benefits of the construction and operation of the New Runway Project.

Detail is also provided on the following areas:

- What is the economic, social and cultural benefit of the construction and operation of the new runway?
- How many jobs will the new runway create during construction and operation?

4.1 Economic Benefit of Perth Airport

Perth Airport provides economic, social and cultural benefits to Western Australians by connecting lives, businesses and communities. This not only supports cultural, family and social ties, but also supports business, tourism and leisure travel. Perth Airport also plays an essential role in economic development by providing freight transport services for companies, and supporting them to undertake their operations, service their customers and grow their businesses.

More than 30 airlines operate services from Perth Airport, reaching around 50 intrastate, interstate and international destinations. The intrastate, interstate and international destinations served by Perth Airport are shown in Figure 4-1 and Figure 4-2.

An economic impact assessment completed as part of the Master Plan 2014, and shown in Table 4-1, found that Perth Airport is a major centre of employment in the Perth metropolitan region, which employed (directly and indirectly) an estimated 12,570 aviation related full-time employees who contributed $1.92 billion to the State's gross regional product (GRP). The number of non-aviation related full-time employees was estimated at 5,230, who contributed approximately $690 million to the State's GRP.

Perth Airport's direct contribution to the Western Australian economy was estimated to be 0.6 per cent of gross state product (GSP) or $2.6 billion annually.

The aviation activities at Perth Airport also generate additional benefits for Perth and Western Australia from the tourism spending by domestic and international visitors who arrive by air. Tourism Research Australia data shows that there were 1.14 million domestic interstate overnight visitors to Western Australia in the year ending September 2013. Of these, 992,000 visitors (87 per cent) used air transport to enter the State. These visitors spent about $2.45 billion in Perth and $2.5 billion in regional Western Australia (including airfares).

For international visitors, data collected by Tourism Research Australia showed there were 768,500 international visitors to Western Australia and approximately 727,800 international visitors to Perth in the year ending September 2013. These international visitors spent approximately $2.27 billion in the State, of which around $1.92 billion was spent in Perth.

Spending by domestic and international tourism enabled by Perth Airport generated 41,400 direct full-time jobs, adding direct value to the GRP of approximately $3.68 billion per year.

When direct and indirect figures are considered, this tourism generated a total of approximately 59,800 full-time jobs and added a total value to the GRP of approximately $6.16 billion per year, as shown in Table 4-2.

Since the release of the Master Plan 2014, more recent data from Tourism Research Australia shows that since 2013:

- domestic interstate overnight visitors increased from 2013 levels by a total of 360,000 to 1.5 million visitors in the year ending September 2018, with spending increasing by $1 billion to $3.9 billion in Perth and an additional $1.4 billion to $3.9 billion in regional Western Australia (including airfares),
- the percentage of visitors that used air transport to travel to Western Australia increased from 87 per cent to 95 per cent, and
- international visitors increased by just over 227,000 to 955,000 international visitors to Perth with 300,000 international visitors to regional Western Australia in the year ending September 2018. These visitors spent a total of approximately $2.2 billion.

These increases would see the current economic benefit of Perth Airport higher than that outlined in the Master Plan 2014.

Aviation services by Perth Airport also facilitates economic benefits in the agriculture and international education sectors that would not take place, or would be smaller, if there was no aviation.

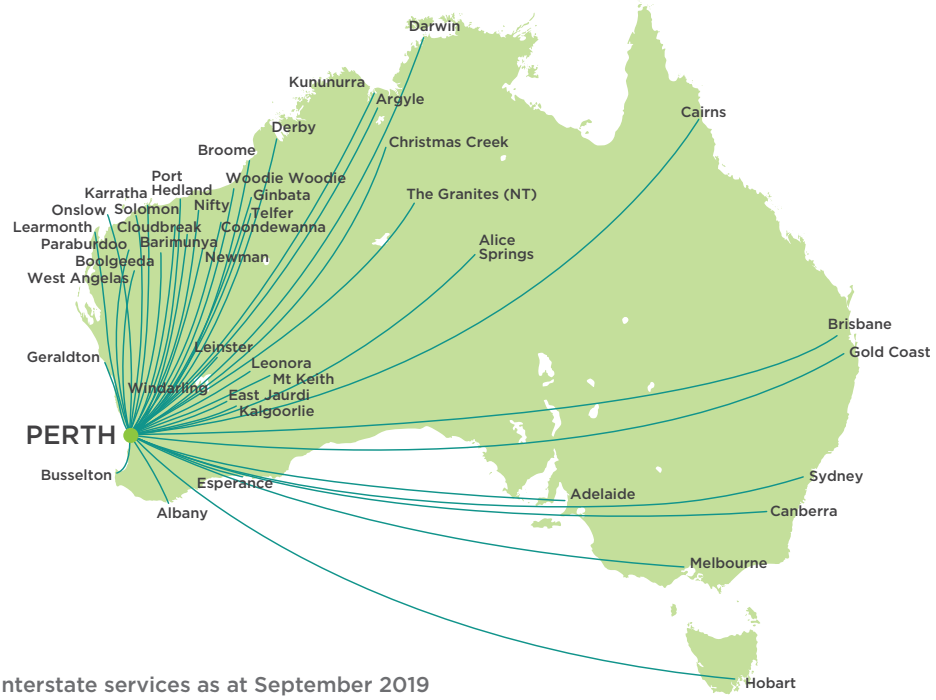


Figure 4-1 Perth Airport intrastate and interstate services as at September 2019
Source: Perth Airport Master Plan

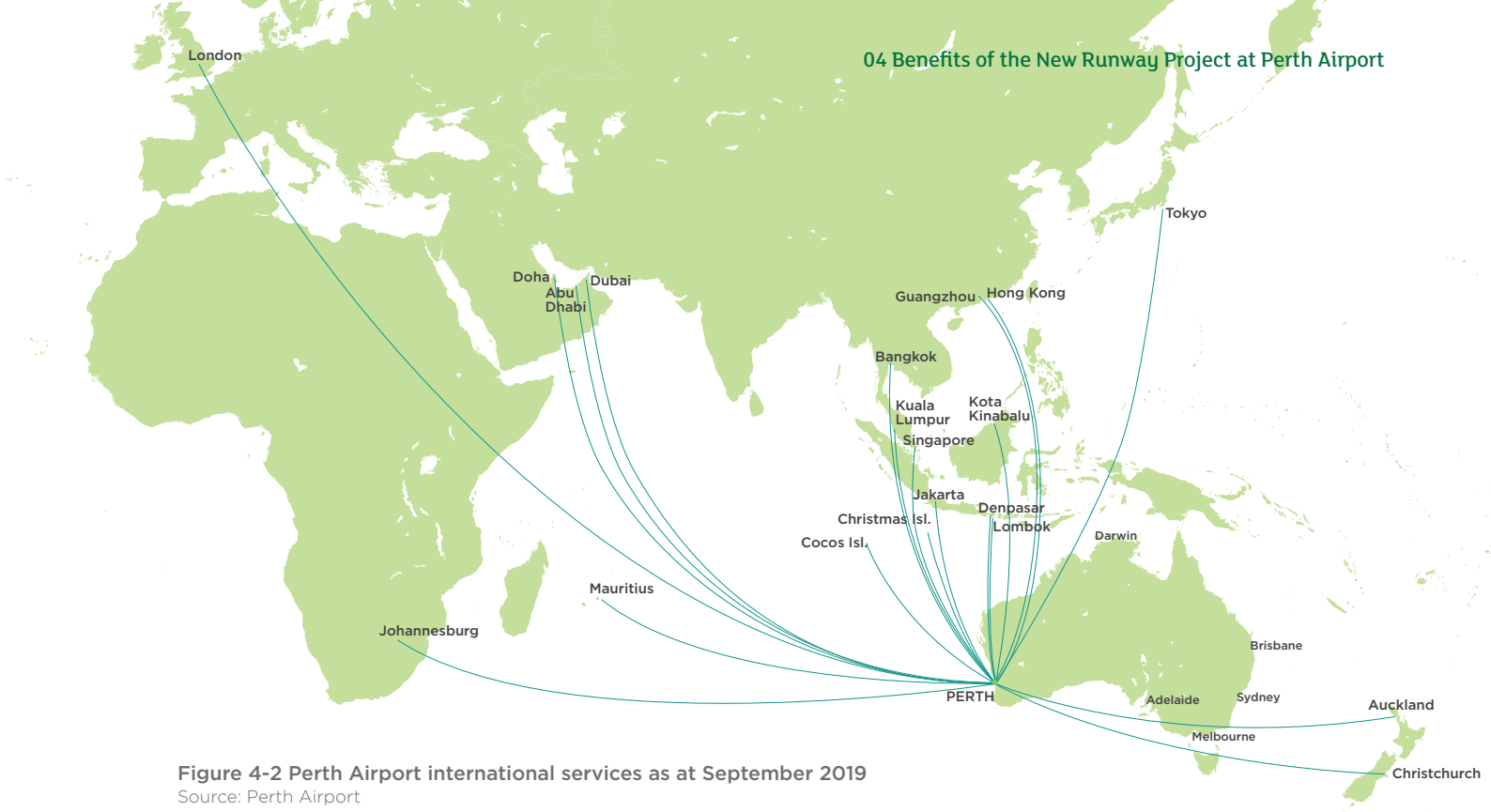


Figure 4-2 Perth Airport international services as at September 2019
Source: Perth Airport

The agriculture sector benefits greatly from the availability of aviation services. Table 4-3 shows the key agricultural products exported through Perth Airport in the 12 months to the end of March 2018. In this period, nearly 34,000 tonnes of agricultural products worth over $566 million were exported through the airport. Nearly two thirds (65 per cent) of this value was made up of fish and crustacean products, while fresh meat comprised 22 per cent of the total value exported. Meat exports out of Perth Airport have increased nearly threefold from 7,000 tonnes in 2011-12 to 20,500 tonnes in 2017-18. These opportunities would not be available without the aviation sector due to the perishable nature of the goods being exported.

The international education market is one of the largest employers within the state. According to Study Perth, a peak body promoting Western Australia to international students, there are around 59,000 international student enrolments each year in Western Australia, contributing significant fees and spending to the local economy. In 2014, the Australian Bureau of Statistics valued exports from international education in Australia at $18.8 billion making it Australia's third largest export. The same report estimated that international student education supports more than 130,700 full time equivalent employees in Australia of nearly 10,000 jobs in Western Australia. Without aviation these benefits would also be greatly diminished.

The Western Australian resource sector, which in 2017 accounted for 45 per cent of Australia's exports, is critically dependent on the FIFO system of employment. FIFO flights take resource-sector workers from their origin in Perth and interstate to their place of work at times determined by their employers based on maximising efficiency and controlling costs of their operations. The Chamber of Minerals and Energy Western Australia (CMEWA) observes that "the resources sector has been transitioning from a construction to operation phase. In 2016 the resources sector employed 104,803 people, although employment numbers have trended downwards since its peak in 2013 with 111,293. Direct employment remains high relative to just ten years ago when the average number of people employed was 59,125 (this is an increase of over 77 per cent)". In 2013, CMEWA also estimated that FIFO workers accounted for 55 per cent of the resource sector workforce in Western Australia, with the majority of these workers coming from the Perth and Peel regions.

Aviation and Non-aviation	Full Time Employment	Annual Adding Value to GRP
Aviation (direct and indirect)	12,570	$1.92 billion
Non-aviation (direct and indirect)	5,230	$690 million
Total	**17,800**	**$2.61 billion**

Table 4-1 Annual economic impact of Perth Airport
Source: Perth Airport Master Plan 2014, ACIL Allen Consultancy, 2014

Tourism Enabled	Full Time Employment	Annual Adding Value to GRP
Direct Value	41,400	$3.68 billion
Indirect Value	18,400	$2.48 billion
Total	**59,800**	**$6.16 billion**

Table 4-2 Annual tourism enabled economic impact of Perth Airport
Source: Perth Airport Master Plan 2014, ACIL Allen Consultancy, 2014

The Master Plan 2014 identified that resource sector FIFO accounts for approximately 77 per cent of all intrastate passengers, most of these being regular FIFO employees. Since 2013 the number of aircraft movements attributed to FIFO activity has decreased by approximately 20 per cent from 72,140 to 57,149 in 2016.

Day-return or overnight business trips, short leisure trips (for example, long weekends) and urgent freight deliveries would all be difficult or logistically impossible without aviation.

Aviation results in lower transport costs (after allowing for the value of time) as well as improvements in transport quality.

Perth Airport provides a critical function in allowing 'back of the clock' operations for the major domestic airlines. These operations allow the airlines to use their aircraft effectively through a period of low or no demand on the east coast (i.e. between 9.00 pm and 5.00 am). The distance and time difference between Perth and the remainder of Australia enable flights to leave the major cities to arrive in Perth between 10.00 pm and 1.00 am. Many of the aircraft return soon after arrival. These are the "red-eye" services which provide additional capacity and assist to keep downward pressure on prices. The balance of the aircraft that arrive late in the evening stay at the airport and depart for east coast ports early in the morning, providing a valuable intercity business connection service.

Exports	Weight (Kg)	Value
Fish and Crustaceans	5,550,606.00	$365,964,406.00
Meat Fresh	17,468,459.00	$124,147,893.00
Fruit Preserved	4,449,081.00	$ 25,143,321.00
Cereal Preps	1,127,290.00	$ 23,656,280.00
Fruits and Nuts-Fresh	2,582,748.00	$ 7,071,504.00
Glycerol and Veg Wax	8,450.00	$ 6,669,124.00
Vegetables	989,207.00	$ 4,666,481.00
Animals Live	628,069.00	$ 3,546,059.00
Seeds and Plants	229,070.00	$ 2,321,956.00
Dairy Eggs and Honey	560,930.00	$ 1,963,728.00
Starches	11,015.00	$362,786.00
Fruit and Vegetable Preparations	53,999.00	$255,649.00
Furs	4,007.00	$215,816.00
Oil Seeds	17,106.00	$211,015.00
Spices	4,578.00	$150,974.00
Vegetables Preserved	12,203.00	$96,043.00
Veg Gums + Saps	1,998.00	$49,855.00
Edible Products	1,658.00	$23,476.00
Grains Milled	5,752.00	$10,606.00
	33,706,226.00	$566,526,972.00

Table 4-3 Air freight products by gross weight through Perth Airport
Source: Maritrade

4.2 Social and Cultural Benefit of Perth Airport

The geographic isolation of Perth, the size of Western Australia and its proximity to Southeast Asia means that Perth residents rely on air transport more than most other Australians, in that they travel by air more frequently and over longer distances for work, education, recreation, health and to visit friends and relatives.

Without air services, personal travel beyond about 300 kilometres would become more difficult. People would travel less, or there would be significant time travelling for long periods in cars, buses or trains. This would reduce the amount of personal connectivity with friends and relatives; the ability to attend important family events; and the opportunity for holidays, as well as cultural and sports trips.

The development of the unique whole-of-state FIFO method of employment sourced by the resource industry has largely been driven by the fact that Western Australia remains primarily a single-city State. The very dispersed and small scale of communities in most of Western Australia means that the level of demand for many services is not sufficient for them to be made available in each community. As a result, people who live in regional Western Australia often need or want to travel to Perth for both necessary services and discretionary entertainment and social activities. The availability, reliability and cost of commercial air services connecting regional communities to Perth is therefore very important.

The role of Perth Airport is not confined to providing and operating airport infrastructure: significant resources are also applied by Perth Airport, working with airlines and the State Government, to expand available air services.

Over the past 10 years, Perth Airport and the State Government have continued to be successful in attracting international airlines to Perth. As shown in Table 4-4, the number of airlines, destinations and aircraft seats to Perth has increased from 11 airlines and 12 international ports, to 21 airlines operating to 17 international ports. The new services over the past five years include:

- Scoot launched five services per week to Singapore in December 2013, increasing to seven services per week in May 2015,
- Two seasonal Air New Zealand services per week to Christchurch between December and April, starting in 2014,
- Etihad commenced daily services to Abu Dhabi in July 2014,
- Qantas resumed services to Singapore in June 2015, starting with five per week,
- Malindo Air launched services to Kuala Lumpur in November 2015, starting at 10 services per week and increased to 12 services each week,
- Batik Air launched twice-daily services to Denpasar in June 2017,
- Cathay Pacific upgraded its daily service from an Airbus A330 to an Airbus A350 at the end of October 2017, which added 17,000 seats per annum,
- Virgin Australia introduced twice weekly services between Perth and Canberra during Parliamentary sitting weeks in August, September, October and December in 2017. The flights operate on Thursdays and Sundays,
- China Southern added a fifth weekly service to Guangzhou in October 2017. The aircraft will also be upgraded from the Airbus A330-200 to the Airbus A33B, adding 43,888 seats per annum,
- Qantas increased its services to Singapore to a twice daily service from April 2018 which adds more than 126,000 seats per annum on the route,
- May 2018, Qatar Airways upgraded its aircraft from a B777-300ER to an A380. This adds a further 159 seats one way on the route, which equates to an additional 115,000 seats per annum,
- In May 2018, Garuda Indonesia added a fifth service on the Perth-Jakarta route. The fifth service adds almost 17,000 seats per annum,
- Malaysia airlines increased the frequency of its daily B737-800 service. The overall impact from the daily schedule to 12 per week is an increase by 83,200 seats per annum, and
- Qantas daily direct flight to London Heathrow commenced in March 2018.

The number of international airlines and connectedness to the rest of the world was recognised by the Centre for Aviation in June 2017. It identified that Perth Airport is the most international airport in Australia by way of servicing the highest percentage of foreign airlines when compared to other major Australian airports, as can be seen in Figure 4-3.

4.3 Connectivity within Western Australia

Perth Airport is both the primary airport in Western Australia and the hub through which nearly all regional aviation is serviced.

Seven airlines currently operate intrastate services in Western Australia and they account for over 50 per cent of all flight movements through Perth Airport.

Around 80 per cent are scheduled flights; the remainder are charter and general aviation flights.

There has been significant change in regional aviation at Perth Airport over the past decade as shown in Table 4-5.

In addition, air travel through Perth Airport links communities in regional Western Australia to the rest of Australia and the world and, to the largest extent possible, enables them to enjoy the same opportunities as Perth residents to engage with the rest of Australia and the world.

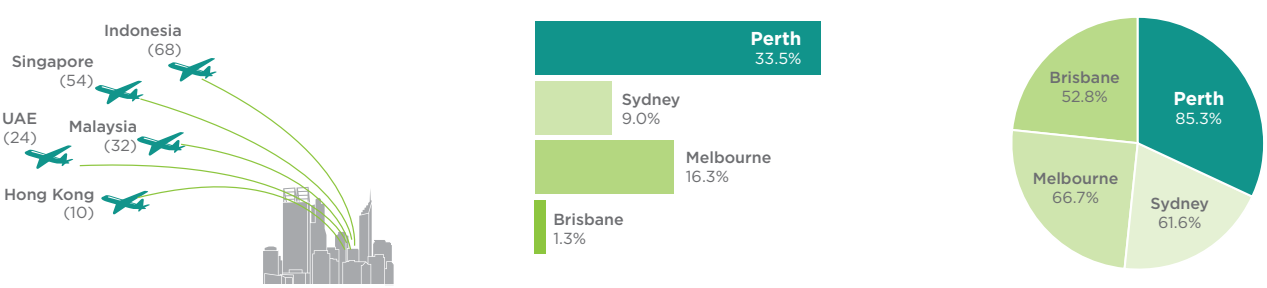


Figure 4-3 Centre for Aviation June 2017 – Perth Airport most international of all Australian airports
Source: Centre for Aviation

Port	Airline	2007/08		2017/18		Percentage Change	
		Seats	Flights	Seats	Flights	Seats	Flights
Abu Dhabi	Etihad Airways			212,778	730		
Auckland	Air New Zealand	142,450	607	246,345	830	73%	37%
	Qantas Airways			8,672	32		
Bangkok	Thai Airways	115,774	366	190,872	729	65%	99%
Brunei	Royal Brunei Airlines	96,328	490			-100%	-100%
Christchurch	Air New Zealand			21,663	72		
Christmas Island	Alliance Airlines			5,280	66		
	National Jet Systems	5,418	71	164	2	-97%	-97%
	Virgin Australia			18,984	113		
Cocos Island	National Jet Systems	4,028	53			-100%	-100%
	Virgin Australia			15,792	94		
Denpasar	Batik Air			233,916	1,313		
	Garuda Indonesia	192,116	1,235	157,471	681	-18%	-45%
	Indonesia AirAsia			383,220	2,129		
	Jetstar Airways			386,718	2,144		
	Ozjet Airlines	17,820	162			-100%	-100%
	Qantas Airways	57,768	332	522	3	-99%	-99%
Doha	Qatar Airways			280,342	730		
Dubai	Emirates	477,080	1,464	581,312	1,460	22%	0%
Guangzhou	China Southern Airlines			113,726	434		
Hong Kong	Cathay Pacific Airways	152,797	491	264,361	997	73%	103%
	Qantas Airways	84,601	314			-100%	-100%
Jakarta	Garuda Indonesia	41,880	417	70,386	433	68%	4%
	Qantas Airways	50,982	293			-100%	-100%
Johannesburg	Qantas Airways	5,400	12			-100%	-100%
	South African Airways	135,534	537	181,154	696	34%	30%
Kota Kinabalu	Malaysia Airlines			16,012	100		
Kuala Lumpur	AirAsia X			429,026	1,138		
	Malaysia Airlines	278,422	961	152,384	804	-45%	-16%
	Malindo Airways			188,100	1,150		
London Heathrow	Qantas Airways			46,256	196		
Mauritius	Air Mauritius	61,902	207	80,498	288	30%	39%
	Qantas Airways	229	1			-100%	-100%
Phuket	Thai Airways	49,576	156			-100%	-100%
Singapore	Jetstar Asia			133,920	744		
	Qantas Airways	449,591	1,457	173,678	987	-61%	-32%
	Scoot Tigerair	138,240	768	240,936	696	74%	-9%
	Singapore Airlines	635,419	2,073	822,827	2,933	29%	41%
Tokyo-Narita	Qantas Airways	74,538	314			-100%	-100%
Grand Total		**3,267,893**	**12,781**	**5,657,315**	**22,724**	**73%**	**78%**

Table 4-4 Comparison of international capacity at Perth Airport between 2008 and 2018
Source: Perth Airport

Financial Year	Total Perth Airport RPT Passengers (million)	Number of Western Australian regional RPT passengers (million)	Percentage of total passengers
2005	6.6	1.1	17.2%
2008	9.0	1.8	20.3%
2012	12.6	3.4	27.1%
2013	13.7	3.8	27.8%
2016	13.8	3.5	25.5%
2018	13.7	3.4	25.1%

Table 4-5 Regional aviation passenger growth at Perth Airport
Source: Perth Airport

4.4 Connectivity with the Rest of Australia

Perth Airport is the largest airport on the west coast of Australia and the key port of entry and departure for anyone arriving to or departing from the State. Reflecting this, domestic passengers make up the majority of passengers through Perth Airport.

Given the vast distances to other Australian states, interstate air services are the only efficient passenger transport mode. In terms of population increase in Western Australia, interstate migration has, over a long period, provided an important contribution to Western Australia's population growth.

4.5 Connectivity with the World

International passengers represent 31 per cent of total passengers through Perth Airport.

Figure 4-4 shows that Western Australians have the highest propensity for international air travel compared to all other Australian States. Propensity to travel is calculated by dividing resident passenger movements by the resident population. Factors contributing to this feature are the higher proportion of the State's population with overseas and interstate family ties, accessibility to high quality leisure destinations within Asia, and the nature of Western Australia's economy with its strong global connections.

More people born overseas live in Western Australia than any other State or Territory. The 2016 Australian Bureau of Statistics (ABS) Census recorded that 39.7 per cent of all Western Australians were born outside Australia compared to 33.3 per cent for the average total Australian population. This trend is even more pronounced for Perth where 42.7 per cent were born outside of Australia.

Air transport provides the only practical means of transport by which residents can stay connected with families, friends and cultures in other Australian States and Territories and other countries.

Western Australia's proximity to Southeast Asia means that countries such as Indonesia, Thailand, Singapore and Malaysia have also become popular holiday destinations for Western Australians, and Perth has become a convenient and attractive place for people from those countries to visit, study, live and invest.

4.6 Community Benefit of Perth Airport

Perth Airport has a significant role to play in the prosperity and well-being of Western Australia and its people.

Perth Airport works cooperatively with the community in which it operates, and the airport supports a wide range of activities that assist local governments, community groups, not-for-profit organisations, and charity organisations.

Perth Airport has a Corporate Social Responsibility program focused on supporting projects, initiatives or events that make meaningful economic, social, and cultural contributions to the people of Western Australia.

Our relationship with the Western Australian community is an important part of our values. Over the past decade Perth Airport has invested more than $7.5 million to positively impact the lives of many West Australians.

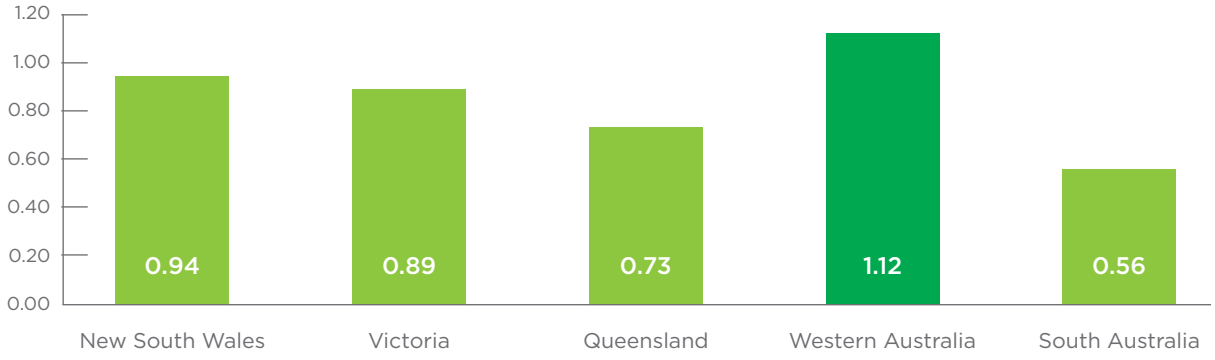


Figure 4-4 Comparison of Western Australia propensity to travel against other States
Source: BITRE 2017 / ABS 2016 Census

4.7 Benefits of the New Runway Project

The NRP is critical to continuing the many benefits that Perth Airport offers the people of Western Australia.

4.7.1 Economic Benefit

Not constructing the new runway will result in productivity losses to travellers (particularly business travellers), increased operational costs for airlines, and constraints on future aircraft movement growth which would lead to forgone visitor and tourism expenditures in Perth and Western Australia.

Not constructing the runway will also result in higher costs for the public arising from:

- demand/supply imbalance for air services and higher cost of products for which air services are currently the lowest cost transport mode, and
- an erosion of the competitiveness of Western Australian industries that depend on air transport, or for which air transport is a material input cost, with knock-on employment impacts.

Because the new runway at Perth Airport represents the lowest cost option to support air services capacity growth, it represents the best option to support the international competitiveness of the State's critical export industries, including resources, tourism, international study and air freight dependent agriculture.

Investment in the new runway will have many positive economic impacts. These impacts arise from:

- **construction of the new runway:** the impacts from the expenditure associated with the design, planning, approval and construction of the runway, taxiways and other associated infrastructure,
- **operation of the new runway:** the impacts from increased operational expenditure by the operator of Perth Airport, such as the maintenance costs and utility costs associated with the new runway,
- **airline expenditure:** the impacts from expenditure incurred by airlines, (such as fuel costs, staffing costs and maintenance costs) due to additional services enabled by the extra capacity provided by the new runway),
- **cost savings by airlines from avoided delays:** impacts from avoided expenditure by airlines on fuel costs, staffing costs and maintenance costs due to avoided delays which lead to increased competitiveness and productivity of the air transport sector in Western Australia,
- **cost savings by business from avoided delays experienced by employees:** the increase in labour productivity by firms and businesses due to delays avoided by their employees,
- **additional international visitor expenditure:** the increased tourism expenditures in Perth and Western Australia due to additional international visitors enabled by the new runway (considering the outflow of expenditure from the State due to increased international travel by Perth and Western Australian residents), and
- **additional expenditure from international students:** data from Study Perth identifies that "more than 9,800 jobs were created as a result of the 49,000 or so international students choosing to study in our State [during 2016]. In addition, the students spend significantly on items including transport, housing and entertainment and on average, host 1.4 million visitors to our State during the course of their studies, further boosting to the State's economy".

The impacts of the construction and operational phases of the NRP were analysed using a computable general equilibrium (CGE) model. A CGE model is the preferred tool for analysing the economy-wide impact of significant projects such as the NRP because it considers economy-wide resource constraints. The model produces more realistic economic impact estimates as it recognises that a large-scale project will inevitably draw resources away from other uses (particularly in the construction phase) unless there is significant slack in the economy in terms of under-utilised resources.

The benefits of the NRP have been quantified using three measures:

- employment as measured by Full Time Equivalent positions (FTE),
- real economic output as measured by Gross Regional Product (GRP) or Gross State Product (GSP), and
- real income.

A FTE position is the number of people employed based on the number of hours worked by a fulltime person. This captures five part time and fulltime employees across a project.

Real economic output as measured by GSP or GRP is a measure of the aggregate output generated by an economy over a given period of time (typically a year). It can be measured on a region or country basis and is adjusted for inflation. In this case the region is Perth and country is Australia.

Measuring the impact of a policy or project using just real economic output may disguise investments or policy changes that are not beneficial in the overall economic welfare sense. This is because it is possible for real economic output to increase (that is, for GDP to rise) while at the same time consumers may be worse off as measured in terms of real income. In such circumstances people and households would be worse off despite economic growth. The converse could also be true in other cases, where the real income impacts are considerably larger than the impacts on real economic output. Therefore, changes in real income are also considered.

Real income is a measure of the ability to purchase goods and services, adjusted for inflation. A rise in real income indicates a rise in the capacity for current consumption, but also an increased ability to accumulate wealth in the form of financial and other assets. The change in real income from a development is a measure of the change in welfare of the people in an economy.

To meet future capacity demand, as outlined in Section 2, the new runway is expected to be operational between year 2023 and 2028 (subject to forecast demand and

commercial agreements of airlines). The economic modelling has assumed a mid-point operational date of 2025 (Financial Year 2025-2026) with construction commencing in 2021 (Financial Year 2021-22). The construction program was modelled at four years and included the construction cost of just under half a billion dollars, including design, construction of runways, taxiways, access roads, utilities, and other costs. Further details on construction are included in Section 6.

4.7.2 Construction

During construction of the new runway, there is a significant economic benefit simply through the expenditure and employment activities that deliver the project.

The construction of the NRP will generate new jobs. Modelling calculates the net impact on employment in the economy due to Perth Airport's investment as shown in Figure 4-5. At the peak of construction, the project will create 487 FTE jobs.

The change in real income at regional level is a measure of real economic output (GRP) plus external income transfers and the region's terms of trade (which measures the purchasing power of the region's exports relative to its imports).

The construction of the NRP will add over $170 million to GRP over a four-year period, as shown in Figure 4-6. The change to the GRP over the four-year period is driven by the delivery stages and therefore cash flow of the project. It should be noted that the impact to GRP is less than the assumed investment of $475 million for the project, as the CGE model employed also accounts for leakages from the economy and assumes that during the period modelled, the economy is at or near capacity, hence some resources will be diverted away from other projects.

As shown in Figure 4-7, the construction of the NRP will add $329.1 million over the four-year construction period to real income in the Perth region.

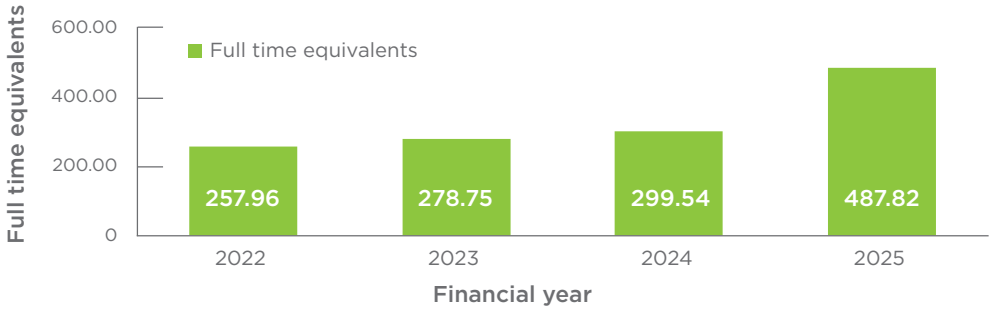


Figure 4-5 Impact of New Runway Project construction on employment in the Perth region
Source: ACIL Allen Consulting, 2017

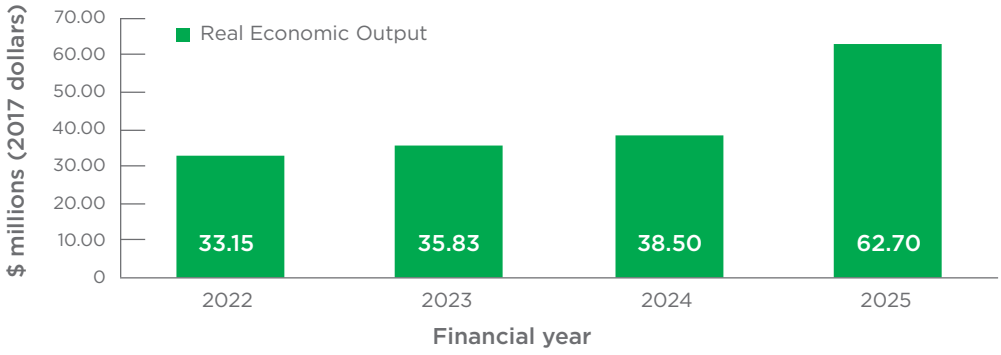


Figure 4-6 Impact of New Runway Project construction on Perth's real economic output
Source: ACIL Allen Consulting, 2017

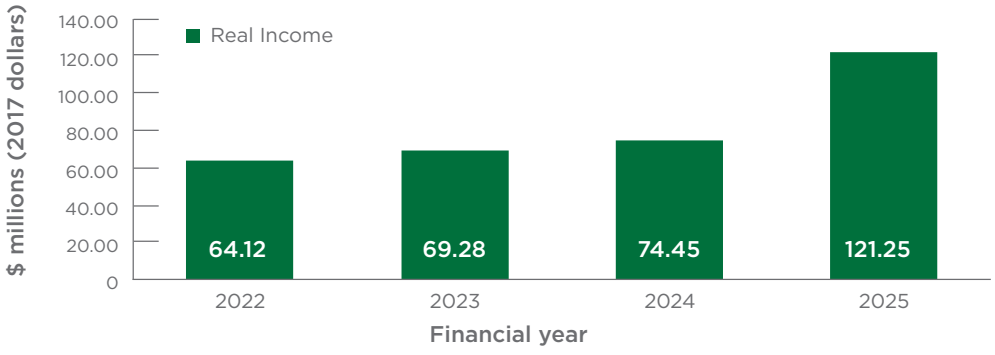


Figure 4-7 Impact of New Runway Project construction on Perth's real income
Source: ACIL Allen Consulting, 2017

4.7.3 Operations

The operations of the new runway will have direct and indirect economic impacts for Perth and for Australia. The economic impacts and benefits of the operational phase of the new runway arise from:

- avoided delay costs for passengers and businesses using aviation services,
- avoided delay costs for airlines, and
- increased visitor and tourism expenditures.

In line with the Transport for NSW's Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives published in March 2013, and adjusted for inflation, it is assumed that the cost of delay at Perth Airport is $48.52 per hour for leisure travellers and $155.29 per hour for business travellers. It is assumed that the companies employing the business travellers are distributed geographically with 33 per cent based in Perth and 62 per cent rest of Australia.

The avoided delay costs to airlines (comprising the avoided maintenance, crew and fuel costs) is assumed to total $111.65 per minute of delay.

The estimated incremental delay costs at Perth Airport by year between 2017 and 2045 as a result of not constructing the new runway are shown in Figure 4-8. The delay costs are calculated using the assumptions set out above and combining these with the results of the delay modelling discussed previously. It is noted that that incremental delay costs are zero prior to 2026 as they are unchanged, with or without the NRP.

By 2045, the combined delay costs to airlines and passengers if the new runway is not constructed are estimated to be around $430 million per annum (measured in 2017 dollars).

According to International Visitors Survey (IVS) data collated and published by Tourism Research Australia, in 2016 international visitors to Perth spent an average of $2,288 while international visitors to regional Western Australia spent an average of $1,338. Based on the number of visitors to Perth and to regional Western Australia, it is assumed that 35.6 per cent of visitors to Perth also visit regional Western Australia. The combined spending in the whole of Western Australia by the average visitor to Perth is thus assumed to be $2,764.

According to National Visitors Survey (NVS) data collated and published by Tourism Research Australia, domestic visitors to Perth spent an average of $804. Based on forecasts of aircraft movements (as per Section 2) for regional airlines and for major domestic airlines, it is assumed that 67 per cent of domestic passengers at Perth Airport are from interstate. This assumption is used in the estimation of forgone domestic tourism expenditure in the absence of the new runway.

There is no robust data on the average expenditure of Western Australian residents travelling internationally. Historical data suggests that the split in domestic passenger movements between Perth or Western Australian residents and interstate visitors is approximately 50:50, and it is likely this split will remain relatively unchanged in the future. Assuming the average expenditure of Western Australian residents travelling interstate is the same as that of interstate visitors to Western Australia, the expenditure outflows will cancel out the inflows, meaning that the net domestic tourism impact of the new runway will be zero. However, it should be noted

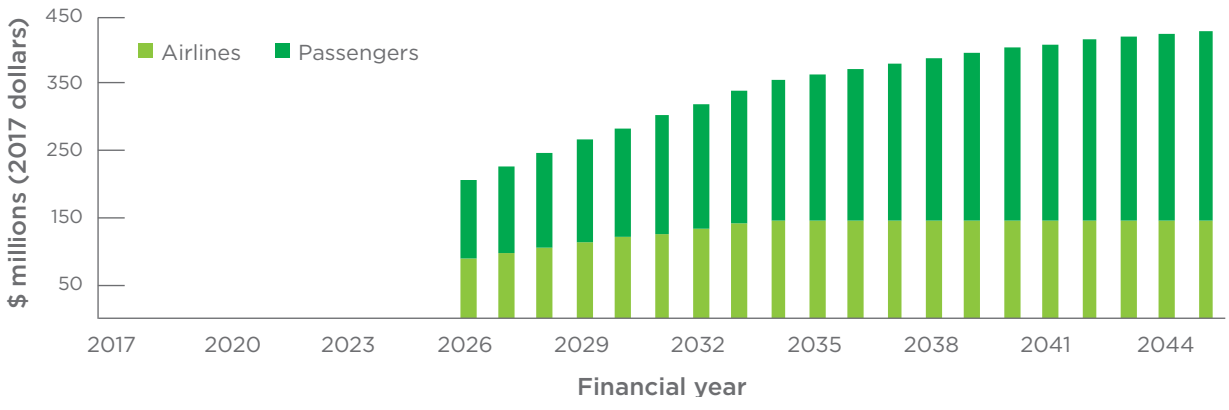


Figure 4-8 Annual delay costs without the new runway, 2018 to 2045
Source: ACIL Allen Consulting, 2017

that Western Australian residents will benefit from the increased ability to travel to other parts of Australia for leisure and business.

For international passenger movements, while the current split between Western Australian residents travelling overseas, and overseas visitors travelling to Western Australia is approximately 45:55, Tourism Futures International forecasts that this split will become 53:47 by 2026. If average expenditures are the same for Western Australian residents travelling overseas and for international visitors to Western Australia, the current net outflow of spending from the State will become a net inflow for most of the period modelled in the economic impact analysis. The new runway thus generates a positive net overall international tourism impact.

The projected net additional tourism expenditure inflow to Perth and Western Australia by 2045 that is enabled by the new runway is shown in Figure 4-9.

At the end of the analysis period in 2045, this inflow is estimated to be $302 million per year in 2017 dollars. The cumulative net tourism expenditure inflow to Perth and Western Australia between 2027 and 2045 amounts to $1.72 billion.

More broadly, if Perth Airport was demand-constrained because of rising delays without the new runway, interstate business travellers may substitute face-to-face meetings with videoconferencing or travel to other business centres around the country (as Perth-based companies become less competitive relative to rivals in other cities with better air transport links and airports that are not demand-constrained), while interstate leisure travellers may travel to other destinations in Australia (such as the Gold Coast) or overseas (such as Bali). Similarly, most of the international travellers may travel to other destinations in Australia, while the remainder may not travel to Australia at all.

4.7.4 Economic Impacts on Perth Region

The new runway will have direct and indirect economic impacts for the Perth region. Perth Airport modelled these impacts over a 20-year period to 2045. The useful life of the new runway is significantly longer than the 20-year period that has been modelled and many of the economic benefits increase over the long term. Therefore, there will be further significant economic benefits from the new runway each year after 2045. The economic impacts and benefits result in changes to GRP, real income and employment.

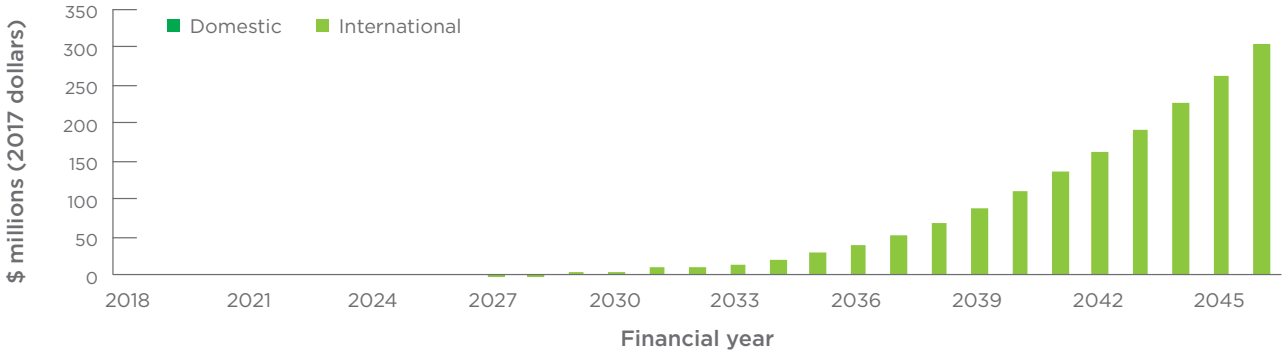


Figure 4-9 Additional visitor expenditure due to the new runway, 2017 to 2045
Source: ACIL Allen Consulting, 2017

4.7.4.1 Employment

The operation of the NRP creates jobs due to:

- operational requirements,
- delay cost savings to airlines,
- delay cost savings to business passengers, and
- tourism impact.

The year-by-year impact of the NRP on employment in the Perth region to 2045 is shown in Figure 4-10.

Employment grows from around 50 FTE in 2025 (day of opening) to just under 300 FTE in 2045.

Another way to describe the employment benefits is via the average annual increase in employment in the Perth region.

This increase between 2022 and 2045 as a result of the NRP is shown in Figure 4-11. The increase in employment in the Perth region is projected to average an additional 169 full-time equivalent jobs per year including both construction and operations. The greatest impact on average annual employment occurs during the construction phase of the project, while the productivity benefit arising from the cost savings to businesses during the operational phase also has a significant impact.

4.7.4.2 Real Economic Output (GRP)

Similar to employment, the economic output from the NRP is a combination of additional operational expenditure by Perth Airport and by airlines, cost savings by airlines from reduced delays, business cost savings from reduced delays to business travellers and increased tourism expenditure.

The year-by-year aggregate impact of the NRP on the Perth region's real economic output (as measured by GRP) to 2045 is shown in Figure 4-12.

The operational impact grows from approximately $40 million in 2026 to $385 million in 2045.

The net present value of the cumulative impact of the NRP on the Perth region's real economic output to 2045, under a seven per cent real discount rate as the standard industry measurement, is shown in Figure 4-13.

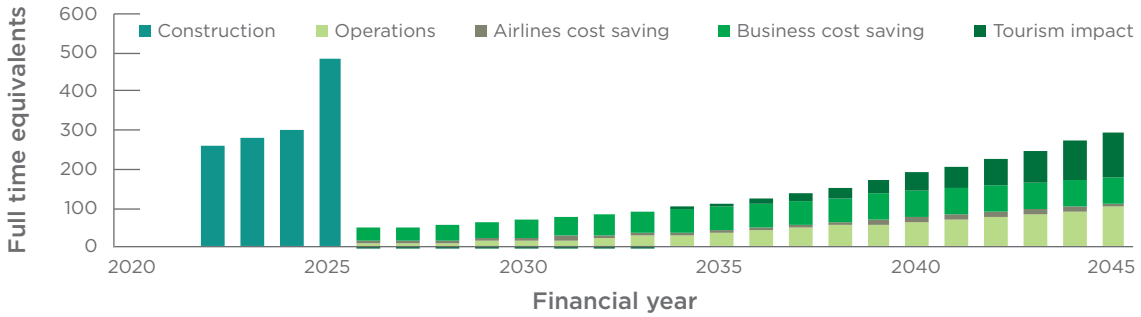


Figure 4-10 Impact of the New Runway Project on employment in the Perth region, 2022 to 2045
Source: ACIL Allen Consulting, 2017

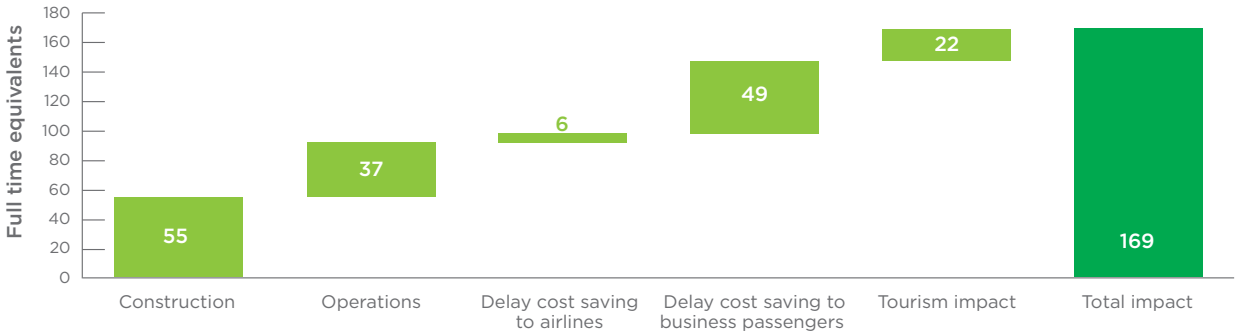


Figure 4-11 Average annual impact of the New Runway Project operations on Perth's employment, 2022 to 2045
Source: ACIL Allen Consulting, 2017

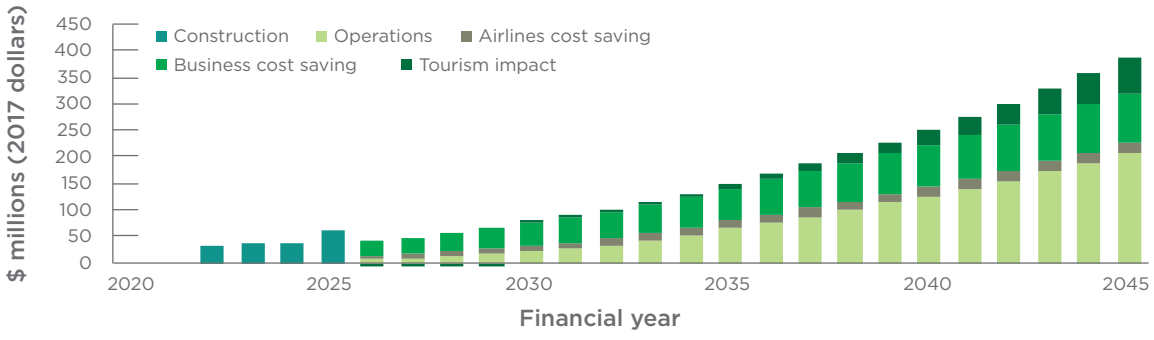


Figure 4-12 Impact of the New Runway Project on Perth's real economic output, 2022 to 2045
Source: ACIL Allen Consulting, 2017

The modelling indicates that the operations expenditure enabled by the new runway has the greatest impact on the real economic output of the Perth region, followed by the productivity benefits to business. The cumulative impact on real economic output in the Perth region to 2045 in present-value terms is projected to be $1.03 billion in 2017 dollars.

4.7.4.3 Real Income

Considering that the change in real income at regional level is a measure of real economic output (GRP) plus external income transfers and the region's terms of trade, it is expected that the operational phase of the NRP will increase real income in Western Australia by approximately $38 million in 2026 increasing to $435 million in 2045. The year-by-year aggregate impact of the NRP on real income in the Perth region to 2045 is shown in Figure 4-14.

The net present value of the cumulative impact of the NRP on the Perth region's real income to 2045, under a seven per cent real discount rate as a standard industry measurement, is shown in Figure 4-15. The modelling indicates that the operations expenditure enabled by the new runway has the greatest impact on the real economic output of the Perth region, followed by the productivity benefits to business.

The cumulative impact on real income in the Perth region to 2045 is projected to be $1.2 billion (as measured in 2017 dollars).

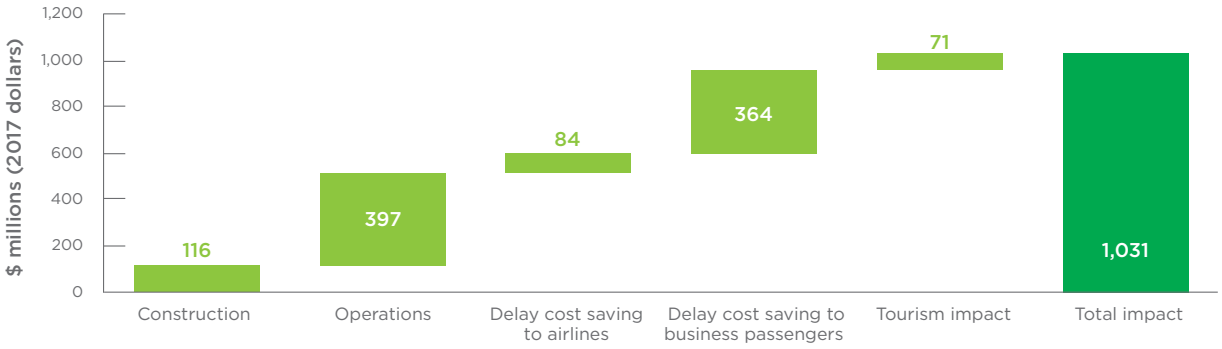


Figure 4-13 Net present value of cumulative impact of the New Runway Project on Perth's real economic output, 2022 to 2045
Source: ACIL Allen Consulting, 2017

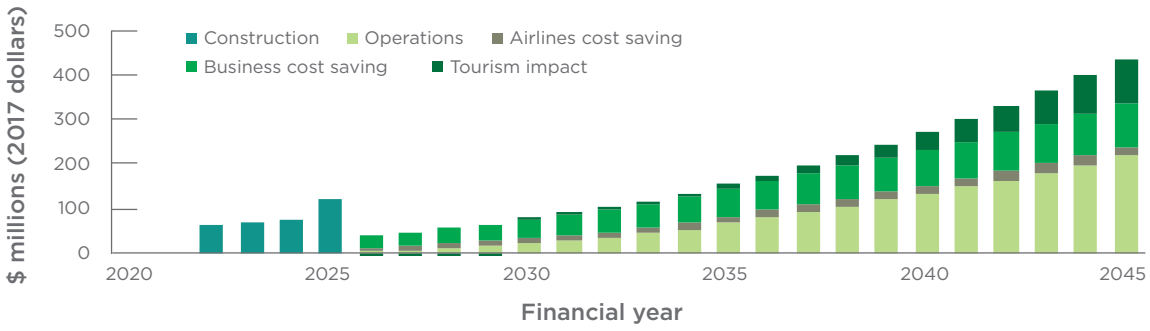


Figure 4-14 Impact of the New Runway Project on Perth's real income, 2022 to 2045
Source: ACIL Allen Consulting, 2017

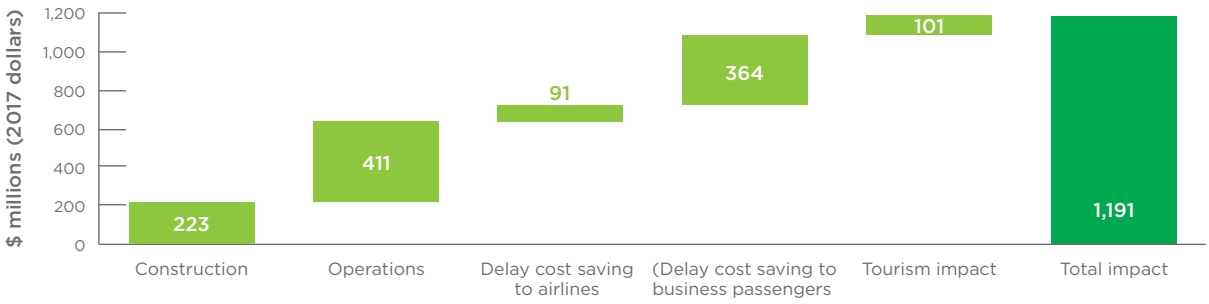


Figure 4-15 Net present value of cumulative impact of the New Runway Project on Perth's real income, 2022 to 2045
Source: ACIL Allen Consulting, 2017

4.7.4.4 New Routes

While the new runway does not in itself open up new routes, it is reasonable to assume that through permitting the capacity, the opportunity to access additional routes will be facilitated.

A recent study examined the economic benefit of increased connectivity to Western Australia. The study modelled four route pairs across existing and future potential routes. The study found the addition of a typical daily international flight flown on an Airbus A330-200 aircraft, with 75 per cent load factor, all passengers disembarking in Perth, and 50 per cent visitors (non-residents), could generate over 600 full-time equivalent jobs (in air service and visitor spending impacts) and $70 million in value-added GDP per year.

4.7.5 Economic Impacts on Australia

The economic impact of the operations of the NRP on Australia is generally greater than the impact on the Perth economy. This is due to assumptions in the model such as the location of the airline service base being on the east coast of Australia and the volume of business travellers located outside of Perth being proportionally higher. The impact of tourism on Perth is greater than Australia due to the increased ability to access the Perth market.

4.7.5.1 Employment

The year-by-year impact of the NRP on employment in Australia to 2045 is shown in Figure 4-16. The impact of the operational phase is smaller than the construction phase, when there are significant flow-on employment impacts on the rest of Australia (particularly in industries linked to the construction sector).

There is a peak in employment benefit to Australia during construction of some 744 FTE jobs, with employment associated with operating the NRP increasing from around 220 FTE jobs in 2025 to more than 350 FTE jobs in 2045.

The average annual impact of the NRP on employment by region between 2022 and 2045 is shown in Table 4-6. Modelling showed that airlines and business will accrue benefits by avoiding delays. This allows airlines and businesses to employ more people due to increased productivity and competitiveness across a wide range of industries.

It should be noted that the CGE model used is a closed model that only examines impacts to Australia, which is why there is a reallocation of resources between Perth and the rest of Western Australia (shown as a negative impact).

Impact type	Perth	Rest of Western Australia	Rest of Australia	Australia
Construction	55.2	4.2	24.9	84.21
Operations	37.2	-4.3	-23.1	9.83
Delay cost savings to airlines	6.1	3.6	154.9	164.64
Delay cost saving to business passengers	48.7	3.1	36.5	88.31
Tourism impact	21.7	-10.1	-0.1	11.40
All impacts	**168.8**	**-3.5**	**193.1**	**358.4**

Table 4-6 Average annual impact of the New Runway Project on employment by region, 2022 to 2045
Source: ACIL Allen Consulting, 2017

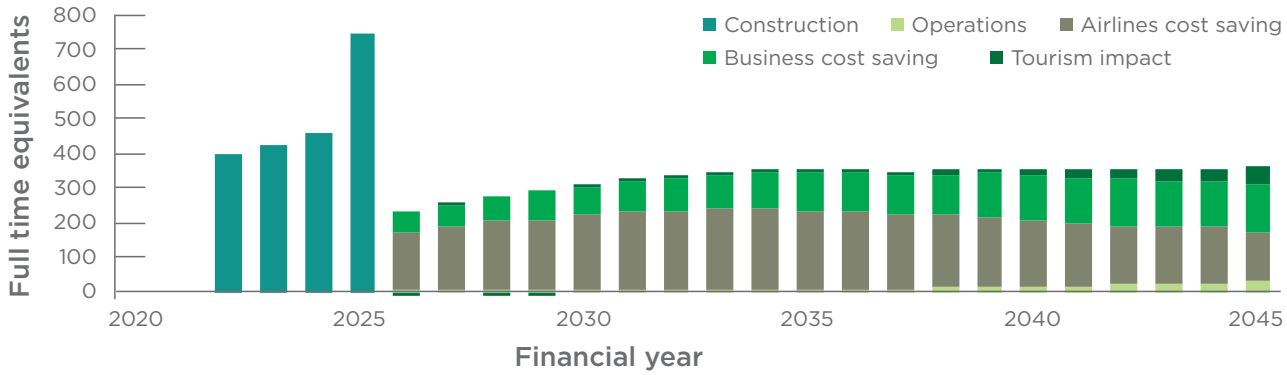


Figure 4-16 Impact of the New Runway Project on employment in Australia, 2022 to 2045
Source: ACIL Allen Consulting, 2017

There may however be a regional dispersal opportunity and the projected increase in tourism to Perth may potentially mitigate any actual decrease.

The annual impact of the NRP on employment in Australia averaged between 2022 and 2045, compared with the impact on Perth is shown in Figure 4-17.

The average annual increase in employment is 168.8 full-time equivalent jobs in Perth and 358.4 jobs within Australia.

4.7.5.2 Real Economic Output (GRP)

Consistent with the analysis of the impact of the new runway on the Perth Region, the economic output from the NRP on Australia is a combination of additional operational expenditures by Perth Airport and by airlines, cost savings by airlines from reduced delays, business cost savings from reduced delays to business travellers, and increased tourism expenditure.

The year-by-year aggregate impact of the operations of the new runway at Perth Airport on Australia's real economic output (as measured by GDP) 2045 is shown in Figure 4-18. The impact to GRP during the operational phase grows from approximately $177 million in 2026 to approximately $589 million in 2045.

As shown in Table 4-7, the economic impact of cost savings to airlines from avoided delays is much greater in Australia than in Perth, as most of the major domestic airlines serving Perth Airport are headquartered in other parts of Australia. Similarly, business cost savings are also greater in the rest of Australia than in Perth, as many of the companies employing the business travellers to Perth are based in other parts of Australia. In addition, the closed model considered that the new runway facilitates additional tourism for Perth at the expense of other regions in Australia hence the negative value for all impacts experienced in the rest of Western Australia.

The impact of the NRP on real economic output in Australia compared with the impact on Perth is shown in Figure 4-19.

The cumulative impact to 2045 on real economic output in present value terms under a seven per cent real discount rate is $1.03 billion for Perth and $2.39 billion for Australia. In undiscounted terms this amounts to $3.7 billion for Perth and $7.9 billion for Australia.

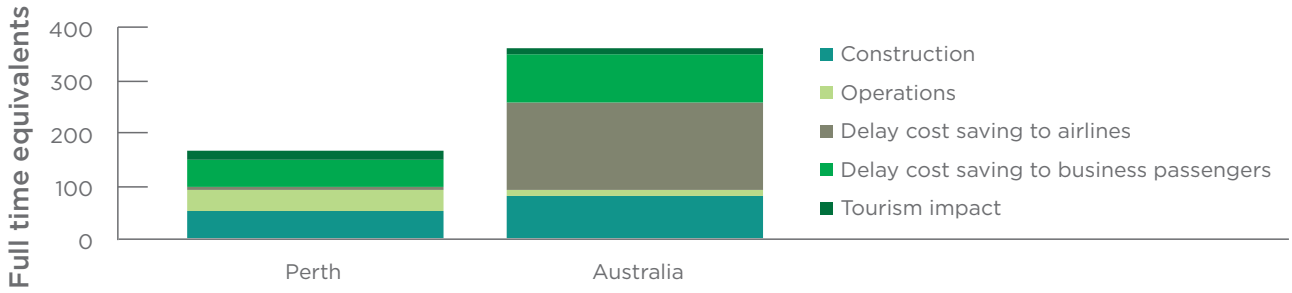


Figure 4-17 Average annual impact of the New Runway Project on Perth and Australian employment, 2022 to 2045
Source: ACIL Allen Consulting, 2017

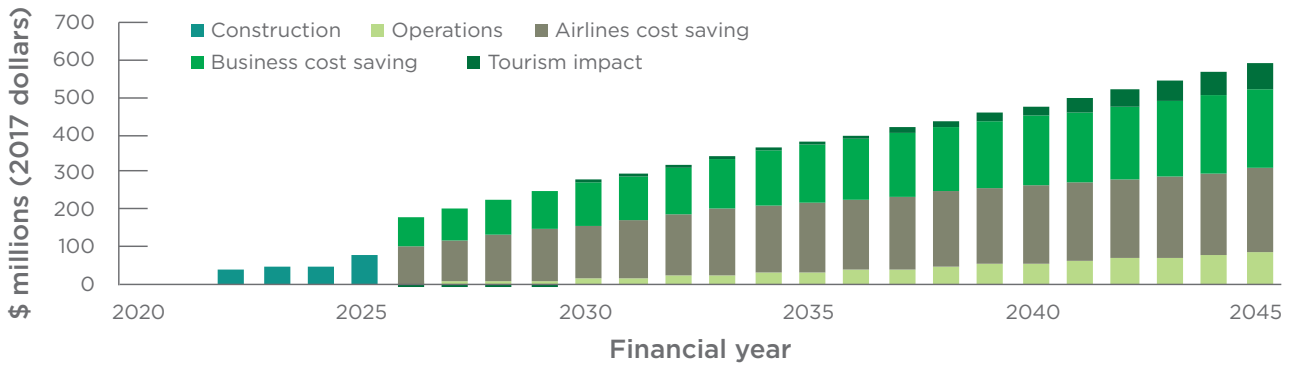


Figure 4-18 New Runway Project impact on Australia's real economic output, 2020 to 2045
Source: ACIL Allen Consulting, 2017

Impact Type	Perth	Rest of Western Australia	Rest of Australia	Australia
Construction	115.5	-4.2	38.8	150.13
Operations	397.0	-15.8	-183.6	197.61
Delay cost savings to airlines	84.0	1.3	992.8	1,078.07
Delay cost saving to business passengers	363.8	28.8	494.7	887.36
Tourism impact	70.8	-12.3	17.3	75.76
All impacts	**1,031.1**	**-2.1**	**1,360.0**	**2,388.94**

Table 4-7 Cumulative impact of the New Runway Project on real economic output by region, 2018 to 2045
Source: ACIL Allen Consulting, 2017

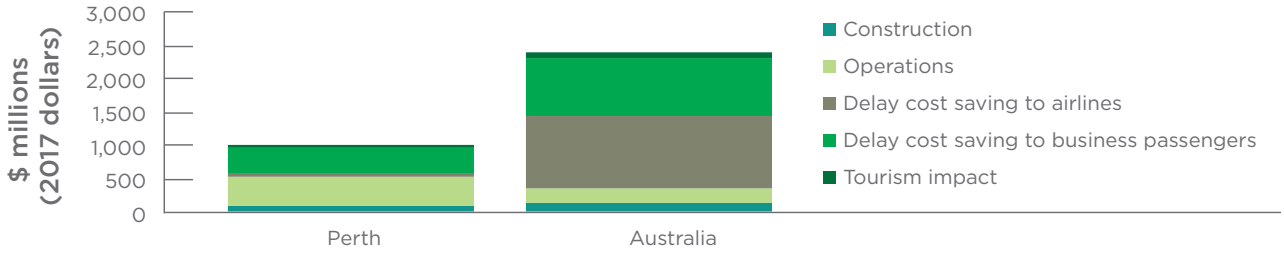


Figure 4-19 Cumulative impact of the New Runway Project on Perth's and Australia's real economic output, 2018 to 2045
Source: ACIL Allen Consulting, 2017

Impact Type	Perth	Rest of Western Australia	Rest of Australia	Australia
Construction	223.4	-16.1	36.0	150.13
Operations	411.1	-15.8	-287.1	197.61
Delay cost savings to airlines	90.7	12.5	916.2	1,078.07
Delay cost saving to business passengers	364.4	56.4	486.7	887.36
Tourism impact	101.2	-23.4	-2.0	75.76
All impacts	**1190.8**	**13.6**	**1149.8**	**2354.2**

Table 4-8 Cumulative impact of New Runway Project on real income by region, 2022 to 2045
Source: ACIL Allen Consulting, 2017

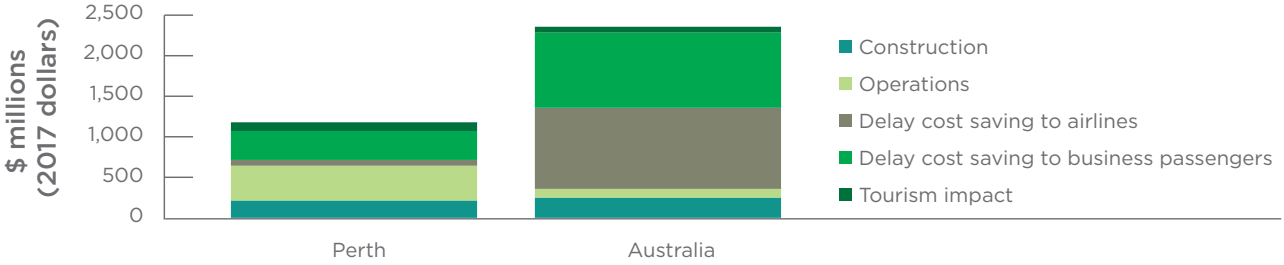


Figure 4-20 Cumulative impact of the New Runway Project on Perth's and Australia's real income, 2022 to 2045
Source: ACIL Allen Consulting, 2017

4.7.5.3 Real Income

Consistent with the analysis of the impact of the new runway to the Perth region, the impact of the NRP on Australia's real income is a combination of additional operational expenditures by Perth Airport and by airlines, cost savings by airlines from reduced delays, business cost savings from reduced delays to business travellers and increased tourism expenditure as shown in Table 4-8.

The impact of the NRP on real income in Australia compared with the impact on real income in Perth is shown in Figure 4-20. The impact of the NRP on Australia is approximately $2.4 billion compared to approximately $1.2 billion for the Perth region.

The year-by-year aggregate impact of the NRP on real income in Australia to 2045 is shown in Figure 4-21. The operational phase will lead to an increase of real income from $167 million in 2026 to approximately $577 million in 2045.

4.8 Future Economic Impact of Perth Airport

Taking into consideration the proposed developments over the 20 years planning horizon of the Master Plan 2014, including the new runway, terminal and commercial developments, the Master Plan 2014 forecasts that by 2034, the total (direct and indirect) number of aviation-related full-time employees would be approximately 22,200, accounting for approximately $4.03 billion of GRP at 2012 prices. The total number of non-aviation related full-time employees is forecast to be approximately 20,020, contributing approximately $3.01 billion to the GRP.

In 2034, the spending by domestic and international tourism enabled by Perth Airport is forecast to generate approximately 125,000 full-time employees, adding value to the GRP of approximately $14.3 billion per year.

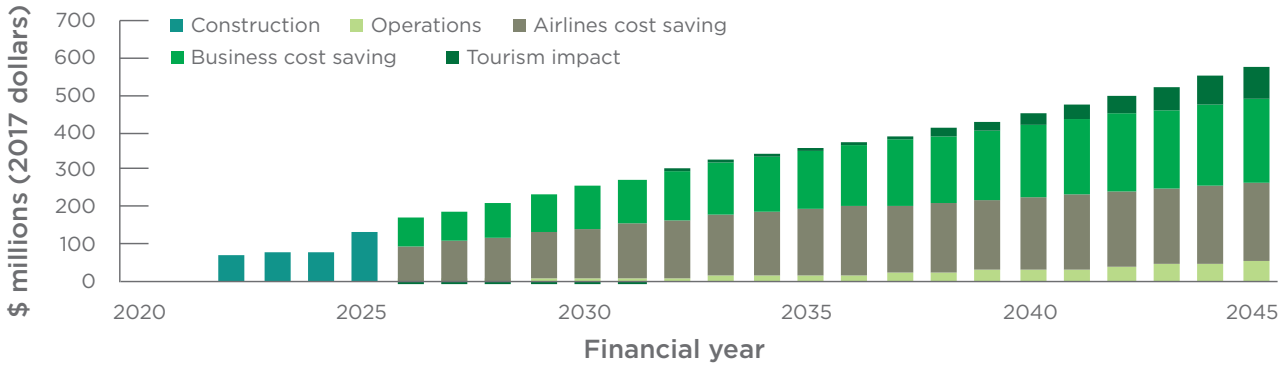


Figure 4-21 Impact of the New Runway Project on Australia's real income, 2022 to 2045
Source: ACIL Allen Consulting, 2017

05
Consistency with State and Local Government Planning

This section provides an assessment of the New Runway Project (NRP) with respect to its consistency and alignment with State and Local Government plans and policies.

Detail is also provided on the following areas:

- How does the new runway align with Western Australian State Government current and future planning?
- How does the new runway align with the 13 Local Governments that surround Perth Airport?

5.1 Planning at Perth Airport

Perth Airport recognises that land use and infrastructure decisions made within as well as beyond the airport boundary affect the capacity of Perth Airport to meet community needs. Thereby, close and effective cooperation between Perth Airport and other authorities and infrastructure providers is critical because:

- Perth Airport's operations impact surrounding communities, including the natural environment, and
- the capacity of Perth Airport to meet the community needs is affected by the land use and infrastructure decisions made beyond the airport boundary.

It is for these reasons that Perth Airport infrastructure plans, including for the New Runway Project (NRP), cannot be developed in isolation from the plans of other authorities with responsibility for land-use planning in metropolitan Perth.

5.2 State Planning

State government planning is controlled by the Western Australian Planning Commission (WAPC) which administers the State Planning Framework and the Metropolitan Region Scheme (MRS) and disseminates policies and strategies on a wide range of planning matters. The planning policies and strategies developed by the WAPC set the strategic context in which the MRS operates.

The State Planning Framework identifies Perth Airport as a 'specialised centre'. The specific commercial and industrial developments envisaged at Perth Airport complement the existing and future land uses in the areas surrounding the estate, and are consistent with the respective surrounding local government land-use zones. Development at Perth Airport also helps increase employment generating land uses and achieve the activity centre objectives of the State Government.

The NRP is consistent with the intent of the State Planning Framework as it is maximising the capacity of aviation infrastructure on the estate to meet the needs of Western Australia with regards to air travel; and to support business, tourism and the economy.

5.2.1 State Aviation Strategy

The first State Aviation Strategy was published in February 2015. This Strategy was prepared by the State Department of Transport in conjunction with key State government agencies covering economic development, planning, tourism, local government and regional development.

The State Aviation Strategy is aimed at "supporting the economic and social development of the State through the provision of safe, affordable, efficient and effective aviation services and infrastructure" and "provides a sound framework for policy setting, future planning and investment in Western Australia's international and domestic air services and airport infrastructure". It proposes actions that the State will take to work in partnership with airports, regional shire councils, airlines, and the resources and energy sectors to ensure adequate services continue to meet the needs of Western Australia.

The State Aviation Strategy confirms the status of Perth Airport as the sole and principle 24-hour airport for the Perth metropolitan region. The Strategy also touched on the need for a new runway at Perth Airport stating that the new runway will:

> "*provide the step-change in capacity needed to cope with current peak hour demand as well as accommodate continuing high levels of growth at Perth Airport*", and "*will benefit all users, improving reliability, reducing delays and permitting peak-period demand growth across interstate and international sectors, as well as resource and other intrastate users*".

In addition, the State Aviation Strategy recognises that a curfew in Perth would reduce aircraft utilisation in Australia by preventing them from flying overnight on the long-haul routes across Australia to and from Perth, in turn reducing aircraft efficiency, increasing costs and adding cost to airfares. This in turn would substantially reduce the frequency of air services to and from Perth, both domestic and international, causing severe consequences for the Western Australian economy.

Given a key finding of the Strategy is that the new runway will provide the capacity needed to cope with demand into the future, the NRP is consistent with the intent of the State Aviation Strategy.

In April 2018, the State Government announced it would be reviewing the strategy. The updated strategy is expected to be released in 2020.

5.2.2 State Planning Strategy 2050

The State Planning Strategy 2050, prepared by the WAPC and endorsed by the Western Australian State Cabinet, was launched in June 2014. The strategy provides the strategic guidance for land-use planning within Western Australia until 2050, as well as the vision and principles for coordinated and sustainable development. The State Planning Strategy does not provide a specific land use plan for the Perth metropolitan region; however, it does identify the need to provide efficient transport routes and hubs. It also recognises Perth Airport as a key element in the movement network of the State, and as the international gateway to Perth and Western Australia, and focal point for the growth of the tourism industry.

The NRP is consistent with and supports the intent of the State Government through the State Planning Strategy 2050, given the project will secure an additional runway to support the growth of international tourism and the State's economic development.

5.2.3 Directions 2031 and Beyond

The WAPC released 'Directions 2031 and Beyond' (Directions 2031) in 2010, as the highest level spatial framework and strategic plan for the Perth and Peel metropolitan region. In Directions 2031, Perth Airport is identified as a 'specialised centre' and recognised as critical to supporting the growth in the Western Australian resource sector, as well as providing Western Australia's primary link to the rest of Australia and the world. Directions 2031 provides for significant growth in the resident population and workforce of the Perth Metropolitan Region, which will support the growth of the airport as a specialised centre and employment hub.

The NRP is consistent with the intent of the strategy, which supports the growth of the airport and will generate additional employment both through construction and ongoing operations.

5.2.4 Perth and Peel @ 3.5 Million

In March 2018, the State Government released the Perth and Peel @ 3.5 million document, introducing the next layer of detail to underpin the high-level strategic vision that has been set through the State Planning Strategy 2050 and Directions 2031. The plan and associated sub-regional structure plans provide the guidance necessary to define the long-term spatial plan for Perth.

Perth Airport is also referenced in the Central, North East, North West and South Sub Regional Planning Frameworks, which designate the estate as a 'specialised activity centre' in line with other State policy. Perth Airport is referenced as a key employment node that is important to the diversification of the economy, particularly within the central sub region where Perth Airport is the focus of employment and a major contributor to productivity, and a facilitator of business clustering and agglomeration.

The NRP is consistent with the intent of the plan, which supports the growth of the airport and will generate additional employment both through construction and ongoing operations.

5.2.5 Transport @ 3.5 Million (2018)

The Transport @ 3.5 Million – Perth and Peel Transport Plan for 3.5 Million People and Beyond was prepared by the State Department of Transport with the intent of guiding the long-term planning for transport infrastructure for the Perth metropolitan region. The plan provides a framework to develop an efficient transport network to cater for Perth's population as it approaches 3.5 million and beyond.

There is limited reference to the significance of Perth Airport as a major generator of people, freight movements and employment, particularly with regard to considering future passenger and freight growth, and the development of employment nodes in and around Perth.

The NRP is consistent with the intent of the plan, in providing capacity to support the ongoing growth of Perth's population and subsequent required transport infrastructure, in addition to contributing to employment generation both during construction and ongoing operations.

5.2.6 State Planning Policy 5.1 – Land Use Planning in the Vicinity of Perth Airport (2015)

The State Planning Policy 5.1 – Land Use Planning in the Vicinity of Perth Airport (SPP 5.1) applies to land in proximity to Perth Airport which is, or may be in the future, affected by aircraft noise, and states:

> *"Perth Airport is fundamental to the continued development of the Perth metropolitan region and the State as a whole. Investment in airport infrastructure and the economic opportunities associated with the operation of the airport are now recognised as important and perhaps critical elements in the prosperity of a city such as Perth. Accordingly, the airport and its ongoing development need to be recognised in the planning of the region, and its operation protected, as far as practicable, from development that could potentially prejudice its performance. One of the main issues to be addressed in the planning of areas in the vicinity of the airport is aircraft noise, which is the focus of this policy."*

The role of this policy is to provide guidance to local governments in the vicinity of Perth Airport and the WAPC when considering developments on land adjacent to, or affected by, the airport.

In practice, the policy requires relevant Local Government authorities to give due consideration to Perth Airport's Australian Noise Exposure Forecast (ANEF) contours in local planning decision making. The intent of this is to ensure that policy measures (such as zoning, residential density, subdivisions, development, notification on titles, and advice) are appropriately applied to applications for development, to avoid potential land-use planning conflicts, which may subsequently impact and restrict airport operations.

Under the *Airports Act 1996*, Perth Airport is required to produce an ANEF for technical endorsement by Airservices Australia. The ANEF is incorporated in each airport Master Plan which is reviewed every five years. The new runway has been identified as a requirement for Perth Airport since the 1970s and has been incorporated in all ANEF contours prepared since 1985, although State policy measures first embedded the ANEF in land-use planning decisions made under the policy in 2004. The ANEF is detailed in Section 22 of this MDP.

Consideration of aircraft noise impacts in line with the endorsed ANEF is beneficial, however the effectiveness of the policy to protect the community is dependent on both the continuity of its application and further work in collaboration with the WAPC to strengthen policy measures. This may include the incorporation of elements of the NASF (National Airports Safeguarding Framework) and alternative metrics to trigger referral and assessment of incompatible land uses and development proximate to Perth Airport.

The NRP is consistent with the intent of SPP 5.1 given that the new runway has been incorporated in the preparation of the ANEF since 1985, and the endorsed ANEF is referenced in the policy, forming the basis for the assessment of land use-planning decisions within the vicinity of Perth Airport.

5.2.7 State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning (2009)

The State Planning Policy 5.4 identifies the primary freight roads and rail routes within the Perth metropolitan area, with the objective to protect these key corridors from future urban expansion. The policy recognises the hierarchy and jurisdiction of freight roads into and around Perth Airport and delineates both Tonkin Highway and Great Eastern Highway as Primary Freight Routes.

The NRP is consistent with this policy as it will not detract from the ability of the State to continue safeguarding these infrastructure corridors.

5.2.8 State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region (2010)

State Planning Policy 2.8 aims to provide a policy and implementation framework that ensures bushland protection and management issues in the Perth metropolitan region are appropriately addressed and integrated with broader land use planning and decision making. The Policy identifies measures that apply to proposals or decisions on State land that are likely to have an adverse impact on regionally significant bushland within a Bush Forever site, as identified in the policy and the MRS.

Bush Forever sites located on State or local reserved or managed land have applicable specific policy measures detailed in the policy.

SPP 2.8 identifies Bush Forever sites on, and within the vicinity of the Perth Airport estate, which have been classified as 'government lands' or 'public infrastructure' under the provisions of the Policy.

However, this policy does not directly relate to the activities on the estate. The estate is governed under Commonwealth legislation and any development on the estate must demonstrate compliance with the Commonwealth legislative requirements of the *Airports Act 1996*, the *Environment Protection Biodiversity and Conservation Act 1999* and the approved Master Plan. These requirements ensure appropriate assessment and determination of actions such as clearing, and that measures such as environmental offsets are adequately provided to account for any removal of regionally significant bushland.

The NRP will meet all applicable Commonwealth legislative requirements and approvals, consistent with the intent of the policy in providing for the appropriate assessment of development impacting regionally significant bushland and the application of subsequent conservation measures such as offsets.

5.2.9 Metropolitan Region Scheme

The Metropolitan Region Scheme (MRS) is prepared and administered by the WAPC as the principal planning scheme for the Perth metropolitan region. The MRS considers generalised broad-scale land uses and sets out regional reservations. The major proportion of the estate is reserved for 'Public Purposes: Commonwealth Government' and a small portion (18.14 hectares) is zoned 'Urban' under the MRS. The land zoned 'Urban' is considered an anomaly, and Perth Airport will work with the WAPC to pursue rezoning to be consistent with the remainder of the estate. Although the land zoned 'Urban' under the MRS has a different classification than the land reserved for 'Public Purposes', its use and intent is consistent with that of the reserve. The MRS does not place any limitations on permissible land uses for reserved land.

The NRP is consistent with the intent of the MRS. The NRP in the context of the MRS is shown in Figure 5-1.

5.2.10 Central Metropolitan Perth Sub-Regional Strategy (2010)

The central sub-region of metropolitan Perth encompasses the local government areas of Bayswater, Belmont, Canning, Fremantle, Melville, Nedlands, Perth, South Perth, Stirling, Subiaco, Peppermint Grove, Bassendean, Cambridge, Claremont, Cottesloe, East Fremantle, Mosman Park, Victoria Park and Vincent.

The Central Metropolitan Perth Sub-Regional Strategy, based on the outcomes sought by Directions 2031, sets employment and housing targets for the central sub-region, investigates opportunities for the delivery of the targets, and sets strategic priorities for the long-term development of the sub-region. It is anticipated that the State Department of Planning, Lands and Heritage (DPLH), in partnership with local governments, will continue to plan for growth and the placement of new residential communities through appropriate assessment of impacts – including impacts on communities from high levels of aircraft noise exposure.

The Strategy identifies Perth Airport specifically as a 'specialised centre' and outlines that Perth Airport has the potential to capitalise on already high levels of activity and access by creating a consolidated business and commercial hub.

The NRP is consistent with the intent of the Policy which supports the growth of the airport, and will generate additional employment both through construction and ongoing operations.

5.2.11 Swan Urban Growth Corridor Sub-Regional Structure Plan (2009)

The Swan Urban Growth Corridor Sub-Regional Structure Plan has been prepared by the DPLH as a strategic document to ensure orderly planning and development of land and infrastructure consistently across the study area.

The Swan Urban Growth Corridor Sub-Regional Structure Plan is based on the outcomes sought by Directions 2031 and sets employment and housing targets for the Swan region and investigates opportunities for the delivery of the targets and sets strategic priorities for the long-term development of the sub-region. The current projections estimate a future population of 33,000 with approximately 12,500 residential lots being developed over the next 25 years.

The sub-regional structure plan provides a set of principles to guide future development in the corridor in a coordinated manner, commensurate with the needs of the community. It considers factors such as economic development, road networks, transit stations, community facilities, district open space, urban densities, activity corridors and neighborhood centres.

The NRP is consistent with the intent of the Swan Urban Growth Corridor Sub-Regional Structure Plan given that the State has considered the placement of the residential development in accordance with SPP 5.1, which incorporates the endorsed ANEF.

Metropolitan Region Scheme

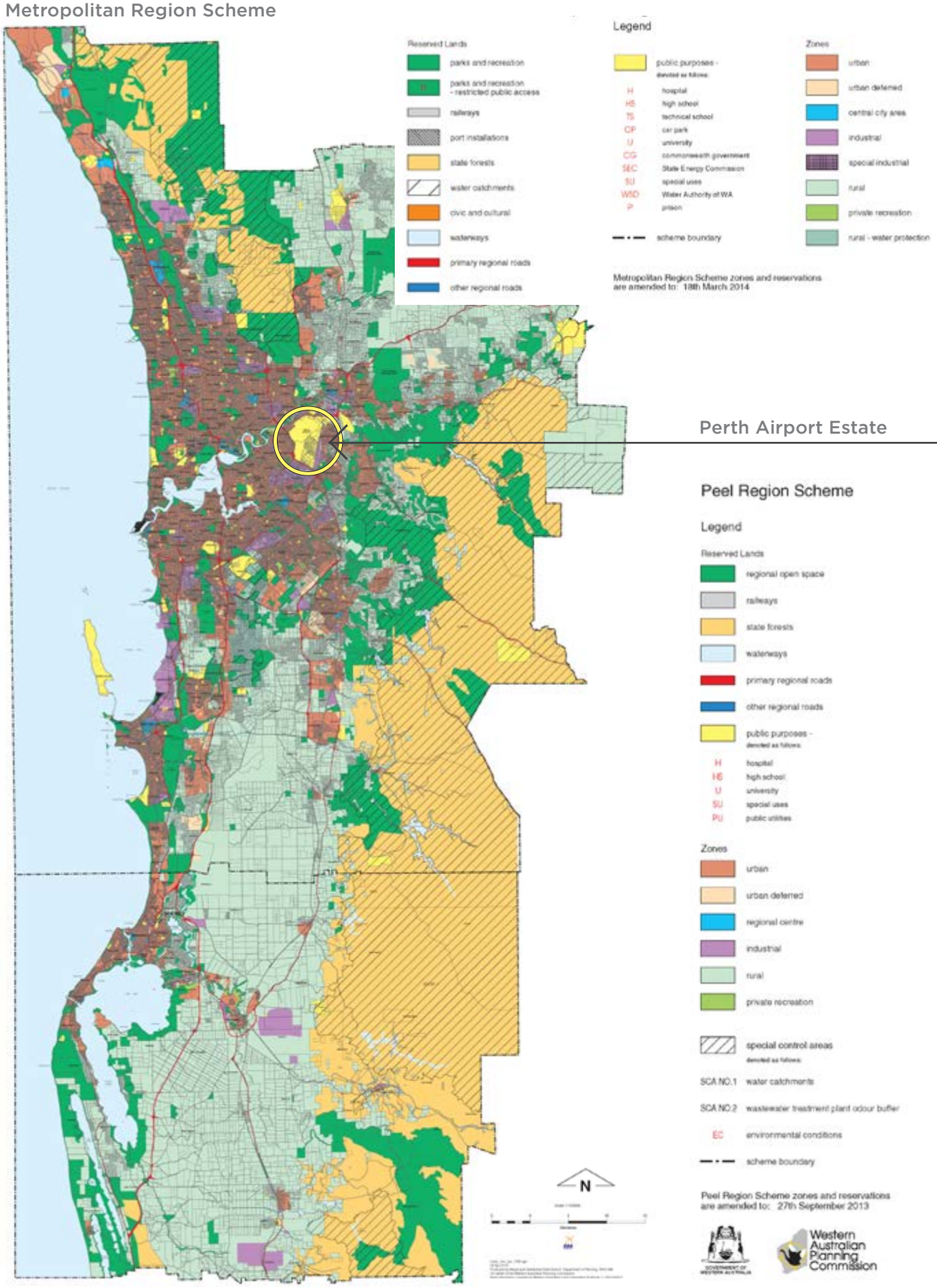
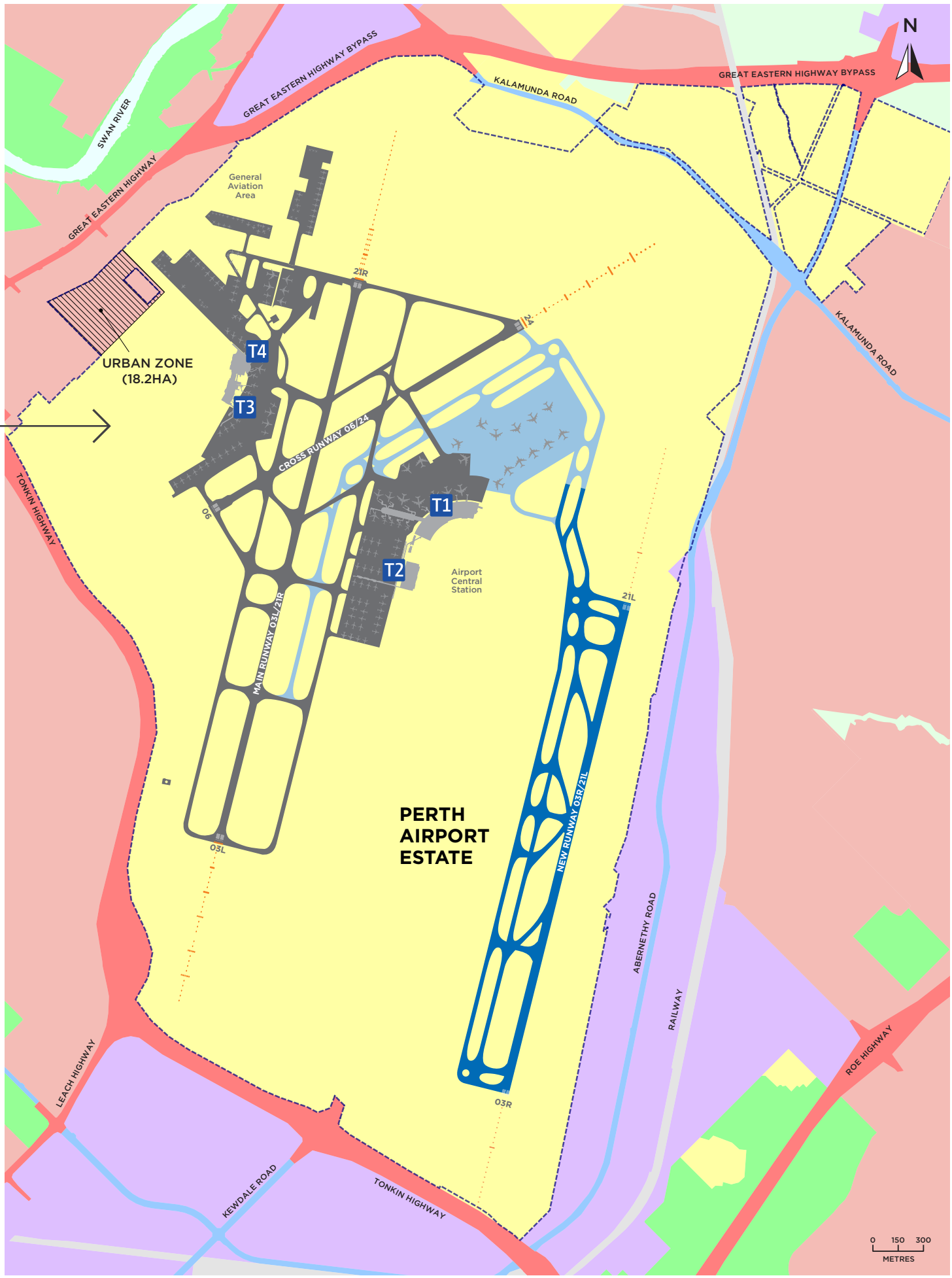


Figure 5-1 New Runway Project in context of the Metropolitan Region Scheme
Source: Western Australian Planning Commission


N
GREAT EASTERN HIGHWAY BYPASS
KALAMUNDA ROAD
SWAN RIVER
GREAT EASTERN HIGHWAY
General Aviation Area
URBAN ZONE (18.2HA)
T4
T3
T1
T2
Airport Central Station
CROSS RUNWAY 06/24
MAIN RUNWAY 03L/21R
NEW RUNWAY 03R/21L
21R
24
06
21L
03L
03R
PERTH AIRPORT ESTATE
TONKIN HIGHWAY
LEACH HIGHWAY
KEWDALE ROAD
ABERNETHY ROAD
RAILWAY
ROE HIGHWAY
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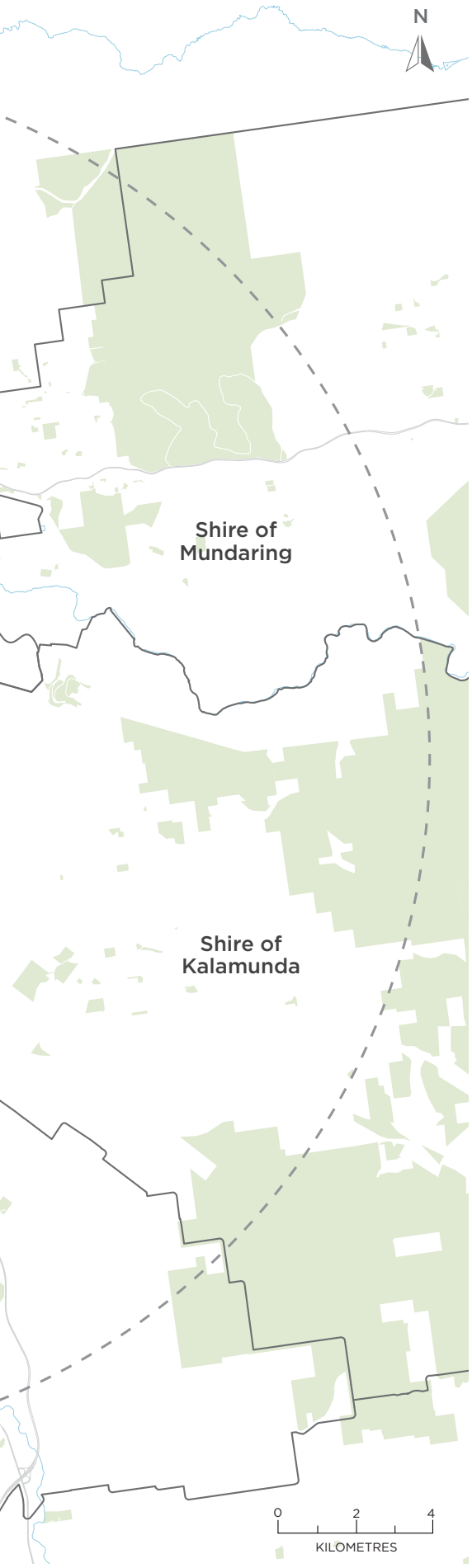
METRES

Figure 5-2 Perth Airport in the context of local government boundaries
Source: Perth Airport



5.3 Local Government Planning Policy

Local governments are responsible for planning their local communities by ensuring appropriate planning controls exist for land use and development. Local planning schemes and strategies are prepared by each individual local government area to:

- set out the way land is to be used and developed,
- classify and determine the acceptability of various land uses, and
- establish the provisions for the coordination of infrastructure and development within the local government area.

Perth Airport estate sits within three local authority areas, divided between the City of Belmont, City of Swan and the City of Kalamunda. While localities closest to the estate are located within these authorities, Perth Airport operations impact local government planning within a much wider catchment of the Perth metropolitan area – largely due to the central location of the estate, only 15 kilometres from the Perth CBD, and strategic location within the metropolitan arterial road network.

To provide an assessment of the NRP with respect to consistency with Local Government planning, the project was reviewed against the applicable Local Government planning schemes and strategies within a 15 kilometre radius of the estate. The key considerations include aircraft noise exposures, and protected airspace.

Highlighting the central location of the airport within its surrounds and the diversity of land uses within proximity, as illustrated in Figure 5-2, the area of interest sits within 18 individual local government areas. The 15-kilometre radius is bounded by the City of Swan in the north and northeast, Shire of Mundaring to the east, City of Gosnells in the south and the City of Nedlands in the west. The natural geography of the area incorporates parts of the Swan River and many of its tributaries, Lake Monger, part of Herdsman Lake, the Swan Valley, Kings Park, and Whiteman Park.

Many community facilities such as hospitals, schools, and churches are located within the area, including the University of Western Australia, Curtin University and Edith Cowan University. Land uses are predominantly characterised by low and high density residential, commercial developments and light and heavy industrial areas, as well as the Darling Scarp to the east which includes large tracts of State Forest.

This area also encapsulates the Perth CBD as well as other major centres, including Midland, Morley, Stirling, and Cannington which are classified as 'Strategic' centres under the State Government's State of Planning Policy (SPP 4.2) – Activity Centres for Perth and Peel. In addition, there are two centres classified as 'Secondary' centres within the area – Belmont and Victoria Park. These centres form major economic and employment hubs, supported by public transport routes and serviced by major road infrastructure, incorporating a range of land uses to support the residential population in and around centres.

Within the area of interest, the following local authorities are responsible for the preparation and implementation of local planning schemes and strategies relevant to their local areas:

- City of Belmont,
- City of Swan,
- City of Kalamunda,
- City of Bayswater,
- Town of Bassendean,
- Shire of Mundaring,
- City of Gosnells,
- City of Canning,
- City of Wanneroo,
- City of Perth,
- City of Vincent,
- Town of Victoria Park,
- City of South Perth,
- City of Nedlands,
- City of Subiaco
- Town of Cambridge,
- City of Melville, and
- City of Stirling.

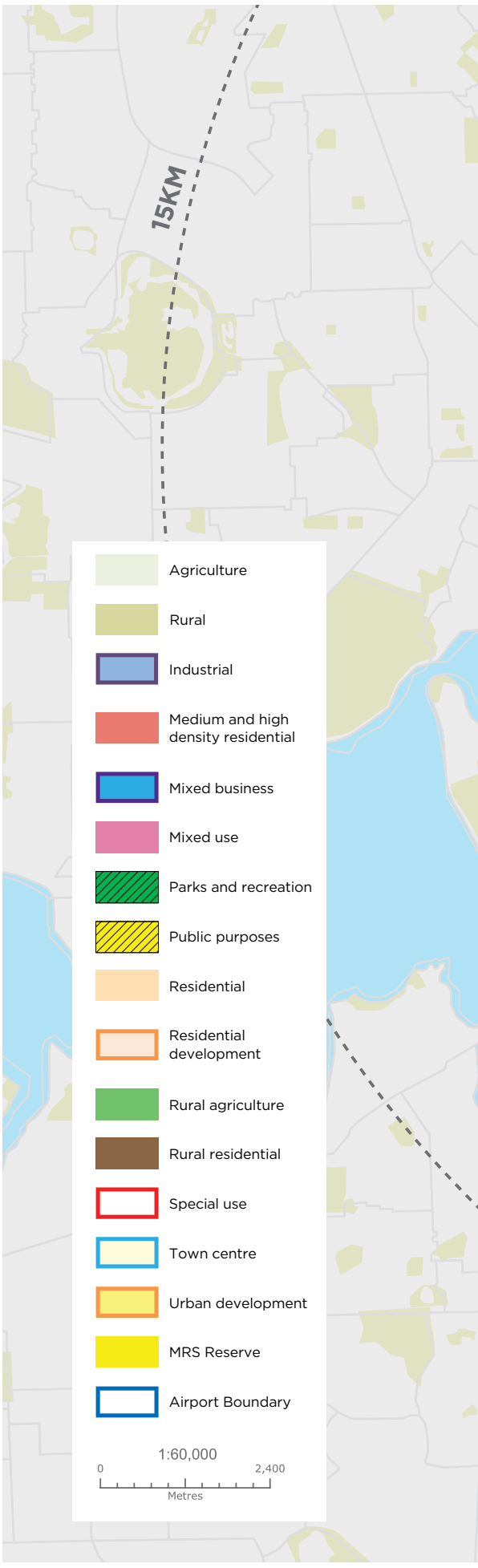
5.3.1 City of Belmont

The City of Belmont Local Planning Scheme No. 15 (LPS 15) provides for 'Industrial' and 'Residential' zones adjacent to the estate including the major Kewdale industrial area, and the residential suburbs of Cloverdale and Redcliffe, as shown in Figure 5-3. Under LPS 15, approximately 33 per cent of the City of Belmont is reserved for 'Public Purposes', which predominantly covers the airport, 22 per cent is zoned 'Residential' and seven per cent zoned 'Industrial'. LPS 15 incorporates provisions relating to land located within the ANEF to ensure referral to Perth Airport in line with State policy, and to ensure the planning and design of new developments within the City considers aircraft noise exposure and protected airspace.

Since the early 1990s, substantial redevelopment of residential land within the City has occurred, as older housing stock has been replaced at increased densities. There are further residential infill opportunities in the area of Rivervale known as 'The Springs' and also within Development Area 6 (an area of Redcliffe immediately to the west of the airport estate). Local Planning Policy No. 14 Development Area 6 Vision (LPP 14) was originally adopted by the City of Belmont Council at its meeting on the 17 December 2013. A revised LPP 14 was subsequently adopted by Council on the 23 February 2016, following the finalisation of the Forrestfield-Airport Link route, which proposed to incorporate a train station in Redcliffe (to be named Redcliffe Station). The development application for the Redcliffe train station was approved by the WAPC on 31 August 2017. The location of the proposed Redcliffe Station is also within Development Area 6; a strategic area identified by the City of Belmont which will leverage off the area's location to the future Redcliffe train station to create opportunities for residential infill and commercial development in line with a Transit Oriented Development. The Draft Redcliffe Station Precinct Activity Centre Plan was released for public comment in February 2020.

The Kewdale Industrial area is strategically located around major freight rail and highway networks. State Planning policy has recognised the importance of the area as a transport and logistics hub. Under LPS 15, the City of Belmont has the capacity to approve a wide range of industrial activities within this zone, ranging from heavy to light industrial and commercial. Current land uses include the BP Fuel Storage facility, the Kewdale Freight Terminal (which accesses the heavy freight rail) and other logistics, freight forwarding and manufacturing uses. It is expected that the importance of this industrial area will further develop over time given its strategic location.

The NRP is consistent with the City of Belmont's local planning with regards to LPS 15 and LPP 14 and is compatible with the intent of future land uses immediately surrounding the estate and within the wider area of interest.



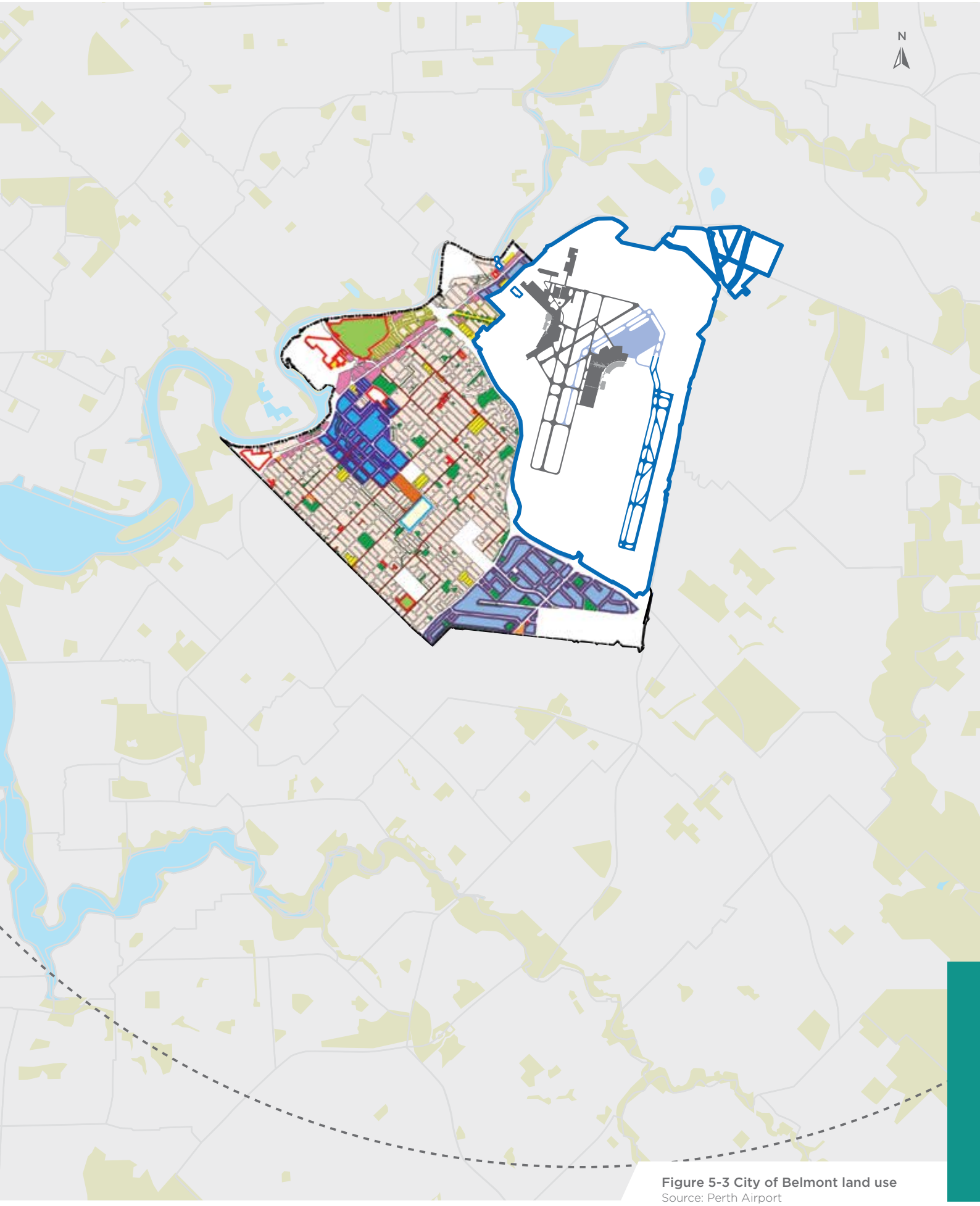


Figure 5-3 City of Belmont land use
Source: Perth Airport

5.3.2 City of Swan

The City of Swan Local Planning Scheme No. 17 (LPS 17) provides for 'Industrial', 'Residential' and 'Rural' areas immediately adjacent to the estate as shown in Figure 5-4. A similar mix of land uses throughout the remainder of the local government area extending beyond the area of interest to the north and north east. LPS 17 incorporates provisions relating to land located within the ANEF contours to ensure referrals to Perth Airport occur in line with State policy, and to ensure the planning and design of new developments within the City consider aircraft noise exposure and protected airspace.

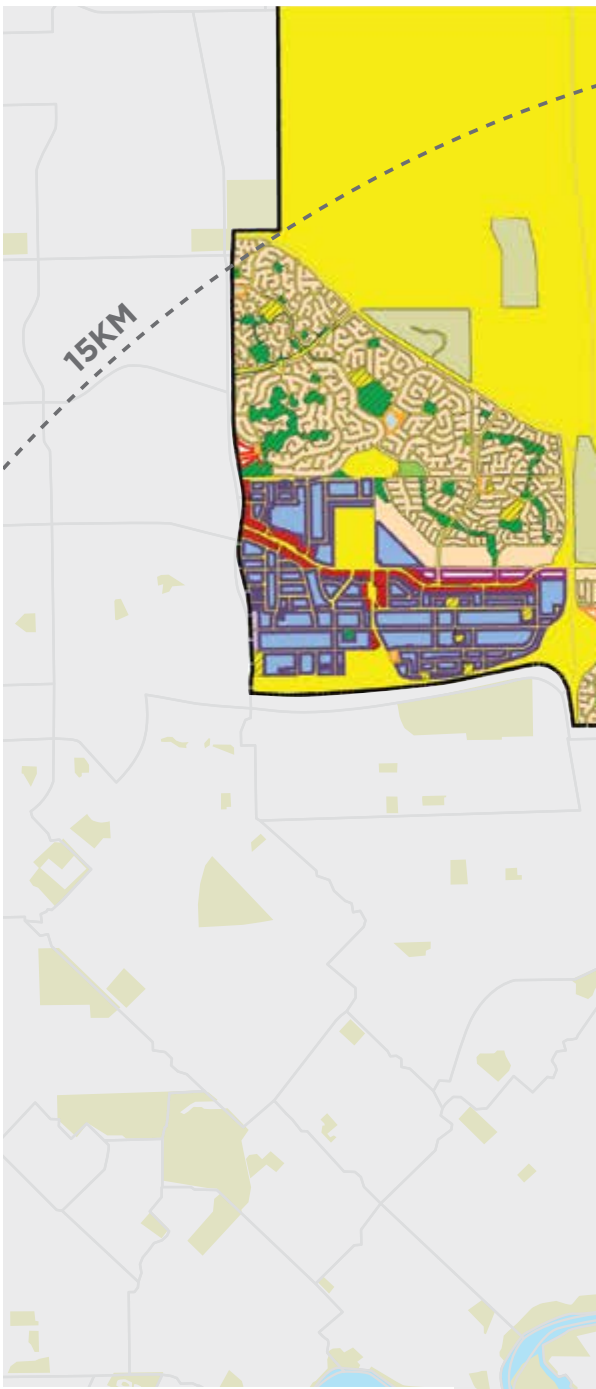
The City of Swan is serviced by the Midland City Centre, which is classified as a 'Strategic Metropolitan Centre' under the provisions of SPP 4.2. The intent of the centre is to cater for substantial future population growth in line with State strategies such as Directions 2031, and Perth and Peel @ 3.5 million. The City of Swan has prepared the Midland Activity Centre Structure Plan to guide the development of the centre to support high density residential and mixed land uses. The Structure Plan considers height limitations for development in line with protected airspace and provides for assessment of possible noise attenuation measures where development is proposed within the 20 ANEF contour and above.

The primary residential growth area in the City of Swan is within the 1,100-hectare Urban Growth Corridor Local Area, which extends north from the Midland City Centre through to the northern boundary of the area of interest. The Urban Growth Corridor includes the suburbs of Brabham and Dayton, and parts of the suburbs of Caversham, West Swan, Whiteman and Bennett Springs. Strategic plans for Brabham include the development of a large neighbourhood centre, and the placement of residential development in this locality was undertaken in accordance with State Policy. In line with provisions of LPS 17 the City of Swan imposes conditions relating to noise amelioration and notifications on Certificates of Title, where development is proposed within the 20 ANEF contour, or higher where deemed to be acceptable under SPP 5.1.

The residential suburb of South Guildford and historic Guildford Town Centre are located immediately to the north of the airport estate, separated by Kalamunda Road, the Great Eastern Highway Bypass and the Midland freight rail. Approval was granted by the WAPC and subsequently the City of Swan for the development of approximately 450 additional new dwellings with the redevelopment of the Rosehill Golf Course, less than 2.3 kilometres from the main runway (03L/21R) and the new runway (03R/21L). Perth Airport strongly objected to the proposal due to the anticipated future exposure of aircraft noise on the residential communities. Considering this objection, in supporting the rezoning of the land to facilitate residential development, the State placed conditions on the approval including the notifications on land titles to advise future landowners of aircraft noise exposure and the installation of noise mitigation measures such as building insulation. These measures are in accordance with SPP 5.1, which is intended to safeguard the continued 24/7 Perth Airport operations.

The Hazelmere Industrial area is located immediately north east of the estate. Its location provides access to air and rail freight transport as well as ready access to major road transport routes including the Tonkin, Roe, Reid, Great Northern, and Great Eastern highways. The Hazelmere Enterprise Area Structure Plan (HEASP) was endorsed by the WAPC in October 2011 and provides a structural framework to guide future planning and decision making for Hazelmere. The north-east corner of the estate falls within the HEASP area.

The NRP is consistent with the intent of the City of Swan's local planning with respect to LPS 17, Midland Activity Centre Structure Plan and the Urban Growth Corridor Local Structure Plans given that these plans have been developed in line with SPP 5.1 provisions which consider the endorsed ANEF. The Midland City Centre Structure Plan also incorporates building height provisions in accordance with restrictions imposed by the Perth Airport protected airspace, which together with the endorsed ANEF takes into account the NRP. The NRP is also consistent with the Hazelmere Enterprise Area Structure Plan, and is compatible with the planned future land uses proximate to the airport estate and within the wider area of interest.



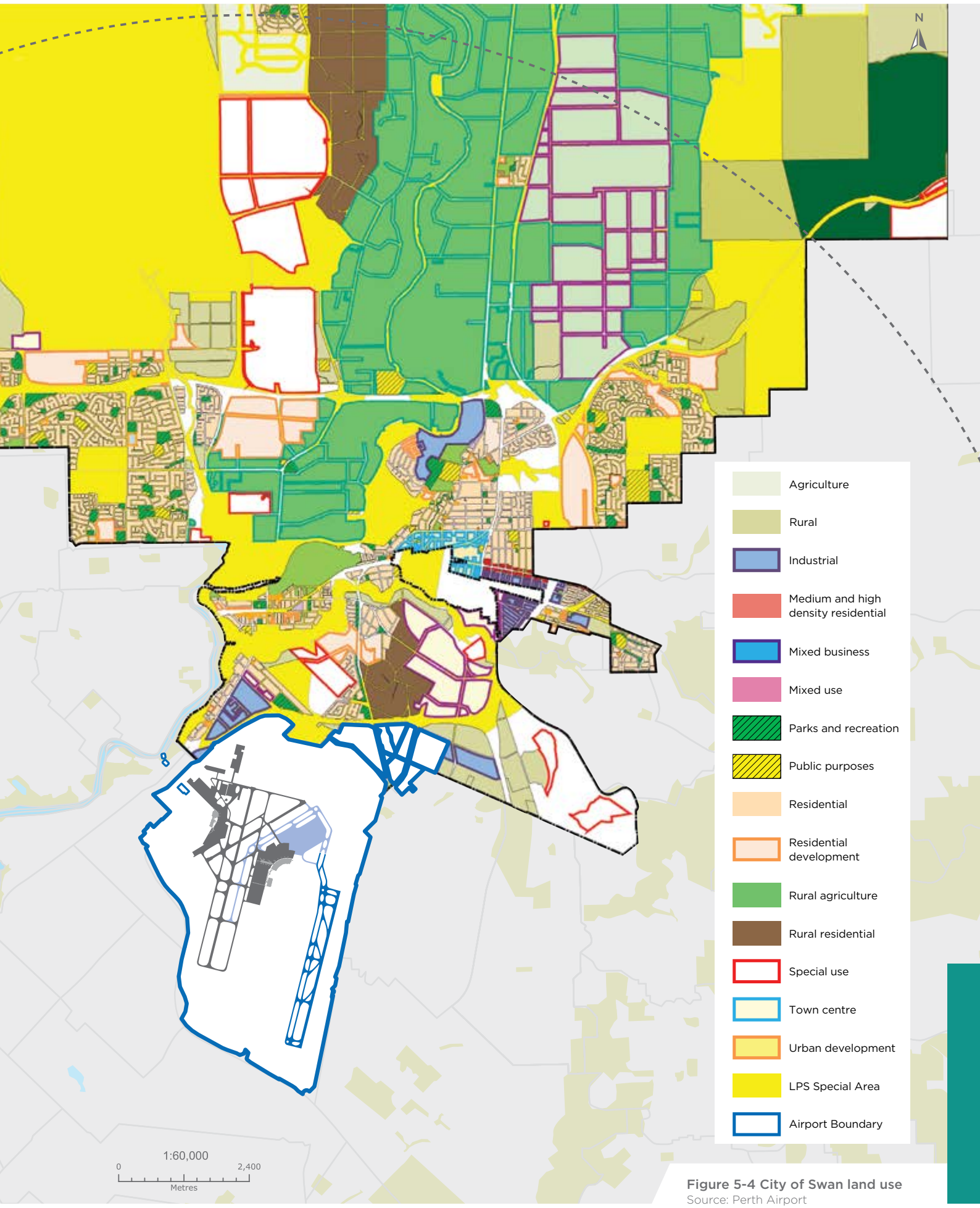
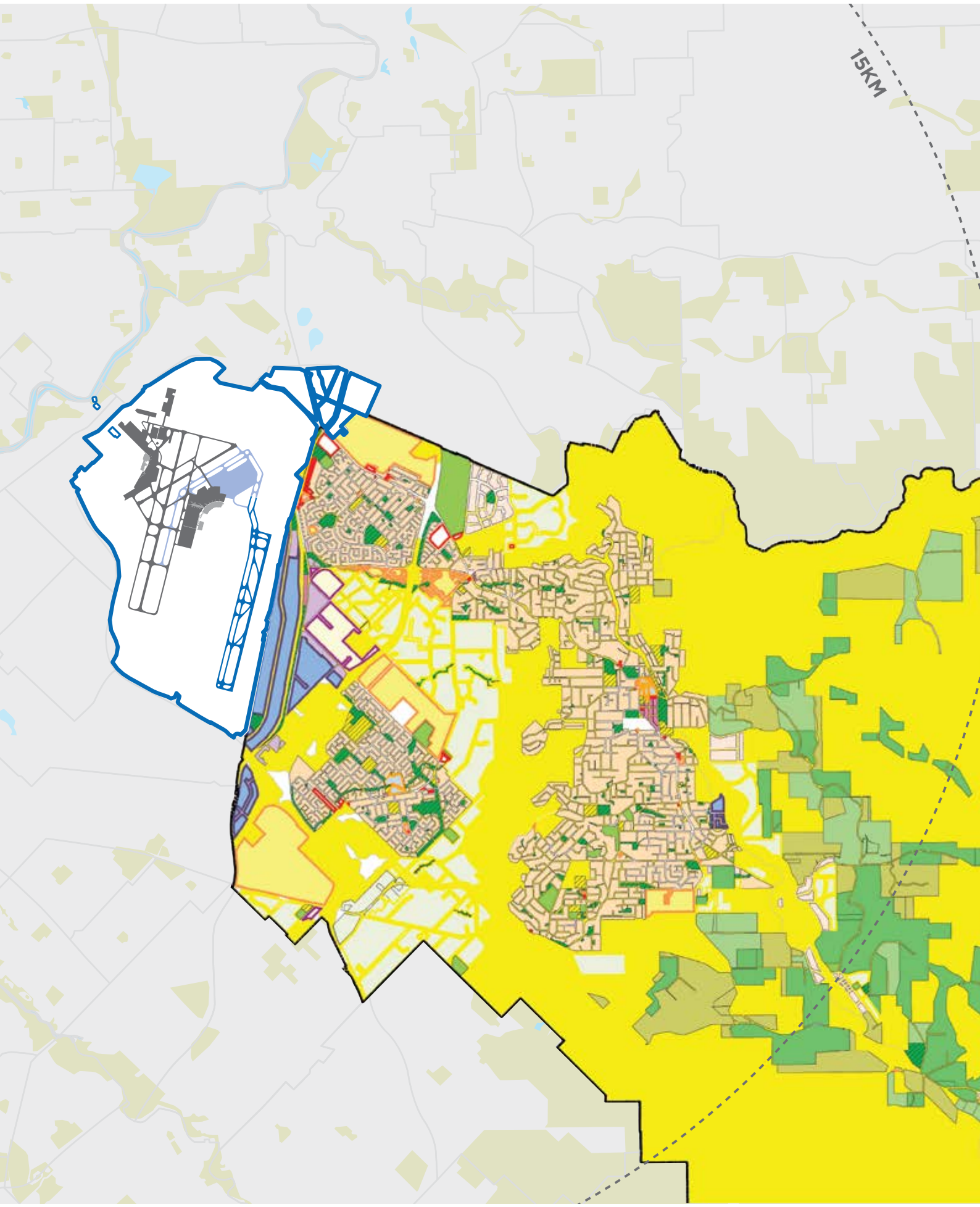


Figure 5-4 City of Swan land use
Source: Perth Airport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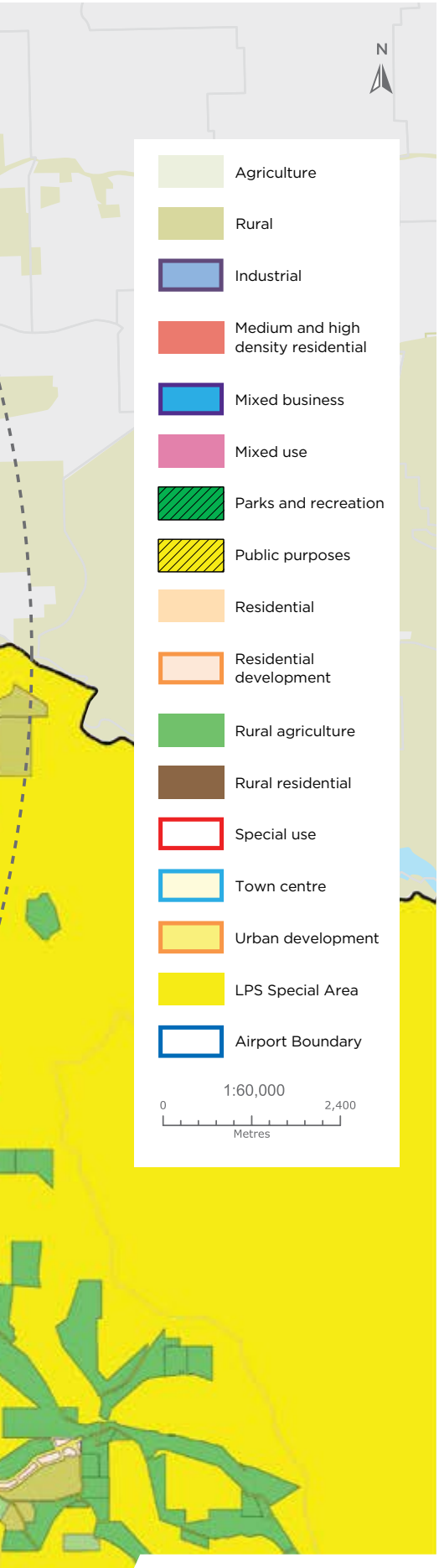


Figure 5-5 City of Kalamunda land use
Source: Perth Airport

5.3.3 City of Kalamunda

The City of Kalamunda Local Planning Scheme No. 3 (LPS 3) provides for 'Industrial' and 'Residential' areas immediately adjacent to the airport estate, as shown in Figure 5-5. The wider local authority comprises rural residential, general rural and incorporates significant reserves for State Forest and Parks and Recreation to the eastern extent of the area of interest. The local government area is serviced by the Kalamunda City Centre and Forrestfield District Centre, both classified as 'District Centres' under the provisions of SPP 4.2. Existing residential areas in High Wycombe, immediately to the east and north east of the estate, have been developed over the past 30 years despite knowledge of the intention to proceed with the development of the NRP as outlined in Perth Airport master plans since the mid 1980's.

With the Forrestfield-Airport Link project including the construction of a station in Forrestfield (to be named Forrestfield Station), the City of Kalamunda prepared and adopted the Forrestfield North District Structure Plan to guide the development of a new activity centre and a Transit Oriented Development precinct based around the future train station. In line with the State Government North-East Subregional Framework, the focus of the high-level District Structure Plan is to deliver an employment, transport and recreation hub incorporating medium to high density residential development around the centre. The plan has considered the placement of residential development outside of the ANEF 20 and above contours in accordance with the provisions of SPP 5.1. The City is now working to prepare a Local Structure Plan for Forrestfield North, which will provide further detail on how the area will be developed. Perth Airport is actively involved in technical working groups for Forrestfield North, to ensure the project is consistent with airport operations.

The WAPC's North-East Sub-regional Planning Framework (May 2015) has earmarked the areas of Wattle Grove and Maida Vale for future urban expansion. The draft plan states:

"The spatial plan addresses the need to:

- *avoid land use conflicts by taking into account buffer requirements such as those required for industry, airports and wastewater treatment plants".*

The City of Kalamunda has completed drafting the concept plan for Wattle Grove South. To minimise noise exposure to existing residential areas, the location of Wattle Grove South has the potential to be a key departure corridor for the new runway. The corridor would be subject to high frequency aircraft overflying and therefore exposure to aircraft noise. This departure corridor needs to be considered in future planning.

Although there are no further details or statutory documents to review, Perth Airport considers that any plans produced to develop in Wattle Grove South, or other areas identified in the North-East Sub-regional Planning Framework, need be in line with the strategic objectives contained within the plan, and demonstrate compliance with SPP 5.1 to ensure existing and new residents are protected from the exposure of aircraft noise.

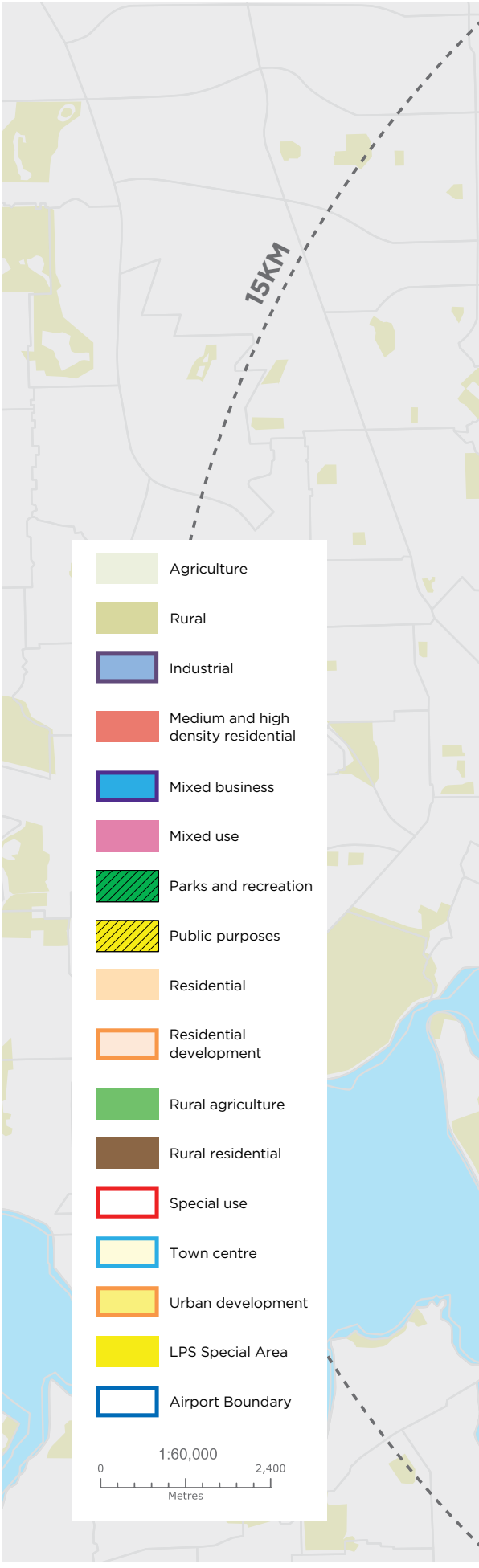
The NRP is consistent with the City of Kalamunda's local planning with respect to LPS 3 and the Forrestfield North District Centre Structure Plan, and is compatible with the intended land uses immediately abutting the estate and within the wider area of interest. Consideration should be given to proximity to the new runway for ground based noise and noise modelling (such as N-above contours) key arrival and departure corridors as discussed in Section 21 and 22.

5.3.4 City of Bayswater

The City of Bayswater Local Planning Scheme No. 24 (LPS 24) primarily provides for residential development from medium to high density, and supporting commercial, industrial, community purposes and parks and recreation, as shown in Figure 5-6. With much of the local authority area already developed, residential infill is likely to occur with increased densities and multiple dwelling developments, predominantly focused around the rail line which extends through Bayswater, Inglewood, Maylands, Ashfield, and Mount Lawley. LPS 24 also provides for industrial land in Ashfield and Bayswater, which is a major light industrial and commercial hub for the north-eastern region. Urban renewal through the Bayswater industrial area has resulted in large cleared and vacant industrial land available for development, with most other industrial zoned land closer to the Bayswater town centre largely built out.

The local authority area is serviced by the Morley City Centre, which is classified as a 'Secondary Centre' under the State's Centres hierarchy within SPP 4.2. Morley is a strategically important centre and operates as a transit interchange and major shopping and commercial destination.

The NRP is consistent with the intent of the City of Bayswater's LPS 24 and is compatible with intended future land use within the area of interest.



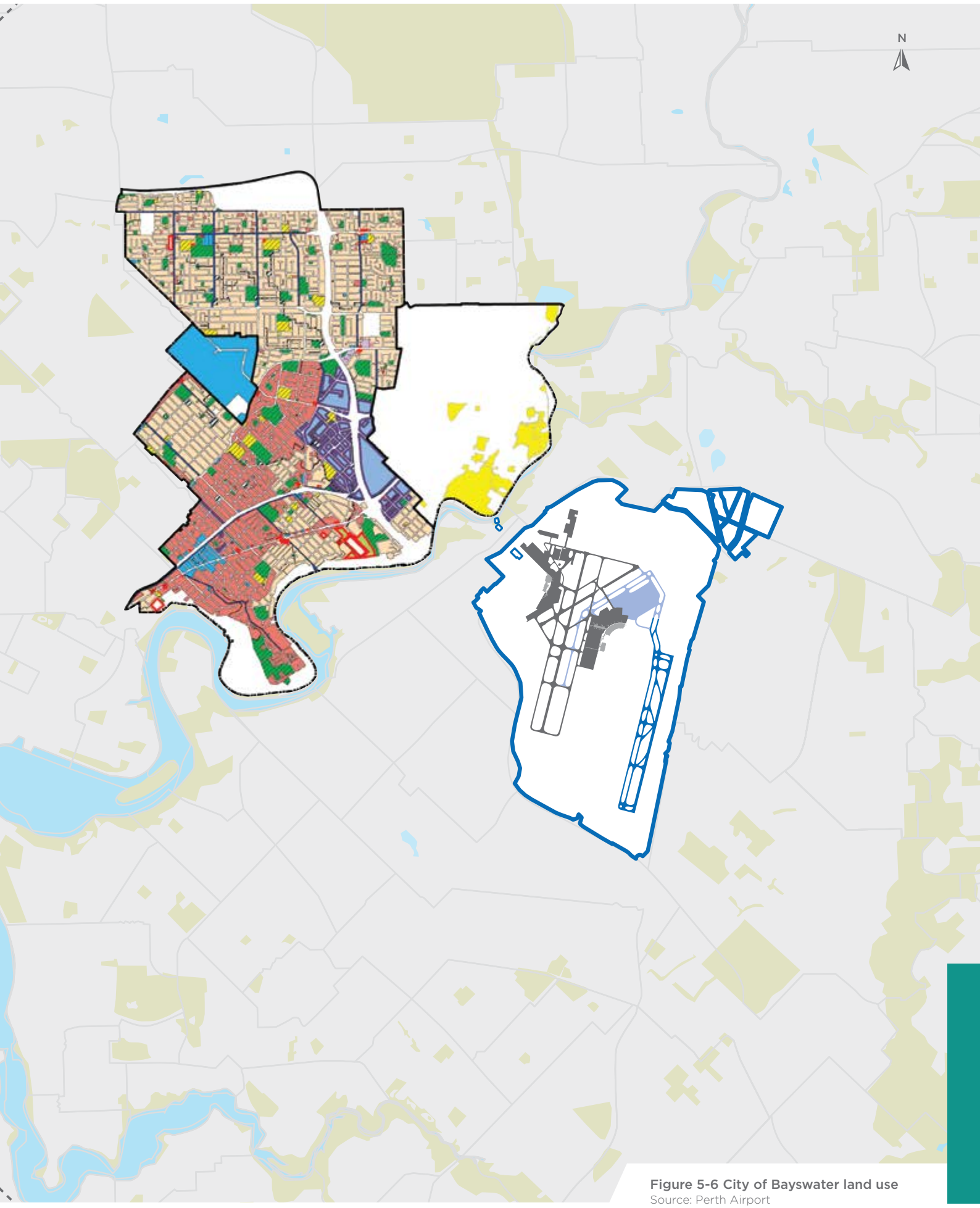
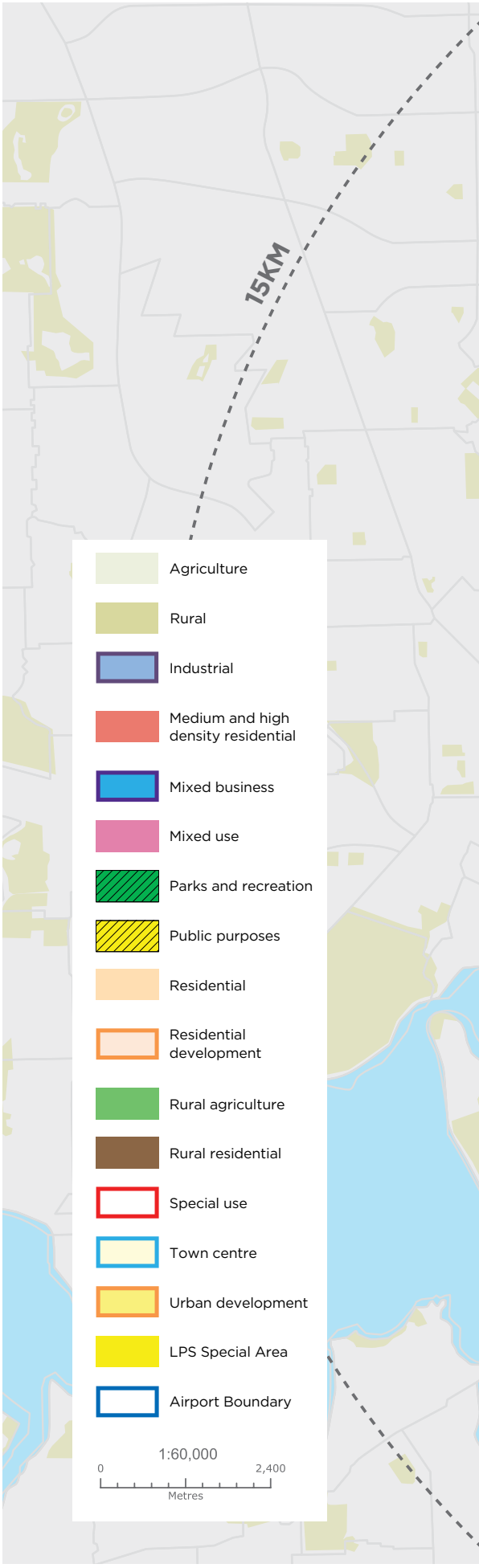


Figure 5-6 City of Bayswater land use
Source: Perth Airport

5.3.5 Town of Bassendean

The Town of Bassendean Local Planning Scheme 10 (LPS 10) primarily provides for medium to low density residential development, as shown in Figure 5-7, through the suburbs of Bassendean, Eden Hill, Kiara and Lockridge. The local authority area is mostly built out in line with zoning, with opportunities for increased residential infill development where rezoning of the land for higher densities can be facilitated. This may result in increased multiple dwelling and mixed-use developments. Strategically located pockets of land, either adjacent the rail line or within the Bassendean town centre, have also been identified for higher densities. Development of these areas will align with the principles of a Transit Oriented Development, in meeting residential infill targets and providing for increased employment and commercial activity. Industrial zoned land is provided for under LPS 10 within the suburb of Bassendean to the north of the rail line, which has largely now been developed.

The NRP is consistent with the Town of Bassendean LPS 10 and is compatible with the intended future land uses within the area of interest.



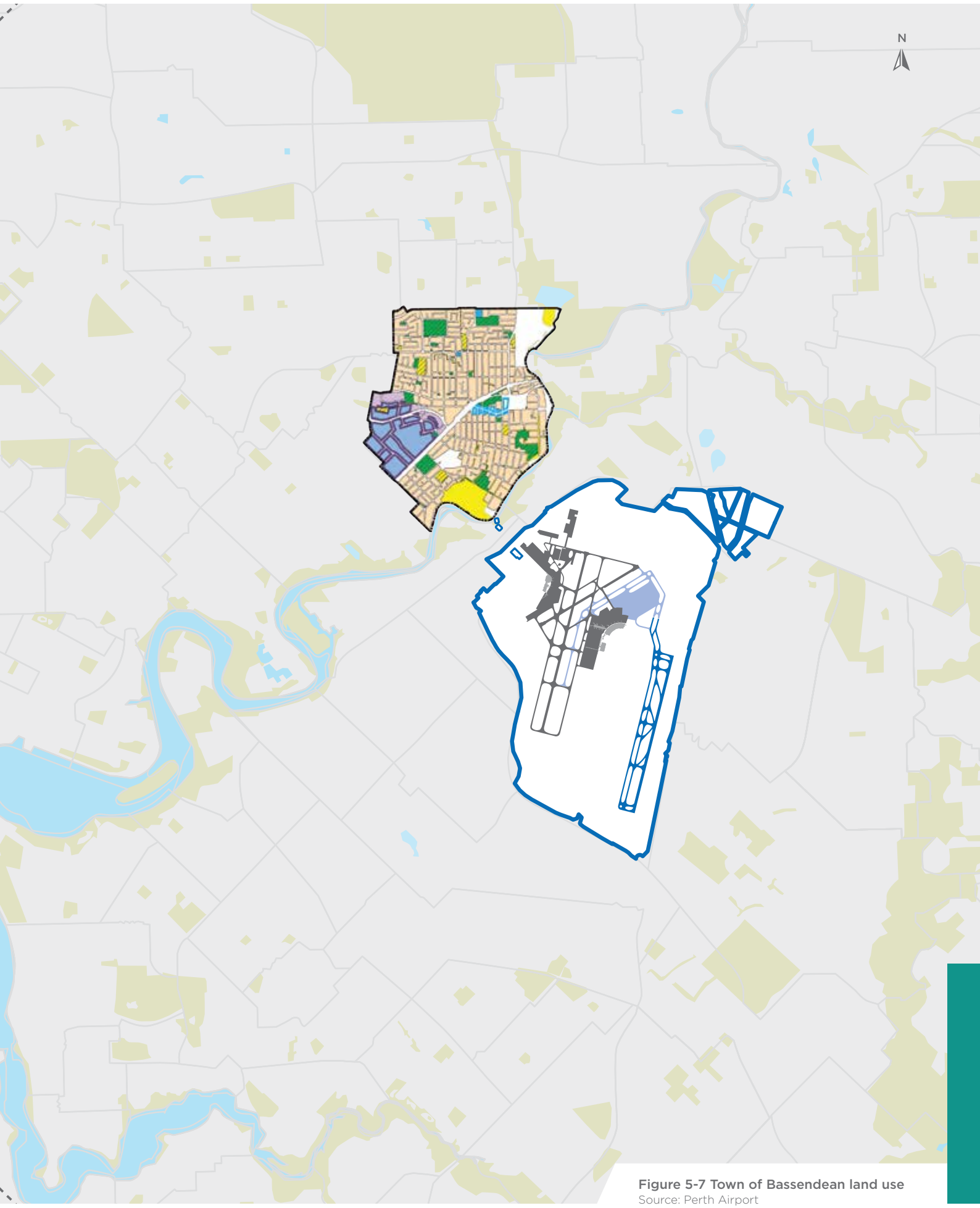
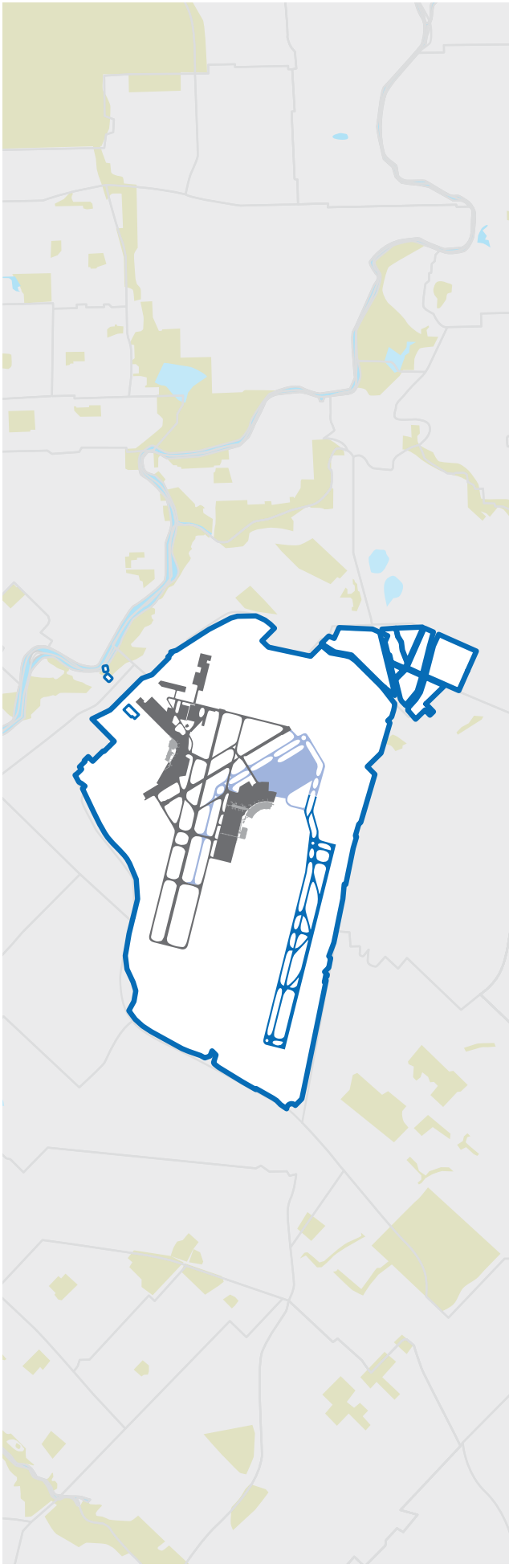


Figure 5-7 Town of Bassendean land use
Source: Perth Airport

5.3.6 Shire of Mundaring

The Shire of Mundaring Local Planning Scheme No. 4 (LPS 4) provides for large areas of State Forest, conservation, protected water catchment areas, and small rural holdings outside of the area of interest extending east into the Darling Scarp away from Perth Airport. The predominant zoning of land within the area of interest is residential (low density) with pockets of higher density land parcels, intended for grouped dwellings or aged care developments, and rural residential lots as shown in Figure 5-8. Several local centres provide for a range of retail, commercial, medical, office and community purpose land uses, with the Mundaring Town Centre serving as the major centre for the local authority area.

The NRP is consistent with the Shire of Mundaring LPS 4 and is compatible with the intended future land uses within the area of interest.



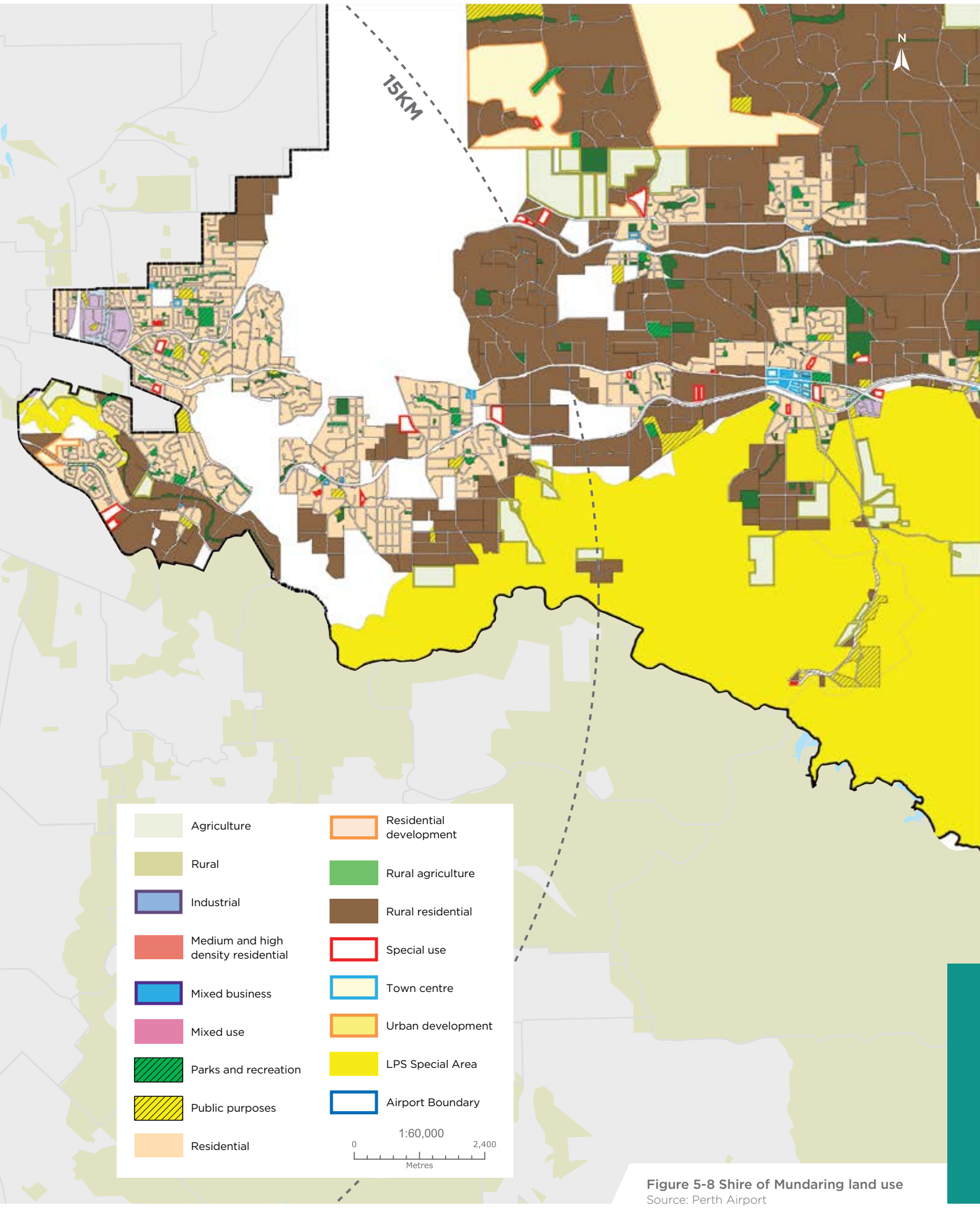
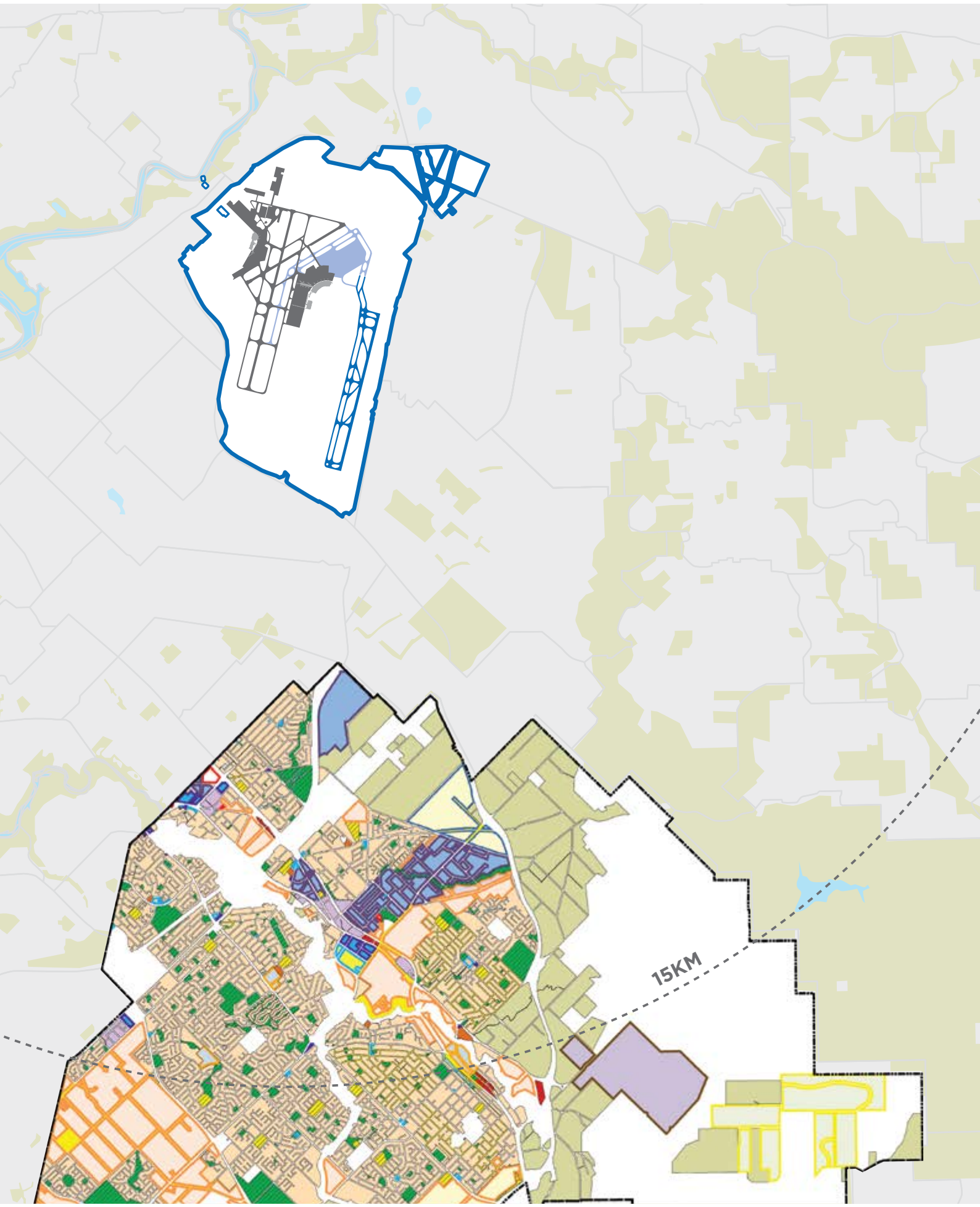


Figure 5-8 Shire of Mundaring land use
Source: Perth Airport


15KM

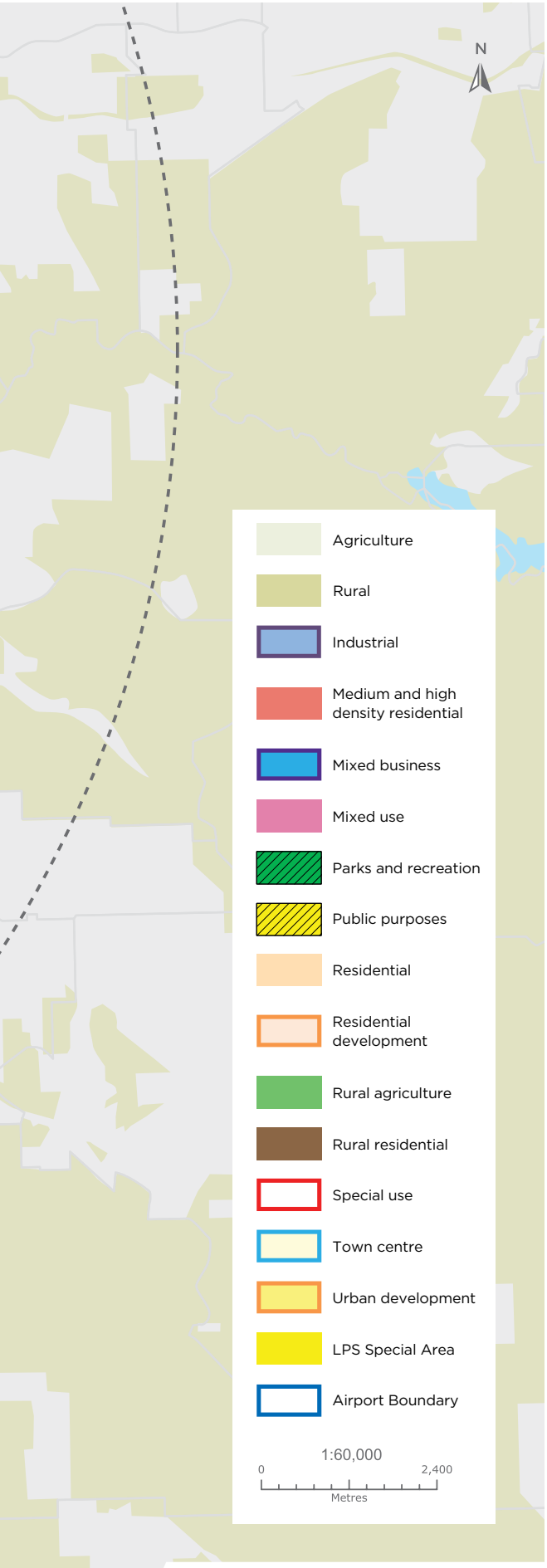


Figure 5-9 City of Gosnells land use
Source: Perth Airport

5.3.7 City of Gosnells

The City of Gosnells is only partially located within the area of interest, with predominantly low intensity land uses such as State forest, parks and recreation, water catchments, and 'General Rural' outside of the area of interest, as shown in Figure 5-9, as well as a small amount of light industrial development. The areas of interest comprise the localities of Orange Grove, Maddington, Kenwick, Beckenham, Thornlie and parts of Canning Vale and Huntingdale.

Local Planning Scheme No. 6 (LPS 6) provides for a mix of land uses predominantly consisting of medium to low-density residential development, as well as pockets of industrial land development and commercial development within local centres.

Draft Local Planning Strategy and Draft Local Planning Scheme No. 24 were adopted by Council at its 12 September 2017 meeting for the purposes of public advertising. The Draft Local Planning Strategy sets a long-term planning direction for the Local Government, and outlines how State and regional planning policy has been applied to achieve key statutory changes. The Draft Local Planning Scheme, includes the following:

- increase the base minimum residential density code from R17.5 to R20,
- increasing residential densities around activity centres and train stations, and
- requirement to obtain development approval for development in areas affected by noise from Perth Airport, rather than be considered as 'Permitted' or exempted development. A consultation period on the draft Scheme No. 24 has been completed and the process is due for progression in 2021.

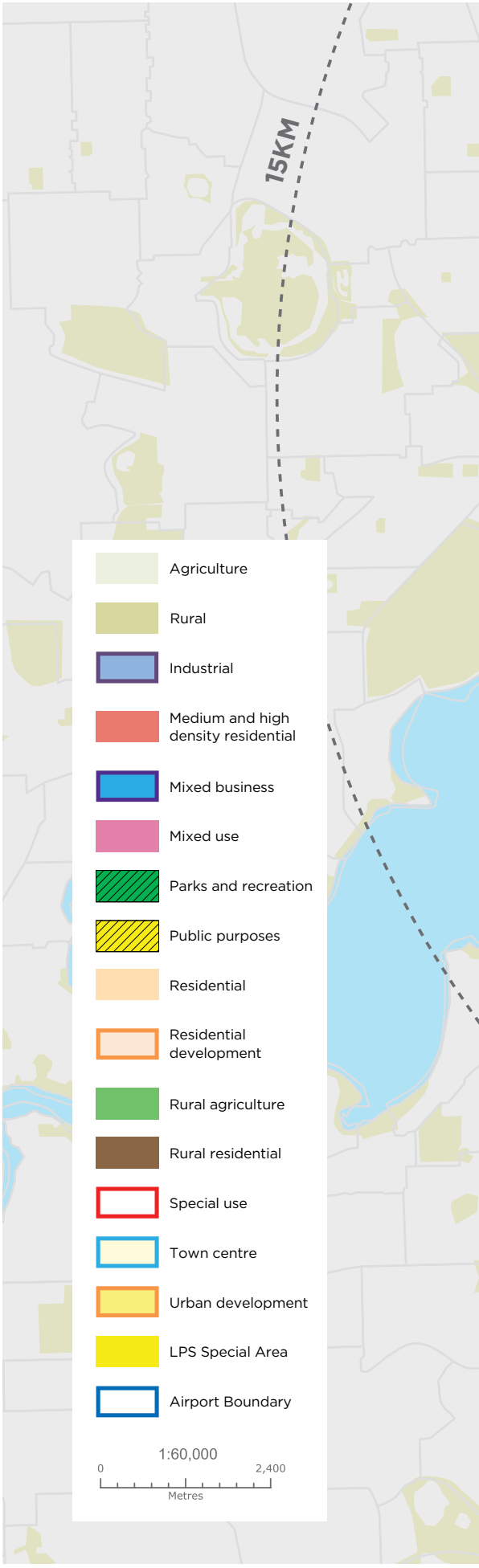
The NRP is consistent with the City of Gosnells LPS 6 and is compatible with the intended land uses within the portion of the local authority area falling within the area of interest.

5.3.8 City of Canning

Most of the City of Canning local authority area is located within the area of interest, with only parts of the suburbs of Parkwood and Canning Vale excluded. The Town Planning Scheme No. 40 (TPS 40) predominantly provides for low to medium density residential land uses, as shown in Figure 5-10, with higher density residential zonings closer to the Cannington City Centre. The Cannington City Centre is classified as a 'Strategic Metropolitan Centre' in the hierarchy of centres within SPP 4.2.T City of Canning has recently adopted an Activity Centre Plan for the Canning City Centre which enables the intensification of residential densities and mixed-use development within the centre. Perth Airport provided comment on the draft plan, and recommended the inclusion of provisions relating to noise amelioration and notifications on titles for development within the ANEF contours, and recommended that residential intensification in areas above the ANEF 20 contour not be supported.

TPS 40 provides for industrial-natured land uses within closest proximity to the estate. The City of Canning has since reviewed its Planning Scheme, and Local Planning Scheme No. 42 was gazetted in May 2020.

The NRP is consistent with the City of Canning TPS 40 and is compatible with the intended future land uses within the area of interest.



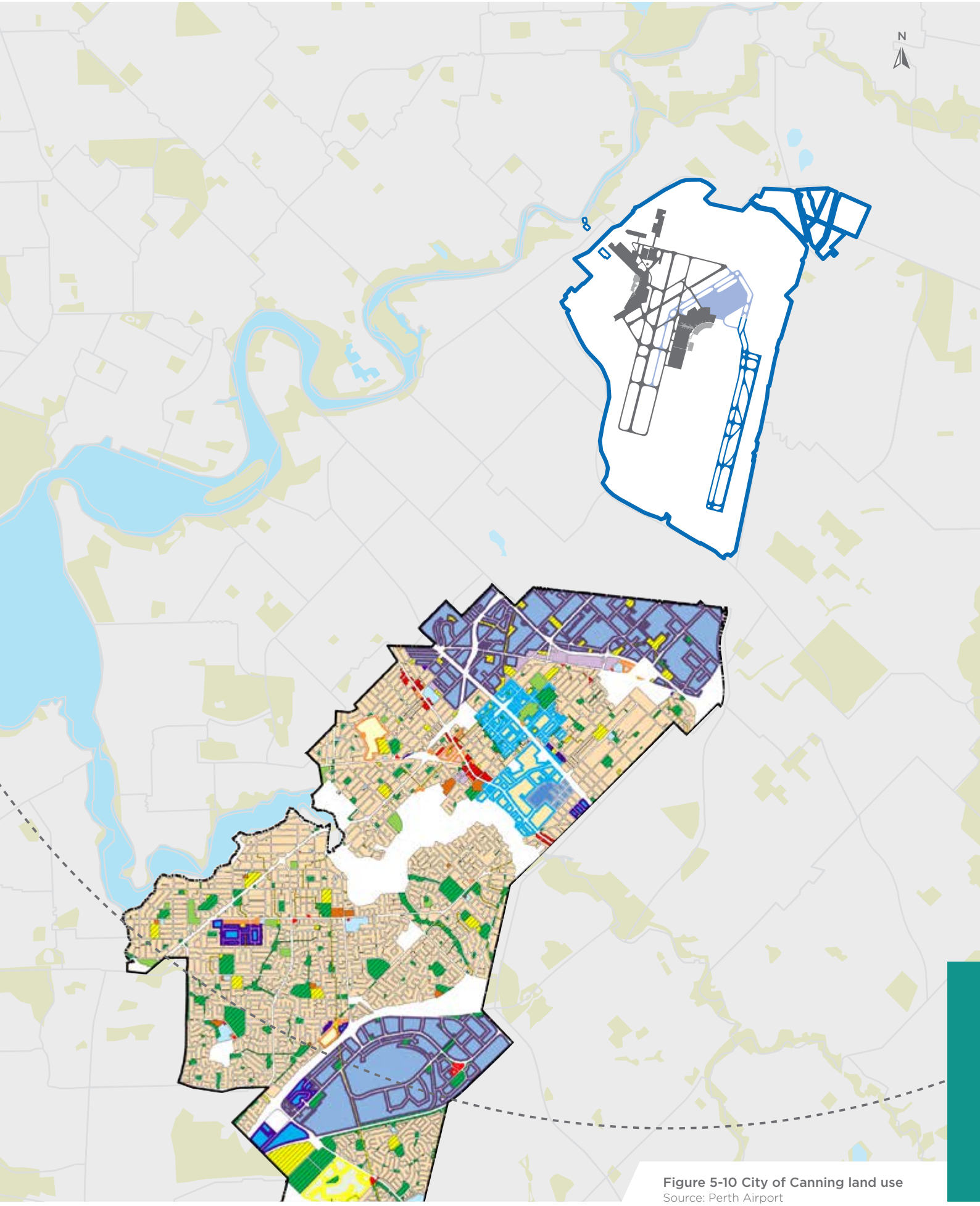
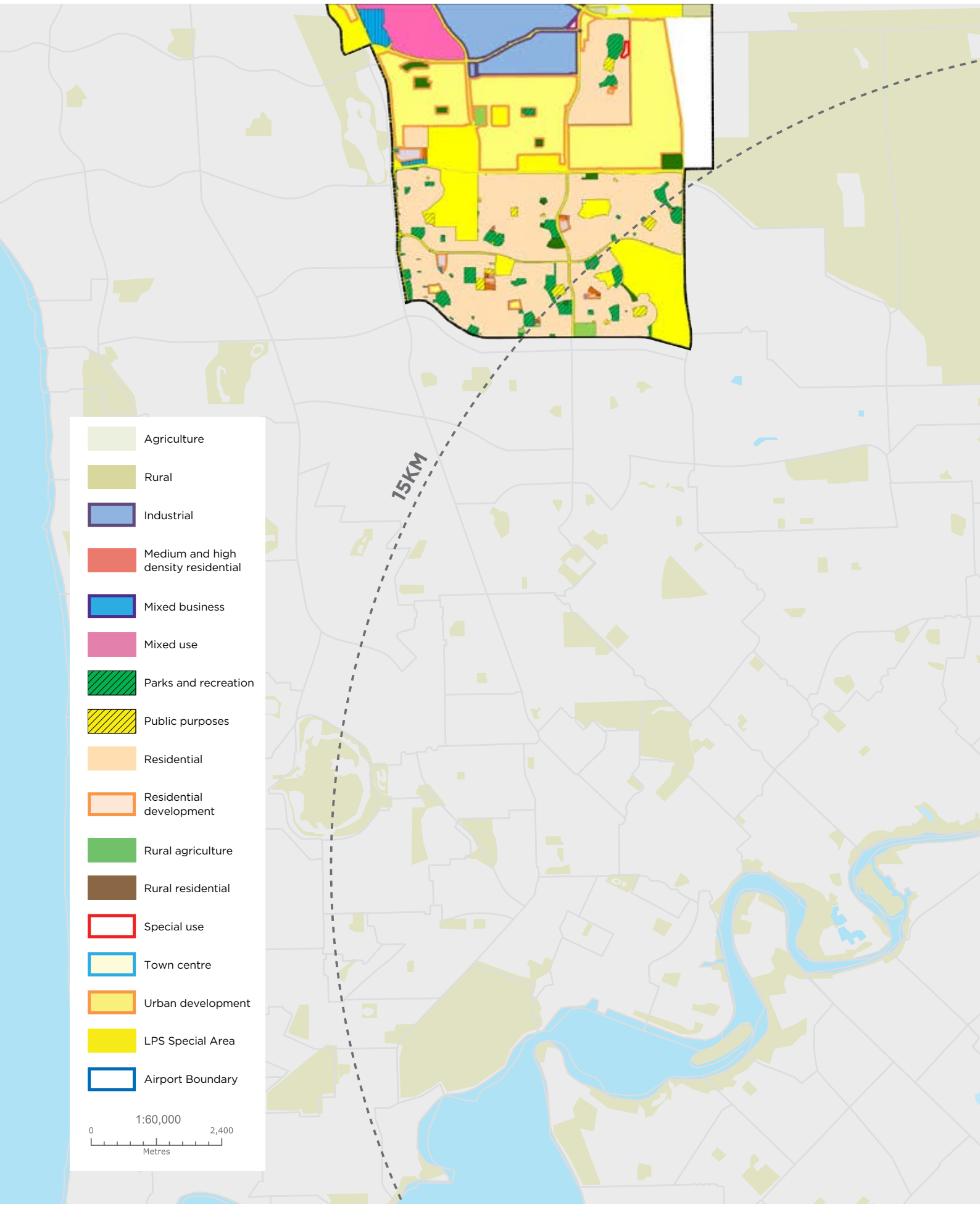


Figure 5-10 City of Canning land use
Source: Perth Airport


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
1:60,000
0
2,400
Metres

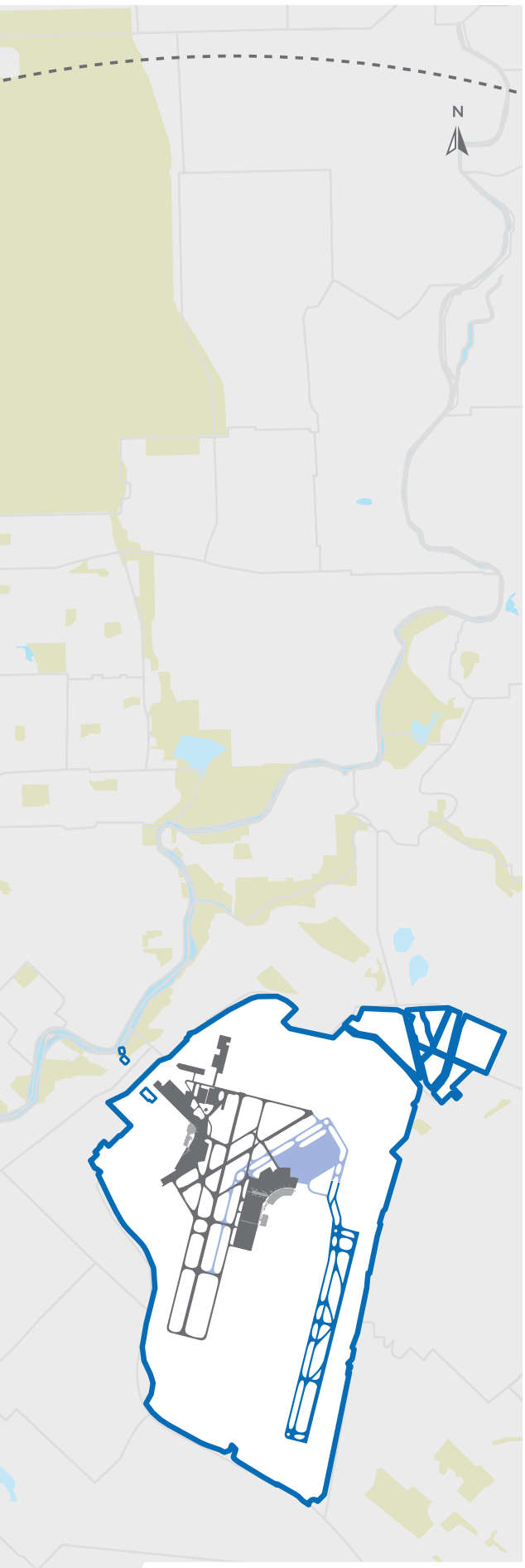
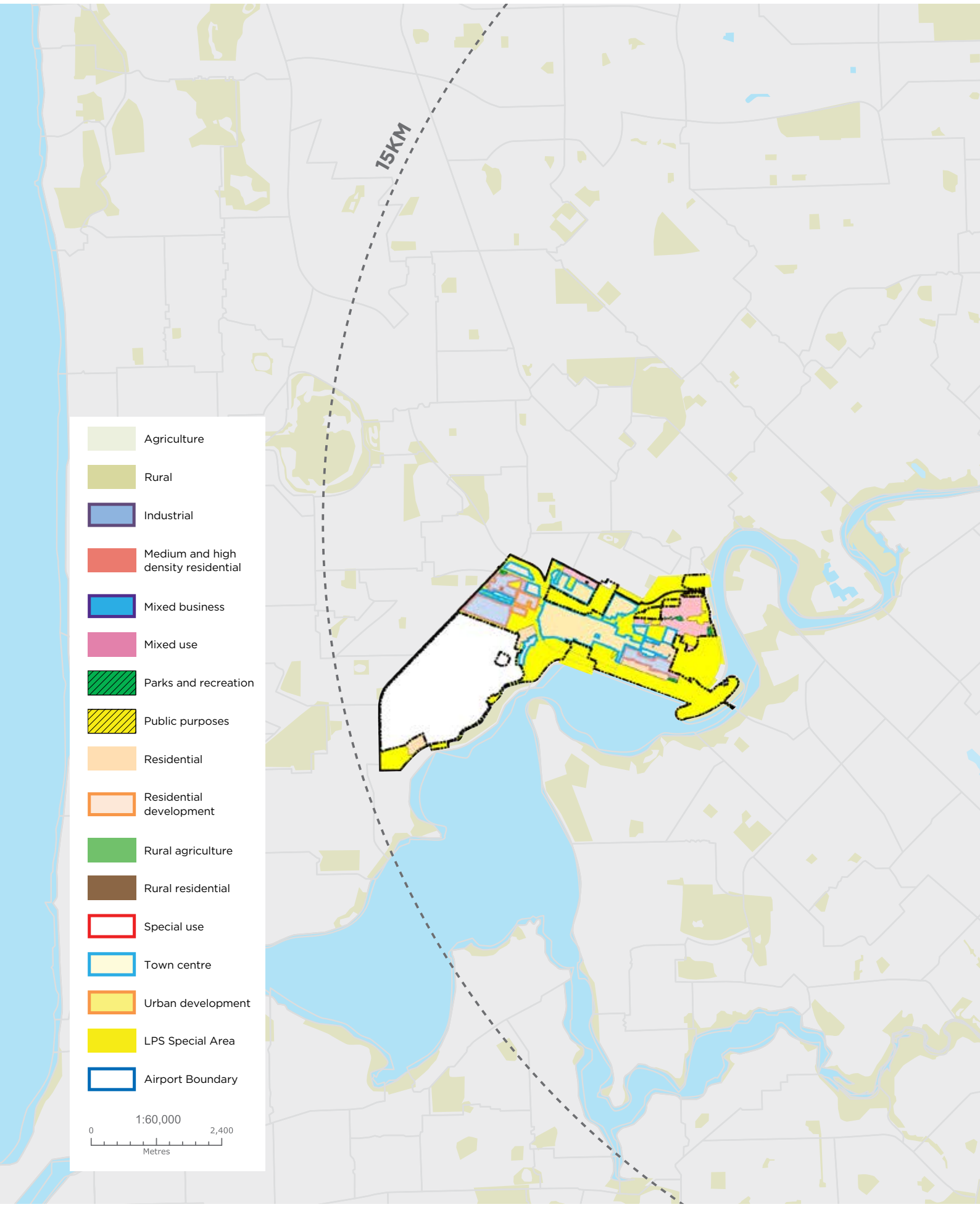


Figure 5-11 City of Wanneroo land use
Source: Perth Airport

5.3.9 City of Wanneroo

The City of Wanneroo local authority area is located predominantly outside of the area of interest, to the north-west of the estate, with only a portion of Marangaroo within the area of interest. For the portion within the area of interest, the MRS largely provides a reservation of 'Parks and Recreation' for Regional Bushland occupied by Koondoola Reserve. The balance of land is zoned under the Town Planning Scheme No. 2 (TPS 2) for a high school, primary school, and low to medium density residential development, serviced by a small local shopping centre, as shown in Figure 5-11.

The NRP is consistent with the City of Wanneroo TPS 2, and is compatible with the future intended land uses provided for under the Scheme within the area of interest.


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
1:60,000
0
2,400
Metres

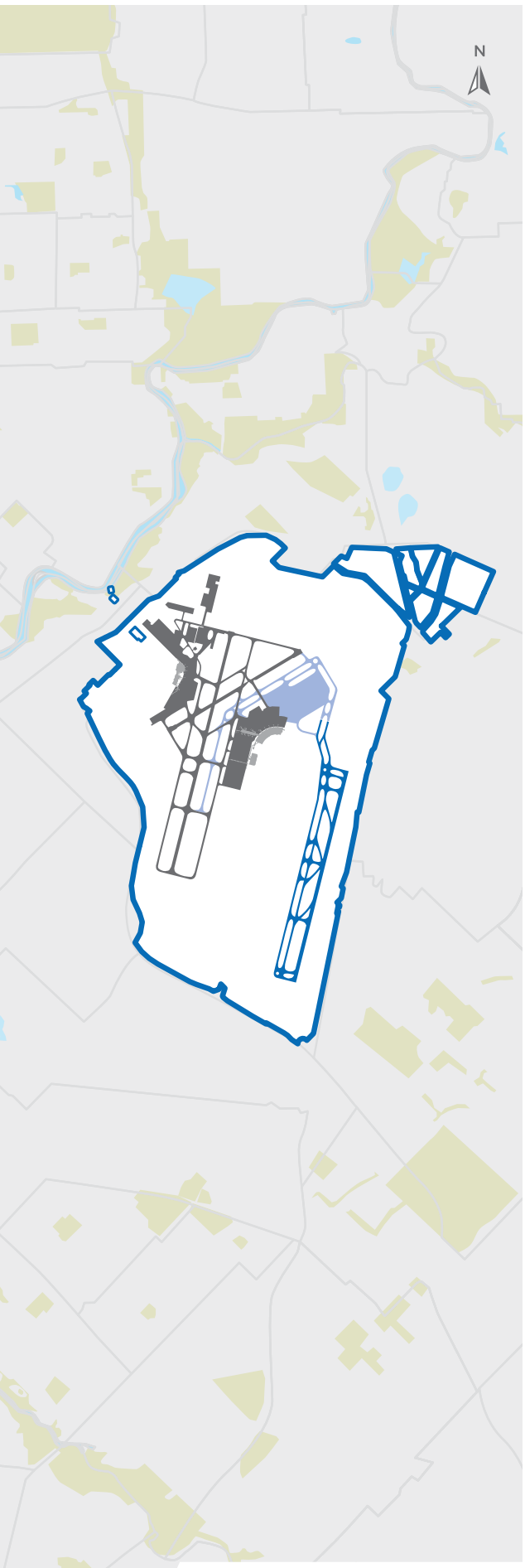


Figure 5-12 City of Perth land use
Source: Perth Airport

5.3.10 City of Perth

The City of Perth is located wholly within the area of interest, 12 kilometres to the west of Perth Airport, as shown in Figure 5-12. Perth is the capital of Western Australia, and the CBD is the premier Activity Centre in accordance with the hierarchy of centres within SPP 4.2, and is the focal point of business and trade for the State. The CBD is dense with a diverse and intense mix of retail, commercial, entertainment, community, medical and residential functions, with the City of Perth Local Planning Scheme 2 (LPS 2) provisions permitting most land uses throughout the centre, except for heavy industrial and land uses which would not be compatible with high-density residential development.

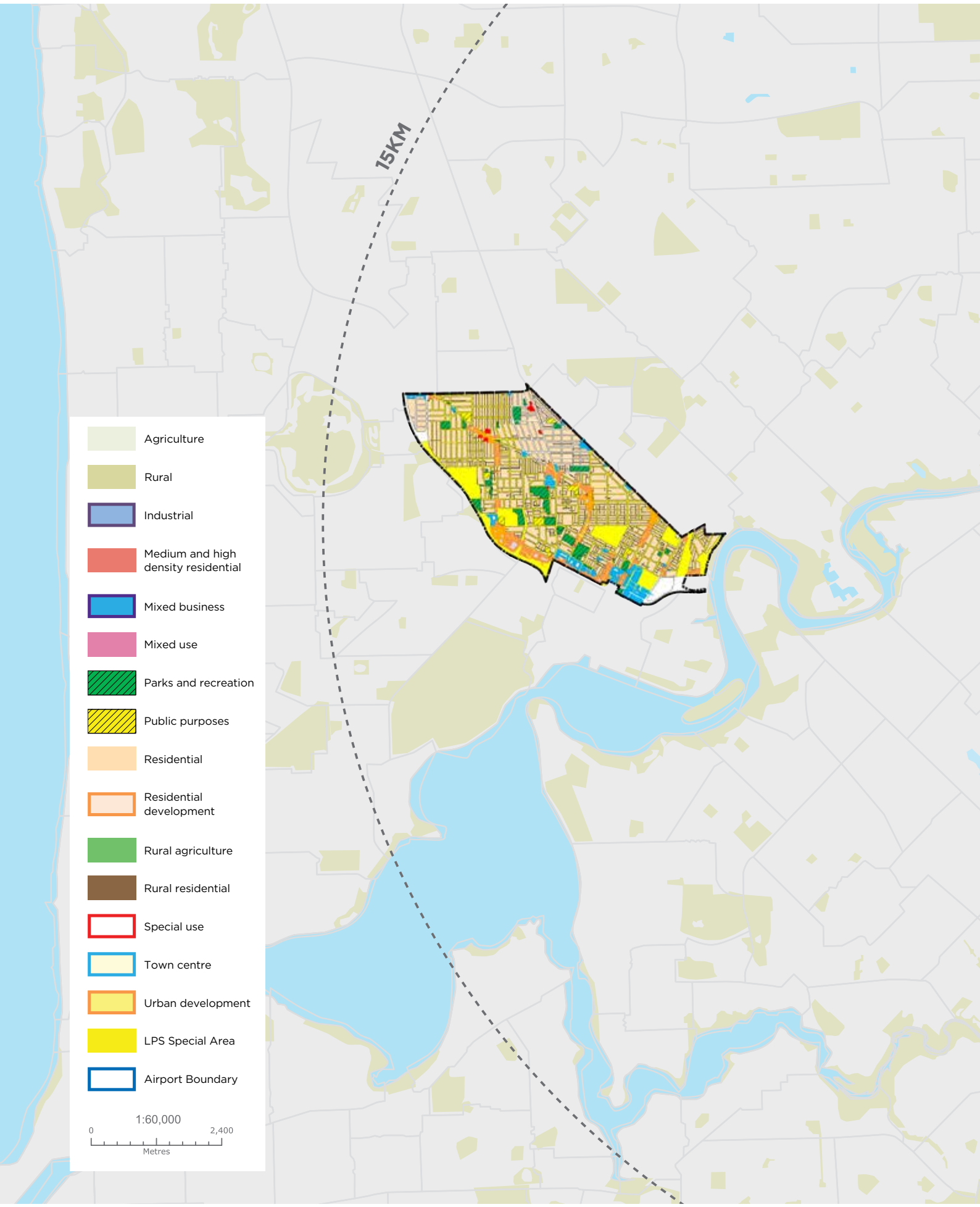
The wider local authority area incorporates West Perth, East Perth, Crawley and Heirisson Island. With the exception of Heirisson Island, which is reserved under the MRS for 'Parks and Recreation', the portion of Crawley which is zoned 'Public Purposes' for the University of Western Australia and 'Residential' for a small pocket of high-density residential development, other localities are a similar mix of inner-city urban land uses with capacity for further infill, residential development and redevelopment over time.

East Perth incorporates well established residential development - much of which is at medium to high density, mixed use developments incorporating office, retail and commercial development, the Royal Perth Hospital, and large-scale entertainment facilities such as the Western Australian Cricket Ground and Gloucester Park. There remains significant scope for redevelopment and intensification in this vicinity over time within the current planning scheme zonings.

West Perth incorporates older residential housing stock intermingled with high-density developments; a high volume of office developments serviced by commercial and some retail; major shopping outlets such as Watertown Brand Outlet; and large hospitals such as Perth Children's Hospital and King Edward Memorial. The uptake of office development within West Perth is currently in decline as a result of the wider economic conditions, with scheme provisions providing scope for significant redevelopment and reuse of development within the locality including further intensification of residential development over time.

The nature of development within the CBD can exceed the height of buildings in any other local authority. The City of Perth incorporates provisions within local area plans regarding building height in order to ensure proposed development does not impact protected airspace.

The NRP is consistent with the City of Perth LPS 2 and is compatible with the intent of land uses intended within the area of interest. Local Area Plans and structure plans for high density residential developments incorporate building height provisions in line with Perth Airport protected airspace requirements, which take into account the NRP.


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
1:60,000
0
2,400
Metres

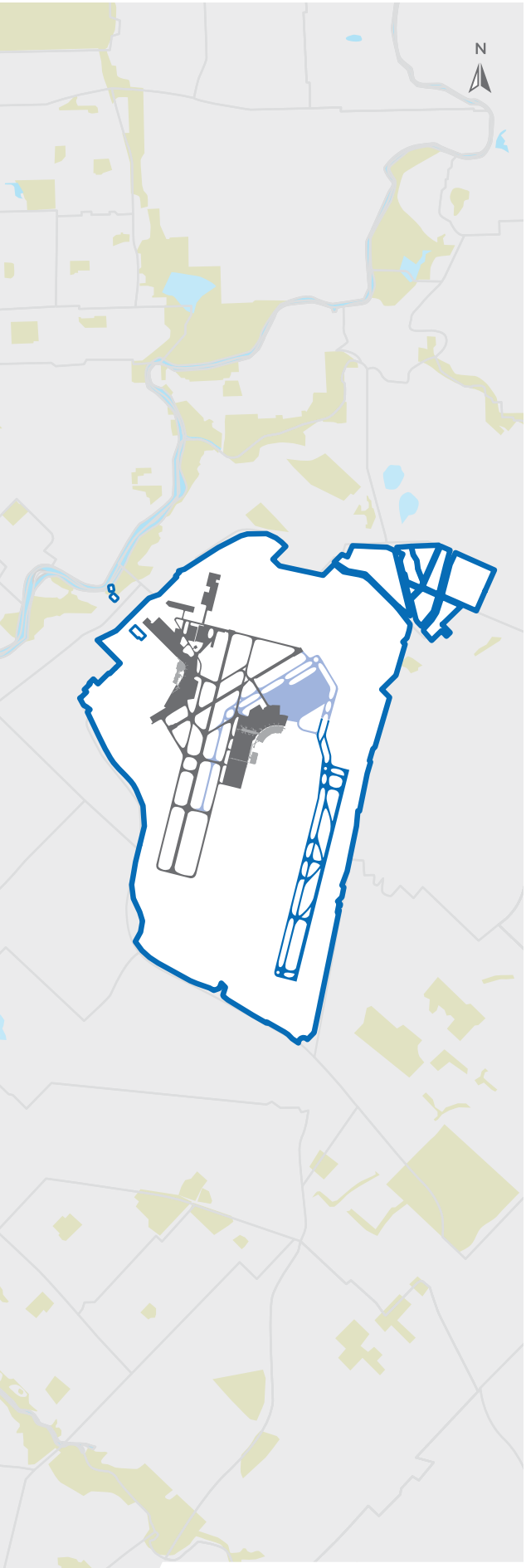


Figure 5-13 City of Vincent land use
Source: Perth Airport

5.3.11 City of Vincent

The City of Vincent local authority area is wholly located within the area of interest, to the west of the airport estate, bordered by the City of Perth, the Swan River, the Town of Cambridge, and the Cities of Subiaco and Stirling as shown in Figure 5-13. It is characterised by inner city urban development, predominantly residential in nature serviced by commercial and retail 'strips' along major roads. Local Planning Scheme No. 2 (LPS 2) provides for primarily residential land use of medium to high density with scope for significant redevelopment and intensification of residential and commercial developments over time.

The major centre of Leederville is classified as a 'Secondary' centre under SPP 4.2. This centre is a hub of entertainment, food and beverage, commercial, community, medical, office and education land uses.

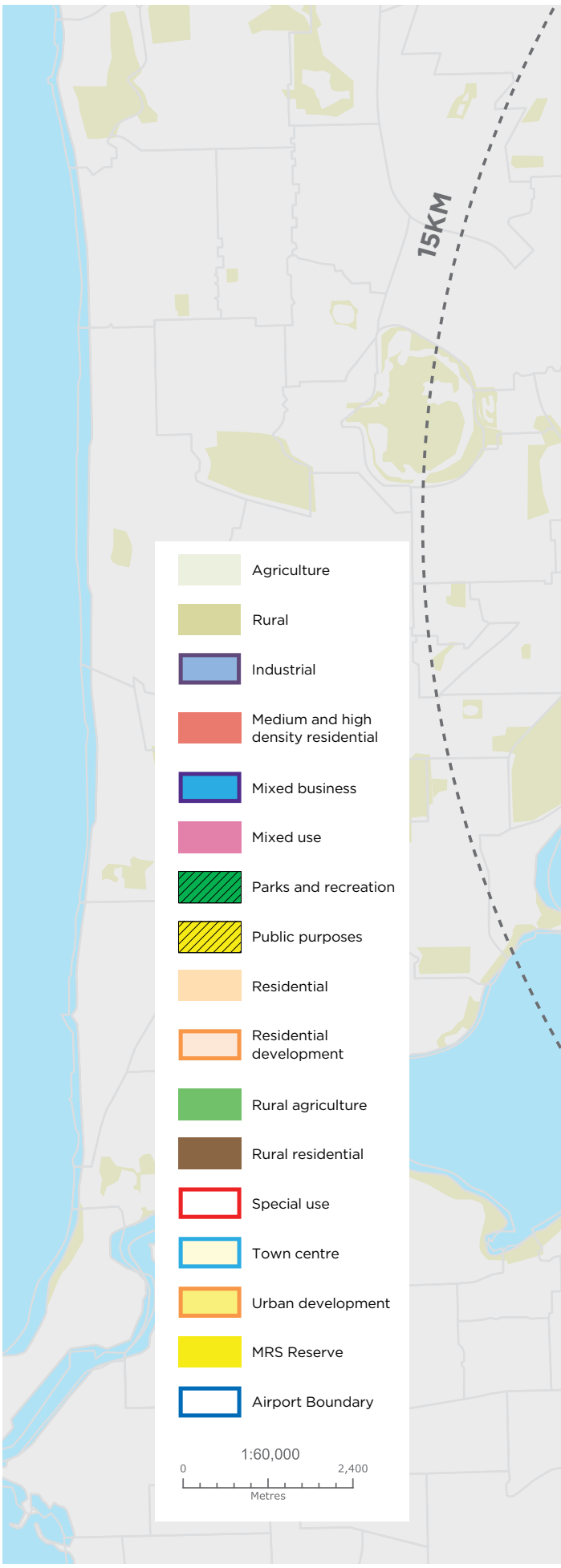
The NRP is consistent with the intent of the LPS 2 and is compatible with the intent of the future land uses within the area of interest.

5.3.12 Town of Victoria Park

The Town of Victoria Park is wholly located within the area of interest, to the south-west of the estate bounded by the Swan River, the City of South Perth, City of Canning and City of Belmont as shown in Figure 5-14. The localities of Burswood, Lathlain, Carlisle, East Victoria Park, Victoria Park and Bentley are all characterised by urban environments given the proximity to the Perth CBD, with Local Planning Scheme No.1 (LPS 1) providing for predominantly low to medium-density residential development through Lathlain, medium density residential through East Victoria Park, Victoria Park, Bentley and parts of Burswood, and high density residential development through Burswood. Local Structure Plans for high density residential developments incorporate building height provisions in line with Perth Airport protected airspace requirements, which consider the NRP.

The MRS also incorporates Parks and Recreation reserved land along the river frontage, and 'Public Purpose' reserve within Bentley used by Curtin University. Curtin University is currently in the process of undertaking a major development on campus which will incorporate intensification of commercial, retail, transport and student housing land uses to make Curtin a major activity hub for the wider community.

The NRP is consistent with the Town of Victoria Park LPS 1 and is compatible with intended land uses within the area of interest. Local structure plans for high density developments incorporate Perth Airport protected airspace requirements, which takes into account the NRP.



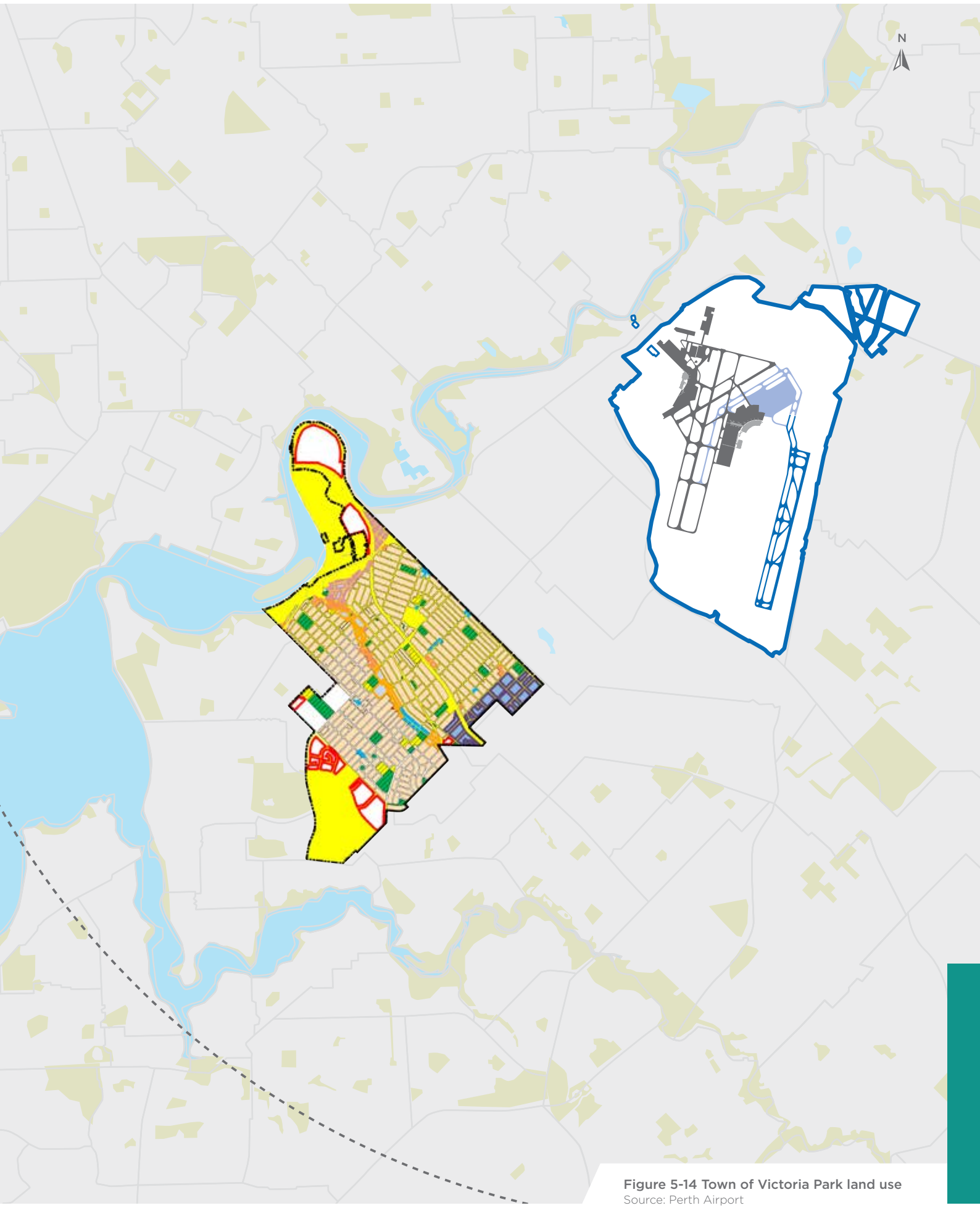


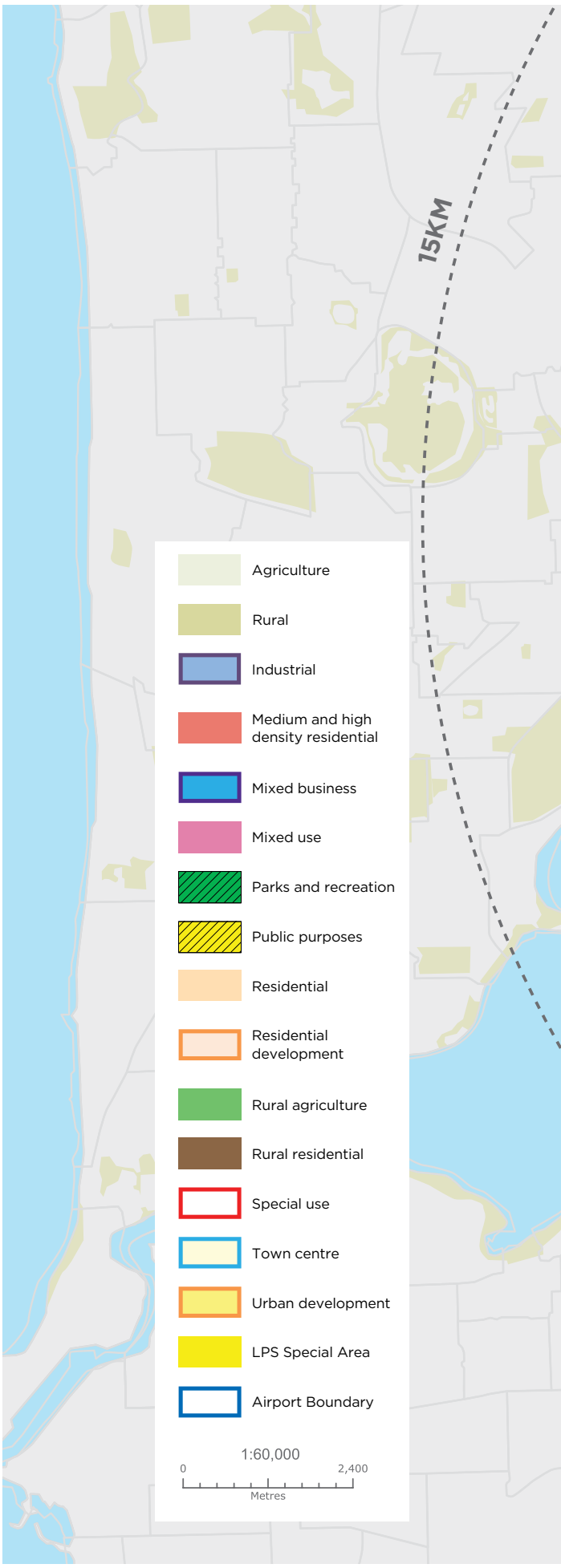
Figure 5-14 Town of Victoria Park land use
Source: Perth Airport

5.3.13 City of South Perth

The City of South Perth is located wholly within the area of interest, to the south-west of the airport estate bordered by the Swan River, the Town of Victoria Park and the City of Canning as shown in Figure 5-15. The localities of South Perth, Manning, Kensington, Karawara, Como, Salter Point and Waterford fall within the local authority area, with significant expanses of foreshore reserve (Parks and Recreation under the MRS) adjacent the Swan River foreshore. The Perth Zoo is also located within the local authority area, occupying 17 hectares of land, and used for a variety of functions including conferences and events, in addition to nature conservation and tourism activities.

Local Planning Scheme No. 6 (LPS 6) predominantly provides for residential land uses of varying densities. Within South Perth and Como, there are pockets of high density, intermingled with medium density residential, supported by local centre commercial and retail development. Within Como and South Perth older housing stock provides significant scope for residential redevelopment at high densities into the future, which will require careful consideration of protected airspace. Waterford and Salter Point are currently zoned for low density residential, predominantly R20, which commonly supports single residential dwellings.

The NRP is consistent with the City of South Perth LPS 6 and is compatible with intended land uses within the area of interest. Local structure plans for high density developments incorporate Perth Airport protected airspace requirements, which takes into account the NRP.



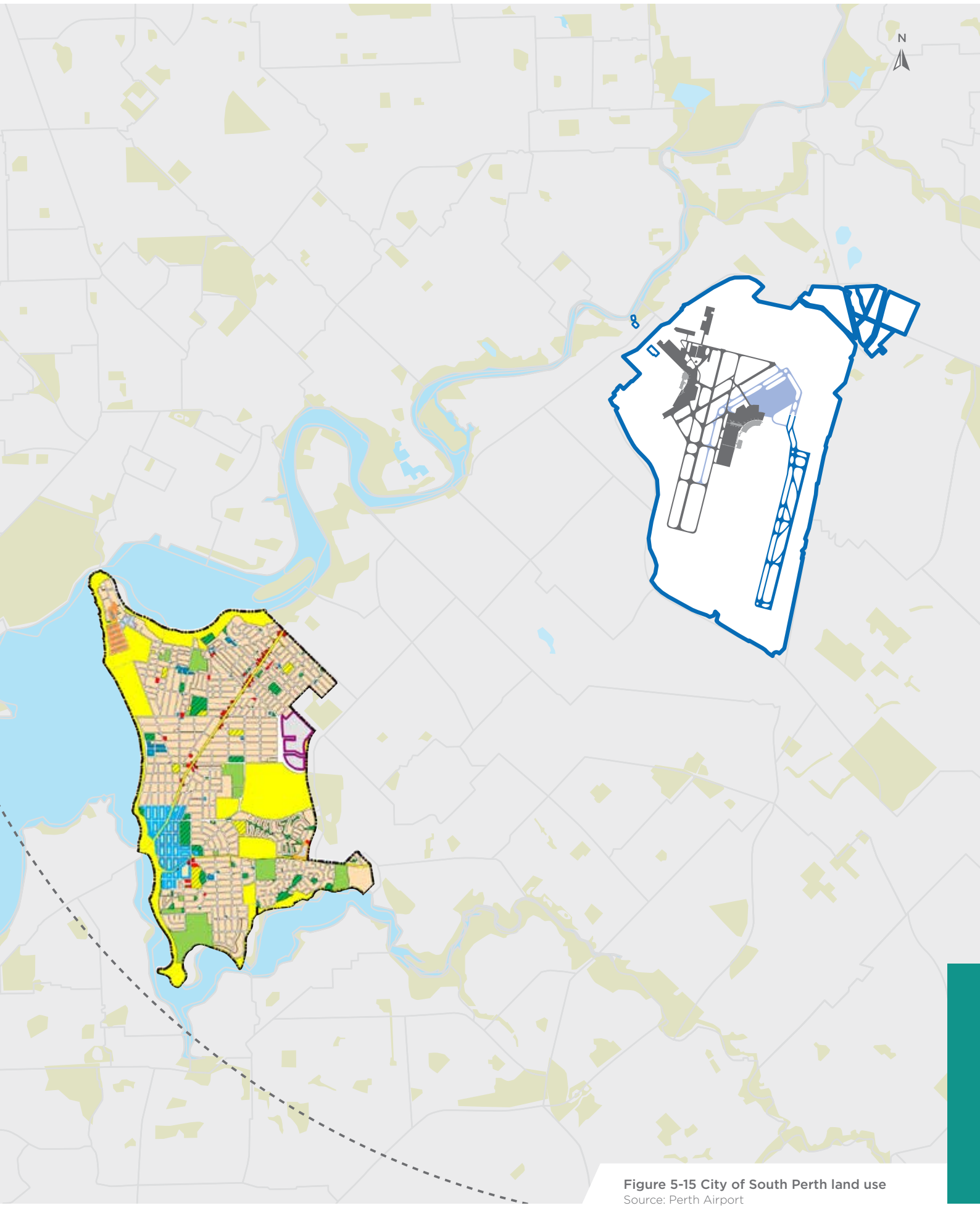
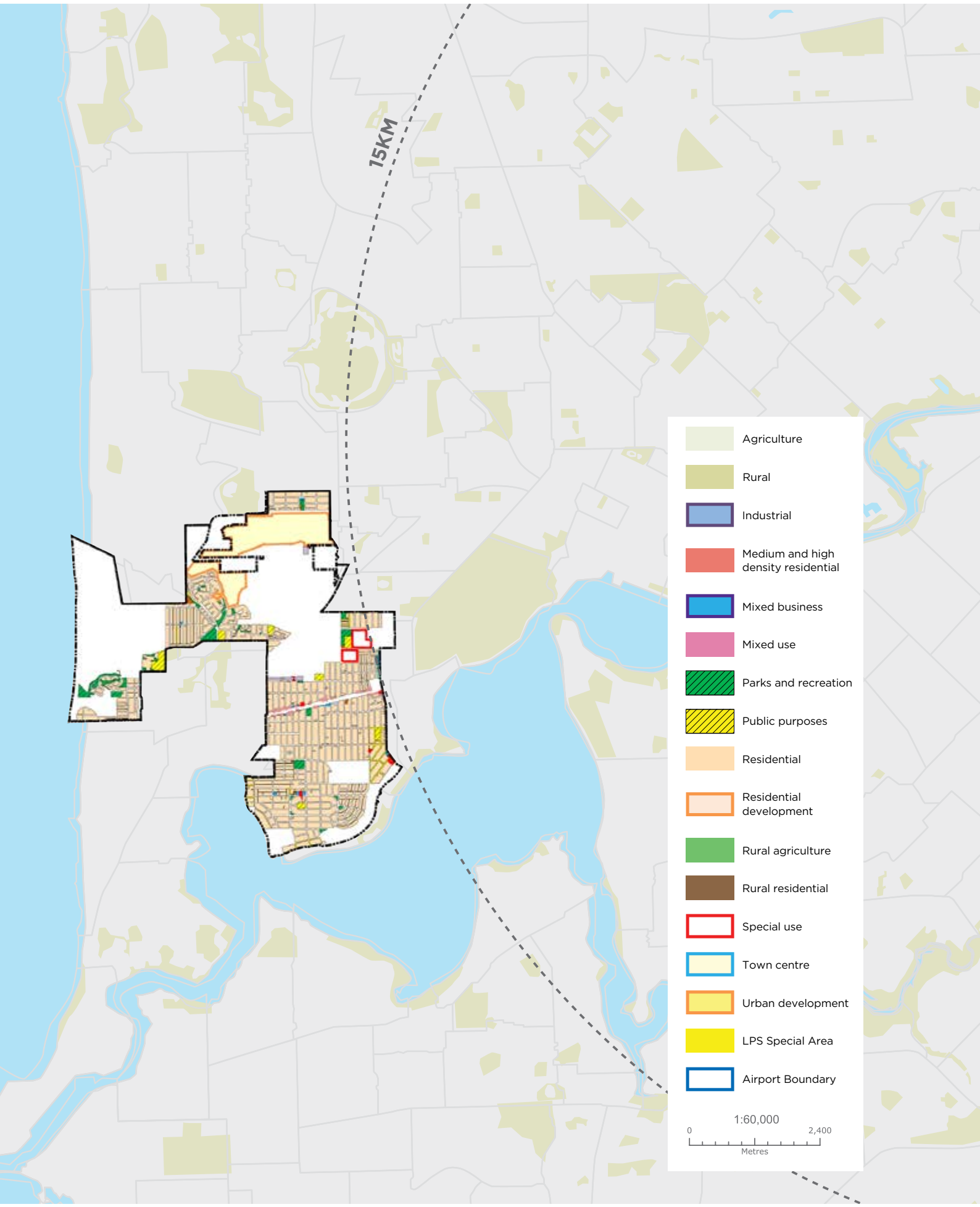


Figure 5-15 City of South Perth land use
Source: Perth Airport


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
1:60,000
0
2,400
Metres

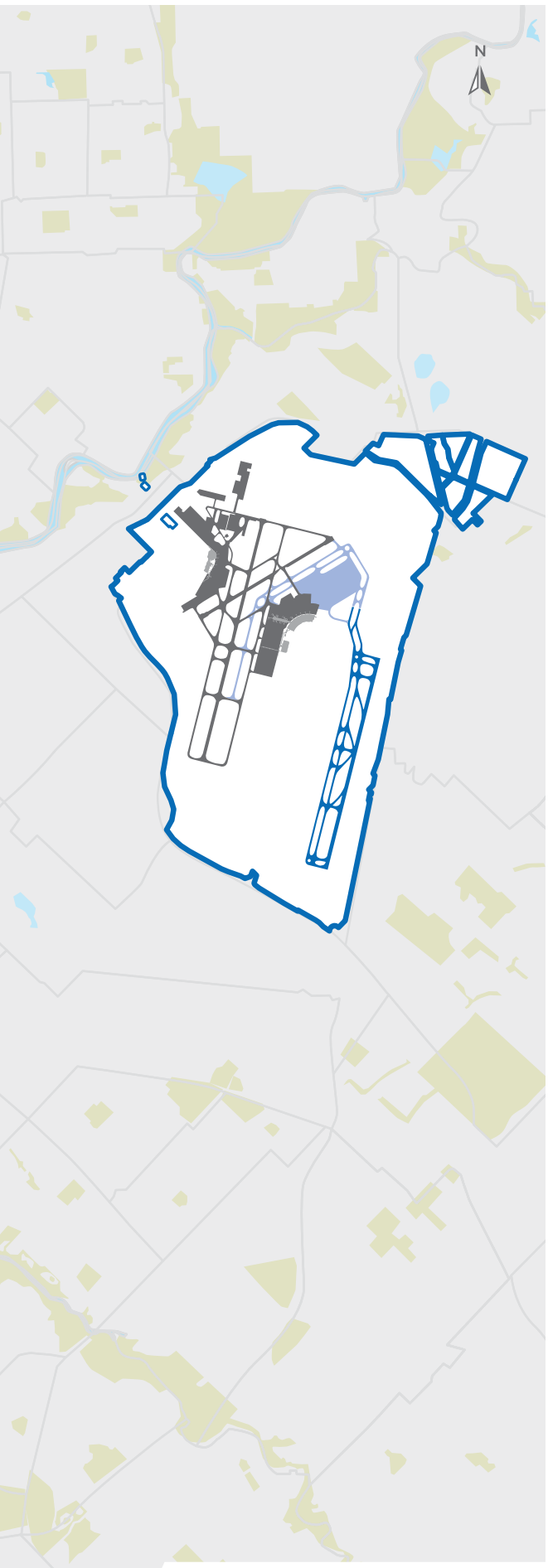


Figure 5-16 City of Nedlands land use
Source: Perth Airport

5.3.14 City of Nedlands

A small portion of the City of Nedlands is located within the area of interest, to the west of the airport estate, bounded by the City of Subiaco and the Swan River, as shown in Figure 5-16. The land uses falling within the area of interest extend only to the Charles Gardiner Hospital and a pocket of low density residential development within the locality of Nedlands zoned under Local Planning Scheme No. 2 (LPS 2).

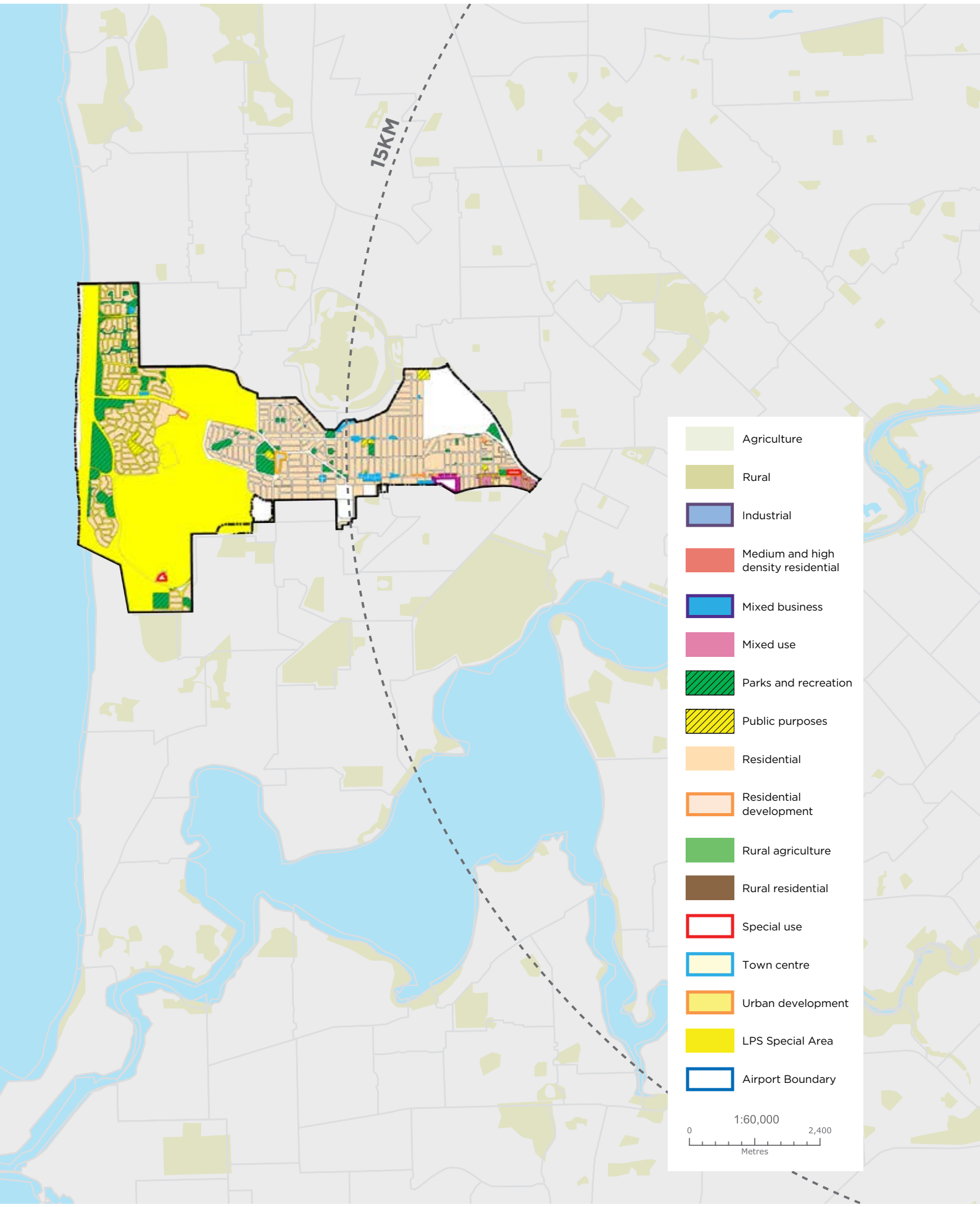
The NRP is consistent with the City of Nedlands LPS 2 and is compatible with the intended land uses within the area of interest.

5.3.15 City of Subiaco

The City of Subiaco is completely contained within 15km from Perth Airport. It lies to the west of the airport estate and is surrounded by the City of Nedlands and Town of Cambridge to the west, the City of Perth to the northeast and Kings Park to the east. The City of Subiaco's Local Planning Scheme 5 provides for predominantly medium density residential development, and the City's central location contains several large hospitals, Perth Modern School and the Noongar Chamber of Commerce. Hay Street and Rokeby Road are important streets for commercial and residential redevelopment in the central area of Subiaco.

The City of Subiaco is not located within the Perth Airport ANEF, N60 or N65 contours and has no policies or planning controls which relate to the impacts from the Perth Airport's operation.

The NRP is consistent with the City of Subiaco's Local Planning Scheme 5 and is compatible with the intended future land use of the area of interest.


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
1:60,000
0
2,400
Metres

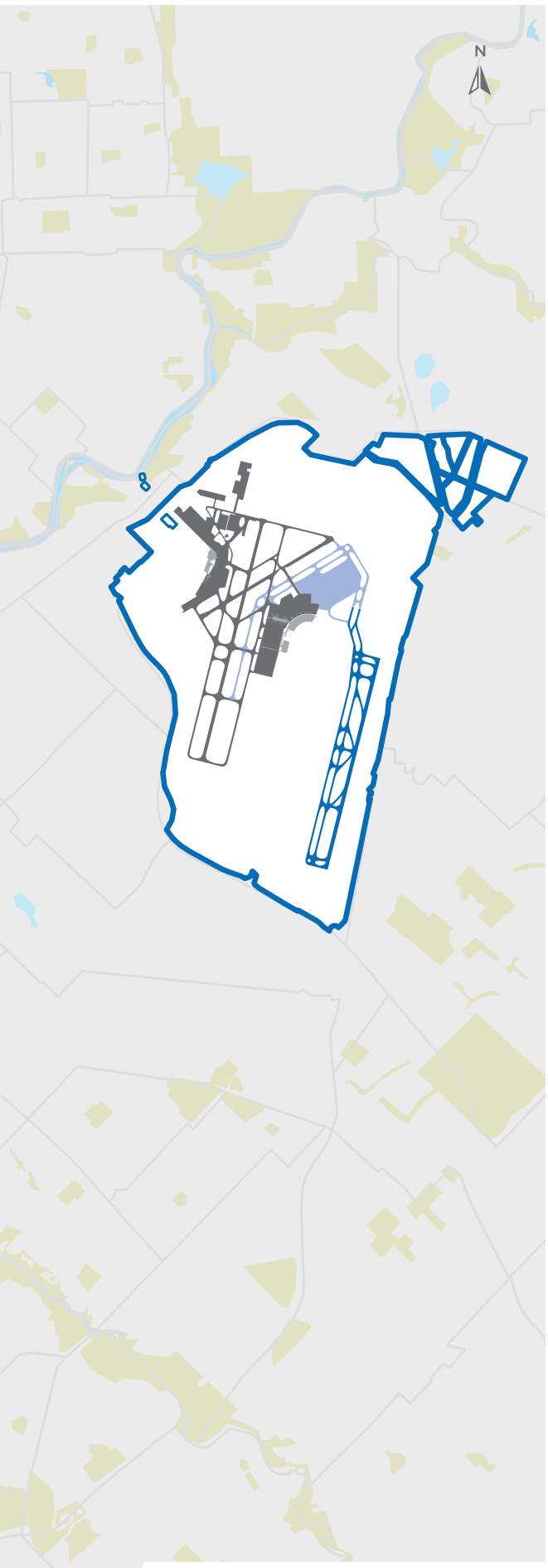
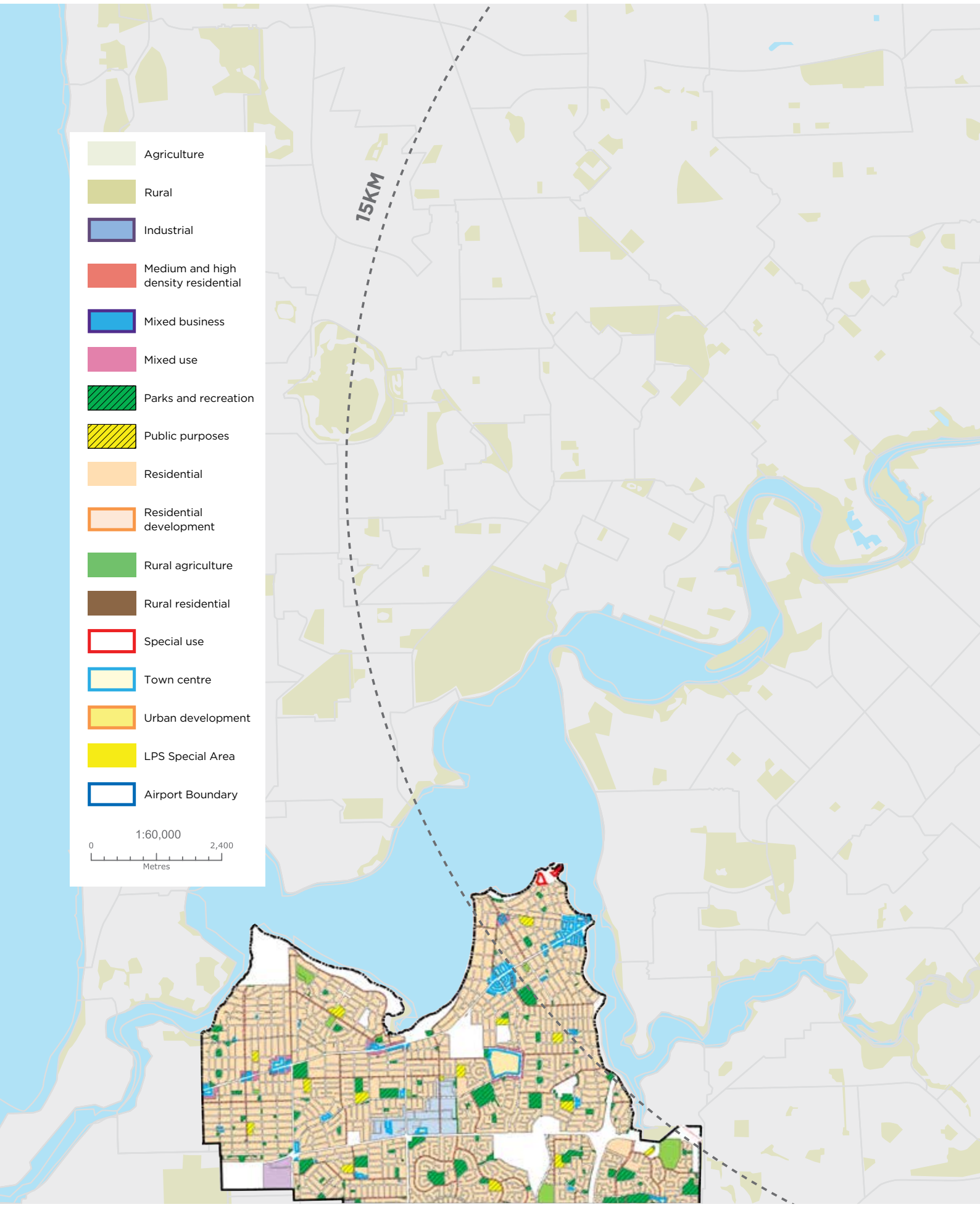


Figure 5-17 Town of Cambridge land use
Source: Perth Airport

5.3.16 Town of Cambridge

The local authority area of Cambridge is partially within the area of interest, located to the west of the airport estate and bounded by the City of Vincent, Stirling and Subiaco, as shown in Figure 5-17. Under the MRS a large proportion of the land falling within the area of interest is reserved 'Parks and Recreation' for Lake Monger and associated parklands. The remaining land is predominantly zoned under the Local Planning Scheme No. 1 (LPS 1) and fully developed for medium density residential development except for a pocket to the south east of the area, which is zoned for 'mixed use' and characterised by commercial, office and medical land uses associated with the St John of God Hospital.

The NRP is consistent with the Town of Cambridge LPS 1 and is compatible with the intended future land uses within the area of interest.


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
1:60,000
0
2,400
Metres

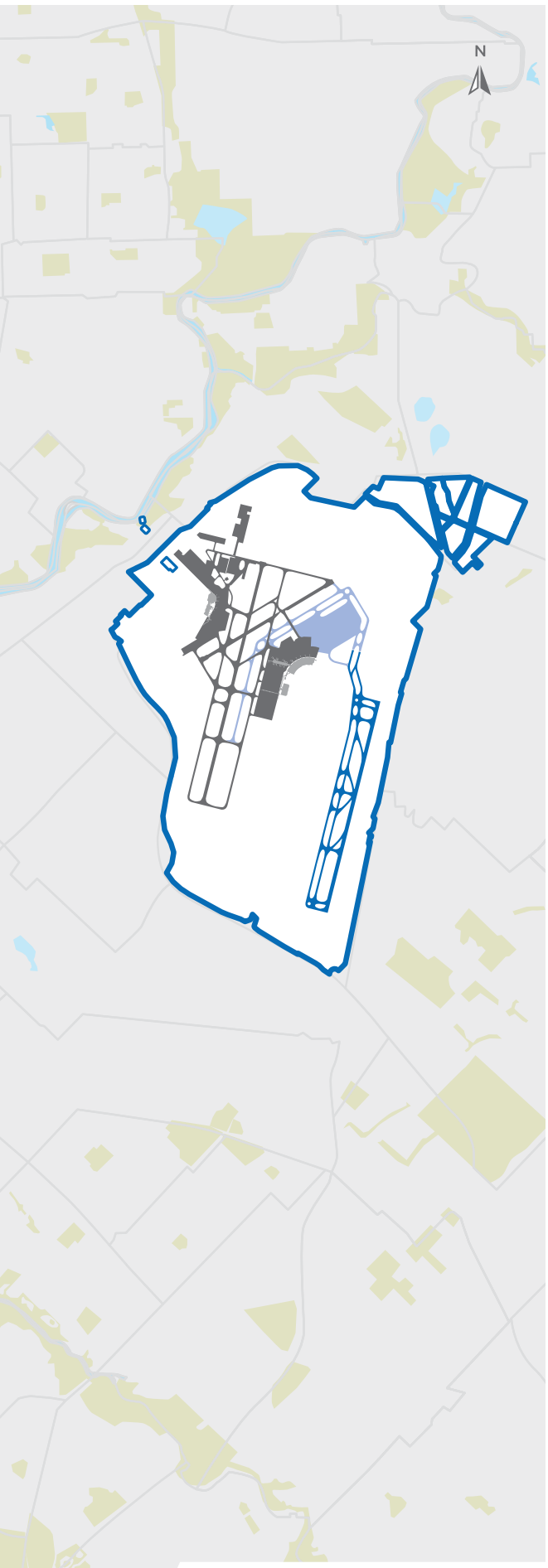
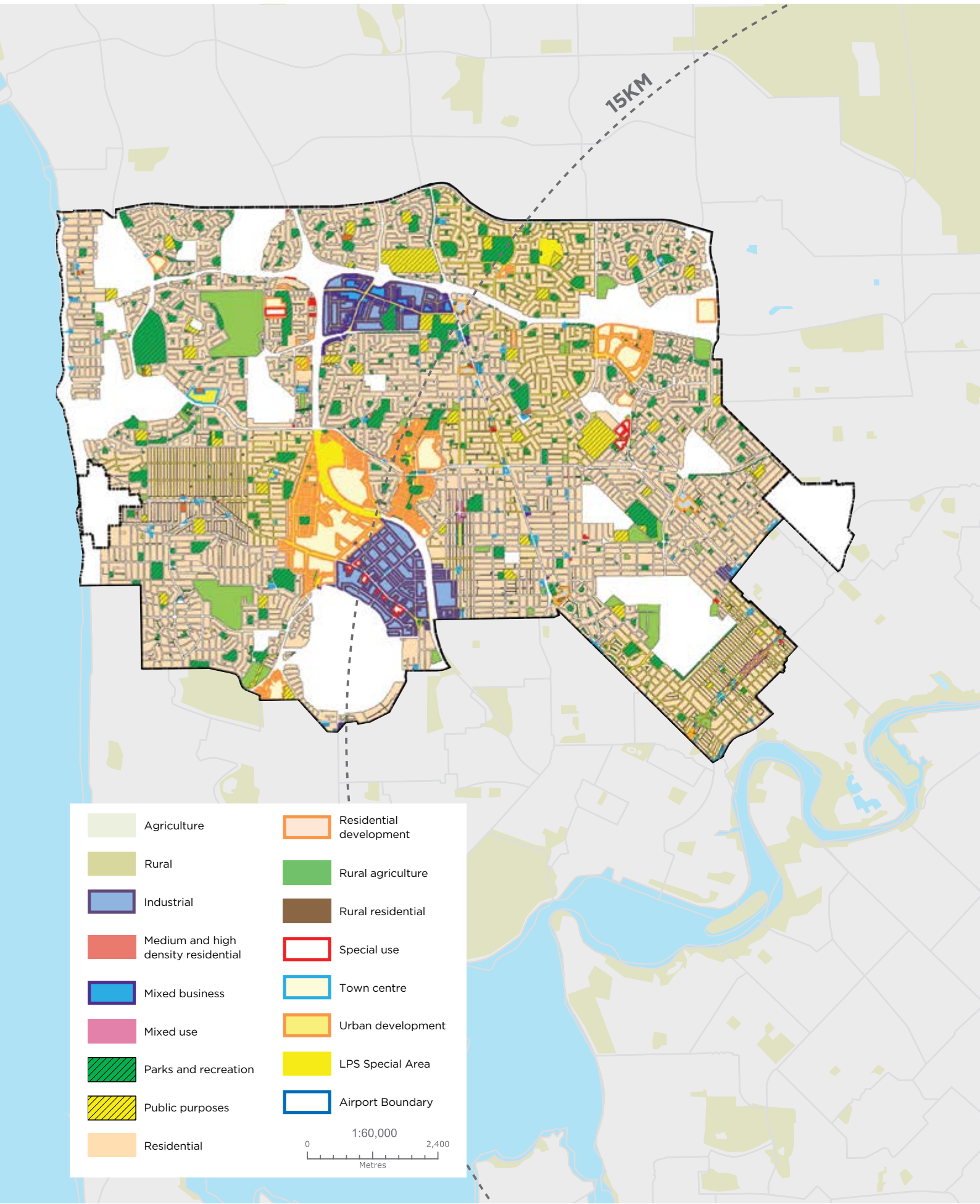


Figure 5-18 City of Melville land use
Source: Perth Airport

5.3.17 City of Melville

A small portion of the City of Melville is located within the area of interest, to the south west of the airport estate and bounded by the Swan River, opposite the City of South Perth. The area of interest incorporates the partial localities of Applecross and Mount Pleasant, predominantly characterised by single dwellings and low to medium density residential development, including aged care and associated residential services as shown in Figure 5-18. Local Planning Scheme No. 6 (LPS 6) provides scope for future residential infill.

The NRP is consistent with the City of Melville LPS No. 6 and is compatible with the future intended land uses within the area of interest.


15KM
Agriculture
Rural
Industrial
Medium and high density residential
Mixed business
Mixed use
Parks and recreation
Public purposes
Residential
Residential development
Rural agriculture
Rural residential
Special use
Town centre
Urban development
LPS Special Area
Airport Boundary
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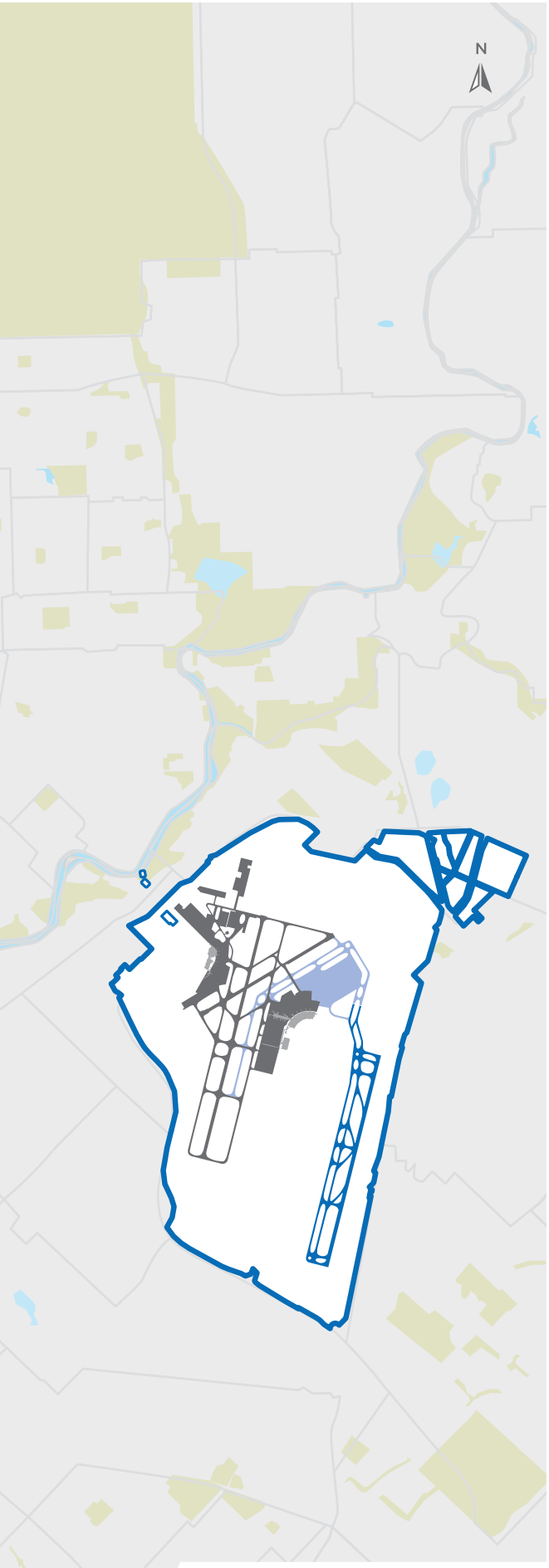

Figure 5-19 City of Stirling land use
Source: Perth Airport

5.3.18 City of Stirling

The City of Stirling Local Planning Scheme No. 3 (LPS 3) provides for residential development from a low to high density and supporting commercial, industrial, community purposes and parks and recreation, as shown in Figure 5-19. Established suburbs within the area of interest are undergoing residential infill development and the City of Stirling Draft Local Planning Strategy has a focus on further increasing densities around activity corridors. The draft Strategy also intends to expand commercial centres and create employment opportunities, which are further reinforced by existing Structure Plans for Mirrabooka Town Centre and Stirling City Centre. Well serviced by major road transport routes including the Mitchell Freeway and Reid Highway, other key areas within the area of interest include the City of Stirling's largest park, Herdsman Lake, the Mount Lawley Golf Club and Edith Cowan University.

The area of interest within the City of Stirling falls outside of the ANEF, and the NRP is consistent with the intent of the City of Stirling's LPS 3 and future planning under the draft Local Planning Strategy.

5.4 Future Planning

Planning for the new runway commenced in the 1970's with a joint Commonwealth and State Committee considering the aviation requirements for the Perth Region (see Section 1 and Section 3). Since this time future planning at both State and Local government levels has considered the new runway location and operations through embedding the ANEF into State policy. In addition, consideration of the existing and future protected airspace has also ensured that the NRP is consistent with State and Local government planning.

Perth Airport will continue to regularly engage with surrounding Local Governments to ensure a clear understanding of the NRP is achieved; allowing for each Local Government to make informed decisions when planning for future development in their respective areas. As the project transitions from approval stage to construction, this communication will be maintained.


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06
Project Description and Construction

This section provides an overview of what the New Runway Project (NRP) includes and details the construction activities associated with the project.

Detail is also provided on the following areas:

- What are the development objectives for the NRP?
- What design standards will the NRP be designed and constructed to?
- What infrastructure is required for the NRP?
- What is involved in the construction of the NRP?

6.1 Development Objectives

Perth Airport's vision is to be Australia's Western Hub – connecting lives, businesses and communities to a world full of possibilities.

This vision guides the overarching corporate objectives for the management of Perth Airport.

The corporate objectives are:

- ensuring our facilities and services are safe and secure for all,
- helping our airline and other business partners develop their businesses,
- meeting the needs of our customers,
- conducting our business in a commercially astute manner,
- providing our employees with satisfying employment,
- conducting operations in an ecologically sustainable manner,
- identifying and managing risk,
- facilitating travel, trade and industry in Western Australia, and
- ensuring we are a responsible and caring corporate citizen.

These corporate objectives are also the development objectives for the NRP.

Developments at Perth Airport are also guided by a set of development objectives which evolve from the company's vision and corporate objectives. The New Runway Project (NRP) is consistent with the development objectives as defined in the Perth Airport Master Plan 2014 and therefore form the development objectives for the NRP.

The NRP development objectives are:

Deliver aviation services that airlines, members of the public, and business enterprises need, at a reasonable cost

To achieve this objective, the NRP ensures Perth Airport has facilities that:

- have sufficient capacity to allow new airlines to provide services from the airport and enable existing airlines to expand their route network and frequency without constraint, and
- timely investment in infrastructure to match demand in order to control costs.

Ensure all facilities are safe and secure for all people who use them or live in the vicinity of the airport

To achieve this objective, the NRP design and operations:

- consider the prevailing aviation security-risk environment,
- address all sources of public-safety risk,
- comply with applicable Australian aviation safety and security legislation which is based on international standards,
- supports and enable those authorities with public-safety and security responsibilities at Perth Airport to fulfil their roles, and
- ensure emergency design considerations will have regard to advice from relevant agencies to ensure emergency management is effective.

Ensure the airport's development and operations respect the strong bond that exists between the Nyungah people and the land that comprises the estate

To achieve this objective, the NRP planning, design, construction and operations are:

- consistent with Perth Airport's Aboriginal Heritage Management Framework,
- undertaken in close consultation with representatives of the Nyungah people, and
- based on assessment that identifies sites of Aboriginal heritage significance.

Ensure that the airport's developments and operation minimises adverse impact on surrounding communities and the environment, and that emissions which contribute to human-induced climate change are minimised

To achieve this objective, the NRP planning, design, construction and operations:

- consider the needs of surrounding communities,
- identify and protect environmental values onsite or provide offsite offsets where considered appropriate,
- effectively address all sources of environmental impacts, including aircraft noise exposure,
- support the initiatives being undertaken by Airservices and airlines to minimise aircraft emissions,
- incorporate better-practice energy and water efficiency, and waste-minimisation technologies, and
- consider all relevant Australian and international standards.

6.2 Description of the New Runway Project

The NRP is composed of the development, construction and operations of the following main elements.

Construction, including clearing and site preparation, of a new runway up to 3,000 metres long with associated infrastructure.

This includes:

- site clearance and placement of fill material,
- a new runway 3,000 metres in length located parallel to the existing main runway (03L/21R),
- runway shoulders and blast pavements, graded runway strip, and runway end-safety areas. These are generally flat areas surrounding a runway that are provided for the safety of aircraft operations but are not used for the landing, take-off or manoeuvring of aircraft,
- associated parallel taxiways, cross taxiways and rapid exit taxiways to provide efficient aircraft taxiing between the runway and terminals,
- runway and taxiway ground lighting to provide directional guidance during restricted visibility conditions, such as night-time and heavy rainfall,
- visual guidance systems, such as high intensity approach lighting and precision approach-path indicators, that are used by pilots to visually identify the runway and align the aircraft for landing,
- new air navigation systems, such as an instrument landing system, that transmit accurate vertical and horizontal guidance for pilots,
- ducting systems for communications, low-voltage power, airfield ground lighting cables and a separate network for Airservices communications,
- a new airside and landside emergency vehicle staging area similar to the existing staging area near the Dunreath Drive and Tonkin Highway interchange,
- relocation of all affected services such as high-voltage power, sewer, potable water, irrigation water, communications,
- vehicle-access road around the perimeter of the new runway area to maintain security inspections and provide access for maintenance and operational vehicles,
- a new airside security fence and electronic security system to meet aviation security requirements, with crash gates for emergency response at appropriate locations,
- civil infrastructure for Airservices communication, navigation and surveillance facilities. This includes communications and power ducting, power cabling, access roads with appropriate parking and turning areas for maintenance access, and graded areas appropriate to the facilities,
- construction of an emergency egress point,
- realignment of Perth Airport's two main drainage channels, (the northern main drain and the southern main drain) to manage stormwater and groundwater flows around the new runway and taxiways, and maintain flood control for associated areas.
- provision of Aviation Rescue and Fire Fighting (ARFF) facilities to ensure the provision of a compliant ARFF service,
- civil infrastructure associated with the new station. This includes communications and power ducting, power supply, potable water supply, sewer connection, a graded area for the station, perimeter security fencing, and access roads onto the airfield, and
- reclosing of Grogan Road.

Development of an airspace management plan that will cater for the changes to current airspace and flight paths to accommodate operations of the new runway.

Following approval of the MDP, further detailed design of the infrastructure and airspace will be undertaken. As the design progresses to more detailed stages, the infrastructure requirements will be reviewed in line with any changes to regulations and stakeholder needs. The layout is designed to be flexible so that infrastructure construction can be staged as appropriate. Consultation will continue with key stakeholders including airlines and Airservices to determine the initial layout (including the exact runway length and number and location of exit and entry taxiways) that will be built to meet operational needs. Over time, the airfield layout will expand as needed to facilitate safe and efficient aircraft operations and meet forecast demand.

6.3 Location

The location of the new runway (03R/21L) is situated on the eastern side of the airport estate, 2,000 metres from the existing main runway (03L/21R) and is wholly contained within the Airfield Precinct.

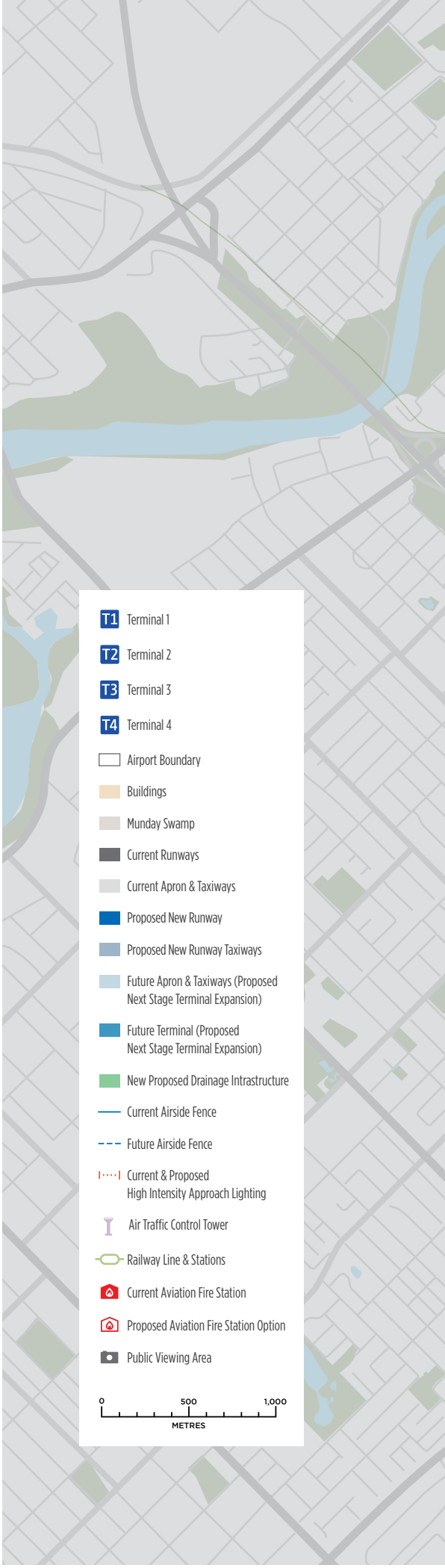
The northern end of the new runway is approximately 1,030 metres further south than the existing main runway (03L/21R) northern threshold. This stagger keeps the new runway as far to the south of Munday Swamp as practicable to minimise the impacts to this heritage area, while also keeping the new runway infrastructure within the estate.

The NRP area encompasses approximately 293 hectares as shown in Figure 6-1, extending from the estate's southern boundary bordering Tonkin Highway, through to Munday Swamp in the north. The new runway area is also bound by Airport Central to the west and Abbott Road to the east.

The northern half of the NRP area currently includes various commercial tenancies, such as car storage and a former driver training track, which are adjacent to and accessed by Grogan Road. The southern half of the NRP area is relatively undeveloped and vegetated.

Within the NRP area, there are some areas containing threatened ecological communities (TECs) and species as listed under the *Environmental Protection and Biodiversity Conservation Act 1999*, as well as areas containing black cockatoo habitat. For detailed discussion on these, refer to Section 11 and Section 12.

Within the NRP area are two known Aboriginal heritage sites that meet the definition of a site under the *Aboriginal Heritage Act 1972* and are listed as 'archaeological scatters' on the State's Register of Aboriginal Sites. In addition, the area comprises seven 'Other Heritage Places' which do not, or no longer, meet the definition of a site despite previous recordings of archaeological material or provision of cultural information. Further information on heritage is provided in Section 16.



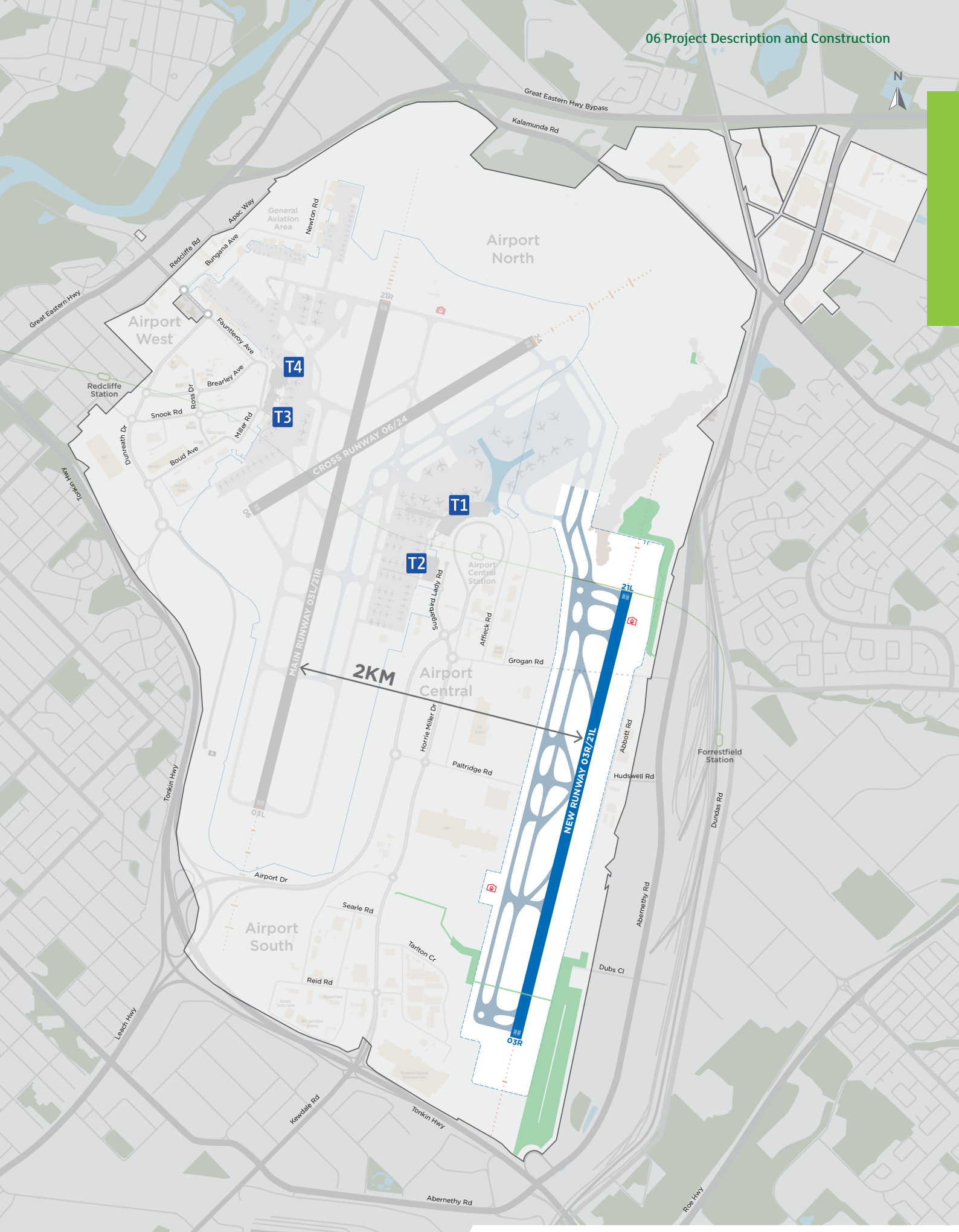


Figure 6-1 New Runway Project and associated infrastructure
Source: Perth Airport

6.4 Design Standards

To ensure safe and consistent operation of airports around the world, the design of airfield infrastructure including runways are guided by specific design standards and advisory publications. For an airport's design, international standards and recommended practices are formalised in Annex 14 of the Convention on International Civil Aviation, adopted by the International Civil Aviation Organization (ICAO). The national standards and advisory publications are administered in Australia by the Civil Aviation Safety Authority (CASA) under the *Civil Aviation Act 1988*, the Civil Aviation Regulations 1988 (CAR 1988) and the Civil Aviation Safety Regulations 1998 (CASR 1998).

Pursuant to the CASR 1998, the requirements for the safety of aerodromes and air navigation are detailed in the Manual of Standards. The key sections of the MOS applicable to the NRP are:

- MOS Part 139 – the requirements for aerodromes used for air transport operations,
- MOS Part 139H – the requirements for the provision of ARFF services,
- MOS Part 172 – the requirements and standards for compliance by an air traffic service provider, including the facilities and equipment required,
- MOS Part 173 – the requirements and standards for instrument flight procedure design, and
- advisory circulars - intended to provide recommendations and guidance to illustrate a means of complying with MOS requirements.

The planning and design considerations for the geometry of the new runway are predominantly the requirements and recommendations of ICAO and MOS Part 139.

The ICAO and MOS adopt a code system, known as the 'aerodrome reference code'. The code comprises of a code number and a code letter. The code number is based on the aircraft reference field length and the code letter is based on the aircraft wingspan and the outer main gear wheel span.

The reference code provides a method of grouping aircraft with different characteristics which behave similarly when landing, taking off, taxiing and parking. The planning of runways, aprons and taxiways is largely based on the aerodrome reference code. The reference code then corresponds to a critical aircraft which is the most demanding aircraft type for the airports infrastructure. Generally, for Perth Airport this is a Code 4F aircraft which represents an Airbus A380.

Infrastructure such as apron and aircraft parking positions also consider the most common aircraft that use the facilities, and then balance the need for the infrastructure and costs to meet the needs of a range of aircraft types.

For the purposes of the initial design of the NRP, a Code 4E critical aircraft was nominated for the runway. The decision to use a Code 4E aircraft was derived from analysis on the types of aircraft likely to use the runway on a regular basis now and in the future. However, this does not prevent a Code 4F from operating on the runway in certain circumstances.

6.5 Runway Naming

The construction of the new runway will result in changes to the designators of the main runway 03/21.

Runways are designated by a number between 01 and 36, which is one-tenth of the magnetic azimuth of the runway's heading in degrees. A runway designated 21 is therefore orientated to 210 degrees, a runway designated 24, points to 240 degrees. A runway can normally be used in both directions, and is named for each of the directions.

The introduction of parallel runways to Perth Airport means there will be two runways pointing in the same direction and hence having the same designators. This is overcome by appending Left (L) and Right (R) to the runways designation. Therefore, the new runway will be called runway 03R/21L with the current main runway becoming runway 03L/21R.

Throughout this document the runways will be referred to as:

- main runway (03L/21R), which is the existing and longest runway,
- new runway (03R/21L), the new runway, and
- cross runway (06/24), the existing runway that crosses the main runway.

6.6 New Runway (03R/21L) and Associated Taxiways

The NRP comprises the construction and operation of a new runway plus all the associated infrastructure for safe and efficient operations.

6.6.1 New Runway Length

The length of a runway is determined by considering the operational requirements of the aircraft that intend to use the runway. The length of runway required for take-off usually dictates the total required length of the runway. A small aircraft, such as a Dash-8, generally needs less runway length to take-off and land than a larger heavier aircraft, such as a Boeing 777.

The elevation and average temperature of the airport, runway conditions (dry versus wet), and the operating weight and engine type of the aircraft also contribute to the length of runway required for a particular aircraft. Consideration is also given to the land that is available and the other runways that are at the airport.

Following a review of future aircraft types and technology, as well as extensive consultation with airlines, the new runway is planned to be 3,000 metres long to accommodate the current and future mix of aircraft operating from Perth Airport. Although many of the aircraft types operating do not require the full length, having a second runway of similar length to the existing main runway (03L/21R) provides greater operational flexibility and redundancy for large aircraft operations if the main runway becomes unavailable for use due to maintenance or an operational incident or emergency. A 3,000-metre runway also gives greater flexibility in the use of flightpaths.

The fuel requirements for long-haul international flights and large domestic aircraft mean that in some cases an aircraft may need a runway longer than 3,000 metres for either take-off or landing. In this case these aircraft will not be able to use the new runway (03R/21L) and therefore their operations will be limited to the main runway (03L/21R), which is 3,444 metres long.

The 3,000-metre length also ensures that all infrastructure is located on the estate while minimising the impact to the Munday Swamp, which is located to the north of the new runway (03R/21L).

Beyond the ends of the runway, safety zones, called Runway End Safety Areas (RESAs), are required. These areas are important in emergency situations as they protect aircraft that undershoot (land short of) or overshoot (go past) the runway. Current CASA standards indicate that the RESAs must be 240 metres long and 90 metres wide, and free of fixed objects other than visual or navigational aids – such required objects, for example approach lighting, will be low mass and frangible. The dimensions of the proposed RESA are shown in layout Figure 6-2.

MOS 139 notes that to reduce the risk of damage to an aeroplane undershooting the runway, and to prevent jet blast erosion from jet aircraft turning and taking off at the end of the runway, it is recommended that areas abutting the runway should be provided with a compacted gravel pavement with a depth at the runway end equal to half the depth of the runway pavement, tapering to natural surface, the length of the taper being adjusted according to the bearing capacity of the natural surface. For areas beyond the gravel surface and outside the runway strip, graded but non-compacted natural surface with a grass cover is preferred. Hard pans should be broken up.

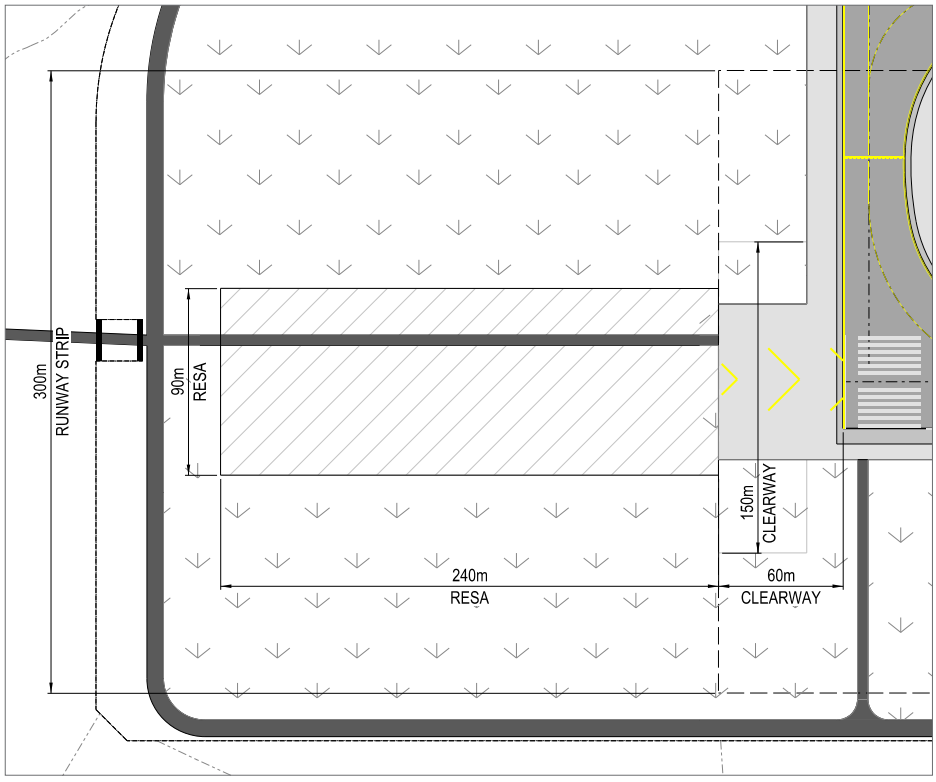


Figure 6-2 Runway 03R Runway End Safety Area layout
Source: Perth Airport

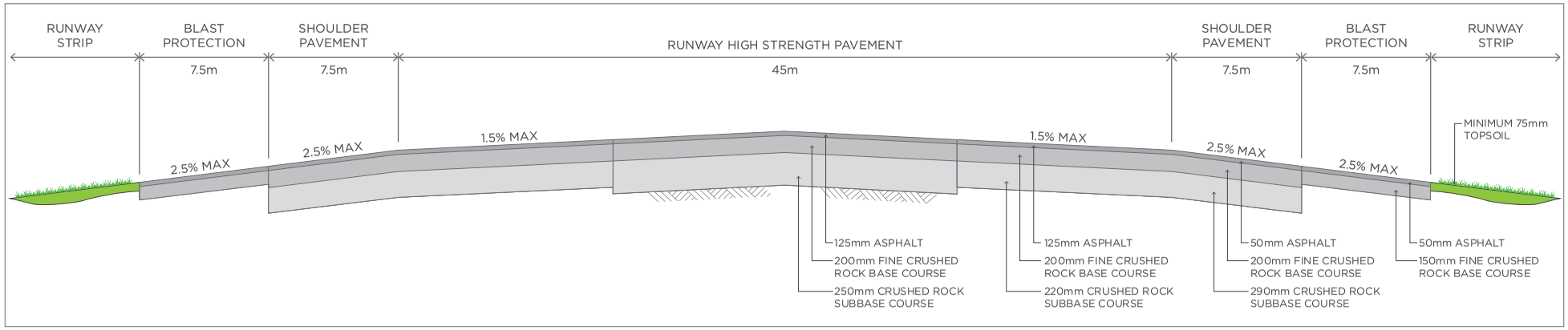


Figure 6-3 Proposed new runway cross section design
Source: Perth Airport

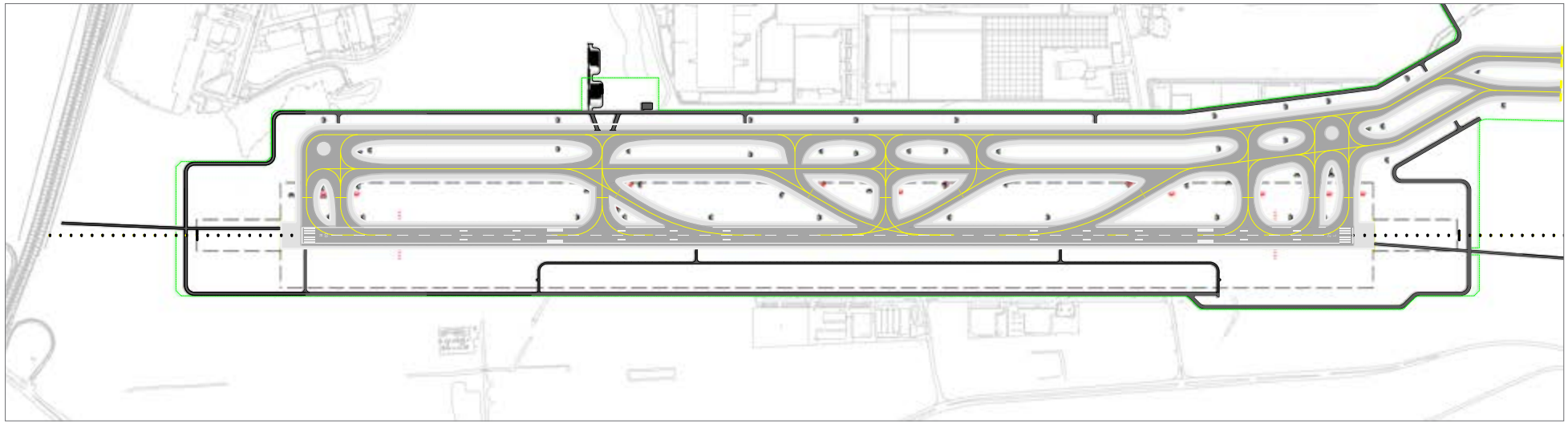


Figure 6-4 New Runway Project long-term taxiway layout
Source: Perth Airport

6.6.2 Runway Width

The width of a runway is based on the aircraft types that will operate on the runway. For the new runway, the initial design work has assumed the largest aircraft that will operate will be a Code E type with wingspan up to 65 metres. This includes aircraft such as Boeing 777 and Airbus A340. Newer aircraft such as Airbus A350 (64.75 metre wingspan) and Boeing 787 (60.12 metre wingspan) are also included in this category. For these Code E aircraft, the runway width is required to be a minimum of 45 metres.

It is anticipated that runway shoulders of 7.5 metres will be provided so that the overall width of runway and shoulders is not less than 60 metres.

As the new runway will serve wide-body aircraft, with engines that may overhang the shoulders, an additional 7.5 metres beyond the shoulders will be prepared to resist erosion from jet blast, giving a total runway width of 75 metres. A proposed cross section of the new runway is shown in Figure 6-3.

Consistent with upcoming changes to MOS 139, Perth Airport may consider Code F aircraft (Airbus A380) operations for a runway of 45 metres width with 7.5 metre shoulders and 7.5 metre blast pavements. This will be determined during the detailed design phase in consultation with airline operators and CASA.

6.6.3 Runway Strip

In line with current standards, it is intended that the new runway will be centred in a 280-metre wide runway strip which extends 60 metres beyond the runway ends. This strip is a safety zone consisting of two major parts:

- the graded portion of the strip close to the runway provides support to an aircraft that may run off the side or end of the runway, and is designed to reduce damage in such an event, and
- for Instrument Landing System (ILS) equipped runways there is an additional 'fly-over area' that allows aircraft to safely fly over at very low level in the case of a missed approach.

As outlined in MOS 139, the graded runway strip will be clear of fixed objects, other than visual aids required for aircraft guidance. Where such objects are required, they will be low mass and frangible so they do not damage aircraft. The flyover area will be kept clear of objects over certain heights to protect aircraft operating in the air.

The strip will be grassed to control erosion and will have controlled, low gradient slopes away from the runway to direct stormwater to the provided drainage channels, located outside of the graded strip.

6.6.4 Taxiways

A system of taxiways is provided to connect the new runway with the terminals, via aircraft aprons, and the existing airfield. The taxiway network is planned to avoid congestion on the ground while aiming to minimise taxiing distances and therefore reducing fuel burn. The taxiway system includes rapid exit taxiways (RETs), parallel taxiways and various link taxiways to provide flexibility for traffic management of aircraft while on the ground.

The long-term layout of the planned taxiway network is shown in Figure 6-4. The next stage of design work will include close liaison with airlines and Airservices to determine the extent of taxiways to be included in the first stage of construction. Not all the planned taxiways will be required on the first day of operations. Subsequent taxiways will be constructed as demand and airfield capacity require them in the future.

The long-term planned taxiway system comprises:

- dual parallel taxiways along the length of the new runway,
- dual parallel taxiways to connect the new runway system to the rest of the airfield,
- runway entry and exit taxiways, and
- rapid exit taxiways from the new runway connecting to the dual parallel taxiway system.

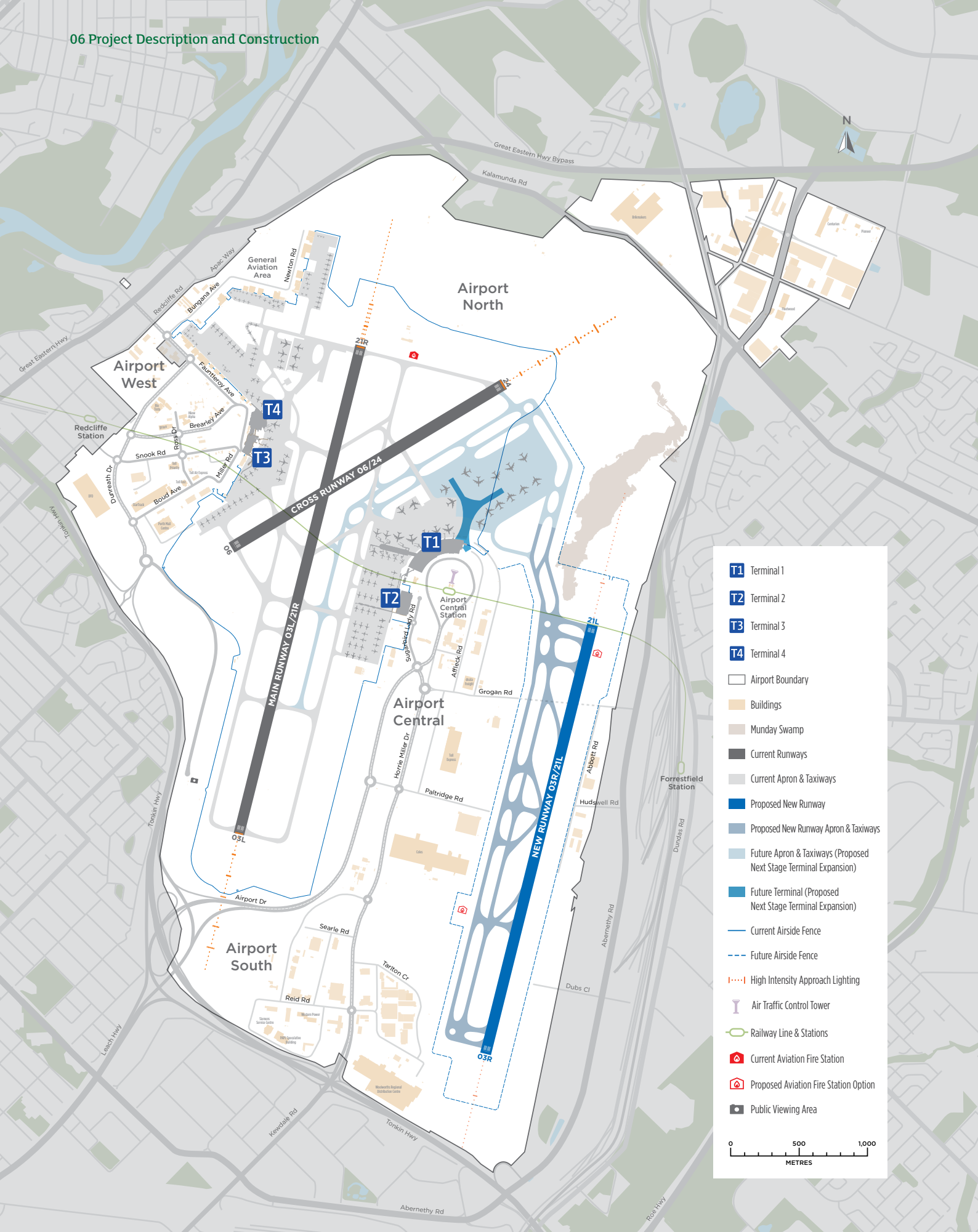


Figure 6-5 New Runway Project in relation to next stage terminal expansion layout
Source: Perth Airport

The taxiways associated with the NRP will connect into taxiways associated with the planned future terminal expansion projects; the next terminal expansion project at Perth Airport as shown in Figure 6-5. This project will undertake a separate approval process. The planned future terminals combined with the NRP project will see a parallel taxiway system throughout the central area. This will ensure two-way flow is achieved across the estate allowing for safe and efficient traffic flow.

Taxiway width is dependent on aircraft size and specifically the wheel track, plus allowances for maintaining clearances to pavement edges to allow for times when the aircraft may stray from the centrelines. From studies of taxiing aircraft, international standards have set this safe clearance as 4.5 metres. Currently all taxiways included in the NRP are designed for Code F aircraft, and on straight sections this requires a width of 23 metres. This is consistent with the existing taxiway system. Actual taxiway requirements, and therefore width, will be confirmed during detailed design as not all taxiways will need to accommodate Code F aircraft.

On curved sections and at junctions, aircraft geometry means that the back wheels cut across the corners which brings them closer to pavement edges. To counteract this, the taxiways are widened using fillets. Fillets are pieces of pavement that taper outwards from the taxiway pavement edge and join either a runway pavement or other taxiway fillet. To efficiently design these fillets, special modelling software is used to simulate the movements of all the aircraft types that may operate. The maximum deviation of the aircraft wheels towards the pavement edges is plotted and the required 4.5 metre clearance is then added to give the pavement area.

Shoulders are then added to protect the aircraft engines which overhang the taxiway edges from potential ingestion of loose material. For Code F, the shoulders are 17.5 metres wide.

Like the runway, the taxiways are located within taxiway strips where the gradients are controlled and where there are no fixed objects that could damage aircraft, other than low-mass frangible visual aids. The strips are grassed for erosion protection.

Taxiway spacing will be consistent with MOS139.

6.6.4.1 Rapid Exit Taxiways

Rapid Exit Taxiways (RETs) allow aircraft to exit the runway at relatively high speed, which then frees up the runway more quickly for a take-off or another landing. This has the effect of enabling more operations on the runway in a set time and therefore increases the overall runway capacity.

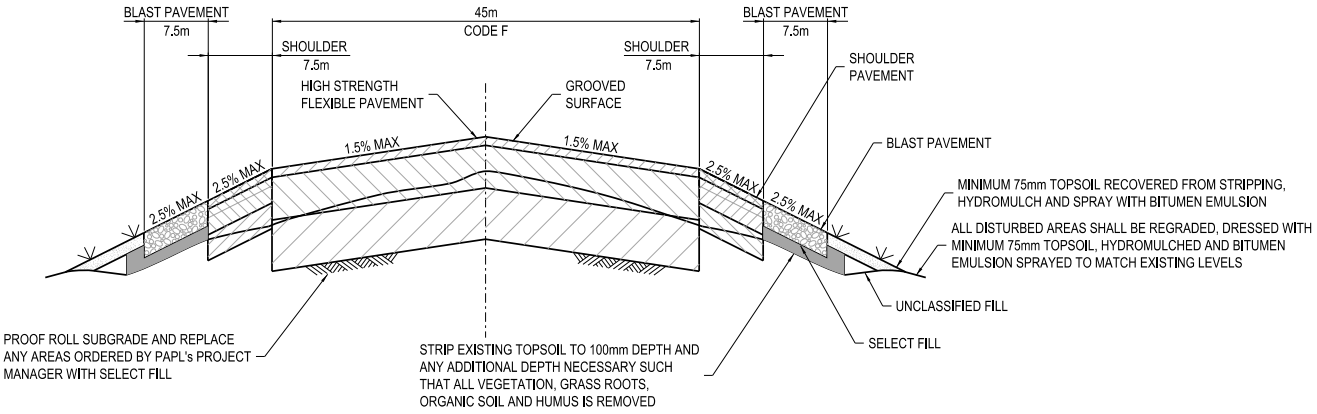
To ensure that the RETs provide the most efficient use of the runway based on the aircraft that will operate, the number and location of RETs will be finalised based on ongoing liaison with airlines during final design.

6.6.4.2 Link Taxiways

Link taxiways are positioned at strategic points around the airfield to allow aircraft to enter and exit the main taxiway system from the apron areas or to change from one taxiway to another. Final locations are dependent on the location of aircraft-parking-apron entry and exit points.

6.6.5 Line Marking

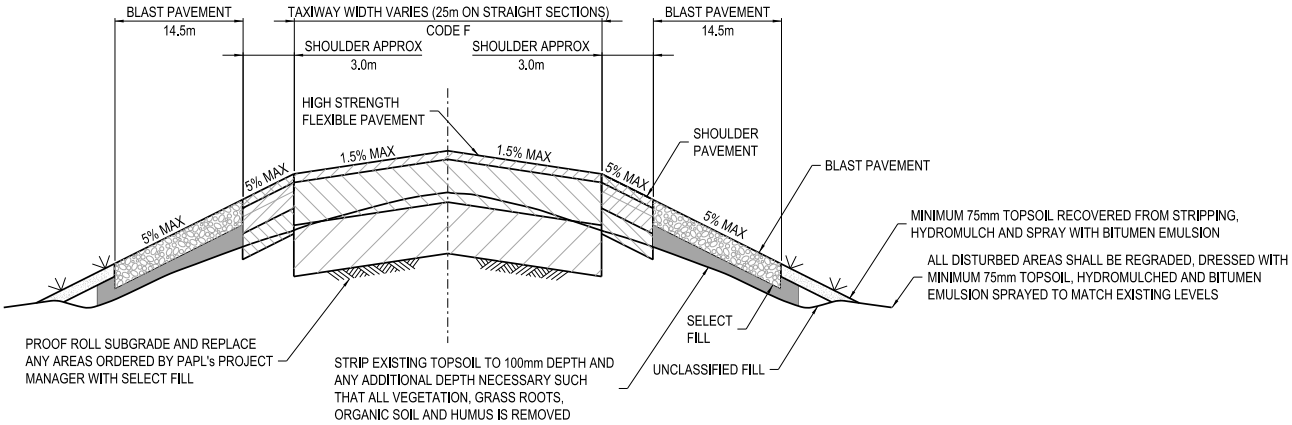
Pavement markings are required on the runway and taxiway surface to give guidance to pilots manoeuvring around the airfield. Markings will include the runway and taxiway centrelines, runway designation markings, runway end markings, runway side stripe markings, touch-down zone markings, intermediate holding position markings, taxiway edge markings, runway holding position and threshold markings. The runway markings will be white and taxiway markings yellow as per the requirements of MOS 139.



TYPICAL SECTION - RUNWAY

NTS

RUNWAY PAVEMENT TYPE	COMPOSITION		
	BASELINE	UPPER BOUND	MATERIAL
HIGH STRENGTH FLEXIBLE PAVEMENT	135mm 200mm 250mm	135mm 470mm 200mm	SIZE 14mm ASPHALT (SEE NOTE 1) FINE CRUSHED ROCK BASE COURSE CRUSHED ROCK SUB BASE COURSE PROOF ROLLED SUBGRADE OR SELECT FILL
SHOULDER PAVEMENT	76mm 350mm	76mm 350mm	SIZE 14mm ASPHALT FINE CRUSHED ROCK BASE COURSE PROOF ROLLED SUBGRADE OR SELECT FILL
BLAST PAVEMENT	35mm 200mm	35mm 200mm	SIZE 7mm ASPHALT FINE CRUSHED ROCK BASE COURSE OR RECLAIMED PROFILINGS



TYPICAL SECTION - TAXIWAY

NTS

TAXIWAY PAVEMENT TYPE	COMPOSITION		
	BASELINE	UPPER BOUND	MATERIAL
HIGH STRENGTH FLEXIBLE PAVEMENT	125mm 200mm 260mm	125mm 470mm 200mm	SIZE 14mm ASPHALT (SEE NOTE 1) FINE CRUSHED ROCK BASE COURSE CRUSHED ROCK SUB BASE COURSE PROOF ROLLED SUBGRADE OR SELECT FILL
SHOULDER PAVEMENT	76mm 350mm	76mm 350mm	SIZE 14mm ASPHALT FINE CRUSHED ROCK BASE COURSE PROOF ROLLED SUBGRADE OR SELECT FILL
BLAST PAVEMENT	35mm 200mm	35mm 200mm	SIZE 7mm ASPHALT FINE CRUSHED ROCK BASE COURSE OR RECLAIMED PROFILINGS

Figure 6-6 Proposed new runway concept pavement design
Source: Perth Airport

6.7 Pavement Design

Runway and taxiway pavements are required to support the heaviest aircraft operating at the airport with minimal maintenance requirements. Unlike roads, where lanes can be closed for maintenance access, aircraft require the full width of pavements and any closures can cause operational restrictions.

Aircraft are at their heaviest when they are fully fuelled for departure and taxiing to the runway. Arriving aircraft can be significantly lighter as they have used most of their fuel.

Different areas of pavements are therefore designed for specific loadings, aircraft types, and numbers of expected aircraft movements within a pre-determined design life. Environmental factors, including temperatures and rainfall, also impact the pavement design and maintenance requirements.

Perth Airport runway and taxiway pavements are typical of Australian airport pavements, being compacted crushed rock and gravel layers with an asphalt surfacing.

The proposed pavement design for the NRP is shown in Figure 6-6.

6.7.1 Pavement Options

Airfield pavements are generally either rigid or flexible pavements. The different pavement types are suitable for different ground conditions and different loadings. For example, where the ground is stiff and not expected to settle, a rigid concrete pavement can be a good choice as it requires less maintenance. Concrete is also often the most appropriate choice where aircraft will park and be fuelled, as it does not rut under slow moving or stationary aircraft, and does not degrade if fuel is accidentally spilt. However, concrete pavement is initially more expensive to construct.

Flexible asphalt pavements are often chosen where there may be some foundation settlements over time, as the pavement can be easily resurfaced to bring it back within the strict tolerances for gradients that exist especially for runways.

Asphalt is also laid without obvious joints. When aircraft are travelling at speed, for example on taxiways and runways, this gives a much better ride quality without the 'juddering' that passengers can experience on a concrete runway.

Historical performance is also considered when deciding on a suitable pavement type.

6.7.2 Existing Runway and Taxiway Pavements

The existing runways and taxiways at Perth Airport have been in use for many years and, with regular maintenance, have performed well. The main runway (03L/21R) was initially built in 1949 and has been lengthened, widened and strengthened over the years. The top layer of the runway, comprised of asphalt, which is designed to wear and be replaced (referred to as the 'wearing course'), is resurfaced approximately every 10 years to maintain its structural integrity. The latest full-width overlay was carried out in 2010. Resurfacing is required to restore the profile of the pavement so that it remains within the strict tolerances of the standards, as well as replacing the asphalt as it becomes brittle due to environmental exposure. On average, in Perth's climate and using readily available materials, a new asphalt runway surface would be expected to last around 10 to 12 years before being resurfaced.

Similarly, the taxiways have developed over the years and been strengthened and widened to suit the changes in aircraft requirements. New taxiways have been added as required to maintain an efficient airfield as flight numbers have increased or airlines have consolidated into Airport Central.

6.7.3 New Runway Project Pavement Design

The key inputs for preliminary design of the airfield pavements are:

- pavement type,
- design life,
- aircraft movement numbers, and
- foundation strength.

The proposed pavement design has followed the Federal Aviation Authority Advisory Circular 150/5320 'Airport Pavement Design and Evaluation' method. The design program associated with this advisory circular has been used to carry out the designs for the flexible pavements. This program models the interactions between aircraft wheel loadings and the various layers of materials in the pavement, including the foundation or subgrade layer, to assess the cumulative damage caused. Once the damage reaches a pre-determined level, the pavement is assumed to have reached its design life. The program adjusts the pavement layer thicknesses until the required design life is achieved.

Perth Airport, in association with the Australian Airports Association Pavement Working Group and other Australian airports, has partnered with the University of the Sunshine Coast on an Airport Pavement Research Project. It is hoped this research project will deliver more efficient pavement solutions, modernised technology, and enhanced best-practice design and delivery of airport pavements. Any benefits from the program may be incorporated into the design and eventual construction of the new runway.

6.7.4 Pavement Type

At Perth Airport, the flexible asphalt runways and taxiways have performed well and have therefore been chosen for the NRP.

Flexible pavements at runway ends can tend to rut quicker than other areas of airfields due to aircraft positioning holding and running up their engines prior to take-off. The longer duration of the static loads, plus the vibrations during run-up, are contributing factors. To reduce maintenance in such areas some airports construct these areas in concrete, and Perth Airport may use concrete in these areas. This will be determined during the final detailed design stages.

6.7.5 Design Life

A structural design life of 20 years has been considered for the flexible pavements associated with the NRP. This does not mean the pavement will last 20 years without maintenance, or that at the end of 20 years it will need full replacement. Rather, the structural design life refers to the time before the assumed aircraft mix will cause the limiting factors of strain to be reached in either the subgrade or the surface material.

The pavement also has a functional design life, which is the time before a pavement requires maintenance to continue to provide an acceptable level of service. This may relate to criteria such as surface friction, surface cracks or surface profile. Existing pavements undergo a regular program of inspection and maintenance in accordance with Perth Airport asset-management plans.

6.7.6 Aircraft Mix

The aircraft mix used in the pavement design is based on Perth Airport's planning for future aircraft movements. An updated mix may be adopted prior to finalising the detailed pavement design. The pavement thickness, however, is not overly sensitive to aircraft numbers and any change to aircraft mix will not have a material effect on the design.

6.7.7 Foundation or Subgrade Layer

The pavement foundation or subgrade will be in-situ material or imported sand fill with an assumed California Bearing Ratio (CBR) test result of 12 per cent. In airfield pavement terms this is a medium-strength foundation. The CBR test is a penetration test conducted at a uniform rate of strain. The force required to produce a given penetration in the material under test is compared to the force required to produce the same penetration in a standard crushed limestone. The result is expressed as a ratio of the two forces. A material with a CBR of 15 means the material offers 15 per cent of the resistance to penetration that the standard crushed limestone offers.

To prepare the subgrade, areas will be bunded and flooded to help displace any trapped air, then heavy rollers will be used and the material tested at various depths to demonstrate the required density has been reached.

6.7.8 Pavement Thickness

A summary of the preliminary design pavement thicknesses is shown in Table 6-1.

The runway and RETs will also require an additional ten millimetres of surfacing to allow for grooving.

Pavement thicknesses for the different areas of the NRP will be finalised during the detailed design stage. However, overall pavement thicknesses are expected to be in the order of 700 to 900 millimetres.

6.7.9 Pavement Design

The preliminary design for the pavements is based on conventional unbound granular, asphalt-surfaced flexible pavement which is similar to that used for the pavements found on the existing airfield. These have been adopted for this project due to the overall good performance of the existing Perth Airport pavements.

6.7.10 Sub-Grade

Following clearance and filling operations, the sand subgrade will be compacted. A series of compaction trials will be undertaken to design the rolling process, such that it gives the required density of material suitable for placement of the pavement layers. Options that will be considered for compacting are:

- flood compaction, whereby areas are bunded and flooded with water prior to rolling – this is the process generally used at Perth Airport,
- placing thin layers and using heavy pneumatic rollers, and
- placing in thicker layers and using impact rollers.

The different methods will be assessed for effectiveness, cost and ability to meet the construction program.

6.7.11 Flexible Pavement

The pavement will consist of layers of dense-graded crushed rock and gravel, laid using mechanical paving spreaders and compacted using rollers. It is anticipated that the material will be mixed at the quarry and transported to site for direct placement into the pavement areas. Correct moisture content will be critical to achieving the required compaction under the action of the rollers.

The thickness of material required is too large to be compacted in a single layer, and so will be built up in several layers, each being rolled and tested to ensure compliance with the specifications.

Once the rock layers are in place, a bitumen prime coat is applied to seal the surface and give a bonding surface for the asphalt.

Material / Layer	Runway / Taxiways
Asphalt	125 millimetres
Granular Base Course	470 – 500 millimetres
Granular Sub Base Course	195 millimetres
Sand Subgrade/Fill (CBR)	15 per cent

Table 6-1 New Runway Project summary of preliminary design pavement thicknesses
Source: Perth Airport

The dense-graded hot-mix asphalt will be delivered to site, continuously spread using a paving machine to the required thickness, and compacted and left to cool.

After the asphalt has been left to cool and cure, the runway and rapid exit taxiways will be grooved to increase friction (skid resistance). The grooves will be a series of regular perpendicular cuts across the pavement. They allow surface water to rapidly drain away to the pavement edges and reduce the risk of aircraft aquaplaning.

6.7.12 Embankments

Minor ground settlements are likely to occur due to additional ground loads from the construction of embankments for the new runway and taxiways. Site development earthworks will require the placement of up to 3.5 metres of fill along the alignment of the new runway. It is estimated that up to 50 millimetres of settlement may occur along the alignment during the placement of the fill, and this will be accommodated by adding additional material during embankment construction. Longer term, consolidation settlements are not expected to be significant.

6.7.13 Subsurface and Geotechnical Considerations

Extensive subsurface and geotechnical investigations have been undertaken within the NRP area. The investigations, and subsequent laboratory testing of samples taken, have enabled the ground conditions of the site to be analysed. The new runway area comprises areas of sandy/clay, clayey/sand topsoil and sand/fill. Refer to Section 9 for further detail on soil and geology.

6.8 Adopted Geotechnical Design

Where any in-situ clayey materials are encountered near the level of pavements, the material will either be removed and replaced with sand fill or stabilised in-situ to avoid any future movement or swelling of the soil impacting the airfield pavements. As the fill material is placed it will be proof-rolled with a heavy roller and the behaviour of the material observed. Any deformations or depressions that occur during this process will warrant closer inspection of the material, and potentially the removal and replacement of unsuitable materials with sand.

Pavement foundation materials will be compacted in accordance with the pavement design requirements. For pavement design purposes the foundation CBR has been investigated and a value of 12 per cent adopted.

The stability of the embankments is controlled by the shear strength of the fill materials and the in-situ foundation materials as well as the magnitude of additional loads behind the crest of the slope. As the aircraft live loads will not be close to the crest of any slopes, slope batter angles of one to three (vertical to horizontal) have been adopted to maintain an adequate factor of safety against slope or bearing failures.

6.9 Drainage

Perth Airport is located on the Swan Coastal Plain and sits within two of the 30 major stormwater catchments of the Swan and Canning rivers system. The Northern Main Drain (NMD) and the Southern Main Drain (SMD) are two open-channel main drains that traverse through the estate, draining two of those 30 catchments. The NMD catchment and the SMD catchment both extend from the top of the Darling Scarp down to the Swan River.

Upstream of the estate the NMD catchment consists primarily of residential areas, while the SMD catchment is primarily residential with an industrial area just outside the estate to the east. Downstream of the estate, the areas for both catchments are a mix of residential, commercial and light industry. The estate consists of aviation land uses plus commercial, light industrial and some retail.

To cater for the NRP and to ensure effective management of stormwater through the estate, the following works are required:

- fill-in of areas that are currently used as stormwater storage, both excavated and naturally low lying areas,
- part of the NMD will be realigned, refer to Figure 6-7,
- part of the SMD will be realigned, refer to Figure 6-8, and
- Munday Swamp will receive additional water in storm events of a magnitude that are likely to occur more than once per year.

Studies were undertaken to examine the existing condition within the NRP area, followed by an impact assessment involving the development of a risk register to identify the impact of the NRP and appropriate mitigation measures for the stormwater infrastructure. Detailed information on the hydrological changes and impacts due to the NRP can be found in Section 10.

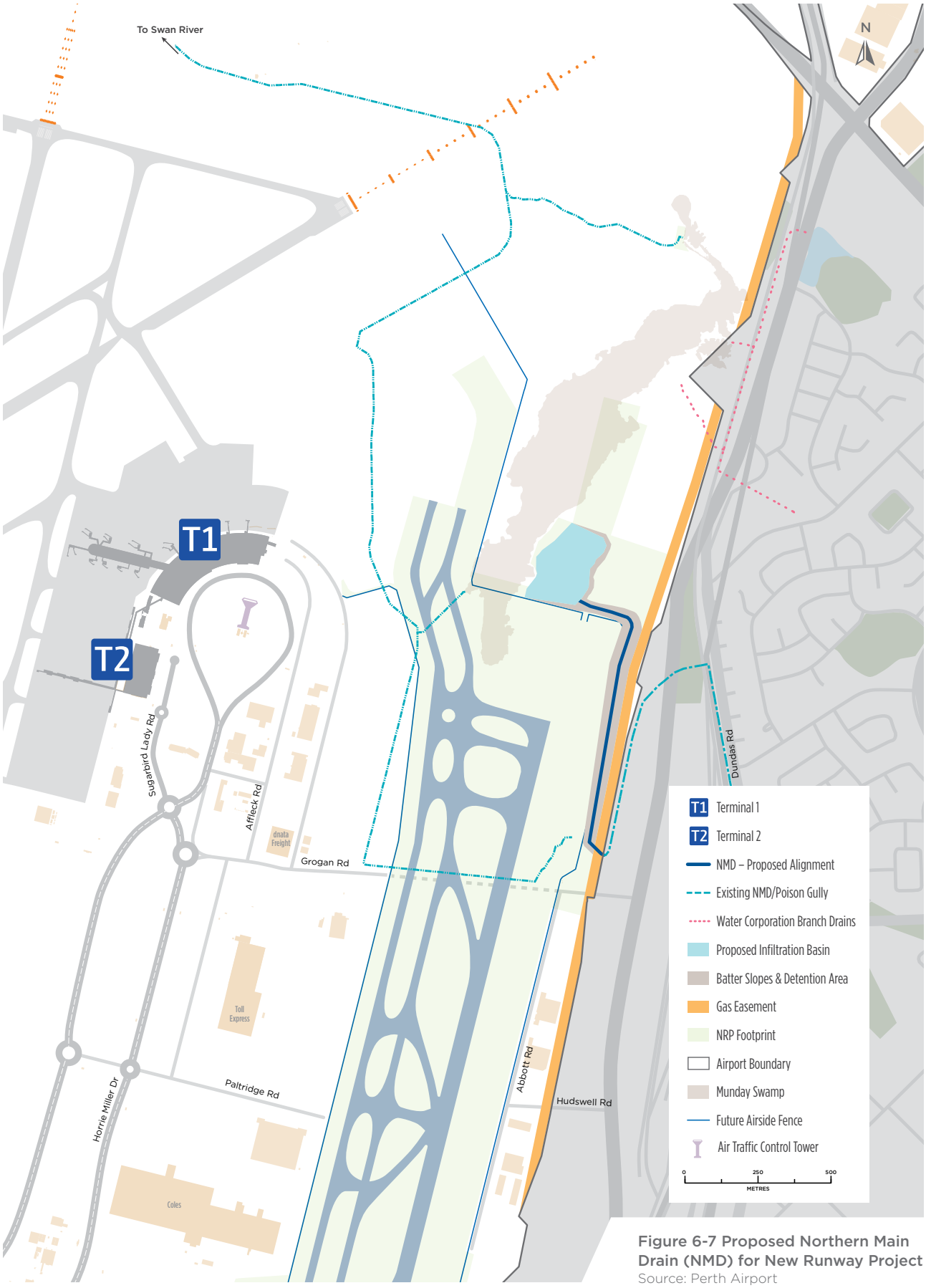


Figure 6-7 Proposed Northern Main Drain (NMD) for New Runway Project
Source: Perth Airport

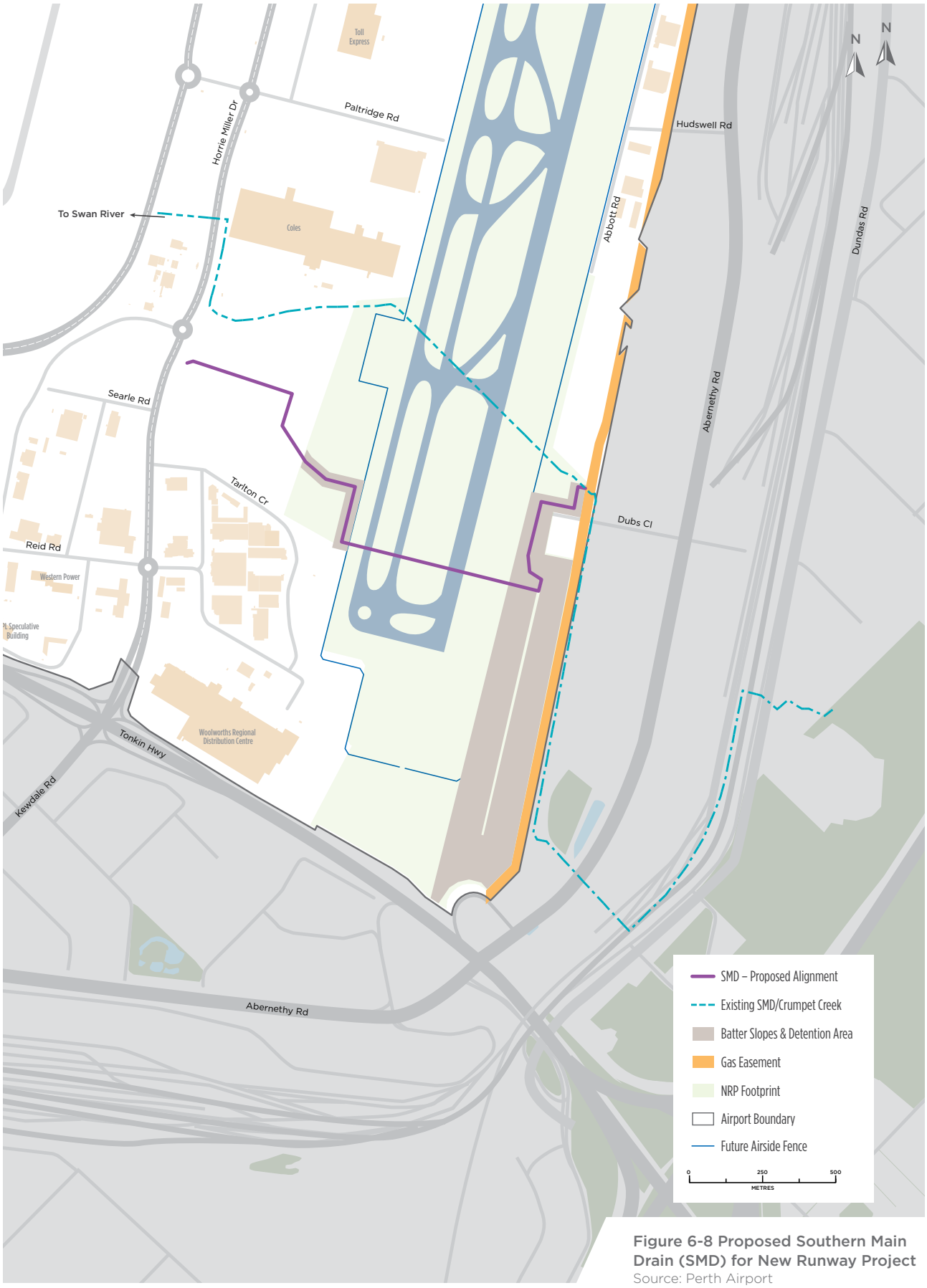


Figure 6-8 Proposed Southern Main Drain (SMD) for New Runway Project
Source: Perth Airport

6.10 Fencing

To maintain a safe and secure airfield, a perimeter security fence will be installed to form the boundary between publicly-accessible landside areas and restricted airside areas. The existing airside perimeter security fence will be extended to protect the expanded airfield from unlawful access.

Perimeter access points and emergency crash gates will be provided at appropriate locations to allow maintenance and emergency vehicle egress and access to the airfield. Additional vehicular access control measures such as barriers, guard rails, bollards and the like will be included for vulnerable and critical areas of the airfield boundary. The fence will be monitored and patrolled by airport security staff. The fence will likely match the existing fence structure, being three metres high with three barbed-wire strands along the top.

Australian aviation security is always under review and subject to change, and any changes to regulations will be incorporated into the security fence at the time of construction.

Security fencing will also be installed around aviation-critical infrastructure that is not contained within the airside zone. It is anticipated that this will include fencing around the high intensity approach lighting located at each end of the new runway.

6.11 Perimeter and Airside Roads

A perimeter road is required around the new runway to facilitate:

- regular security inspections,
- operational inspections of the airside environment,
- maintenance in and around the airfield, and
- response to emergencies.

The perimeter road proposed will be at least eight metres in width and designed to cater for all types of vehicles, including Ultra Large Aviation Rescue Fire Fighting (ARFF) tenders. To provide a safe, all-weather running surface, it is anticipated that the road will be sealed with asphalt as per current airside perimeter roads.

A series of access roads will also link the perimeter roads to taxiways and runways for inspection purposes. These will be restricted to operational personnel only, with appropriate mitigations in place to prevent unauthorised access.

A landside access road may also be built parallel to the security fence where public roads are not already in place. This road will be of basic construction and primarily used for maintenance and emergency situations. It is anticipated that the road will be no more than four metres in width and have a gravel surface.

ARFF access roads will also be provided, and designed to minimise aircraft crash response times. These access roads will extend from the end of each runway-threshold by up to 1,000 metres, or at least within the airport boundary. The access roads will be suitable for Ultra Large ARFF tenders. Perth Airport and Airservices are currently in ongoing discussion on options to meet these requirements.

6.12 Emergency Access and Assembly Point

To facilitate timely response to any airside emergency on or near the new runway site, an emergency staging area will be provided. The staging area will be similar in design and construction to the existing area located at Gate 6 in Airport West.

The staging area will accommodate various types of emergency vehicles, including Ultra Large ARFF and State Department of Fire and Emergency Services firefighting tenders, and have an asphalt paved surface, landside, as well as airside. It is anticipated that a demountable office will also be located airside and near the staging area for use during emergencies. The office will have power, communications, water and sewerage.

The staging area is currently planned to be located adjacent to the ARFF station; however, as the location of the station is yet to be finalised, this may change. The final location and requirements of the staging area will be agreed with Airservices and the Perth Airport Aerodrome Emergency Committee prior to construction. A proposed layout for the emergency staging area is shown in Figure 6-9.

6.13 Airfield Lighting

The airfield lighting consists of high intensity approach lighting and aeronautical ground lighting.

The airfield lighting for the new runway has currently been designed to be consistent with a precision approach Category I runway. A precision approach runway Category I is defined as an instrument runway served by an Instrument Landing System (ILS) and visual aids intended for operations, with a pilot decision height (to commit to or abort the landing) not lower than 60 metres (200 feet) and either a visibility not less than 800 metres or a runway visual range not less than 550 metres.

It is possible that this system may be upgraded either during the next stage of design, or after the runway opens, to a precision approach Category II or Category III runway, noting that upgrading once the runway is open would place restrictions on operations during the works. These categories have progressively lower decision heights, or no decision heights, and lower visibility thresholds.

An upgrade to the approach category would likely take place only if there was airline demand for operations in low visibility conditions, such as in fog, on the new runway. The current main runway 21 has recently been upgraded to Category III capability which will allow operations into Perth Airport to occur with a runway visual range of 75 metres or more. Only one end of the existing runway was chosen for the upgrade to be completed, as in periods of significantly low visibility there tends to be little or no wind and thus selection of runway 21 as the runway-in-use can be relied upon. As the existing runway is equipped with Category III infrastructure, and periods of significantly low visibility which occur infrequently throughout the year, the requirement for a Category III system on the new runway may be low for some time noting its cost of installation.

If the ILS for the new runway was upgraded to Category II or III, changes are typically limited to airfield ground lighting, high intensity approach lighting, and the amount of development allowed within the vicinity of transmitting elements to avoid interference. Generally, transmitting antennae arrays used for Category I can be maintained with only upgrades required to accommodate Category II or III. It is expected that any future upgrade to the ILS system would remain consistent with the NRP approvals as the required changes to upgrade ILS system are typically done within the same footprint as the Category I system.

Perth Airport will continue to work with airlines and Airservices to determine the category of runway infrastructure as well as the need to safeguard for any future upgrades, as stricter limitations on developments in the vicinity associated with Category II or Category III ILS systems is required. This determination will include an assessment of technological advances in approach and landing procedures and associated equipment which may replace the traditional need for an ILS installation.

A network of underground pits and conduits to carry the power and communication cabling will be constructed to enable the lights and control systems. A series of primary cables encloses the airfield, and from this network secondary cables are run to each light fitting.

The typical installation of the electrical conduits will include:

- survey of the new corridor,
- excavate trench for ducts,
- prepare bed of trench for ducts,
- install ducts,
- backfill and lay marker tape,
- topsoil and reseed as appropriate,
- survey of the 'as constructed' alignment, and
- test and commission.

Where conduits run under pavements, the ducts will be installed in the sub-base layer. Following compaction of this layer, a narrow trench will be excavated for the duct to be placed. Backfill of this trench will be with a low strength lean-mix concrete.

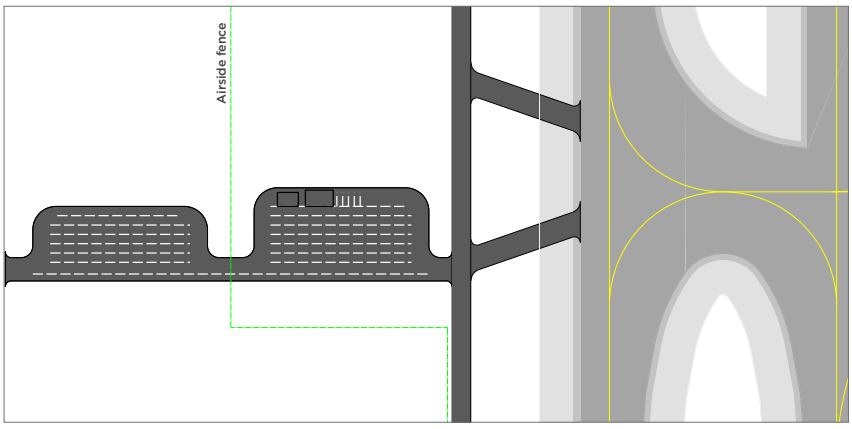


Figure 6-9 Proposed new runway emergency staging area concept
Source: Perth Airport

6.13.1 High Intensity Approach Lighting

High Intensity Approach Lighting (HIAL) allows pilots to undertake safe landings in darkness or reduced visibility conditions. The lights are positioned along the runway extended centreline and provide pilots with information on the alignment of the runway as well as the distance to the landing threshold. The lights form part of the overall landing systems at an airport and the full system is designed to suit visibility criteria as specified in MOS 139. An example of the HIAL at Perth Airport is shown in Figure 6-10.

In line with expected amendments to MOS 139, the required HIAL length for the NRP has been reduced from a previously planned 900 metres to 720 metres. Additionally, the preliminary HIAL design is based on a Distance Coded lighting configuration consistent with other HIAL systems at Perth Airport. To achieve a reduced HIAL length a Barrette centreline lighting configuration is likely required. Although there are not expected to be any limitations or impacts on the minimum runway visibility, the final HIAL system will be reviewed and confirmed as part of the detailed design and in line with the MOS 139 requirements of the day.

The current design will see HIAL installed at each runway end, on masts that position the lights at the correct height above the ground. The HIAL is located within the estate; the northern end may see some lights located within the Munday Swamp heritage area. The proposed layout of the HIAL is shown in Figure 6-11 and Figure 6-12.

A 60-metre clearance zone is required around the HIAL. Within this zone, measured on either side of the HIAL centre line and beyond the last light, obstacles cannot be higher than the light masts to avoid shielding the lights from pilots. This will result in the ongoing requirement to trim or remove trees within the clearance zone and forms part of the MDP approval.

Maintenance access will be provided to the lights via a basic track, and the light masts may be hinged so that the lights can be brought down close to ground level to avoid safety issues associated with working at height. Maintenance of vegetation will be required periodically to maintain line of sight for pilots using the HIAL.

Figure 6-10 High Intensity Approach Light at Perth Airport
Source: Perth Airport

6.13.2 Aerodrome Ground Lighting

Aerodrome ground lighting provides pilots with guidance as they manoeuvre around the airfield. The ground lighting is controlled from the Air Traffic Control tower, enabling the controllers to safely direct aircraft.

The new runway system includes the following lights:

- runway edge lights,
- runway threshold lights,
- runway end lights,
- taxiway centreline lights,
- taxiway edge lights, (to be determined in consultation with Airservices and airlines),
- stop bars at runway and taxiway holding points,
- runway guard lights, and
- movement area guidance signs (MAGS).

All lighting will be designed to meet MOS 139 standards. As the current intention is to construct a Category I ILS, lighting such as runway centreline lights, has not been included. Depending on the final ILS category chosen and airline engagement, additional or alternative lighting may be required.

Lights will be installed in the pavement or off to the side of pavements, consistent with MOS 139 requirements.

Lights will generally be shallow inset fittings connected via underground conduit to a secondary isolating transformer located clear of runway and taxiway strips.

The underground conduit is installed within the base course, with the final light location surveyed prior to further layers added. Upon completion of all pavement works, including asphalting, light locations are re-surveyed, the conduit is cored down to and a shallow light base fitting installed and connected to power supplies. An epoxy is used to fill the narrow gap between the light fitting and pavement to prevent water ingress.

Raised lighting units, if required, will be positioned outside the pavement area and these will be installed by bolting the unit to a concrete pad footing.

6.13.3 Movement Area Guidance Signs

Movement area guidance signs (MAGS) provide information to pilots for manoeuvring around the airfield. The signs require a concrete pad foundation to be cast for the signs to then be bolted to, using frangible connections. Each sign will require a conduit to be installed from the service corridor for a power cable to feed the internal lighting for the signs.

6.13.4 Aerodrome Lighting Equipment Room

Power for the airfield lighting system is provided via an Airfield Lighting Equipment Room (ALER). An ALER includes back-up power generators to enable the lights to continue to function in the event of a general power outage. An additional ALER will be located at a suitable position on the airfield. Main power will be fed to the ALER from the Perth Airport supply.

The new ALER will be located airside and constructed to provide the required power and control systems for the lighting system. Additional supply will come from an existing ALER so that the overall system has sufficient backup. The new ALER will incorporate standby power facilities via a generator.

The control equipment required to operate the lighting system will be in the ALERs. The floor space of the new facilities will provide sufficient space to facilitate future expansion. The standby power plant will be sized accordingly to suit the power requirements of the lighting system. Most components inside each ALER are manufactured off-site and will be delivered to the site on trucks for installation and commissioning by a specialist subcontractor.

A lighting control interface, linked directly to the ALERs, will be located in the Air Traffic Control tower allowing controllers to select the airfield lighting as required.

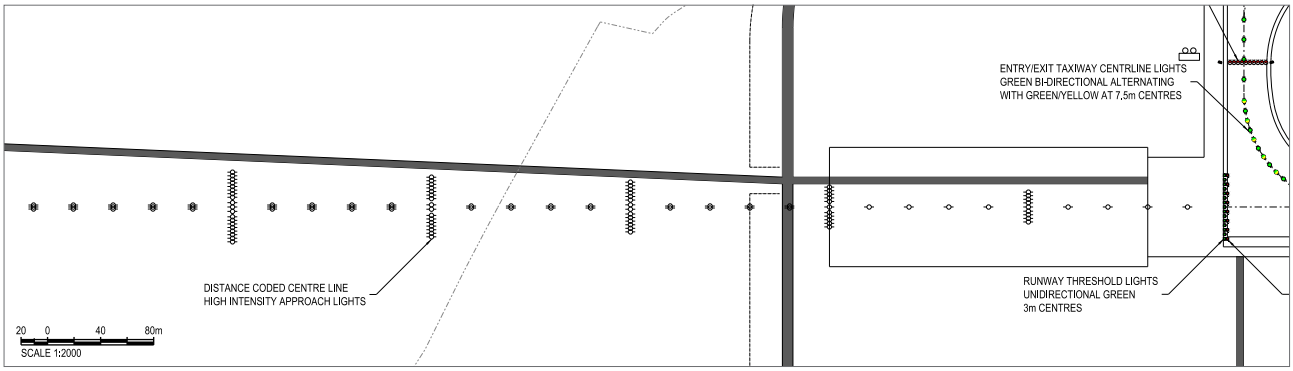


Figure 6-11 Proposed layout of runway 03R High Intensity Approach Lighting
Source: Perth Airport

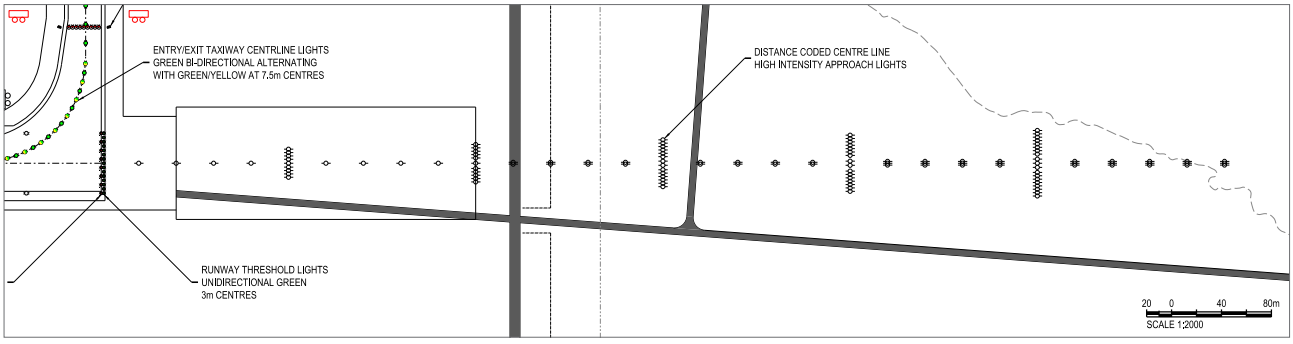


Figure 6-12 Proposed layout of runway 21L High Intensity Approach Lighting
Source: Perth Airport

6.14 Services

Perth Airport has an extensive network of power, water, drainage, sewerage, gas and communications infrastructure which sustains the aviation and commercial development within the airport estate. Perth Airport has a services strategy to ensure these services are available, reliable and of sufficient quantity.

There are existing services that have been identified in the NRP area that will be impacted by the proposed works. Key services will need to be relocated during the construction works and provision made for new temporary and permanent services that will be required for the new runway operations.

Proposed services design is shown in Figure 6-13.

6.14.1 Water

The Water Corporation provides potable water to the estate. Within the estate, the water main infrastructure is owned and managed by Perth Airport. Ring mains connect the Water Corporation's three supply points to the airport and this provides redundancy to the estate for maintenance, upgrades and unplanned events.

A potable water main is currently located along Grogan Road which will traverse under the new runway and taxiways. This main will be relocated parallel to its current alignment and is planned to be installed within a concrete sleeve with pits set outside the taxiways and runway strip. This will provide an outlet for the pressurised water that will not affect the integrity of the taxiways and runway if the main was to leak or burst.

6.14.2 Sewerage

Perth Airport manages the sewer infrastructure on the estate. There are three discharge connection points from the estate into the Water Corporation network. The sewerage system consists of both gravity and pumped networks. In the NRP area, there are two systems that will be impacted:

- a pumped system running west to east from the Paltridge Road sewerage pump station to the Water Corporation's sewer main connection outside the estate at Dubs Close, and
- a gravity system running east to west from Abbott Road to the Airport Central precinct.

The existing pumped main crossing the NRP area from the Paltridge Road pump station will be realigned into a new services corridor under the airside area.

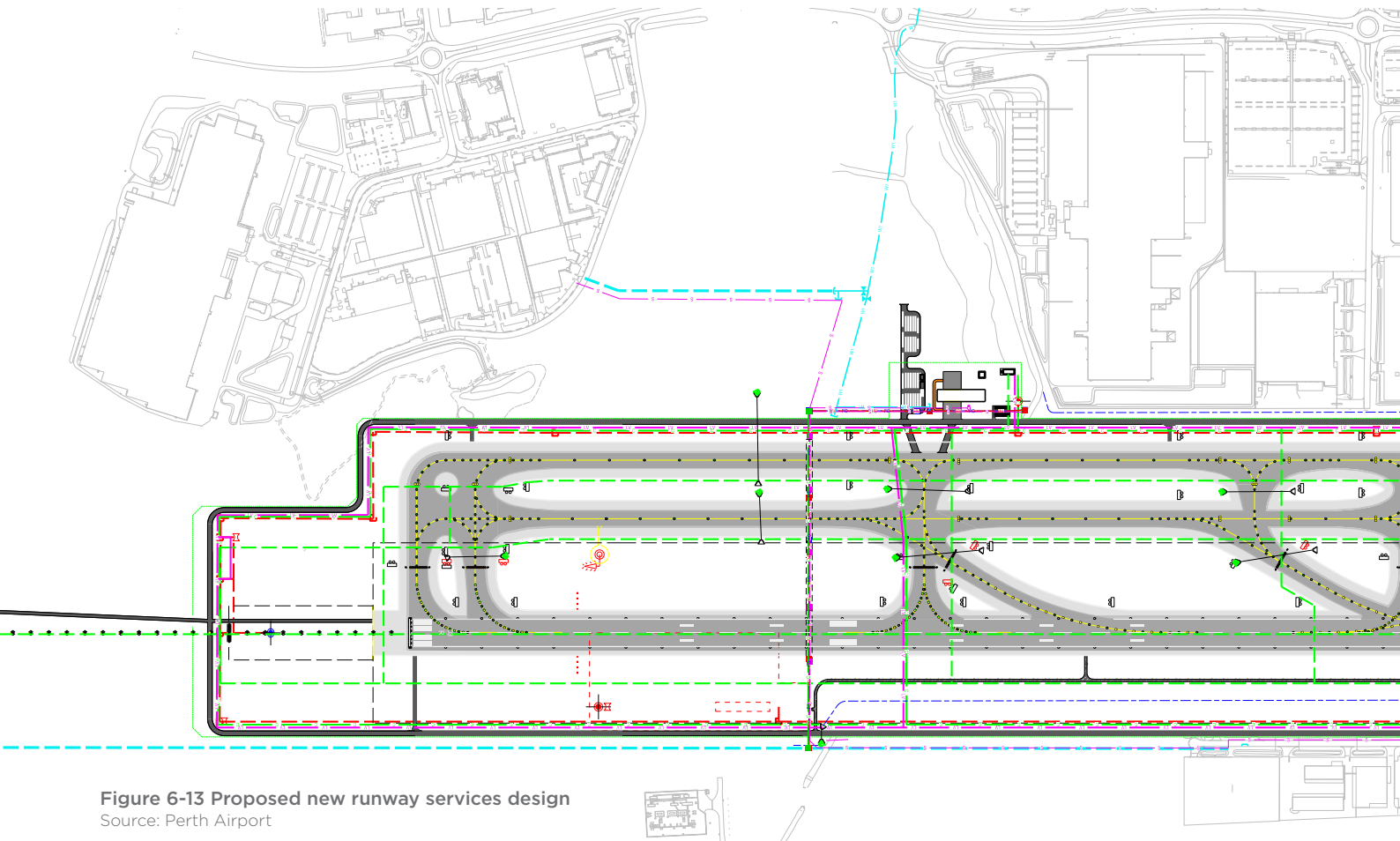


Figure 6-13 Proposed new runway services design
Source: Perth Airport

The current Abbott Road sewer network consists of a gravity sewer network in the eastern verge of road reserve. The sewers converge at the Hudswell Road intersection and then travel westwards along the road reserve through the NRP area, before connecting to the gravity sewer network on Paltridge Road in Airport Central. This line across the new runway will be removed, and the Abbott Road sewer will instead drain into a new small pump station at the Hudswell Road intersection. From there, the sewage will be pumped to the Water Corporation sewer main connection outside the estate boundary at Dubs Close.

During the detailed design, Perth Airport will work with the Water Corporation to determine the requirements for the extra connection. An alternative could be to connect this pumping main into the Paltridge Road pumping main and coordinate the two pumping station control units to only allow one pump to operate at a time.

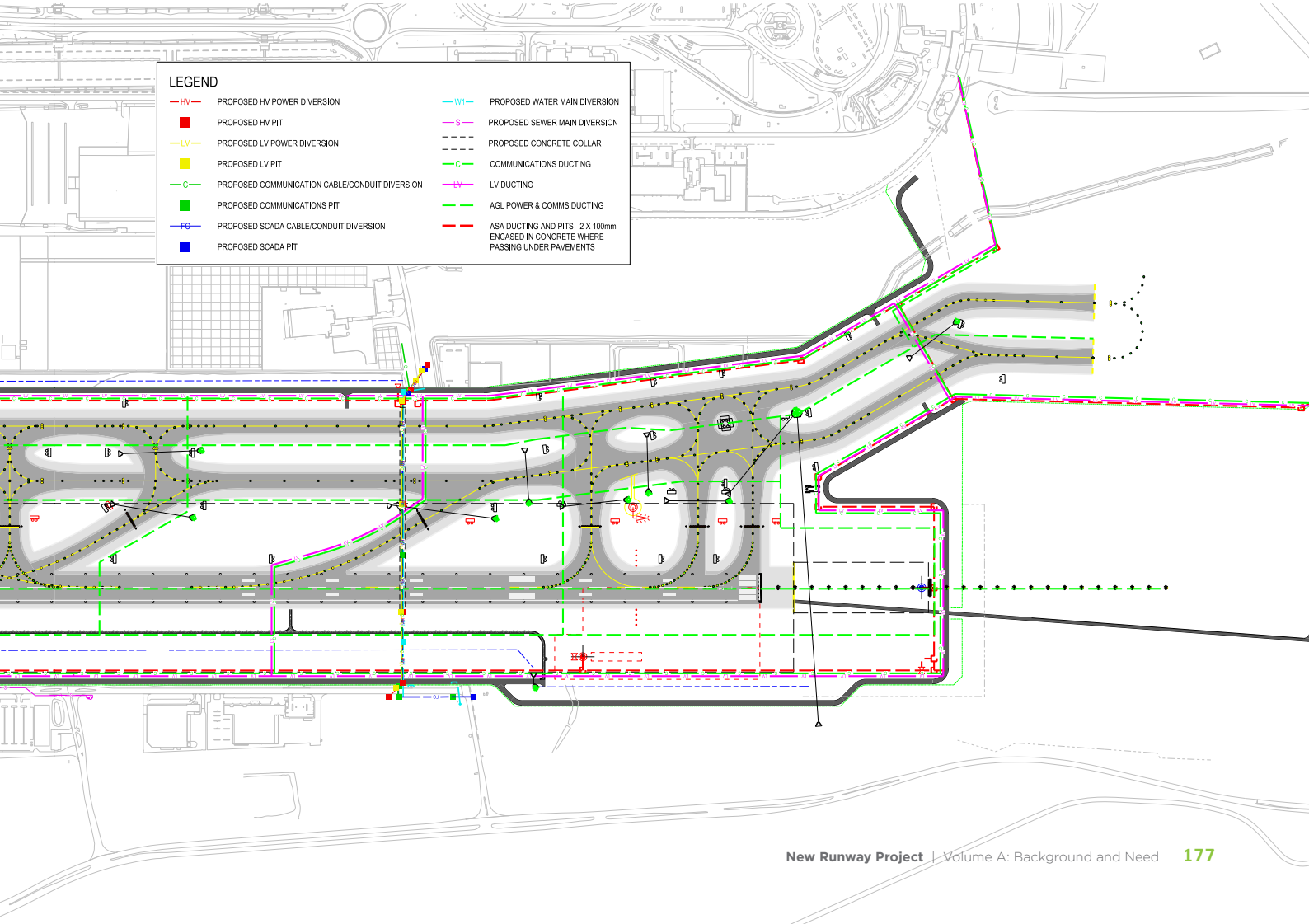
6.14.3 Power Supply

Perth Airport manages the electrical power infrastructure on the estate. The airport network is fed via two 132 kilovolt connections from the Western Power South West Interconnected System (SWIS). The supply is augmented on the estate by Perth Airport's co-generation power plant that feeds T2 and part of T1. One of the SWIS connections is to Munday Substation at Dubs Close on the east side of the estate. The Munday substation is located on the estate and contains assets owned and operated by both Perth Airport and Western Power. A third connection is a line from the Western Power Belmont substation to a switch room on the western side of the estate. The connections are fed from two different Western Power sub-transmission systems, which provide improved redundancy for the airport network.

Underground distribution cables feeding the estate from the Munday substation run across the new runway area in two locations, along Grogan Road and along an alignment further to the south. These cables will be relocated into a new services corridor under the airside area.

A high-voltage overhead power cable which impedes the NRP area will be relocated. These overhead power lines form part of the Western Power SWIS network and is one of two connections to the Munday substation from the SWIS network, the other being another overhead line that connects to the Western Power Forrestfield substation which is located diagonally across the road from the Munday substation but off the estate. It's anticipated that the overhead cable may be relocated. Discussions with Western Power are ongoing but it is expected that a new alignment from Munday substation to the estate boundary will be east along Dubs Close.

The NRP will not affect the Belmont supply connection.



6.14.4 Irrigation

Perth Airport uses groundwater to irrigate landscaped areas. Where irrigation bores are affected by the new runway, new locations will be investigated and new bores drilled. Perth Airport recognises that groundwater supplies in the area are limited and seeks to rationalise their use.

6.14.5 Communications

Reliable communication systems are necessary to ensure safe and efficient aircraft navigation and airport operations. Communications infrastructure within the estate are primarily the responsibility of Perth Airport, although several airside communications cables for control of navigational aids and associated communications are owned by Airservices. Telecommunications throughout the estate are provided by third parties.

There are currently multiple existing communication conduit cabling routes running on both the northern and southern side of Grogan Road that will be considered for relocation. These include the Telstra main fibre route connecting Perth to the eastern states, which crosses the entire airport estate, and runs in a duct beneath the main runway (03R/21L) and taxiways Alpha and Charlie. The remainder of the communications ducts are feeder routes supplying existing services on either side of the new runway. Also requiring relocation is a fibre service identified as part of the Western Power SCADA system. This currently runs north south along Abbott Road and then west along Grogan Road. The functionality of these services will be maintained during construction of the new runway and once it is operational.

All services along Grogan Road will be relocated into a services culvert to be aligned at 90 degrees to the new runway to reduce the length of the runway impacted by the service culverts. They will lie below the runway pavement, covered by a reinforced concrete protection culvert as shown in Figure 16-4. Extensive liaison and advance notice will be required to ensure that the Telstra main fibre cables are relocated and connected with minimal impact to their services.

Relocation of the other services into the new ducts provided across the new runway will be arranged by the owner or carried out by Perth Airport's construction contractor if authorised to do so.

Ducting networks around the new runway site will also be provided for Perth Airport's systems and a dedicated separate duct network for Airservices systems. These networks will connect into existing duct networks to integrate the new facilities (i.e. navigational aid and airfield lighting controls) into the current control systems of Airservices and Perth Airport.

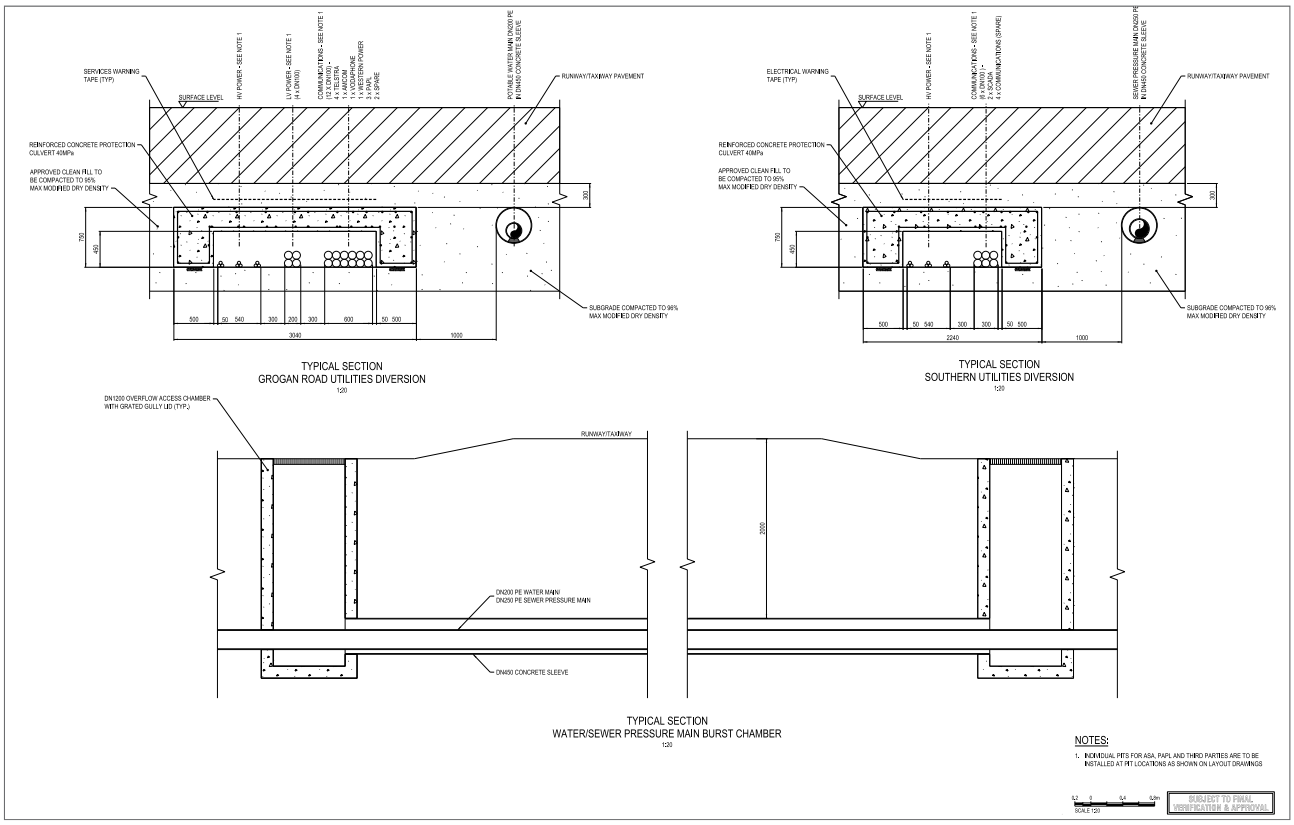


Figure 6-14 Proposed new runway service corridor concept
Source: Perth Airport

6.15 Grogan Road

The new runway will require the reclosure of Grogan Road, which was previously closed to through traffic between 1987 and 2005.

A transport study showed that currently more than 60 per cent of the traffic on Grogan Road during peak periods is non-airport traffic using the road as a shortcut. Initial planning considered Grogan Road being replaced by a tunnel beneath the new runway. During design work the cost for the tunnel was estimated to be in the order of $240 million. This significant cost was driven by the requirements of the tunnel such as life safety elements, monitoring and response capabilities, and the length and distance below the runway that the infrastructure needed to be for safety and aviation security.

Further information is provided in Section 18.

6.16 Landscaping

Construction of the new runway will involve the clearing of existing vegetation within the NRP area. Once the runway, associated taxiways and other infrastructure are constructed, landscaping between taxiways will be low cut grass to decrease bird attraction, soil erosion and dust across the site.

Perth Airport is also trialling a program to reduce the growth of grass in the airfield. It is anticipated that the reduction in grass growth may lead to a reduction in bird-attracting flora within the airfield which may result in improved safety outcomes.

6.17 Public Viewing Area

As part of the project, the feasibility of a public viewing area overlooking the new runway will be considered. A viewing area would be contingent on the availability of land including adequate car parking, and safe access from the road system.

6.18 Noise Bund

Perth Airport will assess the feasibility of a potential noise bund for the new runway 21L threshold once the final technical design of the runway and associated infrastructure is completed.

6.19 Airservices Interfaces and Infrastructure

The new runway system will require several existing and new infrastructure elements, owned and operated by Airservices, that will interface with the NRP.

While the installation of new Airservices hardware will be completed by Airservices, some of the services and the access will be provided as part of the NRP. Siting and performance criteria for some of the existing and new Airservices installations may also influence the design of surrounding NRP infrastructure to avoid interference of signals.

Airservices interfaces and infrastructure associated with the NRP are discussed further in the following sections.

6.19.1 Aviation Rescue Fire Fighting Station

There is a potential requirement for additional ARFF (Aviation Rescue Fire Fighting) facilities to achieve a compliant ARFF service at Perth Airport. Perth Airport and Airservices are working together to determine suitable location(s) for additional facilities that satisfy response requirements, if required.

The CASR 139H regulation stipulates an operational directive of response times not exceeding three minutes to the end of each runway in optimum visibility and surface conditions.

A single ARFF station that services response to all runways would be ideal, however given the layout of the airfield infrastructure, it is unlikely a single location would be available for all runways. Airservices is presently evaluating siting options, and analysing all available sites and information to determine the optimal locations for ARFF facilities. This also includes analysis of the capital and operational costs associated with each option. At present the options analysis has not been finalised and is subject to final airfield designs and layouts.

Figure 6-15 Current Aviation Rescue Fire Fighting station at Perth Airport
Source: Perth Airport

Airservices will ensure that ARFF facilities will achieve a compliant ARFF service at Perth Airport. If a secondary ARFF facility is required, the building is expected to be of a sufficient height to support runway viewing from a fire control centre (if required) supplement the existing fire control centre at the current fire station.

The ARFF station will include covered tender parking bays, wash-down and maintenance facilities and sleeping accommodation, recreation facilities and administration offices for staff. The ARFF station will also require access to and from the airside perimeter road system, taxiways and runway depending on its final location.

The ARFF station will also require a power and potable water supply as well as a sewer connection and communications services. The installed water supply must be capable of providing water at the minimum required ARFF replenishment rate of 30 litres per second.

It is anticipated the new station will be of similar construction to the current ARFF Station at Perth Airport as shown in Figure 6-15.

Currently, two potential locations for a second ARFF station have been identified:

- located to the east of the new runway and adjacent to the Perth Airport boundary north of Grogan Road. The fire station would be accessed from Grogan Road, and
- located to the west of the new runway, south and adjacent to the existing Coles Distribution Centre. The fire station would be accessed from Horrie Miller Drive.

Depending on the security requirements that are in place, it is intended that the fire station will provide landside car-parking facilities and associated airside access for staff.

Civil infrastructure associated with the new station will be provided as part of the NRP. This includes communications and power ducting, power supply, potable water supply, sewer connection, a graded area for the station, perimeter security fencing, and access roads onto the airfield.

During the next phase of the new runway design, Airservices will determine the final location of the station and its physical characteristics in consultation with the airlines and Perth Airport.

Airservices is responsible for funding, delivering and managing any additional ARFF facilities. A Development Application will be provided to Perth Airport to ensure that an adequate assessment of impacts is undertaken. Airservices will also provide a Construction Environmental Management Plan and an Operational Environmental Management Plan, if required. Other approvals, including an Airport Building Control works permit will also be required.

6.19.2 Communication, Navigation, and Surveillance Systems

The NRP will include the installation of new communication, navigation and surveillance (CNS) infrastructure:

- ILS for each runway end,
- additional infrastructure associated with Advanced Surface Movement Guidance and Control System (A-SMGCS),
- anemometers (measure wind speed), and
- Runway Visual Range (RVR) sensors.

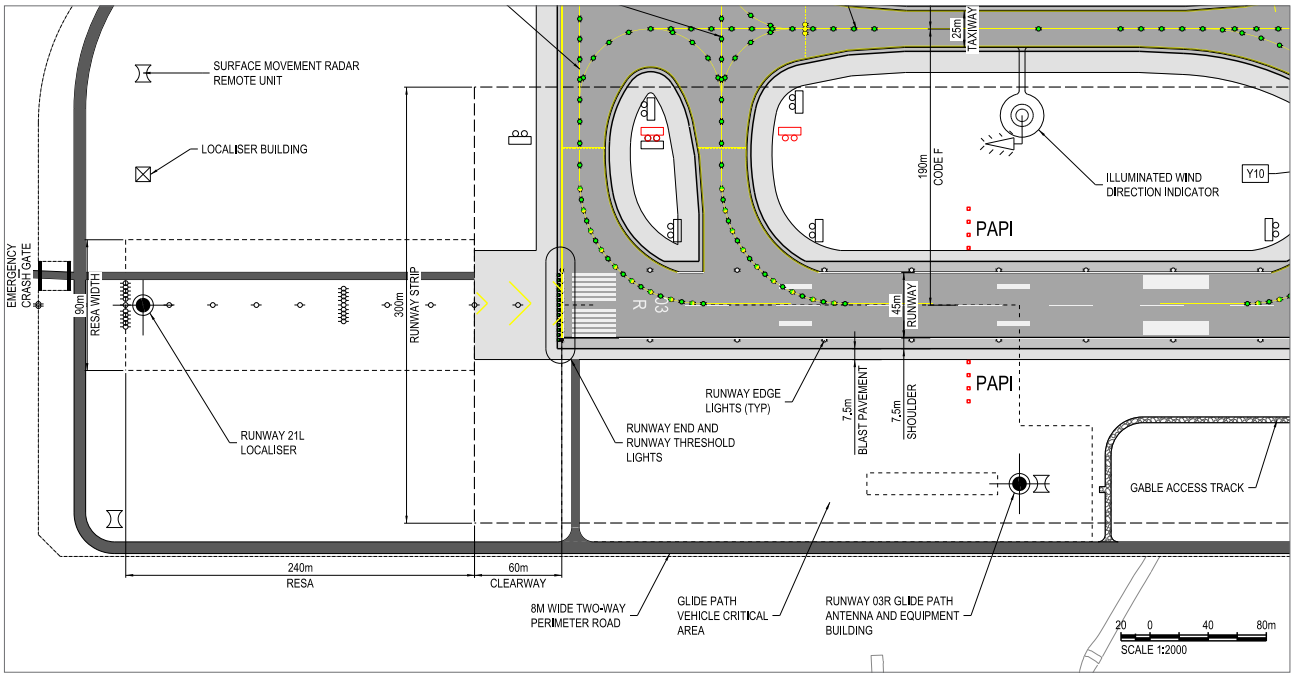


Figure 6-16 Proposed new runway instrument landing system location runway 03R
Source: Perth Airport

As part of the NRP civil infrastructure for Airservices, CNS facilities will be provided. This includes communications and power ducting, power cabling, access roads with appropriate parking and turning areas for maintenance access, and graded areas appropriate to the facilities.

6.19.2.1 Instrument Landing System (ILS)

Each ILS consists of a localiser and a glide path installation. Each installation includes specific antenna arrays as well as a control room. Each installation will require power, communications ducts and cabling as well as road access for maintenance personnel.

The two new glide path installations and two new localisers installations will be positioned approximately as shown in Figure 6-16 and Figure 6-17.

The exact location of the glide path and localiser facilities requires further discussion and agreement with Airservices as the design progresses. Additionally, any grading and drainage in this area will be located to allow for potential future upgrade. The location of the glide path and localisers may influence the final location of the fence line and access roads.

Alternative systems that provide guidance to the runway for landing may replace the need for an ILS on the new runway. Technologies such as Ground Based Augmentation Systems (GBAS) is one such system and depending upon the timing of the runway construction may replace the need for the traditional ILS. Any decisions on the technology to be used will be finalised during the detailed design phase and will be done through consultation with Airservices and the airlines.

6.19.2.2 Advanced Surface Movement Guidance and Control System

The Advanced-Surface Movement Guidance and Control System (A-SMGCS) consists of at least one Surface Movement Radar (SMR) and various Remote Units, the amount of which varies depending on airfield coverage. The system provides air traffic control with real time surveillance information on the position, identification and tracking of aircraft and vehicles on the runways and taxiways at Perth Airport. The system also enhances situational awareness by providing runway monitoring and conflict alerts to controllers.

The construction of the new runway will require one new SMR and various new Remote Units.

Initial locations for a new SMR and additional Remote Units associated with the A-SMGCS have been identified as part of the design and are shown in Figure 6-18.

The final location of the SMR and Remote Unit facilities requires further discussion and agreement with Airservices as the design progresses.

6.19.2.3 Anemometers

The location of anemometers, which measure wind speed, will be agreed with Airservices and Bureau of Meteorology as the design progresses.

6.19.2.4 Runway Visual Range Sensors (Transmissometers)

Runway Visual Range (RVR) Sensors, which provide accurate visibility readings to air traffic control in periods of fog or low visibility, will be installed as part of the new runway construction. RVR sensors will be located at each touchdown zone, the mid-point and ends of the runway.

Display panels detailing the real-time visibility will be installed in the Air Traffic Control tower.

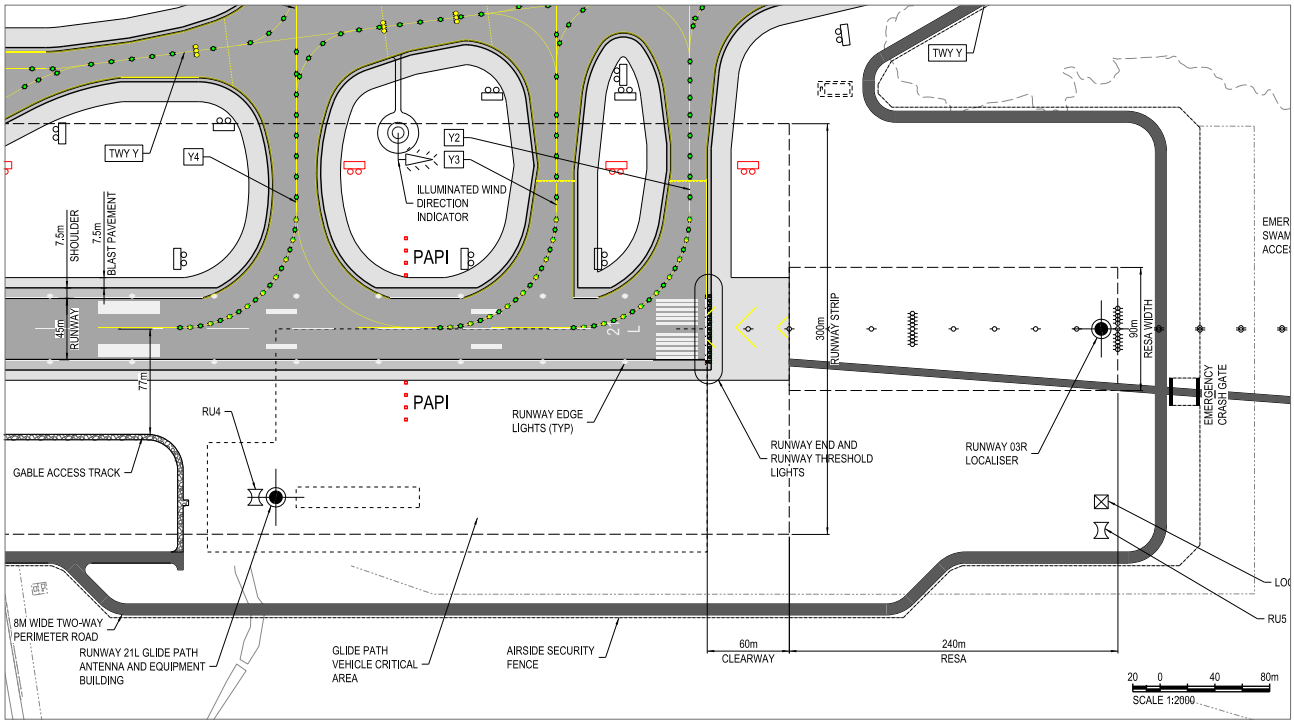


Figure 6-17 Proposed new runway instrument landing system location runway 21L
Source: Perth Airport

6.19.2.5 Future Technologies

Ground Based Augmentation System (GBAS), also known as Honeywell SmartPath, is a satellite-based precision landing system and is recognised as the future technology replacement for current ILS infrastructure. GBAS is currently operational at both Sydney and Melbourne Airport, Perth Airport and Airservices are currently investigating the potential to install GBAS for Perth Airport operations.

6.20 Climate Change

A review was undertaken of the potential impacts on the NRP from climatic conditions if current trends in climate change continue and predictions are realised. The assessment included determining the baseline conditions to establish current trends in climatic conditions and the components of the NRP vulnerable to these trends. An impact assessment, involving the development of a risk register, was then conducted to identify the specific potential risks.

The assessment was based on Australian Standards AS5334-2013 Climate change adaptation for settlements and infrastructure – a risk-based approach and AS/NZS ISO31000-2009 Risk Management – principles and guidelines. Climate projections were developed using the Commonwealth Scientific and Industrial Research Organisation's Climate Futures Tool and based on the global climate models for the local region compiled using data from the local meteorological stations and the Intergovernmental Panel on Climate Change Representative Concentrated Pathway models.

The assessment highlighted that the NRP's most significant risks relate to:

- accelerated degradation of materials and reduction in runway pavement resilience as a result of more extreme temperatures, rainfall and storm conditions resulting in service disruption and reactive maintenance,
- storm impacts resulting in potential for high winds and extreme storm events (e.g. lightning) causing a disruption in airside services, and
- change in vegetation growth patterns as a result of more extreme high temperatures resulting indirectly to higher bird population and an increased chance of bird strike.

Based on the outcomes of the assessment, the NRP has enough adaptive capacity to respond to climate change, to moderate potential damages, to take advantage of opportunities or to cope with the identified consequences. However, climate change science and projections are progressing at a rapid rate. Therefore, in some cases, adaptation applied during the early design stage should consider further, progressive adaptation at a later stage. This is particularly important given the context of significant uncertainties that will remain regarding climate change projections, climate change impacts and their consequences. Adaptation can also introduce secondary risks that have not been currently assessed in detail. Prior to construction, a review of the climate change trends will be undertaken to ensure adaptation options are captured.

6.21 Sustainability

Perth Airport is committed to improving the sustainability performance of the airport estate and to supporting improvement within the broader airport community and aviation industry. Perth Airport has developed an Environment and Sustainability Policy, an Environment Strategy (as provided in the Perth Airport Master Plan) and a Sustainability Strategy. The project will be developed in accordance with the principles in these documents and will apply a focus on sustainable use of energy and water resources, minimisation of waste, careful consideration of sustainable building materials and ongoing reduction of greenhouse gas emission intensity will be adopted for the NRP.

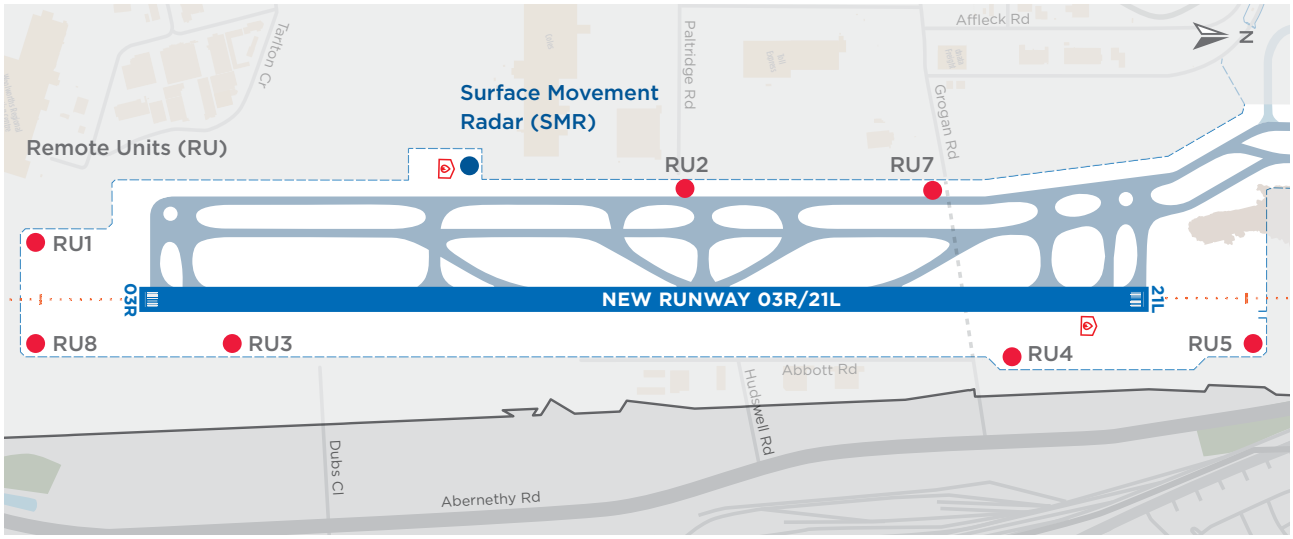


Figure 6-18 Proposed surface movement radar and remote unit locations
Source: Perth Airport

6.22 Project Construction

The NRP is a large scale civil engineering project, with specific technical elements related to aircraft landing and navigation systems. Although a contractor has not been appointed, it is envisaged that a single main contractor will be responsible for the project delivery, with specialist sub-contractors being used where required.

Where Airservices is responsible for its own facilities, such as air navigation infrastructure and any ARFF facilities, a separate process will be required and contracts will include provision for close liaison between Perth Airport's contractor and the Airservices contractor.

These contractors will be required to determine detailed construction methodologies and programs to meet the overall project schedule. Contractors will also be responsible for development and the implementation of construction environmental management plans (CEMPs) for their works.

6.22.1 Construction Timeframe

Based on preliminary design work, an outline construction program has been developed. The program, shown in Table 6-2, includes the key durations, noting that timeframes are dependent on the required operational program and the order of these works may alter depending on Perth Airport requirements. Additionally, some tasks, such as clearing, preliminary earthworks or drainage diversions are likely to be carried out as part of an early works package completed before award of the main construction contract.

Due to the scale of the site, it is likely that the construction works will overlap so that as earthworks are completed in one area, the plant and machinery for this process will move to a new work front, allowing pavement works to progress. The number of work fronts can also be adjusted to balance program against costs. If required, multiple work fronts can be opened to accelerate the construction.

If construction works are delayed for more than a month following completion of clearing activities, dust control, in accordance with Airports (Environmental Protection) Regulations 1997, will be undertaken to keep the surface stable and prevent impacts to air quality and visibility from wind lift.

There are a range of triggers for when additional runway capacity is required at Perth Airport. Considering the annual, daily and hourly requirements and a low, central and high forecast aircraft movement growth scenarios the new runway is expected to be required between by 2023 and 2032 as outlined in Section 2.

Although site preparation is likely to commence following approval, construction of pavements and infrastructure is dependent on actual aircraft movement demand and a commercial agreement with airlines being reached. Pursuant to Part 5, Section 94 (7A) of the Airports Act, this approval permits the project to be substantially complete out to 2032. If construction does not commence prior to 2028, Perth Airport will liaise with and provide advice to the Commonwealth Minister.

Construction activity	Description	Approximate indicated timeframe
Contractor mobilisation	Site office establishment, site security, site access, plant set-up etc.	Month 0 to 2
Site strip and demolition works	Clearance, grubbing, topsoil strip / stockpile, temporary drainage etc.	Month 0 to 10
Drainage diversions	Southern and Northern Main Drain realignments	Month 10 to 17
Earthworks	Cut and reuse material, import sand, spread, compact,	Month 17 to 32
Pavements	Import pavement materials, lay and compact aggregates, surface asphalt	Month 20 to 44
Airfield ground lighting	Install lighting cans, MAGs, cables, transformers, light fittings	Month 28 to 47
Airservices ARFF Facilities and Instrument Landing System installations	Airservices to construct ARFF facility, install glide paths, localisers, buildings, fibre links, Surface Movement Radar, Remote Unit's etc.	Month 28 to 47
Grooving	Runway grooving	Month 48 to 49
Commissioning and Flight Tests	Commission all systems, conduct flight tests	Month 48 to 54

Table 6-2 New Runway Project estimated construction timeframe
Source Perth Airport and Airservices

6.22.2 Hours of Work

With a four to five-year build, the construction activities during the NRP construction phase are expected to generally be from 7.00 am to 7.00 pm Monday to Saturday. To minimise interruption to airfield and aircraft operations, there may be a requirement for 24-hour construction activities at different stages, especially where the new works are required to interface with the existing operational airside areas.

Where possible, Perth Airport will seek to work within local government guidelines to minimise the impact of construction works on the surrounding communities. These guidelines are generally based on the requirements of the Environmental Protection (Noise) Regulations 1997 which nominate construction hours as 7.00 am to 7.00 pm Monday to Saturday.

After-hours noise and vibration issues will be addressed in the preparation and implementation of a CEMP by the NRP construction contractor, as detailed in Section 17.

6.22.3 Contractor Mobilisation and Site Establishment

Contractor compounds will be established in suitable locations to provide secure offices and facilities. It is expected that the main site compound will house temporary site offices, amenity facilities, maintenance and storage buildings as well as parking areas for the contractor's staff. Temporary storage facilities will also be required, as well as facilities to accommodate approximately 100 staff vehicles and 100 general deliveries a day at peak construction. The contractor may choose to use the hardstands at the sites of existing tenancies which will be vacated prior to work starting.

A temporary on-site batching facility for concrete or asphalt production may be considered by the contractor, subject to all appropriate approvals, although local facilities exist that can supply these materials. This is dependent on the successful contractor and their requirement to complete the project.

It is anticipated that services (power, communication, water and sewer) will be available from the existing services within the estate and will be extended to the construction compound, however further investigations will be required to determine the capacity available for each service type. Power for the construction relates primarily to site offices, compounds and batching plants. Where connections to the airport's existing power supply are feasible, this would be preferable. For high power requirements, such as batching plants, that may exceed the available power supply, a local generator may be more suitable subject to appropriate noise and pollution control and safe fuel storage.

Debris removal facilities (i.e. wash-down facility or rumble strips) for vehicles leaving the site will be considered to ensure the public road network is kept free from construction materials. All trucks carrying loose material will have their loads covered to ensure dust and debris is contained within the truck.

6.22.4 Construction Equipment

Construction equipment required for the NRP will consist of standard large civil-engineering plant and machinery including items such as:

- excavators,
- backhoes,
- bulldozers,
- dump trucks,
- graders and scrapers,
- aggregate pavers,
- asphalt pavers,
- rollers,
- water bowsers,
- concrete trucks, and
- cranes.

The management of the equipment within the site will be a key safety and productivity issue. A suitable supply of equipment will be required to progress the works to meet the required program, with maintenance and breakdowns factored in.

6.22.5 Construction Management Plan

A detailed construction management plan will be prepared by the contractor prior to works starting. The plan will cover items such as:

- site management team, roles, responsibilities,
- emergency plans for accidents, spills and airport operational incidents etc.,
- site safety, materials handling etc.,
- noise and vibration management,
- sustainable construction plan,
- dust control,
- site security,
- approvals and permit system,
- airspace penetration assessments,
- interfaces with public areas, roads and traffic plans,
- how the works will be managed in accordance with the contract,
- define the program and construction targets,
- define the site constraints such as stormwater management, contaminated materials management and wastewater management,
- detailed risk assessment,
- materials sources, testing and quality assurance procedures,
- detailed demolition plans,
- excavation plans, and
- Method of Works Plans, in accordance with the CASR 1998 MOS Part 139. These plans detail the works that will interface with the operational airfield. Such works will take place generally towards the end of the project when the new security fence has been joined to the existing fence and the site is designated an airside security zone.

As outlined in Section 17 a Construction Environmental Management Plan (CEMP) will also be required, which also covers some of these items, such as noise and vibration management and dust control.

6.22.6 Construction Waste Management

The contractor will be required to control all construction waste and reuse materials where possible. This may include crushing of existing concrete hardstand areas and using the resultant aggregates in an appropriate manner as either general fill, road base or to make new concrete.

Key considerations include:

- existing asphalt pavement may be suitable for processing and used in blast pavement areas,
- where construction waste is to be taken off site, it will be disposed of at appropriately licenced landfill sites, and
- organic material, such as trees, shrubs etc. will be used as mulch wherever possible.

6.22.7 Site Access

Construction site traffic will access the site from multiple points off Abernethy Road and Horrie Miller Drive, subject to endorsement by Main Roads Western Australia and the appropriate local governments. Further information is provided in Section 18.

6.22.8 Clearing and Site Preparation

Site clearance consists of the demolition and removal of buildings and hardstands from existing tenancies, and general clearance of trees, shrubs, other vegetation, top soil and any existing stockpiles not suitable as fill material.

The construction of the NRP will involve the clearing and site development of approximately 293 hectares of land, including vegetated, open and already developed areas as outlined in Table 6-3.

Prior to commencing the clearing, under Part 13 of the *Environment Protection and Biodiversity Conservation Act 1999*, a permit to clear threatened species and ecological communities must be obtained from the Commonwealth Department of Agriculture, Water and Environment (refer to Section 17 for further detail on this process). A CEMP will also be required prior to the contractor undertaking the site clearing works.

Refer to Section 11 for details of the impacts to flora and vegetation and Section 12 for details of the impacts to fauna.

6.22.9 Filling and Ground Improvement

The site requires a large amount of fill to ensure that finished pavement levels are at a level to protect the pavement from flood events. It is anticipated that material from cut and excavations will be used as fill, following suitable treatment where required. Export of cut material offsite will be discouraged unless material is unsuitable and requires controlled disposal.

The amount of fill material has been initially calculated at approximately 1.2 million cubic metres of imported fill material being required. Where this is to be placed under pavements, it will need to be a clean sand material that can provide an in-situ California Bearing Ratio of at least 12 per cent to act as a foundation. In pavement flanks, where aircraft loadings will not normally occur, a lower grade material may be acceptable.

The major source of the fill will likely be one or more of the established sand quarries in Western Australia, and there are several within reasonable distance of the airport. Depending on the quality available, some fill may be acquired from stockpiles created by other Perth Airport projects within the estate. This will also depend on availability of existing stockpiles and will be determined during construction planning.

Allowing for a bulking factor of 25 per cent, the approximate amount of sand required to be imported is 1.5 million cubic metres, and this will require 71,600 truckloads to transport to site.

Description	Area (hectares)
Infrastructure	36.43
Completely Degraded (included in cleared areas)	111.6
Open Water	0
Vegetation in Good or Better Condition	116.63
Degraded	21.47
Revegetation	6.64
Total	**293**

Table 6-3 Areas to be cleared or prepared as part of New Runway Project
Source: Perth Airport

The program for earthworks is approximately 16 months, or 70 weeks, which equates to approximately 1,000 truck trips per week. To reduce the impact on specific roads, fill may be sourced from multiple locations. The ground transport assessment for the importation of the fill and other construction materials is detailed in Section 18.

6.22.10 Drainage

A stormwater management plan will be developed by Perth Airport as part of the project to match the construction phasing to enable surface flows to be correctly directed to the main drains. Protection of adjacent tenancies and stormwater quality are the driving factors. A series of temporary detention basins may be required to control runoff during interim construction phases until the main southern and northern drains are fully established. Where sediments are disturbed that may impact water quality, a suitable treatment method will be implemented to avoid water quality degradation and will form part of the CEMP.

6.22.11 Excavation

Runways require a generally flat and level surface. The level is set based on the level of the existing airport infrastructure. The site is generally to be filled to raise the levels, although there are some areas requiring excavation works. There will also be excavation required for drainage installations. Excavation in newly filled areas will only be undertaken after suitable compaction so that the areas adjacent to the excavation remain adequately compacted. This is important under paved areas to avoid any future settlement issues.

6.22.12 Quantity of Materials

The amount of pavement material required for the NRP has been estimated based on an upper bound structural pavement thickness. The exact amount is not yet known as the design is still to be finalised. Based on assumed layer depths of the concept design for pavement and asphalt, current estimates are that 185,000 tonnes of asphalt and 845,000 tonnes of crushed rock gravel are required. These are significant quantities and further work will be carried out during the detailed design phase to reduce these quantities if possible.

6.22.13 Pavement and Civil Works

A large part of the NRP is general civil and pavement works. These activities are standard construction activities, similar to processes required on large scale highways projects. The nature of these works will be familiar to large-scale contractors.

6.22.14 Tie-ins to Existing Airfield

It is anticipated that the majority of NRP construction will be undertaken outside of the existing airside security fence. The contractor will be responsible for the security of the construction site during this time. Once the works are substantially complete, a new airport security fence will contain the site and will be joined to the existing fence to encircle the entire extended airfield. At this time the new pavements, ducts, cables etc. will be tied into the existing airfield. The intention is that this should be as late as possible in the program so that most of the construction works are conducted outside of the airside security area. This also minimises interaction between construction works and the operating airfield.

The main civil tie-ins are the taxiway pavements, drainage, ducting, perimeter road and security fence. The detailed staging of this process will be investigated during the detailed design, and finalised in conjunction with the contractor. A Method of Works Plan will be produced, in accordance with the MOS 139 requirements, to ensure there is minimal impact to current operations.

6.22.15 Airport Building Controller Approval

In accordance with Division 5 of the Airports Act, prior to construction commencing, Perth Airport will seek approval from the Commonwealth Airport Building Controller (ABC) for the construction activities via a permit application. The construction activity is to be consistent with the approved MDP.

The construction contractor(s) engaged by Perth Airport must lodge design documentation for construction activity to Perth Airport and the ABC for assessment and approval.

6.23 Airspace Management Plan

In addition to the physical infrastructure as outlined above, the NRP also includes the development of the Airspace to support parallel runway operations.

The draft Airspace Management Plan for the NRP is provided in Section 21.

6.23.1 Airspace Final Design

Airservices is responsible for the final design and implementation of the airspace.

Following MDP approval, and when the final design of infrastructure is complete, the formal airspace detailed design will be completed by Airservices and submitted to the CASA Office of Airspace Regulation for approval.

The Office of Airspace Regulation will consider safety implications, environmental considerations, consultation, government policy, and the promotion and fostering of civil aviation. The assessment will be based on the advice of the Minister for the Environment provided under Section 160 of the EPBC Act, the environmental impacts detailed in this MDP, as well as a safety case undertaken closer to the completion of the construction of the runway.

6.23.2 Commissioning and Flight Tests

Following completion of all construction works, the systems and new airfield will be commissioned. The airfield lights and ILS will be checked on the ground and then during a series of flight checks which will be carried out by CASA approved specialists. Light aircraft and/or helicopters will fly the designed approach paths and engineers will assess and adjust the lights and systems as necessary.

The following elements need to be completed:

- check lights and instrument landing systems (ground and flight checks),
- check pavement surface quality (skid resistance and water runoff),
- check control systems,
- install airfield signage, and
- paint runway and taxiway markings.

There will also be significant procedural and administration changes required as part of commissioning the new runway, including changes to the following regulatory documents:

- Perth Airport Aerodrome Manual,
- Perth Airport Aerodrome Emergency Plan,
- Perth Airport Transport Security Plan, and
- Airservices Aeronautical Information Publications such as the Enroute Supplement Australia (ERSA) and Departure and Approach Procedures (DAPs).

Training relating to new procedures to be required for Air Traffic Control, ARFF, Perth Airport staff and airlines.

Following successful commissioning, which may take 6 to 12 months, the new runway will be deemed operational and ready to take regular aircraft operations.

07
Consultation

This section provides an overview of the consultation activities for the New Runway Project (NRP) prior to approvals and during the public comment period and conveys Perth Airport's commitment to further engagement.

Further detail is provided on the following areas:

- What engagement was undertaken?
- What engagement was undertaken during the public comment period?
- Where people could find further information on the project?
- How people could make a submission?
- What engagement will be undertaken following approval?

7.1 Commitment to Engage

Perth Airport is committed to effective and transparent engagement and employs a range of ongoing consultation and education mechanisms to:

- inform stakeholders and the community about on-airport land-use planning,and developments and potential impacts,
- seek input on alternative approaches and options,
- maintain transparency and stakeholder-focused relationships,
- meet legal and regulatory responsibilities, and
- provide stakeholders with the opportunity to influence the future of Perth Airport.

The ongoing consultation with stakeholders includes Perth Airport's facilitation of and involvement in various forums. These forums enable Perth Airport to engage with Commonwealth, State and Local government authorities, airlines and the community.

Perth Airport currently engages regularly through the following forums.

Perth Airports Municipalities Group

Perth Airport actively participates in the Perth Airport's Municipalities Group (PAMG) which includes the 12 local government authorities whose communities have an interest in Perth Airport and Jandakot Airport. The Group meets regularly to discuss matters which are of interest to the community, such as aircraft noise, flight paths, and off-airport and on-airport development. The PAMG has proven to be an important means of engagement with local communities for more than 30 years. Further information on the PAMG can be found at pamg.com.au.

Planning Coordination Forum

The Planning Coordination Forum (PCF) aims to foster high level strategic discussions between Perth Airport and Commonwealth, State and Local government representatives to promote better planning outcomes in relation to airports developments in the context of the broader urban setting. Currently the PCF is held quarterly.

Perth Airport Community Forum

The Perth Airport Community Forum (PACF), previously referred to as the Perth Airport Community Aviation Consultation Group, is an event held quarterly at various PAMG local government venues. The PACF provides the opportunity for members of the public to meet with representatives from Perth Airport and invited guests such as Airservices and the Aircraft Noise Ombudsman. The purpose of the PACF is to recognise and enhance:

- the long-term sustainability and growth of Perth Airport,
- Perth Airport's reputation as a responsible corporate citizen within the local and broader community,
- Perth Airport's role as a major economic contributor for Western Australia, and
- providing members of the public the opportunity to raise and discuss issues relating to the operation and development of the airport.

Notification of the PACF events, including date, time and location, is generally advertised in the West Australian or community newspapers, on Perth Airport's facebook page and the PAMG website, pamg.com.au.

Perth Airport Aircraft Noise Technical Working Group

The Perth Airport Aircraft Noise Technical Working Group contributes to the successful management of aircraft noise impact at Perth Airport. The Group, chaired by Airservices, meets regularly and comprises representatives from Perth Airport, Airservices, and airlines.

Perth Airport Consultative Environmental and Sustainability Group

The Airport Consultative Environmental and Sustainability Group currently meets quarterly and is comprised of representatives from Commonwealth, State and Local governments as well as airport tenants, conservation groups, catchment groups and community members. The Group discusses topics related to the environmental management of the estate. It is also an opportunity for tenants to learn and work together to minimise the environmental impacts of their operations and to facilitate improved environmental outcomes.

Aboriginal Partnership Agreement Group

The Aboriginal Partnership Agreement Group (PAG) was established in 2009 to facilitate active engagement between Perth Airport, the traditional custodians and other Aboriginal elders. The PAG is a high-level steering group focussed on the cultural heritage management and ongoing development of the airport.

Perth Airport undertakes ongoing review and assessment of each of the groups to ensure their effectiveness and suitability to meet the engagement needs and requirements as defined by the Commonwealth Airport Development Consultation Guidelines. As such the structure composition and terms of reference of the groups may be varied from time to time to ensure the best suitable model to achieve the required outcomes.

7.2 New Runway Project Consultation

One of the objectives of the Airports Act is to ensure there is an appropriate level of vigilance, transparency and scrutiny of airport planning so that the public-interest requirements are met as the airport's development progresses.

Successful development of Perth Airport therefore depends on productive interactions with a wide range of stakeholders who are impacted by, and who may impact, the development of the airport.

In 2012, the (then) Commonwealth Department of Infrastructure and Transport released the Airport Development Consultation Guidelines which provides advice for consultation to be undertaken as part of an airport's Major Development Plan (MDP). These guidelines outline that an effective consultation program ensures that a "proposal has been fully explored, concerns identified and alternatives considered". However, it "does not necessarily mean that all interested parties will be satisfied with the outcome".

The consultation process for the NRP is undertaken in four key stages:

- **Planning for the new runway:** general airport planning consultation activities undertaken as part of the Government enquiry into the future of Perth Airport in the 1970's, which determined the need for a future parallel runway, and all Perth Airport master plans since 1985, including Master Plan 2014 which identified the need to bring forward the approval and construction of the new runway,
- **Preliminary new runway design:** Perth Airport's ongoing consultation since the approval of the Master Plan 2014 and subsequent preliminary runway infrastructure design and technical and environmental studies,
- **Approvals:** detailed engagement supporting the development and release of a MDP for public comment and subsequent development of the final proposal for consideration by the Commonwealth Minster for Infrastructure and Transport, and
- **Final design and construction:** following approval and prior to construction, the on-ground and airspace management plan will be finalised including further consultation.

7.3 Planning for the New Runway

Engagement on the new runway commenced in the 1970's. As outlined in Section 3, in 1973, the Joint State and Commonwealth Committee commenced a formal study on the aviation requirements for the Perth Region. Membership of the Committee included State and Commonwealth Government departments, Local Governments, with input from a range of observers including industry associations and airlines.

The final report was publicly released by the Commonwealth-State Advisory Committee in December 1979, and confirmed that Perth Airport would be developed as the primary airport for the Perth metropolitan region and that it would be based on a future parallel runway system.

The location of the parallel runway system was first released for community comment as part of the Master Plan 1985 planning process, undertaken by the Department of Aviation.

Following privatisation of Perth Airport in 1997, the planning for the parallel runway system was revisited in the Master Plan 1999, and subsequently for Master Plan 2004, Master Plan 2009, and Master Plan 2014. The development of each Master Plan required extensive consultation with Commonwealth, State and Local governments as part of its preparation, as well as a formal public comment period of 60 business days. The future requirement for the new runway was confirmed in each Master Plan.

7.4 Preliminary New Runway Design

The Master Plan 2014 identified that the runway was required in the short term to increase the capacity of Perth Airport. Consultation commenced in 2012 as part of feasibility studies, and the Concept of Operations (CONOPS) was developed in consultation with Airservices and airlines.

The State Government published its first State Aviation Strategy in February 2015 following extensive stakeholder and community consultation. This Strategy was prepared by the State Department of Transport in conjunction with key State government agencies covering economic development, planning, tourism, local government and regional development. The State Government determined that Perth Airport's new runway was required to provide the capacity for current peak-hour demand as well as future growth.

In 2015, the Perth Airport Board of Directors approved a $45 million investment in pre-construction activities for the new runway that included environmental and heritage approvals, preliminary airspace design and public consultation. A joint venture between Aurecon and AECOM was appointed to undertake a preliminary design of the new runway and taxiways. This process included consultation with various Government agencies and local authorities, aviation regulatory bodies, airlines, airport tenants, and infrastructure service providers.

During the preliminary design process for the new runway ground infrastructure, it was determined that recent changes to runway lighting design standards could allow shorter high-intensity approach lighting to be installed, and therefore a longer runway accommodated within the Airfield Precinct as defined in the Master Plan 2014. A proposal to amend the new runway length from 2,700 metres to 3,000 metres via a Minor Variation to the Master Plan 2014 was released for public comment in January 2017 and approved by the then Commonwealth Minister for Infrastructure, Regional Development and Transport in June 2017.

Perth Airport has also continued to engage with Airservices, airlines, Commonwealth Department of Defence, the Civil Aviation Safety Authority and others on the preliminary airspace design.

Throughout the development of technical studies and design stages, Perth Airport has undertaken extensive engagement with a range of stakeholders. Perth Airport has also continued to engage, update and report key findings to the PCF, PAMG and community members through the PACF, Perth Airport website and NRP newsletters.

Perth Airport has met with traditional custodians of the land, including the Aboriginal Partnership Agreement Group members, Whadjuk Working Group and, South West Aboriginal Land and Sea Council, to discuss the impact of the NRP to the heritage values and the approval process under the *Aboriginal Heritage Act 1972*.

7.5 Approvals

Critical to the sustainable development and approval of the new runway projects is consultation with a wide range of stakeholders.

As outlined in Section 1, the development and operations of any development at Perth Airport must be consistent with a range of legislation and regulations. Section 1 also outlines the various approvals required prior to the construction of the new runway, including:

- Section 18 approval under the Aboriginal Heritage Act,
- MDP approval under the Airports Act and the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act),*
- Part 13 permit under the EPBC Act.

7.5.1 Major Development Plan

As part of each approval process extensive engagement is undertaken.

The New Runway Project (NRP) MDP has been prepared to address the various legislative approvals required for a new runway at Perth Airport and provides a combined approvals document to ensure a whole of project is represented. The MDP is a detailed approvals document that has been structured and prepared to meet regulatory requirements of the Airports Act and the EPBC Act.

A MDP goes through various stages as outlined in Figure 7-1.

During each stage of the MDP, extensive consultation with Commonwealth, State and Local government departments, stakeholders and community is undertaken.

Engagement activities associated with the NRP are guided by a comprehensive Stakeholder Engagement Plan. The objectives of the Stakeholder Engagement Plan are to:

- develop a common understanding about the purpose and process for MDP approval,
- adopt industry best-practice engagement techniques to provide opportunities for all stakeholders to be sufficiently informed about topics of interest,
- provide a diverse range of opportunities for community members to learn about the NRP's benefits and impacts, and
- provide sufficient and suitable opportunities and information so stakeholders and community members can provide informed feedback on the NRP.

Consistent with the Airport Development Consultation Guidelines, Perth Airport has undertaken an extensive consultation process for the development of the Preliminary Draft MDP.

This includes the release, review and engagement with key agencies and stakeholders on an exposure draft version of the document. Perth Airport consulted and undertook the following activities during the preparation of this MDP:

- briefings throughout the development of the MDP to the following groups:
  - Perth Airport Planning Coordination Forum,
  - Perth Airports Municipalities Group,
  - Commonwealth Members of Parliament, and
  - State Members of Parliament,
- release of the exposure draft MDP and briefings to Commonwealth government agencies, including:
  - Airservices,
  - Civil Aviation Safety Authority,
  - Department of Defence,
  - Department of Agriculture, Water and Environment, and
  - Department of Infrastructure, Transport, Regional Development and Communications, ,
- release of the exposure draft MDP and briefings to State government agencies, including:
  - Department of Biodiversity, Conservation and Attractions,
  - Department of Planning, Lands and Heritage,
  - Department of Transport, and
  - Department of the Premier and Cabinet,
- release of the exposure draft MDP to the City of Belmont, City of Kalamunda, and City of Swan,
- briefings with planning and environment staff at the local governments of Belmont, Swan, Canning, Gosnells, South Perth and Kalamunda, and
- release of the exposure draft MDP to key airlines and their representative bodies.

Throughout this comprehensive consultation process, Perth Airport has given due regard to interim feedback and has, where possible, incorporated comments raised in the preparation of the Preliminary Draft MDP.

Perth Airport has also commenced briefings to local councilors and community associations.

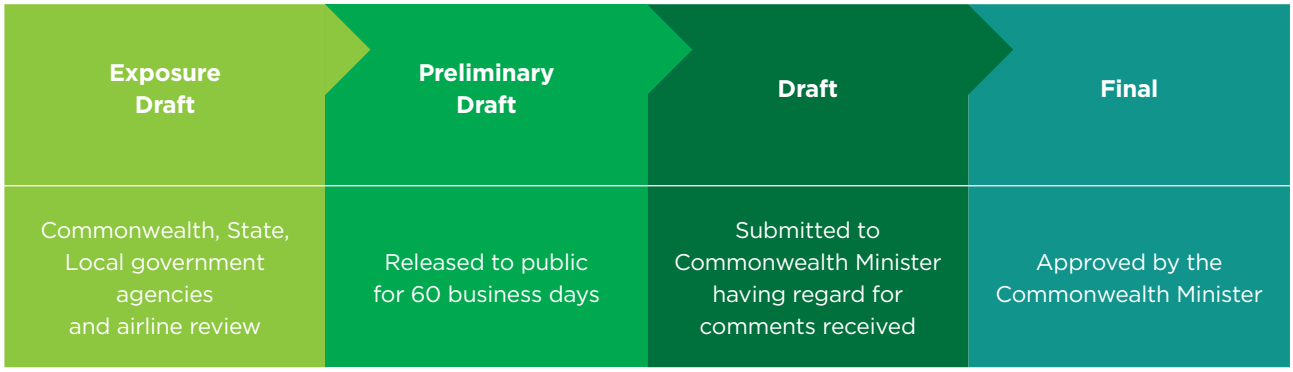


Figure 7-1 Major Development Plan approval process
Source: Perth Airport

7.5.2 Formal Public Comment

In accordance with Section 92 of the Airports Act, the Preliminary Draft MDP was made available for public comment for a period of 60 business days.

An advert was published in The West Australian newspaper, notifying the release of the Preliminary Draft MDP and inviting members of the public to provide written comments on the proposed development.

Section 80 of the Airports Act requires that, prior to the Preliminary Draft MDP being published for public comment, the document must be drawn to the attention of:

- the Minister of the State in which the airport is situated with responsibility for town planning or use of land,
- the authority of that State with responsibility for town planning or use of land, and
- each Local Government body with responsibility for an area surrounding the airport.

On 29 May 2018 a letter advising of the commencement of the formal public comment period with a copy of the Preliminary Draft MDP was sent to the following parties:

- Minister of Transport; Planning; Lands
- Director General – Department of Transport
- Director General – Department of Planning, Lands and Heritage
- Chairman – Western Australian Planning Commission
- Chief Executive Officer – City of Swan
- Chief Executive Officer – City of Kalamunda
- Chief Executive Officer – City of Belmont

7.5.2.1 Obtaining a Copy

A copy of the Preliminary Draft MDP was available for download, free of charge, from newrunway.com.au and perthairport.com.au

Hard copies of the MDP were available for viewing at:

- the Perth Airport Experience Centre, located at Hkew Alpha Building, Ground Floor, 2 George Wiencke Drive, Perth Airport
- NRP information stands at various shopping centres,
- public information briefings, and
- selected public libraries.

Viewing times and locations were available at newrunway.com.au.

Hard copies were also available for purchase at the Perth Airport Experience Centre.

7.5.2.2 Engagement Materials and Activities

To ensure that the community had an opportunity to comment on the proposed NRP development, public engagement included a range of activities and the production of additional material including:

West Australian Advert

Announcements about the commencement of the public comment period were made in the West Australian newspaper.

Project Introduction Letter

The commencement of the public comment period was announced through a letterbox drop to businesses and residential properties in areas surrounding Perth Airport. The letter provided an overview of the NRP and the various activities and materials available for people to find out more about the project.

Social Media

Announcements about key milestones, such as the commencement of the public comment period, and information about community briefings and public events were regularly made through the Perth Airport Facebook and Twitter accounts.

New Runway Project website

The NRP website, newrunway.com.au, provided detailed information about the project, community events schedule, online copies of documentation including the MDP and supplementary information, and online public comment submission form.

Other Communication

Other communication platforms, such as local government websites, were utilised.

7.5.2.3 Supplementary Information

Perth Airport prepared a range of supplementary information, including:

New Runway Project Summary Booklet

Perth Airport has published a New Runway Project Summary booklet that provided an overview of the project including the major impacts and proposed mitigation measures.

Fact Sheets

The following fact sheets were distributed during the NRP public comment period:

- Frequently Asked Questions
- New Runway Project
- What options were considered
- Have your say
- Why Perth Airport is important
- Aboriginal Heritage
- Changes to the road network
- Airspace Management
- Environment Management
- A significant construction project
- Understanding Aircraft Noise

In recognition of the culturally and linguistically diverse communities surrounding Perth Airport, the New Runway Project fact sheet and Have Your Say fact sheet were also translated into Mandarin and Tagalog (Filipino).

Aircraft Noise Information Portal

Released in 2014, the interactive Aircraft Noise Information Portal enables community to obtain specific information on a property's location around Perth Airport in relation to:

- the Australian Noise Exposure Forecast contours,
- N65 Noise Above contours, and
- anticipated changes associated with the NRP.

The interactive noise portal was updated to include further information about the future noise exposure and can be accessed at perthairport.com.au/aircraftnoise. The 'Reducing Aircraft Noise in Existing Homes' booklet, which provide information on noise impacts relating to Perth Airport operations and associated flight paths, was also available for viewing and download from the noise portal site.

E-Newsletters

Since 2014, the Perth Airport website has allowed interested persons to sign up to receive email notifications on the NRP. The first newsletter was distributed in October 2015 to announce the award of the contract of the new runway design. Newsletters were sent out throughout the life of the project, including public comment period.

7.5.2.4 Get Involved

Airport Experience Centre

The Perth Airport Experience Centre located at Hkew Alpha Building, Ground Floor, 2 George Wiencke Drive, Perth Airport, was open to the public during the public comment period. Visitors had the opportunity to view simulations and speak to Perth Airport staff. Online public comment submissions could also be made at the Perth Airport Experience Centre.

Table 7-1 contains opening times for the Airport Experience Centre during the public comment period:

Following the end of the public consultation period the Airport Experience Centre remained available to the public for one on one briefings. These sessions could be booked by contacting Perth Airport on the project information line.

	Open	Close	Number of Hours Open
Monday	11am	7pm	8 hrs
Tuesday	11am	9pm	10 hrs
Wednesday	Closed	Closed	
Thursday	11am	7pm	8 hrs
Friday	11am	7pm	8 hrs
Saturday	11am	2pm	3 hrs
Sunday	11am	2pm	3 hrs
Total Hours Open Per Week			40 hrs

Source: Perth Airport

Public Information Expos

Public information expos were held in a wide range of local government areas, including

- City of Belmont,
- City of Canning,
- City of Gosnells,
- City of Kalamunda,
- Shire of Mundaring,
- City of South Perth, and
- City of Swan.

Notices regarding the times and locations of the public information expos was published at newrunway.com.au, in The West Australian and/or relevant community newspapers, and through Perth Airport social media.

The first was held at City of South Perth on 31 May 2018.

Public Displays

Information displays were presented in various shopping centres and community facilities throughout the public comment period. The schedule of times and locations of the public displays were published at newrunway.com.au and in relevant community newspapers.

Community Event Pop-Up Stands

An NRP stand was established at key community events throughout the public comment period. NRP staff were be available to answer queries and distribute fact sheets and other relevant information.

7.5.2.5 Contact Details

NRP Email

A project specific email address was created to facilitate community enquiries. The NRP email address, newrunway@perthairport.com.au, was provided on all engagement and printed materials as the key contact point for enquiries.

Project Information Line

A dedicated NRP telephone line was established to enable enquiries and feedback for the community during the public comment period. The information-line phone number, 1800 NEW RWY (1800 639 799), was provided on all engagement and printed materials as the key contact point for enquiries about the project.

The phone line was staffed during business hours.

7.5.2.6 Submissions Received during the Public Comment Period

Under the Act, Perth Airport must have due regard for written comments received during the public comment period. Following closure of the comment period a total of 2030 individual submissions were received.

The key matters raised in these submissions were
- The Draft Airspace Management Plan and where planes will fly
- Aircraft noise from proposed flight corridors and mitigation measures
- Options and alternatives considered for the project
- Social impacts of the project
- Impacts to health
- Environmental impacts of the project
- Closure of the cross runway, and
- The need for 24/7 operations at Perth Airport

7.5.3 Submission of Draft MDP to the Minister

Following the formal public comment period, Perth Airport prepared and submitted a Draft MDP to the Commonwealth Minister for Infrastructure, Transport and Regional Development for consideration.

As required by Section 92(2) of the Airports Act, the submission of the Draft MDP to the Minister was accompanied by the following materials:
- copies of all comments received during the public comment period, and
- a written certificate signed on behalf of Perth Airport, containing:
  - a list of names of the people or organisations that provided written comments to the Preliminary Draft MDP,
  - a summary of the comments received, and
  - evidence that Perth Airport has given due regard to those comments in preparing the Draft MDP.

The Commonwealth Minister for Infrastructure, Transport and Regional Development, the Hon Michael McCormack MP, approved the New Runway Project Major Development Plan on 21 November 2020.

7.5.4 Publication of Final MDP

In accordance with Section 86 of the Airports Act, Perth Airport has undertaken the following notifications upon approval of the Major Development Plan:
- published a newspaper notice advising that the MDP has been approved,
- made copies of the final MDP available for inspection or purchase at Perth Airport, and
- made a copy of the approved MDP available on the Perth Airport website.

A summary of Perth Airport's response to key issues raised during the public comment period has also been prepared and published on Perth Airport's website.

Once the final airspace design is completed, Perth Airport will revise the aircraft noise modelling and flight path communications materials. A Stakeholder Engagement Plan will be developed to ensure that the community is informed of the updated flight path and aircraft noise information.

7.6 Final Design and Construction

Perth Airport recognises that there will be strong interest in the NRP beyond the approval of the MDP. Community members and key stakeholders will be kept informed of the progress of the NRP activities leading up to and during the construction process, with regular communications maintained through the Perth Airport website, e-newsletter distribution, and the ongoing consultation forums.

Appendices

Glossary of Terms

03L/21R

Existing main runway designation

03R/21L

New runway designation

06/24

Existing cross runway designation

Aircraft Movement

Either a take-off or a landing by an aircraft.

Airport Lease

The lease agreement between Perth Airport Pty Ltd (formally Westralia Airports Corporation) and the Commonwealth of Australia.

Airside

The movement area of an aerodrome, adjacent terrain and building or portions thereof, access to which is controlled.

Airspace

The portion of the earth's atmosphere over which a nation exercises jurisdiction over aircraft in flight.

Airspace Management Plan

The Airspace Management Plan is a high level document that provides the parameters for which detailed flight path planning can be undertaken prior to the construction of the New Runway.

Section 160 of the *Environment Protection and Biodiversity Conservation Act 1999* notes that before the New Runway Project Major Development Plan can be approved the Commonwealth Minister for Infrastructure, Transport and Regional Development must consider the advice of the Minister for the Environment in relation to the adoption and implementation of a plan for aviation airspace management involving aircraft operations that have, will have, or are likely to have a significant impact on the environment.

Apron

A defined area on a land aerodrome intended to accommodate aircraft for loading and unloading passengers, mail or cargo, fuelling, parking or maintenance

Australian Noise Exposure Forecast (ANEF)

Shows the anticipated noise exposure forecast (shown as contours) for the long-term development of an airport's infrastructure based at a future point in time, commonly ultimate capacity.

Baseline

The point from which the change in the environment as a result of impacts is measured.

Excavator

Means a machine used for excavating soil or sediment material and may include a backhoe excavator, bulldozer, dredge or other similar equipment.

Fauna

The animals of a given region or period considered as a whole.

Flora

The plants of a particular region or period, listed by species and considered as a whole.

Fly-in fly-out (FIFO)

Describes the pattern of work where by employees are flown to and from their place of work.

Forrestfield-Airport Link

The new railway line that is being constructed by the State Government to connect Forrestfield and Perth Airport to the Perth Central Business District.

General Aviation (GA)

Refers to all flights other than military and scheduled airline flights, both private and commercial.

Grade separation

Name given to a method of aligning a junction of two or more roads at different heights (grades) so that they will not disrupt the vehicle traffic flow on other routes when they cross each other.

Greater Perth

Greater Perth consists of the area defined by the Perth Metropolitan Region, with the City of Mandurah and the Pinjarra Level 2 Statistical Area of the Shire of Murray.

Greenfield Area

An area of land that is yet to be developed

Ground Based Augmentation Systems (GBAS)

A satellite-based precision landing system, recognised by ICAO as a potential future replacement for current instrument landing systems (ILS)

Ground Disturbing Activities

Means the disturbance of earth or waters involving machinery including clearing, excavation, backfilling and compacting, but excludes geotechnical investigations, surveying, fencing and rehabilitation works.

Interstate

Activities between States and/or Territories.

Intrastate

Activities within a State or Territory.

Landside

The portion of an aerodrome not designated as airside and to which the general public normally has free access.

Living Stream

A constructed or retrofitted vegetated waterway that mimics the characteristics of a natural stream.

Major Development Plan (MDP)

As defined by Section 91 (1) of the *Airports Act 1996.*

Master Plan

As defined by Section 71 (2) of the *Airports Act 1996.*

Matter of National Environmental Significance (MNES)

As defined by the *Environment Protection and Biodiversity Conservation Act 1999*.

Movement areas

The part of an aerodrome to be used for the surface movement of aircraft, including the manoeuvring areas and aprons.

NATS

The United Kingdom's provider of air traffic control services. In addition to providing services to 13 UK airports, and managing all upper airspace in the United Kingdom, NATS provides services around the world spanning Europe, the Middle East, Asia and North America. Additional information on NATS can be found at www.nats.aero

N-contours

A term used to describe noise through reporting the number of aircraft noise events louder than the specified dB(A) level.

New Runway Project

The New Runway Project (NRP) includes:

- construction, including clearing and site preparation, of a new runway up to 3,000 metres in length and with associated infrastructure.
- development of an airspace management plan that will cater for the changes to current airspace and flight paths to accommodate operations of the new runway.

Pavement

A prepared or semi prepared surface of a given depth for the purpose of providing added bearing capacity to an existing ground surface

Perth Airport Estate (the estate)

The parcel of land Perth Airport sits upon and that is leased from the Commonwealth Government

Runway

A defined rectangular area on a land aerodrome, prepared for the take-off and landing of aircraft along its length.

Runway Number

The number allocated to a runway end, being that whole number nearest to one tenth of the magnetic bearing of the runway centreline (measured clockwise form magnetic north) when viewed from the approach. Single digit numbers are preceded by zero and where the final numeral of the bearing is five degrees, the number allocated is the next largest number.

Taxiway

A defined path on an aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

- aircraft stand taxilane: a portion of an apron designated as a taxiway and intended to provide access to aircraft stands only,
- apron taxiway: a portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron, and
- rapid exit taxiway: a taxiway connected to a runway at an acute angle and designed to allow landing aircraft to turn off at higher speeds than are achieved on other exit taxiways thereby minimising runway occupancy times.

Transmissometers

A device that helps to determine the visibility on the airfield.

Acronym / Abbreviation

03L/21R	Main runway designation
03R/21L	New runway designation
06/24	Cross runway designation
ACE	Airport Capacity Enhancement
ACES	Airport Consultative Environmental Sustainability
Airports Act	*Airports Act 1996*
Airservices	Airservices Australia
ALER	Airfield Lighting Equipment Room
ANEF	Australian Noise Exposure Forecast
ARFF	Aviation Rescue and Fire Fighting
A-SMGCS	Advanced Surface Movement Guidance and Control System
BITRE	Bureau of Infrastructure Transport and Regional Economics
BNE	Brisbane
CAGR	Compound Annual Growth Rate
CAPA	Centre of Aviation
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
CAT	Precision Approach Category
CBD	Central Business District
CBR	California Bearing Ratio
CEMP	Construction Environmental Management Plan
CGE	Computable General Equilibrium
CMEWA	Chamber of Minerals and Energy Western Australia
CONOPS	Concept of Operations
DAPs	Departure and Approach Procedures
DAEW	Department of Agriculture, Water and the Environment
DBNGP	Dampier to Bunbury Natural Gas Pipeline
DBP Act	*Dampier to Bunbury Pipeline Act 1997*
DFO	Direct Factory Outlet
DEE	Department of Environment and Energy
EATS	Empire Air Training Scheme
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERSA	Enroute Supplement Australia
FAC	Federal Airports Corporation
FAL	Forrestfield-Airport Link
FIFO	Fly-in fly-out
FTE	Full Time Equivalent
FY	Financial Year
GBAS	Ground Based Augmentation System
GDP	Gross Domestic Product

GRP	Gross Regional Product
GSP	Gross State Product
HIAL	High Intensity Approach Lighting
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
ISCA	Infrastructure Sustainability Council of Australia
IVS	International Visitor Survey
JUHI	Joint User Hydrant Installation
LAHSO	Land and Hold Short Operations
MAGS	Movement Area Guidance Signs
MDP	Major Development Plan
MOS	Manual of Standards
NFPMS	Noise and Flight Path Monitoring System
NMD	Northern Main Drain
NOC	Notice of Capacity
NRP	New Runway Project
NVS	National Visitor Survey
OECD	Organisation for Economic Cooperation and Development
PACF	Perth Airport Community Forum
PADG	Perth Airport Development Group
PAG	Partnership Agreement Group
PAMG	Perth Airports Municipalities Group
PCF	Planning Coordination Forum
PER	Perth
RAAF	Royal Australian Air Force
RADS	Regional Airports Development Scheme
RESA	Runway End Safety Area
RET	Rapid Exit Taxiway
ROT	Runway Occupancy Times
RPT	Regular Passenger Transport
SMD	Southern Main Drain
SMR	Surface Movement Radar
STAAS	Standard Terminal Area Arrival Speed
SWIS	South West Interconnected System
TEC	Threatened Ecological Communities
TFI	Tourism Futures International
TSP	Transport Security Program

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