

Perth Airport 

Master Plan 2020

APRIL 2020







Section 4: **Aviation Development**

Perth Airport is working toward delivering the long-held vision of a single centralised airport precinct to provide a seamless travel experience and greater convenience for all.



It is vital to the continuing prosperity of Australia and the State that Perth Airport preserves and enhances its capacity to grow commercial aviation services.

4.1 Introduction

The Aviation Development Plan includes runways, taxiways, aircraft parking areas, navigation infrastructure and terminal facilities. The plan takes into consideration:

- maximising airport and airspace capacity in the ultimate airfield configuration,
- ensuring aircraft movements between runways and terminals deliver the most efficient taxiing, lowest fuel burn and therefore the lowest environmental impact and costs,
- all aircraft types up to the largest passenger aircraft (currently the Airbus A380),
- airline partner requirements to meet their business needs,
- customer experience and amenity, and
- the environmental and Aboriginal heritage values across the Perth Airport estate.

Aircraft movements reached a peak of 151,335 in 2013, at the height of the resource sector construction period. In 2018, there were 129,931 movements. Growth forecasts predict that aircraft movements will reach the 2013 peak again by 2025.

The significant investments in both the airfield and new terminal facilities over the past five years are detailed in Section 1. The privately funded \$1 billion investment program included the opening of Terminal 2 (T2) in 2013, substantial improvements to Terminal 1 (T1) International, and the construction of the new T1 Domestic pier in 2015.

Perth Airport is planning for a further \$2.5 billion investment program over the next decade that includes the following key projects, which are subject to Major Development Plans and the associated community consultation and Commonwealth approval:

- expansion of international facilities via staged international terminal upgrades,
- construction of a new terminal in the Airport Central Precinct for the Qantas Group relocation,
- construction of Multi-Modal Transport Interchange facilities, and
- construction of a new parallel runway and associated taxiway system.

4.2 Existing Airfield Configuration

The existing airfield layout, shown in Figure 4-1, consists of two intersecting runways, associated taxiways and apron areas. The main runway (03/21), with an orientation running north-south, is currently 3,444 metres long and 45 metres wide. The runway is a flexible pavement, grooved runway and is contained within a 300-metre-wide runway strip.

The cross runway (06/24), with an orientation running northeast-southeast, is currently 2,163 metres long and 45 metres wide, contained within a 300-metre-wide runway strip.

The runway system is supported by a network of taxiways which provide access from the runways to the various passenger terminals.



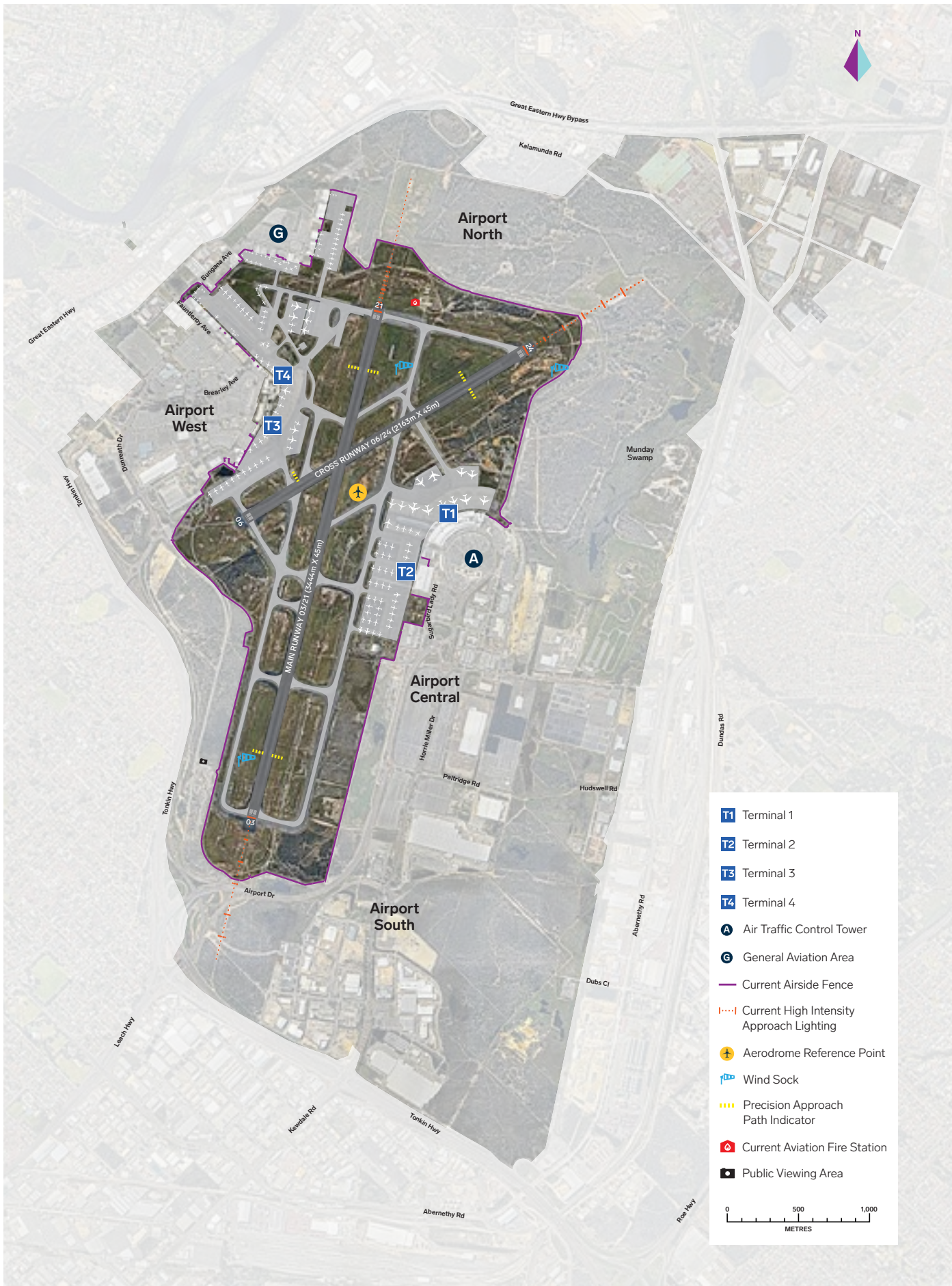


Figure 4-1 Existing Aviation development layout (2018)
 Source: Perth Airport

4.3 Runway Use

Both ends of a runway can be used for arrivals and departures. The direction being used is referred to as the operating or duty runway. An operating mode is the use of a certain runway or a combination of runways and the mode selected is based on a number of factors and selection criteria. Arriving aircraft from the north and departures to the south is referred to as the South Flow while arrivals from the south and departures to the north is referred to the North Flow. While single runway operations can occur for all runway directions (03, 06, 21, or 24), the current runway modes that achieve maximum capacity are shown in Figure 4-2 and comprise:

- arrivals on Runway 03; and departures on Runway 03 and 06, and
- arrivals on Runway 21 and 24; and departures on Runway 21.

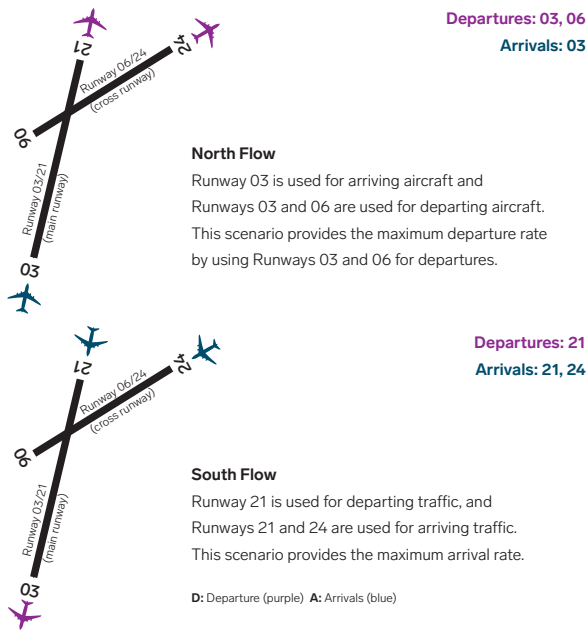


Figure 4-2 Existing runway modes
Source: Perth Airport

The selection of a runway to be used for aircraft arrivals or departures is based on many considerations including the weather, local airspace and traffic demand, and to allow runway maintenance to occur at times.

The runway selection also takes into consideration the requirement for aircraft to depart or arrive during peak periods. Due to the nature of the demand at Perth Airport, currently Tuesdays, Wednesdays and Thursdays are the busiest days with less demand experienced on Mondays and Fridays. Weekend movement figures are approximately half that of the mid-week peak days.

Noise abatement procedures (NAPs) are designed to reduce the impact of aircraft noise on the community. They include procedures for runway use and flight paths to reduce flights over residential areas. NAPs are implemented by Air Traffic Control, but their use is not mandatory and is subject to weather conditions and aircraft requirements. The current NAPs for Perth Airport are available at www.airservicesaustralia.com. Airservices Australia (Airservices) conduct regular reviews to check the effectiveness of NAPs and to seek improvements.

The NAPs have formed the basis for Perth Airport's runway usage since the 1980s. The NAPs were reviewed by Airservices and updated in 2016. The update simplified the preferred runways while maintaining a lower preference for movements to the south west. The NAPs allocate departures to, and arrivals from, the south-southwest (on runway 06/24) as the least preferred and are minimised as there are densely populated suburbs located southwest of Perth Airport with the runway end located 960 metres from residential areas in Redcliffe and Cloverdale. Therefore, the cross runway (06/24) is predominantly used for departures to the north and northeast on Runway 06; and for arrivals from the north and northeast on Runway 24.

The cross runway (06/24) is used for departures to, or arrivals from, the south and southwest, overflying the more densely populated areas of Belmont, Rivervale and Redcliffe in strong crosswind conditions or when runway maintenance works are being completed on the main runway (03/21).



4.3.1 Airfield Capacity Enhancement

Since 2012, Perth Airport has been working with Airservices to support the Airport Capacity Enhancement (ACE) program. The primary objective of ACE is to make the best use of the existing infrastructure to maximise operational efficiency, by improvements to the processes and practices of air traffic controllers, airport operators and airline partners.

The ACE program has helped to address capacity issues and meet industry challenges by managing the efficiency and impact of air traffic at Perth Airport. ACE focuses on three main themes:

- **Harmonisation:** The steps taken to increase efficiency needed to be in harmony with current Australian standards and practices, while providing sufficient room for the development of local procedures,
- **Collaboration:** Every movement matters and every second counts. Over many aircraft movements, the seconds add up to create additional capacity that in turn can reduce delays. The benefits are shared by all and can be achieved collaboratively, and
- **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 March 2019:

- 21 were closed or completed,
- five were underway, and
- two were ongoing.

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

- introduction of a schedule coordination system in 2013 where airlines apply for a slot to ensure that demand does not exceed capacity in peak hours,
- improved taxiway layout to allow more efficient movement of aircraft, with an extension to taxiway Charlie completed in June 2015,
- amended surface and airborne traffic flows as a result of the opening of T2 in March 2013 and the opening of the T1 Domestic pier in November 2015, to ensure efficiency is maintained,
- address airfield-chokepoints including assessing the taxiway layout to improve effectiveness and support optimum traffic flows,
- consideration of a dedicated helicopter aiming point (which was subsequently determined not to be required),
- provision of dual full-length runway entry points to optimise departures, and
- consideration of construction of Rapid Exit Taxiways (RETs) to assist in reducing runway occupancy time.



4.4 Need for Additional Runway Infrastructure

Perth Airport's existing runways continue to reach capacity during peak periods, resulting in delays to flights and disruption to travellers.

While the ACE initiative has delivered airfield and airspace efficiencies and contributed to a significant reduction in delays and congestion at peak times, it is not a solution to the fundamental issue of demand exceeding capacity at certain times of the day.

Due to the nature of the resource sector's fly-in fly-out workforce deployment, Perth Airport experiences significant peak periods of departures and arrivals demand, with approximately 85 per cent of Perth Airport's aircraft movements in the morning peak being departures and only 15 per cent arrivals. The fly-in fly-out

workforce is aircraft movement intensive, causing significant movement peaks throughout the day, as resource sector companies require their services to operate in narrow windows to meet shift change rotations. As a result, in preparation for the significant number of morning departures, there could be as many as 90 RPT, charter and general aviation aircraft parked overnight at Perth Airport.

As a result of the departure waves that feed the resource sector in midweek mornings, there are also large arrival waves which build when those aircraft return to Perth and combine with arriving interstate and international services. These arrival peaks are spread over a wider period than the departure peaks, as current airfield and airspace capacity permits fewer arrivals per hour than departures.

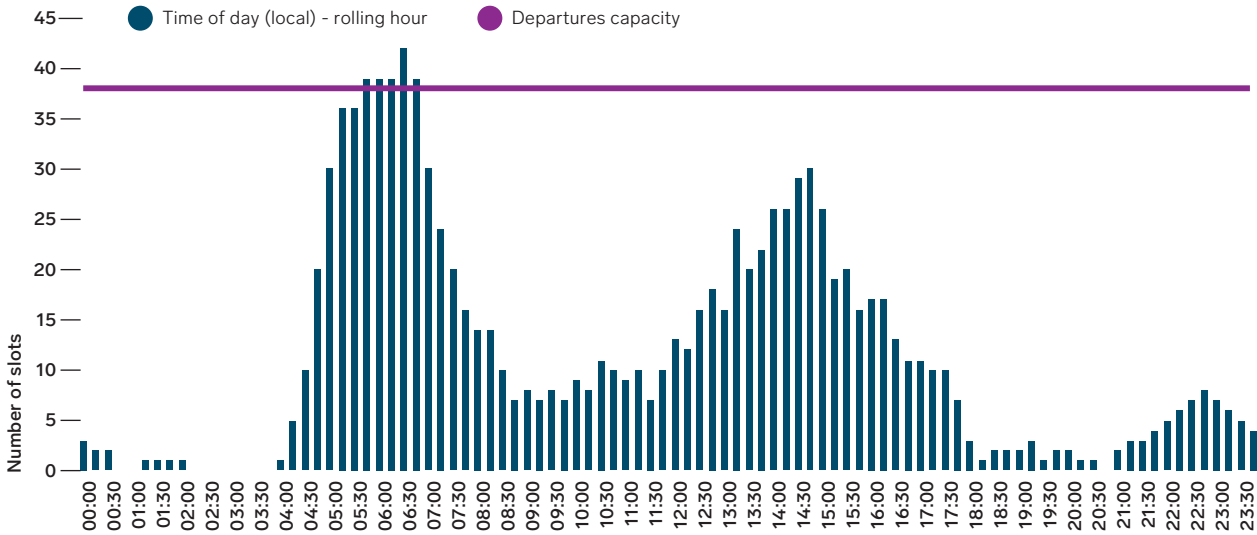


Figure 4-3 Wednesday departures slot demand – winter season 2013
Source: Airport Coordination Australia

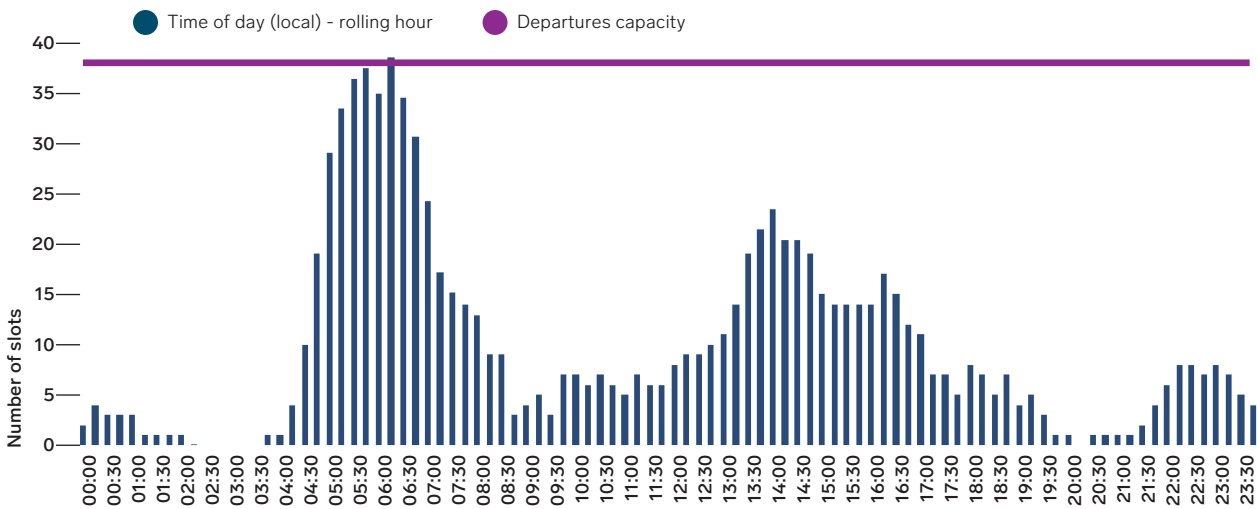


Figure 4-4 Wednesday departures slot demand – winter season 2018
Source: Airport Coordination Australia

While traffic levels have reduced in recent years, this impact is still being felt by intrastate, interstate and international airlines, and there remains evidence that, if the capacity existed, airline partners would prefer to schedule more services in peak periods. Aircraft movements are forecast to return to 2013 levels by around 2025.

Figure 4-3 and Figure 4-4 shows the 2013 and 2018 winter season departures slot demand for Wednesday, which is typically the busiest day of the week. A comparison of the figures shows demand exceeding capacity, in peak periods, even at lower traffic levels. The demand for arrivals slot filings in 2013 and 2018 also exceeded capacity in peak periods as shown in Figure 4-5 and Figure 4-6. When the departures and arrivals demands are combined it is evident that demand continues to exceed capacity during peak periods of the day, as shown in Figure 4-7 and Figure 4-8.

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, subject to Commonwealth approval under the *Airports Act 1996* and *Environmental Protection and Biodiversity Conservation Act 1999*. The only meaningful way airfield capacity expansion can be achieved is with the development of a parallel runway system through the construction of the new runway. Perth Airport has identified that, to meet future capacity demand, the new runway will be needed between 2023 and 2032, subject to actual demand and approval.

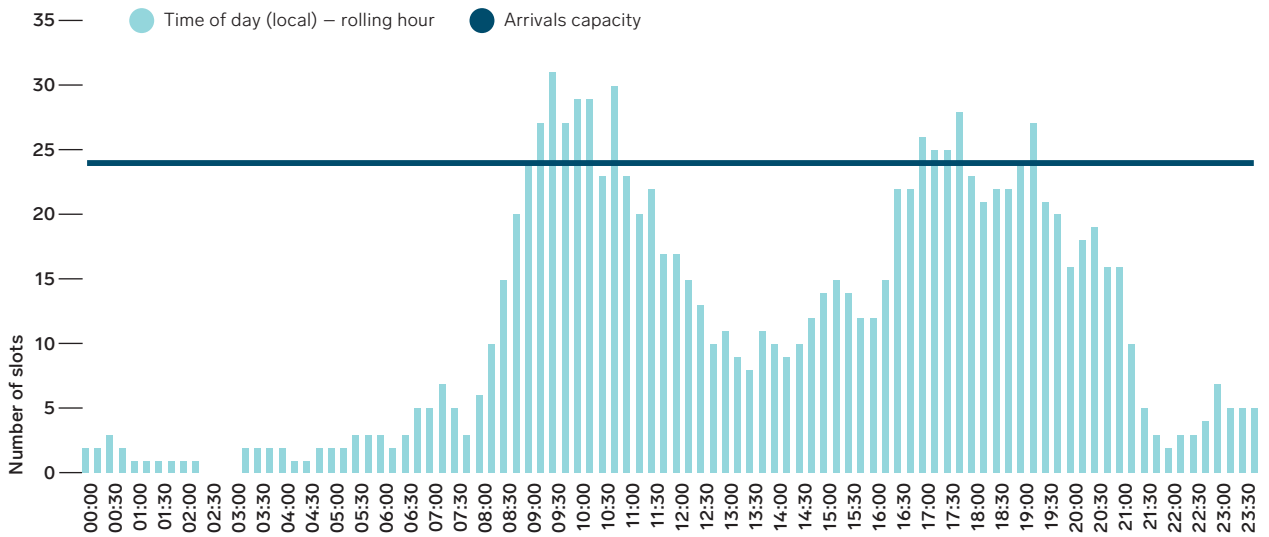


Figure 4-5 Wednesday arrival slot demand – winter season 2013
Source: Airport Coordination Australia

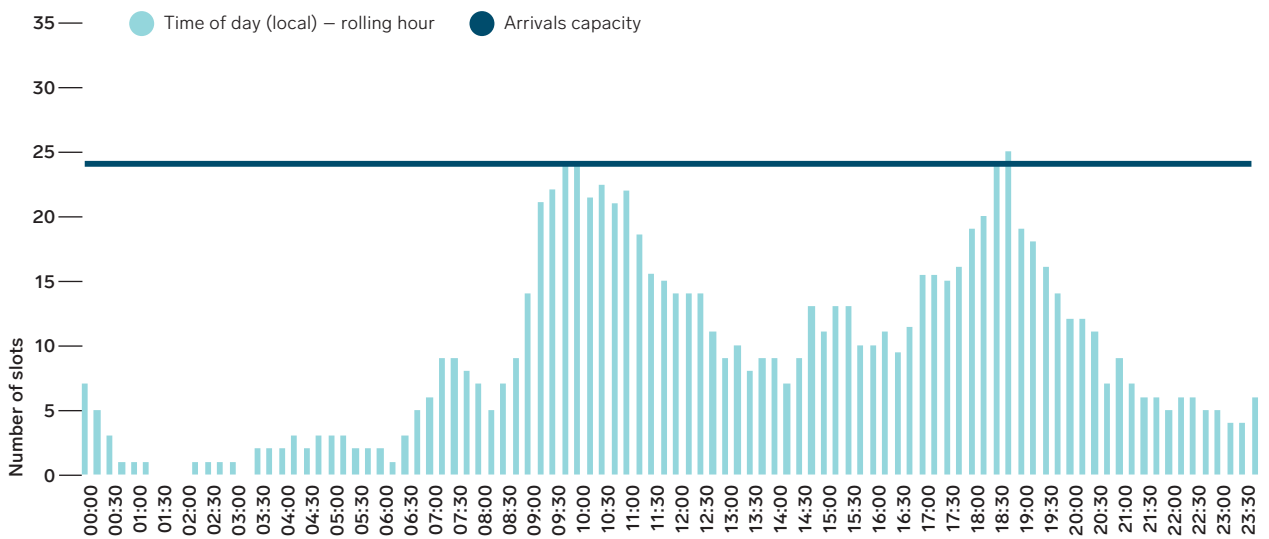


Figure 4-6 Wednesday arrival slot demand – winter season 2018
Source: Airport Coordination Australia

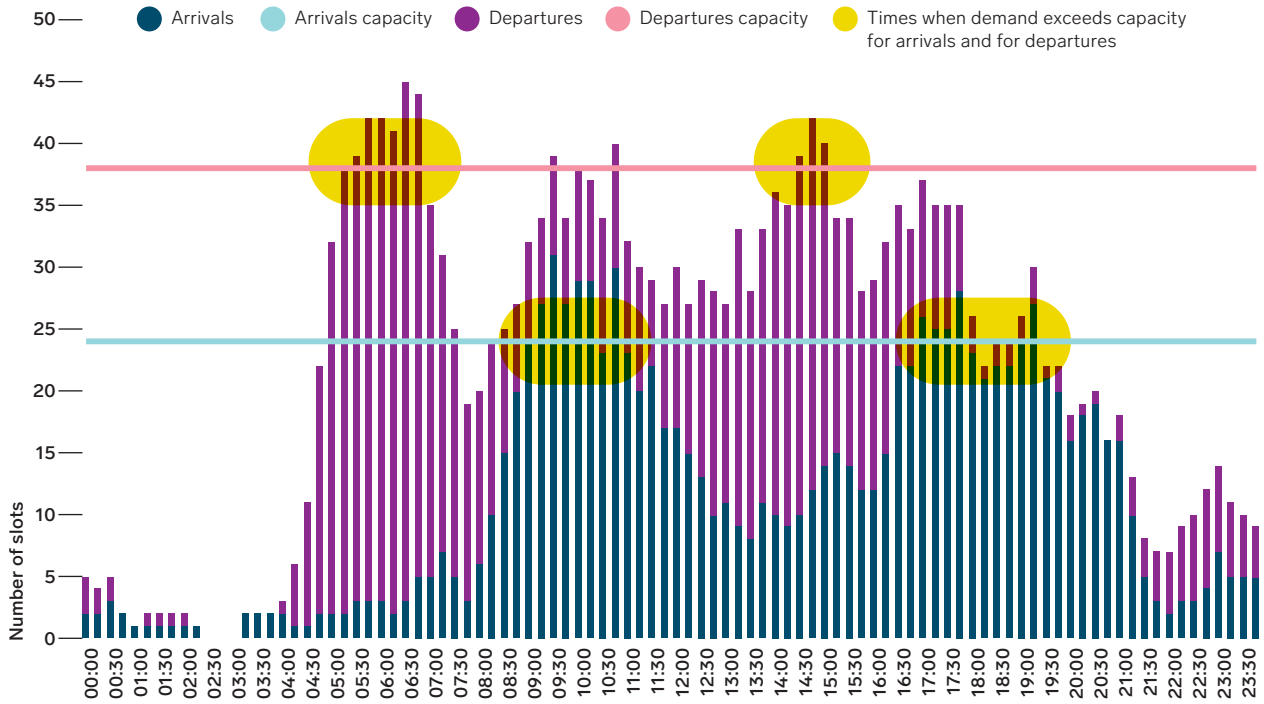


Figure 4-7 Wednesday total runway slot demand – winter season 2013
Source: Airport Coordination Australia

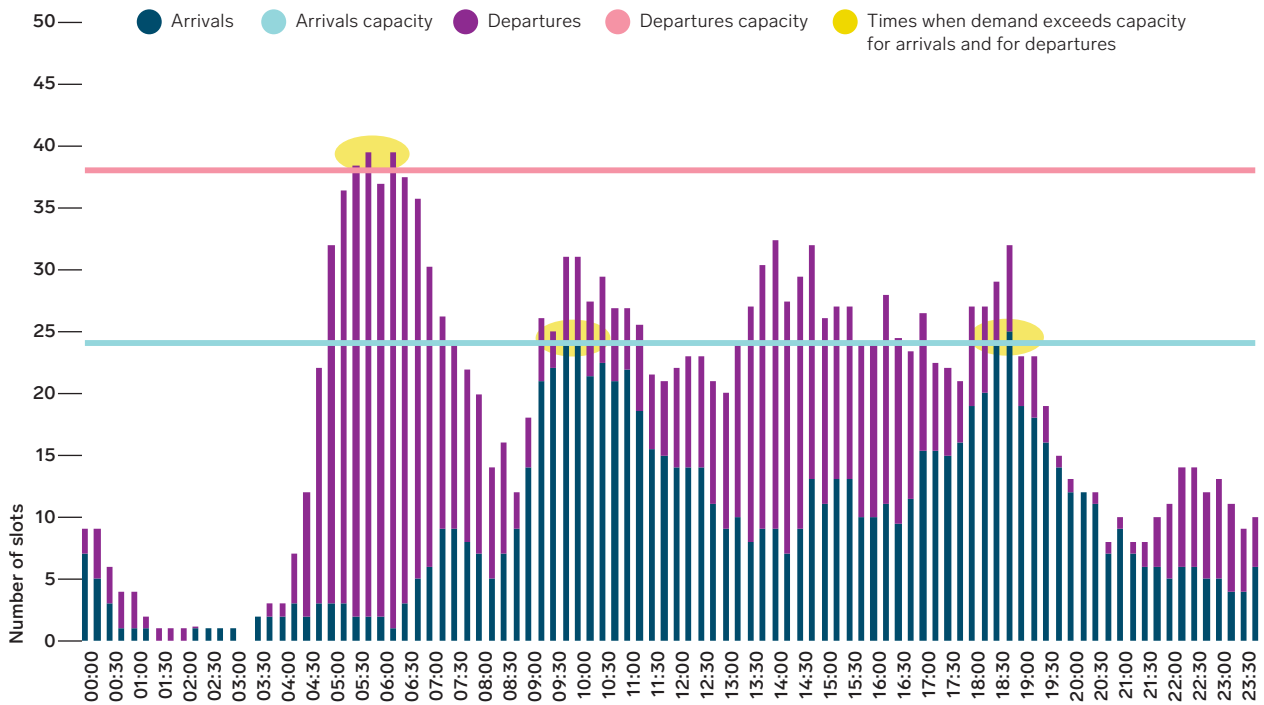


Figure 4-8 Wednesday total runway slot demand – winter season 2018
Source: Airport Coordination Australia

4.5 Proposed Airfield Development Plan

The Airfield Development Plan ensures that the long-term capacity of Perth Airport is safeguarded, and that demand is met.

The proposed Airfield Development Plan covers runways, taxiways, aprons, aircraft parking positions and aviation support services and as mentioned above, are subject to Commonwealth approval.

4.5.1 Runways

The runway configuration and characteristics, such as runway length and width, are determined by a number of factors including:

- maximising useability in most wind conditions,
- providing adequate runway length to cater for existing and future aircraft operating at maximum take-off weight in hot conditions,
- International Civil Aviation Organisation (ICAO) Annex 14 and other relevant international standards, and
- balancing noise exposure to surrounding communities.

Like the previous five master plans, this Master Plan 2020 continues to contemplate future investments in additional runway infrastructure. These are:

- extending the cross runway (06/24) to the north-east to a total length of 3,000 metres,
- extending the main runway (03L/21R) to the north to a total length of 3,800 metres,
- constructing the new runway (03R/21L) to the east of Airport Central to a length of 3,000 metres.

Technical analysis has shown that the proposed long-term airfield layout could cater for more than 475,000 annual aircraft movements (maximum theoretical capacity). This capacity is based on a flattening of the departure and arrival peak periods currently experienced at Perth Airport and spreading the traffic over the day. As discussed in Section 2, Perth Airport is forecast to grow to 202,000 aircraft movements by 2040. Therefore, these runway developments are expected to meet aviation needs beyond the 20-year planning period of this Master Plan 2020.

Subject to demand, airline agreement and approval, the future proposed airfield layout at 2040 is shown in Figure 4-9.

4.5.1.1 Main Runway

The ultimate length of the main runway is planned to increase from the existing 3,444 meters to 3,800 metres. This extended length can accommodate large aircraft at maximum take-off weight on ultra-long-haul flights in summer conditions. The timing of any runway extension will depend on demand for ultra-long-haul flights and aircraft technology. Once the new runway is in operation, the designation of the existing main runway will be 03L/21R.

4.5.1.2 Cross Runway

The existing cross runway, referred to as 06/24, is currently 2,163 metres in length. Consistent with Master Plan 2014, this Master Plan 2020 retains provision for an extension of the cross runway to 3,000 metres. With suitable noise abatement procedures, an extended cross runway could accommodate all aircraft types, including Code F, and would allow a small increase to capacity for arrivals in the southerly flow of traffic on runway 24 through the use of Land and Hold Short Operations, which would allow some aircraft to land on the cross runway and hold short of the intersection with the main runway whilst another aircraft lands or takes off from the main runway. However, it provides no improvement in the northerly flow and therefore scheduling for higher capacity carries a risk of increased aircraft delays depending on which flow is used on the day. The extension of the cross runway would only deliver short-term capacity enhancements.

In 1999, a deed of agreement between the City of Bayswater and Perth Airport was developed in relation to any future extension to the cross runway. The deed reaffirms a commitment that the proposal to extend the cross runway to the northeast will include the adoption of strict and explicit use procedures, such as take-offs to, and landing from, the southwest, which will only occur:

- in emergencies,
- in extreme weather conditions, or
- through the loss of the use of main runway (03L/21R).

The noise abatement procedures and current runway approach (06) and take-off paths (24) for aircraft greater than 20,000 kilograms would be maintained in the event of the extension of the cross runway (06/24).

Consistent with the Master Plan 2014, this Master Plan 2020 also considers that the cross runway may be closed when the parallel runway is constructed and operational. The Concept of Operations (CONOPS) for the parallel runway system showed that the continued use of the cross runway once a parallel runway is operational would reduce the efficiency and overall runway capacity at Perth Airport, therefore negating benefits of the new runway. Several factors influence any decision to decommission the cross runway (which is subject to a Ministerial decision), including operating costs and consultation with aircraft operators, Airservices and the Civil Aviation Safety Authority (CASA). The final decision on the future of the cross runway will be made once the new runway is operational.

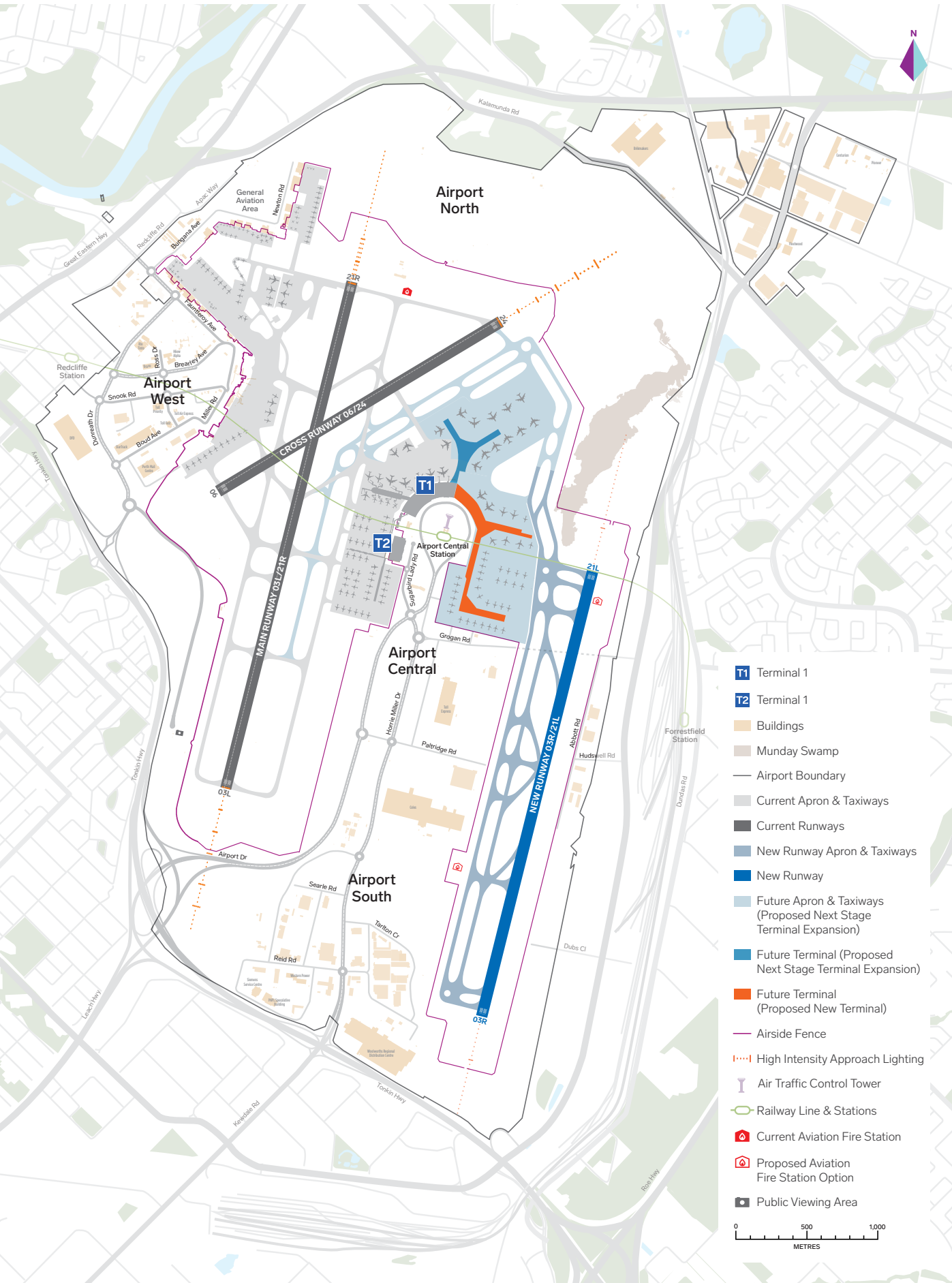


Figure 4-9 Proposed airfield layout 2040
Source: Perth Airport

4.5.1.3 New Runway (03R/21L)

The new runway (03R/21L), with an orientation running north-south, is subject to Commonwealth approval and, if approved, will be parallel to the existing main runway and will be 3,000 metres long and 45 metres wide. The runway will be contained within a maximum of a 300-metre-wide runway strip. The new runway will be equipped with High Intensity Approach Lighting (HIAL) in both directions to support precision approaches. The new runway will be located 2,000 metres east of the existing main runway (03L/21R) which is 1,000 metres east of the Air Traffic Control tower. The new runway will be constructed with a flexible pavement and have a grooved surface.

The new runway is provided for in the future airport layout shown in Figure 4-9. The proposed location of the runway was determined in the late 1970s by the then Department of Aviation, and land was acquired for its future development. Its proposed location remains unchanged with the exception of a shift south to minimise the impact to Munday Swamp.

The Perth Airport 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. Following approval of the Master Plan 2014, the Perth Airport Board of Directors approved a \$45 million investment in preconstruction activities, including environmental and other approvals, preliminary airspace design and public consultation.

The approvals process for the new runway involved the release of a Preliminary Draft Major Development Plan (MDP) in May 2018 for public comment and subsequent Commonwealth Government consideration. The MDP for the New Runway Project outlines the case for the construction and operation of the new runway. The MDP was developed in accordance with the requirements prescribed by the *Airports Act 1996* (Airports Act) and subsequent assessment of the on-ground environmental impacts under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The MDP was also prepared to meet the requirements for aviation airspace-management changes under the EPBC Act.

The draft Airspace Management Plan (AMP), included within the MDP, was developed in consultation with Airservices, airline partners and the Commonwealth Department of Defence. The draft AMP outlines the indicative flight corridors and airspace architecture required for safe and efficient operations of a parallel runway system, while also assessing aircraft noise exposure.

The 60 business day public comment period for the New Runway Project Preliminary Draft MDP, during which Perth Airport sought input from the community and other stakeholders, was completed in August 2018. Perth Airport considered all feedback received and, where possible, incorporated the concerns and issues raised in the Draft MDP, which was presented to the Federal Minister for Infrastructure, Transport and Regional Development in September 2019 for consideration.

To meet future capacity demand, the new runway is expected to be operational between 2023 and 2032, subject to actual demand and approval.

4.5.2 Taxiways

A system of taxiways is provided to connect runways with the various 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 thereby 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.

Further expansion of the existing taxiway system at Perth Airport is necessary within the 20-year planning period and is subject to Ministerial approval under the *Airports Act 1996* (either as part of other projects or approval in its own right), in particular the construction of the taxiway system to support the new runway (03R/21L). Likely taxiway expansions are summarised below.

4.5.2.1 Parallel Taxiways

In line with the timing of the new runway (03R/21L), an extensive parallel taxiway network will also be required. From an Air Traffic Control operational perspective and to maximise efficiency while reducing delays, a dual taxiway system that is not compromised or blocked by aircraft pushing back, aircraft under tow or vehicles is ideal. Dual parallel taxiways are planned for the new runway (03R/21L). In the short to medium term the parallel taxiway closest to the runway will extend for its full length. The second parallel taxiway will be provided, where required, to accommodate areas of dense traffic and access to apron and terminal areas. Bypass taxiway connections will also be provided at various locations.

4.5.2.2 Runway Entry and Exit Points

To improve runway efficiency, multiple runway entry points and RETs are planned for both the main runway (03L/21R) and the new runway (03R/21L). Simulation modelling and engagement with both ATC and Airlines will determine when these are required to be constructed.

Multiple access points to the runway will allow for more efficient sequencing of departing aircraft which improves runway capacity.

As highlighted in the ACE recommendations, dual full-length runway entry points and RETs will be explored to optimise departures. RETs (or high-speed taxiways by definition) are designed to expedite aircraft turning off the runway after landing, thus reducing runway occupancy times. By reducing the runway occupancy times, runway capacity increases.

In 2013, as part of the ACE initiatives, Perth Airport completed a feasibility study for RETs on the main runway (03L/21R) to improve capacity in the peak arrival afternoon period. Following consultation with airline partners, it was determined that the construction of the RETs would be delayed as the benefits were outweighed by the expected timing of the new runway (03R/21L). The new runway (03R/21L) will include the provision of RETs.

To improve runway efficiency, dual runway entry points and RETs are planned for both the main runway (03L/21R) and the new runway (03R/21L). As highlighted in the ACE recommendations, dual full-length runway entry points and RETs will be explored to optimise departures.



Figure 4-10 Current terminal locations
 Source: Perth Airport

4.6 Terminals

The size of a terminal, including the number of aircraft gates, is based on the forecast number of passengers, aircraft movements and visitors during the design 'busy hour', and takes into account the desired level of service required to be provided by the infrastructure.

As shown in Figure 4-10 there are currently five terminals located in two precincts at Perth Airport:

- Terminal 1 Domestic, Terminal 1 International and Terminal 2 are located in Airport Central, and
- Terminal 3 and Terminal 4 are located in Airport West.

Several smaller terminal operations owned and operated by airline partners providing charter and general aviation services to regional areas in Western Australia, are also located within the Airport West Precinct (refer also Table 4-1).

Terminal	Airlines	Pax pa (FY18)	Aerobridge contact gates	Non-aerobridge contact bays	Stand-off bays
T1 International	All international services except Qantas	4,289,477	six (including two swing gates)	1	4
T1 Domestic	Virgin Australia (all interstate and some regional services)	2,498,680	seven-ten (excluding swing gates)	Nil	Nil
T2	Alliance Airlines (regional services, Tigerair (interstate services), Virgin Australia (most regional services), Regional Express Airlines (regional services)	1,379,611	Nil	20	16
T3	Jetstar (interstate and regional), Qantas (international, interstate and regional services)	1,783,451	9	8	34
T4	Qantas (interstate and regional)	3,740,641			

Table 4-1 Perth Airport Terminal Details

Source: Perth Airport

4.6.1 Airport West Precinct

There are currently two multi-user passenger terminals within the Airport West Precinct. T3 and T4 are linked and are currently used for Qantas Group services. Both terminals are now operated and managed by Perth Airport following the expiry of the 30-year lease for T4 with Qantas, and the subsequent transfer of day to day management and operations to Perth Airport from 30 January 2019.

In March 2018, Qantas commenced direct Perth-London flights using the new Boeing 787-9 Dreamliner aircraft with the potential for additional ultra-long routes in the future. To facilitate these services and passenger transfers from Qantas domestic flights, the existing T3 building was upgraded to accommodate international operations until the consolidation of Qantas operations to Airport Central Precinct by 2025.

4.6.2 Airport Central Precinct

The Airport Central Precinct now caters for the majority of domestic and international passenger operations. The consolidation of Qantas operations, from T3/T4 to Airport Central, is anticipated by 2025. This will fulfil the vision for the operation of all passenger terminal services from this precinct.

4.6.2.1 T1 International

T1 International provides passenger processing facilities for all international services, with the exception of the Qantas services currently operating from T3. The terminal is common use, with facilities shared by up to 20 international airline partners across the 24 hours, seven days a week schedule.

Perth Airport has invested significantly in international infrastructure over the past six years to provide sufficient capacity for growth to the early 2020's, enable Airbus A380 services and to meet new Government security requirements which were announced in 2010. T1 International provides

sufficient space for check-in and passenger processing both now and into the future, upgraded outbound and inbound immigration technology (Smart Gates), six aerobridge serviced gates, two of which have swing capabilities and are Airbus A380 capable, and a range of retail and food and beverage options both landside and airside.

Several future projects are planned to sustain capacity and improve service levels for international passengers where facilities are reaching capacity, including check-in self-service technology upgrades, gate upgrades, an expansion of the landside arrivals hall and a staged terminal expansion addressing baggage, boarding, departure lounge and processing capacity into the future (as discussed in Section 4.6.3).

4.6.2.2 Terminal 2

T2 provides terminal processing facilities primarily to meet the needs of regional WA while being able to support interstate services. T2 was constructed in 2013 due to T3 and T4 operating beyond capacity, with extensive bussing operations and a poor customer experience. T2 is currently used by Virgin Australia Regional Airlines (formerly Skywest), Regional Express Airlines (Rex), Tiger Australia and Alliance Airlines. The commencement of domestic services from the Airport Central precinct was part of the first stage of the consolidation of commercial air services to the centralised terminal precinct.

T2 is designed to provide efficient passenger check-in, screening and sufficient amenity for passengers (including retail, lounge and food and beverage facilities), with boarding from a centralised departure lounge serviced by walk-out piers. Parking is provided for up to 36 aircraft. The terminal is linked via an enclosed pedestrian walkway to T1 Domestic located to the east, providing a seamless connection for passengers between inter-regional and Virgin Australia domestic services.

4.6.2.3 T1 Domestic

T1 Domestic is located adjacent to T2 and is integrated with the T1 International building and associated ground transport. Virgin Australia commenced domestic operations from this purpose-built pier in 2015, relocating operations from T3 in the Airport West Precinct and marking another important stage towards consolidation.

The terminal provides self-service check-in facilities for passengers including kiosks and automated bag drops, efficient passenger screening, a mix of retail and food and beverage options, baggage reclaim services, and at least 8 aerobridge serviced gates for Virgin Australia services, including 2 swing gates for flexibility with adjacent international services.

4.6.3 Proposed Terminal Development Plan

Perth Airport remains focused on delivering a fully consolidated terminal precinct by 2025, in line with the consolidation strategy that was outlined in the previous Master Plan 2014.

Consolidation of all commercial passenger services in the Airport Central Precinct will address capacity constraints, provide passengers with an improved transfer experience, and will provide airlines which operate in both domestic and international markets with significant operational savings through co-location of operations.

Construction of the T2 and T1 Domestic terminals delivered the first two stages of the consolidation strategy, enabling regional airlines and Virgin Australia to move their operations to the Airport Central Precinct. In order to accommodate sufficient capacity for forecast international passenger growth in the precinct, staged expansion of T1 will be required in line with demand and accommodated through an extension of the existing building. The final stage of consolidation of all commercial passenger services into Airport Central will be achieved following the construction of new terminal facilities, enabling sufficient terminal capacity for the relocation of Qantas Group operations and ancillary functions from T3 and T4. The location of the international terminal upgrades and the new

terminal projects are shown in Figure 4-11 and are subject to Major Development Plans, the associated Commonwealth approvals and stakeholder and community consultation

4.6.3.1 Terminal 1

International traffic at Perth Airport has continued to grow over recent years and is forecast to continue increasing. Capacity and service quality analysis indicates that a number of key terminal functions are already, or will soon be reaching capacity in coming years, including:

- international stands will begin to reach capacity in the early 2020's, requiring bussing where current infrastructure cannot accommodate international services,
- the departure hall check-in infrastructure is already at capacity in peak periods, with no ability to facilitate more flights or an increase of existing services during these times,
- considerable congestion in the arrivals hall is currently experienced in the peak periods, requiring an expansion to provide additional space,
- passenger boarding of aircraft is currently via the descent of four flights of stairs, requiring the replacement of infrastructure to provide a more equitable journey for passengers with reduced mobility,
- the outbound baggage system will approach its capacity limit in the mid 2020's, and
- the international departure lounge provides a lower level of service due to its narrow linear configuration and being split across two levels.

To ensure international capacity at Perth Airport is maintained and to improve the passenger experience, an incremental upgrade of the international terminal facilities is required.

Perth Airport is planning to replace three of the existing aerobridges, with the first replacement expected in 2020. The new aerobridges will greatly improve passenger experience through the provision of dual headed bridges with ramps and lifts for passenger boarding, removing the need to use existing stairs.



Figure 4-11 Indicative Airport Central Development Plan

Source: Perth Airport

Other international terminal upgrades are expected to progress from 2020. Perth Airport has undertaken considerable planning on future options and is currently engaging with the Board of Airline Representatives Australia (BARA) and other international airline partners to select the preferred options for the upgrades. The projects aim to increase the capacity of international operations at Perth Airport, enhance the departures and arrivals experience for international passengers and facilitate more efficient airline operations. Key aspects of the international terminal upgrades being considered are:

- implementation of common-use self-service check-in technology for international passengers, including kiosks and automated bag drops,
- upgrade of the terminal and construction of additional contact aircraft parking positions for wide-bodied aircraft,
- additional baggage make-up capacity connected to the existing check-in areas,
- new airline lounges providing sufficient areas to meet airline requirements and with the potential for direct boarding,
- improved access for persons with reduced mobility,
- aircraft taxi lanes and aprons to allow access to the new aircraft parking positions, and
- a passenger departure lounge and amenities including duty free, food and beverage and retail facilities.

The longer-term planning considers consolidation and future interfaces with the international terminal upgrades. The plans are cognisant of the need to accommodate both international and domestic growth in the Airport Central Precinct with efficient airside and landside interfaces.

It is envisaged that in future, gates that sit on the interfaces between international and domestic operations will have swing capability.

It is planned that international terminal upgrades will be delivered in stages, with elements such as check-in technology to be prioritised to provide immediate benefit to passengers. The initial scope of the international terminal upgrades will be completed by the mid-2020's to provide capacity to meet forecast passenger growth to 2030, with additional future plans for expansion to be delivered in line with demand.

4.6.3.2 New Terminal Development

The final stage of consolidation of all commercial air services will require construction of a new open access terminal in the Airport Central Precinct to cater primarily for Qantas Group operations.

The new terminal will be located south east of the current T1 International facility. Planning for the new terminal is in the early stages with Perth Airport working closely with Qantas on the design of the building and the aircraft parking bays

The new terminal is planned to be operational by 31 December 2025. The project scope includes:

- taxiways to provide access to the aircraft parking aprons,
- aircraft parking bays, with a number able to be used for both domestic and international operations,
- a terminal building designed to deliver a significantly improved passenger and retail experience and intuitive passenger journeys,
- direct connectivity to T1 International and indirectly, to T2 to facilitate seamless passenger transfers between terminal facilities in the consolidated precinct,
- dedicated access roads with a multi-modal transport interchange (including a multi-storey car park) to service the terminal building and connectivity between the terminal and airport central train station, and
- a design that incorporates sustainable building practices.

4.6.3.3 Terminal expansion plans beyond consolidation

Perth Airport has developed a long-term development plan for growth beyond the full consolidation of all commercial air services into Airport Central. Post consolidation, it will be necessary to expand terminal facilities over time in order to meet growth and maintain acceptable service levels for airline partners and passengers.

The need for terminal upgrade and expansion projects will be assessed as a result of regular passenger forecasting studies, ongoing monitoring and capacity analysis of terminal facilities, feedback and survey results from airline partners, passengers and other Perth Airport stakeholders.

The principles upon which the long-term expansion planning for terminal facilities will be undertaken include:

- responding to the forecast traffic growth and step change in demand as airlines relocate,
- ensuring that the precinct has a sufficient aircraft parking apron area for the long-term demand,
- balancing the runways and apron to each other, as far as possible, to reduce taxiing distances, reduce fuel usage, and increase runway capacity,
- maintaining safe, efficient and free flowing ground movement of aircraft on taxiway and apron areas,
- clustering terminals around an inner precinct as far as practicable to ensure efficiency and connectivity, fully integrated with the Airport Central rail station,
- maintaining terminal piers that are perpendicular to taxiways for maximum efficiency of apron operations,
- adopting terminal layouts that optimise potential commercial performance, and maximise flexibility of common-use infrastructure between airlines and international and domestic operations,
- safeguarding for integration between terminals and processes such as seamless passenger and baggage transfers,
- safeguarding for future innovation and technology within the terminal layout, considering future trends in passenger behaviour, technology use and travel expectations, and
- adopting terminal layouts that facilitate future stages of expansion.

4.6.3.4 T2 Development and Enhancement

T2 was designed with the ability to expand as demand required. During the planning period of this Master Plan 2020, the terminal will be progressively expanded to continue to meet demand. This is likely to include:

- expansion of the departures area including additional seating areas, airline lounges, boarding gates and retail offerings,
- technology and innovation led solutions to increase operational efficiency and enhance the passenger journey, and
- additional baggage reclaim facilities.

4.6.3.5 T3-T4 Terminals Post Consolidation

Following consolidation of Qantas operations to the Airport Central precinct by the end of 2025, the T3 and T4 buildings and associated carparks will be discontinued. The redundant terminal buildings will be demolished as they have reached the end of their useful life.

General aviation operators are likely to remain in the Airport West Precinct in current facilities, and sufficient capacity exists within T2 for the relocation of any operations growing in scale to a size exceeding capacity of their existing facilities.

4.6.4 Aircraft Parking

There are currently 117 aircraft parking (contact and remote) positions located proximate to the passenger terminals, in addition to more than 60 parking positions located within leased apron areas which are controlled by various tenants. The most recent of these parking positions include those added with the construction of T1 Domestic pier in November 2015, adding 12 positions with the capability to accommodate a range of different aircraft types.

Further extensive apron works will be undertaken to accommodate future growth and to complete consolidation of passenger services into Airport Central.

A 2018 study determined the future aircraft stand demand for Perth Airport. The stand demand was forecast by developing 'design day schedules', from which busy hour demand, hourly movement demand and aircraft stand demand could be derived. The design day is a representative busy day projected forward from current aircraft traffic, considering the profile of traffic over the baseline for the various segments (international, domestic and regional). Unlike annual forecasts, this approach takes into account the peak period nature of traffic at Perth Airport.

The stand demand is based on a reference code, which refers to the grouping of aircraft types based on characteristics such as aircraft wingspan and outer main gear wheel span. The groupings of regular aircraft types operating at Perth Airport are the Fokker 100, Airbus A320 and Boeing 737 (Code C), Airbus A330, Boeing B777 and Boeing B787 (Code E), and the Airbus A380 (Code F).

4.6.4.1 Terminal 1 - International & Domestic

T1 stand demand demonstrated in the table below includes all international and domestic operations, including both T1 International and T1 Domestic operations.

Financial Year	Base Scenario Active Stands				Base Scenario Non-Active Stands				Overall Totals			
	Code F	Code E	Code C	Count Total	Code C Equ.	Code F	Code E	Code C	Count Total	Code C Equ.	Count Total	Code C Equ.
2018 Actual	2	4	2	8	12	0	2	1	3	5	10	17
2019	2	4	1	7	13	0	1	3	4	5	11	18
2025	2	6	0	8	16	0	2	3	5	7	13	23
2030	2	8	0	10	20	0	2	4	6	8	16	28
2035	3	8	0	11	22	1	1	4	6	8	17	30
2040	3	9	0	12	24	1	1	4	6	8	18	32

Table 4-2 T1 International stand demand

Source: Airbiz

Note 1: Active stands are those used for actual passenger processing, being either contact stands (i.e. those served by an aerobridge or walk-up) or passengers can be bussed to and from other locations.

Note 2: Non-active stands are those where aircraft not carrying out an immediate turnaround are towed and parked. Aircraft parking demand is impacted by Perth Airport's intensive aircraft movements at certain times of the day, due to FIFO operations.

Financial Year	Base Scenario Active Stands				Base Scenario Non-Active Stands				Overall Totals			
	Code F	Code E	Code C	Count Total	Code C Equ.	Code F	Code E	Code C	Count Total	Code C Equ.	Count Total	Code C Equ.
2018 Actual	0	3	4	7	10	0	1	9	10	11	17	21
2019	0	3	4	7	10	0	1	9	10	11	17	21
2025	0	3	6	9	12	0	1	9	10	11	19	23
2030	0	4	6	10	14	0	2	9	11	13	21	27
2035	0	4	6	10	14	0	2	9	11	13	21	27
2040	0	4	8	12	16	0	2	7	9	11	21	27

Table 4-3 T1 Domestic stand demand

Source: Airbiz

4.6.4.2 Terminal 2

T2 stand demand caters for domestic operations, both intrastate and interstate.

Financial Year	Base Scenario Active Stands					Base Scenario Non-Active Stands					Overall Totals	
	Code F	Code E	Code C	Count Total	Code C Equ.	Code F	Code E	Code C	Count Total	Code C Equ.	Count Total	Code C Equ.
2018 Actual	0	0	16	16	16	0	0	9	9	9	25	25
2019	0	0	16	16	16	0	0	10	10	10	26	26
2025	0	0	16	16	16	0	0	11	11	11	27	27
2030	0	0	17	17	17	0	0	11	11	11	28	28
2035	0	0	20	20	20	0	0	11	11	11	31	31
2040	0	0	22	22	22	0	0	13	13	13	35	35

Table 4-4 T2 stand demand

Source: Airbiz

4.6.4.3 Terminal 3 and Terminal 4

T3 and T4 stand demand includes the intrastate, interstate and international operations from these terminals, which are located in the Airport West Precinct, prior to the relocation of Qantas Group operations to the Airport Central Precinct by December 2025.

Financial Year	Base Scenario Active Stands					Base Scenario Non-Active Stands					Overall Totals	
	Code F	Code E	Code C	Count Total	Code C Equ.	Code F	Code E	Code C	Count Total	Code C Equ.	Count Total	Code C Equ.
2018 Actual	0	4	11	15	19	0	2	17	19	21	34	40
2019	0	4	13	17	21	0	2	15	17	19	34	40
2025	0	5	14	19	24	0	3	16	19	22	38	46
2030	0	5	18	23	28	0	3	17	20	23	43	51
2035	0	5	20	25	30	0	3	20	23	26	48	56
2040	0	6	20	26	32	0	3	24	27	30	53	62

Table 4-5 T3 and T4 Stand Demand

Source: Airbiz December 2018

Financial Year	Base Scenario Active Stands					Base Scenario Non-Active Stands					Overall Totals	
	Code F	Code E	Code C	Count Total	Code C Equ.	Code F	Code E	Code C	Count Total	Code C Equ.	Count Total	Code C Equ.
2018 Actual	0	1	0	1	2	0	0	0	0	0	1	2
2019	0	2	0	2	4	0	0	0	0	0	2	4
2025	0	3	0	3	6	0	0	1	1	1	4	7

Table 4-6 T3 International stand demand

Source: Airbiz

4.6.4.4 Airport Central Precinct

Perth Airport expects that full consolidation into the Airport Central Precinct will take place by December 2025 therefore, Airport Central Precinct must also cater for the full stand demand. It has been determined that by 2040 the following stands will be needed in Airport Central Precinct.

Financial Year	Base Scenario Active Stands					Base Scenario Non-Active Stands					Overall Totals	
	Code F	Code E	Code C	Count Total	Code C Equ.	Code F	Code E	Code C	Count Total	Code C Equ.	Count Total	Code C Equ.
2030	2	17	41	60	79	0	7	41	48	55	108	134
2035	3	17	46	66	86	1	6	44	51	58	117	144
2040	3	19	50	72	94	1	6	48	55	62	127	156

Table 4-7 Airport Central Precinct stand demand by 2040

Source: Airbiz

It is noted that Airport Central stand demands anticipated that the consolidation of operations will result in some efficiencies in the stand use. To accommodate this stand demand, extensive works will be required, including the construction of additional aircraft parking positions.

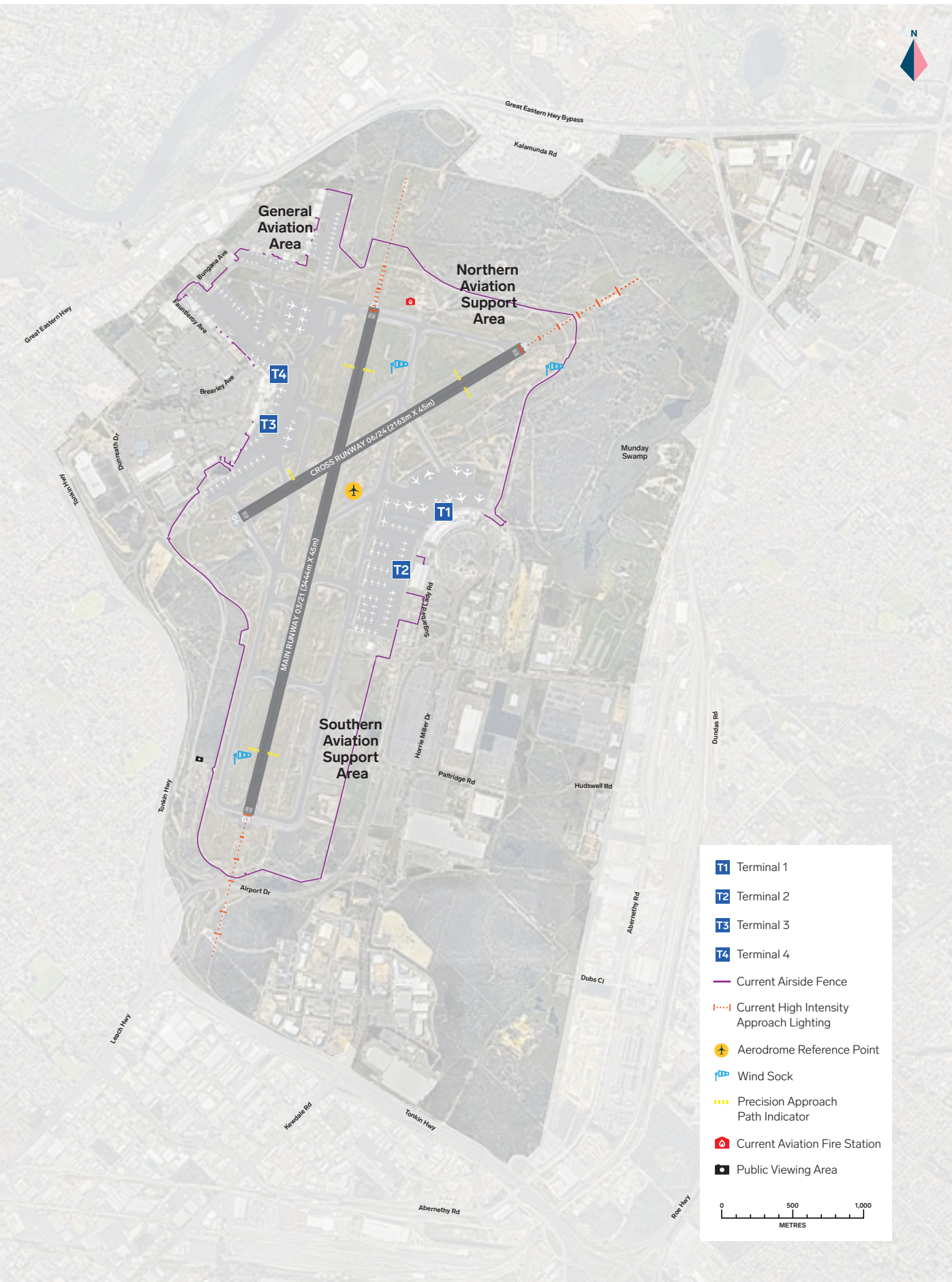


Figure 4-12 Location of aviation support services
Source: Perth Airport

4.7 Aviation Support

Perth Airport caters for the needs of more than 30 airline partners which rely on the services of aviation support operators to provide in-flight catering, ground handling, aircraft maintenance, fuel and air freight facilities. Current tenants on the airport estate include:

- three catering companies,
- five ground handling operators,
- 11 maintenance providers,
- three air cargo terminal operators, and
- a fuel terminal and hydrant network with two fuel providers.

It is difficult to accurately project further demand and timing for development of new hangar facilities as airlines and maintenance organisations typically have many options across their network. Several maintenance and freight organisations are likely to either relocate or develop purpose-built facilities at Perth Airport, some of which will result from the Qantas Group relocating operations to the Airport Central precinct by 2025.

There is expected to be continuing demand for new aviation support facilities including:

- aircraft parking associated with aviation support activities or for layover parking associated with adjacent terminal activities,
- facilities for line or base maintenance of aircraft by airline engineering or maintenance repair overhaul service providers,
- facilities for cargo terminal operators or integrators for air freight transfer, consolidation and interim storage,
- in-flight catering facilities, and
- facilities for the maintenance and storage of ground support equipment.

Perth Airport has identified three key areas for aviation support services as shown in Figure 4-12 and include:

- General Aviation (GA) Area, within the Airport West Precinct,
- Southern Aviation Support Area, located to the south of T2, within the Airport Central Precinct, and
- Northern Aviation Support Area, located to the north of taxiway Whiskey and to the east of Runway 24 threshold, within the Airport North Precinct.

The current GA Area caters for a variety of aviation support services including airline catering and aircraft maintenance. Aviation support operators will continue to be located in the GA Area.

The Southern Aviation Support area is ideally located to provide integrated services to passenger operations in Airport Central. This area was cleared, in readiness for development, in 2014 as part of the taxiway Charlie extension project. The Southern Aviation Support area provides a prime location for future development with airside frontage and proximity to the terminals in the Airport Central Precinct.

The Airport North Precinct, with landside access from Kalamunda Road (detailed in Section 5), will provide a suitable location for the development of aviation support facilities that require access to the GA Area. Most of this area is currently undeveloped.

4.7.1 Fuel Storage

Currently, Jet A-1 fuel is pumped from a depot at Kewdale via an underground pipeline to aboveground tanks at the Joint User Hydrant Installation (JUHI) located to the south of T2. Fuel is pumped from these tanks into the apron hydrant system for refuelling of aircraft on the aprons at all four terminals. This pipeline is currently operating near capacity and is expected to be upgraded during the planning period of this Master Plan 2020.

Air BP and Viva Energy have depots in the Airport West Precinct at the Joint Oil Supply Facility (JOSF). This depot has a Jet A-1 fuel hydrant to supply road transport vehicles used for fuelling aircraft that do not have access to hydrant points. Avgas is also supplied from this depot for fuelling of piston engine aircraft.

The existing fuel storage facilities are located within the Airport Central Precinct (JUHI) and in Airport West (JOSF).

There is current storage capacity for six million litres of fuel at Perth Airport. This corresponds to up to two days of reserve fuel storage after a typical daily fuel use of approximately three million litres is deducted.

During its operation, the JUHI facility has been expanded to meet demand, however, as the lease for all the existing fuel facilities expires on 31 March 2022 and the current location of the JUHI storage tanks are in an area required for the expansion of T2, the construction of additional storage tanks has not been undertaken.

4.7.1.1 Future Fuel Storage Development

The Perth Airport Master Plan 2014 identified that the current aviation fuel storage will need to be relocated in the future. The current aviation fuel supply chain at Perth Airport is constrained by the throughput capacity of the off-airport pipeline and on-airport storage capacity, which is less than 50 per cent of that recommended by the International Air Transport Association (IATA).

The current infrastructure does not provide appropriate levels of supply security or redundancy to manage a supply disruption. To achieve this, alternative modes for fuel delivery and increased on-airport storage are needed to mitigate the risk of a single point of failure and supply disruption.

As a result of these constraints, Perth Airport has been progressing the planning of a new fuel storage facility. The proposed fuel storage facility is critical to the efficient and economic development of the airport by ensuring adequate levels of fuel storage and supply for aviation operations. Any proposed fuel storage facility would likely be subject to an MDP and appropriate environmental and other approvals.

Construction of a new fuel facility that can be supplied by multiple modes (pipeline, road and rail) will reduce the requirement for on-airport storage due to the total volume of fuel available at the BP Refinery and multiple ways of delivering to the airport. It is therefore considered appropriate that sufficient fuel be stored on the airport to provide three to four days' supply.

The estimated average daily fuel uplift at Perth Airport in 2040 will be approximately 5,000 tonnes (6.3 million litres). This estimate was arrived at by analysing the routes served by various aircraft types, the average flight times (hours), and fuel burn rates (including improved efficiency).

For the purpose of future capacity planning and to allow the safeguarding of adequate land, a site of six hectares has been allowed for the new fuel facility, able to accommodate up to eight storage tanks, a road bridging facility and associated offices and staff facilities. Additionally, separate storage will be provided for the 'into plane' refuelling tankers. An airside remote fuel tanker filling facility will also be constructed for servicing aircraft in the GA Area and on bays not connected to the fuel hydrant system.

Until the new fuel facility is constructed and commissioned, the existing facility will continue to operate to ensure continuity of fuel supply.

The Perth Airport Master 2014 identified a potential site within the Airport South Precinct. While being ideally located for supply through the existing fuel pipeline serving the current fuel facility, this location would require supplementary deliveries by road tankers to cross the main passenger flow to the terminals along Airport Drive. Road tankers will be required to supplement the supply pipeline as fuel demand increases, due to the existing delivery pipeline approaching its capacity, or in the event of pipeline supply being interrupted.

An alternate site has since been identified within the Airport North Precinct. Preliminary planning for Airport North incorporates an intermodal rail terminal which could also allow the transfer of fuel from Kwinana by rail in the future. The current Midland freight rail line, which runs along the eastern boundary of the airport estate, allows for the opportunity to provide a private rail access for the direct delivery of freight by rail into the eastern portion of Airport North. This private rail access is a key consideration for the new fuel facility as it will allow the future development of rail access as an additional mode of supply.

Constructing the fuel storage facility within the Airport North Precinct does not conflict with the off-estate areas surrounding the precinct. Areas immediately adjacent to Airport North include major roads, a cemetery and a portion of the airport estate already developed for industrial use. The proposed Airport North site will have good heavy vehicle access to existing heavy haulage routes and would not conflict with passenger traffic accessing the terminals.

A JOSF installation will continue to operate servicing T3 and T4 until all commercial air services are relocated to the Airport Central Precinct by 2025. There may also be a requirement for a satellite facility to service general aviation aircraft.

4.8 General Aviation and Helicopters

Perth Airport recognises the importance of the GA and charter sectors to the tourism, business and resources economy. In recognition of this, Perth Airport will continue to maintain and expand the GA Area in a manner which supports this specific small-medium sized aircraft focused aviation area.

The GA Area is located adjacent and to the north of T3 and T4 within the Airport West precinct and comprises numerous leased facilities from which mainly non-RPT charter services operate. Up until mid-2018, the larger companies operating from this area were Skippers, Cobham Aviation Services Australia and Network Aviation. Interspersed within the GA Area are aircraft maintenance and other aviation support services companies.

Between 2008 and 2014, the level of activity in the GA Area increased significantly, due mainly to the demand for charter services by the resource sector's fly-in fly-out workforce deployment model. Perth Airport responded to this growth by completing the construction of T2 and provided upgrades to airside infrastructure and terminal facilities at T3. These investments provided facilities that are suitable for charter and regular passenger services. As such there is no current requirement for further significant terminal or passenger processing facilities in the GA Area beyond that necessary to support small scale regional and charter movements. Perth Airport has been and will continue to work with GA operators looking to transition new operations that are not suitable for the GA Area into existing and future common use terminals.

There are currently no dedicated helicopter landing facilities at Perth Airport. Current ad-hoc helicopter movements are managed by Air Traffic Control as and when required. Due to wake turbulence requirements, where helicopters must be held and separated from large fixed-wing aircraft, there are only limited areas on the estate where helicopters could operate independent of mainstream airfield operations. The GA Area is considered the most suitable location for helicopter operations. Should Perth Airport be approached by an operator, the need for helicopter facilities on the airfield will be investigated in consultation with Airservices Australia.

Perth Airport will continue to support general aviation and helicopter operations, in the current GA Area. However, large passenger terminals are not considered to be consistent with the intended use of the GA Area or the overall development plan for Perth Airport.



4.9 Air Freight

Perth Airport is working with industry and the State Government to grow air freight capacity, including the identification of infrastructure that will enhance the efficient movement of air freight as volumes grow.

The consolidation of all domestic and international commercial air services to the Airport Central Precinct by 2025 provides an opportunity to increase the efficiency of the air freight logistics chain. The relocation of Qantas operations into Airport Central and the planned future expansion of T2 will require the relocation of a number of the existing air freight operators on the estate. Perth Airport is also considering additional airside and landside freight facilities such as cold storage (in line with Department of Transport's future response in the *'Revitalising Agricultural Region Freight Strategy – Responding to Change, 2019 Draft'*), scanning and freight holding facilities to service the future growth in air freight capacity and movements.

To facilitate improved air freight operations, new freight facilities will be centred on future airside access gates. Possible future locations are within Airport West, Airport North, and to the east or west of Airport Central.

4.10 Air Navigation Facilities and Services

Airservices Australia is responsible for air traffic control, airport rescue and fire-fighting, and navigational services at Perth Airport. Airservices has the following operational services located on the estate:

- Air Traffic Control tower,
- terminal control unit,
- navigational and aircraft approach aids, including Instrument Landing System,
- terminal surveillance radar,
- en-route surveillance radar, and
- aviation rescue and fire-fighting service, and associated facilities.

The existing Air Traffic Control tower is located between the main runway (03L/21R) and the site of the new runway (03R/21L). With an eye level of 65 metres above ground level, the tower affords controllers a good view of all parts of the airfield movement area.

The operational requirement to maintain the line of sight for the control tower to the ends of the runways imposes limits on the height of developments in the building areas to the south of the tower.

Airservices currently operate a single Aviation Rescue Fire Fighting Service (ARFF) Station located adjacent to the runway 21 threshold. This facility provides a domestic response vehicle for first aid, motor vehicle accidents, fire alarms and special service calls.

Based on CASA and ICAO regulations, ARFF has varying levels of service which dictate the required amount of water and foam that is needed to be carried, the response times, water discharge rates and the number of personnel. For the majority of the time, the ARFF Station at Perth Airport is a Category 9 level of service. A Category 10 level of service is needed for Code F (A380) services, and as these only occur at certain times of the day, the Perth Airport ARFF Station upgrades to Category 10 in the hours that the A380 operates.

The planned new runway (03R/21L) will require relocation, upgrades, and new Airservices infrastructure, including an additional ARFF station. As part of the planning for the new runway, Perth Airport will continue to work with Airservices to determine appropriate locations for this infrastructure.

