Port Hedland International Airport Master Plan 2018 – 2038

DRAFT MASTER PLAN AND LAND USE REPORT

27 June 2019

Reference: TAG930

CHAIRPERSON FORWARD

March 11 2016 was an historic milestone in Port Hedland International Airport's history when the PHIA Group commenced operations and development of an important community asset.

Since then PHIA Group's underlying investors, AMP Capital and Infrastructure Capital Group, have committed to transform Port Hedland International Airport to become one of Australia's best regional airports.

As Chairman I am proud to present the Port Hedland International Airport Masterplan and Land Use Plan to cover planning for a 20 year period, from February 2018 to February 2038.

The Airport is the primary air transport hub in the Pilbara region, providing important air transport services to the community; to business and supporting the largest bulk tonnage Port in the world. This Masterplan supports the goals of the Airport and is a roadmap to guide future development in terms of aviation and non-aviation related activities.

The previous Masterplan was developed for the Town in 2012. Today's Masterplan further enhances some of those concepts in a post Local Government environment, whilst leveraging the skill-set and advanced resources of the PHIA Group.

Since transition day, the Airport team has been working diligently; operating the airport and identifying and prioritising various projects for its future expansion and development. This Masterplan identifies the key projects to enable the airport to meet the challenges of the future such as a new Taxiway Golf, an Asphalt Overlay of the Runway, Runway Lighting enhancements, and redevelopment of the passenger terminal building.

Our Airport is well-positioned to accommodate expected growth and to deliver a safe, efficient and optimal level of service to its users. Our stewardship will ensure that all development projects will be well planned, outcome focused and reflect our vision to make the community of Port Hedland proud by being one of Australia's best regional airports and the Gateway to the Pilbara.

Our vision for every customer is an experience that is safe, reliable, welcoming and comfortable; and we are committed to an uncompromising focus on safety and security in everything we do.

Our focus is on taking the Airport forward, whilst acknowledging its rich and vibrant history. Those times past, such as Sir Charles Kingsford Smith and his famous Southern Cross tri-motor aircraft and the group of 'dashing, dare-devil' aviators using the old racecourse aerodrome during the mid-1930's and the iconic 'Pilbara Milk Runs'.

We acknowledge the important Airport forefathers who pioneered key decisions and landmark lobbying. Their legacy outcomes for this Airport include an 817 ha land asset, International status and recognition as the 'Gateway to the Pilbara'.

One of the Masterplan highlights is the commitment to redevelop the terminal that will reflect the needs of the Pilbara region. In the 1940s, the terminal was a simple spinifex-roofed structure cooled by evaporating long-necked water bags. No longer, will an Airport user have to imagine a modern, flexible domestic and international terminal – this Airport will be ranked with the best in regional Australia.

The Airport is an integral part of the community and economy of Port Hedland, and is a critical component of the resource industry in the Pilbara. As we look to the future, our goals include:

- The creation of facilities and opportunities that meet the needs and expectations of our community, customers, stakeholders and shareholders;
- Emerging as the most significant economic transport precinct in the Pilbara, contributing to the employment and growth of the region; and
- Transitioning from an aviation and infrastructure facility, to an economic activity hub, attracting a variety of aeronautical and commercial services, facilities and developments.

This is a long-term investment in Port Hedland, beyond the airport fence. We are positioning the airport for the future with new technologies and innovation, whilst making considered decisions and pursuing tangible opportunities for growth.

This is an exciting time for all of us.

Hon. Cheryl Edwardes AM
PHIA Group Chairman

Document Version Listing

The table below outlines the document version listings for this Master Plan. The Master Plan was first provided to the Town of Port Hedland on 23 March 2018.

Version	Version Description	Changes/ Actions	Date
1.0	Final Draft	Final Draft issued to ToPH	23/03/2018
1.2	Revised Final Draft	Revised drafted based on peer review	30/01/2019
1.3	Revised Final Draft	Minor amendments to draft based on ToPH feedback	04/06/2019
2.0	Final Revised Draft	Minor amendments to draft based on ToPH feedback	27/06/2019

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Reference Documents

- Australian Airports Association Regional Airport Master Planning Guideline – March 2014;
- Port Hedland International Airport Master Plan – March 2012 (AirBiz);
- Port Hedland International Airport Master Plan – January 2011 (Whelans Town Planning and Parsons Brinckerhoff);
- Port Hedland International Airport Baseline Contamination Assessment – Preliminary Site Investigation – August 2016 (GHD);
- Port Hedland International Airport Environmental and Heritage Review – April 2017 (360 Environmental);
- Environmental Protection and Biodiversity Conservations Act 1999;
- Airports (Protection of Airspace) Regulations 1996;
- National Airport Safeguarding Framework;
- Environmental Protection Act 1986;
- Planning and Development Act 2005;
- State Planning Strategy;
- Regional Centres Development Plan;
- Western Australian Aviation Strategy 2015;
- Pilbara Regional Investment Blueprint;
- Pilbara Planning and Infrastructure Framework 2012;
- Regional Development Australia: Pilbara Strategic Plan 2013-2016;
- Pilbara Tourism Product Development Plan 2014;
- Pilbara's Port City Growth Plan 2012;
- Town of Port Hedland: Planning Scheme No. 5; and
- International Air Transport Association – Aerodrome Reference Manual.

Abbreviations

AAA	Australian Airports Association
ABS	Australian Bureau of Statistics
ACI	Airports Council International
ACN	Aircraft Classification Number
ADRM	Aerodrome Development Reference Manual
AEP	Annual Exceedance Probability
AFIS	Aerodrome Flight Information Service
AFRL	Aerodrome Reference Field Length
AFRU	Aerodrome Frequency Response Unit
ANEF	Australian Noise Exposure Forecast
ANEI	Australian Noise Exposure Index
ARFFS	Aerodrome Rescue Fire Fighting Services
AS	Australian Standard
AsA	Airservices Australia
ASS	Acid Sulphate Soils
ATC	Air Traffic Control
AWST	Australian Western Standard Time
BOM	Bureau of Meteorology
CASA	Civil Aviation Safety Authority
CTAF	Common Traffic Advisory Frequency
DIRDC	Department of Infrastructure, Regional Development and Cities
DME	Distance Measuring Equipment
DOW	Department of Water
DVOR	Doppler Very High Frequency Omnidirectional Range
EPA	Environmental Protection Act
EPBCA	Environmental Protection and Biodiversity Conservation Act
ERSA	En Route Supplement Australia
FAA	Federal Aviation Administration
FIFO	Fly In Fly Out
FYE	Financial Year Ending
GA	General Aviation
GDP	Gross Domestic Product
GFA	Gross Floor Area
GRP	Gross Regional Product
GSE	Ground Support Equipment
IATA	International Air Transport Association

ICAO	International Civil Aviation Organisation
ILS	Instrument Landing System
INM	Integrated Noise Model
LGA	Local Government Area
LoS	Level of Service
MOS	Manual of Standards
MRWA	Main Roads Western Australia
MTOW	Maximum Take Off Weight
NASF	National Airport Safeguarding Framework
NDB	Non-Directional Beacon
OLS	Obstacle Limitation Surface
OTS	Office of Transport Security
PAL	Pilot Activated Lighting
PANS-OPS	Precision Approach Navigation Surfaces – Operations
PAPI	Precision Approach Path Indicator
PAX	Passenger
PEC	Priority Ecological Communities
PFAS	Poly-Fluoroalkyl Substances
PHIA	Port Hedland International Airport
PHIA Op Co	Port Hedland International Airport Operating Company, PHIA Asset Pty Ltd as Trustee for the PHIA Asset Trust.
PSZ	Public Safety Zone
RCDP	Regional Centres Development Plan
RDA	Regional Development Australia
RDC	Regional Development Commission
RESA	Runway End Safety Area
RFDS	Royal Flying Doctors Service
RPT	Regular Public Transport
TAG	The Airport Group
TEC	Threatened Ecological Communities
TFI	Tourism Futures International
TNIP	Transparent Noise Information Package
ToPH	Town of Port Hedland
TRA	Tourism Research Australia
TWA	Transient Workers Accommodation
VSS	Visual Segment Surface
WA	Western Australia
WAPC	Western Australian Planning Commission

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Port Hedland International Airport (PHIA) plays an important role in supporting the Pilbara region. PHIA is a key transportation node connecting the people of the Pilbara region for leisure, business, and health and well-being. PHIA allows the region's mining and resource company's employees and stakeholders to efficiently access the world's largest bulk export port, the Port of Port Hedland.

PHIA Asset Pty Ltd as trustee for the PHIA Asset Trust (PHIA Op Co) acquired the lease for the operation of PHIA in March 2016. PHIA Op Co understands the important role the airport plays in the region and the national economy of Australia. PHIA Op Co is committed to ensuring that PHIA operates in a sustainable, safe and secure manner.

This 2018 Airport Master Plan outlines the existing context for PHIA, including the regional context and the regulatory and policy context. Further, the current situation of the airport is outlined, including both aviation and non-aviation related facilities and activities. A SWOT analysis is presented, outlining a number of strengths, weaknesses, opportunities, and threats for PHIA. The critical airport planning parameters follow, outlining key considerations for the future development of the airport including both aviation and non-aviation related aspects, and protection and safeguarded mechanisms. The land use plan depicts the six precincts that have been developed within this Master Plan, with supporting land use guidelines for each. The facilities development plan presents the key facilities and the strategy for these for future development. A ground transport plan depicts a high-level concept of a future ground transport layout at the airport, and the airport safeguarding plan presents considerations of airport safeguarding including noise, protection surface, and planning policy considerations. Lastly, an Implementation Plan is presented to provide a flexible strategy for implementation of this Master Plan.

This Master Plan presents the planning for the staged delivery of key airport infrastructure to accommodate the forecast airport and regional growth including the plan to redevelop the passenger terminal in addition to apron and taxiway development. Further, the Master Plan presents a strategy for the development of a Freight and Logistics Precinct to ensure that the regional mining, oil and gas, agricultural and other industries can leverage off the PHIA strategic regional location and its domestic and international airline connections. The Master Plan adopts broad land use plan to encourage and facilitate the growth of businesses that offer a diversity of jobs and career opportunities and provides infrastructure, facilities and services that serve as a catalyst and enable the private sector and the community to grow and prosper in the region.

INTRODUCTION

1 INTRODUCTION

1.1 Overview of the airport

Port Hedland International Airport (PHIA) is a certified and security-controlled aerodrome on the Pilbara coast, approximately 1,300 km north of Perth and located between the settlements of Port Hedland and South Hedland. The airport site is approximately 817 hectares and has been leased to PHIA Asset Pty Ltd for 50 years, commencing in March 2016.

The airport is an integral part of the community and the economy of Port Hedland and is a critical component of the resource industry of the Pilbara region. It provides for Regular Passenger Transport (RPT) and General Aviation (GA) air services to service the local community and industry.

During the 2016/17 financial year ending (FYE), PHIA recorded a passenger throughput of 365,619. As of October 2017, RPT services are currently provided by Qantas, Virgin Australia, and their subsidiaries who operate approx. 50 flights a week, including multiple daily flights to Perth and a weekly flight to Brisbane, several Pilbara mining airports and Denpasar (Bali). PHIA is also the base for emergency services, with a major Royal Flying Doctor Service (RFDS) base with multiple hangars located at the airport.

1.2 Aim and objectives of the Master Plan

The aim of the Master Plan is to plan for the future development of PHIA and make recommendations, taking into consideration the aspirations and requirements of the airport operator and the Town of Port Hedland (ToPH).

This Master Plan has a 20 year planning horizon which is designed to ensure the airport has capacity for and meets the forecasted future airport growth needs. Further, the Master Plan is prepared to reflect the Australian Airports Association (AAA) Regional Airport Master Planning Guideline.

The key objectives of the Master Planning process are to:

- Develop a Master Plan and land use report for PHIA to service the ToPH and the broader Pilbara region with international, interstate and intrastate air services;
- Provide comments and further recommendations that may impact on the future capacity requirements of the airport;
- Prepare a plan which will demonstrate the ability to satisfy the forecast air traffic demand up to 2038, whilst observing the required regulatory and policy settings applicable to PHIA;
- Develop an implementation plan to meet future capacity needs in a staged manner within an appropriate and economically justifiable time frame;
- Allocate and assign land, based on highest and best use principles to achieve the most optimal spatial outcome, in keeping with PHIA's overall business objectives;
- Review allocation and alignment of terminal facilities to achieve an optimal spatial outcome in accordance with IATA standards and keeping with PHIA's overall business objectives, those that use the airport and lease requirements;
- Maintain the airport as a major contributor to the local and regional economy and assist in the generation of regional economic growth;
- Balance economic, social, and environmental impact of the airport; and
- Ensure that legislative requirements are considered and adhered to.

1.3 Methodology and consultation

This report has been produced based on a combination of:

- A thorough desktop review and analysis of development and planning opportunities at PHIA;
- The engagement of specialists in regional airport forecasting and terminal planning; and
- Extensive stakeholder engagement with both internal and external airport stakeholders.

1.4 Report structure

The report is structured in ten key sections, based on the AAA Regional Airport Master Planning Guideline.

- Introduction;
- Master Plan context;
- Current situation;
- SWOT;
- Strategic vision and objectives;
- Critical airport planning parameters;
- Airport Master Plan;
- Facilities development plan;
- Ground transport plan; and
- Airport safeguarding plan.

BACKGROUND INFORMATION

2 MASTER PLAN CONTEXT

2.1 Historical background

PHIA commenced operations as a regional airfield in 1921 and is now the direct gateway to the world's largest bulk tonnage export port. The first regular service was provided by Western Australian Airlines between Port Hedland and Perth. In 1935, the Royal Flying Doctors Service (RFDS) established its first Western Australian base at the airfield, linking remote communities in the Pilbara region with Perth. To this day, this service continues to serve as a lifeline for the community in and around Port Hedland.

Figure 1: Port Hedland International Airport, circa 1938

In the 1960s, the growth in the mining of resources such as iron ore and salt in the Pilbara region triggered a steady increase in passenger numbers utilising PHIA. In 1967, BHP Billiton outlined their ambitions to export iron ore from the Port of Port Hedland, and by 1969 an iron ore crusher was built and the first iron ore shipment for BHP Billiton was sent to Nelson Point (Port of Port Hedland) to be loaded and shipped overseas.

This growth in mining activities and subsequent passenger growth established a need for the development of airport infrastructure. The original spinifex hut that served as the terminal was replaced by a fibro-cement terminal in 1956. The terminal was again rebuilt in 1971 to accommodate the demand generated by the mining industry and upgraded again in the 1990s.

In 2012, PHIA provided RPT services between Port Hedland and Perth, Brisbane, Melbourne, Darwin, Broome, Karratha and Bali. The airport experienced its peak in passenger movements in the 2012/13 FYE, with approximately 512,600 passengers. As a result of the resource sector moving from a construction to operational phase, the number of services offered decreased. PHIA now[1] offers multiple daily services to/from Perth and a weekly service to/from Brisbane and Bali. The total number of return weekly RPT services based at PHIA currently sits at approximately 50, with operators being Qantas, Virgin Australia and their subsidiaries. The airport also facilitates charter, flight training, general aviation services and helicopter operations.

[1] January, 2018

In March 2016, the ToPH leased the PHIA for a term of 50 years to PHIA Op Co. The site remains on a freehold tenure with the ToPH.

2.2 Regional context

The Pilbara region is located in the north west of Western Australia (WA) and is comprised of the four LGAs of Ashburton, East Pilbara, Port Hedland and Karratha. Commercial RPT airports are located in Karratha, Newman, Paraburdoo, Onslow and Port Hedland. There are also numerous B737 capable airports located across the Pilbara region supporting direct services to mine sites. In 2014/15 FYE, the region recorded a population of 66,000 and a Gross Regional Product (GRP) of $42.4 billion. The local economy is dominated by the resources sector, with strong representations of all key mining sub-sectors with the exception of coal mining. These sectors are key users of local air services. Figure 2 below shows the Pilbara region in the context of WA.

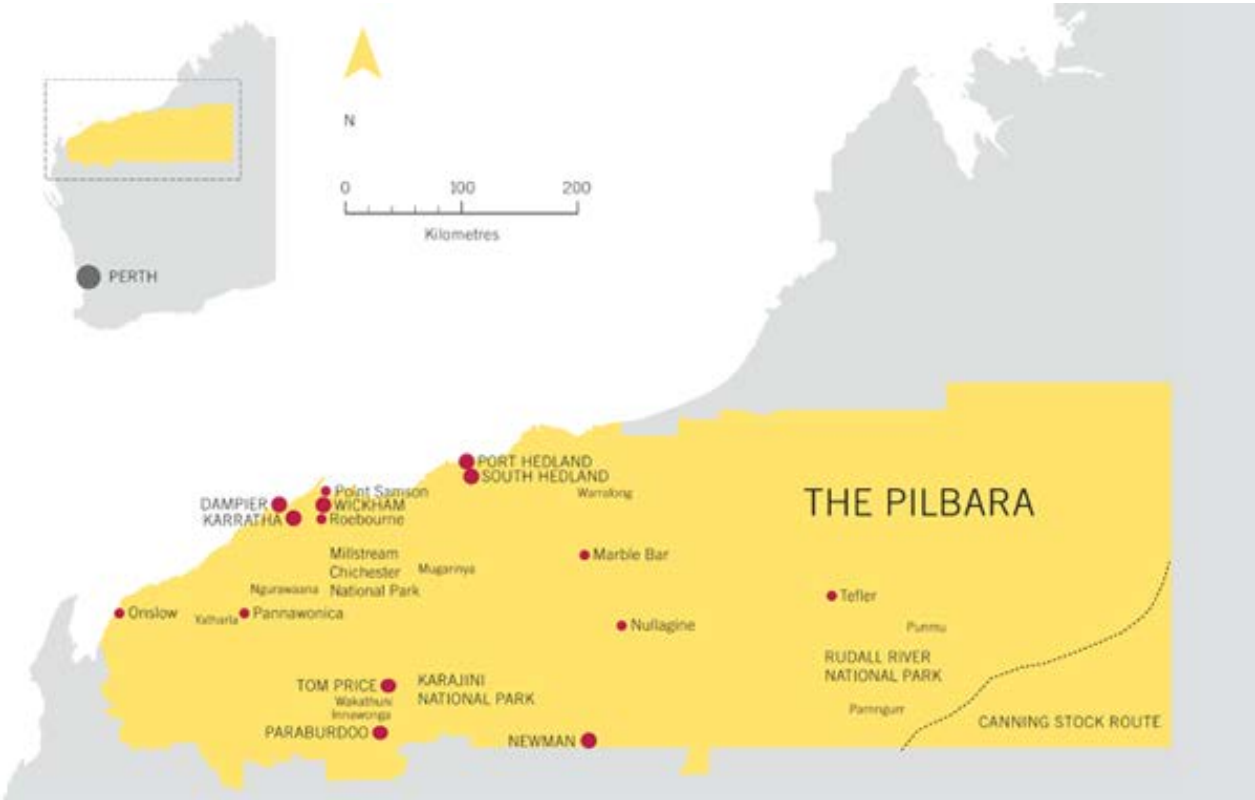


Figure 2: The Pilbara region (The Pilbara Project, 2011)

The region (Figure 2) is also home to three major international-calibre ports, Port Hedland, Cape Lambert and Dampier and several others in planning. Together, the Pilbara supports the largest and most sophisticated bulk exports program in the world (Pilbara Development Commission, 2015).

2.2.1 Regional relevance

PHIA is significant to the Pilbara region. Visitors to the region travel predominately by air (59.2%). A review of relevant strategic regional plans was undertaken to identify their key visions and objectives and how these are relevant to the PHIA Master Plan. The documents reviewed include:

- Pilbara Cities Vision;
- Pilbara Regional Investment Blueprint;
- Pilbara Planning and Infrastructure Framework;
- Regional Development Australia – Pilbara Strategic Plan 2013-2016; and
- Pilbara Tourism Product Development Plan.

Together, these plans create a robust vision for the region. They include aspirations for the ToPH to have a population of 50,000 by 2050; for the Pilbara to have two major airports providing extensive links from the region to the rest of Australia; and intention to capitalise on a competitive advantage by fostering links to Asia. Based on current population and respective projections, the population may not equate to the aspirational population

of 50,000 by 2050. However, within the period of this Master Plan and the airport lease, it is expected that the region, and the ToPH specifically, will increase in population. This is due to the fact that the sea port remains grow from its already level of high output on the back of the resources industry activity. Longer term infrastructure and tourism frameworks also highlight the importance of upgrading the airport as a regional hub. General regional goals include economic diversification and increasing local employment growth, which are underpinned by developing the need to attract and facilitate further infrastructure investment opportunities in the Pilbara.

The PHIA Master Plan 2018 contributes to the aspirations of the Pilbara region through the following key goals:

- Build upon the "Gateway to the Pilbara" experience;
- Provide for the upgrade and expansion of the Terminal to present a modern efficient passenger experience;
- Develop a land use framework that can accommodate the aspirations of the ToPH, regional planning and the future growth and prosperity of the Pilbara;
- Become the dominant intermodal transportation and logistics hub in the Pilbara;
- Encourage non-aviation and commercial development; and
- Foster opportunities for local employment and education.

2.3 Socio-economic context

PHIA is located within the jurisdiction of the ToPH which is in the Pilbara region in WA. The ToPH is approximately 1,600km north of Perth and has two main residential areas, namely Port Hedland and South Hedland. PHIA is approximately 13km from Port Hedland and 10km from South Hedland. Figure 3 below shows the location of PHIA within the ToPH.

Figure 3: PHIA site context

The world's largest bulk export port by tonnage, the Port of Port Hedland ("the Port"), is of high significance to the Australian economy. In 2014/15, 460 million tonnes were exported from the Port, with iron ore accounting for 98.8% of the total. Given the role of the airport in providing direct access to the Port, PHIA serves as a key piece of infrastructure in the region.

ToPH had a GRP of approximately $3.971 billion in 2015, accounting for 14.64% of the Pilbara GRP. As shown in Table 1, mining was the main industry of employment in both Port Hedland and the Pilbara region. In the Pilbara, it contributed to 67.98% or $32.122 billion of the total gross revenue, and 53.66% or $3.663 billion in the ToPH. Mining was followed by the construction and manufacturing industries.

Table 1: Employment by industry

Top Ten Industries	Pilbara Region	Port Hedland
Total	100% (44,956 people)	100% (16,483 people)
Mining	41.15%	25.32%
Construction	18.69%	18.05%
Accommodation & Food Services	5.49%	6.07%
Transport, Postal & Warehousing	5.24%	8.54%
Education & Training	3.40%	5.04%
Manufacturing	3.21%	5.51%
Health Care & Social Assistance	3.17%	6.46%
Administrative & Support Services	3.07%	3.42%
Public Administration & Safety	3.05%	3.92%
Professional, Scientific & Technical Services	3.04%	2.87%

Table 2 summarises key socio-economic statistics for Port Hedland and the Pilbara region.

Table 2: Key socio-economic statistics

Statistic	Pilbara Region	Port Hedland
Population (2015)	65,859	16,483
Average growth in population since 2011	+2.28%	+1.57%
Total number of people employed	44,956	8,570
Primary industry of employment and percentage employed (2015)	Mining (41.15%)	Mining (25.32%)
Median age (2015)	35.4	32
Median income (2015)	80,109	78,042
Gross regional product (2015)	$27.128 billion	$3.971 billion

2.4 Significant regional projects

Main Roads WA (MRWA) is currently developing plans for the realignment of the Great Northern Highway adjacent to the north eastern corner of the Airport lease. The purpose of the new alignment is to create more separation between heavy and light vehicles.

This project will impact PHIA based on the chosen access points and alignment design. The design has been largely completed, including the design of a bridge over the BHP rail line (east of the airport site). MRWA has engaged a consultant to determine the exact construction design, including the access points, connecting the existing highway to the new, realigned highway.

Currently, draft alignment drawings indicate that the highway will be realigned essentially from the beginning of the point which adjoins the airport site, to the next end which adjoins the airport site.

The timeframe for project completion is within the short to medium term (5-10 years). MRWA would be ultimately responsible for any development along the new aligned highway and the old highway would likely be transferred to the ToPH.

At the time of this Master Plan, final design drawings of the realignment had not been produced.

2.5 Regulatory and policy context

The development of PHIA is considered relative to Commonwealth, State and Local Government regulations and policies. This Master Plan is to be viewed as complementing State and Local Government land use planning while ensuring the operational integrity and continued viability of PHIA.

The airport site is assessable in accordance with Federal, State and Local Planning policies. Major Commonwealth agencies and legislation that control, support or have influence on the airport's operations are:

- Civil Aviation Safety Authority (CASA);
- Department of Infrastructure, Regional Development and Cities (DIRDC);
- Office of Transport Security (OTS);
- Australian Federal Police;
- Department of Immigration and Border Protection;
- Air Navigation Act 1920;
- Air Services Act 1995;
- Aviation Transport Security Act 2004;
- Environmental Protection and Biodiversity Conservation Act 1999;
- Endangered Species Protection Act 1992;
- Aboriginal and Torres Strait Islander Heritage Protection Act 1982;
- Australian Heritage Commission Act 1975; and
- The Lease Agreement between the ToPH and PHIA Op Co.

A discussion of key documents is provided in the proceeding section.

2.5.1 Federal regulation

Environmental Protection and Biodiversity Conservation Act 1999

The Environmental Protection and Biodiversity Conservation Act (EPBCA) 1999 is the Australian Government's key piece of environmental legislation which commenced on 16 July 2000. The EPBCA provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the Act as matters of national environmental significance. It is not likely the development at PHIA will have national environmental significance, but it is important to acknowledge the EPBCA nonetheless.

Airports (Protection of Airspace) Regulations 1996

The Federal Minister for Transport can protect the airspace surrounding an airport in accordance with the directions provided in the *Airports (Protection of Airspace) Regulations 1996*. The object of these Regulations is to establish a system for the protection of airspace at, and around, airports in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of airports.

AirServices Australia (AsA)

AirServices Australia (AsA) is responsible for providing air traffic control services for controlled airspace. Within this airspace it provides aerodrome and approach control services to arriving and departing aircraft. PHIA is not within controlled airspace and operates based on an Aerodrome Flight Information Service (AFIS). AsA also provides the industry with the rules for flying aircraft and handles noise complaints.

National Airport Safeguarding Framework
The National Airports Safeguarding Framework (NASF) is a national land use planning framework that provides guidance on development that affects or is in close proximity to aviation operations. The NASF aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports;
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions; and
- Improve aircraft noise disclosure mechanisms.

2.5.2 State regulation

Environmental Protection Act 1986
The Environmental Protection Act (EPA) 1986 is the key piece of environmental legislation for WA. The act provides for the prevention, control and mitigation of pollution and for the conservation, preservation, protection, enhancement and management of the environment.

The key role of the EPA is to provide the government with advice on the environmental acceptability of development proposals and statutory planning schemes. Development proposals include industries, such as mining and infrastructure such as ports, airports and railways.

Any proposal for development that is likely or has potential to have significant environmental impacts or effects should be referred to the EPA.

Planning and Development Act 2005
The Planning and Development Act 2005 is the primary piece of planning legislation for WA. The purpose of the Act is to provide for an efficient and effective land use planning system for the state and to promote the sustainable use and development of land in the state. The Act endeavours to:

- Establish and specify the functions and powers of the Western Australian Planning Commission (WAPC);
- Establish the need for and process by which the WAPC can create and administer state planning policies, region planning schemes, planning control areas and interim development orders whilst identifying the relationships between these instruments;
- Provides the power for local governments to develop local planning schemes for their area and establish the processes by which these plans should be formulated, administered and reviewed; and
- Establishes the requirement for WAPC approval to subdivide or amalgamate any lot and outlines the functions of the WAPC and processes they must follow in dealing with applications of this nature.

State Planning Strategy
The State Planning Strategy 2050 is developed to provide a credible State strategic context and basis for the integration and coordination of land-use planning and development across state, regional and local jurisdictions. Within this Strategy, accessibility into the airports within the Pilbara region is identified as being critical to the efficiency of the resources industry and State and national economic growth. The Strategy highlights the need to ensure infrastructure at these airports is developed in a timely manner.

Regional Centres Development Plan
The WA Governments Regional Centres Development Plan (RCDP) has been developed to support the implementation of the State Planning Strategy 2050 and enforce the delivery of regional growth plans across WA. For example, the Pilbara investment blueprint through the Pilbara Cities Initiative. The plan endeavours to provide a framework to facilitate growth in regional centres and set benchmarks for performance and tools for implementing recommendations such as collaborative partnerships.

Contaminated Sites Act 2003
WA environmental laws, in particular the Contaminated Sites Act 2003, are specifically designed and applied to ensure contaminated sites (including Poly-Fluoroalkyl Substances (PFAS) contaminated sites) are identified, investigated and, where necessary, cleaned up. The object of the Act is outlined as “to protect human health, the environment and environmental values by providing for the identification, recording, management and remediation of contaminated sites in the State”. Any contamination (as defined in Part 4, page 4 of the Act) on the PHIA site must be treated in accordance with the Act.

Western Australian Aviation Strategy 2015

The Western Australian Aviation Strategy was released in 2015. The strategy is intended to complement the State's other key transport strategies covering freight and public transport services. It is aimed at supporting the economic and social development of WA through the provision of safe, affordable, efficient and effective aviation services and infrastructure. The Strategy is set to be formally reviewed in 2020. Key priorities identified are to:

- Directly engage major regional airports in relation to forecasts of aviation activity, particularly in relation to Master Planning;
- Improve infrastructure planning and development at local government owned regional airports;
- Encourage private sector investment in, and management of, regional airports to improve their effectiveness and efficiency;
- Foster the development of tourism through improved aviation services; and
- Encourage competition on intrastate air routes and seek to reduce the high cost of intrastate airfares.

2.5.3 Regional planning frameworks

Pilbara Regional Investment Blueprint

WA has nine Regional Development Commissions (RDC). PHIA is located within the Pilbara Regional Development Commission area. There is a requirement for each RDC to produce a Regional Investment Blueprint to set out the long-term vision for the region. The Pilbara RDC produced a Blueprint with a vision out to 2050, within which opportunities, initiatives and priorities for the region to achieve aspirational economic and community development outcomes were outlined. The Blueprint aims to:

- Encourage diverse investment in the region;
- Inform infrastructure planning, investment and delivery decisions; and
- Maximise social, environmental and economic outcomes for local communities, the state of WA and the nation as a whole.

This is achieved through the development of nine regional pillars based on the analysis of needs, regional interests and comparative advantages that will deliver new sources of growth. One of these pillars is 'land access and economics' which identifies the continued investment in transport infrastructure, including airports, will be required to meet the plans objectives.

Pilbara Planning and Infrastructure Framework 2012

Pilbara Planning and Infrastructure Framework 2012 ("the Framework") sets out a range of strategic planning goals, objectives and actions to address opportunities and challenges, such as the provision of adequate physical and community infrastructure to accommodate population growth over a 25-year period from 2012.

The framework additionally identifies an economic development vision whereby the Pilbara will have a robust, diverse and sustainable regional economy to effectively service the needs of its industry and commerce. The transport vision of the framework encompasses meeting the region's projected expansion of economic activity and population, with equitable access for residents and industry and a practical, safe and affordable opportunities for travel. The air transport priorities included within this plan include the upgrading of PHIA.

Regional Development Australia: Pilbara Strategic Plan 2013-2016

Regional Development Australia (RDA) is a partnership between the federal, state and territory, and local governments to support the growth and development of Australia's regions. The RDA Pilbara has developed four key priority areas that are to:

1. Attract and facilitate infrastructure investment in the Pilbara;
2. Promote economic diversification and capitalise on the Pilbara's competitive advantage;
3. Support priority sector investment projects that meet the aspirations of longevity and sustainability; and
4. Support the community sector to promote liveability through place-based solutions for local communities.

The RDA Pilbara identified a wide range of investment projects that are vital to future growth but can also offer sound returns on investment which included the airports in the region. Airports throughout the region were expected to experience a dramatic rise in patronage and upgrades were expected to be required at all major locations to handle future increased passenger loads.

Pilbara Tourism Product Development Plan 2014
Pilbara Tourism Product Development Plan 2014 provides a framework for the long-term development of the tourism industry in the region based on product development, marketing and promotions, and training and support. Various priority initiatives and target markets which will contribute to the achievement of tourism industry growth in the region are identified.

2.5.4 Local government regulation

Pilbara's Port City Growth Plan 2012
The Pilbara's Port City Growth Plan is a local strategic planning document for the ToPH. The plan sets out a vision for the township that is supported by five core themes to guide and accommodate future growth. These themes are:

- Sustained and diversified economic growth;
- Strengthening local communities and culture;
- Housing diversity and land supply capacity;
- Environmental protection and change adaptation; and
- Building and maintaining infrastructure capacity.

The plan highlights that PHIA is to be a centre for services and employment and has indicated that land south of the runway would be a prime location for industrial development (as evidenced by the development of the Kingsford Smith Business Park).

Town of Port Hedland: Planning Scheme No. 5
The relevant land use planning document for the PHIA is ToPH Planning Scheme No. 5. The Planning Scheme is in the process of being updated to Planning Scheme No. 6.

Land use and zoning
PHIA is located within the Airport Precinct of the Planning Scheme. The objectives for the Airport Precinct, as outlined in the Planning Scheme (Section 5.3.4), are to:

- *"Protect options for future airport infrastructure within the precinct;*
- *Ensure that development within the precinct meets prevailing noise and height limitation standards associated with the operation of aircraft; and*
- *Ensure that any commercial development reinforces the transportation functions of the airport".*

PHIA is zoned as "Airport" within the Commercial category of the Planning Scheme No. 5. Within the Development Requirements section of the Planning Scheme (Section 5.10 of the Planning Scheme), there are two specific requirements prescribed within the "Airports" designation These are:

- *"No development, within the height restriction areas indicated on the Obstacle Limitation Surfaces map in the Local Planning Policy Manual shall exceed the height restrictions indicated in the manual; and*
- *Development within the Residential, Commerce, Health, Welfare and Community or Entertainment, Recreation and Culture categories in the zoning table is not permitted inside the 25 ANEF contour of the Australian Noise Exposure Forecast map contained in Appendix 6. When considering development applications, the local government may vary the requirements of this clause where it is satisfied that aircraft noise will not unduly impact on the proposed use or the development is specifically constructed to attenuate the impact of aircraft noise."*

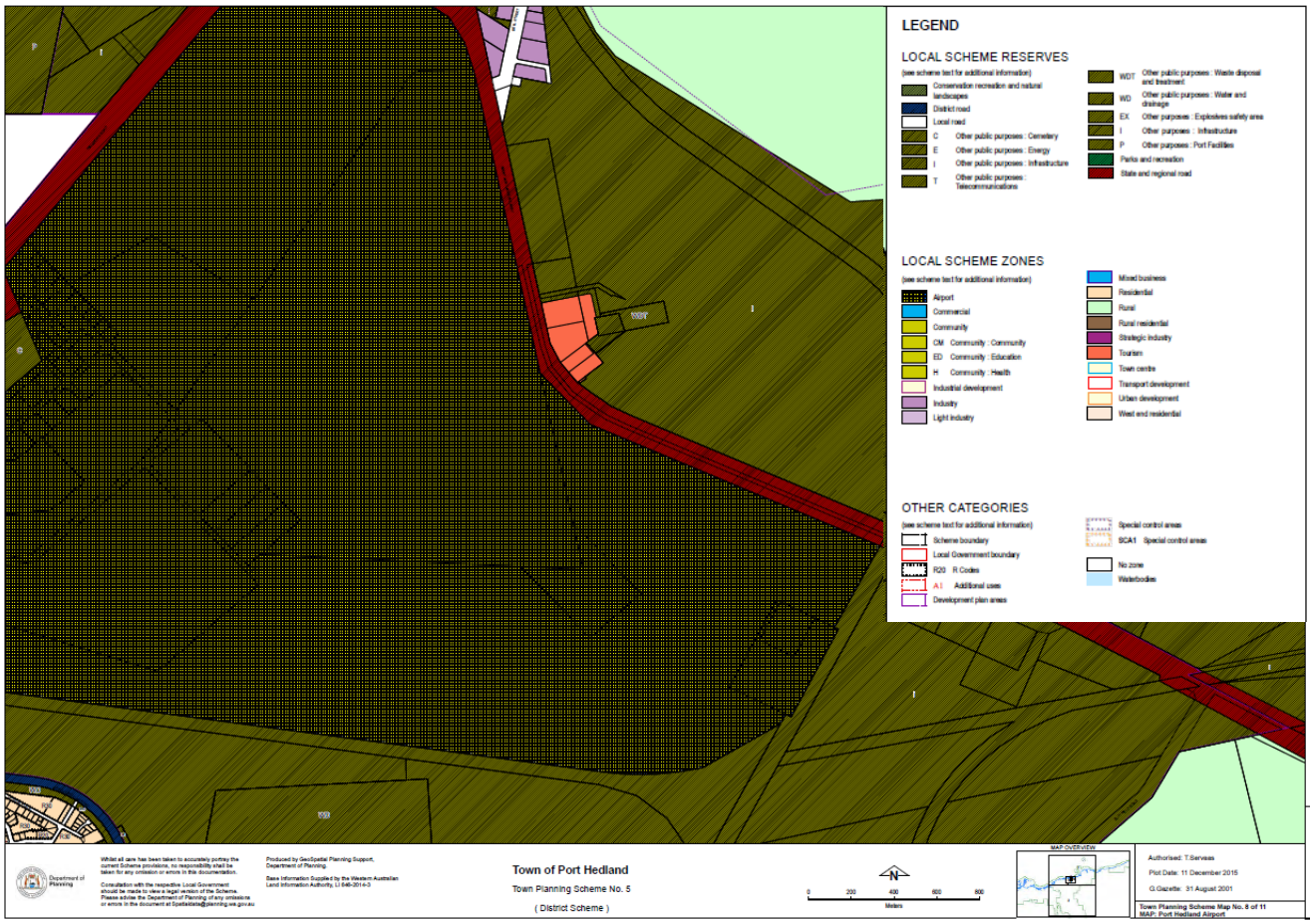


Figure 4: Airport Zone in Planning Scheme No. 5

Within the current Planning Scheme, there are three land uses which are directly permissible within the Airport Zone in the Planning Scheme. These uses, and their adopted definitions, are presented below in Table 3.

Table 3: Permissible land uses in Airport Zone

Land Use	Definition
Aerodrome	Land, buildings and facilities provided for the purpose of landing, take off, refuelling, maintenance, loading and unloading of aircraft.
Motor Vehicle and/or Marine Service Station	Land or buildings used for the retail sale of fuel and lubricants and motor vehicle or marine vessel accessories and may include minor repairs, motor vehicle wash facilities, cafe/restaurant or sale of convenience items with a nett lettable retail floor space not exceeding 300m^2, but does not include a transport depot, spray painting, major repairs and wrecking.
Emergency Services	Land or buildings used to store and maintain emergency vehicles and equipment, coordinate response to emergency events and may include training facilities and caretakers' dwellings.

In addition to approved uses, there are numerous land uses which are permissible either with planning approval, with planning approval after public notice, or if incidental to the predominate use. An example of land uses permissible with planning approval includes: Hotel, Transient Workforce Accommodation (TWA), Distribution Centre, Industry Light, Storage Facility/Depot/Laydown Centre; and Motor Vehicle Wash. A full table of uses

permitted within the Airport Zone is presented in Appendix A – ToPH Planning Scheme Land Uses Table.

The Airport Lease
PHIA's ongoing compliance with Planning Scheme No. 5 is a key consideration within the 50-year airport lease. As per this lease, ToPH will retain its statutory role to approve development proposals under the Town Planning Scheme No. 5, which will continue to be the relevant document used by ToPH for the assessment of building and development proposals by Port Hedland Op. Co. When ToPH Planning Scheme No. 6 comes into effect, that scheme will prevail.

2.5.5 Other relevant planning considerations

Australian Airports Association
The AAA is the national voice for Australian airports and represents the interests of over 260 airports and aerodromes across Australia. In 2013, the AAA commissioned the Regional Airport Master Planning Guideline to assist regional airport operators who often do not have the planning knowledge or resources typically available to the larger airports. This Master Plan largely reflects the 2014 revised version of these guidelines.

International Air Transport Association
The International Air Transport Association (IATA) produces the Airport Development Reference Manual (ADRM) which provides guidance on designing airport facilities. These standards are adopted globally, and are widely accepted as best practice within Australia. The standards provide airport operators with guidelines for space standards of terminal facilities and waiting times for each of these service levels.

The IATA, in collaboration with the Airports Council International (ACI), has recently updated the ADRM. The 10th Edition of the ADRM was published in 2014. New guidelines were introduced to include facilities involving self-service processing which did not exist in the past editions of the ADRM. The IATA ADRM explains that the approach to the Level of Service (LoS) has been modified to better reflect the current aviation market from a global perspective. The new updated benchmarks for LoS now reflects a range of values for space and time to allow an airport to tailor its service level to the market and region it serves. IATA recommends that the appropriate LoS value should always be established in consultation with all stakeholders, including the airport's airline community, airport management and other service providers. The ADRM 10th Edition defines three LoS: overdesign; optimum; and sub-optimum. The level adopted for this Master Plan is 'Optimum'[2]. How this is manifested at PHIA is detailed in Section 6.7 (current context) and Section 9.2.1 (future context).

2.6 Previous and current Master Plans
In 2011, ToPH engaged Whelans Town Planning and Parsons Brinckerhoff to produce a Master Plan (the 2011 Master Plan) that planned for the future development of PHIA while protecting the key operational areas. It identified four precincts for a range of landside development opportunities.

In 2012, Airbiz undertook a review of the 2011 Master Plan, and focused on planning of the operational areas of PHIA to cater for the unprecedented growth PHIA had been experiencing since 2002.

As part of the review in producing the 2012 Master Plan, Tourism Futures International (TFI) completed a passenger forecast in 2011 that forecasted passenger numbers to 2031. TFI identified a number of challenges in the preparation of the 20-year forecast for the airport due to the relationship between passenger numbers and mining, construction and port activities. Due to these challenges, a range of scenarios was produced.

The 2012 Master Plan staged development into three phases. Listed below are the key proposed developments listed under Phase 1 which spans the 2011-2021 period:

1. Terminal expansion;
2. GA apron expansion and new Code C apron edge taxilane for the GA area;
3. RPT apron expansion; and
4. New Code F taxiway.

The two Master Plans produced for ToPH in 2011 (Whelans) and 2012 (Airbiz) address separate components of the airport planning process. The 2011 Master Plan largely focused on land use planning concepts, whereas

[2] As a result of the ToPH Special Meeting on 17 December 2018, the Council moved to change the standard reference used from 'LoS C' to the updated IATA ADRM 'Optimum'. (Council Decision CM201819/101).

the 2012 Master Plan addressed airfield and airspace planning. The 2012 Master Plan by Airbiz is the Master Plan currently adopted, which is being superseded by this Master Plan.

2.7 Key stakeholders

A thorough program of stakeholder engagement was undertaken as part of PHIA Master Planning process in late 2016. Engagement occurred either via face-to-face individual meetings, in a workshop format, or via teleconferencing. TAG coordinated and chaired each engagement session, and representatives from PHIA participated where possible.

The following key stakeholders were engaged:

- Town of Port Hedland;
- Local community;
- Airport Liaison Committee;
- Resource industry peak bodies;
- Resource sector companies;
- Pilbara Ports Authority;
- Airline representatives;
- Department of Immigration and Border Protection;
- Local real estate agents;
- Port Hedland Chamber of Commerce; and
- Port Hedland Development groups (e.g., Community Progress Association Inc.).

CURRENT SITUATION

3 CURRENT SITUATION

3.1 Ownership and management

In March 2016, a 50-year lease of PHIA was acquired by PHIA Op Co. PHIA Op Co's shareholders are specialist infrastructure investment companies. The lease transfers all responsibility for maintaining, operating, developing, and managing the airport from the ToPH to PHIA Op Co for the term of the lease.

3.2 Site description

The airport falls within the jurisdiction of the ToPH and is located on a site which has an area of 817 hectares. It is bordered by the Great Northern Highway on two sides. The southern side is bordered by the BHP Billiton iron ore railway line. This is shown in Figure 5**.**

Figure 5: PHIA lease boundary

3.3 Surrounding land

Much of the land surrounding the airport site is zoned as rural, or rural residential. Additionally, some industrial zoning and transport development areas are located nearby.

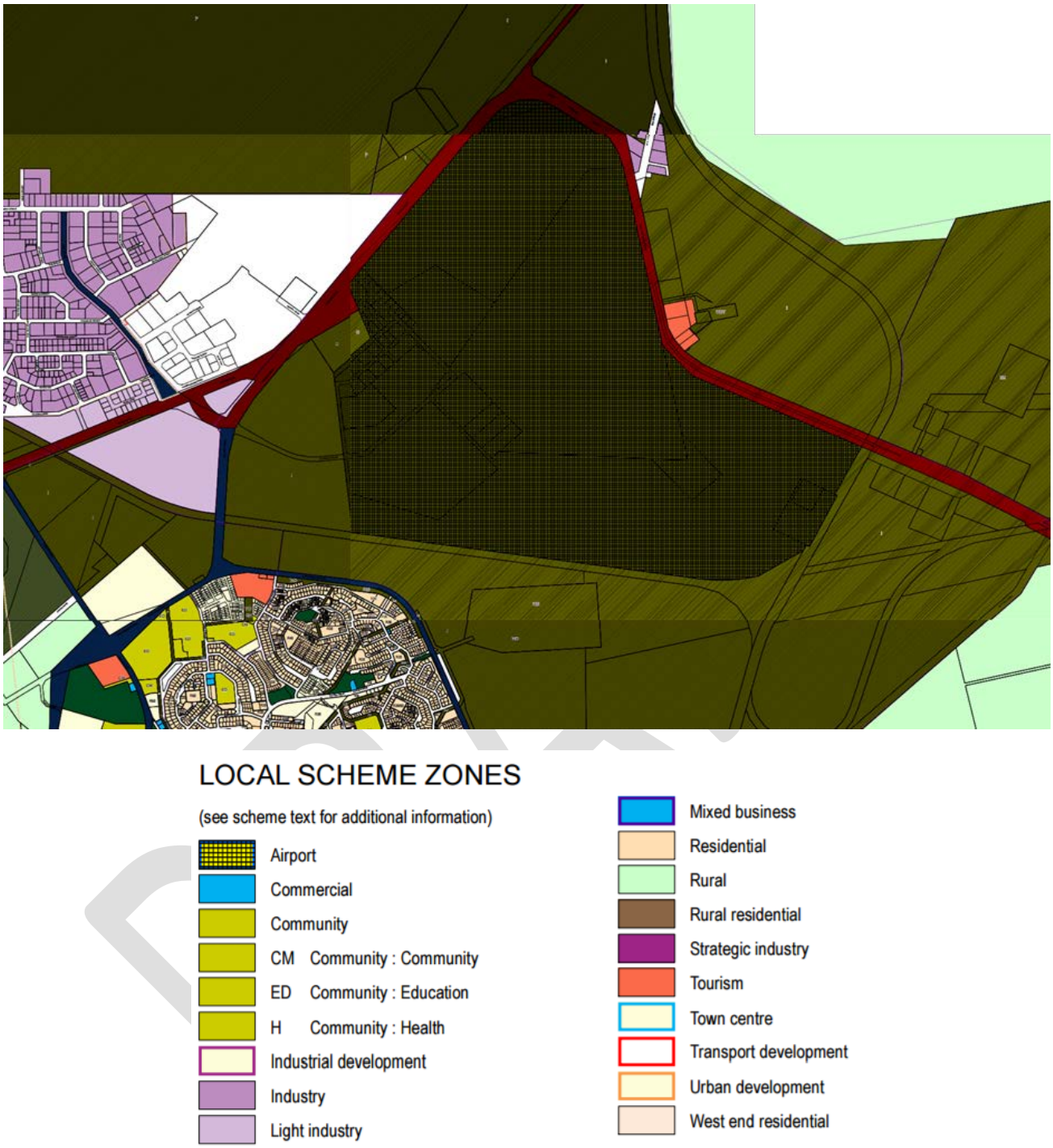


Figure 6: Land use zoning around PHIA (adapted from Planning Scheme)

3.4 Existing activities

The following section describes the existing non-aviation and aviation related activities at PHIA.

3.4.1 Non-aviation related activities

The 2012 Master Plan (Airbiz) identified four key precincts within the airport site. These are depicted in Figure 7 below.

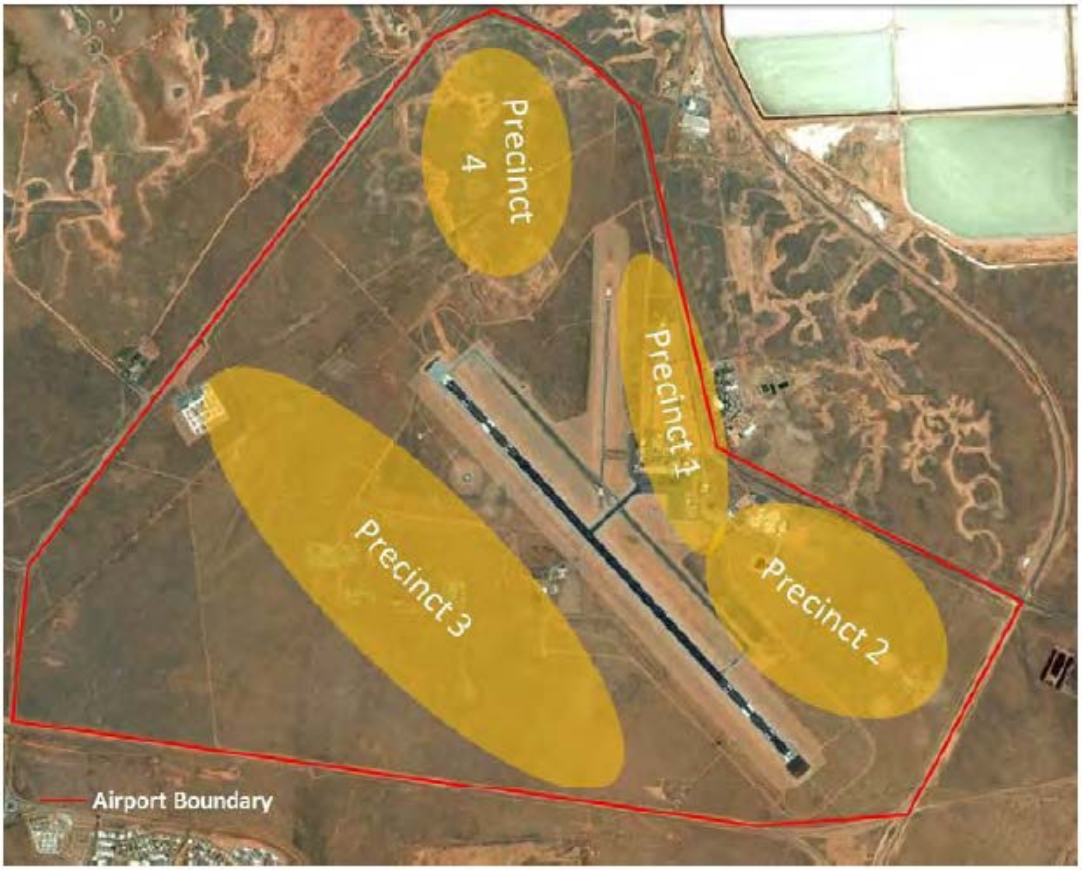


Figure 7: Land use precincts defined in the 2012 Master Plan (Airbiz, 2012)

Precinct 1 contains the RPT terminal, public car parks and ground transport operations, rental car facilities, staff housing, the Bureau of Meteorology, general aviation services, freight facilities and the RFDS.

Precinct 2 includes two TWA facilities, namely the Mia Mia Port Hedland hotel and the ESS Port Haven Village. A non-directional beacon (NDB) and a high frequency radio antenna array operated by Airservices Australia are also located within Precinct 2. Further, this precinct houses the Port Hedland State Emergency Service Unit and commercial tenancies.

Precinct 3 houses the Aerodrome Rescue and Fire Fighting Services (ARFFS) and the airport control tower.

Precinct 4 is undeveloped and development is constrained by its location and hydrological and access issues. Development is constrained to accommodate passive uses (Airbiz, 2012).

The precincts presented above have been superseded by this 2018 Master Plan.

3.4.2 Aviation related activities

PHIA offers RPT services to Perth and Brisbane. Currently, Qantas, Virgin Australia and subsidiaries service the airport. Virgin offers international flights to the Indonesian Denpasar Airport located in Bali. There are also GA, charter, flight training and domestic freight services. The airport is also a significant base to the Royal Flying Doctor Service and the ability to land helicopters is located on site. Additionally, international freight operators use PHIA infrequently.

3.5 Passenger movements

The historical passenger and aircraft movements from 1985/86 and 2015/16 FYE are presented in Figure 8. There was a notable increase in movements, both passenger and aircraft, during the growth in the resource sector in the late 2000s. From 2008/09 FYE, the movements increased at a faster rate until it peaked in 2011

with a passenger number of 512,630. Following this, the passenger numbers softened, again to coincide with to the completion of the mining industry construction phase and transition to an operational activity phase.

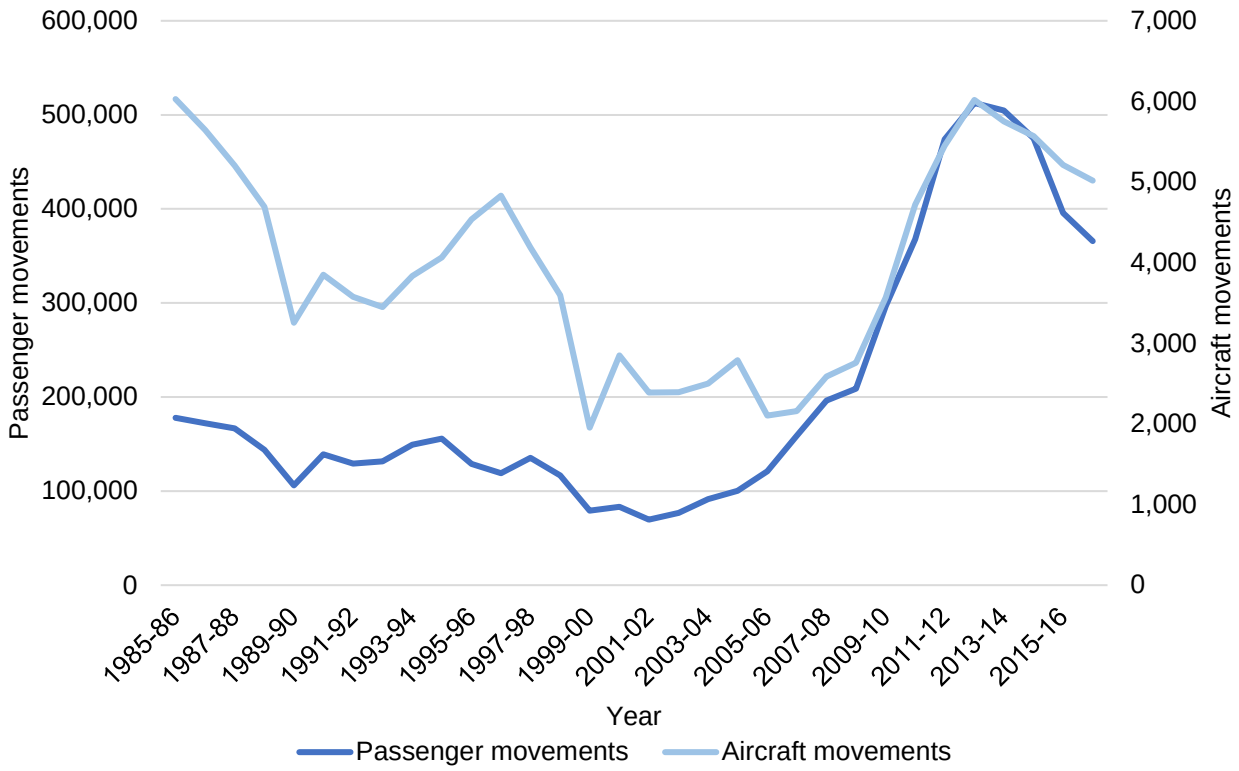


Figure 8: Historical passenger and aircraft movements at PHIA (BITRE, 2016; PHIA data)

3.6 Existing facilities

The following section describes the existing aviation and non-aviation related infrastructure and facilities at PHIA.

3.6.1 Non-aviation related facilities

Backup power compound

There is a HV/LV power compound located on the eastern end of the main RPT apron which was commissioned by ToPH in January 2016. There are two generators located in the compound. It supplies standby power to critical airport activities such as runway lighting, airfield lighting and the terminal. In addition, it provides some backup power to the tenants surrounding the terminal and onsite staff residences.

Non-aviation fuel facilities

Fuel for operational vehicles is stored in a small (approximately 3,000 litre) tank located near the operations shed. Fuel for the backup generators (a 20,000 litre diesel tank) is located within the backup power compound.

Avis (car rental) has both underground and above ground fuel storage facilities. Budget (car rental) previously had underground fuel storage but they are no longer in use.

Port Hedland Riders Compound

This building is located within Precinct 1 (as per the 2012 Master Plan) and has highway frontage. It is currently occupied by the Port Hedland Motorcycle Riders Club House.

Services yard and workshop

This workshop and yard is located to the east of the short-term car park. It is currently under lease for general storage purposes and maintenance.

Town of Port Hedland archive building
This building is located near the Services Yard. It is used by the ToPH Administration Services as an archival facility.

School of the Air Storage unit
This is a brick building located next to the RFDS hangars fronting the GA apron. The building does not have airside access.

Airport operations building
The old PHIA Operations Building is in a prime location with frontage to both the main and northern GA aprons. There is a small undercover staff car park adjacent to the building. Alternative uses are being considered for the building, including heliport support facilities and further commercial office space. The PHIA operations team an office and amenities in the building.

Office building
Russell Aviation currently uses a transportable office building behind the hangar fronting Bay 4 on the RPT Apron as storage. The office complex behind this hangar is vacant.

Airport operations housing
There are four residential houses located to the north of the terminal which are used to provide accommodation services for PHIA.

Fire pump house facility
There is an area to the north of the terminal which contains a building with two diesel fire pumps and a jacking pump with two large 300,000 litre water storage tanks. It is used to provide firefighting booster facilities to the terminal building and red fire hydrants on the main apron.

It is located within Precinct 1 (as defined in the previous Master Plan). The previous (2012) Master Plan highlights that consideration should be given to the relocation of the facility to a more appropriate and more secure location within the airport. A review of the need for such a facility will be undertaken as a part of the redeveloped terminal complex.

Transient worker accommodation camps
There are two TWA camps located east of terminal which both have highway frontage.

State Emergency Service Building
This is located adjacent to a TWA with highway frontage.

Incinerator building
There is an incinerator building located within Precinct 3. It is not currently being serviceable and longer required.

Freight facilities
PHIA has a freight hangar which is currently accessed using the same road as the pick-up/drop off zone at the front of the passenger terminal. A freight parking area also exists on the landside of the hangar. This facility has access to airside opposite Bay 3 of on the RPT Apron. This facility will be demolished as part of the terminal redevelopment and expansion.

Bonded goods store
There is a bonded goods store within the workshop area behind the Hedland Riders facility.

Car rental storage
Car rental companies operating at the airport (Avis, Budget, Hertz, and Thrifty) have storage areas surrounding the bus parking area at the front of the terminal. These storage areas have varying lease terms. In addition, there are some car rental overflow areas located to the east of the terminal near the Great Northern Highway. These are leased on a monthly basis.

3.6.2 Aviation related facilities

Runways

PHIA has two runways as shown in Figure 9. The primary runway (14/32) supports instrument flight procedures, allowing all-weather operations. Both runway ends have an illuminated wind direction indicator. The 14/32 runway is Code 4D with allowance of restricted Code E operations.

The shorter secondary runway (18/36) does not currently support instrument flight procedures. It is a Code 1B runway.

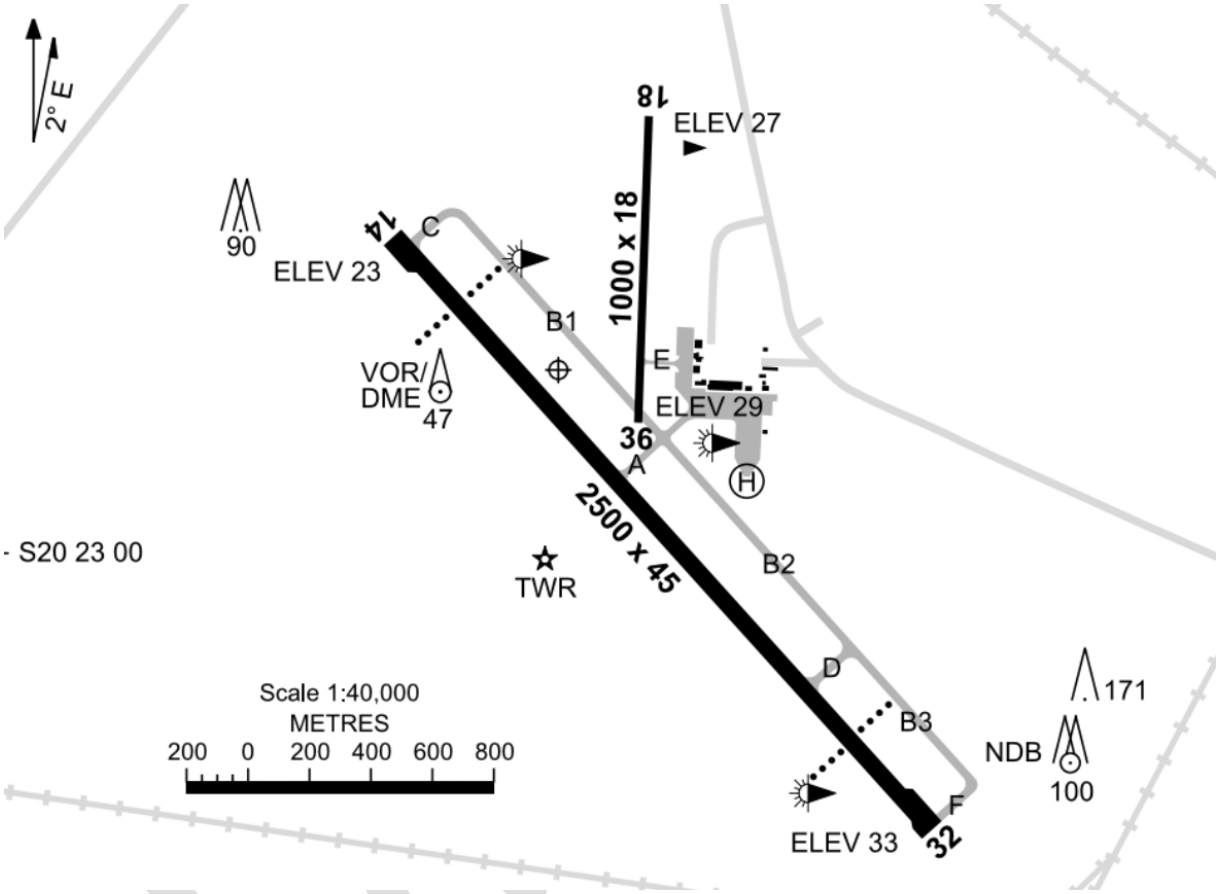


Figure 9: PHIA ERSA (Airservices)

Runway pavement strength

The primary 14/32 runway has a flexible pavement with a pavement classification number of 39. It has a 'high strength' subgrade strength category and can support aircraft operating with a maximum allowable tyre pressure of up to 174 psi (1,200 kPa).

The secondary runway (18/36) also has a flexible pavement and a 'high strength' subgrade strength category. It has a lower PCN number of 8 and can only support aircraft with a maximum allowable tyre pressure of up to 80 psi (550 kPa). It is also restricted to aircraft with a maximum takeoff weight (MTOW) of 5,700 kg.

Further details of the two runways are provided in Table 4.

Table 4: Runway characteristics at PHIA

Characteristic	Runway 14/32	Runway 18/36
Runway length (m)	2,500	1,000
Runway width (m)	45	18
Runway shoulders (m)	7.5	Nil
Runway strip width (m)	300	90
Runway graded strip width (m)	150	90
Strip width maintained	300	90
Pavement type	Flexible	Flexible
Pavement subgrade strength	A (high strength)	A (high strength)
PCN	39	8
Approach surfaces	RWY 14: 1.86%; RWY 32: <1.0%	RWY 18: <1.0%; RWY 36: <1.0%
Tyre pressure limitation	174 psi (1,200 kPa)	80 psi (550 kPa)
Lighting	Low intensity runway edge lighting	Low intensity runway edge lighting
Slope guidance	PAPI	

Taxiways

There are several taxiways in use at PHIA which service aircraft operating on both runways. These taxiways are designated Alpha (A), Bravo 1 (B1), Bravo 2 (B2), Bravo 3 (B3), Charlie (C), Delta (D), Echo (E) and Foxtrot (F). The taxiways are identified in Figure 9 (above) and an overview of the characteristics for each is outlined below in Table 5, below.

Table 5: Taxiway characteristics at PHIA

Taxiway	Shoulder width	PCN	MTOW	Tyre pressure limitation	Pavement type	Lighting
A	10m	33		174 psi (or 1,200 kPa)	Flexible	Inset centreline lighting
B	3m		Below 20,000kg			Inset centreline lighting
C	3m		Below 20,000kg			Inset centreline lighting
D	3m		Below 20,000kg			Inset centreline lighting
E			Below 5,700kg			Inset centreline lighting
F			Below 20,000kg			

Aprons

PHIA has three sealed aprons and a helicopter parking area as shown in Figure 10 below.

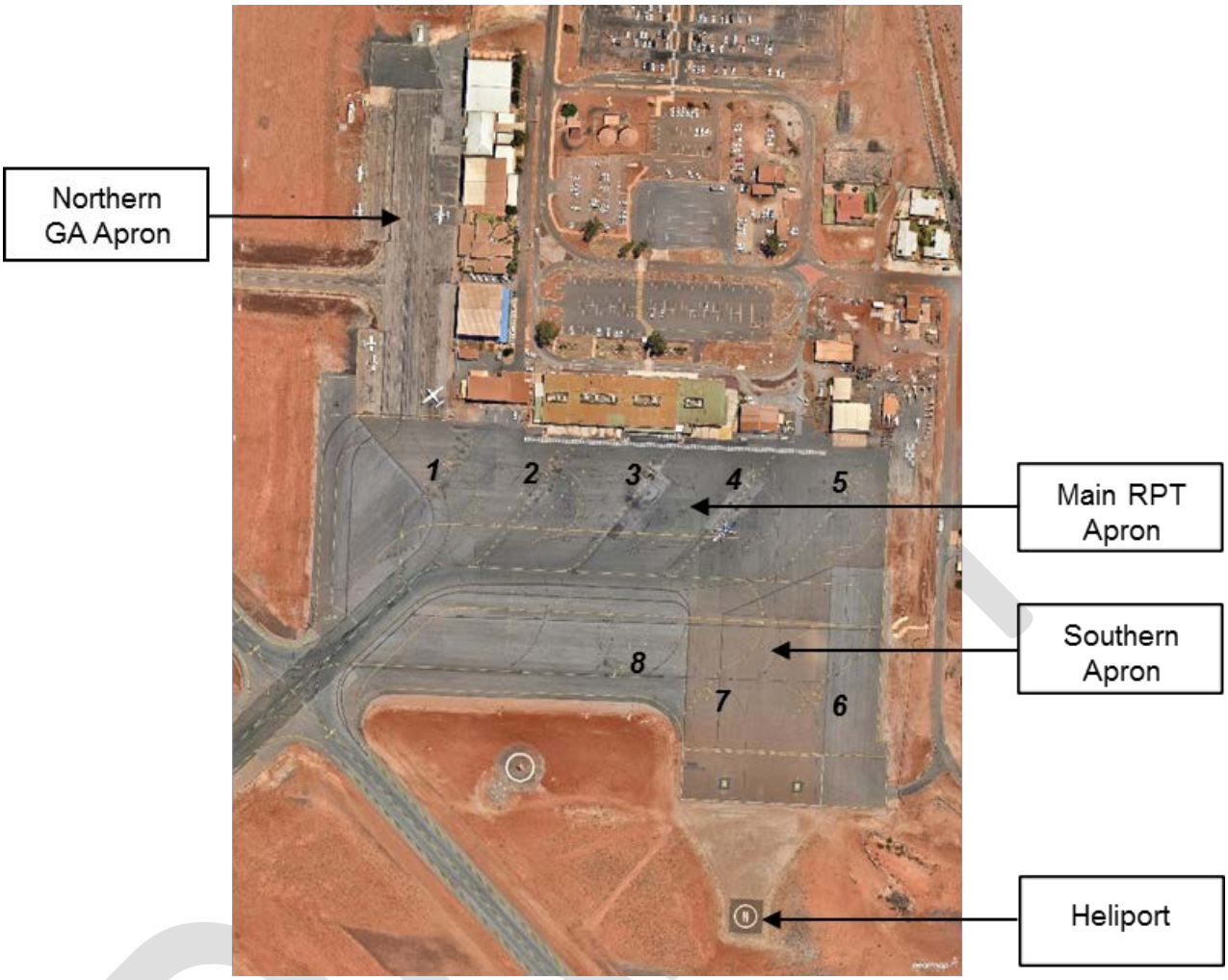


Figure 10: PHIA apron parking layout

The northern GA apron is located perpendicular to the RPT terminal and fronts the GA precinct. It has a bitumen chip seal surface, apron lighting and is not available to aircraft with an MTOW above 5,700 kg. Further, there are three hangars fronting this apron, 2 of which are RFDS Hangars.

The main RPT apron is located in front of the passenger terminal and the Airport Operations building. It has apron lighting. There are five (Bays 1-5) parking bays which concurrently accommodate Code 4C aircraft (e.g., B737-800 and A320) in a power-in power-out arrangement.

There are two hangars with direct access to this apron currently used for air freight and GA. There is also an area in the north-eastern corner of the apron which is currently used for parking ground support equipment (GSE) of for the ground handling agent.

The southern apron is located adjacent to the main RPT apron There are three (Bays 6-8) parking bays on the southern apron which can accommodate aircraft above 5,700kg (GA or RPT). It has previously been used for parking heavy aircraft such as the Antonov 124, Antonov AN12, Illyushin II76, and Lockheed C-130 Hercules.

A heliport parking area and two concrete parking bays are located on the southern end of the southern apron.

Hangars
The airport has five hangars with airside access.

The northern apron (and GA precinct) comprises three hangars. The two northern most hangars are leased to the RFDS. The RFDS base and administration was redeveloped in 1999 with the original hanger being extended to its present size and the adjoining medical and administrative centre being constructed on the site of the previous hangar building. A portion of the RFDS Administration Centre is subleased to the Port Hedland School of the Air. Both buildings are in good condition. The third hangar in the GA precinct, located opposite the operations building, is leased by Polar Aviation. The building is 30m x 30m and is located in a prime location opposite the terminal.

There are two hangars located on the southern apron. These hangars have access to the main RPT and are currently used for air freight (Port Hedland Air Freight) and for GA operations (leased by Russell Aviation).

Aerodrome lighting
An Aerodrome Frequency Response Unit with Pilot Activated Lighting (AFRU+PAL) at a frequency of 119.9 Hz available for pilots on standby. Both runways have Low Intensity Runway Lighting. The primary runway 14/32 (90m spacings) also has a precision approach path indicator (PAPI) at an approach angle of three degrees and a 49ft threshold eye height. Runway 18/36 has lighting with 60m spacings. There are also three illuminated wind direction indicators. The taxiways have green centreline lighting.

Radio navigation and landing aids
There are three navigational and landing aids available at PHIA:

- Non-directional beacon (NDB) with a High Frequency Radio Antenna Array:
- Distance measuring equipment (DME): and
- A Doppler Very High Frequency Omnidirectional Range (DVOR).

These are shown in the ERSA (Figure 9) presented earlier.

Non-Directional Beacon with a High Frequency Radio Antenna Array
The NDB and the High Frequency Radio Antenna Array are located in the south-eastern corner of the airport (north east of runway end 32). This infrastructure is composed of transmitter and receiver towers, antenna arrays and related infrastructure huts. In order to protect radio reception and transmission, this infrastructure has buffers that extend to 500m from the NDB at an angle of 3 degrees vertical from the NDB antenna array. The NDB has an elevation of 100ft and a range of 100nm during daylight hours and 75nm during the night.

Distance Measuring Equipment
The DME is located south east of runway end 14 and has an antenna elevation of 47ft. The DME has a linear buffer with a height limit of approximately 4m at a distance of 300m from the DME, and a limit of approximately 13m at a distance of 1,500m from the DME.

Doppler Very High Frequency Omnidirectional Range
The DVOR is located south east of runway end 14 and has an antenna elevation of 47ft. The DVOR has radial buffers which range from 150m to 1,000m extending at a certain angle from the DVOR. The resulting height limitation varies between 20m and 35m.

3.6.3 Aviation support and landside facilities

Control tower
The old air traffic control (ATC) tower was commissioned in the early 1970s and ceased operations in 1999. This tower has a height of approximately 19m and is owned by the Airport

The tower providing AFIS was relocated to Port Hedland in March 2013. The building height is approximately 8.5m and has a floor height of approximately 5m above the ground.

Currently, AFIS is provided during the following hours (AWST): Mon-Fri: 0730-1840; Sat: 0730-1415; and Sun: 1200-1840. Outside these hours, a CTAF procedures operates. AFIS and CTAF,199.90 VHF. Area Frequency Melbourne 118.60 VHF.

Fire station facility
Air Services Australia operate a Category 6 ARFFS at PHIA. This is located adjacent and south of the 14/32 runway, opposite Taxiway A near the control tower.

Meteorological facilities
Meteorological facilities are provided by the Bureau of Meteorology (BOM) which is located at the entrance to the airport. As an international aerodrome, BOM provides Category A Terminal Aerodrome Forecasts (TAF) and an aerodrome weather report (METAR/SPECI).

Royal Flying Doctor Service transmitter building and arrays
This facility is located at the northern end of the main runway. It is no longer in use and at end of life and will be demolished.

Aviation fuel facilities
There is an Air BP fuelling facility located on the eastern end of the main RPT apron, landside. This facility has two 100kL Jet A1 tanks that are in use and one 55kL tank that is not in use. Refuelling is undertaken by mobile tankers to the aircraft.

There is a dedicated refuelling facility located on the GA apron with an Avgas swipe card system. The RFDS also has a dedicated Jet A1 facility for private use within the GA precinct.

3.7 Ground transport access

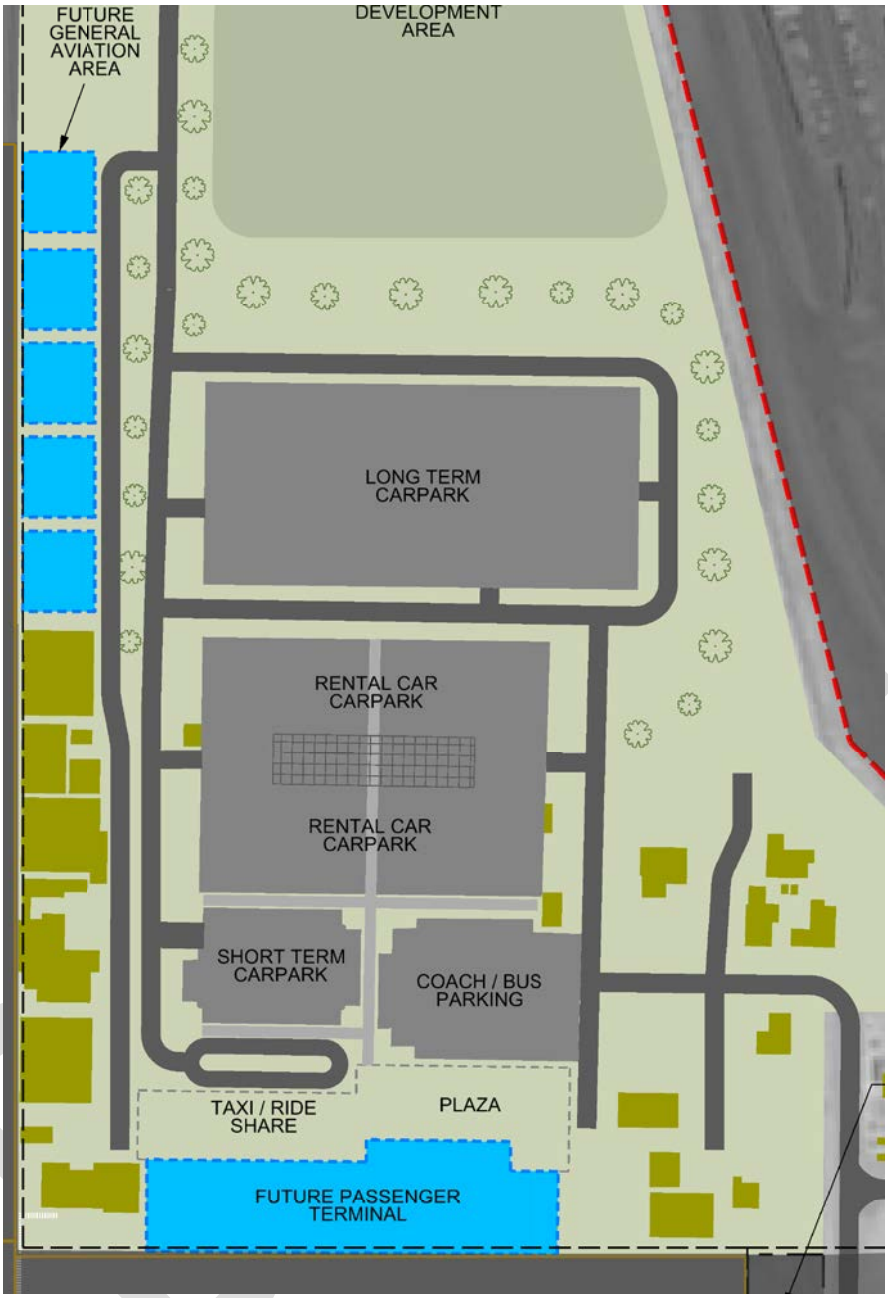
Existing ground access and parking facilities at PHIA are depicted in Figure 11 below. As shown, there is a drop-off/pick-up laneway in front of the terminal. Two public car parks, one for short term parking and another for long-term and staff parking. A bus parking area and car rental facilities are located in between these two public car parks. Table 6 lists the current number of bays available at each of the parking areas.

Table 6: Current vehicle parking capacities

Car park	Current number of bays
Long term	543
Short term	160
Rental	100 (+ approximately 300 separately in an overflow parking area)
Bus	9
Staff	8

From car parking data obtained for the period between October 2016 and January 2017, the average daily utilisation rates were determined to be 13.6% and 4.3% in the long- and short-term car parks, respectively. This indicates that these two car parks were underutilized.

The peak day utilisation rates for the long- and short-term car parks were 18.0% and 11.1%, respectively. While these figures are higher compared to the average daily utilisation rates, the values remain on the lower end compared to a productive car park.



3.8 Utility Services

Any major terminal redevelopment will have a significant impact on the site services and supporting infrastructure. Whilst a detailed assessment of the existing services and structure is outside the scope of this Master Plan the following details are ascertained following discussions with the airport.

Further investigations will be warranted to ensure that proposed services upgrade works by ToPH, as required in the Lease documents, are adequate to meet the needs of the proposed terminal redevelopment as infrastructure upgrade costs can be substantial and are ordinarily identified separately from the terminal redevelopment building costs.

3.8.1 Electrical

A major upgrade of the existing high-voltage electrical supply and transformers has been undertaken by ToPH in 2016. A review of the probable demand will need to be undertaken by suitably qualified engineers to ensure the adequacy of the recently completed power upgrade.

3.8.2 Sewerage

Currently there is no town sewage line to the Port Hedland sewerage treatment plant provided. Sewerage is accumulated and treated on site. This is only a basic treatment using microbes which is disposed when needed.

3.8.3 Water

A consultant recently conducted a review of the water infrastructure servicing PHIA. It was assumed there is an Average Daily Flow of 16.1 L/s with a peak day flow factor for this scenario of 2 to 3 times that of the Average Daily Flow. According to the report, this could imply a design flow of about 64.4 L/s.

It was envisaged that the capacity of a DN200 main based on Water Corporation design criteria would be 30 L/s to 50 L/s. The capacity of a DN300 would be 60L/s to 150 L/s. It was further detailed that the above commentary is limited by the lack of information and should be considered broad in nature. With information currently available, the consultant was not able to advise beyond these broad parameters that the mains are adequate for the PHIA's needs. It is therefore recommended that should PHIA wish to undertake Option 2 of the submission (Review of Capacity against Master Plan) then PHIA should prepare and issue a Request for Information to ToPH to seek the basis of the following:

- Flows for design;
- Peaking factors used; and
- Pressure available at the connection point and service area that was used as the basis of design for sizing the DN300 and DN200 main.

The airport site currently has water storage tanks and a pumping system to boost the fire hydrant system provided on the site, which are at the end of their life.

3.8.4 Stormwater

Airside, the RPT apron drains towards the existing terminal building. Water discharges onto the hard stand between the building and the apron from the terminal roof. From there, it flows over land to the east to be collected and eventually into open swales that traverse adjacent properties passing under the North West Coastal Highway to discharge to the Indian Ocean.

3.9 Environmental values

The following section describes the existing environmental values at PHIA and the potential impact these might have on development and operations. This section is an overview of two expert reports that have been commissioned by PHIA Op Co:

- Baseline Contamination Assessment – Preliminary Site Investigation (GHD - 2016);
- Baseline Contamination Assessment – Detailed Site Investigation (GHD – 2017);
- Baseline Contamination Assessment – Remedial Action Plan (2017); and
- Environmental and Heritage Review (360 Environmental – 2017).

These reports should be referred to when considering development within the airport site to ensure that appropriate treatment of environmental values is undertaken. A map reflecting all relevant constraints on the airport site is included in Appendix B – Environmental Values Mapping.

3.9.1 Contamination Assessment

In 2016, GHD conducted a baseline contamination assessment of the PHIA site. The purpose of this process was to establish the extent of any pre-existing contamination of the Airport lease area in order to determine the extent, risk, and liabilities. This was conducted in two phases:

- Preliminary Site Investigation (Phase 1); and
- Detailed Site Investigation and Remediation Action Plan (Phase 2).

The Detailed Site Investigation recommended that a management action (including remediation) is necessary to address risks posed to relevant receptors with respect to Asbestos Containing Material (ACM) and Per- and Polyfluoroalkyl substances (PFAS) contamination at the Site, and to a lesser extent localised fuel-related

impacts to groundwater in Area 1 and Area 2 (total recoverable hydrocarbons – TRH and benzene, toluene, ethylbenzene, xylene – BTEX).

The GHD produced contamination assessment reports, including the Remediation Action Plan, should be referred to when considering pre-existing site contamination, and recommended actions to remediate these, at PHIA.

3.9.2 Hydrology

The Landgate WA Atlas Inland Waters layer indicates that the nearest water body is an unnamed nonperennial wetland/swamp, located approximately 1.5km northwest of the site. Additionally, Stingray Creek, a tidal water body connected to the Port Hedland harbour and Indian Ocean is located 1.6km north of the site (GHD 2016).

A network of tidal creeks that connect to Stingray Creek and the Port Hedland harbour are nearby stormwater receptors, with several of these creeks crossing the northern site boundary (GHD 2016).

The site is located within the Pilbara Surface Water Area under the Surface Water Proclamation Areas 2009.

Results of a previous study by Cardno in 2011, the Port Hedland Coastal Vulnerability Study, show that there is an overland flow pathway through the centre of the airport site. The flow travels south to north which was identified within the existing 10% and 1% annual exceedance probability (AEP) storm events. Flood depths were noted to be up to approximately 1m in the 10% AEP event and 1.5 m in the 1% AEP event.

3.9.3 Hydrogeology

Drinking water for ToPH is sourced from the Yule River wellfield located approximately 45km west of Port Hedland, and the De Grey River wellfield located approximately 60km east of Port Hedland.

A Department of Water (DoW) WIR bore search identified 13 registered bores located within a 5km radius of the airport site. Two of these bores are in an inferred down-or-cross gradient direction to the northeast and northwest of the site (GHD, 2016).

It is possible that unregistered bores may exist within the area. Given the reported salinity of regional groundwater, it is likely that locally extracted groundwater would only be suitable for non-potable domestic purposes or irrigation (GHD, 2016).

Regional salinity mapping indicates that site groundwater is likely to be between 1,000 and 3,000 mg/l, which allows use for domestic non-potable or irrigation.

Regional total dissolved solids monitoring indicates groundwater within 5km of the airport site ranges between 3,950 and 5,720 mg/l.

Several groundwater monitoring wells were noted across the airport site during an inspection. However, the total number and condition of monitoring wells within the site boundary is unknown.

3.9.4 Flora and fauna

Broad vegetation types

The airport site is located within two broad vegetation types which are considered to be widely represented throughout the Pilbara bioregion.

Threatened and Priority Flora

The flora survey undertaken by Newland Environmental (2011) did not identify any Threatened Flora pursuant to the Wildlife Conservation Act 1950 or the EPBCA. One Priority Flora was recorded:

- *Tephrosia rosea* var. Port Hedland (A.S. George 1114) (Priority 1) [formerly known as Tephrosia rosea var. venulosa Pedley] (Newland Environmental 2011).

In addition to the Priority 1 (P1) species previously located within the site, the Department of Parks and Wildlife (DPaW) database search also identified one Priority Flora has previously been recorded within the site:

- *Pterocaulon intermedium (P3).*

There are two Priority species 'Likely' to occur and five Priority species that may 'Possibly' occur within the site. This assessment is based on the presence of a suitable habitat and the proximity of the nearest recording to the site.

Threatened and Priority Ecological Communities

A search of the DoEE's search tool and the DPaW database identified that there are no Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) within the airport site, and that one Priority 3 TEC exists within a 50km radius of the site.

Conservation Significant Fauna

DPaW's Threatened Fauna Database identified 39 conservation significant species occurring within a 7km radius of the Site. Nature Map identified 13 Threatened fauna species; three Priority fauna species, 2 specially protected fauna species and 33 fauna species protected under international agreement as occurring within a 10km radius of the Site (DPaW 2016).

The EPBCA PMST report identified 29 Threatened fauna species and 53 Migratory fauna species as occurring within a 10km radius of the Site (DoEE 2016). An assessment of the likelihood of any Threatened and Priority fauna occurring within the Site found that of these 46 conservation significant species, one species is considered 'Likely', one species is considered 'Possible' and 44 species are considered 'Unlikely' to occur within the Site.

Conservation Areas

The site does not contain any National Parks, Regional Parks or DPaW managed lands.

3.9.5 Bushfire risk

The ToPH Bushfire Management Plan 2014 mapping identifies that the majority of the region, including the airport site is at high risk of bushfires. According to the Department of Fire and Emergency Services, most of the airport site is within a 'Bushfire Prone Area' as shown in Figure 12 below. This designation means that the area has been in a designated bushfire prone area for longer than four months.

Figure 12: PHIA bushfire risk (Department of Fire and Emergency Services)

A further assessment of the bushfire risk may also be required under the Planning and Development (Local Planning Scheme) Regulations 2015 and the Building Code of Australia.

It should be noted that the airport has an ARFFS station on site together with an operational workforce who patrols the airfield. Both these teams monitor the site and ARFFS provides first responder activation on site which minimises the risk of fires.

3.9.6 Hazardous substances

Fuel storage facilities within the airport site are considered a hazardous substance and must be treated as such when considering development.

3.9.7 Soil

Acid Sulphate Soils

A review of the Department of Water and Environmental Regulation Acid Sulphate Soils (ASS) risk mapping available through the Landgate Shared Information Portal (SLIP) and the Australian Soil Resources Information System was undertaken in March 2016.

The DER ASS risk mapping for the Pilbara Coast does not extend to where the airport site is; however, it is mapped as moderate to high risk close to the northern portion of the site (Landgate, 2016).

Additionally, the ASRIS mapping suggests high probability (low confidence) (A3) directly north of the airport site (CSIRO, 2016). The entire site itself is mapped as extremely low probability (very low confidence) (C4).

Soil contamination

A Baseline Contamination Assessment was produced by GHD in 2016 as part of the due diligence for the Lease Agreement. A search of the DER Contaminated Sites Database shows that the airport site and its immediate surrounds have not been reported as known contaminated sites at the time of the search (May 2016). Seven contaminated sites were identified within an approximately 2.5 km radius of the site, with three belonging to one area. As the closest identified site was approximately 1.5 km north of the site, it is unlikely that the site has been affected by the identified contaminated sites (GHD, 2016).

3.9.8 Summary

The desktop review presented here provides an overview of the outcomes of the 360 Environmental and GHD produced reports. As outlined previously, development at the Airport should consider the environmental impacts and these reports should be referred to in order to ensure that appropriate treatment of environmental values is undertaken. The requirement for further environmental investigations or the production of a complete Environmental Management Plan may be required, subject to individual development considerations.

3.10 Heritage Values

The following section describes the existing heritage values at PHIA and the potential impact these might have on development and operations. This section is an overview of two expert reports commissioned by PHIA Op. Co:

- Aboriginal Cultural Heritage Management Plan (Castledine Gregory and Terra Rosa Consulting – 2017); and
- Environmental and Heritage Review (360 Environmental – 2017).

These reports should be referred to when considering development within the airport site to ensure appropriate treatment of heritage values is undertaken. A map reflecting all relevant constraints on the airport site is included in Appendix C – Heritage Values Mapping.

3.10.1 Native title

Native title exists upon all land except where the granting of tenure has extinguished or suspended native title. Freehold land and crown land are subject to certain types of leasing arrangements (pre-native title) has generally extinguished or suspended the native title. Unallocated crown land and some crown leases (granted after 1993 that are compatible with the existence of native title) are generally subject to the *Native Title Act 1993*.

The boundaries of the airport are located within the area of the Kariyarra People Native Title Claim (WC1999/003 / WAD6169/1998). The Kariyarra People are from the Pilbara Region of WA whose traditional

lands cover 16,686km^2 including ToPH and Mugarinya (otherwise known as the remote community of Yandeyarra).

With regard to PHIA, the site has had land tenure native title suspended or extinguished under the *Native Title Act 1993* as all lots within the site are freehold lots owned by ToPH and now leased to PHIA Op Co.

3.10.2 Aboriginal heritage places

In relation to the *Western Australian Aboriginal Heritage Act 1972* compliance, the proponent is obligated to identify and protect all Aboriginal heritage sites and places as defined by section 5 of the AHA prior to development occurring.

There are currently 1,251 Registered Aboriginal Heritage Sites and Other Heritage Places within the boundaries of the Kariyarra Native Title Claim included in the Register of Aboriginal Sites. Shell midden scatters with no other associated cultural features are the primary site type identified within the Karriyarra Native Title Claim. The considerable number of middens reflects a significant sustainable harvesting of coastal resources by the Kariyarra People who generally live near major water sources. Grinding patches/grooves are the second most common site type, with these located predominantly on exposed granite surfaces. As water is needed for the grinding and sharpening process to wet the rock surface, grinding patches and grooves are often found near water holes or on the lower slopes of hillsides near waterways. Artefact Scatter is the third most common site type and typically occurs in the open flats near water sources.

The desktop review has identified that there is only one Registered Aboriginal Site, ID 27835 (MAI-09-MD28) located within the area of the 2018 Master Plan. The site was identified and recorded in June 2009 by Anthropos Australis Pty. Ltd. The site is a medium density shell midden and scatter. All of the shell material present comes Anadara granosa, whilst the midden also contains two quartz artefacts. The site is situated on a pindan dune between the Great Northern Highway and the fence surrounding PHIA. All but one small portion of the site is outside the Master Plan area, as indicated in Figure 13.

In the Port Hedland area, ephemeral creeks that cut across the sand plains and run to the littoral zone to the north and west of the airport site were paths followed by Aboriginal people as evidenced by the archaeological signature. The Kariyarra Peoples heritage sites are frequently located in the vicinity or close proximity to water sources and is reflective of their customs and traditions. As such, any creeks that cut across PHIA are also likely to contain a similar archaeological signature and would have the same levels of ethnographic cultural significance. It is possible that there is a watercourse present in the northwest portion of the airport site.

Figure 13: Aboriginal hertiage site (360 Environmental)

3.10.3 Other heritage places

There are no other Heritage places located within the area of the 2018 Master Plan. There are several known sites near PHIA which have been outlined in the map in Appendix C – Heritage Values Mapping. All of these heritage sites are located outside the far northern boundary of the 2018 Master Plan area.

3.10.4 Summary

Within the proposed footprints of future development, a broad ethnographic study has also been undertaken. It has identified that there are no sites or areas of concern.

Terra Rosa Consulting considers that no additional field survey work is necessary at these sites based on the desktop assessment. Any further redevelopment of PHIA must be undertaken in a manner which avoids damaging the small portion of the Registered Aboriginal Site ID 27835.

Terra Rosa highlights that there has not been a detailed archaeological study of the area for the 2018 Master Plan. However, PHIA is a highly disturbed site with a history of use as an active aerodrome since the beginning of aviation in Australia. The region has a high level of potential for archaeological sites to be present that are typically low profile in the landscape. Terra Rosa considers that a targeted archaeological inspection of the 2018 Master Plan area may be a considered as a strategy to minimise any risk.

SWOT ANALYSIS

4 SWOT ANALYSIS

Based on the thorough review of the existing situation at PHIA, an analysis of the strengths, weaknesses, opportunities and threats (SWOT) was conducted and is presented below.

4.1 Strengths and advantages

There are several strengths and advantages that PHIA has which other regional airports across Australia and WA do not have. These include:

- The site having a long-term lease from the Local Government;
- Private airport ownership and management;
- Extensive developable land holdings;
- Located within one of WA's regional growth areas;
- Centrally located between Port Hedland and South Hedland;
- High visibility and easy site access off an arterial road and National Highway 1;
- Strong existing passenger base;
- Existing international services;
- Existing use of large freight aircraft such as the AN-124, IL76;
- Existing Interstate and Intrastate services;
- Proximity to the agricultural and horticultural regions of northern WA;
- Second largest regional airport (by PAX) in WA;
- Minimal environmental and heritage constraints on site;
- Capacity to expand international and freight services;
- Limited competition; and
- Proximity to Asia and vast populations to the north.

4.2 Weaknesses and constraints

PHIA has minimal/low weaknesses and constraints. Those presented below are largely representative of any regional airport.

- Existing long-term leases on site may limit development opportunities in the short to medium-term;
- Environmental constraints (including the identification of one priority flora on site, and a high risk of bushfires but minimised by the ARFFS and Airport Reporting Officers);
- Size of the local population;
- Airfare costs and capacity;
- Labour costs;
- Distance and effect on unit costs;
- Propensity for people to drive long distances;
- OLS and PANS-OPS contours could limit some infrastructure heights within the airport site (minimal actual impact expected); and
- ANEF contours may negatively impact land external to the airport. No major disturbance expected within the airport site.

4.3 Opportunities and prospects

There are many opportunities and prospects at PHIA in both airside and landside areas. These are outlined below:

- Increased quality in services and facilities proposed through the terminal redevelopment project;
- Potential to develop PHIA as a major regional international export hub for Western and Northern Australia;
- Existing serviced developable land within Kingsford Smith Business Park (on airport site);
- Relocation of rental car storage areas to the Freight or Highway precinct and the establishment of permanent rental car storage compounds;
- Development of a range of paid parking products including secure undercover long-term parking;
- Solar power possibilities;
- Area available to develop 500m runway extension;
- Develop airport in conjunction with development of tourism product for the region;
- Industrial land for businesses that service and support the Port's export industries;

- Planning and creation of a dedicated freight and logistics precinct to cater to the growing awareness of and demand for domestic and international air freight linkages;
- Development of a modern freight facility; and
- Planning and development of sites in the Eastern Precinct with good road access and high exposure.

4.4 Threats and risks

There are minimal/low threats and risks to the airport. Those which may impact operations and/or development at PHIA are largely driven by broader externalities. These include:

- Some existing infrastructure restrictions;
- Airfare costs;
- Council restrictions;
- Changes in political climate;
- Competition, particularly for international services;
- Minimal airline diversity;
- Future automation of services which might affect the FIFO market;
- Further slowdown of the resource sector; and
- Oversupply of industrial land in the region.

4.5 Summary of SWOT analysis

The strengths, weaknesses, opportunities, and threats for PHIA have been presented here. This analysis has highlighted weaknesses and constraints presented are considered to be reasonably typical of regional airports, particularly those in regional WA. The threats and risk identified are largely driven by broader externalities which PHIA Op. Co. have little control over. There are a number of strengths and advantages that PHIA has, due partly to geographic location, in addition to the strategies of airport management. There are also numerous opportunities and prospects for PHIA that are identified here and have been incorporated into this Master Plan where possible.

STRATEGIC VISION

5 STRATEGIC VISION AND OBJECTIVES

5.1 Strategic Vision

PHIA Op Co has a vison for PHIA to be a leading regional Australian airport and a modern, well-serviced airport which is a major domestic and international gateway airport for Western Australia (WA). It will be *the* gateway to the Pilbara and a major intermodal hub.

5.2 Strategic Objectives

The PHIA Op Co development philosophy is based around the key objectives of:

- Safety and security – ensuring that assets are fit for purpose and meet or exceed regulatory requirements;
- Facilitation – customer and stakeholder satisfaction;
- Sustainable growth management with regard to key aspects of:
    - Master Planning;
    - Operations;
    - Financial;
    - Commercial;
    - Social; and
    - Environmental.
- Business development through:
    - Promoting the airport infrastructure and region's uniqueness to attract international airlines to grow the tourism market;
    - Wherever possible nurture and develop freight logistics to the Pilbara region;
    - Encouraging globally competitive logistics, engineering and supply chain common use facilities, hubs or centres of excellence, to service onshore and offshore industry needs, including defence facilities, and support and facilitate emergency management; and
    - Encouraging communities, industry and business in partnership with the region's training providers to develop facilities at the airport to research advanced operation technologies associated with the mining, resource and oil and gas industries.

CRITICAL PARAMETERS

6 CRITICAL AIRPORT PLANNING PARAMETERS

6.1 Forecast of future operations

6.1.1 Forecast summary

There are a number of challenges in preparing forecasts for PHIA and other mining-driven airports:

- The investment phase of the mining boom has ended during the mid-2010's as was expected. However, the end of this phase was accompanied by an unexpected, and significant, decrease in commodity prices;
- The fall in commodity prices resulted in a withdrawal of many projects from the development pipeline and the suspension and closure of some existing mines. This trend has seen Australian resource companies focussing on cost containment rather than the rapid expansion of early part of the 2010's; and
- As a result of these developments passenger numbers at many mining-related airports, such as PHIA, continue to fall and it is challenging to forecast the new base level passengers and the future growth path.

Tourism Futures International (TFI) has prepared long term traffic forecasts for PHIA using segmentation of the passenger market.

6.1.2 Forecast methodology

Segmentation of the passenger market

This approach is based on segmenting the passenger market at PHIA into a number of components:

- The regular Port Hedland community traffic that would be expected for a resident community of the size of Port Hedland. TFI has estimated this level of traffic to be around 50,000 domestic passengers in 2015/16 FYE. This is based on an analysis of WA airports with limited mining traffic. This represents around 13% of 2015/16 FYE domestic traffic. TFI has broken this down further into two components:
    - Tourism traffic. Tourism Research Australia (TRA) has published visitor data for the ToPH Local Government Area for 2015. It estimated:
        - 14,000 international visitors and 122,000 domestic overnight visitors; and
        - This is a total of 136,000 visitors. TFI has assumed that 10% of these visitors arrived and/or departed by air and that each visitor generates around 1.5 movements (it is assumed that some hire a car and arrive/depart via another regional-WA airport).
    - PHIA-resident traffic. TFI has determined that is the 50,000 less the tourism (inbound) component.
- The Fly In/Fly Out (FIFO) traffic that is associated with ongoing operation and maintenance of the iron ore and other port commodities handling and transport and associated infrastructure.
    - TFI has estimated that this component is responsible for around 54% of 2015/16 FYE traffic.
- The FIFO traffic that is associated with construction activities.
    - For Pilbara airports such as Newman and Paraburdoo this FIFO construction component would be associated with mine construction.
    - For PHIA much of traffic associated with this component results from construction associated with the port and train infrastructure needed to transport iron ore from the Pilbara for export. In an initial scenario. TFI has estimated that this component is one-third of the passenger traffic.

Having identified the traffic components TFI then relates each component to a 'primary driver':

- For the PHIA resident traffic it is the WA economy (measured in GSP).
- For the tourism (inbound) traffic it is the visitor night forecasts for regional WA produced by Tourism Research Australia and Australian GDP growth.
- For ongoing operation and maintenance FIFO traffic TFI has used the Port throughput of iron ore.
- For the construction component it is based on an assessment of the need for construction activity as Port infrastructure reaches capacity. For this construction-related activity TFI has assumed:
    - A base level construction volume requiring 200 workers with a shift pattern leading to 25 air trips per year.

- For further infrastructure development leading to Port capacity expansion in FY24 the assumption is 5,000 construction workers (again generating 25 air trips per year) but spread over the three years 2020/21 FYE to 2022/23 FYE.
- For further infrastructure development leading to Port capacity expansion in 2030/2031 FYE and 2036/37 FYE the assumption is 6,000 construction workers (generating 25 air trips per year) but spread over the three years prior to the capacity addition.

These assumptions and this approach can be refined by surveying passengers at PHIA to more accurately determine the passenger mix. The growth rates of each passenger segment are summarised in Table 7.

Table 7: Passenger segment growth rates governing the forecasts

	Passengers ('000s)							RPT Movements		
	Regional	Tourism	FIFO-Ops	FIFO-Construct	Total Domestic	Int'l	**Total**	Domestic	Int'l	**Total**
FY17-FY27	2.1%	4.2%	2.9%	-25.1%	0.1%	2.9 %	**0.2%**	-0.2%	2.5%	**-0.1%**
FY27-FY37	2.1%	3.7%	2.3%	0.0%	2.4%	1.8 %	**2.4%**	1.4%	1.3%	**1.4%**

Table 8 contains the forecasted passenger and aircraft traffic over the 20-year planning horizon. In 2036/37 FYE, 474,000 passenger movements are forecasted, of which 97.4% represent domestic passengers. 700,000 annual passenger movements are forecast to be reached in 2055/56 FYE. The corresponding number of aircraft movements in 2055/56 FYE is 7,268[3].

Table 8: Forecasts of passenger traffic and aircraft movements

FY	Passengers ('000s)							RPT Movements		
	Regional	Tourism	FIFO-Ops	FIFO-Construct	Total Domestic	Int'l	**Total**	Domestic	Int'l	**Total**
2017	27	22	218	90	358	8	**366**	4,913	104	**5,017**
2018	27	23	221	5	277	8	**285**	3,891	108	**3,999**
2019	28	24	228	5	285	8	**293**	4,067	112	**4,179**
2020	29	25	235	5	294	9	**303**	4,165	116	**4,281**
2021	29	27	243	42	340	9	**349**	4,777	121	**4,898**
2022	30	28	250	42	350	9	**359**	4,873	123	**4,996**
2023	31	29	258	42	359	9	**369**	4,970	125	**5,095**
2024	31	30	266	5	333	9	**342**	4,565	127	**4,692**
2025	32	31	275	5	343	10	**353**	4,654	129	**4,783**
2026	33	33	283	5	354	10	**364**	4,747	131	**4,878**
2027	34	34	291	5	363	10	**373**	4,821	133	**4,954**
2028	34	35	299	50	418	10	**428**	5,489	135	**5,624**
2029	35	36	307	50	428	10	**439**	5,561	137	**5,698**
2030	36	38	314	50	437	11	**448**	5,618	139	**5,757**
2031	37	39	321	5	402	11	**412**	5,105	140	**5,245**
2032	37	41	328	5	411	11	**422**	5,171	142	**5,313**
2033	38	42	335	5	421	11	**432**	5,239	144	**5,383**
2034	39	44	343	50	476	11	**487**	5,864	146	**6,010**

3 As the Master Plan is primarily a land use document where staging is not the primary focus, TFI considers it essential to review the outlook periodically as part of specific investment decisions.

2035	40	45	351	50	486	12	**497**	5,930	148	**6,078**
2036	41	47	358	50	496	12	**508**	5,998	150	**6,148**
2037	42	49	367	5	462	12	**474**	5,530	152	**5,682**

Traffic and movement forecasts

The graph below presents the passenger and aircraft movement forecasts for PHIA from 2017 to 2037 based on the above methodology[4].

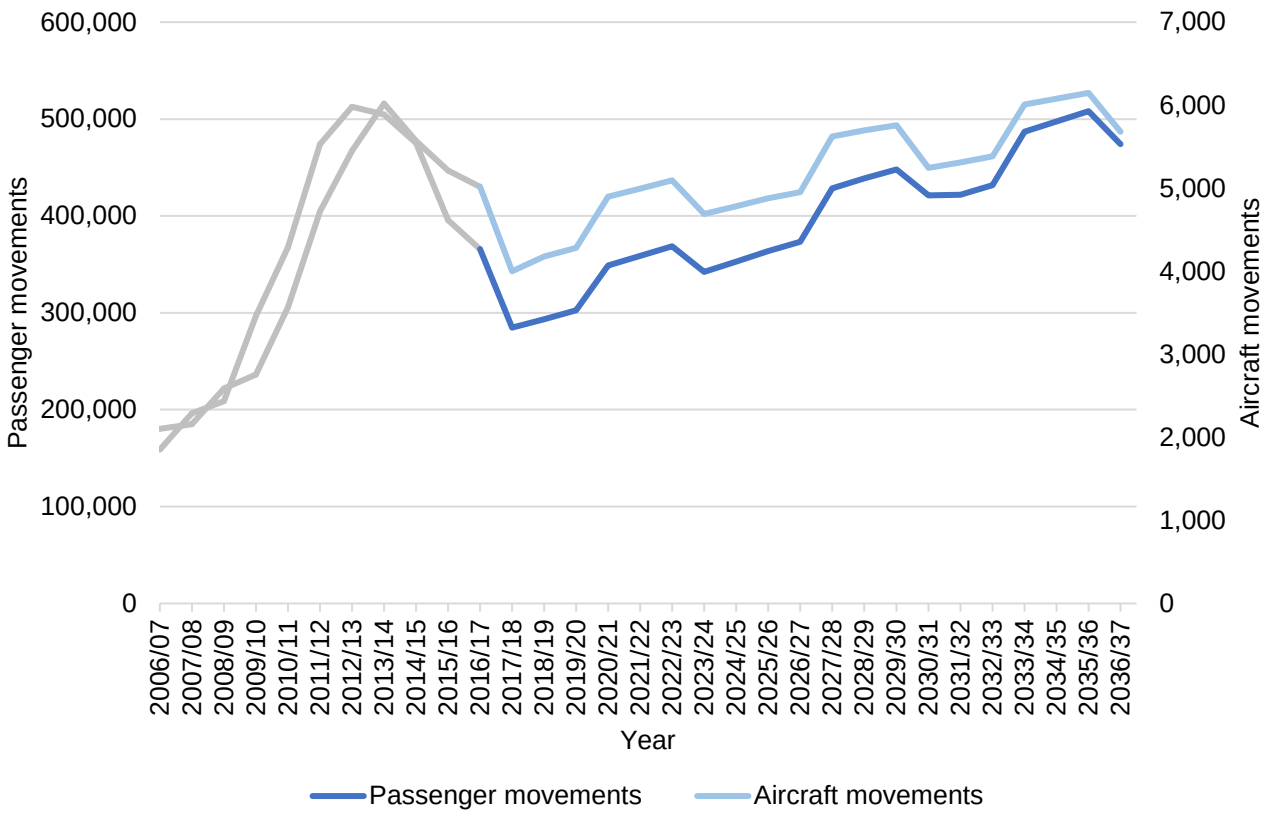


Figure 14: Passenger and aircraft movement forecasts for PHIA

6.2 Aerodrome reference code system

One of the most important elements of the CASA Manual of Standards Part 139 (MOS) is the Aerodrome Reference Code system. In this regard the MOS states:

> *Australia has adopted the International Civil Aviation Organisation (ICAO) methodology of using a code system, known as the Aerodrome Reference Code, to specify the standards for individual aerodrome facilities which are suitable for use by aeroplanes within a range of performances and sizes. The Code is composed of two elements: element 1 is a number related to the aeroplane reference field length; and element 2 is a letter related to the aeroplane wingspan and outer main gear wheel span. A particular specification is related to the more appropriate of the two elements of the Code or to an appropriate combination of the two Code elements. The Code letter or number within an element selected for design purposes is related to the critical aeroplane characteristics for which the facility is provided. There could be more than one critical aeroplane, as the critical aeroplane for a particular facility, such as a runway, may not be the critical aeroplane for another facility, such as the taxiway.*

[4] Developed based on data as at September 2017

The CASR and MOS are the key documents to be referred to when designing an airport/aerodrome and the Aerodrome Reference Code system forms a critical starting point for the design process. The Aerodrome Reference Code is based on the characteristics of an aircraft and not the airport. Once the critical aircraft (or design aircraft) is determined then the aerodrome facilities are designed and built to meet those characteristics. Table 9 below indicates the aircraft characteristics that determine the Aerodrome Reference Code.

Table 9: Aerodrome Reference Code (MOS Part 139)

Aerodrome Reference Code				
Code Element 1		Code Element 2		
Code number	**Aeroplane reference field length (ARFL)**	**Code letter**	**Wing span**	**Outer main gear wheel span**
1	Less than 800m	A	Up to but not including 15m	Up to but not including 4.5m
2	800m up to but not including 1200m	B	15m up to but not including 24m	4.5m up to but not including 6m
3	1200m up to but not including 1800m	C	24m up to but not including 36m	6m up to but not including 9m
4	1800m and over	D	36m up to but not including 52m	9m up to but not including 14m
		E	52m up to but not including 65m	9m up to but not including 14m
		F	65 up to but not including 80m	14m up to but not including 16m

The Code number for element 1 of the Aerodrome Reference Code is determined from column 1 of the above table. The Code number corresponding to the highest value of the aeroplane reference field lengths for which the runway is intended must be selected.

"Aeroplane reference field length" is defined in the MOS as:

> *The minimum field length required for take-off at maximum certificated take-off mass, sea level, standard atmospheric conditions, still air and zero runway slope, as shown in the appropriate aeroplane flight manual prescribed by the certificating authority or equivalent data from the aeroplane manufacturer. Field length means balanced field length for aeroplanes, if applicable, or take-off distance in other cases.*

As noted in the MOS Part 139:

> *The determination of the aeroplane reference field length is solely for the selection of a Code number and must not be confused with runway length requirements, which are influenced by other factors.*

The Code letter for element 2 of the Aerodrome Reference Code is determined from column 3 of the above table. The Code letter, which corresponds to the greatest wingspan, or the greatest outer main gear wheel span, whichever gives the more demanding Code letter of the aeroplanes for which the facility is intended must be selected.

Unless otherwise agreed by CASA, aerodrome operators are required to maintain the airport's runways and taxiways in accordance with the standards set out in the MOS Part 139. Any proposed change to the selected design aircraft may impact the Aerodrome Reference Code of PHIA. This must be continually reviewed and updated.

6.3 Selected design aircraft

Determining runway length, width and strength for an airport needs to be based on the critical aircraft that are likely to use the airport in the future. Typically, this is based on RPT aircraft. At PHIA, Qantas currently operates B737-800s to Perth and Brisbane; QantasLink operates B717s; and Network Aviation operates F100s to Perth. Virgin Australia operates B737-800s and F100s to Perth and B737-800s to Denpasar.

Table 10 below shows the indicative characteristics of the aircraft design currently operating at PHIA, as well as that of the incoming new design aircraft expected to join the Qantas and Virgin fleets in the short term. This information is provided for indicative purposes only; specific values for particular aircraft should be obtained from the aircraft operator or the aircraft manufacturer.

Table 10: Aircraft design characteristics

Aircraft	Seats	ARFL (m) *	MTOW (kg) *	ACN *	CODE
F100	100	1,695	44,450	27	3C
B717	110	2,130	51,710	30	4C
A320neo	168	2,400	79,000	28	4C
B737-800	174	2,256	70,535	46	4C
B737-MAX 8	126	tbc	82,191	48	4C

* ARFL = Aeroplane reference field length
* MTOW = Maximum take-off weight
* ACN = Aircraft Classification Number. The ACN is based on the aircraft's MTOW on a flexible pavement with a sub-grade rating of "B".

It is also necessary to consider aircraft length, which is not part of the ICAO classification system, in order to establish a design aircraft envelope for planning purposes, particularly for planning apron areas. Over time many aircraft types have stretched in length to provide a greater carrying capacity.

6.4 Aircraft movement area

The heart of an airport is the aircraft movement area (or airside area). This area comprises of the runways, taxiways and aprons. Once all other critical planning parameters have been assessed it is then possible to design the movement area. This area includes the runways, taxiways, aprons and parking areas.

The Facilities Development Plan (Section 9) details the proposed upgrades to the aircraft movement areas for PHIA into the future.

6.5 Pavement strength

The pavement strength of PHIA infrastructure is as was detailed previously in Section, 3.6.2.

The pavement strength rating for a runway must be determined using the ACN-PCN pavement rating system described in Chapter 5 of the MOS. CASA does not specify a standard for the runway bearing strength; however, the bearing strength must be such that it will not cause any safety problems to aircraft. The ACN-PCN assists in the assessment for design.

6.6 Aviation support and landside facilities

Major aviation support facilities that need to be considered if the aircraft movement area and pavement strength are updated include:

- Control tower;
- Navigation aids;
- Aerodrome lighting;
- Meteorological facilities;
- Aircraft hangars;

- Cargo facilities;
- Rescue and firefighting facilities;
- Non RPT aircraft and helicopter facilities;
- Fuel facilities;
- Access roads and car parks; and
- Lifelines such as Power, Water, Sewerage, and Telecommunications.

Each aviation support and landside facility will have particular requirements and they should be sited in an appropriate location for aircraft operations and airport user needs. A description of the existing aviation support and landside facilities listed above are incorporated throughout the previous sections of this Master Plan, particularly within the Current Situation (Section 3).

Where it has been identified that specific facilities may be impacted by future development, the Facilities Development Plan (Section 9) describes the future requirements for these support facilities based on forecasts and regulatory requirements.

6.7 Passenger terminal

6.7.1 IATA guidelines

IATA has established guidelines for terminal area and the LoS of a terminal facility. The Optimum service level is defined as a terminal which provides “sufficient space to accommodate the necessary functions in a comfortable environment” with “acceptable processing and waiting times”. The Optimum LoS should be the minimum objective of any terminal.

IATA provides guidelines for the space standards of airport terminal facilities and waiting times for each service level. These guidelines are used to determine the static capacity of the terminal. Static capacity is used to describe the holding potential of a facility or area, including the queueing areas and is usually expressed as the number of occupants that a given area will accommodate at any one moment. IATA static capacity standards are stated using area (in square metres) per occupant and can be used to ascertain the appropriate terminal functional area requirements based on the agreed maximum passenger numbers. These functional area requirements are identified using the peak period demand. The peak period demand number is usually determined by the busy hour flight schedule, seating capacities of the aircraft operating at the airport during the peak hour, aircraft load factors and passenger dwell times at the major terminal movement areas.

A broad-brush assessment of the current terminal peak hour capacity has been produced based on the IATA area recommendations to assess the existing operational capacity of the major functional areas.

6.7.2 Current terminal overview

The existing terminal building consists of a 2,700m² steel portal framed building with a low-pitched metal roof and a combination of steel framed external walls sheeted with fibrous cement or colour bond custom orb and painted masonry walls.

The building has been extended and modified historically, including the relocation of the external walls to the edge of the roof overhang to increase the available functional space. These modifications have largely resulted in no roof overhang to provide shading to external walls. This is not a desirable design in such a hostile hot climate.

Image 1: Terminal frontage (November 2016)

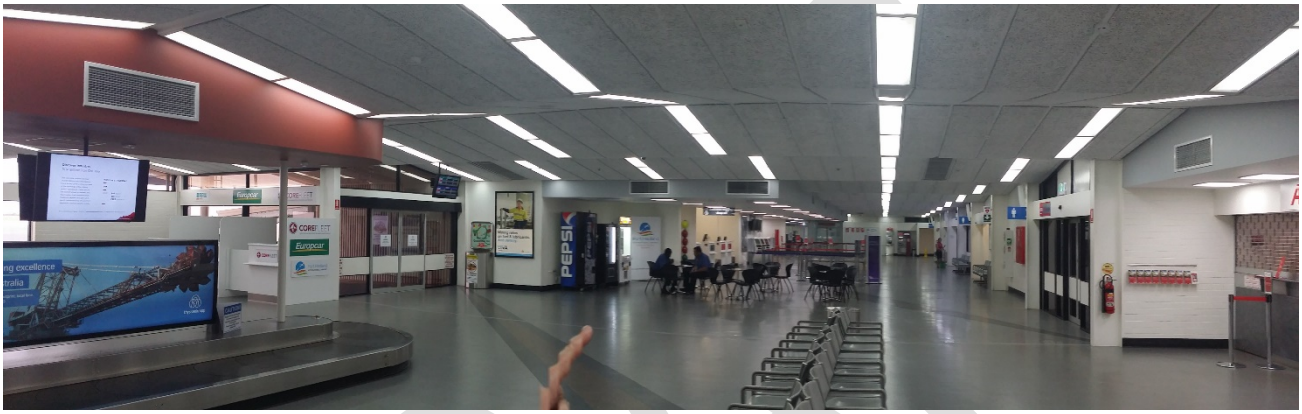


Image 2: Terminal arrivals/check in area (November 2016)

Image 3: Terminal entry from the airside/baggage handling area (November 2016)

The building generally has a profiled exposed grid Canaanite ceiling lower than that desirable in a public building of a similar size. Floor coverings throughout consist of vinyl to most public areas with ceramic tiles to amenities and the concession area.

The building contains the traditional functional spaces including check-in, baggage claim, security screening, departure lounge, airline lounge, airline offices, amenities, airport administration as well as a dedicated international passenger processing area. Some multiuse of terminal areas for domestic and international processing area is facilitated using a series of complicated operable walls, which is currently only utilised for one return flight a week.

The current terminal layout is consistent with the desirable passenger flows for a simple single level linear terminal. However, the location of the baggage claim area to the east of check-in is unconventional as the check-in area is usually the first functional area encountered on the landside set down to reduce traffic conflicts.

6.7.3 Current terminal capacity

The check-in area of the existing terminal is approximately 378m². Accordingly, based on the IATA guidelines, the current check-in area will accommodate a peak period number of between 210 and 290. The current check-in area has a limited depth of approximately 10m. This is less than adequate for the passenger numbers due to the significant queue depth lost to circulation space necessary both adjacent to the check-in counters and to access the amenities and offices located on the landside.

The current domestic departure lounge when fully available (i.e. no concurrent international departure) is approximately 465m². This includes a kiosk seating area. An assessment of the configuration of the departure lounge, concessions area and the location of the gates indicates the current supported peak period is in the order of 320 passengers.

The baggage claim area in the existing terminal, exclusive of the claim device and the car-rental desks, is approximately 275m². Based on the IATA recommendations for area allowances, the existing baggage claim area supports a peak period number of approximately 160-183 arriving passengers.

The existing terminal building is air-conditioned by package air-conditioning units located on the roof of the building. Management has confirmed that the system is beyond their expected use by dates and poses a continual maintenance issue. Significant problems include condensation overflows, associated damage to ceilings, and false fire alarms precipitated by “steamy conditions” in locations throughout the building.

6.7.4 Current peak hour assessment

The airport experiences surges in passengers depending on the day and the time. The current peak hour for arriving passengers is on a Tuesday morning and the peak hour for departing passengers is on a Thursday afternoon.

Based on the assessment above of the major functional areas in the existing terminal, it is suggested that the realistic maximum operating capacity of the terminal whilst providing the IATA Optimum LoS would be a single Code C aircraft. This is exceeded in the morning and afternoon peak periods where there are currently up to three Code C RPT aircraft, consequently resulting in a sub-optimum LoS.

Section 9.2.1 presents further details on terminal planning for PHIA which has been developed in this Master Plan to facilitate the forecast growth at PHIA in alignment with IATA guidelines.

6.8 Security requirements

Security screening is required at airports that operate RPT services and open charter aircraft with an MTOW greater than 20,000kg. In compliance with the Aviation Transport Security Act and Regulations (ATSA and ATSR), passengers undergo security screening after checking in and before moving to the departures gate. Random explosive trace detection is carried out either pre or post screening. Carry-on baggage is also screened at the passenger screening point while check baggage is screened as it progresses from check-in through the baggage make-up system.

Any future changes in operations and terminal redevelopment at PHIA should comply with or exceed the requirements of the Aviation Transport Security Act 2004 and Aviation Transport Security Regulations 2005.

6.9 Airspace protection surfaces

Development on PHIA must be carried out and constructed in a manner that does not compromise the efficiency of navigation aids or the operational capability of aircraft using PHIA. In that regard all developments will be required to give due and proper consideration where applicable to the following issues:

- Navigation aid infrastructure safety zones and signal direction;
- Minimising sun glare from reflective surfaces;
- Wind turbulence impacts during construction and of the finished facility;
- Height limitations due to the presence of OLS, PANS-OPS, and VSS surfaces;
- Height limitations including dishes and aerials; and
- Lighting that may illuminate above the horizontal. Within the approach and take-off surfaces this is more critical.

The National Airports Safeguarding Framework includes guidelines which provide proponents of development and local government with further information about how to address risk to aviation safety posed by development. An Airport Safeguarding Plan is also presented in this Master Plan which addresses the above considerations.

6.9.1 Obstacle limitation surfaces (OLS)

OLS are a number of reference geometric surfaces in airspace that determine when an object may become an obstacle to aircraft manoeuvring in flight in the vicinity of an airport during circling, approach or departure. They define protection requirements for the initial and final stages of a flight. During these manoeuvres visibility must be good enough for the pilot to see and maintain visual reference to the airport and take responsibility for obstacle avoidance and separation from other aircraft.

The objective of OLS is to define a volume of airspace in proximity to an airport which should ideally be kept free of obstacles that may endanger aircraft in visual operations or during the visual stages of an instrument flight. Even so, the intention is not to restrict or prohibit all obstacles but to ensure that either existing or potential obstacles are examined for their effect on aircraft operations and that their presence is properly considered.

As the OLS are pertinent to visual operations (both day and night), it may be sufficient to ensure that the obstacle is conspicuous to pilots, and this may simply require that it be marked and/or lit. Each new obstacle will in some way restrict the freedom of aircraft operations and inevitably contribute to flight path congestion and delays. If an obstacle is located in the approach and take-off areas pilots will need to make adjustments to their normal take-off and landing to guarantee obstacle clearance. This may mean using less than the full runway length operationally available and may result in significant operational penalties such as fewer passengers, less cargo, less fuel or other operational restrictions.

The most stringent requirements apply on the extended centre line of a runway in the approach and take-off areas. Depending on the type of aircraft able to use the runway, the approach and take-off surfaces may extend up to15 km from the runway strip end with the edge boundaries diverging wider with distance from the runway end. At either side of the runway strip and the approach surface are two OLS components called the transitional surfaces. These are intended to protect an aircraft which encounters severe cross winds during the final phase of the approach to land and may then drift sideways as the pilot decides to ‘go around’ for another attempt (missed approach).

There are two, or in some cases three, other surfaces which provide obstacle protection for aircraft circling to land – the inner horizontal surface, the conical surface and/or the outer horizontal surface. Depending on aircraft size and the type of activities catered for by the airport, their combined effect may extend up to a 15km radius of the airport.

Obstacles in the vicinity of an airport, whether they be natural or constructed, may seriously limit the scope of the airport’s operations. Tall structures and airports are usually incompatible in the immediate approach and take-off areas, a short distance away and also up to 56km away from the airport. Obstacles unrelated to the runway alignment can also affect aircraft approaching or departing an airport, particularly in poor weather conditions or in instances of ‘One Engine Inoperative’ (engine failure) departures or arrivals. The OLS, in conjunction with the PANS-OPS surfaces are used to define these airspace requirements and to assess the significance of an existing or proposed object.

6.9.2 PANS-OPS

The PANS-OPS surfaces are based on criteria released by ICAO in a document named “Procedures for Air Navigation Services – Aircraft Operations” Volume II (Document 8168 – PANS-OPS). Aircraft flight paths are accommodated within those unpenetrated surfaces to clear obstacles by a safe margin. All airports which have

a scheduled or regular passenger service or those which allow for “all-weather” operations must have such flight paths (procedures).

Aircraft not only fly in fine weather conditions, but also in weather which limits the pilot’s ability to see obstacles or the airport. In these conditions the pilot must rely on instruments in the cockpit to provide navigation. This is called an Instrument Flight and there are rules (IFR) which mandate aircraft operations. Instrument Flight Procedures (IFP) are defined flight paths which guarantee the safety of aircraft operating without visual reference, and these are developed for the airport by Airservices Australia in accordance with the criteria in the PANS-OPS. The surfaces created to this standard offer aircraft a minimum clearance from obstacles based on statistics, weather records and aircraft performance characteristics.

For larger ports, departure procedures are created to safeguard all weather departures and to facilitate air traffic control information services. Large aircraft (MTOW greater than 5700kg) must also have a safe departure path in the case of an engine failure of the critical engine after take-off. Approach procedure paths guide a landing aircraft to align with the landing runway and generally position the aircraft at a height, orientation and velocity from which the pilot can make a safe visual landing, or, if unsuccessful, will allow the pilot to go around climb to a safe height to consider the next option.
Manoeuvring to align with the runway can commence as far as 56km away from the runway and forms a horizontal plane which surrounds the airport at a safe height. Through that surface, individual surfaces descending to the runway or climbing from the runway form three dimensional channels of safe heights. Where flight paths cross, the lowest individual surface is ‘critical’ and will ‘cut’ through other surfaces. With many flight paths the resulting surface will be very complex. The modelling of such surfaces can either be as individual surfaces, which are then easier to interpret, or a combined critical surface model, which has complex interactions modelled as a series of contours and intersecting planes. The latter version, although more difficult to comprehend, allows for determination of a single critical height at any particular location.

The PANS-OPS surfaces protect aircraft in all-weather operations and specifically when the ambient conditions do not allow the pilot to see the runway or manoeuvre to avoid obstacles. Because of this limitation, no intrusion is acceptable to the PANS-OPS surfaces under any condition.

6.9.3 Hazardous lighting

The source of light emissions near an airport is a potential source of concern to safe aircraft operations for two main reasons. Firstly, if bright lights, such as floodlights, emit too much light above the horizontal plane, there is the possibility that a pilot can be dazzled and momentarily be unable to read the flight deck instruments or recognise the runway light. Secondly, lights might create a pattern that looks similar to approach or runway lighting and this might cause confusion for a pilot unfamiliar with the airport. Street lighting, security lighting and illuminated sports grounds are examples that require special consideration. The problem can often be corrected by providing suitable screening or shielding each light source.

CASA has powers to impose requirements on developers of a controlled activity (artificial lighting) to deal with lights that could be considered to cause confusion, distraction or glare to pilots and potentially endanger safe aircraft operations by prevention of clear reception of instruments and air navigation lights.

It is preferable if the lighting design can take these issues into account, rather than requiring modification or the extinguishment of the light source after installation is complete.

Local planning schemes should recognise the potential hazard of inappropriate lighting by specifying appropriate performance standards for lighting installations in proximity to an airport.

Both developers and designers will need to take advice upon the zones of restricted lighting at PHIA in accordance with the guidelines issued by CASA - *Lighting in the Vicinity of Aerodromes - Advice to Designers*.

6.9.4 Safety Areas

Public safety zones

To protect the public from the risk of an incident of an aircraft undershooting or overshooting a runway, many national authorities define an area beyond the runway end in order to enhance the protection of people and property on the ground beyond the end of a runway. These areas are provided to prevent congregation of people in areas which might subject them to increased risk of death or injury in the event of an aircraft incident.

Currently there is no national regulation requiring the provision of PSZs in Australia. It is also acknowledged that PSZ are not currently mandated within WA legislation; however, they are included within the context of this report for the purpose of future proofing PHIA given the increased acknowledgement of PSZ at airports across Australia.

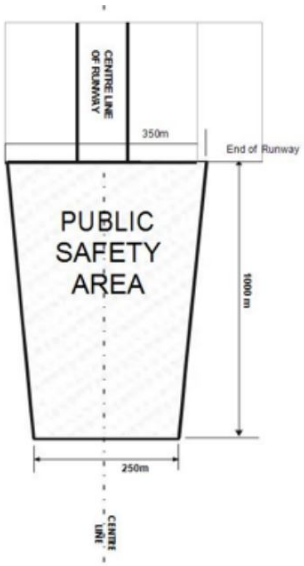


Figure 15: Public Safety Zone (QLD Government)

A PSZ forms the shape of an isosceles trapezoid 1000m x 350m closest to the runway end, tapering to a width of 250m furthest from the runway (see Figure 15). It lies beneath the approach or take-off path where the aircraft is closest to the ground at the end of the runway.

With regard to PHIA, all but one of the notional PSZs at each end of the runway lies on land outside the boundary of the airport. Land uses recommended to be permitted under the PSZ should be activities that do not attract the assembly of a large number of people. Low occupancy uses such as the following are recommended:

- Golf courses (not club houses);
- Agricultural operations (other than forestry or livestock);
- Plant and machinery buildings;
- Low occupancy warehousing; and
- Car parking.

There are several land uses recommended to be discouraged, avoided or prohibited which would facilitate activities that may attract the assembly of large number of people or that have the potential to be highly hazardous in the event of an incident involving an aircraft. These include:

- Residences and public places of assembly (e.g., churches, schools, hospitals, office buildings, sports stadiums, shopping centres, and other industrial and commercial uses involving large numbers of workers or customers);
- Accommodation activities;
- Fuel storage facilities; and
- The manufacture or bulk storage of flammable, explosive or noxious materials.

Runway end safety area (RESA)

MOS 139 describes the requirements for Runway End Safety Areas (RESA) within Australia. A RESA must be provided at the end of a runway strip to protect an aircraft in the event of undershooting or overrunning the runway, unless the runway's code number is 1 or 2 and it is not an instrument runway.

The minimum length of the RESA must be 90m where the associated runway is suitable for aircraft with a code number 3 or 4 and is used by air transport jet aircraft. In other cases, the minimum RESA length must be 60m. The width of a RESA must not be less than twice the width of the associated runway. The current RESA at PHIA is 90m x 90m at the northern end of the 14/32 runway and 150m x 90m at the southern end of the 14/32 runway.

6.10 Aircraft noise contours

An Australian Noise Exposure Forecast (ANEF) is a contour map showing the forecast of aircraft noise levels that are expected to exist around an airport in the future. The ANEF computation is based on forecasts of traffic movements on an average day. Allocations of the forecast movements to runways and flight paths are on an

average basis and take into account both the existing and forecasted air traffic control procedures at nominated runways and preferred flight paths for noise abatement purposes at an airport.

The following factors of aircraft noise are taken into account in calculating the ANEF:

- The intensity, duration, tonal content and spectrum of audible frequencies of noise from aircraft takeoffs, landings and reverse thrust after landing (the noise generated at an airport from ground running of aircraft engines or taxiing movements is not included for practical reasons);
- The forecasted frequency of aircraft types and movements on the various flight paths;
- The average daily distribution of aircraft takeoffs and landing movements in both daytime (7am to 7pm) and night time (7pm to 7am) hours; and
- The topography of the area surrounding an airport.

6.10.1 Calculation of the ANEF

The ANEF system combines the noise level and frequency of operations to calculate the average noise level at any point along and to the side of the flight path using the following reasonably simple mathematical procedure.

Partial ANEFs are calculated for the frequency of number of night-time and day-time operations of each aircraft type and flight path. These calculations use a value of Effective Perceived Noise Level (EPNL) for each aircraft and takes into account all known annoying aspects in the temporal frequency spectrum and spatial domain. The EPNL level is obtained by the algebraic addition of the maximum perceived noise level at any instant corrected by noise tonal and duration factors.

The EPNL unit is also used for the international certification of new aircraft. These Partial ANEF values are computed for each significant type of noise intrusion. The total ANEF at any point on the ground around the Airport is composed of all individual noise exposures (summed logarithmically) produced by each aircraft type operating on each path over the period of one day.

These calculated values do not take account of any background noise levels from road or rail activities.

6.10.2 Noise threshold levels

The effects of noise can range from minor to very serious depending on the noise level, its duration and the subject's sensitivity. Noise, by definition being unwanted sound, elicits a wide range of individual responses in the vicinity of airports and the reasons for the differences between individuals are largely socially-based and complex to quantify. However, research has indicated that unlike an individual's reaction, community response to noise impact issues is more predictable.

In the area outside the 20 ANEF contour it is generally accepted that the noise exposure is not of significant concern, although there will be some individual exceptions. Within the area between the 20 to 25 ANEF contour, levels of noise are generally accepted to emerge as an environmental problem, and within the 25 ANEF contour the noise exposure becomes progressively more severe. Table 11 compares land use to acceptable ANEF contour levels.

It should be noted that the actual location of the 20 ANEF contour is difficult to accurately define. This is because variations in actual flight paths, pilot operating techniques, meteorological conditions and topography, all have a largely unpredictable effect on the position of the 20 ANEF contour for any given day.

Recommendations relating to land use within the ANEF contours are contained in Australian Standard AS2021-2000 "Acoustics – Aircraft Noise Intrusion – Building Siting and Construction". These recommendations are summarised in Table 11 below (this a summary only).

Table 11: ANEF site zoning acceptability

Building type	ANEF Zone of Site		
	Acceptable	Conditionally Acceptable	Unacceptable
Accommodation activity (except short–term accommodation, rooming accommodation), residential care facility	Less than 20 ANEF	20–25 ANEF	25–40 ANEF

Short-term accommodation, hotel, rooming accommodation	Less than 25 ANEF	25–30 ANEF	30–40 ANEF
Educational establishment, child care centre	Less than 20 ANEF	20–25 ANEF	25–40 ANEF
Hospital, health care service	Less than 20 ANEF	20–25 ANEF	25–40 ANEF
Community use, places of worship	Less than 20 ANEF	20–30 ANEF	30–40 ANEF
Office	Less than 25 ANEF	25–35 ANEF	35–40 ANEF
Light industrial	Less than 30 ANEF	30-40 ANEF	Greater than 40
Other industrial	Acceptable in all ANEF zones		

Notes:

1. As the actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths, the procedure of Clause 2.3.2 in AS2021 – 2000 may be followed for building sites outside but near to the 20 ANEF contour.
2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate.

There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases (above) should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3 in AS2021– 2000.

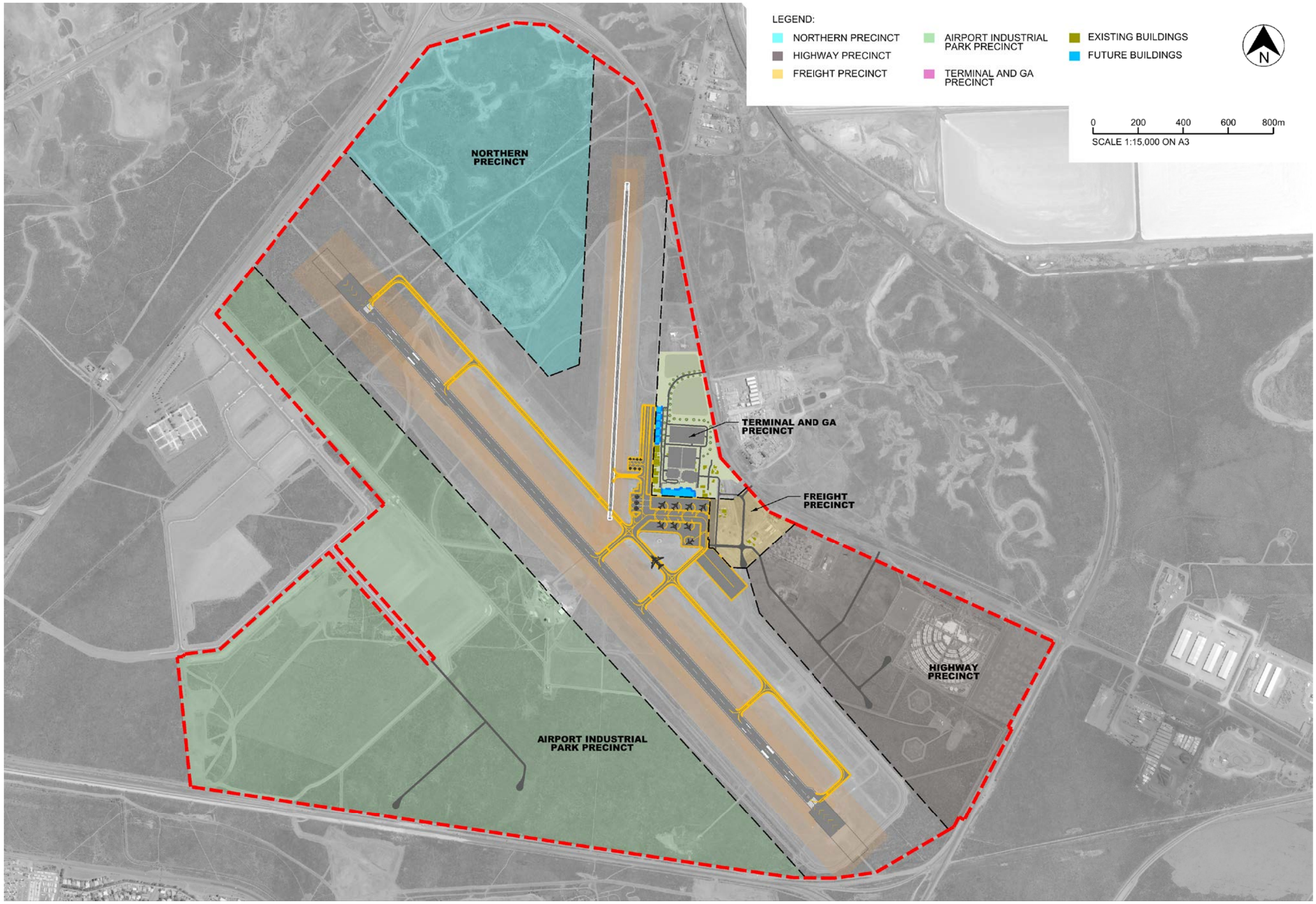
This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required Aircraft Noise Reduction (ANR) determined according to Clause 3.2 in AS2021 – 2000. For structures such as residences and schools, the effect of aircraft noise on outdoor areas associated with the building should be considered.

In some instances, building applications may be approved in higher noise level areas but require noise mitigation through acoustic materials. This would be on a case by case basis at the discretion of the ToPH as the local authority.

In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

An ANEF report has been produced as part of this Master Plan. A summary of this and how it affects the land users around the airport and beyond is presented as part of Section 11.5.

AIRPORT MASTER PLAN


LEGEND:
NORTHERN PRECINCT
HIGHWAY PRECINCT
FREIGHT PRECINCT
AIRPORT INDUSTRIAL PARK PRECINCT
TERMINAL AND GA PRECINCT
EXISTING BUILDINGS
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0 200 400 600 800m
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NORTHERN PRECINCT
TERMINAL AND GA PRECINCT
FREIGHT PRECINCT
HIGHWAY PRECINCT
AIRPORT INDUSTRIAL PARK PRECINCT

8 LAND USE PLAN

This section describes the land use precinct guidelines developed for PHIA as part of this Master Plan. A land use precinct plan, supported by precinct specific drawings. Further detail of permissible and non-permissible land uses within each precinct are presented in Appendix D – Permissible Land Uses Table.

8.1 Land use precinct guidelines

This Master Plan establishes six precincts with the airport site as detailed below (see Figure 18 following for drawing):

- Airside Precinct – 309.4 hectares
- Northern Precinct – 107.6 hectares
- Terminal and General Aviation Precinct – 24.5 hectares
- Freight Precinct – 8.4 hectares
- Highway Precinct – 89.3 hectares
- Airport Industrial Park Precinct – 278.3 hectares

All development within the airport site must abide by the relevant Local, State and Federal regulations. All areas depicted are conceptual only. The relevant professional advice and designs must be received to ensure feasibility. Any building should be designed in a way which complements and reflects the location of the site accordingly. Building design in all precincts must abide by OLS contour restrictions imposed by both runways 14/32 and 18/36 and airport operations requirements (i.e. no lighting above the horizontal).

Airside Precinct

The area within this precinct is solely dedicated to the provision and protection of aircraft operations at PHIA. Only development and infrastructure integral to the efficient and safe operation of aircraft and support services should be considered in this precinct.

Northern Precinct

Land within the Northern Precinct should be utilised to support airport related uses as well as activities that may wish to be located at or near the airport for other reasons, or wish to take advantage of the location, exposure and other attributes of the site.

Due to proximity to the highway, the Northern Precinct would be ideal for accommodating large-scale and low-impact land uses. For example, such land uses could include:

- Bulk freight;
- Service stations; and
- Laydown yards.

Terminal and General Aviation (GA) Precinct

The intent of this precinct is to service the passenger terminal as effectively as possible, while allowing for concurrent supporting or ancillary uses of the precinct.

Areas within this precinct may either have airside access or be located further from the Airside Precinct. Development and should reflect the location of the site accordingly.

Land uses within this precinct are anticipated to be those that provide either direct service to the passengers or are required for the operation of the airport and terminal.

Aviation-related activities which may require airside access include:

- GA uses;
- The provision of emergency services; and
- Ground service equipment support services.

Land uses which do not need direct airside access within this precinct may include, but are not limited to:

- Car parking;
- Rental car facilities;

- Ground transport;
- Vehicle servicing;
- Car wash;
- Service station;
- Airport operation offices;
- Areas for expansion of the passenger terminal;
- Hotels and short-term accommodation; and
- Residential use for airport operational staff.

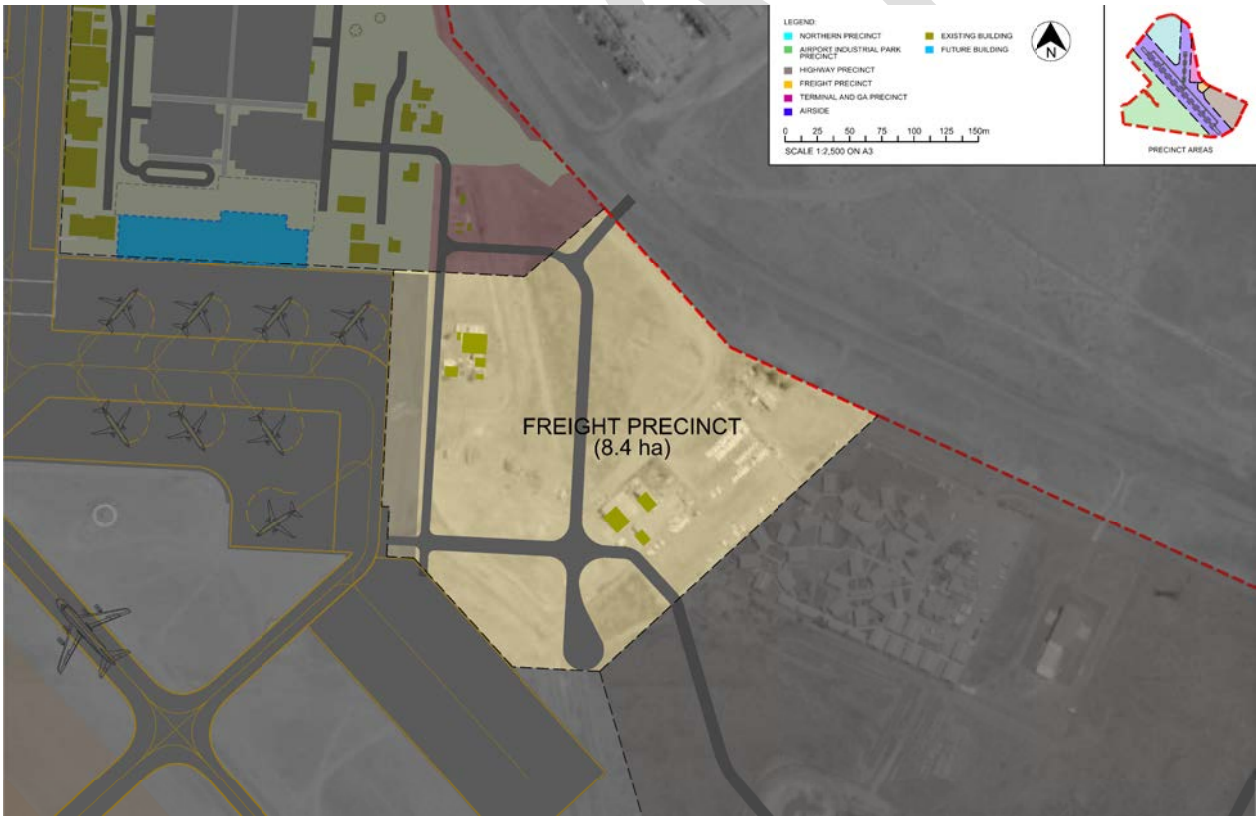
Any development within this precinct should give consideration to potential terminal expansions so as to not impinge any future expansion requirements.

Freight Precinct

The Freight Precinct should be utilised to accommodate air freight and logistics uses. This may include uses such as:

- Freight storage shed;
- Laydown yards;
- Vehicle servicing;
- Freight forwarding facilities;
- Ground transport access for freight vehicles;
- Warehousing;
- Distribution facilities;
- Parking for freight vehicles; and
- Any other ancillary freight uses as permissible in the 'Transport Depot' or 'Industry – Transport' uses outlined in the Planning Scheme.

Due to the proximity to the Terminal and GA Precinct, part of the freight and logistics precinct would be ideal for rental car storage use, aviation fuel depot, and airport operations works depot. See Figure 17 for further details.



Highway Precinct

The Highway Precinct will accommodate businesses that wish to be located at the airport and take advantage of the exposure and/or access to the Great Northern Highway.

Airport-related activities include:

- Rental car storage areas;
- Freight sheds; and
- Aircraft maintenance facilities.

Uses that may wish to be located at or near the airport for other reasons include:

- Offices for businesses that use the airport;
- General warehousing;
- Industry-general;
- Industry-light;
- Retail fuel sales; and
- Road freight facilities and road transport lay down yards.

Other non-aviation related uses may include:

- Car dealerships;
- Short-term accommodation (for example a TWA);
- Solar power storage or collection; and
- Offices for airport-related businesses.

Airport Industrial Park Precinct

The general location of the airport in proximity to the Port lends itself to uses that can service Port-related activities, general regional demand for industrial and as well as airport-related industrial uses.

The Airport Industrial Park Precinct includes the portion of the Kingsford Smith Business Park which is located within the airport site. The Business Park is a designated light industrial and retail precinct (including the bulk hardware site). Any land uses within this area of the Airport Industrial Park Precinct should comply with the overall strategic intent of the Business Park.

The area of the Airport Industrial Park Precinct which adjoins the airfield could also accommodate:

- Large aircraft maintenance facilities;
- Defence facilities and support;
- Other uses that may require airside and landside access; and
- Other industrial uses such as warehousing and distribution facilities and solar power plants or intensive agriculture.

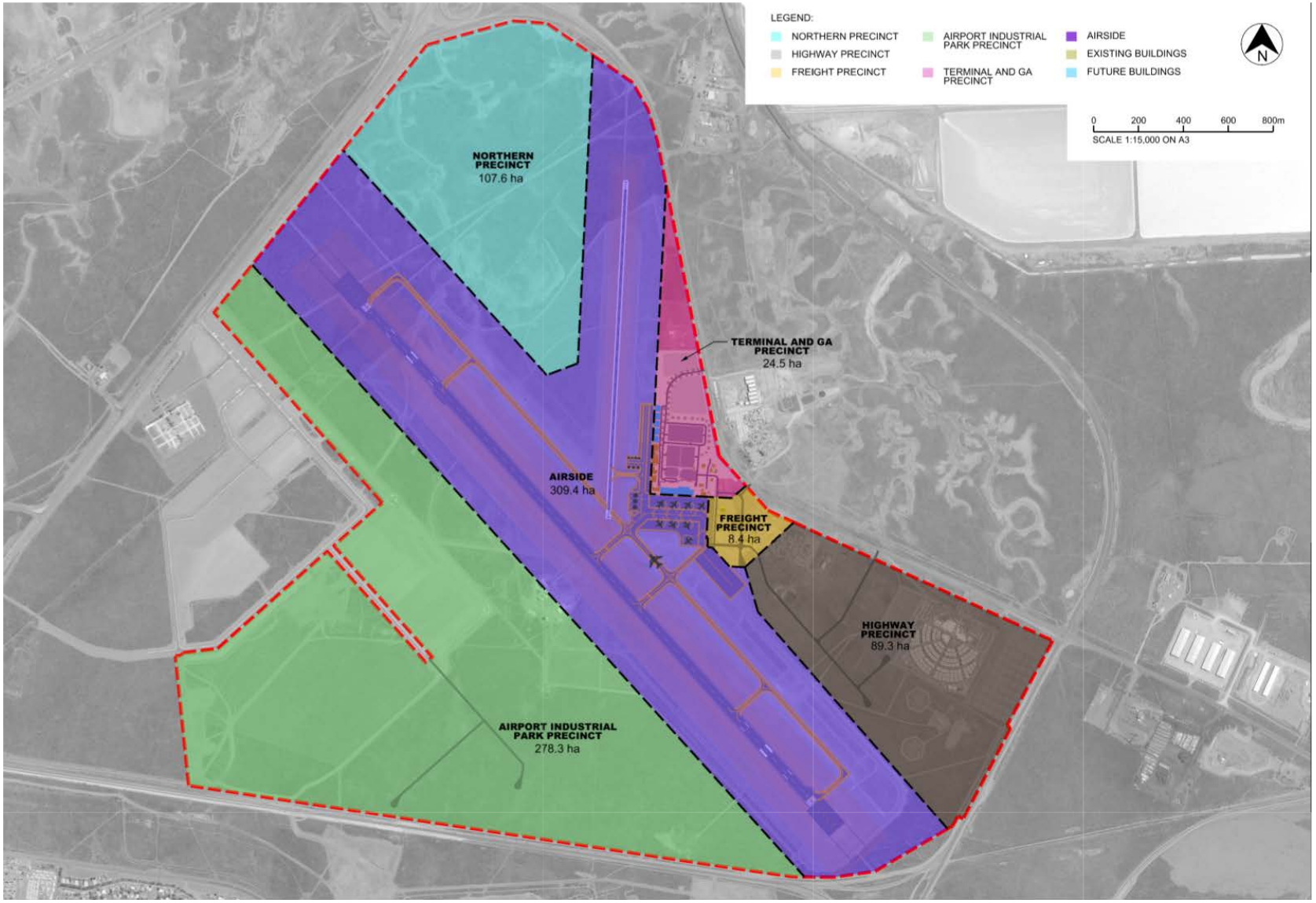


Figure 18: PHIA precinct plan

9 FACILITIES DEVELOPMENT PLAN

9.1 Movement area facilities

9.1.1 Runways

For the planning period of this Master Plan, there is no foreseeable lengthening, widening or strengthening for the runway infrastructure. For the purposes of future proofing, this Master Plan has provided an allowance for a runway extension reserve area of 500m for both Runway 14/32 and Runway 18/36.

9.1.2 Taxiways

This Master Plan has allowed for the construction of a new parallel taxiway to provide access to RPT and future freight aprons.

9.1.3 Aprons and aircraft parking areas

Expansion of the apron areas has been allowed for in this Master Plan. This includes the provision of a heavy aircraft parking bay for future potential freight operations (Code F); three heliport parking locations; a GA and light helicopter parking area; and RPT aircraft overflow areas (Code C).

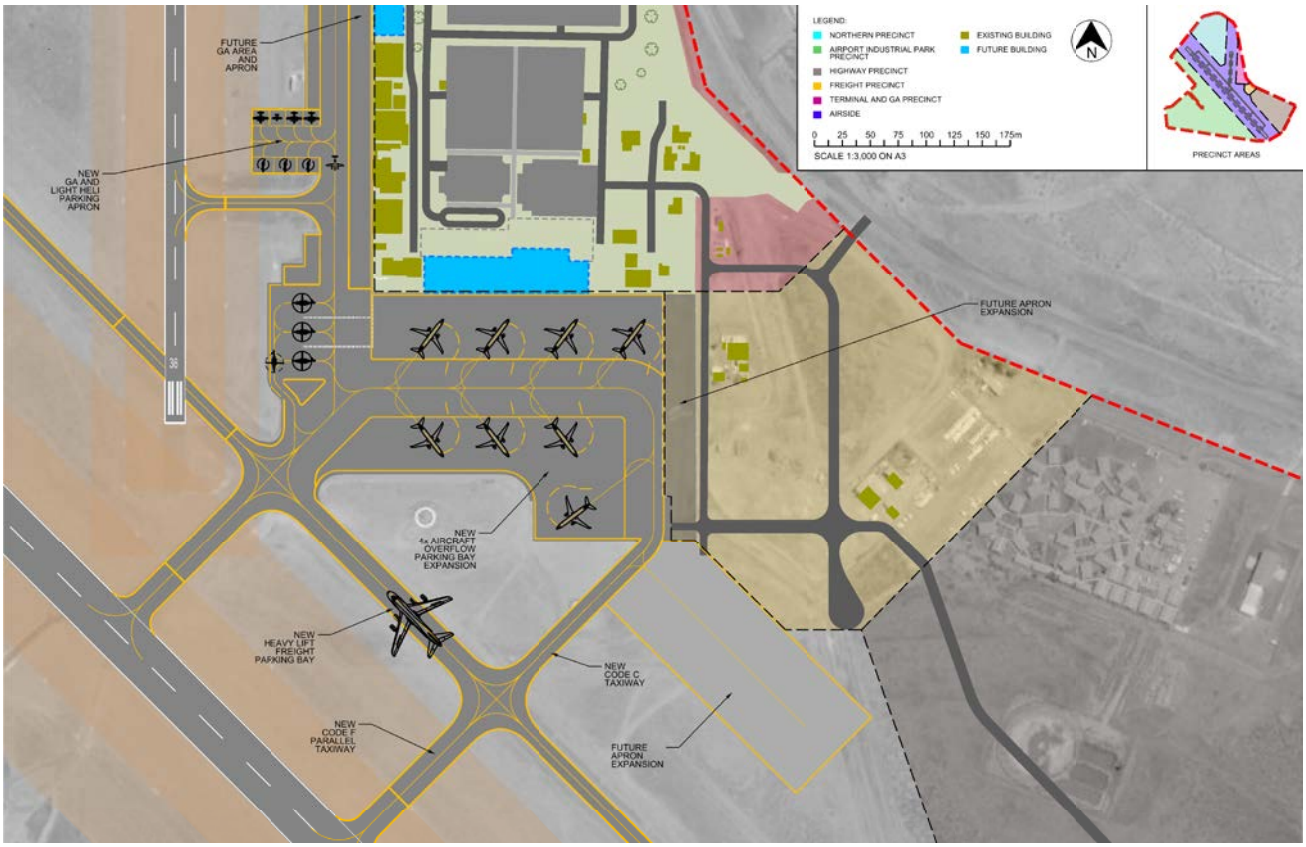


Figure 19: PHIA apron expansion plan

9.2 Aviation support facilities

The following section outlines elements of support facilities that are likely to be impacted by future development at PHIA.

9.2.1 Passenger terminal

Spatial requirements of the passenger terminal in the future are based on future peak airport traffic patterns and flow of traffic within the terminal. This flow is largely dependent on factors including the design aircraft expected to serve PHIA; technological advancements; regional population and economic growth rates; the LoS and functional areas standards established by IATA and the flight schedule.

Based on the passenger and RPT aircraft movement forecasts, the terminal is expected to reach a peak period passenger throughout (15-minute peak) of 418 passengers when the airport first records at least 700,000 passengers, which is in forecast to be in 2055/56FYE. The load factor and number of RPT aircraft movements in 2055/56FYE are forecasted to be 70.3% and 7,268, respectively[5].

It is expected that the passenger segments will be served by a mixture of B737s, B717s and F100s expected to arrive in the morning, afternoon or evening. Consequently, the terminal is expected to experience three traffic peaks (morning, midday, and evening). With 418 passengers in the 15-minute peak period, the morning traffic peak is expected to be the busiest of the three peaks.

The total terminal area required to address the peak period forecast is calculated to be approximately 4,610m^2.

Terminal redevelopment

PHIA Op. Co. will redevelop the existing terminal to address the above criteria and to facilitate the future requirements of PHIA. Terminal redevelopment will satisfy the following criteria:

- A terminal footprint that supports a peak period number of at least 418 passengers is required with functional areas consistent with the IATA nominated space requirements;
- Ground transport accessibility;
- Room for expansion of terminal;
- Room for expansion of airside infrastructure;
- Utilise existing infrastructure;
- Provide an aesthetically appealing and economic upgrade that visually represents the theme of “The gateway to the Pilbara”;
- A staged terminal development that does not interfere with terminal operations; and
- Meets the growing passenger demand.

Based on these factors and the long-term planning horizon, the terminal redevelopment at PHIA will be designed to accommodate 700,000 passengers. The first phase of development will accommodate expected demand through to 2033/2034 of 450,000 passengers. Further expansions will be investigated in response to growth.

Artists illustrations of the terminal redevelopment are presented below.

[5] As a result of the ToPH Special Meeting on 17 December 2018, the Council moved to allow terminal redevelopment “design” to accommodate at least 700,000 per annum, with construction terminal redevelopment to accommodate at least 450,000 passengers per annum (Council Decision CM201819/101).

Image 4: Artists impression of PHIA terminal redevelopment (outside)

9.2.2 Fuel facilities

The current fuel facility is sufficient an in an appropriate location. However, the facility is located within the future Freight and Logistics Precinct and dependent on demand land within this precinct, investigation may be required in order to establish the appropriateness of the current site for the fuel facility or the potential for relocation.

9.2.3 Aircraft hangars

There is considerable scope for the accommodation of additional GA and RPT hangers at PHIA subject to the demand for these facilitates. Additional GA aircraft hangars can be accommodated in a northerly direction from the existing hangers in the Terminal and GA Precinct and parallel to runway 18/36. If required, hangers can also be located on the northern boundary of Taxiway Bravo.

9.2.4 Navigation aids

The navigation aids described in Section 3.6.2 are expected to be sufficient for the life of this Master Plan. Any significant changes in airport operations or changes to air navigation requirements by the relevant authorities would require review of these aids.

9.2.5 Meteorological facilities

Meteorological facilities are provided by the Bureau of Meteorology (BOM) which is located at the entrance to the airport. As an international aerodrome, BOM provides Category A Terminal Aerodrome Forecasts (TAF) and an aerodrome weather report (METAR/SPECI). These are expected to be sufficient for the life of this Master Plan. Any significant changes in airport operations may require review of these facilities.

These facilities are on potentially valuable commercial land which, given the unattended nature of their use, may be investigated for opportunities of relocation to realise more commercially viable outcomes for both BOM and PHIA.

9.3 Other facilities

9.3.1 Access roads

Regional Road System (Great Northern Highway)

Consistent with highway road design standards, the MRWA have indicated that within the life of this Master Plan, the alignment of the Great Northern Highway that current bounds the eastern boundary of the airport site will likely be replaced by a limited access high speed connection between the rail crossing and the newly constructed grade separated interchange. The existing road will then be downgraded to continue to provide access to the airport and existing businesses in this precinct. The existing main airport access road is expected to remain when the road is downgraded.

Airport Road System

The proposed future airport ground transport layout is detailed in Section 10.

9.3.2 Car parks

There is currently adequate car parking, bus parking and rental car parking areas in the Terminal and GA Precinct to meet the 20-year forecast growth. From a planning and efficiency viewpoint, the car parking at PHIA will be enhanced as part of the terminal redevelopment project with improved traffic flow.

There are currently 543 parking spaces in the long-term car park and 160 parking spaces in the short-term car park. Based on the current occupancy rates and the forecasted peak period number of 418, it is forecasted that 200 and 120 bays would be required in the long- and short-term car parks, respectively, by 2037. As such, the existing capacities of both car parks are sufficient to meet this demand. The existing nine bus parking spaces are also expected to be sufficient until 2037.

For the rental car park, an additional 20 bays are forecasted which would then bring the total number of rental car spaces to 120 bays. There is sufficient spatial capacity within the overflow car parking area to construct these additional bays. The proposed car parking layout and road network is shown in Section 10.

9.3.3 Rental car storage areas

The rental car storage areas are located in the freight /logistics precinct. Vehicles that have been returned by customers can be moved to the storage areas for repair, cleaning and storage until they are ready to be returned to the terminal face for re hiring. Movement between the storage areas and the terminal face holding bays will be via a new connecting road that will be separate from the main terminal access road used by arriving and departing passengers and the various forms of ground transport.

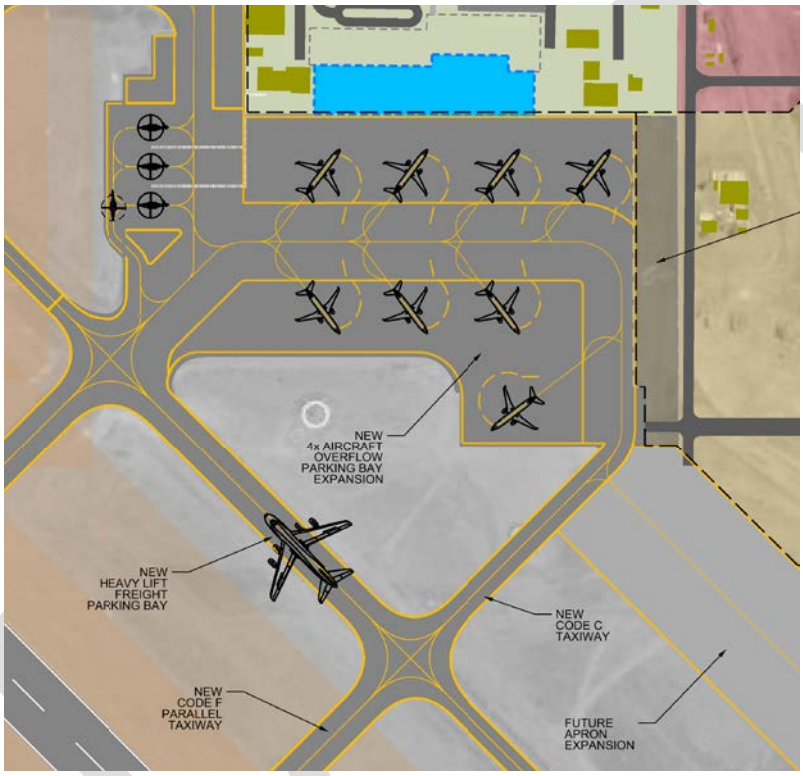
9.4 Freight

9.4.1 Freight opportunities

Several opportunities for the future of airfreight growth and development at PHIA are suggested. International airfreight has been identified as a potential area of growth for the airport and endeavours to leverage Port Hedland's geographic proximity to both Asia and the various resources ventures in the Pilbara (ToPH 2014). A few opportunities on the airport site which will contribute to the future scope of airfreight include:

- The airfield capabilities of PHIA are the best in the Pilbara and Kimberley region. The existing 2500m runway is able to handle larger freight dedicated aircraft such as the Antonov-124;
- The airport is in proximity to mining industry hubs which presents the opportunity to be able to access time critical freight/goods faster via Port Hedland rather than via Perth or Darwin. This increased efficiency is also a cost saving measure for many stakeholders;
- PHIA already has limited operations and frameworks in place for handling international cargo. The Pilbara Cargo Terminal is a separate entity that lacks sufficient dedicated facilities;
- Proximity to the agricultural areas of North WA;
- PHIA with its international services provides the only regional international export hub in WA; and
- Existing RPT international services and facilities.

Figure 20 below identifies potential future parking arrangements for large freight aircraft



9.4.2 Freight precinct objectives

The airport's role is to ensure that adequate land has been allocated to allow the industry to develop with appropriate access. The Freight Precinct at PHIA is designed in conjunction with the projection of the ultimate freight capacity (international and domestic). The precinct will:

- Provide tenants with premium landside and airside site access via a new perimeter access route from the Great Northern Highway;
- Extend the existing airfield apron to meet the existing access road and realign the airside boundary (as per Figure 17 presented earlier);
- Propose the potential relocation of the air fuel depot to allow for premium airside/landside flow and lots;

- Provide 8.4 ha of land (including 1.3 ha at the airside interface) to easily accommodate forecast GFA requirements;
- Provide spacious freight lots to accommodate required site access, parking and turning space for vehicles up to 25m in length and any further unique requirements for freight handling in the Pilbara;
- Provide a heavy freight vehicle access yard to ensure airside and landside permeability and access to a full freighter parking bay; and
- Accommodate a GSE area as part of any apron extension zone.

Ultimate/Maximum Freight Capacity
The designated freight precinct includes an area of approximately 1.3 ha of land on the airside/landside interface suitable for processing freight. A building area to land area ratio of 50% has been assumed and 13,000 m^2 of land has been allowed for with airside frontage.

Utilising general site planning principles this area could accommodate approximately 6,500 m^2 GFA of freight / cargo processing facility on the airside / landside interface.

Using the IATA space planning ratios this building area can accommodate approximately 32,000 tonnes per annum assuming predominately manual operations within the building. Capacity can increase threefold if a fully automated freight shed was developed.

9.5 Utility services

9.5.1 Electricity
As part of the terminal redevelopment project, a review of the probable demand will be undertaken by suitably qualified engineers to ensure the adequacy of the ongoing upgrade expectations.

9.5.2 Sewerage
As part of the transfer agreement, ToPH is to provide a new sewerage line connecting the PHIA to the town's sewerage collection and treatment system.

9.5.3 Waste Water
The capacity of the proposed reticulation scheme to be provided by ToPH, in terms of flow rates, pipe capacities and sewer servicing levels is deemed suitable for the current developments. In the event that PHIA intends to progress significantly larger developments, alternative infrastructure, or more detailed analysis of flows and operation of the proposed infrastructure would be required.

9.5.4 Water
Current water facilities are insufficient to meet even current demands. It is the ToPH obligation to run deep sewerage and water from the South Hedland facility, as part of the lease agreement with PHIA.

9.5.5 Stormwater
It is recommended that a full stormwater management plan be developed in conjunction with any terminal redevelopment and apron works.

GROUND TRANSPORT PLAN

10 GROUND TRANSPORT PLAN

Section 3 describes the existing access roads, car parks and car hire facilities and infrastructure. A ground transport plan will be completed as part of the terminal redevelopment project. Figure 21 represents the proposed ground transport plan along with a possible car parking layout.

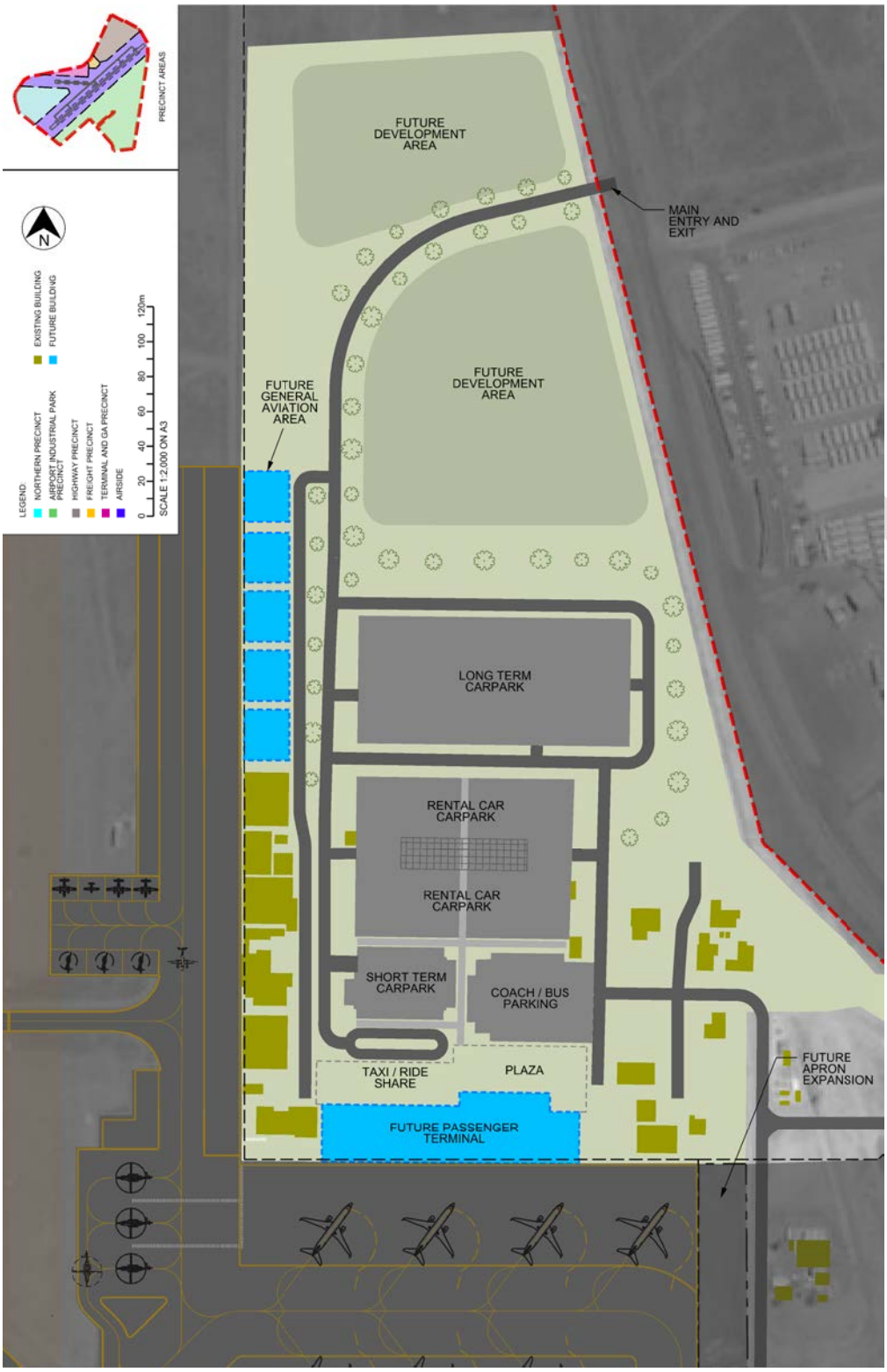


Figure 21: Proposed ground transport plan and car parking layout

AIRPORT SAFEGUARDING PLAN

11 AIRPORT SAFEGUARDING PLAN

11.1 National airports safeguarding framework

The National Airports Safeguarding Framework provides guidance on planning requirements for development that affects aviation operations. This includes building activity around airports that might penetrate operational airspace and/or affect navigational procedures for aircraft.

The Framework was developed by the National Airports Safeguarding Advisory Group, which includes representatives from Commonwealth Infrastructure and Defence departments and aviation agencies; state and territory planning and transport departments, and the Australian Local Government Association. The Framework applies at all airports in Australia and affects planning and development around airports, including development activity that might penetrate operational airspace and/or affect navigational procedures for aircraft.

The Australian Government recognises that responsibility for land use planning rests primarily with state, territory and local governments, but that a national approach can assist in improving planning outcomes on and near airports and under flight paths. The aim of the Framework is to:

- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions;
- Improve community amenity by minimising noise sensitive developments near airports, including through the use of additional noise metrics; and
- Improve aircraft noise-disclosure mechanisms.

The Framework is intended to provide guidance to state, local and territory governments which can in turn be used to guide assessment and approvals for land use and development on and around identified airports. The Framework consists of:

- Principles for National Airports Safeguarding Framework;
- Guideline A: Managing Aircraft Noise;
- Guideline B: Managing Building-Generated Windshear;
- Guideline C: Managing Wildlife Strike Risk;
- Guideline D: Managing Wind Turbine Risk to Aircraft;
- Guideline E: Managing Pilot Lighting Distraction; and
- Guideline F: Managing Protected Airspace Intrusion.

As the Framework applies to all airports in Australia, it is critical that it I considered when planning for and operating PHIA.

11.2 Airspace protection surfaces

International standards have been adopted which define two sets of invisible surfaces above the ground around an airport. The airspace above these surfaces forms the airport's protected airspace. These two surfaces are the:

- Obstacle Limitation Surface (OLS); and
- Procedures for Air Navigational Services—Aircraft Operations (PANS-OPS) surface.

The Department of Infrastructure and Regional Development describes the two surfaces as:

- The OLS as generally the lowest surface and is designed to provide protection for aircraft flying into or out of the airport when the pilot is flying by sight; and
- The PANS-OPS surface is generally above the OLS and is designed to safeguard an aircraft from collision with obstacles when the aircraft's flight may be guided solely by instruments, in conditions of poor visibility.

For certain instrument flight procedures, the Visual Segment Surface (VSS) forms part of the airspace defined through the PANS-OPS. Where pilots are using an instrument flight procedure to perform an instrument approach to a runway with an aligned procedure, the VSS is an additional segment of airspace that needs to be kept clear of obstacles.

The OLS, PANS-OPS, and VSS must be considered when developing at the airport. They will each restrict any development nearby to the airport, particularly development located in close proximity to the runways or taxiways. The level of restriction depends on the proximity and elevation of the site relative to the OLS contours, and the PANS-OPS and VSS surfaces. Spatial planning with regard to these airspace protection surfaces is regulated through the Manual of Standards (MOS) Part 139 – Aerodromes, regulated by the Civil Aviation and Safety Authority. The Advisory Circular 139-21 provides information on VSS requirements.

The ERSA for PHIA states that the highest runway end elevation at PHIA is 33ft (10.0584m). For the purposes of this section, this is the assumed building site ground level for the entire airport site. The building height restriction is the difference between the OLS contour height and the building site ground level. The following table shows the building heights permitted within the OLS contours of PHIA.

Table 12: OLS building height restrictions

OLS contour (m)	Building site ground level (m)	Building height restriction (m)
10	10.0584	0.0584
20	10.0584	9.9416
30	10.0584	19.9416
40	10.0584	29.9416
52	10.0584	41.9416

11.3 Safety Areas

As described earlier in **Section 6.9.4**, there are two key safety areas which must be considered when safeguarding the airport – the Runway End Safety Area (RESA), and the Public Safety Zone (PSZ). At PHIA, both of these protection areas fall significantly outside of the airport site.

11.4 Airport Safeguarding Plan for PHIA

The RESA, PSZ, and OLS contours for PHIA are presented on the following page. This drawing is for indicative purposes only.

At the time of writing, the ToPH Planning Scheme No. 5 includes OLS surfaces for PHIA, dated 2005[6]. An updated set of OLS surfaces have been produced as at May 2018 (presented in Appendix E – Obstacle Limitations Survey) and should be referred to when considering any development in the vicinity of the airport. The Planning Scheme should also be referred to when considering development near the airport.

[6] https://www.porthedland.wa.gov.au/planning-building-and-environment/planning/planning-policies.aspx

Figure 22: PHIA airfield protection surfaces

11.5 Aircraft noise

11.5.1 The ANEF System

The most common method of determining the noise impact aircraft operations have on areas surrounding an airport is to prepare noise exposure forecasts using the computer based simulation model developed by the US FAA – the Integrated Noise Model (INM). The INM is used to calculate noise metrics utilised by most national authorities in land use planning adjacent to airports. The INM calculates the noise exposure "footprint" based on an analysis of aircraft traffic movements, flight track geometry, runway utilisation data and assumptions on typical current and future aircraft models and fleet mix.

Noise is associated with any activity that involves a release of energy, including aircraft operations at and around an airport. Noise elicits a wide range of individual responses and is consistently identified as the most significant environmental effect of airport operations.

The ANEF contours are used in conjunction with Australian Standard of AS 2021-2015 by State and Local Governments when developing land use planning advice in areas shown to be affected by aircraft noise.

11.5.2 ANEF contours at PHIA

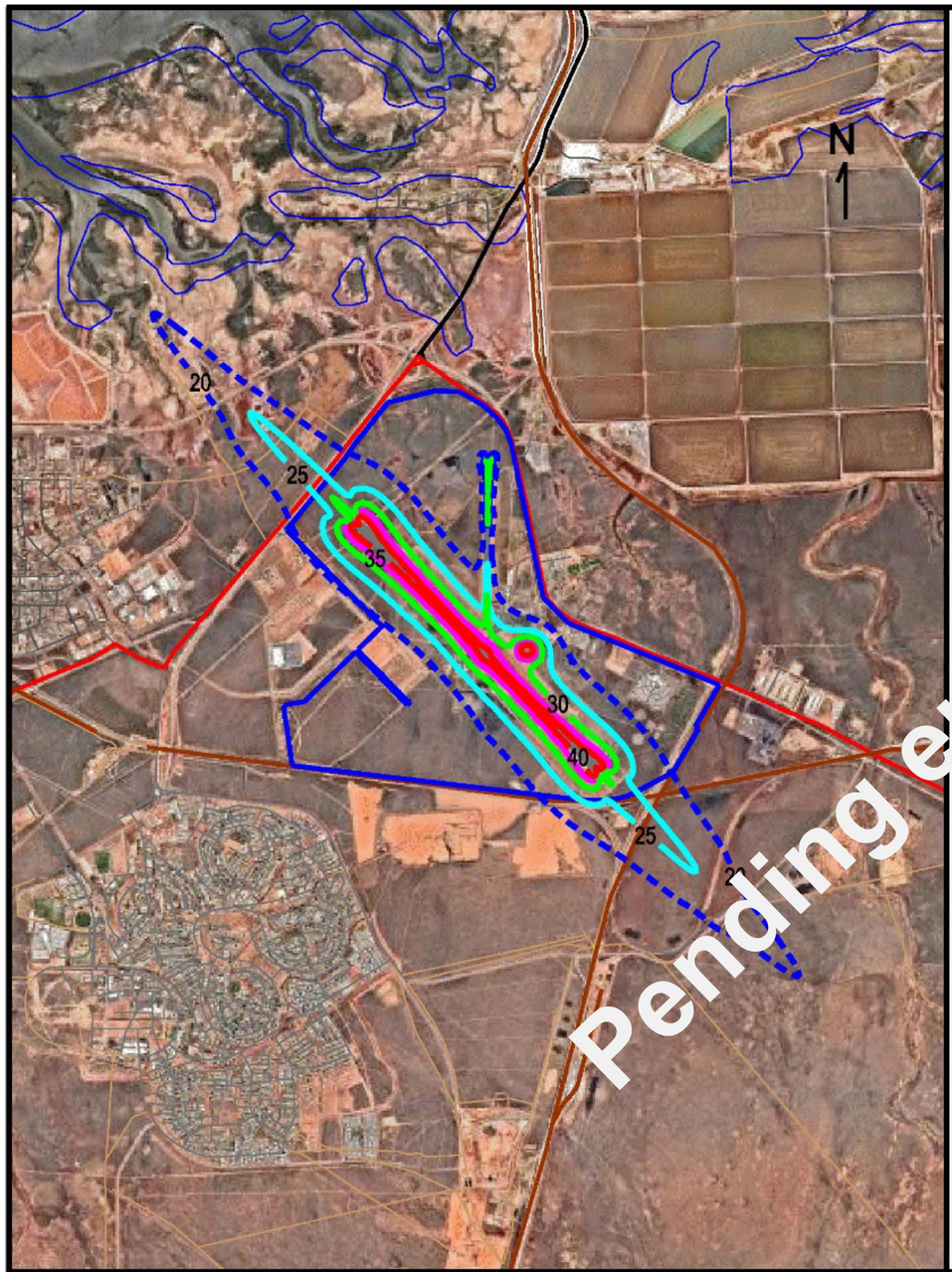
The ANEF has been prepared for PHIA based on the forecast of 474,000 passenger movements to 2037. Aircraft movements (including both RPT, GA, and helicopter movements) for this time are forecast to reach 15,866. The ANEF contours developed for this Master Plan are presented on the following page[7].

The ANEF reflects the noise contours which are considered significant under the AS2021-2015. A summary of how each contour affects land users surrounding PHIA is provided here.

Table 13: ANEF contours at PHIA

ANEF Contour	Impacts on land use
40	Entirely within airport site
35	Entirely within airport site
30	Entirely within airport site
25	Entirely within airport site
20	Currently vacant land Zoned as 'transport development', 'rural residential', and 'rural'

[7] At the time of writing, the ANEF presented in this Master Plan was in the process of being endorsed by Airservices Australia.



Rwy	Aircraft	Arrivals			Departures			Circuits			Total
		Day	Night	Total	Day	Night	Total	Day	Night	Total	
14	717200	0.9592	0.0133	**0.9725**	0.9592	0.0133	**0.9725**				**1.9450**
14	737800	3.3811	0.0293	**3.4105**	3.3811	0.0293	**3.4105**				**6.8209**
14	74720B	0.0044	0.0044	**0.0087**	0.0044	0.0044	**0.0087**				**0.0174**
14	BEC58P	0.5534	0.0507	**0.6041**	0.5534	0.0507	**0.6041**	0.0135	0.0000	**0.0135**	**1.2216**
14	CIT3	0.0542	0.0108	**0.0650**	0.0542	0.0108	**0.0650**				**0.1300**
14	CNA208	1.8283	1.1556	**2.9839**	1.8283	1.1556	**2.9839**	0.0070	0.0105	**0.0176**	**5.9854**
14	CNA210	0.0756	0.0041	**0.0797**	0.0756	0.0041	**0.0797**	0.0036	0.0000	**0.0036**	**0.1629**
14	CNA441	0.0665	0.0121	**0.0786**	0.0665	0.0121	**0.0786**				**0.1573**
14	CNA55B	0.1282	0.0154	**0.1435**	0.1282	0.0154	**0.1436**	0.1282	0.0000	**0.1282**	**0.4152**
14	DHC830	0.0195	0.4349	**0.4543**	0.0195	0.4349	**0.4543**				**0.9087**
14	F28MK2	2.5818	0.0293	**2.6111**	2.5818	0.0293	**2.6111**				**5.2223**
14	GASEPF	0.7366	0.2821	**1.0187**	0.7366	0.2821	**1.0187**	1.4309	0.0545	**1.4854**	**3.5228**
14	GASEPV	0.0477	0.0000	**0.0477**	0.0477	0.0000	**0.0477**	0.0237	0.0000	**0.0237**	**0.1190**
14	LEAR35	0.0866	0.0130	**0.0996**	0.0866	0.0130	**0.0996**				**0.1993**
14		**10.5231**	**2.0549**	**12.5780**	**10.5231**	**2.0549**	**12.5780**	**1.6068**	**0.0651**	**1.6719**	**26.8279**
18	BEC58P	0.1301	0.0119	**0.1420**	0.1301	0.0119	**0.1420**				**0.2840**
18	CNA208	0.4298	0.2716	**0.7014**	0.4298	0.2716	**0.7014**	0.0019	0.0028	**0.0047**	**1.4076**
18	CNA210	0.0178	0.0010	**0.0187**	0.0178	0.0010	**0.0187**	0.0010	0.0000	**0.0010**	**0.0384**
18	CNA441	0.0156	0.0028	**0.0185**	0.0156	0.0028	**0.0185**				**0.0370**
18	GASEPF	0.1731	0.0663	**0.2396**	0.1731	0.0663	**0.2396**	0.3968	[illegible]	**0.4016**	**0.8806**
18	GASEPV	0.0112	0.0000	**0.0112**	0.0112	0.0000	**0.0112**	[illegible]	[illegible]	[illegible]	**0.0288**
18		**0.7776**	**0.3537**	**1.1313**	**0.7776**	**0.3537**	**1.1313**	[illegible]	[illegible]	[illegible]	**2.6763**
32	717200	0.7471	0.0104	**0.7575**	0.7471	0.0104	[illegible]				**1.5150**
32	737800	2.6335	0.0228	**2.6564**	2.6335	0.0228	[illegible]				**5.3128**
32	74720B	0.0034	0.0034	**0.0068**	0.0034	0.0034	[illegible]				**0.0136**
32	BEC58P	0.3755	0.0344	**0.4098**	0.3755	[illegible]	[illegible]	0.0098	0.0000	**0.0098**	**0.8294**
32	CIT3	0.0422	0.0084	**0.0506**	0.0422	[illegible]	[illegible]				**0.1012**
32	CNA208	1.2401	0.7810	**2.0245**	1.2401	[illegible]	[illegible]	0.0055	0.0082	**0.0137**	**4.0626**
32	CNA210	0.0513	0.0028	**0.0541**	[illegible]	[illegible]	**0.0541**	0.0028	0.0000	**0.0028**	**0.1109**
32	CNA441	0.0451	0.0082	**0.0533**	[illegible]	[illegible]	**0.0533**				**0.1067**
32	CNA55B	0.0968	0.0120	**0.1118**	[illegible]	[illegible]	**0.1118**	0.0998	0.0000	**0.0998**	**0.3234**
32	DHC830	0.0152	0.3387	**0.3539**	[illegible]	[illegible]	**0.3539**				**0.7078**
32	F28MK2	2.0110	0.0228	**2.0338**	[illegible]	0.0228	**2.0338**				**4.0676**
32	GASEPF	0.4967	[illegible]	**0.691[illegible]**	[illegible]	0.1914	**0.6911**	1.1164	0.0425	**1.1590**	**2.5412**
32	GASEPV	0.0323	[illegible]	[illegible]	0.0323	0.0000	**0.0323**	0.0185	0.0000	**0.0185**	**0.0832**
32	LEAR35	0.0675	[illegible]	[illegible]	0.0675	0.0101	**0.0776**	**1.2528**	**0.0508**	**1.3035**	**1.4587**
32		**7.8[illegible]**	**1.4495**	**[illegible]135**	**7.8641**	**1.4495**	**9.3135**	**2.5055**	**0.1015**	**2.6070**	**21.2341**
36	BEC58P	[illegible]	[illegible]34	**0.0762**	0.0668	0.0084	**0.0762**				**0.1524**
36	[illegible]NA208	0.2[illegible]	0.1458	**0.3764**	0.2306	0.1458	**0.3764**	0.0010	0.0015	**0.0025**	**0.7553**
36	[illegible]210	0.00[illegible]	0.0005	**0.0101**	0.0095	0.0005	**0.0101**	0.0005	0.0000	**0.0005**	**0.0206**
36	[illegible]	[illegible]	0.0015	**0.0099**	0.0084	0.0015	**0.0099**				**0.0198**
36	[illegible]ASE[illegible]	0.0529	0.0356	**0.1285**	0.0929	0.0356	**0.1286**	0.2076	0.0079	**0.2155**	**0.4726**
36	[illegible]ASEP[illegible]	0.0060	0.0000	**0.0060**	0.0060	0.0000	**0.0060**	0.0034	0.0000	**0.0034**	**0.0155**
[illegible]		**0.4173**	**0.1898**	**0.6070**	**0.4173**	**0.1898**	**0.6070**	**0.2125**	**0.0094**	**0.2220**	**1.4361**
H1	[illegible]206B3	0.1876	0.0096	**0.1973**	0.1876	0.0096	**0.1973**				**0.3945**
H1	EC130	0.3369	0.0334	**0.3703**	0.3369	0.0334	**0.3703**				**0.7406**
[illegible]	R44	0.0727	0.0040	**0.0767**	0.0727	0.0040	**0.0767**				**0.1534**
H1		**0.5972**	**0.0471**	**0.6443**	**0.5972**	**0.0471**	**0.6443**				**1.2885**
H4	EC130	0.3369	0.0334	**0.3703**	0.3369	0.0334	**0.3703**				**0.7406**
H4		**0.3369**	**0.0334**	**0.3703**	**0.3369**	**0.0334**	**0.3703**				**0.7406**
Grand Total		20.5161	4.1284	24.6444	20.5161	4.1284	24.6444	4.7210	0.1936	4.9145	54.2034

TABLE 2.1

BUILDING SITE ACCEPTABILITY BASED ON ANEF ZONES
(To be used in conjunction with Table 3.3)

Building type	ANEF zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF (Note 1)	20 to 25 ANEF (Note 2)	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF (Note 1)	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF (Note 1)	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

NOTES: -

1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contours.

2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

3. There will be cases where a building of a particular type will contain spaces used for activites which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.

4. This Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required ANR determined according to Clause 3.2. For residences, schools, etc, the effect of aircraft noise on outdoor areas associated with the buildings should be considered.

5. In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations.

Qualification

Factors taken into account for the calculation of the 2037 ANEF contours are as follows:

- The number and types of aircraft forecast to operate on an average day,
- Runway usage was in accordance with an average 9:00am and 3:00pm monitored wind conditions,
- RPT aircraft approach and destination was instrumental in distribution on flight tracks.
- Noise characteristics of aircraft were taken into account to ensure they will be representative of aircraft operations for the forecast year,
- Aircraft operations are defined as daytime (7am – 7pm) and night-time (7pm to 7am), and
- Terrain was not used in the calculation of these noise contours.

Contours are plotted at intervals of 5 ANEF over the Range of 20 to 40 ANEF, the higher the ANEF value the greater the noise exposure. Although aircraft noise does not stop outside the 20 ANEF contour, noise from sources other than aircraft may predominate over aircraft noise.

Port Hedland International Airport neither assumes nor accepts responsibility for the accuracy or any reliance placed on them.

airservices

ENDORSEMENT FOR TECHNICAL ACCURACY

STANDARD ANEF

.....

Date: ...../...../.....

Executive General Manager Safety, Environment & Assurance
Airservices Australia. Canberra

The aircraft noise contours on this chart have been calculated using an appropriate modelling process. Airservices Australia has, in accordance with the approved manner of endorsement, considered the physical ultimate capacity of the existing or proposed runway/s in its endorsement process.
The data input and assumptions made in that process are derived in part from external sources. Airservices Australia makes no warranty in respect of that information and excludes all liability for any loss arising from reliance on that information.

Scale

0 km 0.5 km 1.0 km 1.5 km 2.0 km

PORT HEDLAND INTERNATIONAL AIRPORT
2037 ANEF

The 2037 ANEF contours were prepared using INM Version 7.0d

11.5.3 Number above contours

Number above contours were prepared for the 2037 ANEF in order to identify the impact aircraft used in the preparation in this ANEF may have on the areas surrounding PHIA.

11.5.4 Communication of aircraft noise

The ANEF system which is based on the AS2021:2015, Acoustics – Aircraft noise intrusion – Building siting and construction is used to describe the description of aircraft noise around an airport within Australian. However, it is also widely recognised that the ANEF system is not easily translated as to how individuals are affected by and react to aircraft noise around an airport when subject to aircraft over flights and the loudness of each event. This is due to the way the ANEF combines the effects of loudness and duration of each noise event when calculating the resultant ANEF contours, especially when these contours which are used when planning identify land use around an airport. Sound levels are identified using a non-linear decibel scale which, when there is a change of between 1 dB(A) and 2 dB(A) in sound level, is usually difficult for most people to detect; whilst a 3 dB(A) to 5 dB(A) change can usually be noticed. In addition, when there is a noise level changes of 10 dB(A) it corresponds to an approximate doubling or halving in noise power or loudness of the source. As we live in an environment where there are different sources that generate noise it is pertinent to understand the differences in sound levels that may be experienced within and outside of a building. These noise levels are shown in Table 14.

Table 14: Typical noise levels

Activity	Typical Noise Level dB(a)
Quiet room	30
Rainfall	50
Conversation at 2m	60
Washing machine	65-70
Inside car, windows closed, 50km/h	67-73
Main road	70
Vacuum cleaner	85-90
Very loud rock music	120

11.5.5 Preparation of number above contours

When these noise levels are compared to that generated by various aircraft types, noise levels of 60 dB(A) and 70 dB(A) are used as a means of identifying areas that may be impacted by aircraft around an airport. Based on this, the DIRDC developed the Transparent Noise Information Package (TNIP), which uses an INM study prepared for an ANEF as a means of identifying the noise impact that may be experienced by people working or residing in areas around an airport. TNIP prepares a set of contours that are described as 'Number above', or 'N', contours which illustrate the average number of events per day louder than a selected sound level. In the majority of cases, noise levels of 60 dB(A) and 70 dB(A) are used, which are shown on charts as N60 and N70 contours. The 60 dB(A) noise level is generally accepted as intrusive inside certain living areas and the of 70 dB(A) noise level as intrusive within a house with the windows open and at which conversation is disturbed.

N60s and N70s contours are used to assist people and communities to better understand the impacts of aircraft noise by providing the estimated number of noise events and loudness of these events that they may experience during an average day.

11.5.6 Impact of noise above contours at PHIA

The N60 and N70 contours shown in Figure 24 and Figure 25 reflect contours for areas that experience noise levels greater than 60 and 70 dB(A) where there may be 5, 10, and 20 aircraft overflights of areas around an airport that exceed number of that noise level. It should be noted that AS2021:2015 identifies that the smaller the ANEF contour value the greater the variation in flight paths followed by aircraft on different days and changes in the extent of noise impact that may be experienced from day to day. Based on this, it can be assumed the same applies to 'Number above' contours, especially areas near and outside the contour shown for 5 noise events.

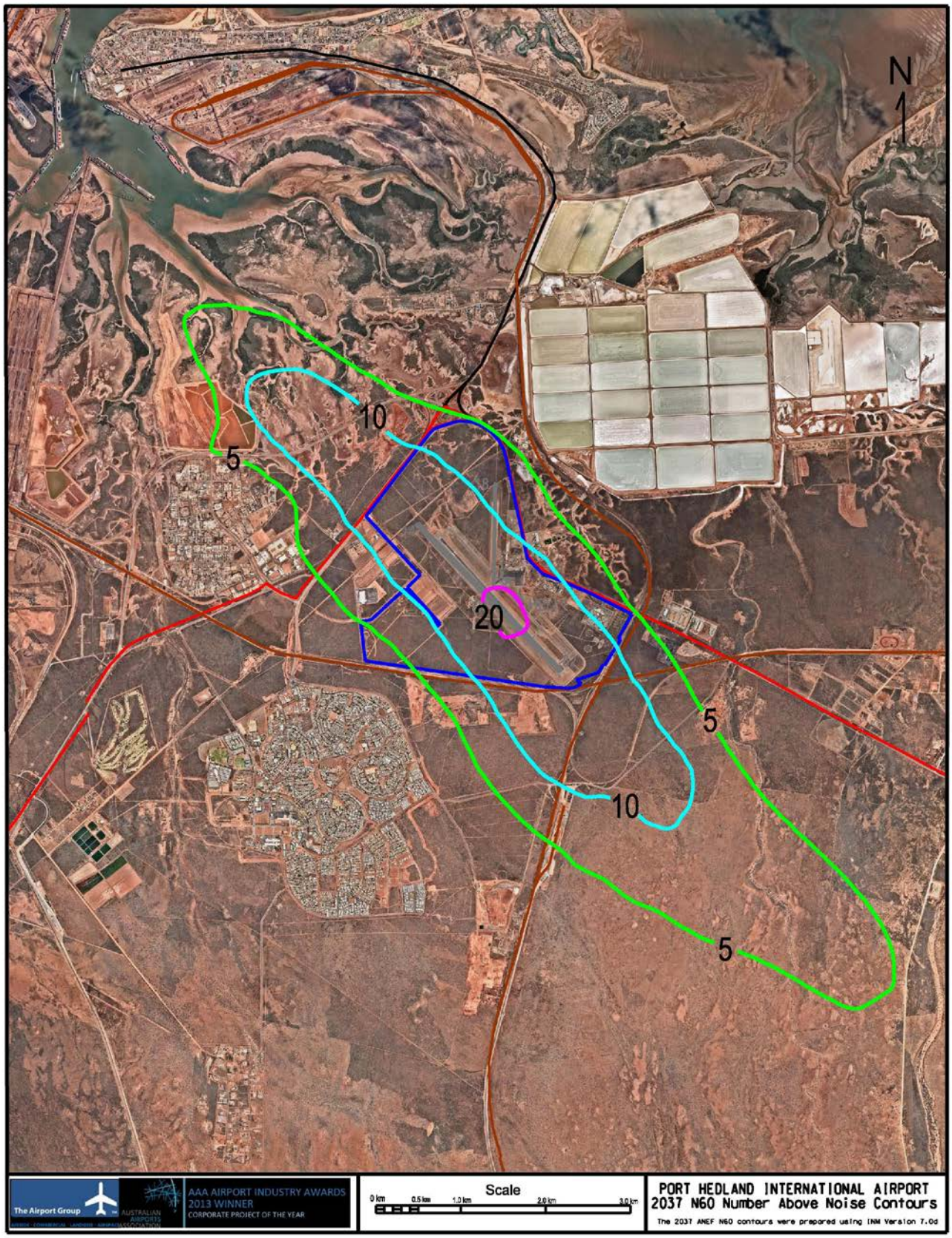


Figure 24: N60 Noise Above Contours at PHIA

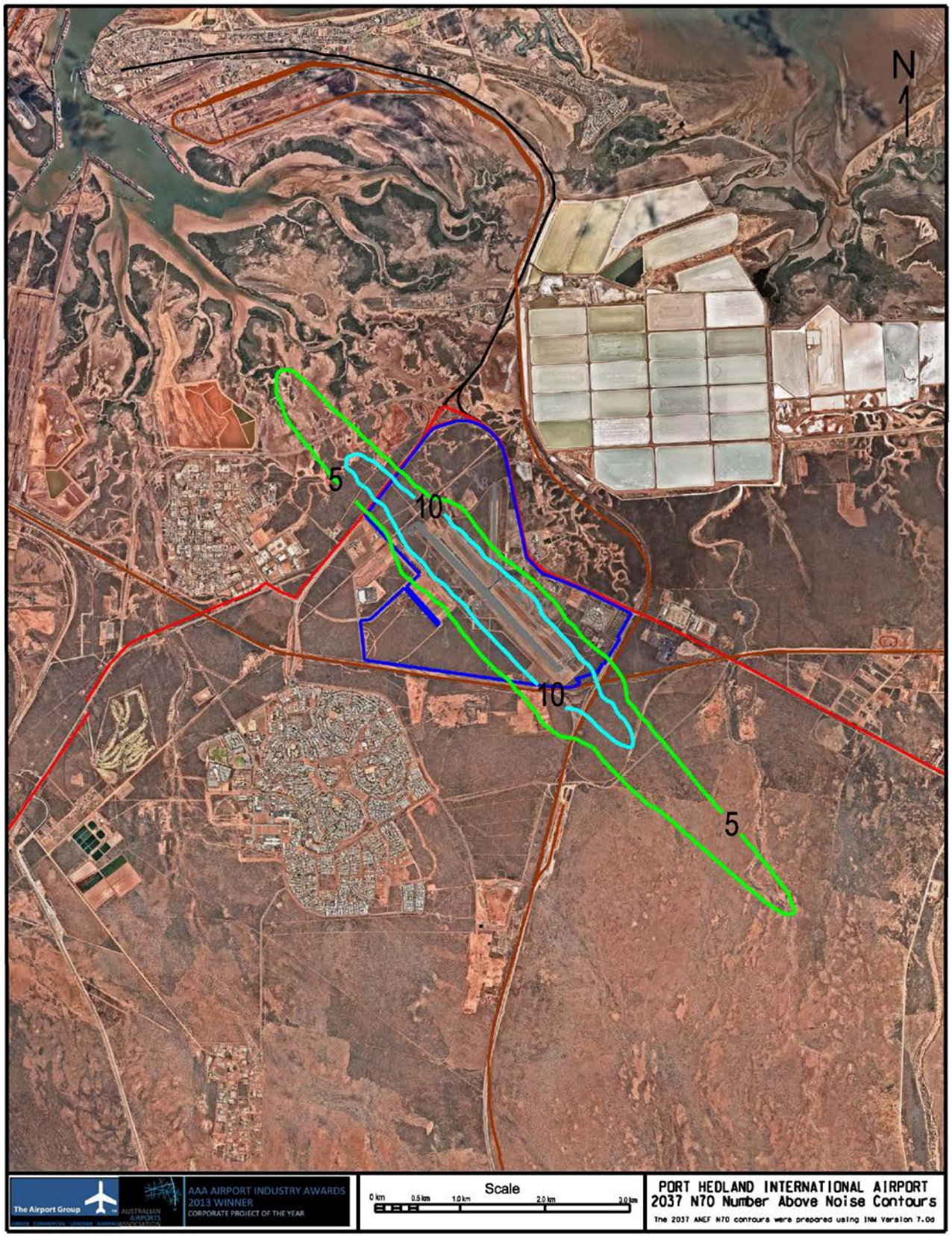


Figure 25: N70 Noise Above Contours at PHIA

11.5.7 ANEF and number above summary

The 2037 ANEI contours prepared for PHIA indicate the extent of the areas these contours cover within and outside the airport boundary. Only the 20 ANEF contour extends past the northwest and southeast airport boundary which appear to be non-residential areas. The 25, 30, 35 and 40 ANEF contours are wholly contained within the airport boundary. The analysis also shows that even though there is a forecasted increase in number of movements, there should not be a noticeable change in the noise impact of aircraft operations at PHIA due to the level of activity that currently occurs and the forecasted increase in aircraft movements that will occur over a 20-year period.

A risk assessment of the preparation of these contours has highlighted the following:

- The proposed contours have been prepared in accordance with Australian Standard AS2021-2015;
- The forecasted increase in the number of aircraft should not noticeably alter the noise impact of aircraft due to the current residential areas not being overflown by aircraft during their approach to and departure at the YPPH airport;
- No change in approach and departure aircraft flight profiles is expected;
- RPT operations will be mainly flown by ICAO Chapter 4 certified aircraft, which have reduced noise emissions impacts;
- There will be minimal change to types of aircraft operations;
- Most arrivals and departures are during the day or early evening;
- There are no populous areas directly below the approach and departure flight paths for both runways, and only a small area to the west of Runway 14/32 may be affected by sideline noise of arrivals to Runway 14 and departures from Runway 32. The approach and departure flight paths are over non-residential areas for both runways and helipads and it is expected that there should not be a change to the flight paths flown or noticeable impact of aircraft noise to that currently experienced; and
- The 'Number above' noise contours indicate that there are no residential areas that may experience more than five flights per day that exceed 60 or 70 dB(A) and the residential areas of Wedgefield and South Hedland should experience less than five events per day where the noise levels are greater than 60 or 70 dB(A). The 10 'Number above' N70 contour does not appear to overfly any residential areas around the YPPH airport and the 20 'Number above N70 contour is contained within the airport boundary.

The adoption of the 2037 ANEF should not generate any public concern. Any changes to aircraft operations at PHIA airport should not have a noticeable change in the extent of the ANEF contours.

NASF Guideline A contains further information and recommendations regarding aircraft noise contours which should be considered by airport operators.

11.6 Planning policies and controls

Planning policies and controls relating to the safeguarding of PHIA have been discussed in this Section. In addition, an overview of relevant policies and controls for safeguarding has been presented in Section 6.9.

IMPLEMENTATION PLAN

12 IMPLEMENTATION PLAN

To provide direction for future development, a staged Implementation Plan has been produced and is presented here for PHIA. Taking into account the current situation at PHIA, the SWOT analysis, critical airport planning parameters, including the forecast passenger and aircraft movements, the Implementation Plan outlines a pragmatic and flexible staging plan for the short, medium and long term at PHIA. PHIA Op. Co. should remain flexible with future development options and opportunities and the capacity to respond to market drivers and changes in air traffic movements as required.

Short term (0-5 years)
General
• Annually review actual passenger movements against forecast figures. • Ensure ongoing maintenance of airport infrastructure condition to ensure compliance. • Monitor the update of MOS Part 139 with a view to make any required changes in line with MOS 139. • Endorsement of the ANEF with Airservices Australia.
Terminal and GA Precinct
• Commence redevelopment of existing terminal. • Engage with existing and potential tenants for uses within the Terminal and GA Precinct. • Maintain ongoing engagement with GA users.
Freight Precinct
• Seek engagement and potential demand for development in the Freight Precinct. • Based on market demand, consider apron expansion requirements to service the Precinct.
Highway Precinct
• Seek engagement and potential demand for development in the Highway Precinct.
Airport Industrial Park Precinct
• N/A
Northern Precinct
• N/A

Medium term (5-10 years)
General
• Annually review actual passenger movements against forecast figures. • Produce new passenger and aircraft movement forecast (if adopting period of every five years). • Ensure ongoing maintenance of airport infrastructure condition to ensure compliance.
Terminal and GA Precinct
• Engage with existing and potential tenants for uses within the Terminal and GA Precinct. • Maintain ongoing engagement with GA users.
Freight Precinct
• Seek engagement and potential demand for development in the Freight Precinct. • Based on market demand, consider apron expansion requirements to service the Precinct.
Highway Precinct
• Seek engagement and potential demand for development in the Highway Precinct.

Airport Industrial Park Precinct
• N/A
Northern Precinct
• N/A

Long term (10-20 years)
General
• Annually review actual passenger movements against forecast figures. • Produce new passenger and aircraft movement forecast (if adopting period of every five years). • Ensure ongoing maintenance of airport infrastructure condition to ensure compliance.
Terminal and GA Precinct
• Engage with existing and potential tenants for uses within the Terminal and GA Precinct. • Maintain ongoing engagement with GA users.
Freight Precinct
• Seek engagement and potential demand for development in the Freight Precinct. • Based on market demand, consider apron expansion requirements to service the Precinct.
Highway Precinct
• Seek engagement and potential demand for development in the Highway Precinct.
Airport Industrial Park Precinct
• Seek engagement and potential demand for development in the Airport Industrial Park Precinct.
Northern Precinct
• Seek engagement and potential demand for development in the Northern Precinct.

APPENDICES

INDEX OF APPENDICES

- Appendix A – ToPH Planning Scheme Land Uses Table
- Appendix B – Environmental Values Mapping
- Appendix C – Heritage Values Mapping
- Appendix D – Permissible Land Uses Table

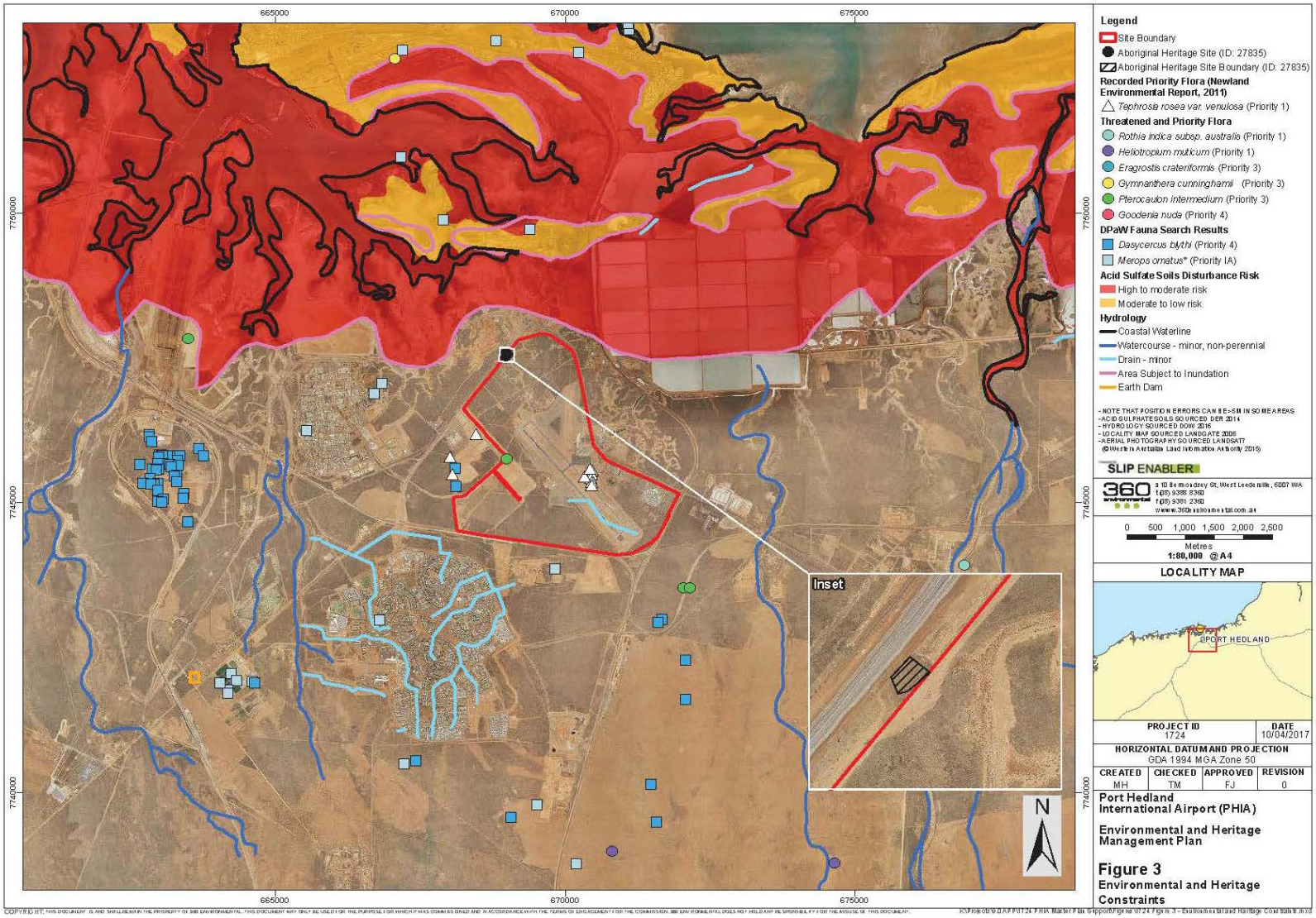
Appendix A – ToPH Planning Scheme Land Uses Table

The following table details the development and land uses permitted within the 'Airport' zone (Section 3.2 of the Planning Scheme).

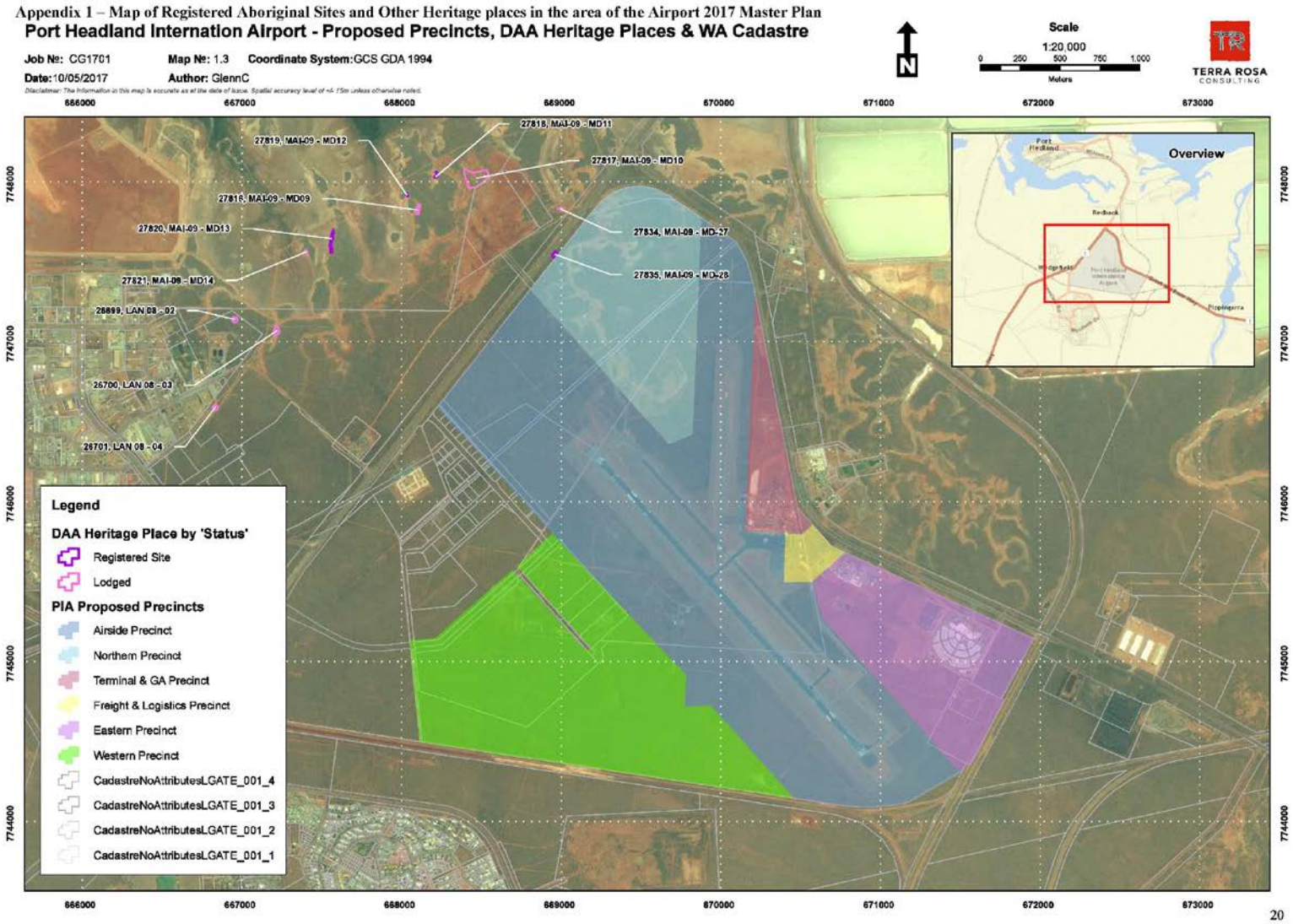
Use	Permitted	Scheme No. 5 Permitted		
		With planning approval	With planning approval after public notice	If incidental to the predominate use
Residential				
Hotel		✓		
Motel			✓	
TWA		✓		
Industry				
Arts and Crafts Centre				✓
Container park		✓		
Distribution Centre		✓		
Intensive Agriculture			✓	
Hire Service (Industrial)		✓		
Industry Light		✓		
Industry Service		✓		
Infrastructure		✓		
Storage facility/ depot/ laydown area		✓		
Commerce				
Aerodrome	✓			
Dry Cleaning			✓	
Motor Vehicle and/or Marine Repair		✓		
Motor Vehicle and/or Marine Sales or Hire		✓		
Motor Vehicle and/or Marine Service Station	✓			
Motor Vehicle Wash		✓		
Office			✓	
Outdoor Display		✓		
Reception Centre		✓		
Restaurant (includes Café)		✓		
Restricted Premises			✓	

Shop		✓		
Showroom		✓		
Takeaway Food Outlet			✓	
Warehouse		✓		
Health, Welfare & Community Services				
Carpark		✓		
Child Care Service				✓
Community Use		✓		
Education Establishment		✓		
Emergency Services	✓			
Funeral Parlour			✓	
Juvenile Detention Centre			✓	
Place of Public Meeting, Assembly, or Worship		✓		
Prison			✓	
Public Utility		✓		
Entertainment, Recreation, and Culture				
Entertainment Venue		✓		
Private Recreation		✓		
Public Recreation		✓		

Appendix B – Environmental Values Mapping



Appendix C – Heritage Values Mapping



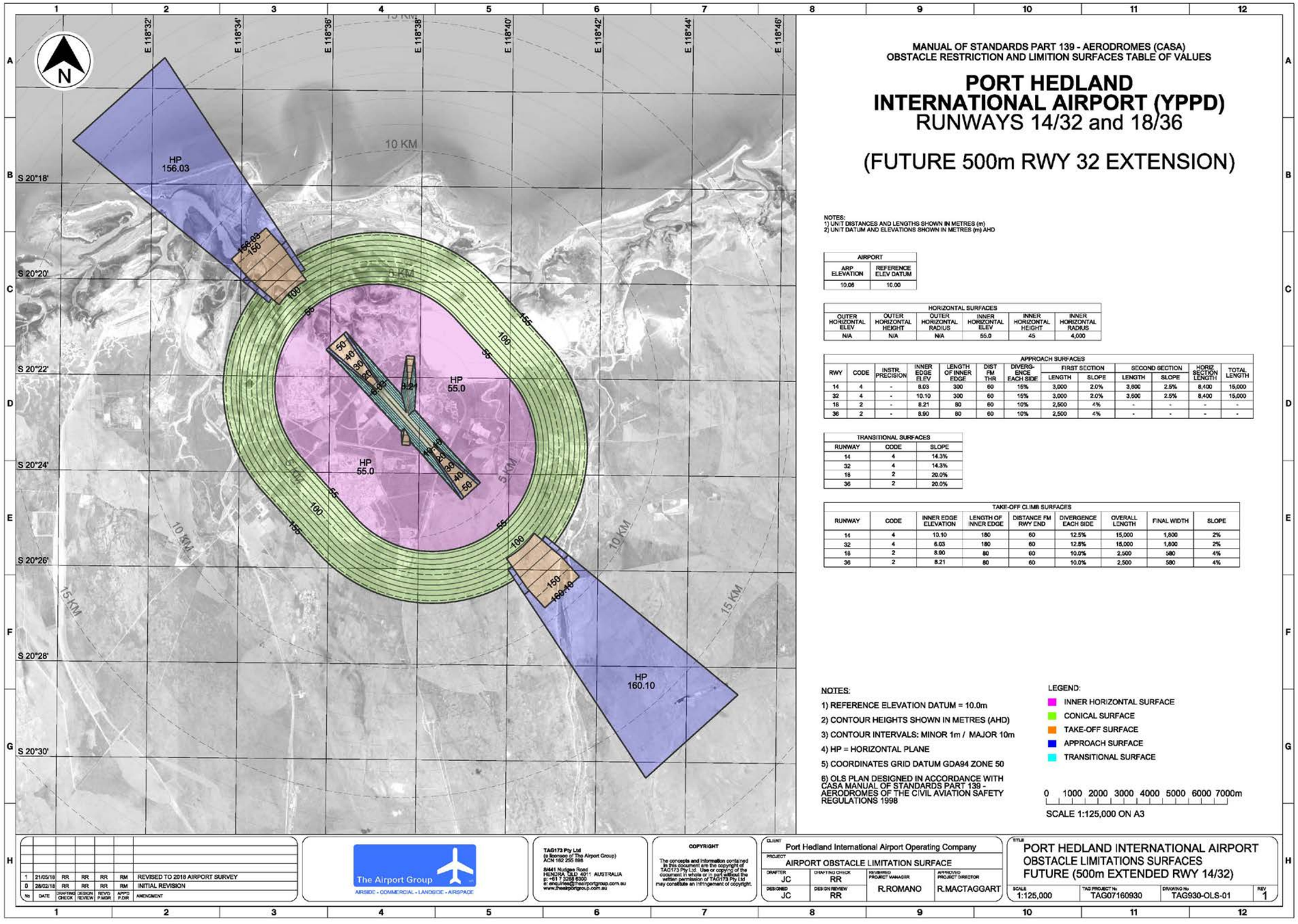
Appendix D – Permissible Land Uses Table

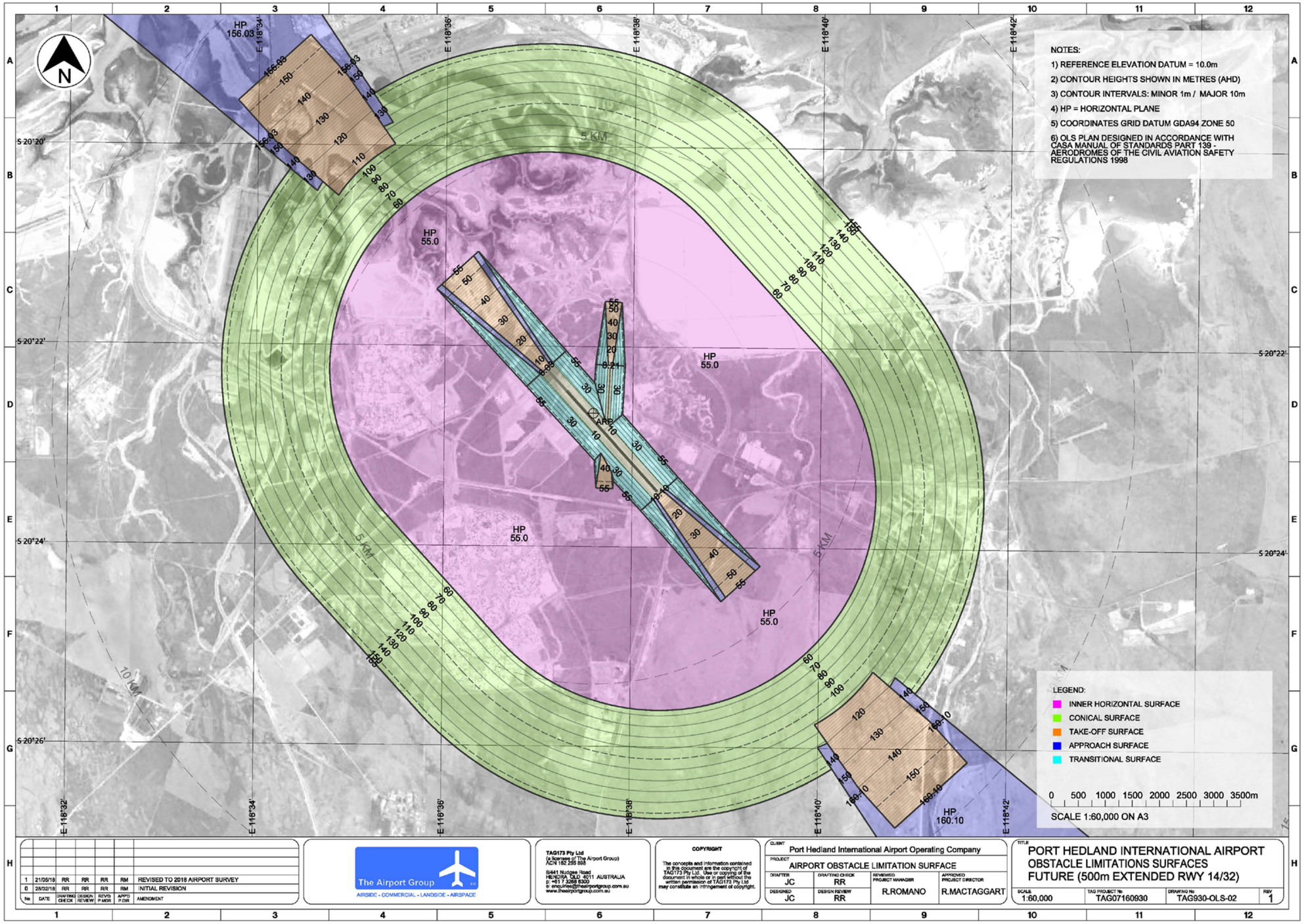
Uses	Terminal Precinct	Freight & Logistics	Eastern Precinct	Western Precinct	Northern Precinct	Airside
Uses Permitted under TPS 5 (P)						
Aerodrome						✓
Motor Vehicle and/or marine service station	✓	✓	✓	✓	✓	
Emergency services	✓	✓	✓	✓	✓	✓
Development is Permitted with Council approval - (AA)						
Hotel	✓		✓			
TWA			✓	✓	✓	
Container Park	✓	✓	✓	✓	✓	
Distribution Centre	✓	✓	✓	✓	✓	
Hire Service (industrial)	✓	✓	✓	✓	✓	✓
Industry – light	✓	✓	✓	✓	✓	
Industry – service	✓	✓	✓	✓	✓	
Infrastructure?	✓	✓	✓	✓	✓	✓
Storage facility / depot/laydown area		✓	✓	✓	✓	
Motor Vehicle and or Marine Repair	✓	✓	✓	✓	✓	
Motor vehicle and or marine sales or hire	✓	✓	✓	✓	✓	
Motor vehicle wash	✓	✓	✓			
Outdoor display	✓	✓	✓			
Reception centre	✓		✓	✓		
Restaurant	✓			✓		
Shop	✓					
Showroom	✓	✓	✓	✓		
Warehouse	✓	✓	✓	✓	✓	
Carpark	✓	✓	✓	✓	✓	
Community use	✓		✓	✓	✓	

Education	✓		✓	✓	✓	
Place of public meeting	✓		✓	✓	✓	
Public utility	✓		✓	✓	✓	
Entertainment venue	✓		✓			
Private recreation	✓		✓	✓	✓	
Public recreation	✓		✓	✓	✓	
Development is Permitted with Council Approval under clause 4.3 - (SA)						
Motel	✓		✓	✓		
Intensive agriculture			✓	✓	✓	
Dry cleaning	✓					
Office	✓	✓	✓	✓		
Funeral Parlor	✓	✓	✓	✓		
Development is not permitted unless the use is incidental to predominant use - (IP)						
Childcare services	✓					
Tourism Development	✓		✓	✓	✓	
Abattoir	✓	✓	✓	✓	✓	
Agriculture			✓	✓	✓	
Fuel Depot	✓	✓	✓			
Harbour Installation				✓	✓	
Industry General	✓	✓	✓	✓	✓	
Industry Resource processing		✓	✓	✓	✓	
Industry Transport	✓	✓	✓	✓	✓	
Transport Depot	✓	✓	✓	✓	✓	
Truck Stop	✓		✓			
Market	✓	✓	✓	✓	✓	
Mobile business	✓					
Motor vehicle and or marine wrecking			✓	✓	✓	
Consulting Rooms	✓	✓	✓			

Medical Centre	✓	✓	✓			
Nursing Home	✓		✓	✓	✓	
Public Mall	✓		✓	✓	✓	

Appendix E – Obstacle Limitations Survey

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CONICAL SURFACE
TAKE-OFF SURFACE
APPROACH SURFACE
TRANSITIONAL SURFACE
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HP 55.0
HP 160.10
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10 KM
ARP
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S 20°22'
S 20°24'
S 20°26'
E 118°32'
E 118°34'
E 118°36'
E 118°38'
E 118°40'
E 118°42'
1 21/05/18 RR RR RR RM REVISED TO 2018 AIRPORT SURVEY
0 28/02/18 RR RR RR RM INITIAL REVISION
No DATE DRAFTING CHECK DESIGN REVIEW REVD P MGR APPD P DIR AMENDMENT
The Airport Group
AIRSIDE - COMMERCIAL - LANDSIDE - AIRSPACE
TAG173 Pty Ltd
(a licensee of The Airport Group)
ACN 162 255 888
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CLIENT Port Hedland International Airport Operating Company
PROJECT AIRPORT OBSTACLE LIMITATION SURFACE
DRAFTER JC
DRAFTING CHECK RR
DESIGNED JC
DESIGN REVIEW RR
REVIEWED PROJECT MANAGER R.ROMANO
APPROVED PROJECT DIRECTOR R.MACTAGGART
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OBSTACLE LIMITATIONS SURFACES
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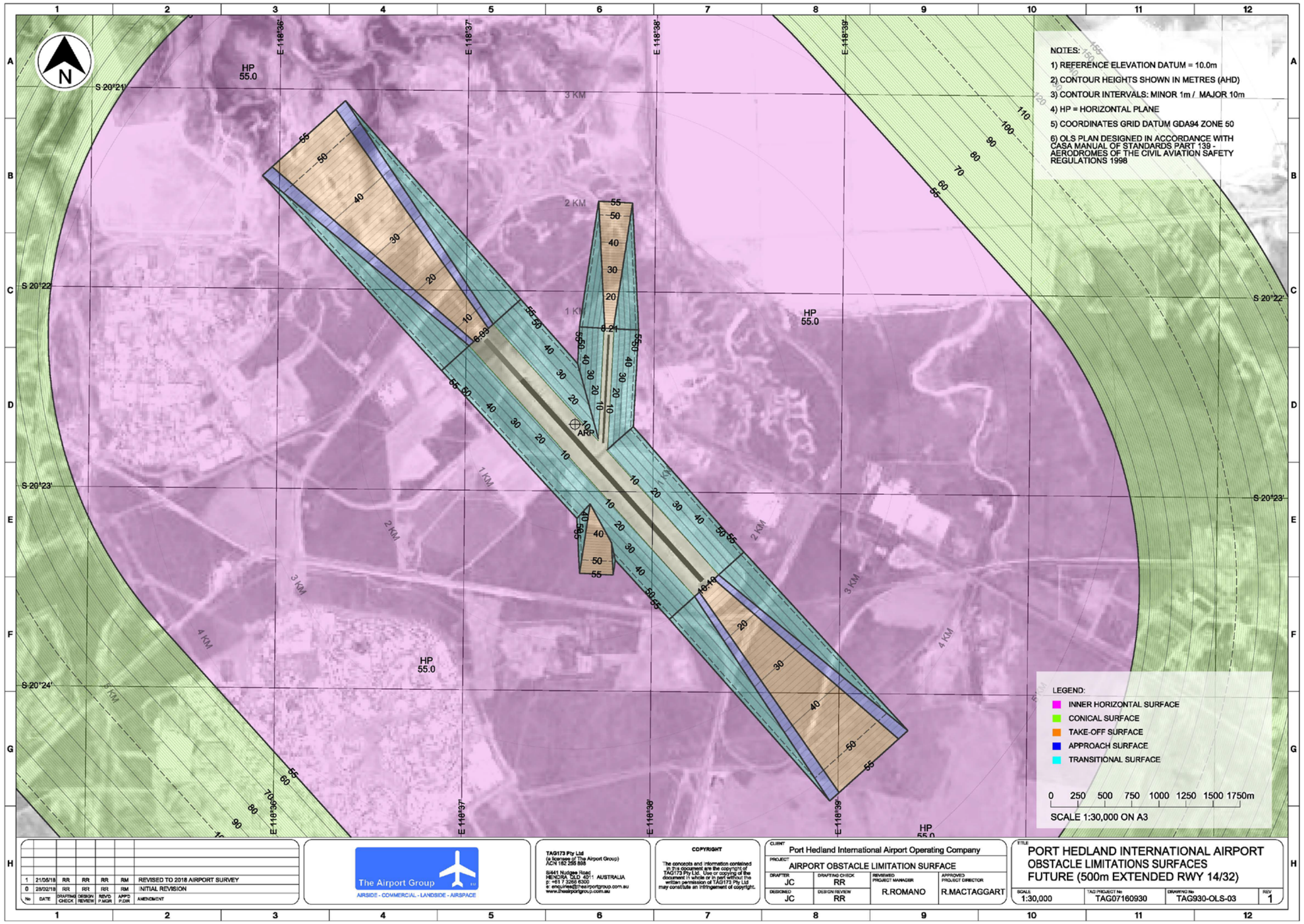
DRAWING No TAG930-OLS-02
REV 1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LEGEND:
INNER HORIZONTAL SURFACE
CONICAL SURFACE
TAKE-OFF SURFACE
APPROACH SURFACE
TRANSITIONAL SURFACE
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HP 55.0
ARP
S 20°21'
S 20°22'
S 20°23'
S 20°24'
E 118°36'
E 118°37'
E 118°38'
E 118°39'
1 KM
2 KM
3 KM
4 KM
1 21/05/18 RR RR RR RM REVISED TO 2018 AIRPORT SURVEY
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DRAFTING CHECK RR
REVIEWED PROJECT MANAGER R.ROMANO
APPROVED PROJECT DIRECTOR R.MACTAGGART
DESIGNED JC
DESIGN REVIEW RR
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