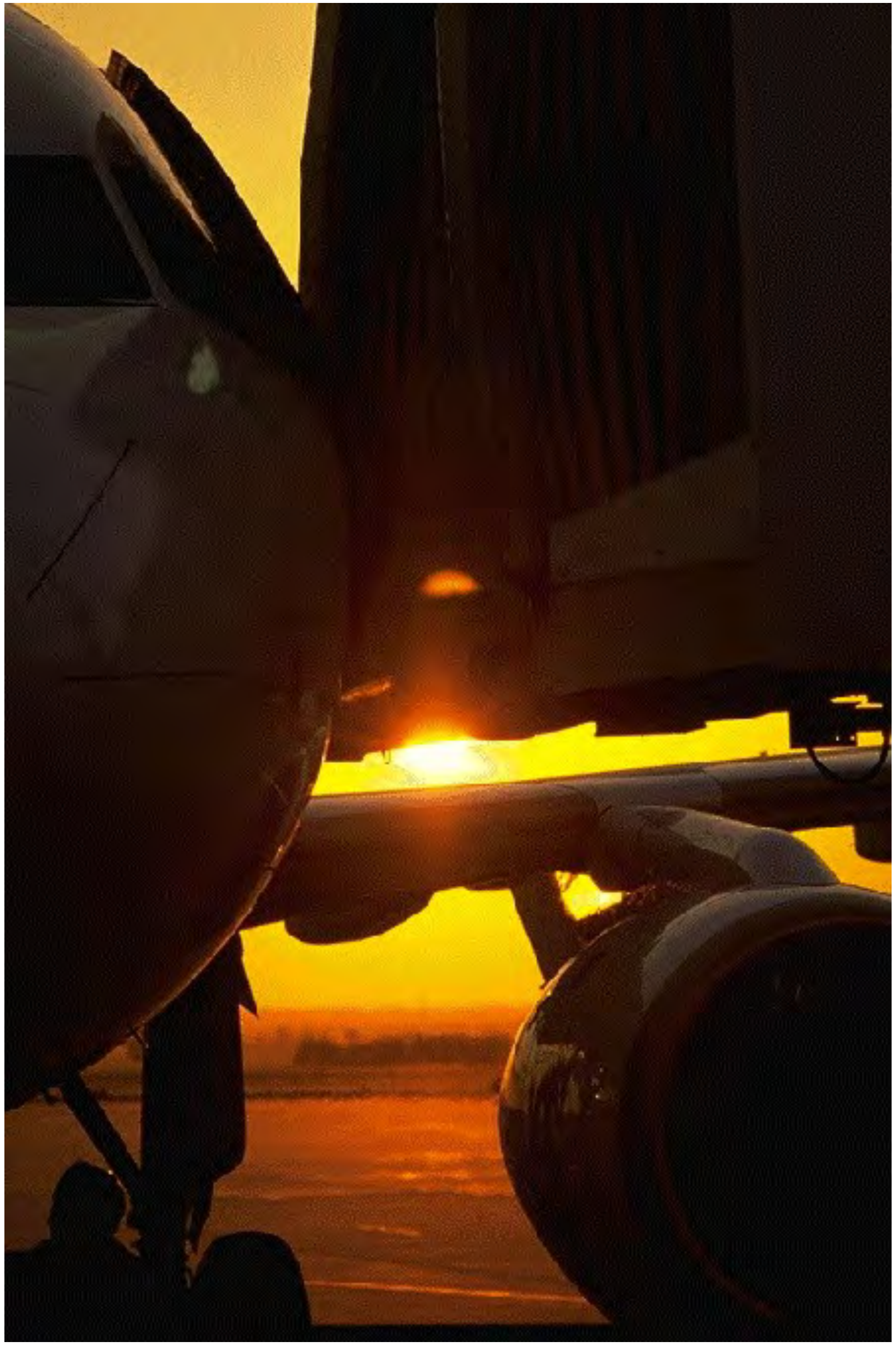
Port Hedland International Airport

Master Plan

September 2011



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4. Port Hedland International Airport Terminal Redevelopment Concept Masterplan, July 2011, THINC Projects, Sandover Pinder, Rider Levett Bucknall,
5. Port Hedland Terminal Plan Stakeholder Consultation, December 2008, Airbiz
6. Air Traffic Forecasts for Port Hedland Airport, March 2011, Tourism Futures International (TFI)

1 Introduction

1.1. Master Planning Objectives

The Port Hedland International Airport (PHE) Master Plan provides a planning framework for future development of the airport to meet long-term business and operational objectives and regional requirements.

A number of airport studies on various aspects of land use, demand and terminal development have been undertaken in recent years. However, the airport lacked a single strategic document that summarises the key aviation and related issues and opportunities, and a roadmap to guide airport development.

The overall objective of this Master Plan is to assess the current and future infrastructure needs of the airport serving one of Western Australia's major regional centres.

This Airport Master Plan has considered the following recent studies completed for the Town of Port Hedland;

- PHIA Master Plan, Whelans & PB January 2011
- PHIA Master Plan 2008, AMPC
- PHIA Strategic Master Plan 2007/17, ToPH.

In addition it also considers other studies including;

- Port Hedland International Airport Terminal Redevelopment Concept Masterplan, July 2011, THINC Projects, Sandover Pinder, Rider Levett Bucknall,
- Port Hedland Terminal Plan Stakeholder Consultation, December 2008, Airbiz
- Air Traffic Forecasts for Port Hedland Airport, March 2011, Tourism Futures International (TFI).

It establishes a 20 year development framework (2011-2031) for the airport within the parameters of demand and capacity analysis.

The Master Plan is a useful, relevant and living planning document which addresses strategic and commercial issues. It examines development opportunities which may be appropriate for Port Hedland International Airport. The Airport Master Plan should be reviewed at regular intervals throughout the life of the document to ensure that it adequately responds to any changes in key drivers, such as demand and business objectives.

The airport provides the ground facility infrastructure to enable the air transportation of passengers, freight, the conduct of aerial work and access for the private aviator. This Master Plan provides a vision for the development of the airport to meet these needs taking due account of the growth of the business sectors facilitated, the community and the catchment that it serves. The Master Plan sets the land use framework for orderly development to meet actual demand over time.

This Master Plan reviews and updates previously written material and focuses on:

1. Updated air traffic forecasts to 2030/31
2. Medium to long term aviation demand and infrastructure requirements
3. The provision for flexible planning requirements factoring potential changes in aviation industry requirements over time
4. Providing the Town of Port Hedland (TOPH) with confidence to pursue new Regular Passenger Transport (RPT) services.

2 Airport Description

2.1. Introduction

The Town of Port Hedland is located in the Pilbara Region approximately 1,300km north of Perth, Western Australia. The town consists of two main residential areas, Port Hedland and South Hedland. Two major features dot the town, the first being the Wedgefield industrial areas and the second the BHP Billiton Iron Ore Nelson Point crushing and shipping facility.

The port is one of the world's largest by tonnage and plans are underway to expand the capability of the port due to rapid growth in mineral exports from the surrounding mining operations.

2.2. Aircraft Operations

The Port Hedland International Airport currently operates general passenger and freight flights from/to Perth, Brisbane, Melbourne (via Perth), Darwin, Broome, Karratha and Bali. Several flights operate to transport workers from Port Hedland to remote mine sites. Some international flights stop at Port Hedland for fuel or customs checks.

The Qantas group currently operate B737-800 and B717 aircraft on the Perth and Melbourne route. Virgin Australia also operates B737-800 and Embraer 190 services on the Perth route. Strategic Airlines operate A320 aircraft on the Port Hedland Brisbane route.

Skywest Airlines operates F100 aircraft to Port Hedland. It also offers international services from Port Hedland to Bali/Denpasar in Indonesia. Other airlines serving the airport include Air North, Network Aviation, Alliance Aviation, Skytraders, and Skippers Aviation

Port Hedland Airport has a regular although unscheduled flow of charter flights servicing the large mining community that surrounds it.

Other operations include irregular freight operations by Antonov 124 aircraft, corporate jet aviation, small itinerant aircraft and helicopter operations.

Port Hedland Airport is also designated as an Alternate Use and Restricted Use International Airport by the Department of Infrastructure and Transport under the Air Navigation Act 1920. for aircraft up to Code E size. This means that aircraft that cannot land at Perth or other destinations due to weather or other incidents can land and be fuelled at Port Hedland if and when required. Customs, Health and Immigrations procedures can only be made available on a restricted basis for flights with prior approval.

FIGURE 2-1 CURRENT MAIN ROUTES FROM / TO PORT HEDLAND

2.3. Runways

The existing airfield movement area consists of two runways and adjoining taxiways illustrated in Figure 2-2.

Table 2-1 gives the key characteristic of the two runways.

Runway	Length	Runway Width	Strip Width
14/32	2,500m	45m	300m
18/36	1,000m	18m	90m

TABLE 2-1 PORT HEDLAND AIRPORT RUNWAY SYSTEM

FIGURE 2-2 EXISTING AIRFIELD

Runway 14 / 32

The main runway 14/32 is 2,500m long and 45m wide with turning bays at each end. Based on the International Civil Aviation Organisations (ICAO) classification system the main runway can be classified as a code 4E runway.

The runway was constructed with a pavement classification number (PCN) of 27 with a flexible (F) pavement (as opposed to rigid (concrete) pavement) consisting of an asphalt/bitumen surface with a sub grade strength category classified as high strength (A). The runway is designed for aircraft operating with a tyre pressure of 1200 psi (174 kPA).

Pavements are classified in relation to the Aircraft Classification Number (ACN) to PCN Ratio. The ACN expresses the effect of a specific aircraft on a nominated pavement for a specified standard subgrade strength. The Pavement Classification number expresses the bearing strength of a pavement for unrestricted movements and is determined from the CBR of the subgrade, design wheel load and pavement thickness.

Any aircraft with an ACN equal to or less than the published PCN of a runway can operate on an unrestricted basis subject to tyre pressure constraints. Any aircraft with an ACN greater than the PCN may still operate with a pavement concession issued by the aerodrome. The aerodrome may also issue a concession for tyre pressure.

A 1999 airport management commissioned a report by Shawman Pty Ltd for an engineering assessment of runway and apron areas. The report stated that in 1995 BHP conducted an assessment and that the number of actual movements conducted compared to the design movements equated to only 10 meaning that the life of the runway would be extended. They also amended the design aircraft to include:

- BAE 146-200 (44,225kg MTOW[1]) aircraft 18 operations per week
- B737-300 (62,823kg) aircraft 8 operations per week
- A330-300 (223,000kg) aircraft 3 operations per year
- B767-300 (181,440kg) aircraft 3 operations per year

The assessment was carried out at a PCN of 27 and based on this information estimated that the pavement was expected to reach its end of life in 2034. The 1999 report revised the runway PCN up to 39 from the previous recorded PCN of 27. The report concluded that the intermittent use of the pavement by larger aircraft, B767-300 or equivalent and A330-300 or equivalent, would not significantly accelerate damage and with the revised PCN to 39 should exceed the timeframe predicted by BHP in 1995.

The Report recommended that for regular large aircraft movements (B767-300, A330 or equivalent) the runway be strengthened through the application of an asphalt overlay of 50 to 75mm resulting in an increased PCN to 55-62 dependant on thickness of the overlay chosen. The strengthening of the runway by a 50mm overlay would allow for regular services of B767-300ER or equivalent.

Table 2-2 gives detailed characteristics of the main runway.

Description	Runway 14/32
Runway Length	2,500m
Runway Width	45m
Runway Shoulders	7m
Pavement Type	Flexible
Pavement Surface	Chip Seal
Runway Strip Width	150m
Runway Graded Strip Width	150m
Strip Width Maintained	300m
Approach Surfaces	RWY 14: 1.86%, RWY 32: <1.0%
Pavement Classification Number	PCN 39
Pavement Type	Flexible
Subgrade Category	A
Tyre Pressure Limitation	1200psi(174kPA)
Determined by	Technical Inspection
Lighting	Low intensity runway edge lighting
Slope Guidance	PAPI
Aerodrome Facility reference Code	4D
Description	14/32 Runway

TABLE 2-2 CHARACTERISTICS OF RUNWAY 14/32

[1] MTOW = Maximum Take-Off Weight

Runway 18/36

Runway 18/36 is 1,000m long and 18m wide with turning bays at each end. Based on the International Civil Aviation Organisations (ICAO) classification system the main runway can be classified as a code 2B runway.

Full data on Runway 18/36 is not fully available. The seal is chip seal with a 150mm gravel base course and was constructed in 1971. The runway PCN is 8 and accordingly is limited to light aircraft only (below 5700kgs). The runway is starting to experience a large amount of shape loss. The 2007 technical inspection of the pavement report indicated that works were required for shape correction to the runway. Any works would involve the reconstruction of the runway. Any reconstruction works should include the strengthening and lengthening of the runway to cater for use by larger medium weight aircraft.

Description	Runway 18/36
Runway Length	1,000m
Runway Width	18m
Runway Shoulders	Nil
Pavement Type	Flexible
Pavement Surface	Chip Seal
Runway Strip Width	90m
Runway Graded Strip Width	90m
Strip Width Maintained	90m
Approach Surfaces	RWY 18: <1.0%, RWY 36: <1.0%
Pavement Classification Number	PCN 8/F/A/550/U
Pavement Type	Flexible
Subgrade Category	A

TABLE 2-3 CHARACTERISTICS OF RUNWAY 18/36

Runway 18/36 also forms part of the taxiway configuration for the airport linking the general aviation Northern Apron with Taxiway B via Taxiway E. Inset centreline lighting is used to delineate this use as a taxiway.

2.4. Taxiways

There are five taxiways in use at Port Hedland Airport and are designated Alpha (A), Bravo 1 (B1), Bravo 2 (B2), Bravo 3 (B3), Charlie (C), Delta (D), Echo (E) and Foxtrot (F). Taxiways A, B1, B2, C and D were constructed in 1984. Taxiway E was constructed in 1971. Taxiways B3 and F are under construction and due for completion in November 2011.

Taxiway A provides access from Runway 14/32 to the Main Apron. This Taxiway has a PCN of 33 and is a flexible asphalt pavement with a sub grade category A and tyre pressure limitation of 1200psi (174 kPA) and is suitable for Code 4D aircraft and has 7m sealed shoulders. Taxiway Alpha was resealed with a 25m asphalt overlay over the chip-seal surface in 2006. The PCN for the taxiway should be reviewed. Inset centreline lighting is used on the taxiway.

Taxiway B is parallel to Runway 14/32. It is the old Main Runway and connects Runway 14/32 via Taxiways A, C, D and Runway 18/36. It is available to aircraft up to 100,000kg MTOW and has 3m sealed shoulders. Inset centreline lighting is used. The 2006 Pavement Technical Report recommended reseal of the taxiway in the short to medium term. Some shape correction is required in places. Asphalt overlay is recommended. Should any reseal be undertaken it is recommended that centreline lighting be replaced with elevated edge lighting.

Taxiway C connects Runway 14/32 to Taxiway B. It is available to aircraft up to 100,000kg MTOW and has 3m sealed shoulders. Inset centreline lighting is used The 2006 Pavement Technical Report recommended reseal of the taxiway in the short to medium term. Some shape correction is required in places. Asphalt overlay is recommended. Should any reseal be undertaken it is recommended that centreline lighting be replaced with elevated edge lighting.

Taxiway D connects Runway 14/32 to Taxiway B. It is available to aircraft up to 100,000kg MTOW and has 3m sealed shoulders. Inset centreline lighting is used. The 2006 Pavement Technical Report recommended reseal of the taxiway in the short to medium term. Some shape correction is required in places. Asphalt overlay is recommended. Should any reseal be undertaken it is recommended that centreline lighting be replaced with elevated edge lighting.

Taxiway E connects Runway 18/36 to the Northern GA Apron and is restricted to aircraft below 5,700kg. Inset centreline lighting is used. Any upgrade of Runway 18/36 should incorporate reconstruction of Taxiway E.

2.5. Aprons

There are three sealed apron areas in use at Port Hedland Airport;

- The Northern General Aviation apron
- The Main RPT Parking Apron
- Southern Apron and Helicopter operations area.

FIGURE 2-3 EXISTING APRONS

Northern Apron

This is the oldest of all the apron areas. The bitumen seal is thin and is for use by aircraft below 5,700kg. This apron has a chip seal surface and apron lighting. The surface was resealed in 1985 and subsequently resealed in 2004 and again in 2006 with a sand seal. There are two hangars, Polar Aviation (northern) and the RFDS, fronting this apron, with an aircraft wash-down bay in the northern section.

This is the parking apron for itinerant aircraft below 5,700kg. The Northern Apron requires extension to cater for increased general aviation traffic at the airport and consolidation of general aviation.

Helicopter operations should also be relocated to this apron. Apron lighting should be upgraded to MOS 139 lighting standards and the towers located near the RFDS placed on standby power.

Main RPT Apron

The Main RPT Apron accommodates 5 parking bays for aircraft up to B717, B737-800 and A320 concurrently in a power-in power-out arrangement. This apron has been used by aircraft as large as Antonov 124 in the past and has apron lighting.

This apron was constructed in 1971 and was completely resurfaced in 1984. The average thickness of the apron is 150mm or greater in trafficked areas. This apron has a myriad of asphalt surfaces varying in age. The 1999 report placed the PCN of the main parking apron as 56. Parking Bays 2 and 3 were reconstructed in 2001. Bay 4 was overlayed with shape correction in 2006 and a complete resurface of 30mm asphalt overlay was carried out in 2007. Further engineering reports should be carried out to review the PCN. The 1999 report recommended that as asphalt and bitumen are subject to deterioration due to fuel spillages that consideration be given to removing existing pavements in parking areas to subgrade depth and replaced with a cement stabilised bitumen or base course followed by concrete pads or concrete block pavers.

The passenger terminal and the operations building face this apron. Two hangars also front the apron: the Air Freight hangar which is ageing and should be demolished; the other hangar which is modern and one of the largest hangars at the airport. It is currently leased by a general aviation operator Golden Eagle Airlines operating propeller aircraft under 5,700kgs.

Southern Apron

The Antonov 124 uses this area for extended parking and larger aircraft such as the Shorts Belfast and AN12, Illushyn Il76 and C-130. The Southern Apron has one hangar fronting, which is used by local operators Polar Aviation who operates aircraft below 5,700kg. The area is used by itinerant aircraft above 5,700kg as well as other locally based aircraft not requiring parking on the Main Apron. It has an asphalt surface and apron lighting. The apron was not included in the 1999 Shawmac Report and a further engineering assessment of the pavement should be undertaken to determine its PCN. The Southern Apron was constructed in 1984 as part of the airport upgrade carried out by BHP. Although records of construction are not able to be located the construction has been identified by airport management to be 25mm of asphalt over 150mm of crushed base course.

Helicopter Operations

The helicopter landing area and two concrete parking bays are located on the eastern side of the Southern Apron. The location of the parking bays close to Gate 1 is undesirable because of the potential conflict between road vehicles and the vertical descent profiles of helicopter operations. Helicopter operations are increasing due to the growth in resource activity into remote locations. There is no direct pedestrian access to the Southern Apron with access only via Gate 2 or the terminal. This causes security and screening issues during RPT operations. Helicopter operations should be relocated to a dedicated area at the end of the Northern Apron ensuring appropriate separation from other operations.

2.6. Terminal Facilities

The original terminal building was built on the current site in 1971. This terminal building was extended in 1990 to include the international area. The terminal was further extended in 1999/2000 to include the arrivals area, additions to the international area and modification of the departure lounges. The current terminal is area is 3,000sqm and has three departure gates. Gate 3 is used by both domestic and international operations.

The current terminal building has a number of issues that have on a number of occasions tried to be rectified without success. The electrical services are ageing and in some cases substandard with the Town of Port Hedland addressing these electrical issues.

The terminal is subject to leaks during heavy rain. Given the extensive air-conditioning ducting systems it is difficult to pinpoint the location of the actual points of egress. The flat roof design with box gutters is not appropriate for the heavy cyclonic rains that are experienced in Port Hedland. The building décor is blue grey and presents a very clinical appearance to terminal users. The extensive use of windows throughout the terminal causes concerns during severe weather events and increases demand on the air-conditioning system to maintain a pleasant air temperature on hot days.

CCTV is currently being installed to allow for remote visual observation of the terminal areas including the international areas and airside movement areas when the Administration and operations unit re-locates to new premises in the original ASA maintenance facility.. The Public Address system is aging, has been superseded by current technology and cannot be maintained due to its age.

The current terminal was designed without consideration of future expansion of operations and aviation security requirements. Since the terminal was extended in 2000 passenger security screening has been introduced, checked baggage screening for international and now domestic jet RPT flights has also commenced. Passenger numbers have increased dramatically and aircraft types have grown in size from Boeing B717 and Fokker F100 to Boeing 737-800 and A320 operations. At peak times and with maximum load factors, this can create congestion in check-in areas, the screening point and departure lounges.

Airport Bar and Café

The current facilities and structure of the Airport Bar and Café was part of the 1990 terminal extension and remained unchanged in the 2000 extension. The refrigeration systems and café equipment are ageing and no longer operate to efficient energy levels. The Café is not on the emergency power supply for the terminal. The cafe has undergone quite extensive modifications but still lacks space.

Passenger facilities

Existing floor space is at a premium. Qantas, Skywest, Virgin Australia, Airnorth and Strategic currently operate from the terminal however new operations are not possible as there is not adequate space within the current building. The VIP room is inadequate for current requirements and check-in facilities are inadequate for current operations and further strain will be put on this infrastructure with the introduction of larger aircraft and increased loads from 117 to 150-180 passengers depending on seating configuration.

Air-conditioning

The terminal is serviced by 14 roof mounted air-conditioners with extensive ducting through the terminal. The system is controlled through a computerised management system.

CJ Lommer Pty Ltd Mechanical Engineers stated in a 2007 report of the status of the terminal air-conditioning stated that the air-conditioning units were reaching the end of their serviceable life in the Pilbara’s harsh climate. The report also stated that preliminary investigation of sections of the ducting showed that sections viewed were deteriorating.

Seating

Seating within the terminal is not adequate both for departing passengers and “meters and greeters’.

Departure Areas

The current departure areas are at capacity at the moment and will not be able to accommodate the larger number of passengers with the change in aircraft type. The current screening point is a bottle neck for passengers. The slow movement of passengers through the screening area is a concern for all airports and in keeping flights departing on time. The area needs to be modified for smoother passenger flow. There are no food, water or toilet facilities in the departure areas.

Baggage Facilities

There is only one baggage reclaim belt which is at capacity at the moment. The introduction of the larger aircraft or the parallel scheduled arrival of aircraft will not be able to be accommodated with the current facility.

The back of house baggage makeup areas are not adequate. The introduction of checked baggage screening will require extensive modification of the baggage make up area to accommodate the x-ray equipment and the introduction of conveyor systems to feed bags through.

International Area

Port Hedland Airport is the only airport in the North West that is operationally set up to handle international passenger traffic with a dedicated international area. The current area has customs and quarantine office areas, toilet facilities and baggage area. When operational, Gate 3 is separated from the general passenger area. The area no longer adequately accommodates passengers or provides appropriate facilities due to the increase in passenger growth. The area is heavily congested reducing passenger amenity. The international baggage collection area has a baggage carousel.

Terminal Fire Services

The terminal fire panel has been replaced however the overall fire detection system within the terminal required upgrading to ensure the utmost compliance with building standards for public buildings. The current system does not allow for early warning of roof cavity fires. The terminal does not have a sprinkler system for the confined roof spaces or the general terminal areas.

Sensors are not placed appropriately as the alarm is activated during hot weather when terminal doors open.

The internal ceilings within the terminal, although having excellent acoustic properties, inhibit access to the roof cavity and access is restricted.

The current layout and design of the terminal will continue to provide congestion and may be further compromised with the introduction of larger aircraft in the future.

2.7. Landside Areas

Avis Maintenance Yard

The building was constructed in circa 1970 and is in poor condition. The surrounding yard is in reasonable condition but is no longer suitable for the Avis operations. There are underground and above ground fuel tanks which are licensed by Avis however as the tank was in placed prior to the current lessee occupying the premises. The Town of Port Hedland will be responsible for any decontamination issues. All infrastructure is owned by the Town of Port Hedland. The yard is subject to access and flooding issues in heavy rain. The parking areas within the yard are not sufficient with the excess vehicles being placed in public car parking spaces. This adds further pressure on existing facilities. It is recommended that the current facility be demolished with land being made available for lease for the establishment of modern facilities which comply with current environmental standards.

Hertz Maintenance Facility

This facility consists of a small maintenance shed and wash down bays. It is an open faced shed and is not appropriate for current operations. It is in a poor state and has issues with waste water disposal. The parking areas within the yard are not sufficient with the excess vehicles being placed in public car parking spaces which adds further pressure on existing facilities. It is recommended that the current facility be demolished with land being made available for lease for the establishment of modern facilities which comply with current environmental standards.

Budget Hire Cars Maintenance and Office Facility

The facility consists of an office facility and two undercover wash bays with parking areas. The date of construction is not known but is circa 1970. The facility is ageing and although in reasonable condition it is no longer suitable for current operations. Underground fuel tanks located on site are licensed by the operator. However, as the tank was in placed prior to the current lessee occupying the premises, the Town of Port Hedland will be responsible for any decontamination issues.

The parking areas within the yard are not sufficient with the excess vehicles being placed in public car parking spaces. This adds further pressure on existing facilities. It is recommended that the current facility be demolished and land made available for lease for the establishment of modern facilities which comply with current environmental standards.

2.8. Landing Aids

Non-Directional Beacon (NDB); High Frequency Antenna Array

The NDB is a navigation aid located in the south eastern corner of the airport. The NDB and High Frequency Radio Antenna Array consist of transmitter and receiver towers, antenna arrays and related infrastructure huts. Buffers are required to this infrastructure, namely restrictions on the height of structures within the buffer area, to protect radio reception and transmission. These buffers extend to 500 metres from the NDB, at an angle of 3 degrees vertical from the NDB antenna array.

The effect of this buffer is to limit the potential height of any buildings or structures within the controlled area.

Distance Measuring Equipment (DME)

The DME is a ground transponder that provides a radio pulse enabling distance to be measured between the aircraft and the ground beacon.

The DME is located on the southern side of Runway 14/32. This equipment requires a buffer with height restrictions to below a plane measured between 10 and 1500 metres from 1 metre below the antenna, at an angle of 0.5 degrees. This results in a height limit of approximately 4 metres at 300 metres from the DME, and a limit of 13 metres at 1500 metres from the DME.

Doppler Very high frequency Omni Range (DVOR)

DVOR is another air navigation aid that requires specific height restrictions. This equipment is located at the same site as the DME, on the southern side of Runway 14/32. This equipment also requires buffers with height restrictions to below a plane measured between 10 and 1500 metres from 1 metre below the antenna, at an angle of 0.5 degrees. Unlike the DME, which requires linear buffers, the DVOR requires height limits on a radial basis from the DVOR. These buffers range from 150 metres to 1000 metres, again with a buffer extending at an angle from the DVOR. This results in a graduated height limit ranging from 20 - 35 metres.

2.9. Air Traffic Service Communications Facilities

Airservices Australia Facilities

Airservices Australia hold a lease over navigational facilities at the airport which has been in place since the Town commenced operating the airport.

2.10. GA Facilities

Polar Aviation Northern Hangar

The hangar and office complex is located on the Northern General Aviation Hangar. A new 30 metre x 30 metre hangar and office complex was constructed in 2010. The hangar is located in a prime location near the main airport terminal.

Air Freight Hangar

The Town of Port Hedland owns this facility. A comprehensive upgrade is required for continued operation. Redevelopment of the terminal precinct should include the demolition of the facility and relocation of freight services to a dedicated area away from the main passenger operations.

Golden Eagle Aviation Offices and Hangar

This office and hangar complex was constructed in 1999 by the Town of Port Hedland and is currently leased by Golden Eagle Aviation. The hangar has frontage to the main apron. Given the location of the hangar on the main apron the most appropriate use for it should be for an operator with aircraft over 5,700kg and jet operations. Conflicts do exist with parking for jet aircraft when the operator has light aircraft out of the hangar and security issues regarding checked baggage and passenger screening during the operational period. The current operation should be relocated to the Northern General Aviation when extended.

Polar Aviation Southern Hangar

This hangar building is located on the Southern (high-strength) Apron area which is currently lease by Polar Aviation. The hangar is in good condition but it does not have the capacity to store larger aircraft currently using the airport. The use of the hangar by GA (light aircraft) operator is an underutilisation of the heavy apron area. The current location of the hangar causes security and access issues. It is recommended that this facility be demolished or relocated to the Northern GA Area to consolidate GA to one area.

2.11. Fuelling Facilities

Mobil Aviation Fuel Facility

This facility was constructed by Mobil but is not currently in use. All infrastructure on the site is the responsibility of Mobil. The buildings and surrounding fuel storage areas are not being maintained to an appropriate standard by the current lessee. The site is in a highly visible location in the terminal precinct and should the facility become active again it would cause major issues relating to access, traffic and terminal evacuation procedures and it is not an appropriate location for a fuel facility. It is recommended that the current facility be demolished with land being made available for lease near the current Air BP fuel facility to establish modern facilities complying with current environmental standards.

Air BP Facility

The current facility is in an excellent condition and well maintained by the current operator. All infrastructure is owned by the lessee. The Avgas swipe bowser located on the main apron is also maintained by the current operator to an acceptable standard. The swipe bowser is to be removed and a 12000 litre self bunded above ground card swipe avgas tank is to be situated on the northern GA apron to service GA aircraft and remove them from the RPT apron. The Air BP fuel depot is to be resited to an expanded Southern Apron.

2.12. Other Facilities

Royal Flying Doctor Service (RFDS) Base and Administration

Located on the Northern General Aviation Apron, 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. The existing structures were constructed by the RFDS and are subject to commercial lease arrangements.

A portion of the Administration Centre is subleased to the Minister for Education to provide “School of the Air” services to the Region. This sublease is subject to the same lease terms as the RFDS lease.

The buildings are new and in very good condition. Currently there is no emergency power or standby power arrangements. The RFDS has proposed an extension of the lease area to provide dedicated staff and operational vehicle parking. The RFDS have a dedicated refuelling facility located near their hangar which is maintained by Air BP under arrangement.

School of the Air - Storage Unit

This building is currently being used for storage by the School of the Air. The building is brick and was previously used as the office facility by Air BP prior to the construction of their present facilities. It is a reasonably good condition. It is an appropriate location for a security guard point.

Hedland Riders Compound

This facility is currently subject to monthly tenancy, but there are a number of issues relating its use as a public building. The building currently does not comply with required electrical standards and contains asbestos. The Town of Port Hedland is responsible for the facility. The facility has access to highway frontage. It is recommended that the building be demolished.

Bureau of Meteorology

This building and the immediate environment is the responsibility of the Bureau of Meteorology and is in excellent condition. It is subject to lease and occupies highway frontage at the entrance to the airport.

Town of Port Hedland Archive Building

This building is located within the Mechanical Workshop compound and is currently used by the Town of Port Hedland Administration Services as an archival facility. The building also consists of a double bay workshop which is currently being used by the Town of Port Hedland Building Maintenance Officer.

Mechanical Workshop

This workshop was used by Aerodrome Rescue and Fire Fighting Services (ARFFS) for maintenance of mobile fire fighting equipment prior to the withdrawal of fire services to Port Hedland. The eastern end of the workshop is still subject to a lease to Airservices Australia. Discussions have been held with Airservices Australia for the surrender of this facility. The remainder of the building is used for general storage.

The remainder of the building is currently used for storage purposes. The location of the Town of Port Hedland’s archival facility does not allow for the commercial leasing of this compound. It is recommended that the Airport Operations relocate from the present depot site to this location given the proximity to the terminal and airside areas.

Fire Station Facility

The fire services were withdrawn from Port Hedland by Airservices Australia approximately seven years ago. Since this time the facility has been vacant. Airservices Australia is responsible for the maintenance of the facility. The facility is located adjacent to the main runway and is in reasonable condition. ARFFS is to be reinstated to the Port Hedland airport in the near future.

Airservices Australia also has a satellite dish station which is not part of the lease. The facility is located near the Control Tower. They have advised that plans to relocate the facility to the Transmitter facility are well advanced. Airservices Australia also occupies the generator room and communications room at the base of the air traffic Control Tower. This is a joint facility used by Airservices Australia and the Town of Port Hedland. Airservices Australia maintains the generator facilities.

RFDS Transmitter Building and Arrays

This facility is located at the cemetery end of the main runway and is used by the RFDS for communication purposes. The RFDS are responsible for maintenance of the facility.

2.13. AIRPORT BUILDINGS: OPERATIONS

Landside

Airport Operations Building

The Operations Building is currently occupied by Town of Port Hedland Airport Management. The building's lower floor was used by the State Emergency Service for its operational headquarters.

During Cyclone George in March 2007 the building suffered extensive water inundation. Structural engineers have indicated that the building is not suitable for use as an operational centre during a severe weather event however it is suitable as shelter. The building occupies a prime location on the airport with frontage to both the main and northern general aviation aprons. The building also contains asbestos building material and floor tiles. Any redevelopment of the terminal area should include the demolition of this building.

Residence 12

This residence is currently occupied by Airport Operational Staff. The property is ageing and is in a reasonable condition. The fibro three bedroom residence contains asbestos and there is evidence of deterioration of the footings.

Residence 10

This four bedroom two bathroom residence was constructed in the late 1990's with airport funds. It is currently occupied by airport operational staff and the property is in excellent condition.

Airport Depot

This compound consists of a brick office building with toilet and shower facilities, a workshop and store area and an open equipment storage shed. There is also an ageing bulk fuel storage facility.

The workshop and store is currently used to maintain airport equipment and vehicles. The building was originally constructed by the Civil Aviation Authority as a carpenter's workshop.

The compound is large and would be suitable for a commercial freight facility.

Fire Pump House Facility

The facility consists of a building containing two diesel fire pumps and jacking pump with two large 300,000 litre water storage tanks. This facility provides fire fighting booster facilities to the terminal building and red fire hydrants on the main apron. It is well maintained, however consideration should be given to the relocation of the facility to a more appropriate and more secure location within the airport.

Airside

Incinerator Building

This facility is a diesel fuelled incinerator with high intensity burners and afterburners used for quarantine purposes for international flights. The facility is in good working order and is well maintained. The facility is regularly used by law enforcement agencies for the destruction of seized items.

Air Traffic Control Tower Facility

The Control Tower facility is owned by the Town of Port Hedland. The generator and communications rooms at the base of the Tower are jointly used by the Airservices Australia and the Town of Port Hedland for navigation and operational equipment. The Aerodrome Beacon is located on the roof of the Tower. The Tower is currently closed but will re-open at a period after the ARFFS have returned to the Port Hedland International Airport.

Power House

Located on the eastern end of the RPT jet apron, the powerhouse supplies standby power to critical airport facilities such as runway and associate airfield lighting and also supports essential facilities within the terminal and operations facilities. Although well maintained, the current generators are ageing making servicing a problem in the future.

3 Aviation Forecasts

3.1. Introduction

Annual passenger and aircraft movement forecasts for this Master Plan were prepared by Tourism Futures International (TFI).

This section discusses air traffic forecasts for Port Hedland International Airport for the planning period 2010/2011 through to 2030/31. It summarises both the influences on traffic growth in the short, medium and longer term, and the latest passenger forecasts for Port Hedland International Airport. In addition these forecasts set out the busy hour assumptions derived to determine key development such as aircraft parking and terminal requirements.

The main driver of the passenger market for Port Hedland is the mining sector and in particular Iron Ore and Base Metals. Port Hedland is in Western Australia's Pilbara Region, a key part of the State's mining sector. Apart from Port Hedland other airports in the Pilbara include Karratha (mainly iron ore and oil and gas), Paraburdoo and Port Newman (both iron ore producers). Passenger growth over recent years has been strong to all of these Pilbara airports. Since the immediate impact of the Global Financial Crisis (GFC) there has been an improvement in global economic forecasts. However the high levels of sovereign and household debt in developed countries is causing further concern and could promote further financial crises. The necessary debt reduction (by governments, companies and consumers) across much of the developed world, allied with the need to reduce the GFC fiscal stimulus, suggests a downward pressure on economic recovery.

This global position is important to airports such as Port Hedland Airport because much of the passenger demand derives from mining-related activities for minerals exported to countries such as China and India.

The challenges in forecasting for Port Hedland and other mining-driven airports arise because:

- Strong demand for commodities over recent years has driven up commodity prices and these high prices justify huge increases in mining investment.
- Construction activity for new iron ore projects in the Pilbara has been responsible for the growth in passenger traffic.
- High prices lead to supplier countries expanding capacity at the same time as emerging market steel manufacturers look for cheaper alternative sources of supply.

- These factors lead to an excess supply and falling prices. In response new resource projects are deferred.
- This can lead to periods of strong growth in traffic followed by periods of decline. One of the greatest forecasting challenges is predicting when such a cycle will end and when a new cycle will begin.

As a result TFI has used a scenario-based process for projecting Port Hedland traffic. TFI has developed a number of scenarios based on assumptions with respect to the total traffic incorporating mining traffic and the underlying growth in community traffic and 'normal' levels of mining traffic.

3.2. Traffic History for Port Hedland

Current Airline Services at Port Hedland

Current airline services to/from Port Hedland (PHE) are summarised in Table 3-1. Most services operate to/from Perth with Qantas/QantasLink and Virgin Australia providing 37 services per week. A limited number of services are also operated to/from other intrastate locations; Karratha and Broome. Services also operate to/from Melbourne, Brisbane and Denpasar.

Port	Airline Return Services Per Week					Total Return Services
	Qantas/QantasLink	Virgin Australia	Airnorth	Skywest	Strategic	
Within WA						
Perth	28	14				**42**
Karratha			1			**1**
Broome			1	1		**2**
Outside WA						
Melbourne	1					**1**
Brisbane					1	**1**
Denpasar				2		**2**
Total	**26**	**12**	**2**	**3**	**1**	**49**

TABLE 3-1 RETURN SERVICES PER WEEK AT PORT HEDLAND

SOURCE: AIRLINE SCHEDULES

NOTE: STRATEGIC IS WITHDRAWING PORT HEDLAND TO BALI DIRECT FLIGHTS FROM THE END OF MARCH 2011

TFI has received monthly data from the airport for the period July 2008 through to December 2010. Figure 3.1 shows the numbers of passengers and growth over the period. Month to month growth has been very strong over the period shown.

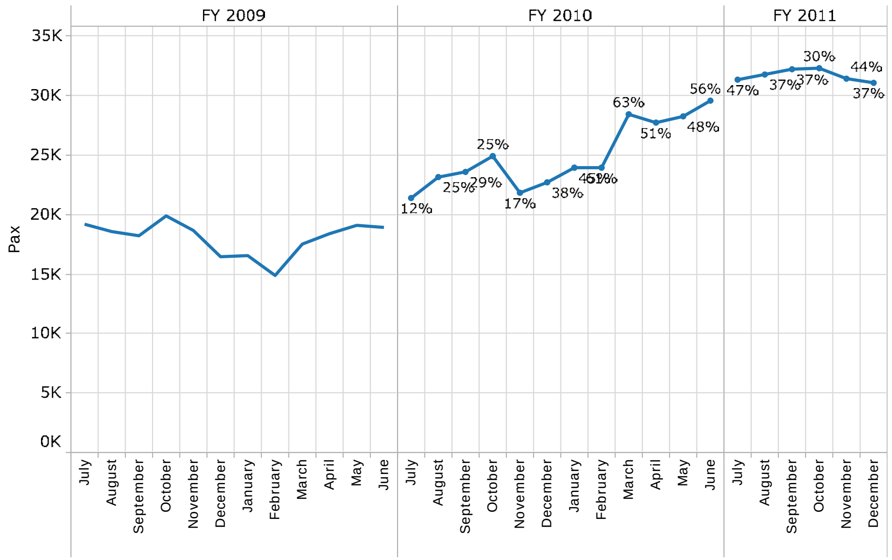

FIGURE 3-1 MONTHLY PASSENGER MOVEMENTS/CHANGE OVER PREVIOUS YEARS
SOURCE: PHE DATA

Bureau of Infrastructure, Transport and Regional Economics Data

In addition to the local airport-provided data, domestic data (for passengers and aircraft movements) is regularly published for the top routes in the Bureau of Infrastructure, Transport and Regional Economics (BITRE) publication Australian Domestic Airline Activity. This data is published as traffic on board by stages and includes all traffic on each flight stage between two directly connected airports. It thus includes domestic transit passengers.

A second BITRE publication used by TFI is Air Transport Statistics: Airport Traffic Data which contains a time series of annual airport traffic data for Australian airports receiving more than 7,000 revenue passenger movements annually. It includes International, Domestic and Regional.

Airline Data

Table 3-2 provides the BITRE data for the financial years 2005 to 2010. Note that the overall passenger CAGR over the period has amounted to 24.2%. During this same period the CAGR for aircraft movements has been much slower at just 4.5%. This suggests that a large proportion of the passenger growth has been accommodated through the use of larger aircraft.

Longer Term History

Figure 3.2 uses BITRE data to show passenger movements at Port Hedland Airport over a long time period, from 1977/78 through to 2009/10. It is evident that Port Hedland has experienced strong volatility over the period. TFI has broken the period into two 'eras':

- The period from 1977/78 to 2002, characterised by a strong growth period and then a slow decline in passenger numbers.
- The most recent period from 2002 with strong and relatively sustained growth. The slower growth in 2007/08 and particularly 2008/09 results from the Global Financial Crisis (GFC).

Figure 3.3 uses BITRE aircraft movement data to show aircraft movement performance for Port Hedland Airport. The figure also shows the average numbers of passengers per aircraft movement. The key drivers for the aircraft movements have been the passenger numbers, the types of airlines carrying those passengers and their aircraft type decisions.

The average number of passengers per movement increased from 10-15 over the period to 1984/85, to 29-40 through to 2006 and from there the increase has been to 85 by 2009/10.

	Years end 30 June						CAGR for 2005 to 2010
	• 2005	• 2006	• 2007	2008	2009	2010	
Passengers							
From PHE					215,940	298,941	n.a.
BITRE Domestic	84,168	109,359	151,740	189,475	206,501	295,152	28.5%
BITRE Regional	16,262	11,572	7,015	6,777	2,318	1,658	-36.7%
Total BITRE	100,430	120,931	158,755	196,252	208,819	296,810	24.2%
RPT Aircraft							
BITRE Domestic	1,835	1,451	1,860	2,228	2,653	3,344	12.8%
BITRE Regional	956	649	299	360	104	133	-32.6%
Total BITRE	2,791	2,100	2,159	2,588	2,757	3,477	4.5%

TABLE 3-2 PASSENGER AND RPT AIRCRAFT MOVEMENTS

SOURCE: PHE, BITRE DATA

NOTES: N.A. = NOT AVAILABLE; CAGR = COMPOUND ANNUAL GROWTH RATE.

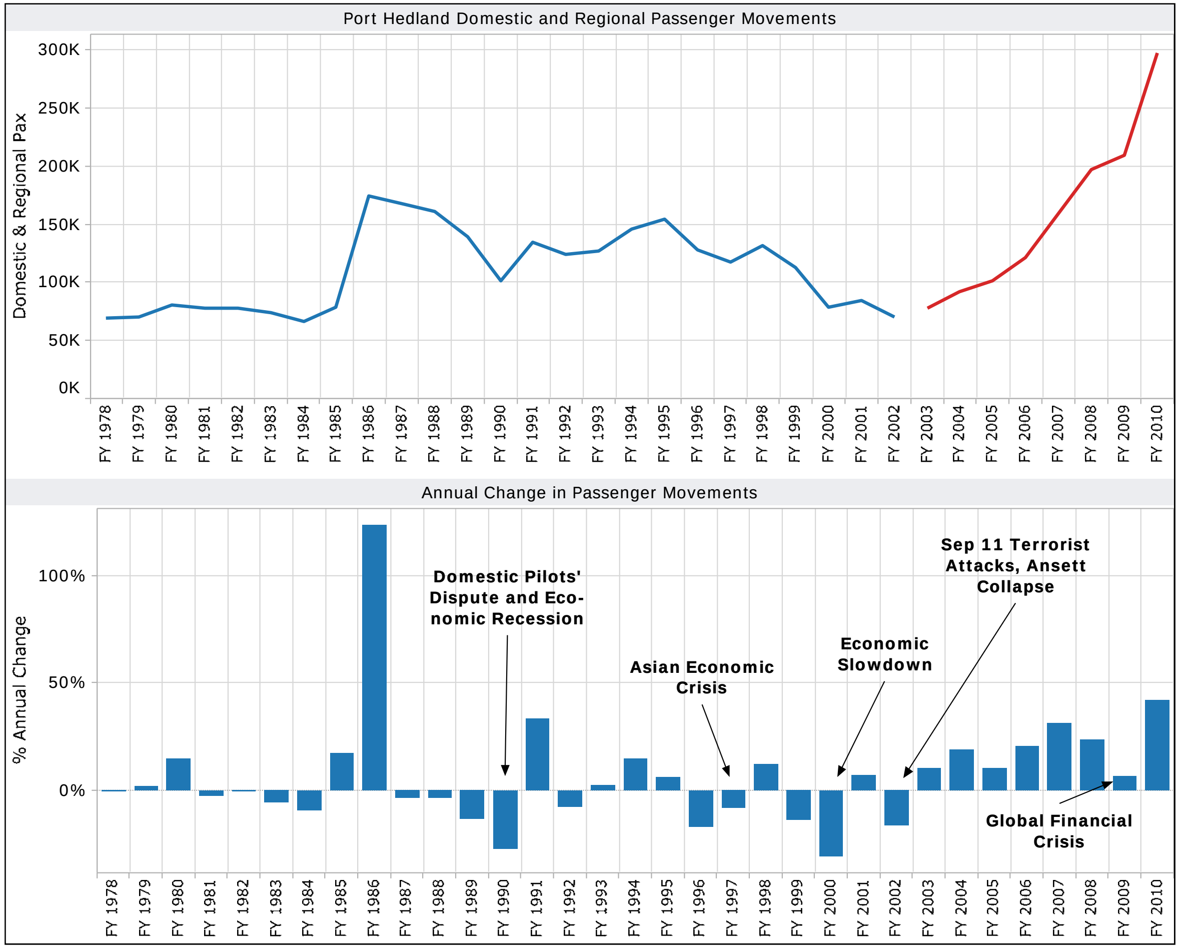

FIGURE 3-2 DOMESTIC/ REGIONAL PASSENGER MOVEMENTS AND ANNUAL CHANGE

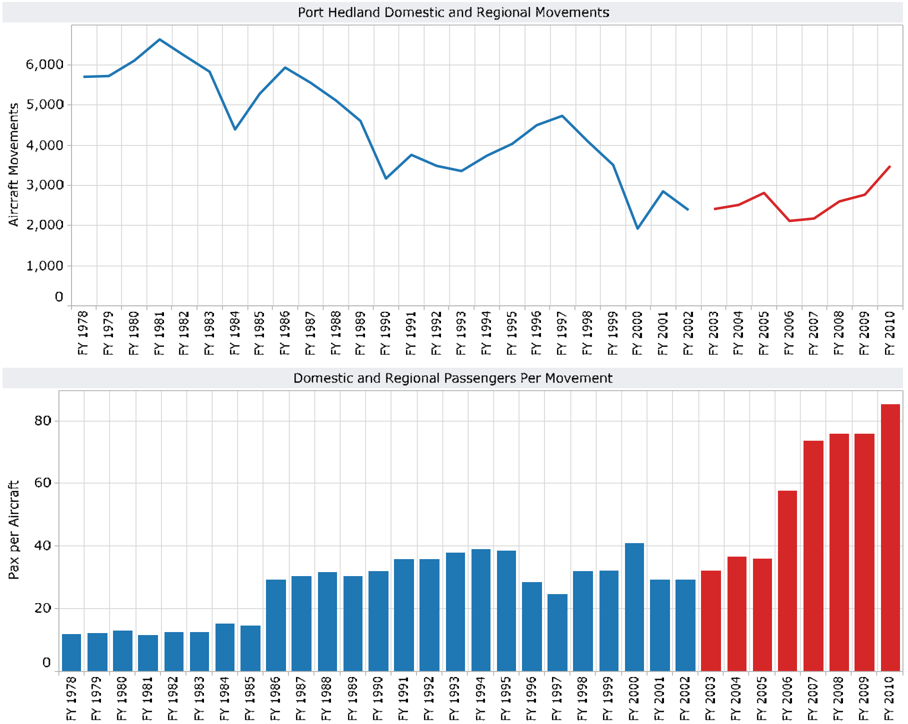

FIGURE 3-3 DOMESTIC AND REGIONAL AIRCRAFT MOVEMENTS; AVE PAX/MVNT
SOURCE: BITRE DATA

International Traffic History

Note that the data above shows the performance of Port Hedland Airport for domestic and regional traffic. Port Hedland Airport has recently seen the addition of some international traffic. Port Hedland Airport has seen international services before, specifically over the period from 1983/84 to 1999/2000. Figure 3-4 shows that during this earlier period international passengers at Port Hedland Airport averaged around 3,800 per year on an average 95 movements per year.

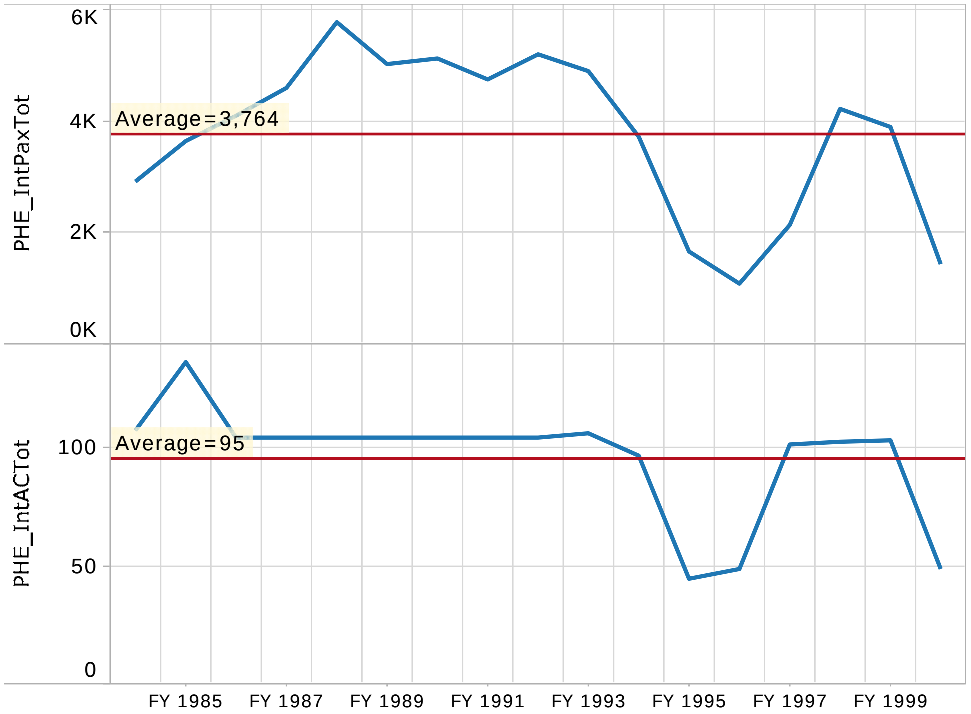

FIGURE 3-4 INTERNTIONAL PASSENGER AND AIRCRAFT MOVEMENTS
SOURCE: BITRE DATA

3.3. Projections

Forecasting Approach

In reality a large number of factors influence the growth of passenger movements at an airport.

These include:

- Economic activity related to specific industries such as mining.
- The incomes of travellers or potential travellers. Both the level of income and confidence that these levels will be maintained and grow are important.
- The prices of air transport and the ground component of travel.
- The competitiveness (quality, product attributes and price) of a destination compared to alternative destinations.
- The supply of airline services – frequency, reliability, quality of service.
- Tourism promotion by Governments, airlines and industry bodies.
- Consumer tastes and available time for travel.
- One off factors and shocks. These include the travel impacts of events such as the Olympics, September 11, the collapse of an airline such as Ansett, and health concerns such as those generated by SARS.

However only some of these factors can be measured and their impacts included in forecasting models.

The approach adopted by TFI in preparing the Port Hedland Airport forecasts was based on a number of elements:

- A review of the traffic history available for Port Hedland Airport and an assessment of statistical trends.
- A review and analysis of the general aviation and business environment and current airline schedules. This assists in the development of assumptions and identification of qualitative factors that might influence traffic outcomes.
- Development of models linking drivers and traffic. In the case of Port Hedland Airport the mining sector activity is key in determining likely growth rates and peaks in the future.

Overall, TFI's approach is to:

- Include as much information in the forecasting process as possible (given time and budget constraints).
- Adopt a number of perspectives (macro and a micro approach).
- Utilise econometric and time series models.
- Prepare a range of forecasts and indicate sensitivities.

The Challenge of Forecasting Mining-Related Growth

The challenges in forecasting for Port Hedland and other mining-driven airports arise because:

- Strong demand for commodities over recent years has driven up commodity prices and these high prices justify huge increases in mining investment.
- Construction activity for new iron ore projects in the Pilbara has been responsible for the growth in passenger traffic.
- High prices lead to supplier countries expanding capacity at the same time as emerging market steel manufacturers look for cheaper alternative sources of supply.

These factors lead to an excess supply and falling prices. In response new resource projects are deferred.

This can lead to periods of strong growth in traffic followed by periods of decline. One of the greatest forecasting challenges is predicting when such a cycle will end and when a new cycle will begin.

TFI has tested a number of models linking Port Hedland Airport traffic to drivers such as:

- National economic factors such as GDP and Private Consumption Expenditure (PCE).
- Economic growth in countries that import minerals from WA and the Pilbara.
- WA Gross State Product (GSP).
- National, WA and regional populations.
- WA variables such as production, exports and imports, CPI, employment levels.
- Mining-related variables such as national iron production, iron ore prices and WA construction activity (much of which is mining related).

A number of the models performed well in explaining past growth. For example, models related to WA GSP. They project steady growth over the next 20 years. However use of mining-related variables leads to strong growth in the two to five year period, reaching high levels of traffic before declining. This occurs because of a reasonable expectation that mining is cyclical even when there is strong demand from countries such as China and India.

The best models relate activity levels at Port Hedland Airport to WA Real Final Demand (RFD) and WA Iron Ore Production levels. As production levels grow passenger traffic accelerates. On the other hand a slowing of production growth leads to a decline in passenger numbers. The pattern is one of strong growth over the next few years and then a decline.

TFI has used a scenario-based process for projecting Port Hedland traffic. Traffic has been projected based on:

- Growth in total traffic incorporating both resource-oriented and non-resource-oriented traffic.

  Two levels of forecast were developed – one with iron ore production levels projected by TFI using time series analysis, the other based on growth rates for national iron ore production as projected by ABARES.
- Growth in non-resource-oriented traffic. In reviewing traffic behaviour prior to the collapse of Ansett in September 2001 and prior to the acceleration in mining-related traffic from around 2003, TFI found an elasticity of passenger traffic to RFD of around 0.5 to 1.0 (i.e. every 1% increase in RFD generates between a 0.5% and 1% increase in passenger traffic to Port Hedland Airport).

Based on this analysis TFI has developed the following four scenarios:

- Scenario 1: based on the higher level of iron ore production and with a higher base (non-mining boom) level of traffic. Traffic for Port Hedland peaks at around 610,000 passenger movements in 2014/15 and begins to decline towards the base traffic levels.
- Scenario 2: based on a lower level of iron ore production and a lower base level of traffic than Scenario 1. Traffic for Port Hedland peaks at 460,000 in 2013/14 for this scenario.
- Scenario 3: Scenarios 3 and 4 are extensions of the first two scenarios. Scenario 3 takes the peak level of 610,000 for 2014/15 from Scenario 1 and extends it forward to a level of 700,000 by 2030/31 (the CAGR for 2009/10 to 2030/31 is 4.2% for this scenario).
- Scenario 4: This Scenario takes the peak level of 460,000 for 2013/14 from Scenario 1 and extends it forward to a level of 600,000 by 2030/31 (the CAGR for 2009/10 to 2030/31 is 3.4% for this scenario).

Passenger Projections

Table 3-3 shows the passenger movement forecasts (they are also shown in Figure 3-5). Scenarios 1 and 2 show the passenger movements growing from 297,000 in 2009/10 to peak at 610,000 in 2014/15 (for Scenario 1) and 460,000 by 2013/14 (for Scenario 2). Scenarios 1 and 2 show the decline from these peaks back to underlying base traffic levels before increasing.

Scenarios 3 and 4 show the growth from the peak levels of Scenarios 1 and 2 to between 600,000 and 700,000 passengers by 2030/31.

Note that TFI's expectation is for limited growth in international passengers driven largely by outbound travel related to mining activity. However it is also possible that growth could occur due to the need to expand the labour force from overseas.

Years end 30 June	Actual Pax	Pax Scenario 1	Pax Scenario 2	Pax Scenario 3	Pax Scenario 4
	'000s Passenger Movements				
2010	297	297	297	297	297
2014		596	460	596	460
2015		610	449	610	468
2020		485	336	641	509
2025		340	220	671	551
2030		409	237	702	592
2031		424	241	700	600
2020 on 2010		5.0%	1.2%	8.0%	5.6%
2031 on 2010		1.7%	-1.0%	4.2%	3.4%

TABLE 3-3 PASSENGER PROJECTION SCENARIOS

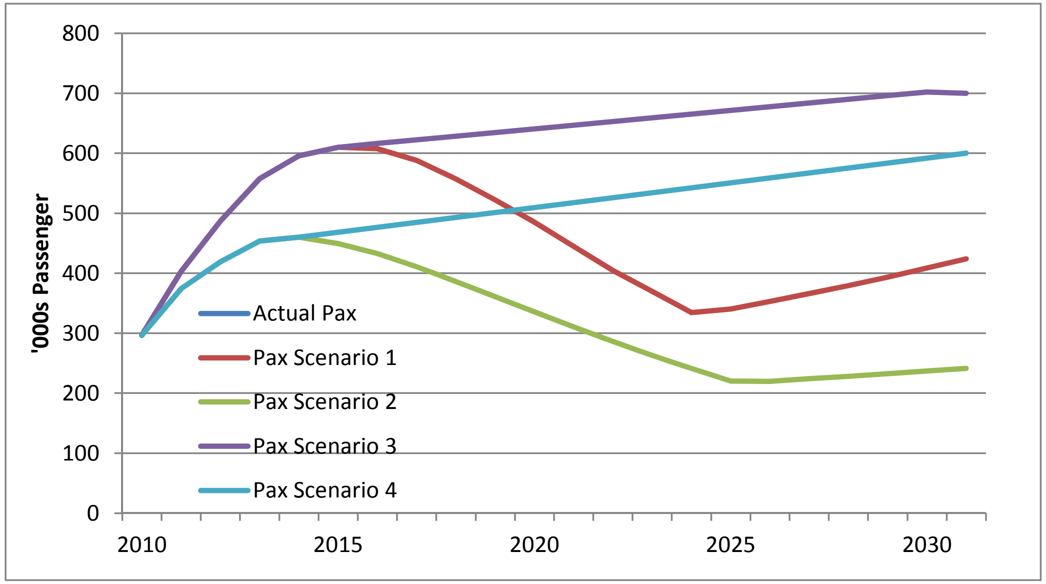

FIGURE 3-5 PASSENGER PROJECTIONS

Aircraft Movement Projections

Table 3-4 shows the total aircraft movement projections. The passenger forecasts are used to generate aircraft movement forecasts. The current mix is around 47% of RPT aircraft movements with aircraft of B737/A320 size (average of around 166 seats) with 49% of 100 to 115 seats and a small number of movements with 76 seat aircraft. TFI expects the proportion of B737 size aircraft to increase over time. Only the one movement mix scenario has been developed at this stage.

Years end 30 June	Actual RPT Aircraft Movts	Aircraft Movements for Pax Scenario			
		1	2	3	4
	'000s Aircraft Movements				
2010	3.5	3.5	3.5	3.5	3.5
2014		6.7	5.3	6.7	5.2
2015		6.9	5.2	6.9	5.3
2020		5.4	3.9	7.2	5.7
2025		3.8	2.6	7.4	6.2
2030		4.5	2.7	7.7	6.6
2031		4.5	2.6	7.4	6.5
2020 on 2010		4.6%	1.1%	7.5%	5.1%
2031 on 2010		1.2%	-1.0%	3.7%	2.9%

TABLE 3-4 TOTAL AIRCRAFT MOVEMENT PROJECTIONS

SOURCE: TFI

3.4. Master Plan Busy Hour Demand

The airside areas of this Master Plan, in particular the RPT Apron and Passenger Terminal areas are based on a range of busy hour demand assumptions driven by factors including the Airport Vision, existing operations, industry consultation, passenger forecasts and collective local and national industry knowledge.

The key busy hour demand assumptions that the Master Plan is based on are listed below;

1. There is potential for regular passenger transport services by Code E aircraft on both domestic and international routes.
   - Growth in services from Australia's East Cost destinations such as Sydney and Brisbane by Code E aircraft should be considered. Qantas have indicated they may replace some Code C operations with Code E A333 aircraft on a Port Hedland routes in the future.
   - It is possible that Port Hedland Airport may receive international Code E services to Singapore (for example) or other Asian destinations (i.e. SYD-PHE-SIN)
2. Based on existing schedule information it is quite possible that international and domestic services could arrive/depart the airport in the same hour (a coincident domestic and international peak hour) at some stage in the future. This means that the terminal and apron facilities need to be flexible in their ability to respond to coincident international and domestic operations.

Based on these assumptions the demand scenario shown in Table 3-5 was developed for the 2031 planning horizon;

Aircraft Type	No.	Seats	Load Factor	Passengers	Sector
B738	2	170	80%	272	*Dom*
B787/A332	1	300	65%	195	*Int*
B787/A332	1	300	65%	195	*Dom*
A320	1	150	80%	120	*Dom*
Total Passengers				**782**	

TABLE 3-5 BUSY HOUR DEMAND

The demand scenario is optimistic to give Port Hedland International Airport flexibility to respond to uncertain future demand requirements. In this respect infrastructure developments provide capacity to cater to both increases in Code E and/or increases Code C operations.

4 Airside Planning

4.1. Introduction

Airside planning is based on the selected design aircraft and forecast peak hour aircraft movement and stand demand. In the development of an airport, the airport owner and stakeholders have made significant investments in the facilities that make up the airport. An airport Master Plan should therefore retain as much as possible of existing infrastructure and facilities, where this is economically and operationally feasible.

Airside planning has been developed specifically to provide flexibility to respond in both the short term and long term aviation requirements.

Earlier work did not envisage that Port Hedland Airport would cater to RPT services by Code E aircraft. However discussions with airlines during the consultation process and the current economic boom in the region have somewhat tempered this view and the flexibility to accommodate Code E RPT operations should be preserved in the Master Plan.

Planning has therefore been based on a demand scenario where Port Hedland Airport may cater to regular services by wide bodied aircraft (both on Domestic and International routes) supporting aircraft up to Code E. With the introduction of new domestic and international aircraft types such as the B777, A330, B787 and the A350, all of which are Code 4E, the future geometric development of the airside needs to cater for a higher code category to provide flexibility for future business development.

Qantas is currently replacing many of its B767 (Code D) aircraft with the Code E A330 and potentially the B787 aircraft type over the next 5 years.

Design Aircraft

Airside planning is based on the geometric layout of Runway 14/32 and its associated parallel taxiway and RPT apron being used by aircraft up to Code E size.

Whilst Port Hedland International Airport already has some unscheduled Code F Antonov 124 operations it is not appropriate to plan the entire airport to Code F standards, although planning does allow for Code F in specific areas (i.e. Cargo). The existing parallel taxiway is already located at a Code F separation although it is not envisaged that Antonov aircraft will require this taxiway unless conflicts with peak RPT operations occur.

Considering this, and the demand assumptions detailed earlier, the design aircraft is the Code E A333 / B787. As discussed there is the potential for airlines such as Qantas to use the A333 (or a similar airline with B787 types) on Port Hedland and east coast routes in place of some Code C (B738 services) or on international routes possibly from Singapore.

Operations by the Antonov 124 will continue to use the main runway and a new apron access point.

The secondary runway 18/36 is available for general aviation and business jet aircraft. A 500m runway reserve has been allowed for in this Master Plan. If developed, the runway would become a Code 2B runway and the new 1,500m length will allow for larger Code C aircraft types to use the runway including the following aircraft types:

- Dash-300
- Q400 (with possible weight restrictions)
- ATR-42/72
- Metro II/III
- B1900D
- SF340B (with possible weight restrictions).

Airfield Planning Parameters

The master planning principles specific to Port Hedland Airport are established from International and Australian standards and recommended practices. International standards and recommended practices are provided in the International Civil Aviation Organisation (ICAO) publications, in particular Annex 14 Volume 1 'Aerodrome Design and Operations'. As a signatory to the Chicago Convention on Civil Aviation, Australia has adopted ICAO Annex 14 standards and practices, subject to notified differences.

Australian regulations governing aviation and aerodromes are contained in the Civil Aviation Act 1988 and accompanying Regulations and Orders. This legislative authority is supplemented by the Manual of Standards (MOS) Part 139 (Aerodromes) and Civil Aviation Safety Authority (CASA) is the national regulatory agency.

Key planning parameters for the main runway (assuming a non-precision approach runway) are summarised in Table 4-1.

FIGURE 4-1 DESIGN AIRCRAFT

Criteria	Code C	Code E	Code F
Runway strip width	300.0m	300.0m	300.0m
Runway centreline – Taxiway centreline	168.0m	182.5m	190m
Runway width	45.0m	45.0m	60m
Runway shoulder width (each side)	-	7.5m	7.5
Taxiway centreline – Apron edge centreline	44.0m	80.0m	97.5
Apron edge taxiway - Taxilane clearance	26.0m	46.5m	50.5
Taxiway width	15.0m	23.0m	25.0m

TABLE 4-1 PLANNING PARAMETERS FOR MAIN RUNWAY 14/32

Runway Usability

Generally operations occur with early morning approaches on Runway 14. This is understood to commonly switch onto operations using Runway 32 from midmorning until evening.

4.2. Summary Airside Master Plan Developments

Key additions to airfield infrastructure are summarised below;

- Reserve land for 500m Runway 14/32 extension (and associated taxiways)
- Reserve land for 500m Runway 18/36 extension (and associated taxiways)
- Expansion of parallel Taxiway to 23m wide (Code E capable) and provision of taxiway shoulders
- Addition of stub taxiways (joining the parallel taxiway to the main runway): 1 Code F capable, 1 Code C capable
- Widening of existing main Taxiway A to be Code E capable
- Expansion of RPT apron to allow for power-in push-back Code E operations
- Provision of a Code E apron edge taxilane on the RPT apron and additional taxiway exit point from RPT apron to improve circulation
- Expansion of Runway 18/36 to 30m wide (Code C capable)
- Expansion of GA apron to be Code C capable
- Provision of Code C taxilane on extended GA apron
- Reserve land for Code F freight apron and terminal facility
- Terminal Expansion – Phases I and II
- Reserve land for future Terminal expansion
- Relocation of Helicopter facilities into GA area.

4.3. Runways

The current length and width of the main runway 14/32 at 2,500m x 45m is sufficient to allow for restricted Code E operations (meaning some Code E widebody aircraft must operate with weight restrictions/payload penalties).

Airside planning is developed with provision for Code E RPT services to operate from the main runway. A small number of runway and airfield improvements were identified to improve airfield efficiency and to provide flexibility for a reduction in operating restrictions for Code E widebody aircraft if required in the future, these are set out below.

It should be noted that at present Runway 14/32 does not have any capacity issues. The airfield improvements identified here will reduce the possibility of capacity issues arising in the future, in particular the widening of the parallel taxiway to be Code E capable.

Runway Length

The take-off and landing length requirements of a particular aircraft is dependent on performance characteristics which may vary with take-off mass, range, temperature, weather, engines fitted, airport altitude, atmospheric conditions and runway slope.

Runway length required is determined from aircraft manufacturers' published information. Here we set out a brief assessment of runway lengths and the aircraft and routes that could potentially be served. This assessment has been made at a master planning level. More detailed study would be required prior to any detailed design.

Runway 14/32

Runway 14/32 is presently constructed to a length of 2,500 metres. Airside planning provides for a 500m extension reserve to the northern end of the runway. A future 500m extension would reduce operating restrictions placed on Code E wide body aircraft and provide flexibility to cater to unrestricted widebody aircraft services, possibly from Australia's east coast or other international destinations such as Singapore or further.

An assessment of the required runway length was undertaken to determine an appropriate area to reserve for runway expansion. This assessment was based on possible aircraft types and destinations and used publicly available material from Boeing and Airbus.

Information from Airbus for the A330 aircraft and Boeing for the 787 is not sufficiently available to accurately determine the runway length required specifically for Port Hedland. For these aircraft, an estimation of the runway lengths to allow unrestricted operations at Maximum Take-off Weight (MTOW) and based on 37 degrees (ISA + 22) and an elevation of 10m, is as follows:

- A330-300 At least 3,400m (for an estimated range of 7,000 - 7,200nm)
- B787-8 At least 3,100m (for an estimated range of 7,600nm – 8,200nm)

Therefore if the maximum design range was to fly to Sydney (1,911nm) or Singapore (1,793nm) (as illustrated in Figure 4-2), the required runway length could be reduced (given the aircraft would carry less fuel). Existing runway pavement strengths will also need to be compared against airline and aircraft requirements to determine if further payload restrictions apply.

For the B737-800w and A320-200, the main runway length is adequate. However the B737-800w may have some weight restrictions for MTOW operations.

Note that the specific airlines should be consulted when an accurate determination of the runway length is required for design.

Following this assessment it was determined that a 500m runway reserve would be appropriate for master planning purposes. The decision to extend the runway will need to be conducted on a business case study which will most probably be triggered by the potential for new long haul airline routes.

Runway 18/36

The existing cross runway 18/36 at 1,000m x 18m is suitable for Code 1A and 1B aircraft, but cannot be used by Code C aircraft. It is considered appropriate from a master planning perspective to reserve land for a runway expansion to accommodate Code C aircraft operations.

Therefore airside planning provide for the widening of the runway to 30m (Code C capable) and for a 500m runway reserve on the northern end of the runway. These additions will allow the runway to be used by a larger range of aircraft (assuming appropriate pavement strength).

Typical aircraft that can use the existing 1,000m long runway will depend on the destinations and airline configurations however the following aircraft could probably use the cross runway:

- Dornier 228
- Twin Otter (with possible restrictions, dependant on destination)
- Beech KingAir 200

FIGURE 4-2 POSSIBLE FUTURE ROUTES

By increasing the length of the runway by 500m and the width from 18m to 30m, provided the pavement strength was adequate, the runway could be used by up to Code C aircraft such as:

- Dash-300
- Q400 (with possible weight restrictions)
- ATR-42/72
- Metro II/III
- B1900D
- SF340B (with possible weight restrictions)

Airlines should be consulted for aircraft specific data to accurately determine the required runway length prior to detailed design.

The decision to extend this runway will be driven primarily by the growth in GA services or capacity issues surrounding the main runway 14/32.

If GA and itinerant traffic are causing delays in RPT services on the main runway and slowing access to the RPT apron the decision may be made to remove all or some GA traffic from the main runway 14/32 and placing them onto Runway 18/36. It is considered unlikely that this will happen in the medium term but may need to be studied in more detail as air traffic increases.

Runway Shoulders

For Code E aircraft operations runway shoulders must be provided and the total width of the runway and shoulders must not be less than 60 metres.

Port Hedland Airport currently has a 45 metre runway and 7.5 metre wide shoulders on each side to support Code E aircraft operations. This is sufficient for the design aircraft. However, operations by Antonov 124 aircraft may be required to operate with a concession of some type.

Runway Strip

The main runway has a 300m wide runway strip which allows for precision and non-precision approaches by Code E aircraft.

Runway End Safety Area (RESA)

Runway End Safety Areas (RESA) are cleared and graded areas extending from the end of a runway strip to reduce the risk of damage to an aeroplane in the event of a runway undershoot or overrun. CASA requires a RESA unless the runway's code number is 1 or 2 and it is not an instrument runway.

The CASA RESA requirements are:

- 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 jets
- The width of the RESA must not be less than twice the width of the associated runway
- The RESA must be free of fixed objects, other than visual or navigation aids for the guidance of aircraft
- The RESA must be prepared or constructed so as to reduce the risk of damage to an aircraft, reduce aircraft deceleration and facilitate the movement of rescue and fire fighting vehicles
- The recommended RESA length for international operations is 240m
- A RESA is required for new runways and existing runways when lengthened.

For international alternate operations, a RESA of 240 meters is recommended at the runway ends. A 240m RESA has been planned for Runway 14/32.

Runway Protection Zones (RPZ)

To protect the public from the risk of an incident of an aircraft undershooting or overshooting a runway, many national authorities define a zone beyond the runway end in order to enhance the protection of people and property on the ground beyond the end of a runway. These zones 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. Such zones are often referred to as a Public Safety Zone (PSZ).

Currently there is no national regulation requiring the provision of RPZs in Australia and ICAO Annex 14 does not refer to the provision of such zones. Future protection could be considered in line with the guidelines of the United States Federal Aviation Administration (FAA) Runway Protection Zone (RPZ) or similar to Queensland which has enacted legislation relating to the provision of RPZ's (termed Public Safety Zones (PSZ's)) around airports within the state (http://www.dlgp.qld.gov.au/docs/ipa/spp1_02guidelines.pdf).

The Queensland Government legislation states *"Although air travel is relatively very safe and the probability of an incident during any single operation is very low, the highest risk of an accident occurs during take-off or landing. This is when the aircraft is aligned with the extended runway centreline and relatively close to the end of the runway. An analysis of aircraft accidents reported to the International Civil*

Aviation Organisation (ICAO) since 1970 suggests most of these accidents occur within 1,000m before the runway on arrival or within 500m beyond the runway end on departure. Consideration should therefore be given to restricting development within this vicinity on the grounds of public safety. UK research undertaken for the Department of the Environment, Transport and the Regions (in particular R&D Report 96368 and R&D Report 97059) suggests the public safety area should take the form of an isosceles triangle, tapering in width away from the runway end, having a base line of 350m and extending up to 3,500m from the runway end.

At less busy airports, such as those in Queensland, with a higher proportion of light general aviation movements, the risk contour reduces to around 1,000m. The public safety area defined in Annex 3 of SPP 1/02 *therefore reflects the international findings and standards modified for the Queensland situation."*

The Queensland Government and FAA RPZ's are illustrated in Figure 4-3.

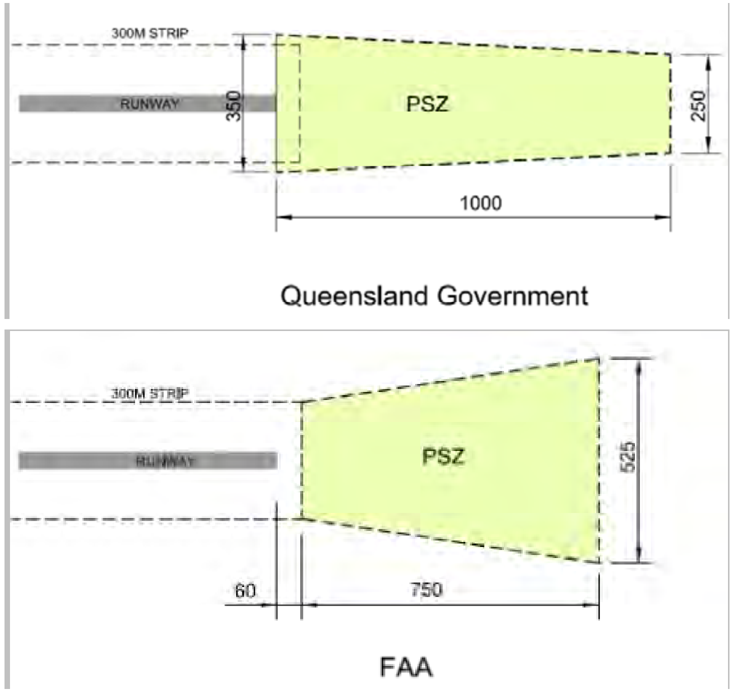

FIGURE 4-3   RUNWAY PROTECTION ZONES

Other methods (such as that adopted in the UK) vary the RPZ dimensions are a function of the type of aircraft and approach visibility minimum associated with the end of a runway. Protection for future RPZs is considered at each end of Runway 14/32 and will be based on the forecast aircraft mix and individual runway risk contours.

The notional RPZ at each end of the runway lies substantially on land outside the boundary of the Airport.

It is recommended that the ToPH either acquires sufficient land to accommodate the RPZs or gives consideration to working with neighbouring land occupants to institute appropriate land use controls within the notional RPZ at each runway end to achieve the following:.

1. Land uses recommended to be permitted under the RPZ should be activities that do not attract the assembly of a large number of people, such as:
    - Golf courses (not club houses)
    - Agricultural operations (other than forestry or livestock)
    - Plant and machinery buildings
    - Low occupancy warehousing
    - Car parking.
2. Land uses recommended to be discouraged, avoided or prohibited should be 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, such as:
    - Residences and public places of assembly (churches, schools, hospitals, office buildings, shopping malls etc.)
    - Playgrounds, sports grounds,
    - Fuel storage facilities.

Taxiways

Taxiways development will facilitate an efficient airfield flow at peak times. These will include the widening of existing taxiways and additions of new taxiways to service runway extensions and a more flexible RPT and freight apron layout. Proposed taxiway developments are summarised in Table 4-2 and shown in Figure 4-4.

The new stub taxiway indicated as number 3 in Figure 4-4 has been approximately located to allow for Code C aircraft (such as the B738) to land and exit the runway without having to taxi to the runway threshold. It is not considered necessary to place rapid exit taxiways on the airfield as runway capacity is not an issue at present or within the planning horizon.

Ref. (1)	Taxiway	Total Length Required (m)	Total Width Required (m)
1	Parallel taxiway widening and extension to Runway 32 threshold	2,500m	23m + 10.5m shoulders each side
2	New apron edge taxilane to service GA area and expanded Runway 18/36	1,000m	18m +3.5m shoulders each side
3	New Stub taxiway – Code C	180m	18m +3.5m shoulders each side
4	Widening of existing Taxiway A to be Code E capable	n/a	23m + 10.5m shoulders per side
5	New Stub taxiway -Code F	180m	25m + 17.5m shoulders each side
6	New access taxiway for RPT and Freight apron – Code F		23m + 17.5m shoulders per side
7	New Code E apron edge taxilane to service RPT apron		

Note (1) Indicated in Red on Figure 4-4

TABLE 4-2 PROPOSED TAXIWAY DEVELOPMENTS

4.4. Aprons

RPT

The current RPT apron has five power-in power-out bays suitable for handling 4xB717/B737 and 1xF100 aircraft concurrently. A parking bay, identified as 2A, is configured to handle a B767 aircraft on power-in power -out arrangements.

Planning for the RPT apron has considered a long term demand scenario with an apron area with the flexibility to cater to both Code C and Code E concurrent aircraft operations (on both international and domestic sectors).

Apron planning assumptions at the planning horizon are as follows;

- 2 x Code E aircraft parking stands (A333/B787) - one international and one domestic, one stand in Multi-Aircraft Ramp System (MARS) configuration
- 3 x Code C aircraft (A320/B738) – three domestic

The apron layout rationalises the existing apron by changing the existing bays to power-in push-back positions and by providing for two Code E stands. In the MARS configuration one of the Code E positions also provides two Code C positions (when the Code E position is vacant) providing flexibility on the apron to cater to different demand scenarios.

The Master Plan takes the long term future growth of the apron in a south-easterly direction parallel with the main runway. The apron layout is in part driven by a desire to attain more depth in the terminal area and move terminal growth into a less constrained area.

It is expected that the RPT apron will operate alongside a freight apron located south east of the RPT apron.

Phased RPT Apron Development

Apron development could occur in two phases, driven by demand and run concurrently with phased terminal expansion (discussed in Section 5-2). Phase I would involve rotating the existing power-in power-out stands to power-in push-back positions. This would require the addition of an apron edge taxilane. Initial assessment has shown that this configuration would also allow for a single rotated Code E position at the western end of the RPT apron.

Figure 4-5 shows the Phase I Apron Plan (the terminal reserve illustrated on Figure 4-5 is discussed in Section 5-2).

Phase II, also depending on demand, would see the ultimate Master Plan configuration achieved with two power-in push-back Code E positions (one in MARS configuration) and three Code C positions including a Code E apron edge taxilane.

FIGURE 4-4 PROPOSED TAXIWAY DEVELOPMENTS

General and Itinerant Aviation

General Aviation (GA) and other itinerant operations currently operate from the Northern Apron with a limited number using the RPT and southern aprons (Golden Eagle and helicopter operations).

Presently some itinerant aircraft operations are parked on the RPT apron due to a lack of aircraft parking space in other areas. This has the potential to conflict with RPT services. This Master Plan provides additional aircraft parking capacity for itinerant aircraft away from the RPT apron in the form of a Code C capable GA apron.

Current helicopter operations occur near the RPT and Freight aprons. The Master Plan has relocated all helicopter operations away from the main RPT apron to a new expanded GA area to avoid conflicts between fixed and rotary wing aircraft and itinerant and scheduled services.

The Master Plan has provided a GA apron capable of parking Code C aircraft and an associated Code C parallel taxiway servicing the area. The dimensions of this area are based on Runway 18/36 operating as an instrument non-precision approach runway.

The expansion and future growth of the GA area enables the following;

- Additional aircraft parking for GA and itinerant aircraft up to Code C
- Relocated helicopter facilities
- Additional area for new hangar facilities
- Code C aircraft to exit Runway 14/32 and taxi to the GA apron on a new apron edge taxilane removing the need to use Runway 18/34 as a access taxiway from the main runway to the GA area.

Freight

Currently there are irregular operations by Antonov 124 aircraft. however most air freight consists of just-in-time material and small parcels.

Air freight has been identified (through the consultation process) as a potential area for growth and an area has been reserved for this activity in the Master Plan. The notional facility provides for nose-in parking by Code F aircraft and reserves sufficient area for ground operations.

It is considered appropriate that, in the longer term, apron growth will continue in a southerly direction and development of a freight apron may be interchangeable with RPT operations if required.

4.5. Obstacle Limitation Surfaces

The approach and departure surfaces as well as circling areas surrounding an Airport are defined by Obstacle Limitation Surfaces (OLS). OLS are conceptual (imaginary) surfaces associated with a runway system which identify the lower limits of the airspace surrounding an aerodrome above which objects become obstacles to aircraft operations. Activities and structures must not exceed a height indicated by the Airport Height Areas and Approach Surfaces, which are set out in local town plans, unless an aeronautical study (in accordance with Civil Aviation Safety Authority guidelines) determines the proposal would not adversely affect the safety or significantly affect the regularity of aviation operations.

The PANS-OPS are a second set of surfaces determined by aircraft flight operations under instrument conditions that form an envelope over the existing obstacle environment. These surfaces are established by the instrument procedure designer to ensure that an aircraft will have a specified minimum clearance above any accountable obstacle in situations where the pilot is relying entirely on the information derived from cockpit instruments and may have no external visual reference to the ground, to obstacles or to other aircraft. As a result, PANS-OPS surfaces cannot be infringed in any circumstances.

The prescribed airspace for this Master Plan makes provision for a 500m extension to the northern end of Runway 14/32, providing a total length of 3,000m, and a 500m extension on the northern end of Runway 18/36, providing a total length of 1,500m.

The OLS provides the basis for future planning of the airport and surrounding precincts to meet aviation, commercial and legislative demands. The OLS based on the indicated Runway layout is illustrated in Figure 4-6.

4.6. Navigation Aids and Landing Aids

Navigational aids are supplied and maintained by Airservices Australia under the Airservices Australia Act.

The Non-Directional Beacon (NDB) is a navigation aid located in the south-eastern corner of the airfield. The NDB and High Frequency Radio Antenna Array consists of transmitter and receiver towers, antenna arrays and related infrastructure huts. Buffers are required to this infrastructure, namely restrictions on the height of structures within the buffer area, to protect radio receipt and transmission.

FIGURE 4-5 RPT APRON PHASE I

These buffers extend to 500 metres from the NDB, at an angle of 3 degrees vertical from the NDB antenna array.

The effect of this buffer is to limit the potential height of any buildings or structures within area.

To be sure that any height restrictions are captured and accounted for, it is recommended that height limits are encapsulated in relevant town planning documents.

Any proposed rezoning of the land or any subdivision or development should be referred to Civil Aviation Safety Authority (CASA) as well as Airservices Australia to ensure that any height restrictions are calculated and can then be used to formulate specific Scheme provisions to protect this equipment.

The Air Traffic Management Division of Airservices Australia advise that the VOR/DME and NDB will all remain and no changes are planned for the near future. For the period beyond, their need is uncertain subject to the advancement in the use of satellite based systems.

No demand presently exists for an Instrument Landing System (ILS). Situations of low cloud and fog (particularly during winter) would generate demand but its high cost may not warrant installation. An ILS may be deemed unnecessary if RNP procedures are created.

4.7. Aerodrome Rescue and Fire Fighting Services (ARFFS)

ARFFS are required if the aerodrome has a scheduled international passenger service or handles more than 350,000 passengers per year.

The regulatory requirements for the provision of ARFFS are extensive. They include provision on the aerodrome of a fire station, training facilities, water storage, facilities for the maintenance of vehicles and communication facilities. In addition, the officer in charge must hold appropriate Australian Fire Competencies qualifications.

The present location of the ARRFS facility conflicts with the future RPT apron developments. A new area for the ARFFS facilities has been identified on the eastern side of the airport. Since no specific conflicts were identified during this planning exercise the Master Plan retains this ARFFS location. An Airservices Australia study due to begin during the writing of this Master Plan will confirm the optimal ARFFS facility location.

4.8. Air Traffic Control Tower

Port Hedland Airport is non-controlled and has no air traffic control service although it does have an unused facility. The siting of the Control Tower is aimed at providing views for the controllers that incorporate the following key elements:

- Adequate visibility of all of the manoeuvring area and airspace under the controller’s area of responsibility, including runway approach lights, graded areas at least 300m from the runway threshold and take-off climb surfaces
- A view of all runway ends and fire fighting routes
- Minimised glare from the sun
- The ability to detect the movement of an aircraft commencing its take-off run within an appropriate time frame (recommended to be four seconds, with an upper limit of five seconds)
- Lines of sight that are not impaired by external light sources.

We have conducted a brief assessment of the Control Tower location against CASA recommended response times as shown in Figure 4-7.

The assessment shows that the existing thresholds are close to the CASA recommended time of 4 seconds. The existing Control Tower location is sufficient to serve the runway in its current configuration.

Should the cross runway 18/36 be extended it is probable that the Control Tower location would be unsuitable and depending on the outcome of a detailed study may require a new location.

4.9. Aircraft Noise Impacts

A desktop assessment of airport noise related to the Australian Noise Exposure Forecast (ANEF) System was carried out to determine if the airport required an update of its airport noise contours based on the future aircraft traffic mix and number of aircraft movements.

The study confirmed that based on the aircraft movement forecasts and due to the location of the airport in relation to the town and associated residential development, no existing communities are likely to be adversely affected by a projected increase in aircraft type or frequency.

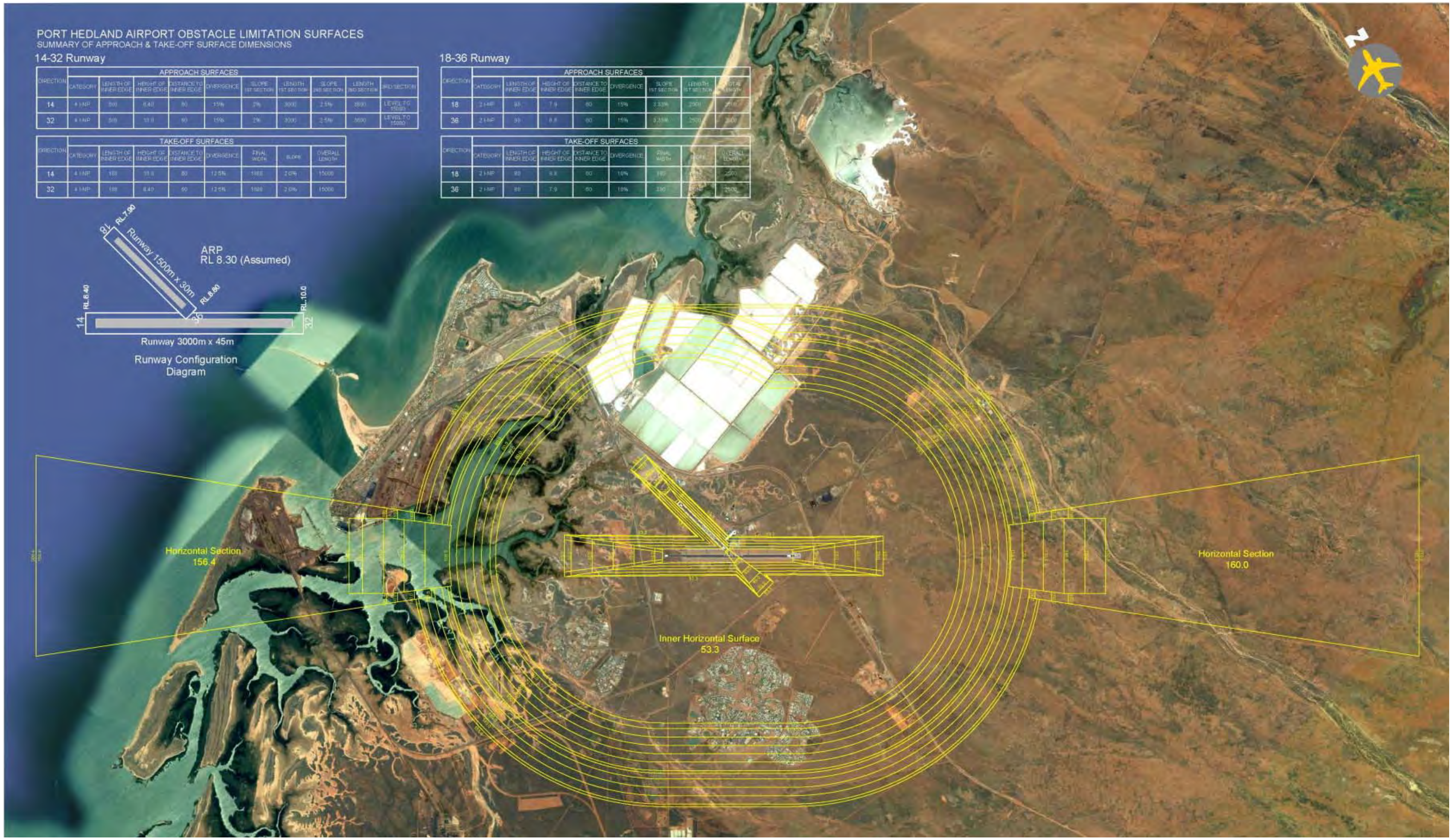

FIGURE 4-6 OBSTACLE LIMITATION SURFACES

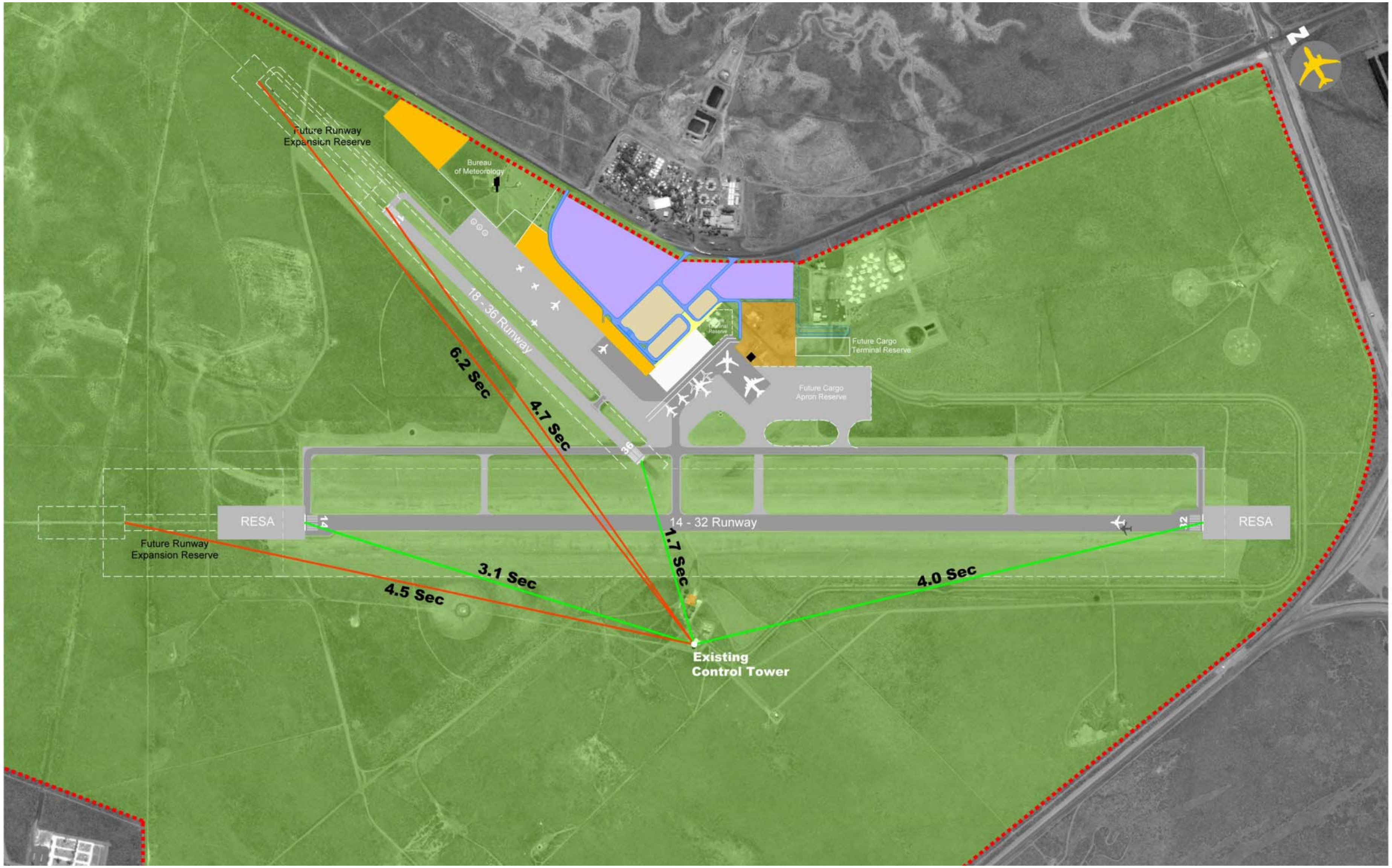

FIGURE 4-7 CONTROL TOWER RESPONSE TIMES

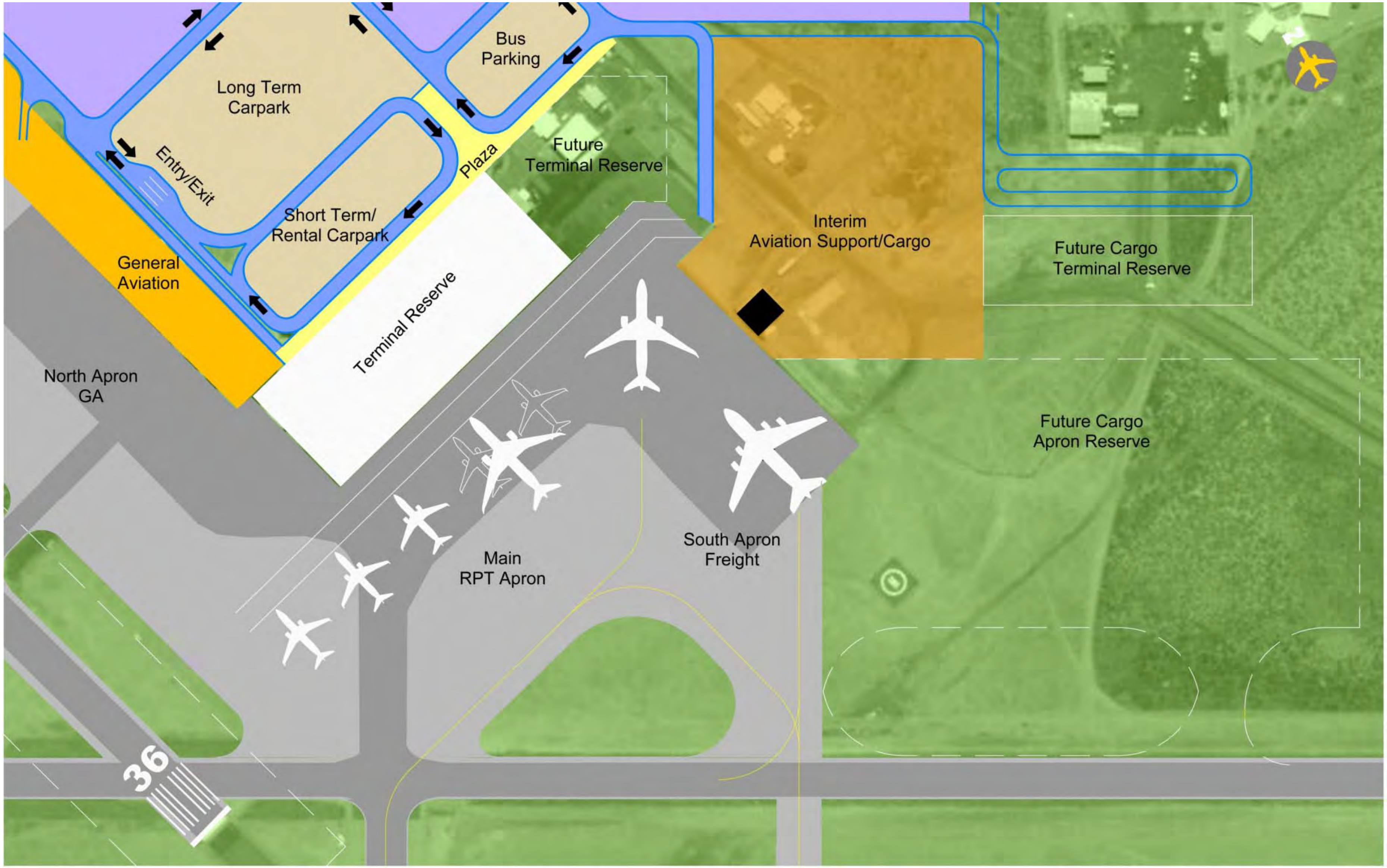

FIGURE 4-8 PROPOSED APRON LAYOUT 2031

5 Landside Planning

5.1. Introduction

Landside planning has been developed in four precincts (refer Figure 5-1). The work presented here includes landside developments carried out in the 'Port Hedland International Airport Master Plan' prepared by Whelans Town Planning and Parsons Brinkerhoff.

Terminal developments are based on an assessment of terminal requirements completed for this Master Plan based on the passenger demand identified in the forecasts. At the time of writing independent terminal development planning was underway. This Master Plan has considered this work and included it where appropriate.

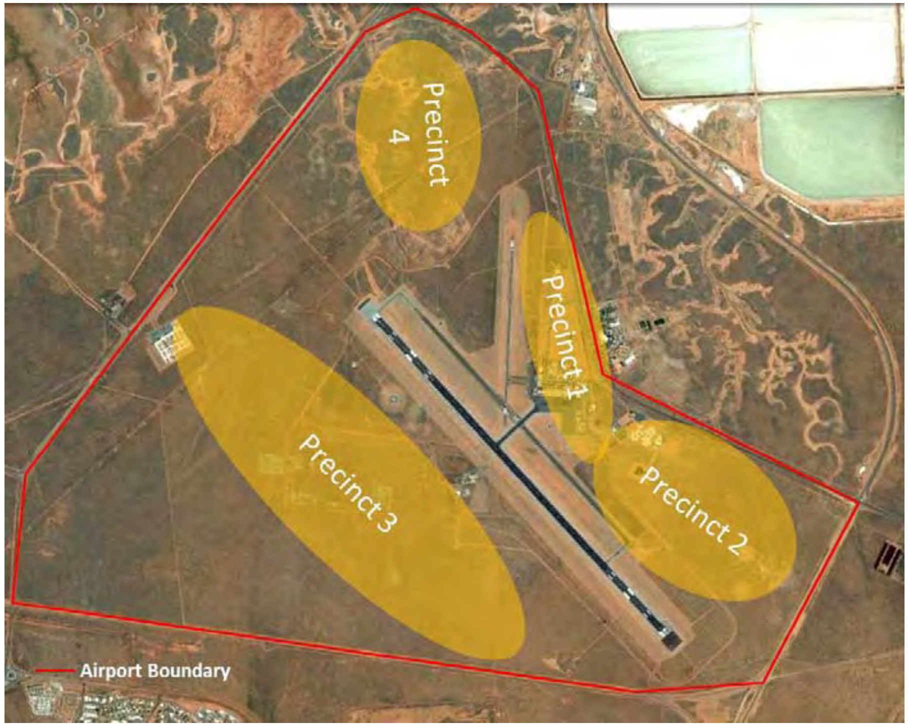

FIGURE 5-1 LANDSIDE PRECINCTS

5.2. Precinct 1

RPT Terminal

The existing terminal building is approximately 30m in depth and is constrained on its western end by the GA apron and Airport Operations building, and on its eastern end by a General Aviation hangar. On the northern side of the terminal is the kerbside and car parking facilities.

Building expansion towards the west can occur in a limited fashion by extending the terminal to the edge of the GA apron and removing the Airport Operations building.

This Master Plan has developed a terminal reserve to the west, east and south of the existing terminal following the future growth of the RPT apron. Growth in a southerly direction out over the existing apron will allow for an increase in terminal depth needed to implement simple in-line passenger processing facilities. Future growth of the terminal outside of the planning horizon could then continue parallel to the main runway in a south-easterly direction.

Expansion of the terminal in the manner identified will require alterations to the existing apron configuration and the landside configuration of roads and car parking facilities. A utility/power house exists in the area suggested for long term terminal expansion, beyond the Master Plan time horizon and would require relocation at that time.

Terminal Building Expansion

Port Hedland currently operates a single level terminal catering to regional, domestic and international services.

The existing total area of the terminal is approximately 2,800m^2. The terminal is understood to be capacity constrained and at the writing of this Master Plan expansion planning was being carried out by Sandover Pinder, Rider Levett Bucknall and THINC Projects.

This Master Plan has identified two phases of terminal development and considers the ongoing work described above.

Terminal Expansion Phase I

Due to the pressing requirement for better all-around terminal facilities and the need to develop larger passenger processing facilities, in particular international, an independent terminal development project is currently underway. The planning work has identified upgrades to the existing terminal and expansion work. As this work is ongoing at the time of writing, we have considered the terminal concepts from this work in the Phase I terminal development outlined below.

A Phase I demand scenario as agreed with Port Hedland Airport, reflects the short to medium term market potential:

- 2 x B738 aircraft (domestic)
- 1 x A320 aircraft (domestic)
- 1 x A333 aircraft (international)
- 1 x F100 aircraft (charter)

The total terminal area required to service this demand scenario has been calculated at approximately 10,000m^2, an additional 25% Gross Floor Area (GFA) has been allowed for in determining an appropriate Phase I terminal expansion reserve. This allowance will give Port Hedland Airport flexibility to develop an expanded terminal within this reserve.

A terminal expansion within the reserve to achieve this floor area and improve the functionality of the existing terminal could occur with.

1. Expansion of the south-west end of the existing terminal building possibly allowing for an expanded international offering and housing baggage claim
2. Expansion of the terminal south over the existing apron to take the total terminal depth to approximately 70m in order to achieve linear passenger processing and allow for swing capabilities between domestic and international operations.
3. Expansion of the north eastern end of the building.

The Phase I terminal expansion reserve is intended to provide an area within which the required terminal expansions could occur. The actual dimensions of a Phase I terminal expansion will be derived from more detailed planning work as it occurs and will be dependent on the way passenger processing facilities are to be laid out. However, the reserve area provided is considered appropriate for planning purposes.

Phase I terminal development would likely coincide with the Phase I apron developments identified in Figure 4-5.

Terminal Expansion Phase II

The second phase of terminal expansion is based on the ultimate Master Plan demand scenario and sees the terminal expanded to a footprint of approximately 11,000m^2.

Given that the Phase 1 development area has been calculated at 10,000m^2, an additional 1,000m^2 of terminal shell could be constructed at this time allowing within fitout when required by demand. Alternatively voids would be created within the building for infilling as functional areas require expansion.

In the longer term if International Code E services are likely to occur with more frequency the airport may be better served by migrating International processing into an expanded facility in the area shown as 'future terminal reserve ' on Figure 5-3. Anew international facility could be developed in the extended terminal where an increase in terminal and apron depth would be most beneficial and in close proximity to the future location for Code E international aircraft parking. There would also be the potential to develop some domestic/international swing capabilities (international departure lounge used for overflow of domestic passengers, when international services are not operating) between the existing terminal and new international component dependent on the coincidence of domestic and international peak hours and internal terminal configuration. The decision to develop the terminal further will be based on passenger numbers, particularly international, and the peak periods for international and domestic passengers coinciding.

Figure 5-3 shows the terminal reserve based on the 2031 peak hour demand.

Landside Area

The area around the existing Terminal is the most developed component of the Airport and includes a variety of existing land uses. Most are directly or incidentally related to the function of the runway and terminal uses, and include car hire, terminal services, Royal Flying Doctor Service and Bureau of Meteorology, as well as Freight and General Aviation.

This area is currently considered to be cluttered and ad hoc, and does not function optimally.

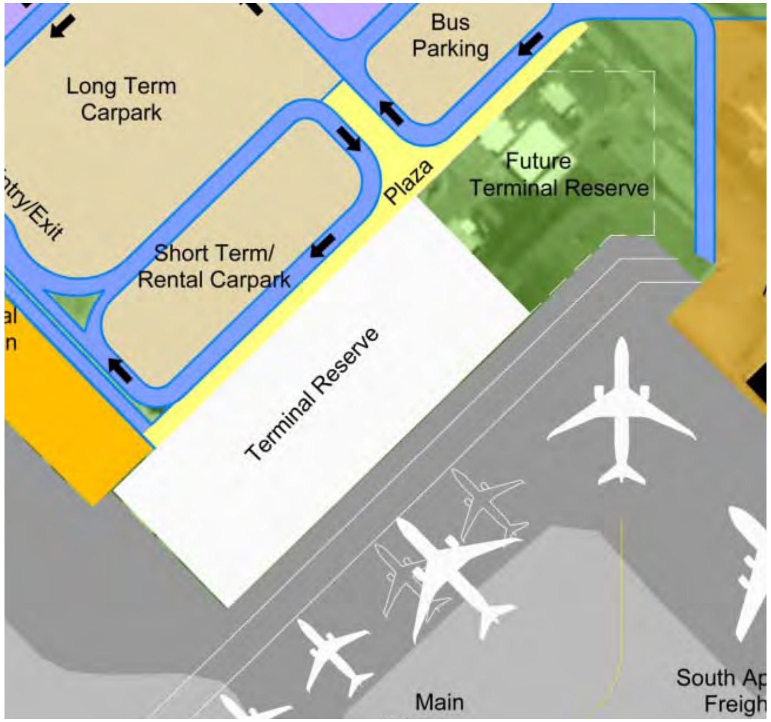

FIGURE 5-2 TERMINAL RESERVE

There are a number of land use and activity conflicts within this precinct:

- Freight, GA and RPT activities are located in close proximity, and need to be separated
- There is insufficient car parking for vehicle hire and public car parking
- Outdated facilities such as the Terminal and car parking areas need to be expanded and upgraded. Additionally, as the airport continues to grow, there will be increased demand for growth in freight and logistics, tourism and vehicle hire.

To resolve these conflicts and provide for growth, the purpose of the Master Plan in this area is therefore threefold:

- Resolve existing land use conflicts by rationalising land uses, especially in close proximity to the Terminal
- Identify new locations for some existing uses and
- Provide for the expansion of land uses as required.

To achieve these objectives the following recommendations are made regarding land use and development:

- Relocate land uses conflicting with RPT activities and terminal expansion
- Implement a freight and logistics precinct to accommodate rationalisation and expansion of these uses
- Create lots for car hire company operations within close proximity to parking areas and the Terminal
- Expand public car parking areas
- Rationalise access and traffic flow
- Extend the northern and southern GA aprons and accommodate expansion of GA away from RPT activities
- Create 'cut off' drains to divert stormwater away from the precinct
- Extend drainage lines and install attenuation basins to adequately manage stormwater
- Implement landscaping and entry statements to primary access point.

Significant upgrades to car parking and terminal facilities are proposed.

Significant modifications to existing drainage network are also required to better deal with stormwater drainage in landside areas.

Accordingly, the Master Plan allocates land such that uses directly related to Terminal activities, such as parking, storage and workshops are all located within close proximity to the terminal, and uses that conflict with terminal activities, such as logistics and freight, are located within a specific precinct for this purpose. Similarly, commercial airport uses such as vehicle hire and GA and charter services are located within specific precincts.

Freight and Maintenance Facilities

Air freight has been identified (through the consultation process) as a potential area for growth. An area has been reserved for this activity in the Master Plan on both the airside (through development of a dedicated Code F capable freight apron) and landside (through reserving an appropriate size block of land for a possible Cargo terminal) as shown in Figure 5-3. The area could also be used for aircraft maintenance and could support a large 50x50m maintenance hangar and operation.

The provision of a new cargo and maintenance facilities will be driven by business needs and will require sufficient landside area and access roads to keep freight trucks off the main airport access roads.

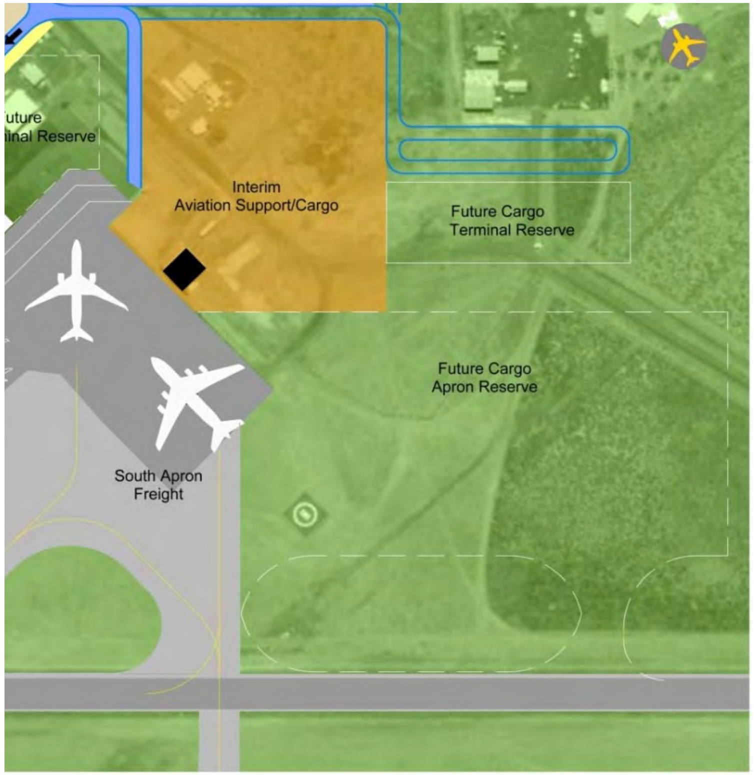

FIGURE 5-3 RESERVE FOR FREIGHT AND MAINTENANCE FACILITIES

General Aviation (GA)

The GA area has been retained in its existing location and expanded in the master plan as it is positioned away from the Terminal and RPT apron. There is sufficient landside area to accommodate future small hangar developments for future GA and Corporate aviation operations. Helicopter operations have also been relocated away from the main apron to this area and the landside will need to support this operation.

The area could also house a small GA/Corporate passenger processing facility if required.

Facilities that currently lie in the way of future terminal expansion such as Golden Eagle will be relocated to this area. Expansion of the GA area can occur in two phases based on a 250m apron extension followed by a later 250m extension to its fullest form shown in Figure 5-4. The provision of services sites in this area will be based on specific business cases.

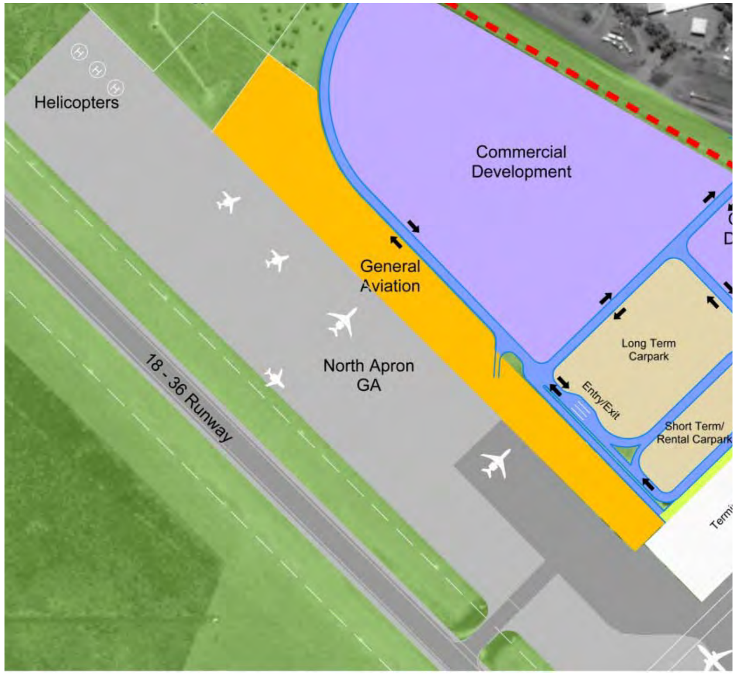

FIGURE 5-4 GENERAL AVIATION AREA

Interim Aviation Support Facilities (including Fuel)

An area has been identified as 'Interim Aviation Support Facilities' on the Master Plan. This area currently houses BP Fuelling Facilities and a Hangar facility.

It is the intention of this Master Plan that the area is reserved for future growth of the apron and terminal. As a result uses of the area in the interim should be kept to non-permanent facilities. The BP fuel facility can eventually be pushed east nearer the future freight reserve. The existing hangar can be relocated into the General Aviation area.

Land Uses

At a high level, land areas within this area not required for aviation uses have been categorised as commercial areas such as car rental areas and possibly a hotel/motel. In the Report 'Port Hedland International Airport Master Plan' prepared by Whelans Town Planning and Parsons Brinckerhoff July 2011, (see Appendix II) more detail is given as to the specific land uses in this area.

Commercial

The landside area shown as Commercial in the Master Plan (Figure 6-2) can be subdivided into land parcels suitable for commercial development.

The commercial objective must be to maximize the return from the land and to attract aviation and other related business to the airport.

The land is high value property due to its uniqueness. Port Hedland has only one airport and hence there are few competitive demands on location presented to aviation related businesses if they seek to be close to their market. The airport presents another opportunity to enhance regional values and diversity in a manner which is fitting of a regional gateway.

The airport is conveniently located to the Port Hedland, South Hedland, Wedgefield and Red Bank centres. These centres provide a range of services, accommodation and retail options. Residential and industrial subdivisions are located in reasonable proximity to the airport.

The adjacency of these facilities and amenities is relevant to the potential role and shape of developments which are suited to and appropriate at the airport as a transport interchange, an aviation centre and a gateway for the region.

Having regard to this situation and the role served by the airport, opportunities which deserve consideration for development within the airport precinct include:

- International Flying College – the airport site is well served by nearby community infrastructure which provides a range of social and recreational outlets for flying school residents and staff. The provision of an International Flying College would be a complementary use of airport land.
- Hotel/Convention/Business Centre – as the primary gateway for business/workforce visitors into and through Port Hedland, the availability of a hotel and associated convention and business facilities would offer these typically short-stay visitors with convenient accommodation well connected to air services.
- Commercial office – the provision of office accommodation at airports is attractive to businesses with high air-transport usage
- Showcase opportunities – as a regional gateway, the airport precinct offers unrivalled opportunities for outdoor signage and display yards showcasing relevant products, services, materials and equipment.

Beyond the airport boundary the provision of complimentary commercial developments would enhance the airport visitor experience and the eventual airport development opportunity were the full range of commercial uses listed above realized. As this land is external to the airport, the airport would not exert direct influence in planning and development of these areas. However just as it is important to state the value to the airport of adjacent residential, industrial, retail and recreation facilities, it is also relevant to suggest the establishment of other land uses which would continue to develop the diversity of activities and services which would be potentially complimentary to the airports development interests.

In particular development of complimentary airport land uses such as:

- Service stations
- Convenience stores
- Fast food outlets
- Outdoor advertising
- Other similar passer-by and service oriented uses.

The primary planning objective has been to establish future planning principles for commercial development of the RPT and GA sectors.

Transport and Access

The development of Precinct 1 will require some reconfiguration of the existing roadways to allow the following;

- Reconfigured drop-off kerb and bus parking area adjacent to new terminal pedestrian plaza area
- Additional access point off the Great Northern Highway (GNH)
- Possibly a second additional access point for a dedicated Freight area if developed.

5.3. Precinct 2

Precinct 2 has been predominantly developed with two Transient Workforce Accommodation developments; Auzcorp's Mia Mia site, and the 2000+ person Port Haven site. Airservices Australia's navigation and communications infrastructure is also located within this precinct, consisting of the NDB and a High Frequency Radio Antenna Array. The State Emergency Service depot is also located within the precinct, to the south-east of the Mia Mia encampment.

Development within this precinct must recognise existing land uses to ensure that conflicts are minimised. Future growth of the RPT and Freight aprons may in the longer term encroach into this area and the resulting landside infrastructure will need to be provided in this area. Additionally, it is recommended that long term use of the land is embargoed to ensure that any long term requirement for the use of this land for airport related uses can be pursued. Accordingly it is recommended that this land, even if subdivided, should be leased, and not sold to developers. This will ensure that the land is protected for the long term. Developments within this precinct are further discussed in Appendix II.

Land Uses

Only land uses compatible with existing Precinct 2 land uses and that will not impact on the NDB or Antenna Array should be considered for this Precinct. Land uses considered compatible with these uses are:

- Transient Workers Accommodation
- Transport Development [consistent TDZ draft Scheme provisions]
- Hotel/Motel.

Again, it is critical that land uses not consistent with or directly related to airport activities are prohibited from this Precinct.

Transport and Access

Access to developable portions of Precinct 2 can be provided off the Great Northern Highway (GNH).

Given that there are multiple access points along this stretch of the GNH, access to the Mia Mia TWA and SES depot can be rationalised to reduce the number of access points on to the GNH. Alternatively, should this precinct be utilised by a single owner, a single common access could be developed that would also provide access to the SES and Mia Mia sites.

5.4. Precinct 3

The ARFFS and Control Tower are located in this Precinct. It is not envisaged that this area will be required in the near or longer term for other airport related activities. Precinct 3, while constrained by height limits from DVOR and DME infrastructure and OLS surfaces, has significant potential for subdivision and development. Restrictions to land uses will be required to ensure that the operating parameters of the DVOR and DME are not detrimentally affected.

Subdivision of this precinct will require access from GNH. Limited points are available to access the ToPH land due to existing land leases and the cemetery site consuming the majority of the frontage to GNH. As a result only one location for access is available, situated on the northern side of the ToPH cemetery. The subdivision of Precinct 3 is a logical expansion of the Wedgefield Industrial Area and the TDZ currently being planned for by LandCorp. Additionally, the presence of the runways and railway lines further limit the potential for this land to be developed for anything other than Industrial purposes.

The existing ToPH Incinerator and Airservices Australia Fire Training Module currently located within this precinct may be required to be relocated, if so alternative locations should be able to be readily identified.

Land Uses

As discussed above, logical use and development of this land is to extend and integrate industrial and transport uses, both existing within the adjacent Wedgefield Industrial Area as well as proposed as part of LandCorp's TDZ (providing specifically for transport laydown, vehicle break down and storage areas).

The substantial available developable land area of Precinct 3 presents the potential to provide for a considerable range of lot sizes that cannot be provided in other areas of the township capable of being developed for Industrial land use purposes. Significantly, it can provide for larger lots in the range of 10 to 20 hectares should market demand require. However, land uses within this precinct, will be constrained by heights restrictions. Detailed analysis in this regard should be undertaken by, or in conjunction with, CASA and Airservices Australia, to ensure the necessary land use controls are implemented.

A parcel of land of approximately 50 hectares in area has also been identified in previous studies for Precinct 3, for potential development of a Department of Defence base, as per the ToPH's request. Should this base proceed, this will not impact upon the traffic movement or drainage for the rest of the Precinct.

Developments within this precinct are further discussed in Appendix II.

5.5. Precinct 4

Precinct 4 is located at the junction of Great Northern Highway and Port Hedland Road. This precinct is bounded by the GNH, which effectively 'wraps' around the precinct, and both runways. This land has some clear physical characteristics that result in the land likely being subject to inundation. Combined with buffers and access issues due to its locational constraints, this Precinct is the most prohibited for development potential.

Land Uses

Given the location of the site, hydrological and access issues, this Precinct is only suitable for 'passive' uses rather than active land uses such as industrial or commercial development. Passive uses constitute land uses that generate little traffic or access requirements, and don't require significant development other than earthworks. Land uses such as plant or turf farm, solar farm, wind farm or long term storage would suit this precinct. Public utilities such as a waste water recycling plant could also be considered. Uses such as plant or turf farms and solar farms, however, generate potential conflicts with aircraft, such as attracting birds in the case of plant farms or reflections and glare in the case of a solar farm. These uses will require careful consideration prior to implementation. It is noted that solar farms have been developed on airport land in other locations, such as Alice Springs airport, and may be suitable, subject to design considerations to ensure glare does not affect aircraft. A wind farm would need to comply with OLS requirements, however, it is considered that a wind farm can be accommodated, and would be an excellent use of the land. Storage, such as the Transport Development Zone proposed on the other side of the Highway, would be suitable, however, may not be aesthetically acceptable, and access may be problematic. Notwithstanding aesthetics, this use would be compatible with proposed adjoining land uses, and if access and aesthetics can be resolved, part of the land that is not subject to inundation could be utilised. Another use that may be permitted in this precinct is a 'Fly In Estate'. An estate of this type provides a taxiway from a runway to an area of land that can be developed with aircraft hangers and a dwelling, either separate or on top of the hanger, and allows for residents to park aircraft within the estate. Given the high costs involved (taxiways and apron costs would have to be absorbed onto the estate costs) demand for this type of development is not likely to be high; however, this type of development is a recent innovation. Given the constraints on Precinct 4, this use may be suitable, as it is unlikely to generate significant traffic, and can utilise proximity to the secondary runway.

Any land uses proposed for this precinct will require careful consideration, as well as development provisions to accommodate minimum floor levels to ensure it is not subject to inundation, as this precinct is identified as potentially subject to inundation as discussed above.

Developments within this precinct are further discussed in Appendix II.

Figure 5-5 shows the 2031 landside layout in Precinct 1.

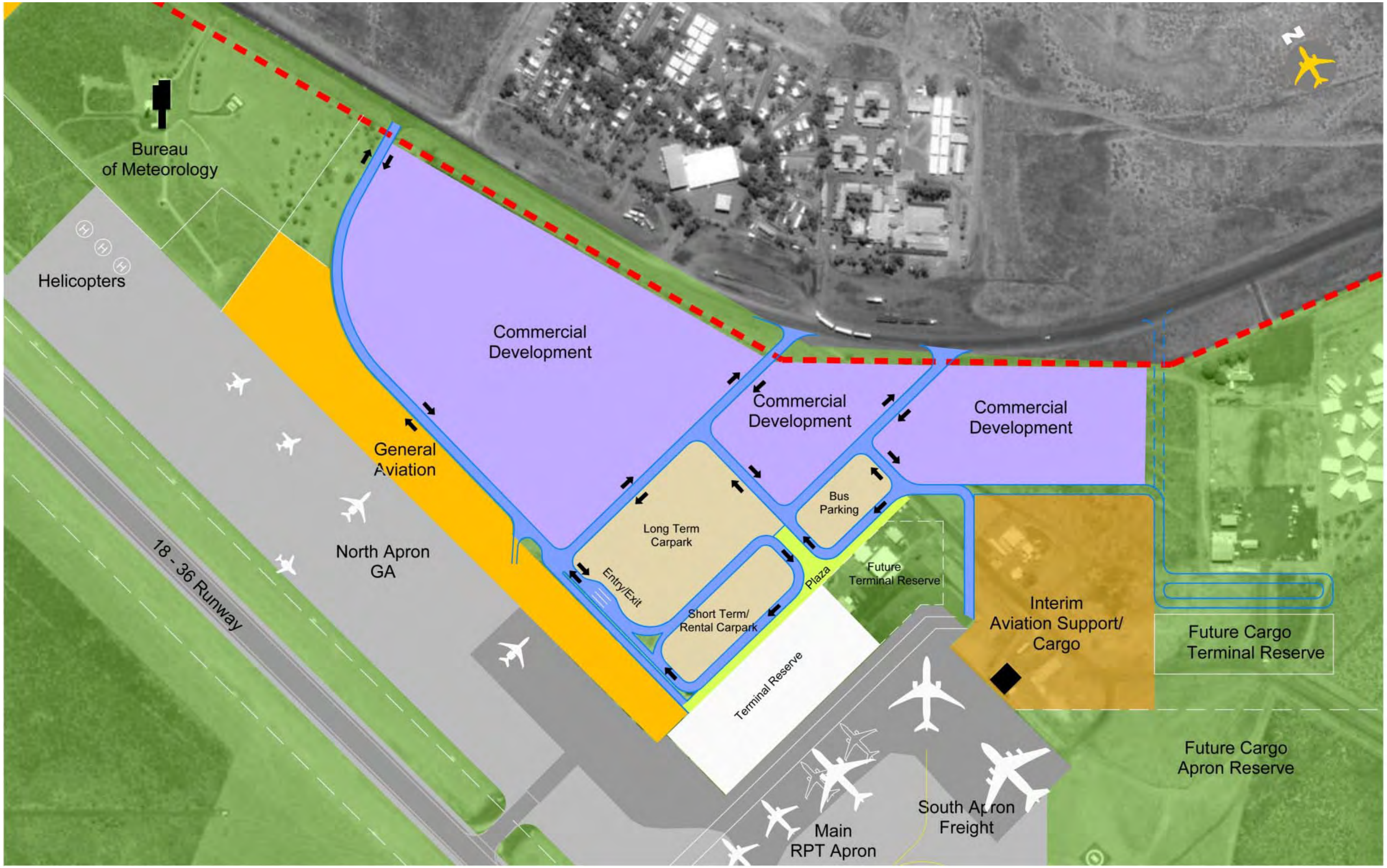

FIGURE 5-5 LANDSIDE LAYOUT 2031 IN PRECINCT 1

6 Master Plan

6.1. Airport Master Plan

Figure 6-1 shows the Port Hedland International Airport 2031 Master Plan It addresses all the features discussed in this report.

The key features of the Master Plan are:

- Protection of 300m strip around the main runway
- Identification and protection of areas for possible future RESAs at both ends of the runway
- Protection for long-term extension of the main runway and cross runway
- Retention of the existing passenger terminal with provision for future expansion
- Expansion of RPT apron to allow for power-in push-back Code E operations and provide flexibility for future airline traffic
- Future GA expansion zone to the east of the cross-runway 18/36
- Provision for future commercial zones are provided to the north of the terminal
- Retention of the existing Control Tower and Aerodrome Rescue and Fire Fighting Services
- Development of additional stub taxiways to improve airfield circulation
- Widening of parallel taxiway to allow Code E aircraft operations
- Widening of existing Taxiway A to be Code E capable
- Expansion of Runway 18/36 to 30m wide (Code C capable)
- Provision of Code C parallel taxilane on extended GA apron
- Reserve land for Code F cargo apron and cargo terminal facility and aircraft maintenance.

6.2. Phasing – Provision of Key Infrastructure

The development years for each piece of airside infrastructure are primarily driven by forecast demand. Should the demand not eventuate as forecast, the year(s) each piece of infrastructure is required may shift.

These developments are shown in Figure 6-2 and described below for:

- Phase I: 2011-2021
- Phase II: 2021-2031.
- Long Term: Beyond 2031

Phase I – 2011 – 2021

The following describes key additions to infrastructure in Phase I.

Development	*Trigger*
Expansion of RPT apron to allow for power-in push-back operations by Code C aircraft allowing for additional Code C positions	*Congestion issues on RPT apron, peak hour demand, off schedule requirements*
Phase I expansion of GA apron (develop Code C apron by 250m north).	*Business drivers such as expanding number of GA operations who want apron frontage and demand for corporate jets*
New Code C apron edge taxilane for GA area (developed at same time as new GA apron additions	*GA apron growth and increasing GA traffic on cross runway*
New Code F taxiway (removing need for Antonov 124 to cross RPT apron)	*Conflicting taxiing flows with RPT traffic, operational flexibility, frequency and timing of freight operations*
Terminal expansion - Phase I (expansion based on existing planning work and expansion into existing Airport Operations building and Freight Building)	*Terminal congestion and peak hour passenger demand, new services, changes in fleet*

Phase II – 2021 - 2031

The following describes key additions to infrastructure in Phase II.

Development	*Trigger*
Expansion of RPT apron to allow for two Code E power-in push –back positions and associated Code E apron edge taxilane	*Increasing services by Code E aircraft, 2 concurrent Code E operations in peak periods*
Phase II expansion of GA apron (develop Code C apron to full length required).	*Business drivers such as expanding number of GA operations who want apron frontage*
Widening of parallel taxiway to be Code E capable	*Develop at same time as Code E RPT apron development. Capacity issues on main runway require Code E aircraft to taxi to runway thresholds off the main runway i.e. on parallel taxiway to reduce runway delays*
Terminal expansion - Phase II (develop terminal area to the east of existing terminal and parallel with main runway and associated landside infrastructure)	*Increasing international services require larger in-line processing area and demand/capacity issues in existing terminal, Code E aircraft operations*
Develop Cargo apron and terminal and Aircraft Maintenance	*Business drivers such as a specified desire by freight operators to develop a purpose built facility.*

Long Term – 2031 +

The following describes additional growth outside of the planning period;

- Expansion of RPT apron in south easterly direction to accommodate additional Code E MARS configured aircraft parking positions
- Expansion of Passenger Terminal in south easterly direction
- Expansion of freight and aircraft maintenance area
- Possible expansion of runways if required (triggered by the addition of new airline routes requiring aircraft to operate from a greater runway length).

FIGURE 6-1 PORT HEDLAND MASTER PLAN 2031

7 Staged Development Costing

7.1. Introduction

Staged development costing for input to the Port Hedland International Airport forward budgeting were provided by Turner and Townsend as part of this Master Plan. Capital expenditure projects are based on the airside and landside developments included in the Airport Master Plan and have been categorised in two Phases consistent with the Master Plan.

The Capex Summary is shown on Table 7-1.

Stage 1 Short term 2011 to 2021		
Terminal and External Works		71,700,000
GA apron, apron edge TWY and TWY upgrade to RWY		8,000,000
RPT apron expansion phase 1		2,600,000
Code F TWY from RWY to Cargo apron		7,200,000
	Sub Total Phase 1	89,500,000
Stage 2 Long term 2021 to 2031		
Terminal expansion fitout		3,900,000
Terminal landside plaza		500,000
GA Apron extension		6,200,000
RPT Apron expansion		8,200,000
Code C stub taxiway		1,100,000
Landside roads expansion		500,000
Balance of External Works		3,200,000
Parallel Taxiway upgrade to Code E		25,800,000
	Sub Total Phase 2	49,400,000

Exclusions:

(1) Any upgrade the ARFFS, Control Tower, or Navaids is by others

(2) Escalation of cost is excluded, all costs are current prices

(3) Code C pavement costs based on similar works at another airport in the region. The specification for Code E and Code F compliant aprons and taxiways has been deduced from CBRs issued in Aerodrome Standards documentation and needs to be verified by an engineer

(4) Loose furniture fittings and equipment

(5) Work outside the boundary of the site

(6) Infrastructure upgrade costs to meet additional demand if required

(7) GST

TABLE 7-1 CAPEX SUMMARY