

Darwin International Airport



***Final Master Plan
2004 – 2024***





Darwin International Airport

Final Master Plan 2004 – 2024

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Executive Summary

Airports Act 1996

The *Airports Act 1996* and its associated Regulations set out the requirements for the regulation of airports leased under the Act. Issues of master planning are contained within Division 3 of Part 5 of the Act which states there is to be a Final Master Plan for each airport.

A Final Master Plan is a Draft Master Plan that has been approved by the Commonwealth Minister for Transport and Regional Services. A Preliminary Draft Master Plan is prepared for public comment prior to submission. The Final Master Plan is required for subsequent approval of major developments at the airport.

In the case of a joint-user airport, a Draft or Final Master Plan must specify:

- The airport-lessee company's development objectives for the airport
- The airport-lessee company's assessment of the future needs of civil aviation users of the airport, and other users of the airport, for services and facilities relating to the airport
- The airport-lessee company's proposals for land use and related development of the airport site, where proposals embrace airside, landside, surface access and land planning/zoning aspects
- Forecasts relating to noise exposure levels

- The airport-lessee company's plans—developed following consultations with airlines that use the airport, local government bodies in the vicinity of the airport and the Department of Defence—for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels
- The airport-lessee company's assessment of environmental issues that might reasonably be associated with the implementation of the plan
- The airport-lessee company's plans for dealing with the environmental issues mentioned above including plans for ameliorating or preventing environmental impacts
- If a draft environmental strategy for the airport has been approved, the date of that approval
- Such other matters (if any) as are specified in the regulations

Development Philosophy and Objectives

The development philosophy of Northern Territory Airports PL relates to the Development Objectives contained within this Final Master Plan.

Northern Territory Airports PL

The Northern Territory Airports PL role is to manage and develop Darwin International Airport according to existing and predicted demand. In particular it plans and develops for:

- Aeronautical operations
- Commercial and non-aeronautical demand
- Control of airport land
- Services and facilities

The Northern Territory Airports PL carries out all operations by the ideals of the parent Airport Development Group (ADG) which include:

Mission Statement

In the interests of all stakeholders, operate an airport business that is world class in financial and environmental performance, customer service and safety and security, and is recognised as a key contributor and participant in the economic growth of the Northern Territory.



Airport Vision

Northern Territory Airports PL has a Vision for Darwin International Airport which encompasses:

- The maintenance of the Airport as an important and dynamic contributor to the economic development of the Territory
- The development of the Airport into a customer-focussed facility about which all Territorians can be proud and which all visitors will consider to be a positive element of their overall travel experience
- A highly cooperative relationship with all levels of government and other Territory stakeholders
- Aeronautical and non-aeronautical development at the Airport which meets the commercial objectives of the airport owner and makes a significant contribution to the economy
- A reliable and mutually beneficial working relationship with operational stakeholders

Goal of the Master Plan

Consistent with the Mission, Vision and Values, the Goal of the Master Plan is to support the growth of long-term value for the Northern Territory Airports PL and other Airport stakeholders, including the Territory. A key factor in being able to achieve this Goal relates to successful long-term planning of airport assets. The Master Plan will achieve this by:

- Planning for new capacity to facilitate future growth at Darwin International Airport
- Providing new growth opportunities and maximising the use of existing assets within Darwin International Airport
- Engaging with and seeking feedback and input from a range of stakeholders, to ensure an equitable balance is achieved between the economic benefits of growth, and the social and environmental impacts of growth

Purpose of the Master Plan

The purpose of this Master Plan is to:

- **Fulfil statutory obligations** under the Airports Act 1996 (Part 5 Division 3) by meeting all legislative requirements, thereby enabling approval of the Final Master Plan by the Minister:
- **Outline a plan** for the provision of future facilities and services to achieve optimum airport use
- Propose a **development philosophy** that is compatible with Territory and local planning objectives, thereby ensuring a harmonious interface between the airport's operations and its adjacent communities
- Incorporate **planning considerations and management guidelines** to ensure the airport is developed in a socially and environmentally responsible manner, recognising regional planning requirements and the goals of Local, Territory and Commonwealth Government agencies

- Identify **opportunities for development** of aviation and commercial businesses
- Provide adequately and economically for **future aviation traffic**, passenger flows, surface traffic and various commercial functions throughout the life of the airport site within acceptable social, economic and environmental constraints
- Guide the **responsible development of existing and proposed airport** land uses and facilities
- Incorporate issues raised through **consultation with stakeholders** from both the public and private sectors who may be impacted by ongoing airport development
- Reach understanding between Northern Territory Airports PL, our business/operational partners, and other stakeholders on a **20-year strategic outlook** for the future development of Darwin International Airport based on sustainable outcomes
- Create **long-term planning clarity** in relation to land use, infrastructure development and operational matters

Development Objectives

The *Airports Act 1996* specifically notes that the Final Master Plan should contain the airport-lessee company's development objectives for civil use of the airport.

The following Development Objectives for Darwin International Airport have been set for the preparation of this Master Plan:

- **Safety and Security:** Northern Territory Airports PL will provide the highest practical standards for safety and security including providing infrastructure to ensure aircraft safety and airport security and cooperating with responsible public safety authorities who provide these services:
- **Quality of Service:** Northern Territory Airports PL will respond positively to increasing customer and stakeholder expectations of service, commensurate with its obligation to its shareholders
- **Capacity and Operating Efficiency:** Northern Territory Airports PL will provide adequate capacity—balanced among all airport systems—and promote ongoing performance, high service standards, operating efficiency and expansion capacity
- **Traffic Growth:** Northern Territory Airports PL will aggressively market its airports and the Territory to airline interests to increase passenger, cargo and aircraft throughput and bring wealth to the Territory
- **Environmental Compatibility:** Northern Territory Airports PL will recognise issues of ecological significance and adopt principles of environmental sustainability—Northern Territory Airports PL has considered existing environmental concerns and has adopted its planning to avoid or minimise adverse impacts

- **Financial Viability:** Northern Territory Airports PL will manage its assets to optimise the return to the shareholder—to ensure financial viability of the airport, the planning effort will consider issues of revenue enhancement, justification of capital investment and optimisation of operating costs

Response

This Preliminary Draft Master Plan has been prepared by the Northern Territory Airports PL with the assistance of various external consultants, including

- **BAA plc** for traffic forecasts which are required to both predict long-term demand and provide input into the development of noise forecasts
- **ACIL Tasman** for a review of the airport's economic significance and its impact on both the region and the Territory
- **Woodhead International** for both the development of terminal design—required to ensure optimal landside and airside development—and land-use planning/zoning on the airport
- **Rehbein AOS Airport Consulting** for the production of Obstacle Limitation Surfaces (OLS) and Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS) charts which are required for the accurate examination of the airports impact on the three-dimensional environment, also for the production of a Navaid drawing
- **Airplan** for an analysis of runway taxiway use to ensure long term efficiency
- **Sinclair Knight Merz** for noise analysis, in particular the production of ANEF and N70 drawings to allow examination of the impact of noise on the surrounding area
- **Department of Defence** for all forecasting of military activity including traffic volumes and flight tracks, for noise analysis
- **Bellette Design** for publication design and production

This Draft Master Plan describes the facilities and services required to support increasing airport activities during the Planning Period until the year 2024 and also beyond. It also sets out the potential for airport commercial development. It is a reflection on the impact of changes in the aviation industry over the last five years, but also follows the broad strategic direction of its predecessor. It considers airport development in greater detail with the benefit of six years operations by Northern Territory Airports PL. This Final Master Plan brings together a variety of concepts for improvements.

Existing Airport

Darwin International Airport lies along the northern boundary of RAAF Base Darwin.

There is a main runway with a direction of 11/29 which is 3,354 metres long by 60 metres wide. It is capable of serving all forms of civilian aircraft up to



and including Code E, for example the Boeing 777. Runway usage is dependent on the season, with runway 11 used primarily in the dry season and runway 29 used primarily in the wet season.

The secondary runway has a direction of 18/36. It is 1,524 metres long by 30 metres wide and, because of pavement strength issues, restricted to aircraft up to De Havilland Dash 8 in size. Runway 36 used primarily for landing and runway 18 primarily for take-off.

The passenger terminal apron accommodates international, domestic and regional aircraft as well as heavy-duty helicopter movements.

Light fixed-wing general aviation aircraft operate from an apron complex to the north-west of the terminal apron. Other helicopters are located east of the passenger terminal apron, as are small scale airline freight facilities.

Air Traffic Control services are provided by the Royal Australian Air Force continuously, 24 hours per day.

Darwin International Airport is currently the Northern Territory's sole international airport.

Runway System

Darwin Airport has the following runways:

see **Diagram 6.1** Runways and Taxiways

Main Runway 11/29

The main runway 11/29 is 3,354 metres long by 60 metres wide. It is of flexible construction and grooved for the central 45 metre portion. Under the Joint-User Deed, the Department of Defence is responsible for maintaining all runways under a cost-sharing agreement, with Darwin International Airport PL.

Crosswind Runway 18/36

The crosswind runway is 1,524 metres long by 30 metres wide.

Forecasts

Darwin International Airport serves international, domestic and regional passengers. There is also a vibrant general aviation and commuter population based at the airport.

International passengers are predicted to more than triple in numbers over the planning period, from 207,000 passengers per annum in 2004 to 730,000 passengers per annum in 2024. These passenger figures include:

- Origin / Destination
- Transit
- Domestic on Carriage

Although this growth is welcome, the 2024 throughput represents a considerable shortfall on previous forecasts. International aircraft movements will increase from 4,340 movements in 2004 to 7,800 movements in 2024.

Domestic passengers are predicted to more than double in numbers over the planning period, from 890,000 passengers per annum in 2004 to 1,820,000 passengers per annum in 2024. Compared to this growth, domestic aircraft movements will increase from 13,100 movements in 2004 to 18,200 movements in 2024. Larger aircraft and better aircraft utilisation lead to this smaller growth rate.

General aviation aircraft have a volatile growth pattern but are expected to rise from 40,000 movements per annum in 2004 to 50,000 movements per annum in 2024.

Economic Significance

Through the activities of directly-related businesses and their interactions with the wider economy, the airport is estimated to account for approximately one percent of the Northern Territory economy. The heavy tourism industry reliance on the airport is reflected in an additional two percent of economic activity associated with air-related travel.

The significance of the airport to the Territory is more than just economic. It forms a critical means of connecting communities in remote areas and provides a conduit for medical assistance. It provides a base upon which to build Darwin's position as a regional transport and freight hub, and makes Darwin an attractive place to do business.

As Darwin seeks to build upon its national and international position the airport will take on increased significance as a key part of the Territory's infrastructure, and initiatives to increase air activity and tourism visitation will further increase the vibrancy and improve the development of the Northern Territory economy.

The following table sets out summary quantitative findings in relation to estimated current and projected Darwin International Airport impacts on the local economy:

Annual airport-related business impacts

	Total 2002/03	Total 2023/24
Output (\$m)	157.1	349.9
Income (\$m)	40.9	90.9
Employment (jobs)	948	2,115
Value-added (\$m)	87.5	194.2

Source: Survey of businesses by Northern Territory Airports PL; analysis by ACIL Tasman. Note: All financial estimates throughout this report include GST, excepting output and value-added calculations

Runways and Taxiways

The existing runway system at Darwin International Airport is the responsibility of the Department of Defence. The main runway 11/29 is adequate for all predicted demands for aircraft access to the airport. Previous studies indicated some benefit in shifting the secondary runway 18/36 northwards to allow the construction of a 240m Runway End Safety Area. However a review of this runway's profile indicates this would involve considerable cost and may, in fact, not be practical. The decision to do this is a matter for the Department of Defence.

A review of taxiway use has led to a recommendation to construct a new parallel taxiway, north of the main runway.

see **Diagram 6.2** Proposed Taxiway Construction

Airspace Protection

The objective of prescribing airspace for protection is to ensure that the areas used, or proposed to be used, by aircraft arriving at or departing from an airport are not adversely affected by buildings, structures or other activities. New structures should be designed, or other activities controlled, to ensure they do not intrude into the present or future prescribed airspace. Part 12 of the Act provides for the protection of airspace now and in the future *...in the interests of the safety, efficiency or regularity of air transport operations.*

Obstacle control drawings have been prepared for the existing and future layouts of Darwin International Airport.

see **Diagram 7.1.1 – 7.4** Obstacle Control Drawings



Passenger Terminal Zone

Terminal Building

The existing Darwin International Airport passenger terminal caters for international, domestic and regional passengers within the single two-storey building. Aerobridges, leading from the first floor, serve Bays 2, 3 and 4. Bay 2 can accept B747 aircraft, whilst Bays 3 and 4 can handle aircraft up to Boeing 767 in size.

The proposals for expansion are based on the infill and extension of the first storey over the entire ground level to provide greater passenger areas. This work also includes current plans to develop a 'swing gate' serving both international and domestic passengers alternately.

see **Diagram 8.2** First Staging Plan

Passenger Aircraft Parking

Current international stand demand reflects the large number of relatively short haul operations to Dili. Whilst these will remain and grow, other long-haul services will be introduced requiring greater provision of larger parking bays. Both now and in the future, at least one international long-stay parking bay will be required for aircraft remaining on the ground for over 24 hours.

The parking of domestic aircraft will increasingly be dominated by the requirements of B737-800 and A320 aircraft. A more dominant issue may be the need to assign bays to particular airlines.

Two apron layouts are under consideration:

see **Diagram 8.3** Aircraft Parking Option 1

see **Diagram 8.4** Aircraft Parking Option 2

Both require additional apron construction. Layout designs include for the provision of an upgraded taxiway access.

Surface Access

Existing External Access Road System

Darwin International Airport is well located for regional and district road access and has good links to the CBD. Its primary accesses are as follows:

- The main airport entry is through the junction of McMillans Road and Henry Wrigley Drive which is not part of the airport and is a responsibility of the Northern Territory Government. Henry Wrigley Drive crosses the Rapid Creek Bridge and enters the airport.
- A secondary entry into the airport is via the junction of McMillans Road and Charles Eaton Drive. This junction is also the responsibility of the Northern Territory Government. Charles Eaton Drive allows access into the General Aviation area without conflicting with scheduled passenger traffic.

Future External Access Road System

Upon assuming responsibility for Darwin International Airport, Northern Territory Airports PL commissioned a Traffic Impact Assessment Study in 1999. This has been the subject of continuous consultation with Darwin City Council and the Northern Territory Government. Arising out of these consultations, Northern Territory Airports PL has agreed to ensure that junction improvements are made over time as necessary.

Also, the details of two new additional airport access junctions have been developed which have the agreement of all concerned. These are:

- A signalled access at the present junction of Bagot Road and Totem Road
- A new junction from McMillans Road into the proposed commercial development area

The latter junction will connect into a new access road between Charles Eaton Drive and the proposed Bagot and Totem Roads junction.

Internal Road System

The internal road system is expected to have sufficient capacity to serve over the planning period.

Commercial Land Development

Darwin International Airport incorporates 87 hectares of undeveloped airport property, which is high-value land adjacent to that required for aviation-related and ancillary support uses. The airport is well situated as the gateway to both the City of Darwin and the Northern Territory, which in turn is well situated geographically, politically and economically for dynamic opportunities in the Asia Pacific region.

see **Diagram 12.1** Land Use Plan

The 87 hectares of undeveloped land has been divided into four broad land uses, which are:

- Business Park
- Service Industry
- Airport Business
- Tourist

Business Park

The business park land use area will facilitate commercial and business development which would benefit from a location close to the airport and central to Darwin's northern suburbs.

Service Industry

The service industry land use area will encourage and facilitate service and light industry which requires a location close to the airport.

Airport Business

The airport business land use area will encourage the development of a range of commercial/business enterprise uses which would benefit from a location in close proximity to the airport and its terminal area.

Tourist

The tourist land use area will encourage the establishment of a viable tourist/visitor development which would benefit from a location in immediate proximity to the airport and its terminal area.

Airport Development Precincts

To assist and encourage progressive and strong growth of the undeveloped land, it has been further broken up into three development precincts. These are:

- The **Bagot Road/Totem Road Development Precinct** which includes a land area of approximately 35 hectares and borders Bagot and McMillan Roads. This precinct can be developed in isolation and will target commercial business, warehouse and show-room style accommodation and retail uses.
- The **McMillan's/Charles Eaton Drive Precinct** which includes an area of approximately 21 hectares and will be developed to incorporate restaurants, medical suites and childcare facilities as well as retail and other commercial business uses.



- The **Airport Terminal Precinct** which includes an area of approximately 44 hectares and will be developed to include the hotel/resort development, a high-technology park and terminal and business parking.

Airport Noise Forecasts

The Joint User Deed that Northern Territory Airports PL has requires that the Department of Defence should produce noise forecasts for Darwin International Airport. In this Master Plan, as with the previous one, Defence was not inclined to do so.

see **Diagram 13.2** 2024 ANEF

see **Diagram 13.3** 2024 N70

Environment

The Act requires that besides the Master Plan a separate Airport Environmental Strategy also be produced. In parallel, the Master Plan must identify those aspects of future development that may have an impact on the environment, and note actions that need to be taken to ameliorate the effect of development on the environment.

The following environmental issues and constraints have been identified for the proposed development precincts.

Bagot Road Precinct

The Ludmilla Catchment in which the Bagot Road Precinct falls was identified as a Significant Site in the 1999 Airport Environment Strategy. The previous Airport Environment Strategy also identified an area of vegetation that should be retained as parkland. Surveys conducted by ecologists in 2003 and verified by leading scientists in the areas of habitat fragmentation have found that the maintenance of such a small park as habitat is not viable. It is recommended in the Airport Environment Strategy that a larger and more diverse area should be set aside as an environmental reserve with linkages to Rapid Creek (see Rapid Creek Precinct).

Strategies integrating commercial development with appropriate landscaping guidelines will need to be employed. A vegetation-management strategy and erosion and sediment plan may be developed prior to any clearing of vegetation in this area.

Two animal species which are listed on the Northern Territory threatened species list are present in the tall woodland on Bagot Road. It is proposed that nesting boxes and habitat creation be developed in the environmental reserve.

Rapid Creek Precinct

The Rapid Creek Corridor was identified as a Significant Site in the 1999 Airport Environment Strategy. However, no major development has been identified within the 75 metre buffer area. This precinct also includes the new proposed environment reserve involving land management (weeds, fire etc) in its initial stages. It is proposed that a sediment retention basin be built on the corner of Collopy Road and Charles Eaton Drive to mitigate the effects of erosion and sedimentation on Rapid Creek. A species of conservation significance (Pittosporum plant) is also present in the vegetation to the north-west of the precinct.

Airport Precinct

The main environmental constraint in this precinct is the run-off storm-water into the sensitive receiving waters of Rapid Creek. Past initiatives have mitigated any hydrocarbons running off the terminal or general aviation aprons into Rapid Creek.

Ministerial Approval Process

This Final Master Plan has been approved by the Minister on behalf of the Commonwealth Government after a period of public consultation. It sets out the long-term strategy for airport development over the planning period. Approval of the Master Plan does not automatically confer approval on subsequent major developments. The Act requires that for certain developments under certain trigger conditions, a specific Major Development Plan must also have the Minister's approval before construction can commence.

The developments to which these conditions will apply include the construction or extension of a runway, terminal building, taxiway, road, rail access, or anything that may have a significant environmental or ecological impact.

The trigger conditions are that the development either significantly increases the capacity of the airport to handle movements of passengers, freight and aircraft, or the cost of the development exceeds \$10 million.

Ministerial approval process, as set out in the Act, requires that a process of public consultation and environmental impact review are undertaken prior to the Minister's approval being sought.

Element	1999 Final Master Plan	2004 Final Master Plan
Forecasts	Forecasts predict the equivalent of 1,027,000 international passengers in 2024 with an equivalent number of 8,900 international aircraft movements. Also 2,310,000 domestic passengers and almost 22,000 aircraft.	Forecasts reduced considerably, predicting growth to 730,000 international passengers in 2024 from an estimated base of 207,000 international passengers in 2004. Equivalent number of international passenger aircraft is 7,800 from a current base of 4,340. Also 1,820,000 domestic passengers from today's base of 890,000 passengers and 18,200 aircraft from a current base of 13,100 aircraft.
Economic Significance	Studies not included.	Economic studies of Darwin International Airport show it contributes approximately 1% of the Northern Territory economy with an output of \$157 million and supports 948 full-time jobs. The additional benefits flowing from associated air tourism are greater with an additional 2,066 full-time jobs and further output of \$263 million.
Runways and Taxiways	Runway 18/36 shifted north by 105 metres. Extensive system of taxiways illustrated but not discussed. OLS and PANS-OPS surfaces prepared for current and proposed layouts.	Proposal limited to construction of parallel taxiway north of Runway 11/29, following analysis of airport use and runway construction issues. OLS and PANS-OPS surfaces prepared for current and proposed layouts. Current OLS corrected to take account of runway profile.
Terminal	Significant expansion considered.	Terminal layout examined by architect and growth considered to be contained within expansion of upper floor over ground floor and infill.
Apron Parking	Recommendation made to provide 22 aircraft parking positions but not illustrated.	Aircraft parking demand reviewed and recommendation made to provide 9 international and 11 domestic aircraft parking positions (some positions may be shared). Options for "linear" or "pier" parking designed and illustrated for consultation.
Surface Access	Reference to further studies for external access. Existing internal access system considered appropriate. New road routes illustrated on land use plan.	Studies of external traffic completed and future improvements proposed to existing junctions plus two new junctions proposed into commercial development area. Existing internal access system considered appropriate for retained terminal area. New road routes illustrated on land use plan.
Commercial (non-Aeronautical) Development	Outline land use plan illustrated providing for business park, commercial and service areas. Also indication of landscaping and remnant vegetation.	1999 land use plan refined with commercial development precincts, landscaping and ecological corridor identified. Development has already progressed according to this layout, including early construction of a hotel.
Support Facilities	Provision for freight, fuel, general aviation, catering parking, new fire station and ATC facilities, and commuter facilities.	Similar provision but reflecting reduced forecast demand.
Services and Utilities	Existing facilities considered to be appropriate for current operations.	Existing facilities considered to be generally appropriate. Recognition that all new development must be subject to review of services provision.
Aircraft Noise	Required ANEF drawings produced plus other illustrative drawings.	Required ANEF drawings produced plus other illustrative drawings.
Environment	Reference and extracts from accompanying Airport Environment Strategy document referring to proposals within the Draft Master Plan.	Reference and extracts from accompanying Airport Environment Strategy document referring to proposals within the Draft Master Plan.



Comparison of 1999 Final Master Plan and 2024 Final Master Plan.

This Final Master Plan for 2024 builds on the Final Master Plan for 2019.

Variations between the two plans are made due mainly to:

- Reduced and changed air traffic demand forecasts
- Increased and increasing security and safety requirements
- Greater experience of Northern Territory Airports PL to manage airport operations.

Brief differences between the two plans are noted in the preceding table.



1. Introduction

Darwin International Airport is currently the Northern Territory's sole international airport bringing visitors into Australia via the 'Top End'. It provides for the civil needs of Darwin—the seat of Government for the Northern Territory—and serves not only visitors but is essential to the business and government communities and for links to remote areas.

Airport Development Group PL (ADG) through its subsidiaries acquired the lease to Darwin International Airport from the Commonwealth Government under the *Airports Act 1996* with a commencement date of 10 June 1998. ADG owns 100% of Northern Territory Airports PL which in turn owns 100% of Darwin International Airport PL, the holder of a fifty-year lease over the airport with options to renew for a further forty-nine years.

The Commonwealth of Australia's Department of Defence owns the runways and taxiways, except for those taxiways within the airport-leased areas. Civil aircraft operate on the runways within the terms of a Joint User Deed between Northern Territory Airports PL and the Department of Defence.

This section reviews the requirements of the *Airports Act 1996* with regard to the development of the Master Plan process. It considers the operating conditions at the time of the previous Final Master Plan and discusses the subsequent changes in world aviation conditions. Northern Territory Airports PL has responded positively in producing this Final Master Plan.

Requirement for a New Master Plan

The *Airports Act 1996* requires Master Plans to be produced for Darwin International Airport every five years as part of the overall master planning process leading to approval of the Final Master Plan by the Commonwealth Government Minister for Transport and Regional Services.

Airports Act 1996

The *Airports Act 1996* and its associated Regulations set out the requirements for the regulation of airports leased under the Act. Issues of master planning are contained within Division 3 of Part 5 of the Act which states there is to be a Final Master Plan for each airport.

A Final Master Plan is a Draft Master Plan that has been approved by the Commonwealth Minister for Transport and Regional Services. A Preliminary

1. Introduction



Draft Master Plan is prepared for public comment prior to submission after a ninety-day period of public consultation. The Final Master Plan is required for subsequent approval of major developments at the airport.

In the case of a joint-user airport, Final Master Plan must specify;

- The airport-lessee company's development objectives for civil use of the airport
- The airport-lessee company's assessment of the future needs of civil aviation users of the airport, and other civil users of the airport, for services and facilities relating to the area of the airport site leased to the company
- The airport-lessee company's proposals for land use and related development of the area of the airport site leased to the company, where the proposals embrace:
 - In all cases – landside, surface access and land planning/zoning aspects
 - If the leased area includes one or more runways or taxiways – airside aspects
- Forecasts relating to the civil use of the airport.
- The airport-lessee company's plans—developed following consultation with the airlines that use the airport, local government bodies in the vicinity of the airport and the Department of Defence—for managing aircraft noise intrusion in areas forecast to be subject to exposure above significant ANEF levels
- The airport-lessee company's assessment of environmental issues that might reasonably be expected to be associated with the implementation of the plan
- The airport-lessee company's plans for dealing with the environmental issues mentioned above including plans for ameliorating or preventing environmental impacts
- If a draft environment strategy for the airport has been approved, the date of approval
- Such other matters (if any) as are specified in the regulations. The regulations are the Airport Regulations 1997

Environmental Strategy

The *Airports Act 1996* also requires the production of an Environmental Strategy in a similar manner to the Master Plan and within a similar time-frame. A Final Environment Strategy has been prepared in association with this Master Plan and is referenced accordingly. This Final Master Plan identifies policies and strategies that have been included within the Environment Strategy as appropriate to this document.

Response

This Final Master Plan has been prepared by the Northern Territory Airports PL with the assistance of various external consultants, including:

- **BAA plc** for traffic forecasts which are required to both predict long-term demand and provide input into the development of noise forecasts
- **ACIL Tasman** for a review of the airport's economic significance and its impact on both the region and the Territory
- **Woodhead International** for both the development of terminal design—required to ensure optimal landside and airside development—and land-use planning/zoning on the airport
- **Rehbein Rehbein AOS Airport Consulting** for the production of Obstacle Limitation Surfaces (OLS) and Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS) charts which are required for the accurate examination of the airports impact on the three-dimensional environment. Also for the production of a Navaid drawing
- **Airplan** for an analysis of runway taxiway use to ensure long term efficiency
- **Sinclair Knight Merz** for noise analysis, in particular the production of ANEF and N70 drawings to allow examination of the impact of noise on the surrounding area
- **Department of Defence** for all forecasting of military activity including traffic volumes and flight tracks, for noise analysis
- **Bellette Design** for publication design and production

This Final Master Plan describes the facilities and services required to support increasing airport activities during the Planning Period until the year 2024 and also beyond. It also sets out the potential for airport commercial development. It is a reflection on the impact of changes in the aviation industry over the last five years, but also follows the broad strategic direction of its predecessor. It considers airport development in greater detail with the benefit of six years operations by Northern Territory Airports PL. This Final Master Plan brings together a variety of concepts for improvements.

This Final Master Plan has been the subject of consultation within the aviation industry. It has the endorsement of the Board of the Northern Territory Airports PL.

It describes the facilities required for airport growth within the twenty-year Planning Period. In doing so, it:

- Provides for forecasted demand by air traffic and passengers, surface transport and other airport activities, including commercial development within accepted social, environmental and economic restraints
- Guides current and future development of the aerodrome and wider airport in a responsible manner
- Sets out a development philosophy and objectives, as required by the *Airports Act 1996*, that are compatible with local and Territory planning strategies
- Identifies the airport's impact on those affected, both positively and negatively

Previous Master Plan

A Master Plan and associated Environmental Strategy were produced for Darwin International Airport in 1999. A Preliminary Draft Master Plan and Environmental Strategy were forwarded to the Minister for Transport and Regional Services in February 1999 and subsequently placed on public exhibition. Taking account of public comments, the Final Master Plan and Environmental Strategy were submitted to the Minister for Transport and Regional Services who approved both as the final document on 15 September 1999.

In 2001 the appropriateness of the initiatives outlined in the Environmental Strategy was reviewed and amendments recommended. The Minister approved Minor Variations to the Airport Environmental Strategy in January 2002.

1999 Operating Conditions

The 1999 Master Plan was developed at a time of growth and optimism within the domestic and international civil aviation industry:

- Foreign investment in Australian airlines had recently been approved—British Airways was aligned with Qantas and Ansett had been purchased by Air New Zealand—supposedly bringing greater skills and efficiencies into Australian aviation
- Ansett had entered the international market
- Nationally, since deregulation in 1989 the number of domestic and international passengers had grown year by year
- Australia was embarking on a policy of “open skies” with other countries
- The promise of Trans Tasman deregulation was bringing hopes of significant numbers of new travellers
- The forthcoming Olympic Games were hoped to bring sustained new international demand
- New national airlines were being established; Impulse was expanding from a regional carrier with the acquisition of B717 aircraft and Virgin Blue was setting up with B737 aircraft

Forecasts of demand and overall strategy were affected by this optimism.

Last Five Years

The last five years have seen significant changes to the aviation industry:

- Internationally, conflicts and terrorism have brought increasing security imposts and fear of flying, with events including the September 11 attacks of 2001 on the World Trade Centre and Pentagon, allied forces intervention in Afghanistan and the second Gulf War
- The impact of fear of the SARS virus all but halted discretionary travel

1. Introduction



- Domestically, Ansett collapsed in 2001 and Impulse Airlines was absorbed by Qantas, whilst Virgin Blue continued to prosper as a low-cost airline
- The level of alternative competition on domestic and international routes has been greatly diminished and as a consequence fares have remained high and demand was limited by capacity provided.

Consultation

In preparing the Draft Master Plan, Darwin International Airport has met with the following:

- Commonwealth Government
 - Federal Member for Solomon
 - Australian Customs Service
 - Airport Environment Officer
 - Australian Federal Police Protective Service
 - Australian Quarantine Inspection Service
 - Department of Defence
 - Department of Environment and Heritage
 - Department of Transport and Regional Services
- Northern Territory Government
 - Cabinet
 - Leader of the Opposition
 - Shadow Minister for Transport
 - Department of Building Industry Research and Development
 - Department of Infrastructure Planning and the Environment
- Territory Authorities
 - Northern Territory Chamber of Commerce and Industry
 - Northern Territory Tourism Committee
 - Rapid Creek Catchment Committee
 - Larakia Nation
 - Greening Australia NT
- Darwin City Council
- Airlines
 - Qantas
 - Virgin Blue
 - Jetstar
 - Board of Airline Representatives Australia
 - International airlines

All airport tenants and stakeholders were contacted via written questionnaire.

Additionally airport representatives undertook a comprehensive series of briefings.

The overall Master Plan was the subject of a comprehensive display at the NT Expo 2004 which attracted over 20,000 visitors.

Responsibilities

The Northern Territory Airports PL formally leased Darwin International Airport on 10 June 1998 in accordance with the *Airports Act 1996* with an initial lease period of fifty years, renewable for a further forty nine years. The Northern Territory Airports PL's main function is to manage and develop Darwin International Airport being mindful not only of future demand but also the impact of growth on the environment. To do this, the Northern Territory Airports PL sees its functions as encompassing planning and development, commercial activities, control of airport land and the provision of facilities and services.

Other organisations have statutory responsibilities for the airport:

- The **Department of Defence** provides the runways and associated taxiways for use by civil aircraft under a cost-sharing agreement as set out in a Joint-User Deed. Under this Joint-User Deed, the Department of Defence is also responsible for control of the environmental impacts which arise from the operation of the RAAF base, in particular the production of ANEF charts and the protection of airspace against the erection of obstacles that could interfere with aircraft operations. Air Traffic Services are provided by the Department of Defence.
- **Airservices Australia** is a Government Business Enterprise providing air navigational aids and services, aeronautical information services, Aviation Rescue and Fire Fighting (housed under a separate agreement in a facility provided by the Department of Defence) and Search and Rescue.
- The **Civil Aviation Safety Authority** is the aviation regulator, responsible for setting aviation safety standards, registering aircraft, licensing or certification of aerodromes, safety promotion and education, compliance auditing and oversight of Airservices Australia.
- The **Department of Transport and Regional Services** has responsibilities including the administration of government policy including the *Airports Act 1996* and the *Airports (Environment Protection Regulations) 1996* and *Air Navigation Regulations*, aviation security and investigation of aviation accidents and incidents through its agency, the Australian Transport Safety Board.



2. Background

This section describes the history of Darwin International Airport from early aerodrome provision at the Parap Police Paddock prior to relocation to the present airport site. It sets out the current scheduled airline services and briefly describes the existing aerodrome facilities and the airport location.

History

Darwin's first aerodrome was located at Parap Police Paddock which was selected in 1919 as the Australian port of entry for the England to Australia air race. Keith and Ross Smith arrived on 10 December 1919 as the first international flight. Two days later, the first flight across the continent arrived from Melbourne. This aerodrome continued to be developed along the alignment of the current Ross Smith Avenue.

The existing aerodrome site was commissioned in July 1940 by the RAAF and continued in its sole use until the end of the Second World War in 1945. During the war it came under attack by Japanese fighters, evidence of which remains in the form of bullet holes in some buildings. The, then, Department of Air made the military airfield available for civil use under the terms of a joint-user policy, which included a requirement for a civil building area to be set aside as a self-contained entity. At that time all existing civil building development was in the south west part of the aerodrome, in what is now the Department of Defence's area. It was agreed that the civil facilities could be placed here whilst civil traffic levels were low. Starting small—in part of a hangar—the civil terminal expanded, as did the apron, roads and car park serving it, creating considerable congestion.

2. Background



This congestion was recognised as early as the late 1950's and plans were prepared for a civil move north of the main runway 11/29. However, the high cost of this option led to civil facilities being planned to move to the east of runway 18/36. Runway upgrades continued throughout this time with the high-strength main runway completed in 1962 and the crosswind runway reconstructed in 1964. Contemporaneously, the eastern development started with a new combined fire station and control tower, traffic operations centre and other technical facilities placed there. A general aviation hangar area was also set out.

This situation continued until 1980 when it was concluded that civil operations should again transfer to the north-side. Following various studies, the Government confirmed this strategy in 1982 with the construction of a civil terminal starting in 1984. However, construction was halted the next year due to concern over the total cost.

The Federal Airports Corporation assumed responsibility for the civil facilities on 1 April 1989 and immediately commenced the development of civil facilities on the north-side of the airport, largely along the lines of the Department of Aviation's 1983 master plan. Under a \$55 million contract construction commenced of a domestic/international terminal, aircraft apron, taxiways, roads and car parks in January 1990. Separate helicopter and general aviation aprons and support infrastructure were also developed. Civil air services first started operations from the current terminal on 15 December 1991. Shared civil/military facilities, including a new control tower and separate fire station, were constructed on the north-side in 1998 by the Department of Defence. Following the new terminal construction, airport expansion has continued with new roads and car parks.

In 1998, Airports Development Group acquired a fifty year lease, with a further forty-nine year option on the three main Northern Territory airports. Airports Development Group owns 100% of Northern Territory Airports PL, which in turn owns 100% of Darwin International Airport PL, which has a fifty year lease with a forty nine year option on the civil airport. Darwin International Airport PL is the airport operator.

The 11 September 2001 terrorist attacks and the subsequent wars on terror, together with the collapse of Ansett on 14 September 2001 and rise of the budget carriers, drastically affected Australia's travel patterns, and subsequent airline rationalisation has seen Darwin's share of international traffic fall considerably.

Airport Lease

Darwin International Airport is leased in accordance with the *Airports Act 1996*. All aspects of the lease are administered by the Department of Transport and Regional Services. There is also in place a Joint User Deed, see below, which sets out the relationship with the Department of Defence and Northern Territory Airports PL. This document was agreed by the Federal Airports Corporation, the previous airport operator.

The overall airport area comprises:

- Civil (leased) Area comprising the International Terminal and associated apron and other areas
- Joint User Area, primarily the runways
- Military Area, primarily RAAF Base Darwin

Joint User Deed

Darwin International Airport is identified as a Joint User Airport under the *Airports Act 1996*. The airport has shared facilities since 1945.

Responsibilities between the Department of Defence and Northern Territory Airports PL are set out in the Joint User Deed.

For Department of Defence purposes, Darwin serves as a transport air head, logistics base and redeployment base for combat aircraft. Both runways lie within the Joint User Area and are under the direct control of the Department of Defence, which is responsible for their maintenance. There is a cost sharing agreement for the use of the Defence manoeuvring area (runways and taxiways) by civil aircraft.

Both parties, civil and Defence, are responsible for providing and maintaining their own facilities and services, whether these are located in their own areas or elsewhere.

The Department of Defence provides Air Traffic Control facilities which are staffed by Defence personnel.

The Joint User Deed contains, inter alia, the following provisions:

- Each party should make available information regarding planning and development in the jointly used areas
- Department of Defence is responsible for the control of environmental impacts, including the preparation of ANEF charts.

- Cooperation in the preparation of Obstacle Clearance, PANS-OPS (both civil needs) and Joint Obstacle Clearance Surfaces (Defence need). Defence is responsible for enforcing the requirements of these surfaces.
- Agreements for co-funding maintenance and capital works
- Operational and safety management

Current Services

International Services

In terms of numbers of daily movements, international traffic is dominated by flights to Dili in East Timor with up to three turnarounds per day operated by:

- Airnorth

- United Nations

Airnorth operates Embraer Brasilia aircraft. De Havilland Dash 7 aircraft are operated on behalf of the United Nations.

There are additional scheduled international services to:

- Brunei by Royal Brunei Airlines operating A319 or A320 aircraft
- Singapore by Australian Airlines operating B767-300 aircraft
- Denpasar, Bali by Garuda Indonesia Airways operating B737-400 aircraft and Qantas operating B737-400 aircraft
- Singapore by Qantas operating A 330-300 aircraft
- Airnorth operates a Kupang service for Merpati using Brasilia aircraft

see **Diagram 2.1** International Network

Domestic Services

Following the collapse of Ansett, the Qantas group (including National Jet Systems) has been the major domestic carrier and operates several services per day to:

- Sydney
- Melbourne
- Adelaide
- Perth
- Brisbane
- Alice Springs
- Cairns
- Gove
- McArthur River (NJS)

2. Background



Diagram 2.1 International Network

2. Background



Diagram 2.2 Domestic Network

2. Background

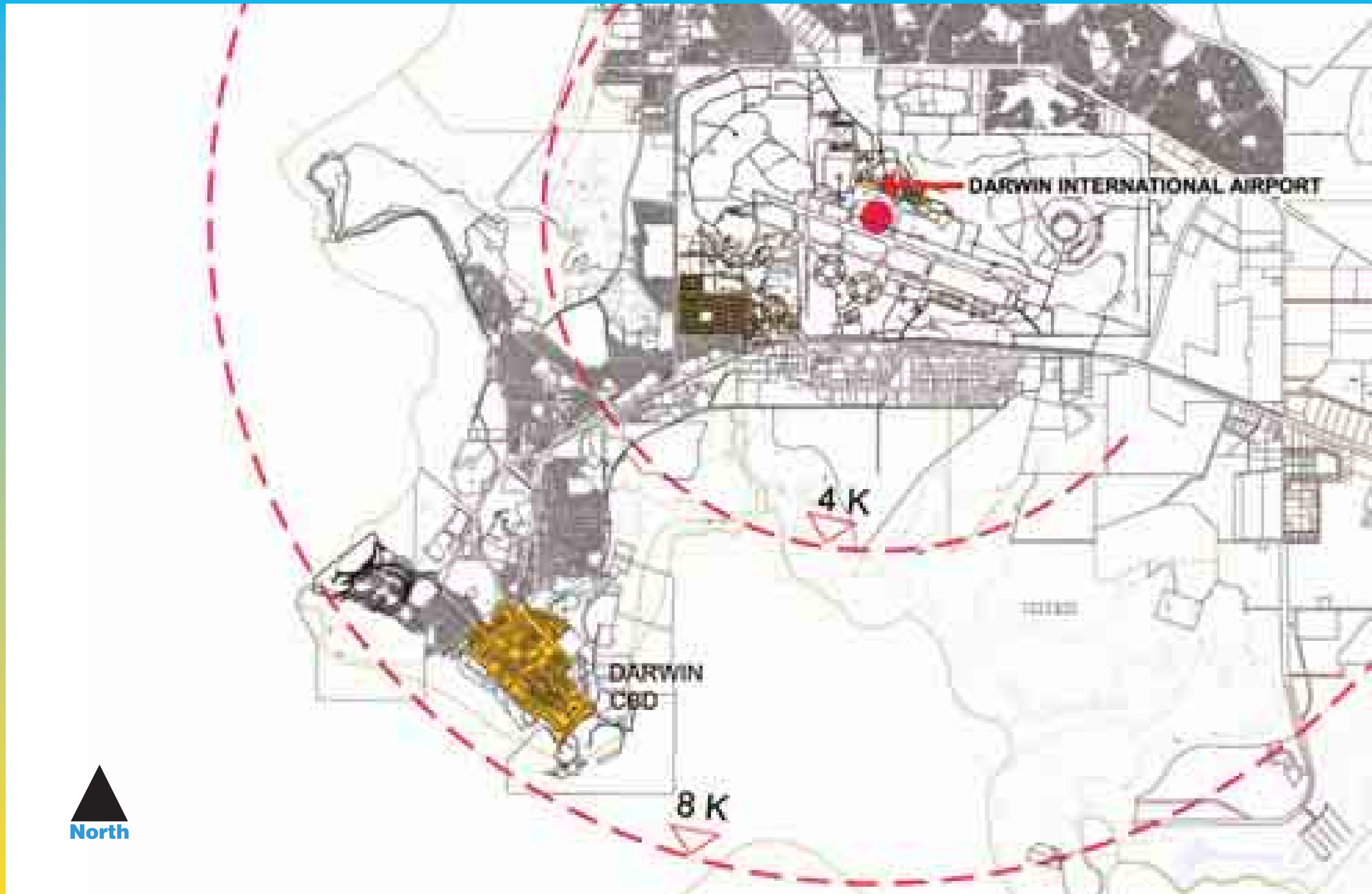


Diagram 2.3 Locality Plan

2. Background



A significant proportion of these flights operates between 11pm and 2am local time.

Skywest operates F100 services to Perth via Broome.

Virgin Blue commenced operations in 2003 and now serves Sydney, Melbourne and Brisbane.

Aircraft operated include the Boeing 767, Boeing 737 and British Aerospace 146 families F100 and the De Havilland Dash 8 aircraft.

see **Diagram 2.2** Domestic Network

Regional Services

Airnorth operates regional services to:

- Kununurra
- Gove
- Maningrida
- Broome

Airnorth operates the Metro and Embraer Brasilia aircraft on these routes.

Groote Eylandt is also served by Vincent Aviation with a Beech 1900 aircraft.

Aboriginal Air Services services Katherine with a Cessna 208 aircraft.

Northern Territory Airports' Commitment

On 15 July 2002, the Northern Territory's Minister for Tourism announced a partnership between the Territory Government and Northern Territory Airports PL, to fund the dedicated aviation specialist position of Aviation Development Director with responsibilities for promoting new services to the Northern Territory including:

- Preparation and development of an annual work plan
- Implementation of the plan
- Preparation of performance reports to the NT Government

Due to the combined efforts of the Director, the Northern Territory Government and Northern Territory Airports PL additional services by Australian Airlines, Royal Brunei Airlines, Virgin Blue and Skywest were secured, as well as charter services.

Other Users

Darwin International Airport shares facilities with the Department of Defence. Air Forces of various other countries operate from RAAF Base Darwin, mainly during Defence exercises.

Existing Airport

Darwin International Airport lies along the northern boundary of RAAF Base Darwin.

There is a main runway with a direction of 11/29 which is 3,354 metres long by 60 metres wide. It is capable of serving all forms of civilian aircraft up to and including Code E, for example the Boeing B777. Runway usage is dependent on the season, with runway 11 used primarily in the dry season and runway 29 primarily in the wet season.

The secondary runway has a direction of 18/36. It is 1,524 metres long by 30 metres wide and is capable of serving aircraft up to Boeing 737-400 in size but generally restricted to aircraft up to De Havilland Dash 8 in size. Runway 36 is used primarily for landing and runway 18 primarily for take-off.

The passenger terminal apron accommodates international, domestic and regional aircraft as well as heavy-duty helicopter movements.

Light fixed-wing general aviation aircraft operate from an apron complex to the north-west of the terminal apron. Other helicopters are located east of the passenger terminal apron, as are small scale airline freight facilities.

Air Traffic Control services are provided by the Royal Australian Air Force continuously, 24 hours per day.

Airport Location

The Northern Territory is 1,346,000 square kilometres in area, forming approximately one-sixth of the total land mass of Australia. In comparison, it has less than one percent of the Australian population, with fewer than 200,000 residents. Darwin accounts for approximately 50% of the Northern Territory residents.

Darwin International Airport is located within the city of Darwin—adjacent to the coast line—to which it has good road connections.

see **Diagram 2.3** Locality Plan



3. *Development Philosophy and Objectives*

This section sets out the development philosophy of Northern Territory Airports PL and relates it to the Development Objectives included within this Final Master Plan as required by the *Airports Act 1996*.

Northern Territory Airports PL

The Northern Territory Airports PL role is to manage and develop Darwin International Airport according to existing and predicted demand. In particular it plans and develops for:

- Aeronautical operations
- Commercial and non-aeronautical demand
- Control of airport land
- Services and facilities

The Northern Territory Airports PL carries out all operations by the ideals of the parent Airport Development Group which include:

Mission Statement

In the interests of all stakeholders, operate an airport business that is world class in financial and environmental performance, customer service and safety and security, and is recognised as a key contributor and participant in the economic growth of the Northern Territory.

3. Development Philosophy and Objectives



Vision

The Airport Development Group's vision is to be a world class airport business. That is, we aspire to the following:

- Standards of efficiency and safety that equal world's best practice
- Compliance with all operational, regulatory and environmental standards
- Customer satisfaction with facilities, commensurate with the scale of our airports
- Staff and management excellence
- Appropriate returns to shareholders on investment capital that reflect the underlying risk
- All commercial opportunities are fully investigated, and where appropriate developed and implemented

Values

We will demonstrate our values by action and we will:

- Deliver on our commitments to customers, shareholders and other stakeholders
- Act with honesty and integrity in all our dealings with employees and customers
- Demonstrate our professionalism and credibility in all areas of our operations
- Respond in a timely and appropriate manner to stakeholder needs
- Reward staff for their endeavours on a fair and equitable basis
- Accept the responsibility and accountability that goes with the challenge of delivering objectives and plans
- Respect all people with whom we work and have contact
- Excel in providing the highest-quality service and support to our stakeholders

Airport Vision

Northern Territory Airports PL has a vision for Darwin International Airport which encompasses:

- The maintenance of the airport as an important and dynamic contributor to the economic development of the Territory
- The development of the airport into a customer-focussed facility about which all Territorians can be proud and which all visitors will consider to be a positive element of their overall travel experience
- A highly cooperative relationship with all levels of government and other Territory stakeholders
- Aeronautical and non-aeronautical development at the airport that meets the commercial objectives of the airport owner and makes a significant contribution to the Territory economy
- A reliable and mutually-beneficial working relationship with operational stakeholders

Goal of the Master Plan

Consistent with the Mission, Vision and Values, the Goal of the Master Plan is to support the growth of long-term value for the Airport Development Group and other Airport stakeholders, including the Territory. A key factor in being able to achieve this Goal relates to successful long-term planning of our airport assets. The Master Plan will achieve this by:

- Planning for new capacity to facilitate future growth at Darwin International Airport
- Providing new growth opportunities and maximising the use of existing assets within Darwin International Airport
- Engaging with and seeking feedback and input from a range of stakeholders, to ensure an equitable balance is achieved between the economic benefits of growth, and the social and environmental impacts of growth

Purpose of the Master Plan

The purpose of this Master Plan is to:

- **Fulfil statutory obligations** under the *Airports Act 1996* (Part 5 Division 3) by meeting all legislative requirements, thereby enabling approval of the Master Plan by the Minister for Transport and Regional Services. Also to ensure that any obligations that have passed to the Airport Development Group (the Airport Lessee Company) or any interest in the land to which the lease is subject have been addressed
- **Outline a plan** for the provision of future facilities and services to achieve optimum airport use
- Propose a **development philosophy** that is compatible with Territory and local planning objectives, thereby ensuring a harmonious interface between the airport's operations and its adjacent communities
- Incorporate **planning considerations and management guidelines** to ensure the airport is developed in a socially and environmentally responsible manner, recognising regional planning requirements and the goals of Local, Territory and Commonwealth Government agencies
- Identify **opportunities for development** of aviation and commercial businesses
- Provide adequately and economically for **future aviation traffic**, passenger flows, surface traffic and various commercial functions throughout the life of the airport site within acceptable social, economic and environmental constraints
- Guide the **responsible development of existing and proposed airport** land uses and facilities
- Incorporate issues raised through **consultation with stakeholders** from both the public and private sectors who may be impacted upon by ongoing airport development

- Reach understanding between Northern Territory Airports PL, business/operational partners, and other stakeholders on a **20-year strategic outlook** for the future development of Darwin International Airport based on sustainable outcomes
- Create **long-term planning clarity** in relation to land use, infrastructure development and operational matters

Development Objectives

The *Airports Act 1996* specifically notes that the Master Plan should contain the airport-lessee company's Development Objectives for civil use of the airport.

The following Development Objectives for Darwin International Airport have been set for the preparation of this Master Plan:

- **Safety and Security:** Northern Territory Airports PL will provide the highest practical standards for safety and security, including providing infrastructure to ensure aircraft safety and airport security, and cooperating with responsible public safety authorities who provide these services
- **Quality of Service:** Northern Territory Airports PL will respond positively to increasing customer and stakeholder expectations of service, commensurate with its obligation to its shareholders
- **Capacity and Operating Efficiency:** Northern Territory Airports PL will provide adequate capacity—balanced among all airport systems—and promote ongoing performance, high-service standards, operating efficiency and expansion capacity
- **Traffic Growth:** Northern Territory Airports PL will aggressively market its Airports and the Territory to airline interests, to increase passenger, cargo and aircraft throughput and bring wealth to the Territory
- **Environmental Compatibility:** Northern Territory Airports PL will recognise issues of ecological significance and adopt principles of environmental sustainability—Northern Territory Airports PL has considered existing environmental concerns and has adopted its planning to avoid or minimise adverse impacts
- **Financial Viability:** Northern Territory Airports PL will manage its assets to optimise the return to the shareholder—To ensure financial viability of the airport, the planning effort will consider issues of revenue enhancement, justification of capital investment and optimisation of operating costs



4. *Traffic Forecasts*

The BAA plc Research Department was commissioned by Northern Territory Airports PL to prepare a set of forecasts for Darwin International Airport. The forecasts were to cover annual forecasts for individual years from 2003/04 to 2008/09, with five-yearly interval forecasts up to and including 2023/24, the horizon year for this master plan. In addition to developing 'most likely' forecasts which are included herein, BAA also provided 'high' and 'low' forecasts for internal business planning. Busy hour and other forecasts were also provided.

Economic Background

BAA has noted that under normal circumstances the relatively narrow portfolio of routes and services operated from Darwin International Airport means that a conventional econometric-modelling-based approach to traffic forecasting is only of borderline relevance. In the context of recent upheavals affecting both international and domestic traffic, it is even less appropriate at present.

However it is worth recording the economic and industry environment against which these latest traffic forecasts were prepared.

The sharp uptake in economic activity recorded in February and March 2002, interpreted by many to herald a reasonable recovery from the downturn of 2000/01, proved to be short-lived. The main reason for this was probably the uncertainty induced by rising concern over a, then, possible future conflict with Iraq. Additional factors have been structural problems associated with the creation of the Eurozone which have hindered German attempts to stimulate its economy, and a growing realisation that the war on terrorism has not been won by military success in Afghanistan or Iraq.

4. Traffic Forecasts



Geo Political Background

Gulf War 2

Any forecast of air traffic made at this time has to take into account the second Gulf War and its implications of ongoing instability as well as the potential for further major terrorist attacks.

Bali

The attacks in Bali on 12 October 2002 were pivotal for Australia because it brought the fear of and involvement in terrorist attacks much closer to home. It is still too early to be sure about the long-term impacts on the enthusiasm of Australians for overseas travel but in the shorter term it is expected that Australians will be more circumspect about their choice of location, with a swing away from SE Asia towards domestic and Pacific Island destinations.

Tsunami

These forecasts were prepared before the Asian Tsunami which may have a similar impact on travel as did the events in Bali

Airline Industry Background

The collapse of Ansett dramatically changed the landscape in Australia's domestic aviation industry. The impact on passengers and airports has been lessened by the ability of Qantas to upgrade its capacity (both in terms of frequency and by using the larger capacity aircraft in its fleet) and by the speed in which Virgin Blue has expanded its coverage of the trunk routes.

Unfortunately, Darwin does not have the attractiveness that east-coast ports have. This is partly a function of its remoteness and the seasonality and character of its traffic. However, Virgin Blue is now well established on the Sydney and Brisbane routes and has recently commenced operations serving Melbourne.

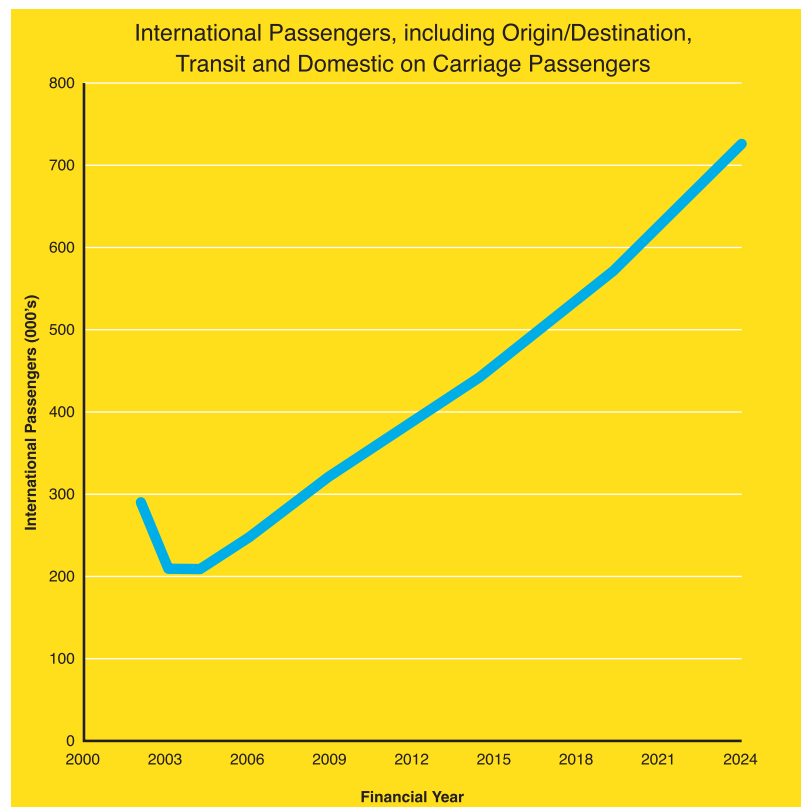
The loss of Ansett has also had more subtle effects on Northern Territory Airports PL. As a member of a major world (Star) alliance it could act as a feed and conduit for airlines such as Singapore Airlines, distributing international visitors around Australia easily and at relatively low fares. As a result some of the business which Ansett used to bring to Darwin has not switched to Qantas.

International Forecasts

In late 2002 the whole world was bracing itself for an expected invasion of Iraq and the consequent negative impacts on international security and travel. While previous BAA forecasts correctly identified that such an invasion would have a lesser impact on international travel than 9/11, and that it would have virtually no impact on domestic travel, the aviation industry was clearly unprepared for SARS and its more serious effect on Asia-Pacific traffic during 2003.

Previous losses of Singapore and Malaysia Airlines' services and the trimming of Qantas' Singapore services to three per week had already reduced Darwin's international capacity. The continuing losses on Bali services following the bombing of October 2002 and the winding down of the post-independence surge in traffic to East Timor also contributed to another poor year in 2003.

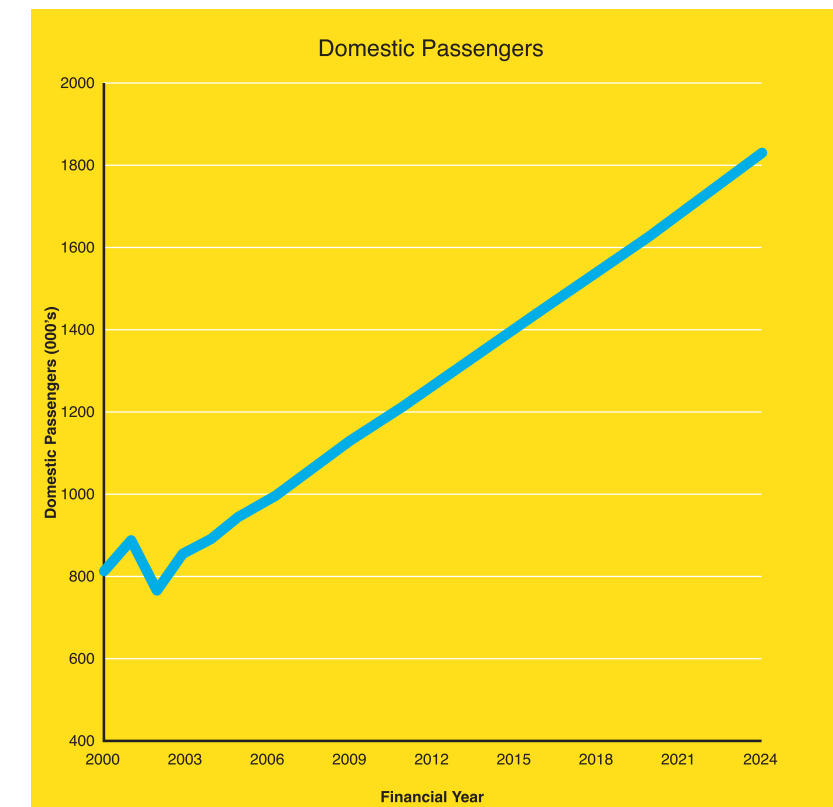
In such circumstances it would be easy to produce an overly gloomy view of the future, particularly as Darwin's share of Australian international traffic has dropped by 40% from the share it held only five years ago. However, there are grounds for modest optimism in Darwin's international traffic outlook.



Graph 4.1



Graph 4.2



Graph 4.3

4. Traffic Forecasts



These are as follows:

- It is hard to imagine a further combination of so many external shocks in the short term, and in their absence there is certain to be a technical recovery of the majority of the traffic lost through SARS and the Iraq War etc.
- Because Darwin is a relatively 'thin' destination for each of its key potential major carriers (including Qantas) it has experienced a more volatile history in terms of service provision. When airlines are in expansionary mode their additions to capacity (in percentage terms) are more pronounced on such routes. Equally, when in contracting mood, they tend to prune these routes first. It therefore follows that if 2003 marks the trough of the most recent cycle, then Darwin can expect to receive some stimulus in terms of additional international capacity. The capacity-constrained Singapore route is an obvious candidate but new or resumed services to Thailand and Malaysia must also be reasonable in prospect.
- The new Australian Airlines services to Singapore (ex Cairns) are of great potential significance to Darwin because if successful they could encourage others.
- The economic climate in Europe and Asia is also expected to improve from recent sluggish performance, while Australia's stronger dollar linked to its continued relatively bouyant economy should stimulate greater outbound demand.

It is not appropriate to use econometric models given the lack of adequate base-data available to create a matrix of passenger-types, and also the high sensitivity of traffic volumes to a few airline capacity-planner decisions. BAA has prepared these forecasts using judgement, guided by the following key assumptions:

- That over the next few years Darwin will gradually recover about 15% of its lost share of Australian international traffic
- That this recovery—or growth faster than the average—will continue over the long term but that even by the end of the 20 year period, Darwin will only have reclaimed half of the percentage share it held before 11 September 2001.

If this appears to be a cautious view, it is because Darwin's previous market share was achieved in a less-competitive aviation industry, where thinner routes could benefit to a degree from the implicit cross-subsidy support that full-service carriers would previously have been prepared to give.

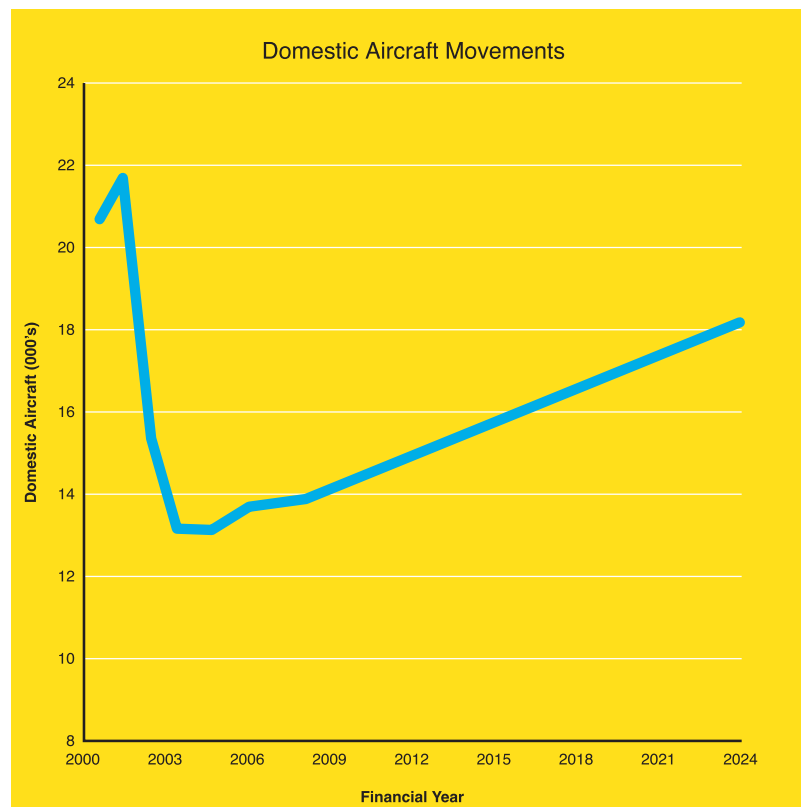
Domestic Forecasts

Darwin's domestic traffic increased by 12% for the year 2002/03, partly stimulated by new Virgin Blue capacity and partly by the need for international travellers to switch to domestic feeder services following the cutbacks in international capacity out of Darwin.

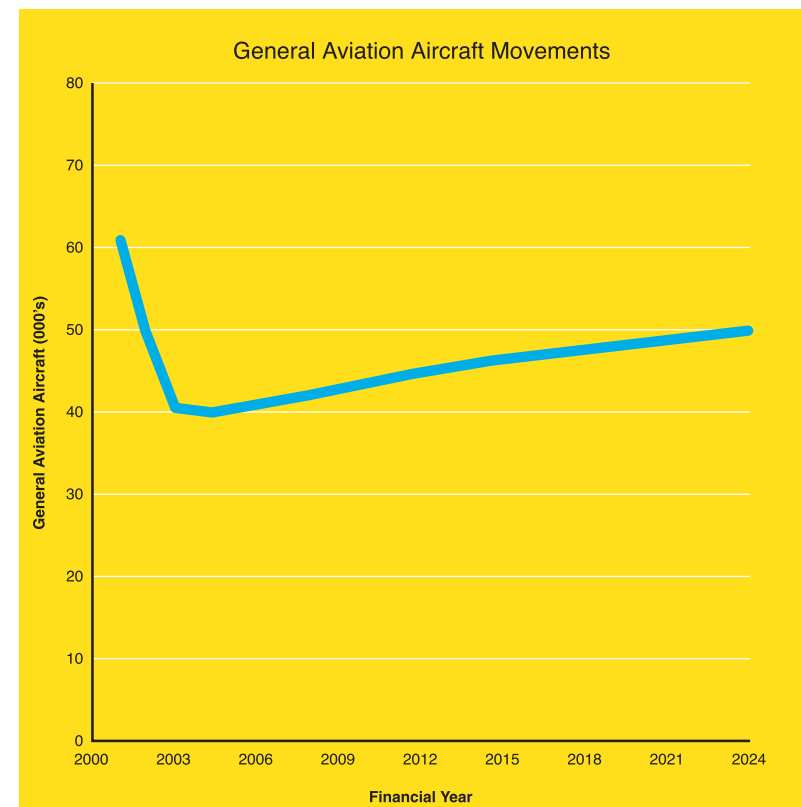
Further, publicised increases in capacity of Darwin during 2004 such as the new Melbourne service of Virgin Blue, have been factored in, adjusting for dilution effects on existing services as well as the assumed continued vigorous growth in the Australian economy.

The key assumptions for domestic forecasts are: a reasonably strong Australian economy, a progressive (but not electric) stepping up of Virgin's market share on the thicker domestic routes leading to slow growth or losses on competing Qantas services, and modest growth in cross-country Airlink traffic.

In terms of movements, the recent cutbacks in frequency have been more severe than the drop in passenger numbers. These forecasts reflect the assumption that since most of the growth in passengers will be on routes served by new Virgin Blue services, the effect will be to increase average passenger loads. This has the result that movements are projected to grow more slowly than passengers, but that a higher proportion of them will be of larger types.

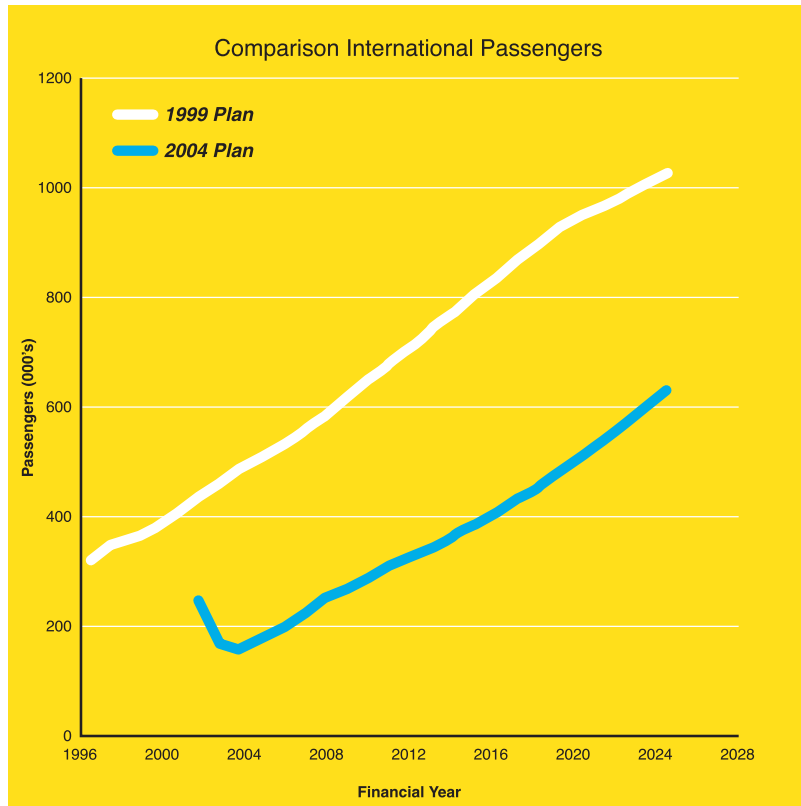


Graph 4.4

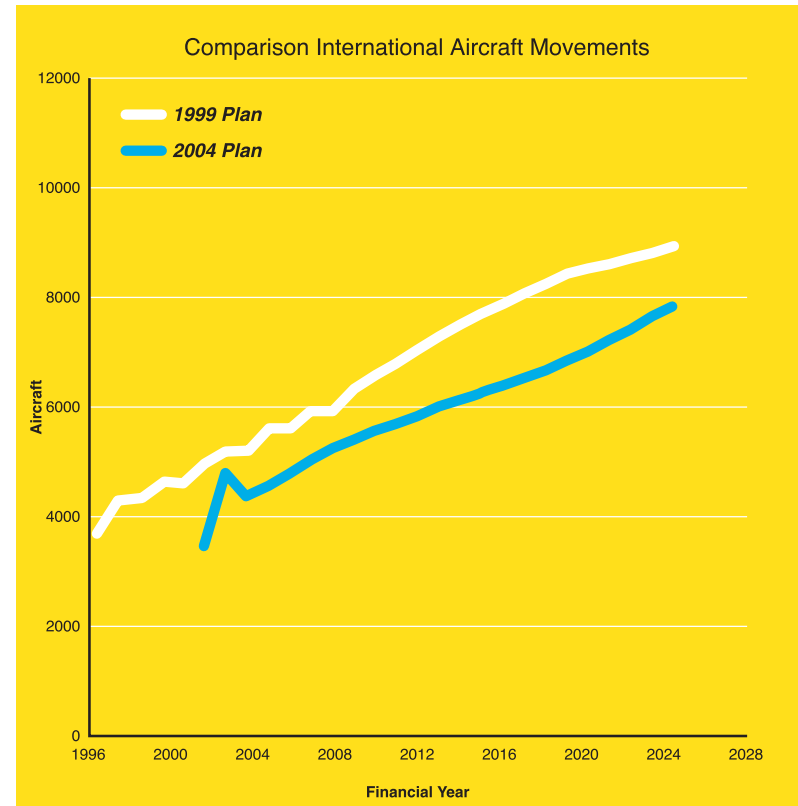


Graph 4.5

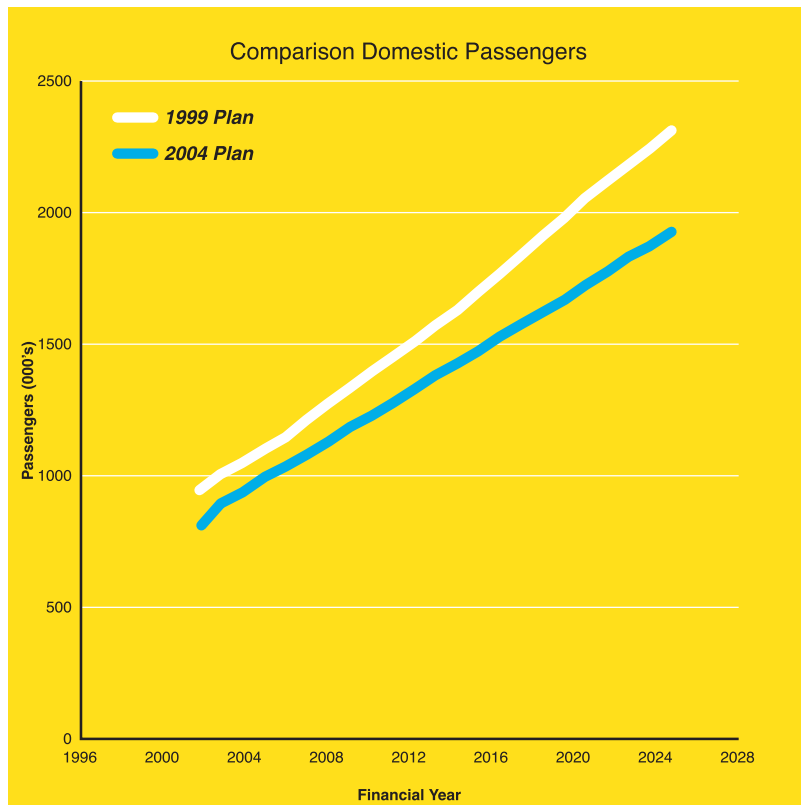
4. Traffic Forecasts



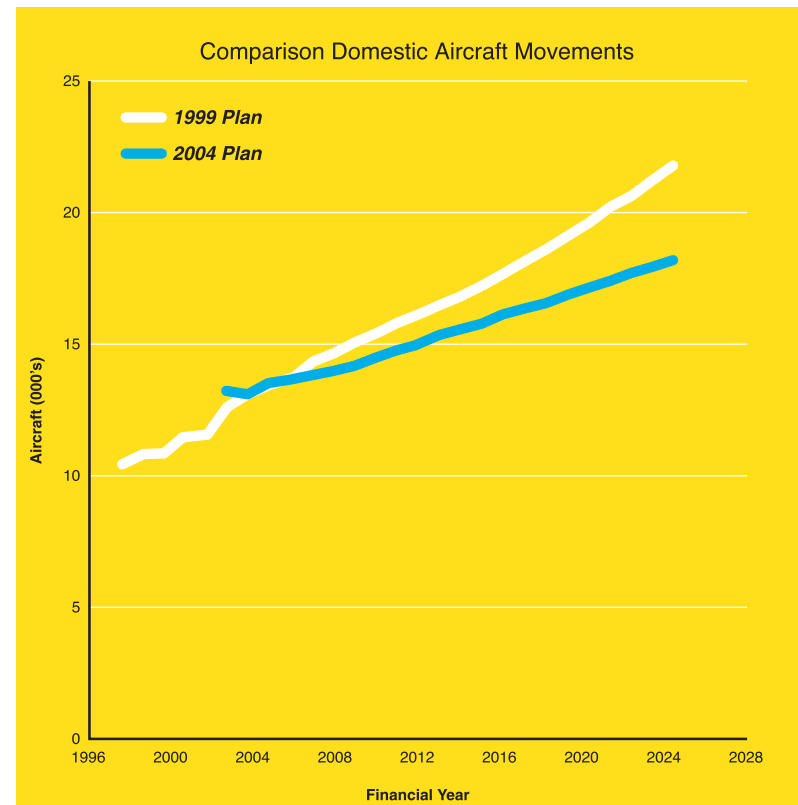
Graph 4.6



Graph 4.7



Graph 4.8



Graph 4.9

General Aviation Forecasts

General aviation movements slumped over 2001/02/03 and are not expected to recover over the planning period. They will grow from the current level of approximately 40,000 movements per annum to 50,000 movements per annum.

Comparison with Previous Forecasts

The revised forecasts will have a significant effect on the proposals contained within this master plan. A brief comparison of the current view of the future with the forecast in the previous master plan is relevant.

International Passengers

Carrying the longer term view of the previous forecasts forward to 2024 indicates that an international passenger throughput of just over one million passengers was envisaged. However it is now thought that international passengers will be 730,000. Actual growth rates appear similar but with current predictions springing from a much lower base.

International Aircraft

Growth of international aircraft numbers as seen today is similar to that of the previous master plan and reflects the current thoughts of smaller gauge aircraft serving the international passenger.

Domestic Passengers

There is little difference between the two forecasts of domestic passenger growth, with the later forecast indicating 1,820,000 passengers by 2024.

Domestic Aircraft

Similarly, both plans forecast the annual demand of domestic aircraft to be in the region of approximately 20,000 in the longer term.



5. Economic Significance of the Airport

The consultant ACIL Tasman was commissioned to undertake a study of the economic impact of Darwin International Airport on the Territory and regional economies. The study covers the economic impact of the Darwin International Airport based upon the direct, indirect and induced activities that occur at these facilities.

Economic Impact

The following table sets out summary quantitative findings in relation to estimated current and projected Darwin International Airport impacts on the local economy :

Annual airport-related business impacts		
	Total 2002/03	Total 2023/24
Output (\$m)	157.1	349.9
Income (\$m)	40.9	90.9
Employment (jobs)	948	2,115
Value-added (\$m)	87.5	194.2

Source: Survey of businesses by NT Airports; analysis by ACIL Tasman.

Note: All financial estimates throughout this report include GST, excepting output and value-added calculations

Airport Businesses

Many businesses owe at least some of their activity to the Airport. These include providers of airport infrastructure (the largest being Northern Territory Airports PL itself); aviation support services, which include operators who provide airlines with catering as well as businesses engaged in aircraft

5. Economic Significance of the Airport



maintenance and fuel providers; retailing, of which the biggest component is land transport and which also includes cafe, gift-shop and foreign exchange franchises within the terminal; and off-airport activities, such as bus and coach services and city booking offices.

The airlines and aircraft operators drive demand for these services. The major scheduled airlines, Qantas and Virgin Blue, account for most of the 877,000 domestic passengers who made use of the airport in the most recent year for which data are available. The corresponding 209,000 international travellers were largely accounted for by Garuda Indonesia, Qantas and Royal Brunei passengers.

Airnorth, which operates services to many locations in northern Australia and to Dili, also has a major presence. Charter services as well as regular passenger transport are also provided by Northern Air Charter, Air Frontier, Anindilyakwa Air, Pearl Aviation and Pel-Air, among others. Finally, airfreight and courier companies (such as Patrick Cargo, Pel-Air and TNT) have major operations from Darwin.

Airport Output, Income, Employment and Value Added

Input-output multipliers for the Northern Territory were applied to business activity data collected in the above-mentioned survey and from information provided by Northern Territory Airports PL. Four types of input-output multiplier were used: output, income, employment and value added. Direct and flow-on effects were thus estimated. Estimates throughout may be regarded as conservative, as individual company expenditures or revenues which could not reliably be estimated were omitted, resulting in underestimates of total airport impacts.

The total impact of the airport's operation was found to be substantial. The airport currently supports, directly and indirectly, nearly 1,000 jobs.

Associated annual output (revenue) impact on the Northern Territory's economy was estimated at \$157 million, with corresponding value added (contribution to GDP) by the airport totalling \$88 million. Almost half of the value added (\$41 million) is estimated to relate to employee wages and other income.

To put these figures in some context, both the amount of the value added and the employment generated were equivalent to around one per cent of the figures for the Northern Territory as a whole. It is clear that in its present configuration, Darwin International Airport is a highly significant economic entity within the Northern Territory.

Airport and Tourism

In addition to business activity associated directly with the airport, there is also activity generated by the visitors to the region who arrive by air. The Northern Territory Tourist Commission estimated in 2002/03 that 215,000 travellers arrived into the Darwin region by air, spending an estimated \$244 million.

This expenditure translates into a \$303 million increase in output, leading to \$187 million in value added and 2,321 jobs. Allowing for the fact that some of these benefits have already been captured in the airport's economic impacts described above, tourism is estimated in net terms to create an additional \$167 million in value added and 2,066 jobs in the Territory.

Additional Tourists and Flights

The outcomes of attracting more tourists via air travel—on the basis of tourist spending alone—were estimated. It was found each additional visitor adds \$869 of value to the local economy. Furthermore, the direct and indirect effects of an additional 90 visitors has the effect of creating another job in the Territory.

The combined economic effects can be used to estimate the likely impact of additional flights into Darwin International Airport. Two examples were used: an additional weekly domestic flight of a Boeing B737-800 and an additional weekly international flight of a Boeing 767-300.

The following table summarises the incremental economic effects, in terms of the value added and employment, of between one to ten additional flights per week of each of these types of aircraft.

Economic effects of additional flights to Darwin				
No. of extra weekly flights	Effects of a Boeing B737-800		Effects of a Boeing B767-300	
	Value added (\$m)	Employment	Value added (\$m)	Employment
1	6.19	76	7.24	89
2	12.39	152	14.47	178
3	18.58	228	27.71	266
5	30.97	380	36.18	444
10	61.95	760	72.35	888

Other Economic and Social Impacts

Airport activity affects social and other elements not apparent in accounts and the flow of payments. Such impacts were identified during consultations

with a diverse range of stakeholders, including the Department of Defence, providers of aerial medical services, representatives of the tourism, freight and construction sectors, and community representatives.

Important effects identified included:

- Amongst Australian airports, Darwin has the eleventh-highest number of small and medium aircraft movements, with general aviation and club facilities providing apron parking for over 100 aircraft.
- The Northern Territory's main medical services are located in Darwin, and most residents on remote communities requiring such services travel by air. A total of 875 aerial medical flights (originating from Darwin) were recorded for Darwin International Airport in 2002.
- Darwin International Airport is an important source of work for the construction sector. Substantial projects have become more common in recent years as Northern Territory Airports PL has developed previously unused airport property.
- Darwin International Airport is a strategic defence asset of the highest priority. Over 6,400 military flight movements last year constituted the second highest number recorded by Airservices Australia for defence-utilised airports.
- Darwin International Airport plays a vital role in sustaining remote communities in Australia's northern regions.

Darwin Airport in the Future

BAA, the world's largest airport operator and a shareholder of Northern Territory Airports PL, prepared 20-year passenger and aircraft movement forecasts for the Airport. These estimates of the number of international passengers, international aircraft movements, domestic passengers, domestic aircraft movements, general aviation movements and freight tonnage were used to scale up current levels of business activity to identify possible activity levels in 2023/24.

Individual judgements were made regarding factors most strongly influencing the revenue of each business. The scaled-up revenues were then combined with the input-output table to estimate the economic activity likely to be generated by the airport in the year 2023/24.

On this basis, it is expected that the airport could support over 2,000 jobs in 2023. Associated annual output (revenue) is estimated to be \$350 million, with corresponding value added (contribution to GDP) to the order of \$194 million per year. Approximately half of the value added (\$91 million) is estimated to relate to employee wages and other income.

For each impact indicator—'most likely', 'low' and 'high' estimates were derived, revealing significant variation between 'low' and 'high' outcomes.

5. Economic Significance of the Airport



Taking the example of jobs, there could be a difference of as much as 650 jobs depending on how airport activity develops over the next 20 years. To the extent that activity is encouraged towards the 'high' scenario, there are clearly significant potential gains to the Northern Territory economy.

The effects of visitor expenditure in 2023/24 were also estimated. It was estimated that a total of 5,000 jobs and \$400 million of value added could result from visitors arriving by air (under the 'most likely' scenario).

Conclusion

This report provides an indication of the extent to which Darwin International Airport contributes to the Northern Territory economy. Through a comprehensive survey and consultation process, and by developing an updated input-output table for the Territory, ACIL Tasman has been able to describe the impacts of the airport directly and indirectly upon on the Northern Territory economy, both in terms of employment and value added.

Through the activities of directly-related businesses and their interactions with the wider economy, the airport is estimated to account for approximately one percent of the Northern Territory economy. The heavy tourism industry reliance on the airport is reflected in an additional two percent of economic activity associated with air-related travel.

The significance of the airport to the Territory is more than just economic. It forms a critical means of connecting communities in remote areas, a conduit for medical assistance. It provides a base upon which to build Darwin's position as a regional transport and freight hub, and makes Darwin an attractive place to do business.

As Darwin seeks to build upon its national and international position, the airport will take on increased significance as a key part of the Territory's infrastructure. Initiatives to increase air activity and tourism visitation will further increase the vibrancy and improve the development of the Northern Territory economy.



6. *Runways and Taxiways*

The Darwin International Airport runway system is located within the Joint-User Area which, in accordance with the Joint-User Deed, is managed by the Department of Defence. Civil aircraft access the system by means of taxiways leading from the civil area, and do this in accordance with the Joint-User Deed. Civil aircraft form approximately 85%, in numerical terms, of all airport activity.

The consultant Airplan has provided advice for this section regarding taxiway use. Aerodrome Operations Support reviewed previous proposals to shift runway 18/36.

Operational Planning Standards

Civil aerodrome planning for Darwin International Airport, as with all Australian airports, follows accepted International Civil Aviation Organisation methodology of using a code system, known as the Aerodrome Reference Code. This Code is composed of two elements:

- Element 1, the Code Number, is a number related to the aeroplane reference field length
- Element 2, the Code Letter, is a letter related to aeroplane wing span and outer main gear wheel span

Code Number

The Code Number indicates the runway type, in particular the length of the runway involved. There are four options:

Code Number 1	Code Number 2	Code Number 3	Code Number 4
< 800 metres	800m – 1200m	1200m – 1800m	> 1800m

Runway 11/29 has the Code Number 4 and runway 18/36 has the Code Number 3.

6. Runways and Taxiways



Code Letter

The planning of terminal aprons and taxiways is largely based on Element 2, the Code Letter. Each Code Letter represents specific sized aircraft whose dimensions are:

Code Letter	A	B	C	D	E	F
Typical Aircraft	Cessna 172 Partenavia	DHC 6 Metro	Boeing 717 Boeing 737	Airbus 300 Boeing 767	Boeing 747 Boeing 777	
Wingspan	<15 metres	15 – 24 m.	24 – 36 m	36 – 52 m	52 – 65 m	65 – 80 m

Runway 11/29 has the Code Letter F and runway 18/36 has the Code Letter C.

Runways and Taxiways Strategy

Existing Runways

Darwin Airport has the following runways:

- A main runway, with an orientation of 11/29, whose length is 3,354 metres and width 60 metres. It is a flexible runway and is grooved for the central 45 metre portion. Under the Joint-User Deed, the Department of Defence is responsible for the maintenance of this runway.
- The crosswind runway has an orientation of 18/36, with a length of 1,524 metres, and width of 30 metres. As with the main runway, under the Joint-User Deed the Department of Defence is responsible for the maintenance of this runway.
- The Department of Defence has established a grass strip to the south of runway 11/29 for light aircraft. Civil aircraft do not use this runway.
- Military helicopters currently operate from a landing site, south and west of runways 11/29 and 18/36 respectively.

see **Diagram 6.1** Runways and Taxiways

Runway 11/29 Strip

The runway 11/29 strip width is 230 metres. Civil operators at Darwin International Airport are subject to the requirements of the Civil Aviation Safety Authority whose Manual of Standards Part 139 notes that the civil standard for a 60 metre wide runway should be 300 metres. Accordingly CASA has provided an exemption to the normal standard which is recorded in the Airport Operations Manual. The width is published in the Airservices Australia En Route Supplement. The obstacle clearance surfaces are based a 300 metre inner edge.

Runway 11/29 Usage

The use of runway 11/29 is dependent on seasonal weather. During the dry season (March – September), runway 11 is used predominantly in the mornings, whilst runway 29 is used predominantly in the afternoon and evenings.

The threshold of runway 11 is displaced every two weeks for a period of three hours to allow the Department of Defence to carry out maintenance to its cable arrestor system. The cable arrestor is design for specific military aircraft and is not used by civil aircraft. This displaced length of 2,906 metres does not impact on current civil aviation operations.

Landing and Hold-Short Operations are available on runway 29 to allow continuous use of Runway 18/36.

Runway 18/36 Usage

Runway 18/36 is used predominantly for departures on runway 18 and landings on runway 36.

Landings on runway 36 often involve Landing and Hold Short Operations before aircraft clear runway 11/29. There are restrictions on runway 18/36 operations when high explosives are on Ordnance Loading Apron 9 in the Department of Defence area.

The ConocoPhillips LNG Plant, expected to be operational in 2006, is about five nautical miles south of runway 36. The Civil Aviation Safety Authority requires that a Danger and Restricted Area be established up to 490 metres (1600 feet) above the ground flare. This should not restrict operations on runway 18/36.

Grass Runway South of Runway 11/29

The grass strip south of runway 11/29 was originally used for Caribou low-level parachute extractions. Caribou aircraft are now no longer based in Darwin. The runway is sometimes used now for 161 RECCE SQN Kiowa's, called 'Choppers South'.

The 161 RECCE SQN Kiowa is planned for relocation in 2005. Thereafter this area (subject to successful relocation) will not be used for the purpose of 161 RECCE SQN.

Runway Capacity

Total annual demand for runway use is:

	2003/04	2023/24
Civil Traffic		
International Aircraft	4,340	7,800
Domestic Aircraft	13,100	18,200
General Aviation Aircraft	40,000	50,000
Military Traffic		
Fighters (est. over 60 days)	4,090	4,090
Transport (est. over 60 days)	650	650
Other (est. over 225 days)	22,250	22,250
Total	84,430	102,990

Data Source: BAA forecasts and internal assumptions

It can be concluded from the above figures that runway capacity will not be an issue within the planning horizon. This conclusion does not consider airspace issues which are the responsibility of Airservices Australia and the Department of Defence.

Taxiways

The responsibility for taxiway operations and maintenance varies between both the Department of Defence and Northern Territory Airports PL according to the taxiway in question.

Taxiway A

Taxiway A lies south of and parallel to runway 11/29. It is the responsibility of the Department of Defence according to the Joint-User Deed. The operation of runway 11/29 depends on taxiway A for aircraft accessing the runway 29 threshold. The use of taxiway A by civil aircraft involves runway crossings, with attendant-reduced capacity and risk.

Taxiway A has unsealed shoulders and cannot be used by four-engined jet aircraft, which must backtrack down runway 11/29.

Much of taxiway A is unavailable for use by civil aircraft when ordnance loading aprons are in use by the Department of Defence. This requires backtracking by all aircraft on runway 11/29.

The Department of Defence is understood to be researching the use of taxiway A as an emergency runway. Should it prove suitable, taxiway A will not be available during any emergency event.

6. Runways and Taxiways

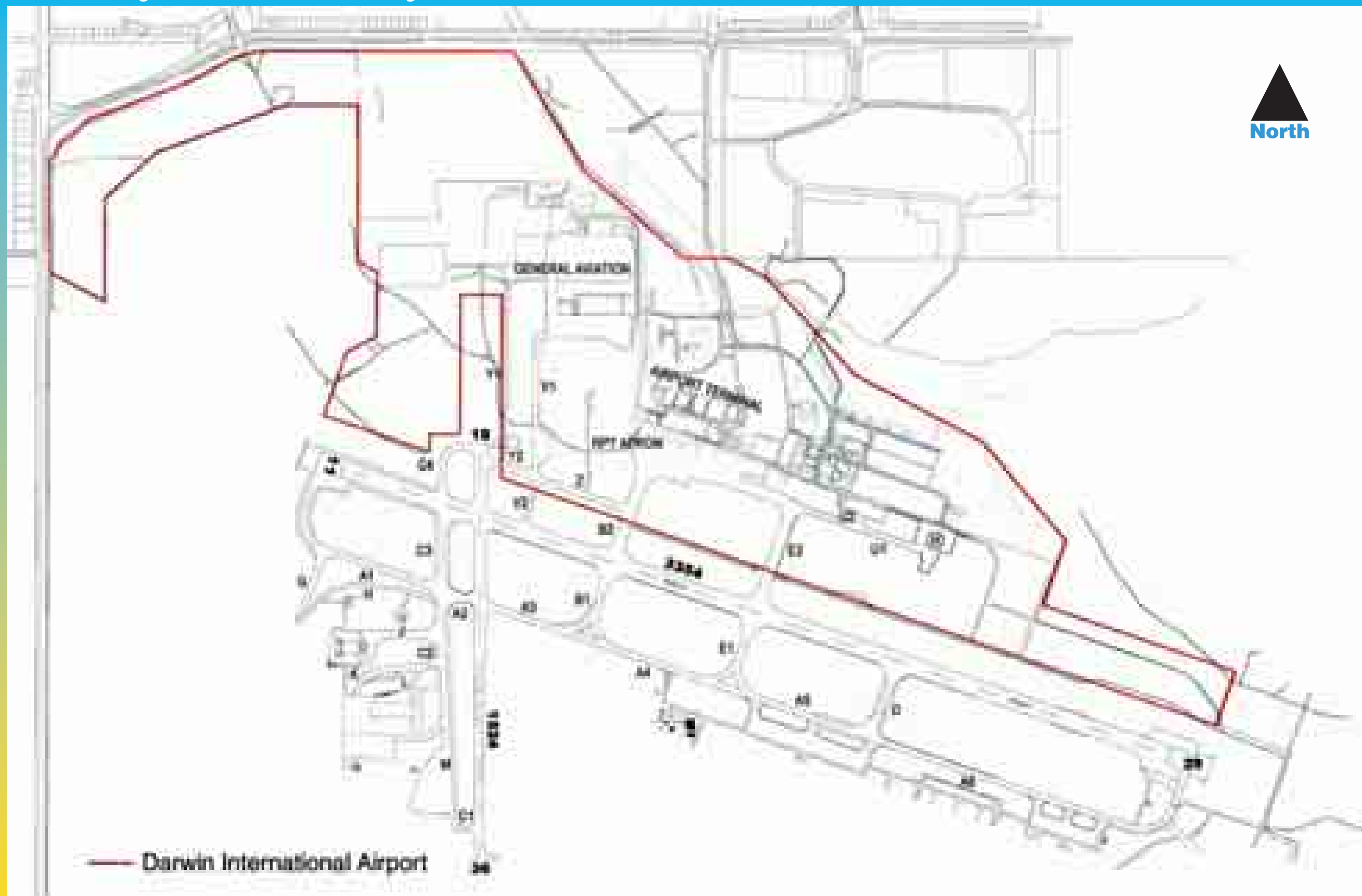


Diagram 6.1 Runways and Taxiways

6. Runways and Taxiways

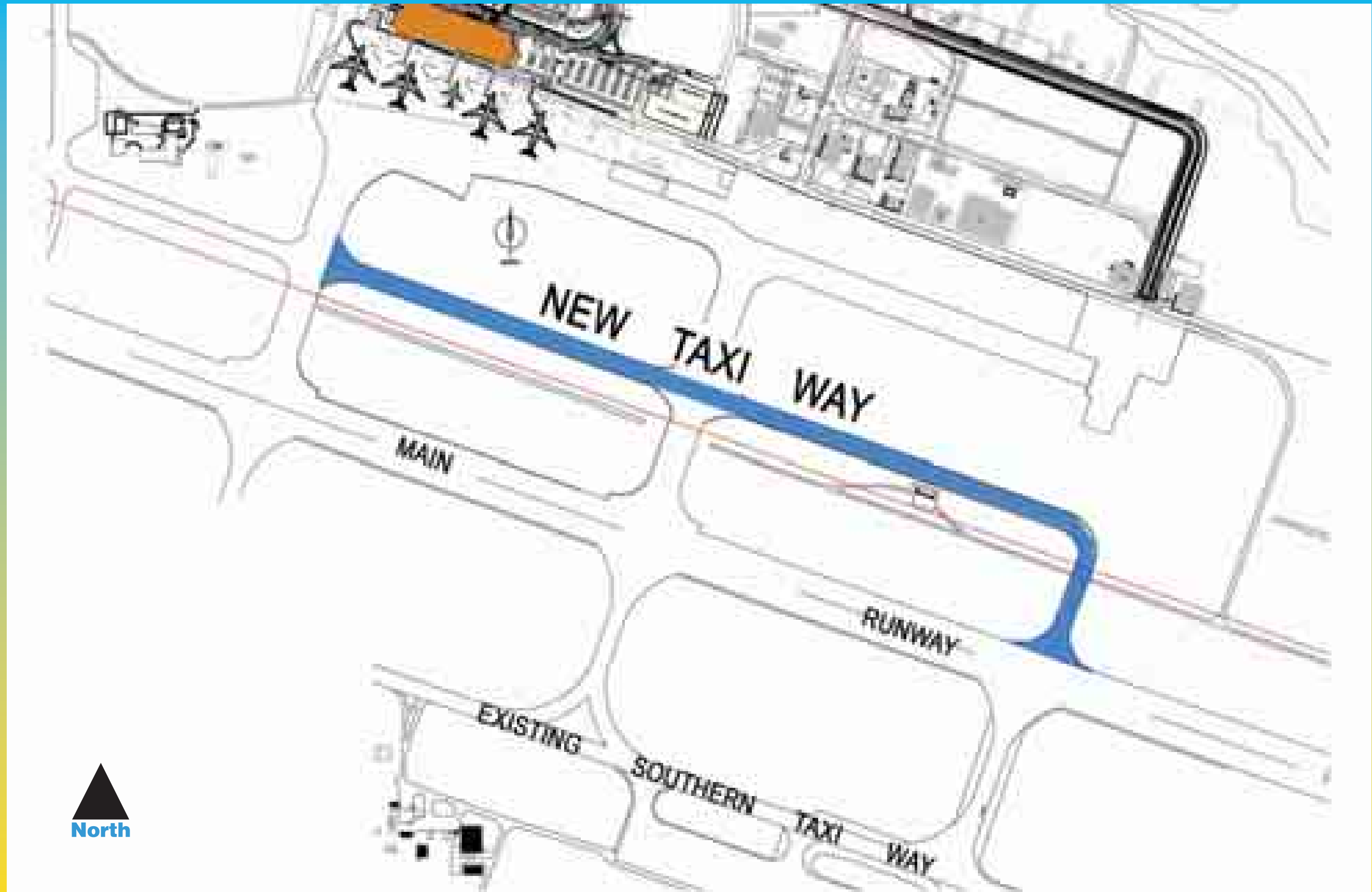


Diagram 6.2 Proposed Taxiway Construction

6. Runways and Taxiways



Taxiways B1, E1 and D1

Taxiways B1, E1 and D1 are to the south of runway 11/29 and connect it with taxiway A. They lie within the Defence area and are Joint-User responsibilities.

Taxiway C

Taxiway C is west of and generally parallel to runway 18/36. The nature of runway 18/36 operations means that general aviation aircraft departing on runway 18 do not use taxiway C, whilst general aviation aircraft landing on runway 36 taxi to the runway end into the general aviation apron area.

General aviation aircraft landing on runway 36 under Landing and Hold-Short Operations enter the northern end of taxiway C3 and C4 via taxiway A2.

Taxiway C is a Joint-User responsibility.

Taxiways B2, E2 and U

The terminal apron taxiway access system comprises taxiways B2 and E2 linking the back-of-apron taxiway U to runway 11/29.

These are the responsibility of Northern Territory Airports PL.

Taxiways Y and V

Taxiway Y gives access to the general aviation and commuter apron area. It leads off from near the runway 18 threshold.

Taxiway V connects the general aviation and commuter apron area across taxiway Z to runway 11/29.

Both taxiways are Northern Territory Airports PL's responsibility.

Taxiway Z

Taxiway Z connects the runway 18 threshold with the terminal apron.

It is limited to use by Code C aircraft with a weight restriction of 22,000 kg.

Previous Studies

Two previous civil studies have considered runway and taxiway development:

Final Master Plan – October 1999

The 1999 Final Master Plan concluded that the existing length of the main runway 11/29 was appropriate in the longer term.

The 1999 Final Master Plan noted that Runway 18/36 currently has a Runway End Safety Area of 90 metres and recommended that it should be extended to a maximum of 300 metres by shifting the runway northwards by 105 metres.

The 1999 Plan also illustrated, but did not discuss, a system of runway 11/29 dual parallel taxiways, one, aligned to taxiway Z, extending to both thresholds and the other aligned with the new back-of-apron. Associated with this suggested layout were rapid exit taxiways on both sides of runway 11/29.

Also other minor taxiways are illustrated, assumed to improve access within the general aviation apron area.

All these proposals have been the subject of further analysis.

Taxiway Requirements

There are lease-agreement costs under the Joint-User Deed involved with civil aircraft operating on Department of Defence taxiways. A taxiway study was commissioned to identify how civil operations could be enhanced, and costs reduced, by the construction of replacement taxiways.

The Airplan consultancy undertook a significant taxiway simulation exercise, modelling civil use of Department of Defence taxiways with a view to identifying which of these taxiways are necessary in the longer term for civil operations and which civil taxiways could be constructed to improve operations. The study recommends for civil operations:

- The retention of the threshold ends of taxiway A, ie. taxiway A1 from threshold 11 to taxiway C, and taxiway A6 from threshold 29 to taxiway D
- The retention of taxiways C 3 and C4 north of taxiway A
- The construction of a single parallel taxiway, based on the, currently substandard, taxiway Z, re-aligned to take larger aircraft, between taxiways C and D
- In the longer term, the complete construction of taxiway Z as a parallel runway

Runway 18/36

Operational and noise aspects of aircraft using runway 18/36 to and from the north affects on-airport commercial development.

A recent examination of runway 18/36 by Rehbein AOS Airport Consulting indicates that any extension to the north will require significant earthworks to ensure gradients of acceptable standards and could not be addressed without significant reconstruction of the entire runway area. It is unlikely that the

expense of carrying out these works would be justified on a commercial basis. Under these circumstances, it is unlikely that runway 18/36 would be shortened at its southern end due to the need to maintain adequate runway length.

Any decision to shift runway 18/36 would be a matter for the Department of Defence.

Defence Master Plan

There is also the Defence Master Plan. This document is now reported to be dated.

Either as part of the Defence Master Plan or in a separate examination, there has been some consideration of:

- Extending runway 11/29 to 3,600 metres
- Extending runway 18/36 to 2,010 metres

These safeguards are contained within the unleased areas of the airport and would not be required for ongoing civil use, although the extension of runway 11/29 to 3,600 metres would allow use by some B747 aircraft operating at their maximum allowable take-off weight.

The leased boundary for Darwin International Airport is set to allow for full extensions of runways 11/29 and 18/36 by the Department of Defence which can do so should it wish.

Extending runway 11/29 will have no adverse impact on civil operations; in fact it would be beneficial for the occasional fully-laden large aircraft wishing to operate into Darwin International Airport.

The Department of Defence has advised that it intends to prepare a revised Master Plan for RAAF Base Darwin during 2005, noting that under the terms of the Joint User Deed, the *Airport Act 1996* and the airport lease it will undertake a process of consultation with Northern Territory Airports PL. The Master Plan will assist detailed facility planning for the Darwin International Airport.

Commonwealth Public Works Committee

A recent examination by the Commonwealth Public Works Committee (PWC) confirmed the construction of facilities for the collocation and re-equipment of the 1st Aviation Regiment at Robertson Barracks. Evidence given to the PWC affirmed that subject to the implementation by the Army of approved flight design procedures and the permanent quarantining of the flight corridor by

6. Runways and Taxiways



the Northern Territory Government, operations from Robertson Barracks would not impact on Darwin International Airport operations. The Northern Territory Government has agreed to sterilise land from housing development in the area to facilitate helicopter operations. This Master Plan is predicated on these commitments.

Future Development

This 2004 Final Master Plan indicates the following development:

- Defence proposals to safeguard for extensions of runway 11/29 and runway 18/36 lie outside the Darwin International Airport leased area. Use of the civil airport requires only runway 11/29 at its current length.
- Runway 18/36 is shown as continuing in its current location and length.
- The proposal for an upgraded, re-aligned and extended taxiway Z, together with other minor taxiway works, is included.

see **Diagram 6.2** Proposed Taxiway Construction

The Department of Defence has advised that it has master planned taxiway Z to be constructed to run parallel to the complete length of runway 11/29. Any new construction of taxiway Z will require negotiations with Defence in that the proposed alignment is within both the Joint User and Civil Areas.

General Aviation Parking

The growth of General Aviation activity historically has been sporadic. An expansion area has been identified. However any construction of this must be subject to additional layout studies and acceptable commercial return.

See **Diagram 12.1** Land Use Plan



7. *Airspace Protection*

The objective of prescribing airspace for protection is to ensure that the areas used, or proposed to be used, by civil aircraft arriving at or departing from Darwin International Airport are not adversely affected by buildings, structures or other activities. New structures should be designed, or other activities controlled, to ensure they do not intrude into the present or future prescribed airspace. Part 12 of the *Airports Act 1996* provides for the protection of airspace now and in the future *...in the interests of the safety, efficiency or regularity of air transport operations.*

The protection described below applies to civil aircraft only. Protection for military aircraft is a matter for the Department of Defence which applies its own operating standards.

The consultant Rehbein AOS Airport Consulting developed plans of airspace protection.

Prescribed Airspace Components

Prescribed airspace consists of two forms of protection, Obstacle Limitation Surfaces (OLS) and Procedures for Air Navigation Services–Aircraft Operations (PANS-OPS).

The broad purpose of OLS is to define a volume of airspace that is ideally kept free of obstacles in order to minimise the danger to aircraft during the final visual segment of an instrument approach procedure. Infringement of these surfaces may occur provided the infringing obstacle is appropriately marked and lit.

The PANS-OPS surfaces are intended to safeguard an aircraft from collision with obstacles when the pilot is flying on instruments. They apply minimum obstacle clearance to structures, terrain or other natural features within the area to determine the limiting altitude at which a manoeuvre can be safely executed. As a result, long-term infringements of PANS-OPS surfaces are prohibited under the Airports (Protection of Airspace) Regulations 1996.

In this respect the OLS and PANS-OPS surfaces provide protection for aircraft operations in two quite different circumstances, the first when the pilot can see if there is an obstacle and the second when the pilot cannot.

7. Airspace Protection



Two-dimensional drawings have been prepared for the existing layout and operation of Darwin International Airport.

Existing OLS

The existing OLS geometry is based on the following runway codes and classifications;

- Runway 11, Code 4, non-precision, instrument
- Runway 29, Code 4, category 1, precision, instrument
- Runway 18, Code 3, non-instrument
- Runway 36, Code 3, non-precision, instrument

In this instance the runway 11/29 and 18/36 strip-widths are 230 metres and 90 metres, the former having a CASA dispensation and the latter the standard for a non-instrument runway. The inner edges of the approach surfaces have been adopted as 300 metres and 90 metres respectively, the latter being non-standard for a code 3 non-precision, instrument runway.

see **Diagram 7.1.1** and **Diagram 7.1.2** Existing OLS

Existing PANS-OPS Surfaces

Airspace protection has been considered for the following approach procedures and instrument departures published by Airservices Australia;

- 10 NM MSA
- Visual circling
- DME or GPS arrivals
- Runway 11 VOR or VOR/DME
- Runway 11 Locator or Locator/DME
- Runway 11 GPS
- Runway 29 ILS or ILS/DME or LLZ
- Runway 29 VOR or VOR/DME
- Runway 29 Twin Locator or Twin Locator DME
- Runway 29 GPS
- Runway 36 GPS
- Standard Instrument Departures.

see **Diagram 7.2** Existing PANS-OPS

Protection of Future Airspace Requirements

A development application has been approved for the construction of a high rise building approximately 6 kilometres south west of Darwin International Airport within the Central Business Precinct of Darwin City. Including rooftop structures this will have a maximum height of RL 122 metres AHD. The potential impact of this building has been accounted for within the future OLS and PANS-OPS examination.

Future OLS and PANS-OPS drawings have been prepared for Darwin International Airport based on the long-term retention of the existing runway geometry and assuming the following instrument procedures would be practical:

- Visual circling approaches
- GPS arrival procedures
- GPS non-precision approaches to Runways 11, 18, 29 and 36
- GPS precision approaches to Runways 11 and 29
- GPS standard instrument departures

The future OLS retains the runway 11/29 and 18/36 strip-widths at 230 metres and 90 metres as it is impractical to provide the respective 300 metres and 150 metres standard. It is accepted that during landing minimal adjustments will be made for each instrument approach procedure to account for the reduced strip-widths. The inner-edge length for each approach surface has nevertheless been adopted as the standard values of 300 metres and 150 metres.

see **Diagram 7.3.1** and **Diagram 7.3.2** Future OLS

see **Diagram 7.4** Future PANS-OPS

All these illustrated surfaces represent complex three-dimensional shapes. These are held on computer for reference.

Radio and Electronic Aids

The aerodrome is supported by a number of aids to assist with navigation and airfield operations.

see **Diagram 7.5** Radio and Electronic Aids

Joint Obstruction Clearance Surfaces

The OLS and PANS-OPS refer to civil procedures. For Military use, Joint Obstruction Clearance Surfaces (JOCS) are prepared. As part of a process to amend the Defence (Areas Control) Regulations (D(AC)R), the Department of Defence has advised that it will be revising the JOCS for RAAF Base Darwin.

The time frame for the preparation of D(AC)R for RAAF Base Darwin is 2006.

7. Airspace Protection

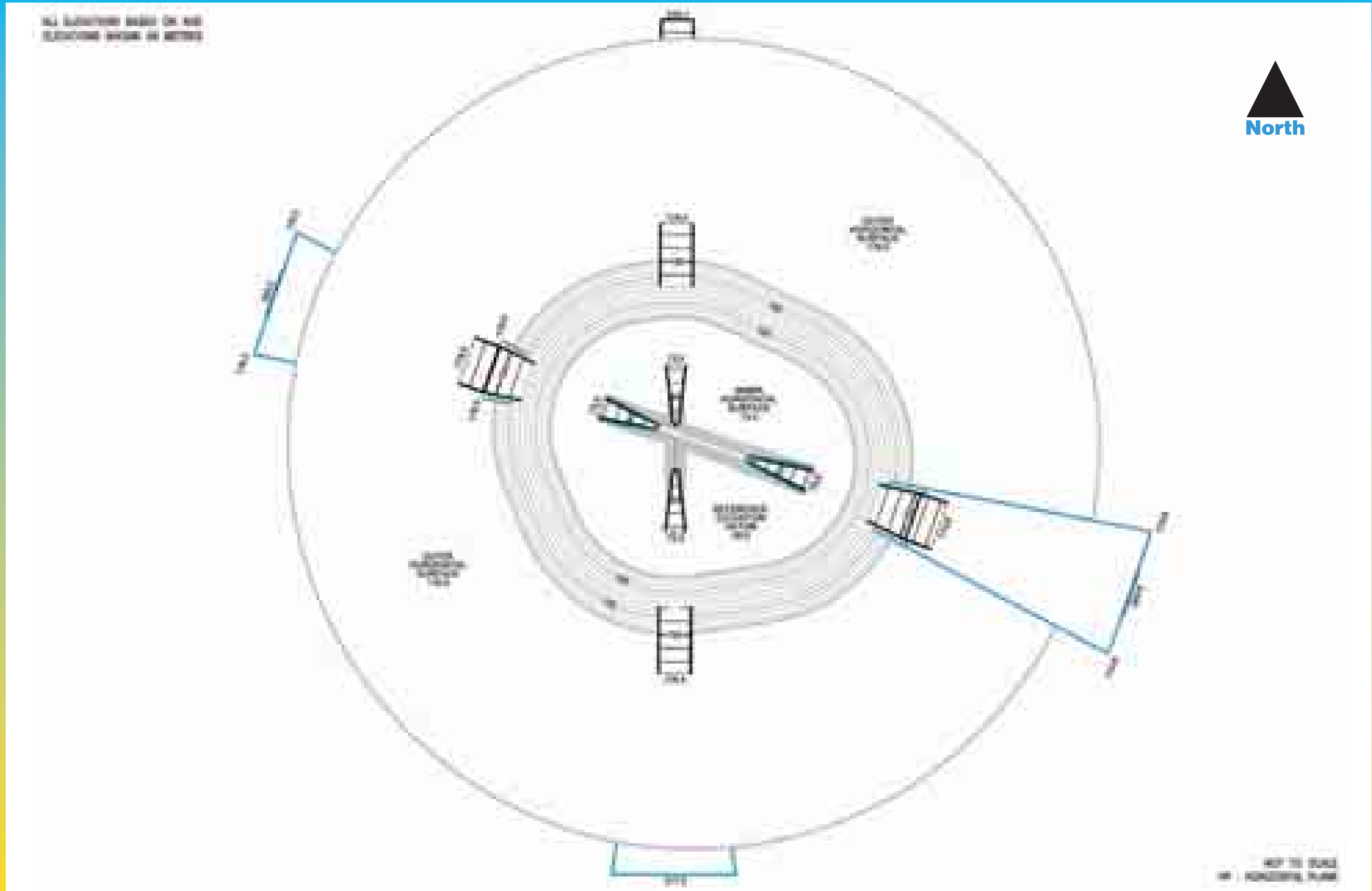


Diagram 7.1.1 Existing OLS

7. Airspace Protection



RUNWAY CLASSIFICATION CODE		
Runway	Class	Code
17	Instrument Runway Precision Category I	1000 4
18	Instrument Runway Precision Category I	1000 4
19	Non-Instrument Runway	1000 1
20	Instrument Runway Precision Category I	1000 4

APPROACH SURFACES										
Runway	Length (ft)	Width (ft)	Obstacle Clearance	Height (ft)	Width (ft)	Width (ft)	Width (ft)	Width (ft)	Width (ft)	Width (ft)
17	3523	300	40	175	1000	1000	1000	1000	1000	1000
18	3523	300	40	175	1000	1000	1000	1000	1000	1000
19	3523	300	40	175	1000	1000	1000	1000	1000	1000
20	3523	300	40	175	1000	1000	1000	1000	1000	1000

TAKE-OFF CLIMB SURFACES							
Runway	Length (ft)	Width (ft)	Obstacle Clearance	Height (ft)	Width (ft)	Width (ft)	Width (ft)
17	3523	300	40	175	1000	1000	1000
18	3523	300	40	175	1000	1000	1000
19	3523	300	40	175	1000	1000	1000
20	3523	300	40	175	1000	1000	1000

APPROACH	
Runway	Code
17	1000 4
18	1000 4

CONDIAL SURFACE		
Runway	Length (ft)	Width (ft)
17	3523	300
18	3523	300

TRANSITIONAL SURFACES	
Runway	Code
17	1000 4
18	1000 4

INNER HORIZONTAL SURFACE		
Runway	Length (ft)	Width (ft)
17	3523	300
18	3523	300

OUTER HORIZONTAL SURFACE		
Runway	Length (ft)	Width (ft)
17	3523	300
18	3523	300

- NOTES:
1. ALL DIMENSIONS AND DISTANCES ARE IN FEET.
 2. SURFACE CODES ARE BASED ON THE FOLLOWING: (A) CATEGORY OF RUNWAY, (B) SURFACE CODE, (C) SURFACE CODE, (D) SURFACE CODE.



Diagram 7.1.2 Existing OLS

7. Airspace Protection

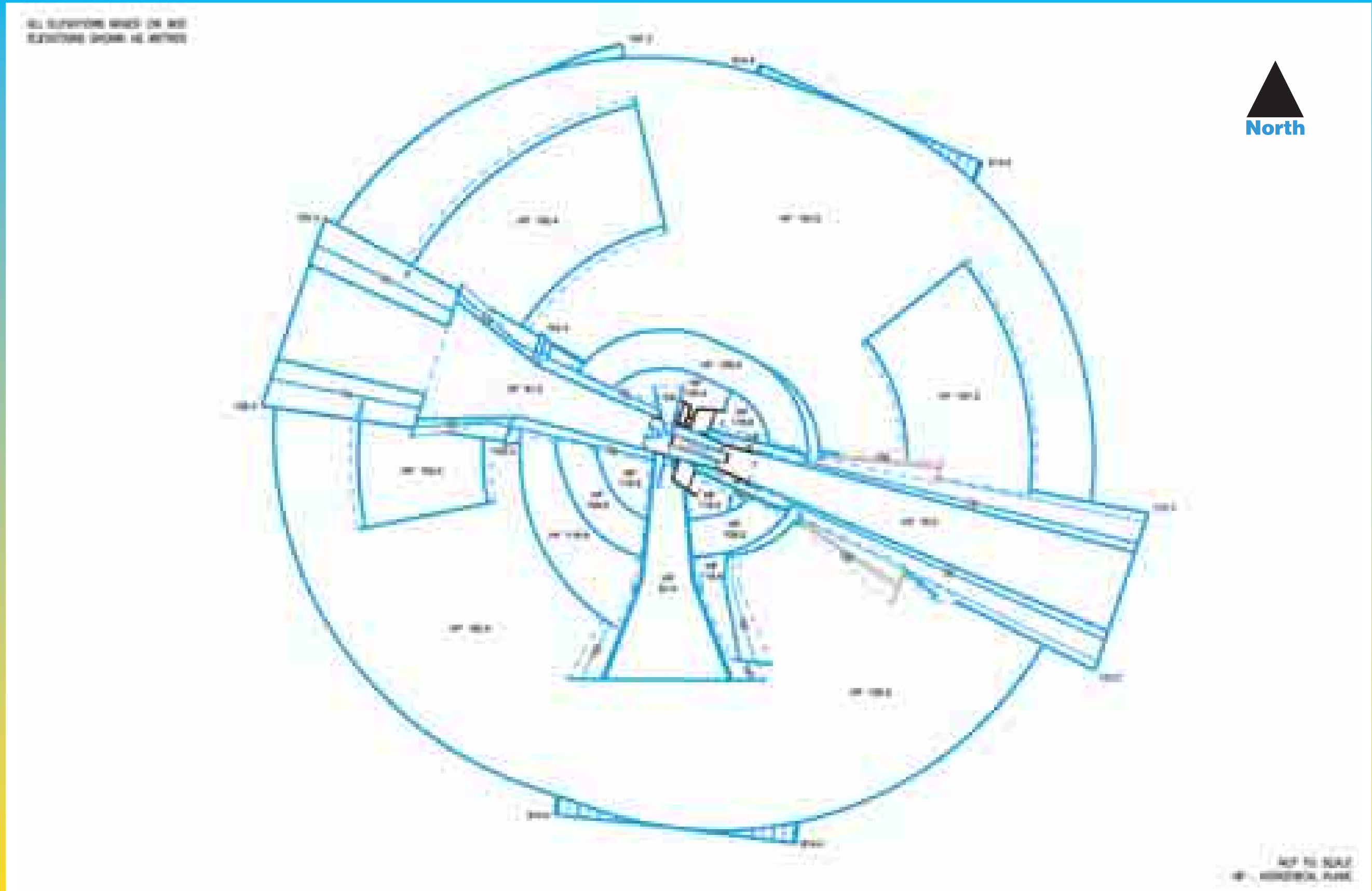


Diagram 7.2 Existing PANS-OPS

7. Airspace Protection

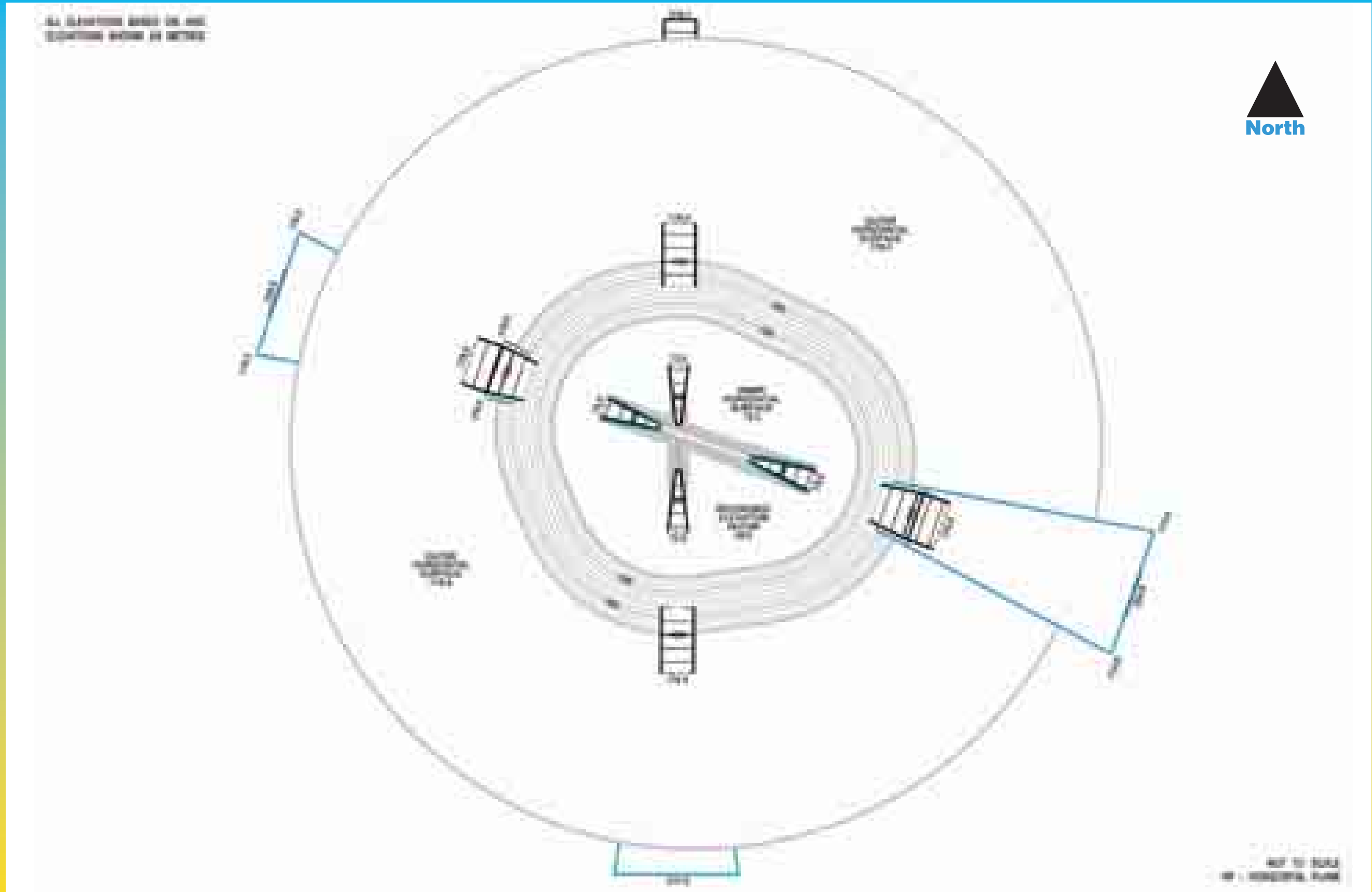


Diagram 7.3.1 Future OLS

7. Airspace Protection



RUNWAY CLASSIFICATION CODE		
Runway	Category	Height
11	CONCRETE WITH PRECAST CURBS #	1000 #
24	CONCRETE WITH PRECAST CURBS #	1000 #
18	ASPH/CONCRETE 1000 #	1000 #
20	CONCRETE WITH PRECAST CURBS #	1000 #

APPROACH	
11-1	15.7
11-2	15.4

CONICAL SURFACE		
Runway	Width	Height
11-1/2	20	100
11-1/4	20	100
11-1/8	20	100

TRANSITIONAL SURFACES	
Runway	Height
11-1/2	14.25
11-1/4	14.25
11-1/8	14.25

INNER HORIZONTAL SURFACE		
Runway	Width	Height
11-1/2	20	400
11-1/4	20	400
11-1/8	20	400

OUTER HORIZONTAL SURFACE		
Runway	Width	Height
11-1/2	20	1000
11-1/4	20	1000
11-1/8	20	1000

NOTES:
 1. ALL DIMENSIONS AND HEIGHTS ARE IN METERS.
 2. ELEVATIONS BASED ON MEAN SEA LEVEL DATUM (MSL).
 3. DIMENSIONS BASED ON MEAN SEA LEVEL DATUM (MSL).

APPROACH SURFACES										
Runway	Width at 1000 ft	Width at 500 ft	Width at 100 ft	Height at 100 ft	Height at 500 ft	Height at 1000 ft	Width at 1000 ft	Width at 500 ft	Width at 100 ft	Height at 100 ft
11	20.2	20	20	100	200	200	20	200	0.1%	400
24	20.2	20	20	100	200	200	20	200	0.1%	400
18	20.7	20	20	100	200	200	20	200	0.1%	400
20	27.9	20	20	100	200	200	20	200	0.1%	400

TAKE-OFF CLimb SURFACES							
Runway	Width at 1000 ft	Width at 500 ft	Width at 100 ft	Height at 100 ft	Height at 500 ft	Height at 1000 ft	Width at 1000 ft
11	20.2	20	20	10.25	200	1000	20
24	20.2	20	20	10.25	200	1000	20
18	27.9	20	20	10.25	200	1000	20
20	27.9	20	20	10.25	200	1000	20

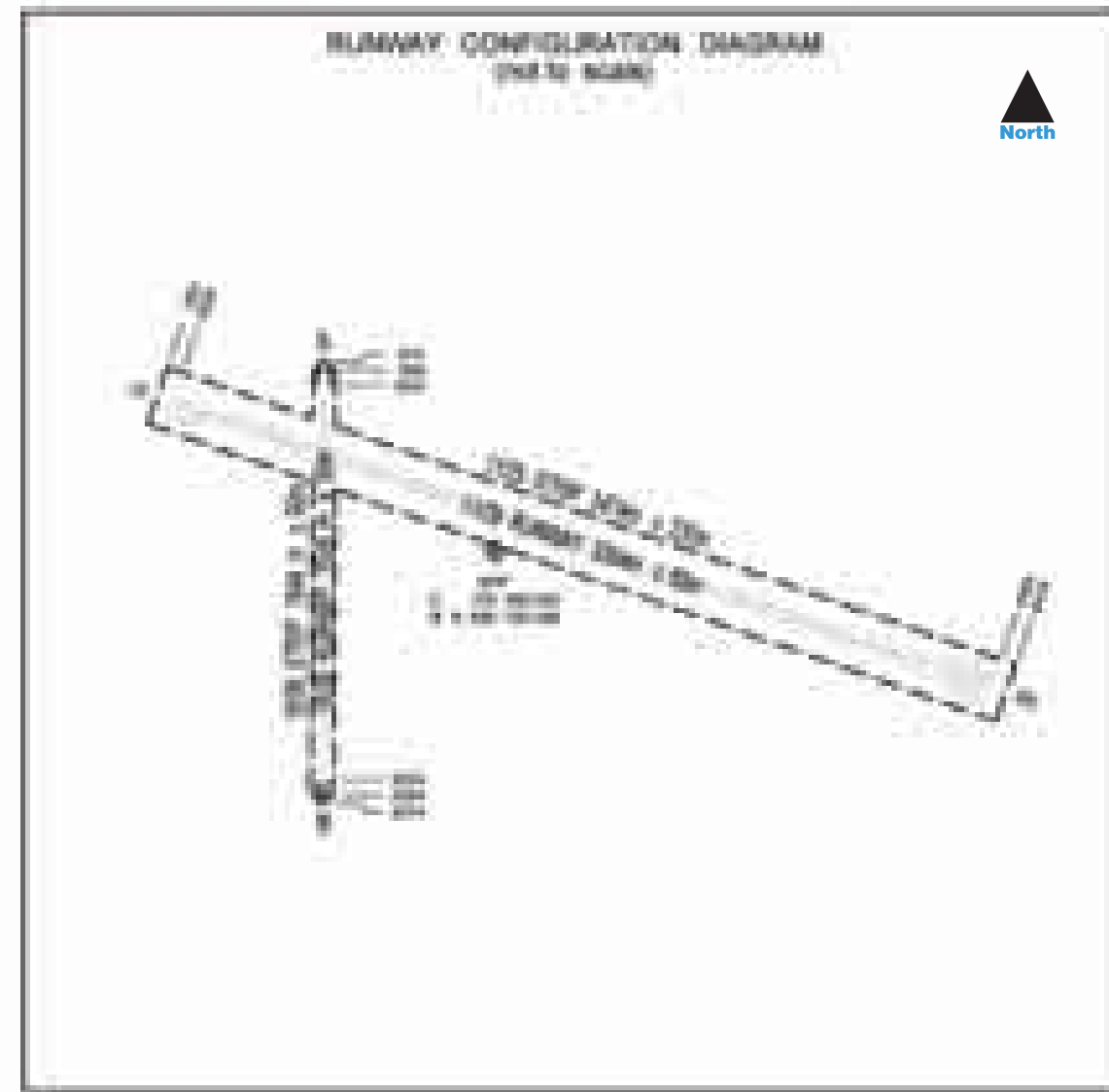


Diagram 7.3.2 Future OLS

7. Airspace Protection

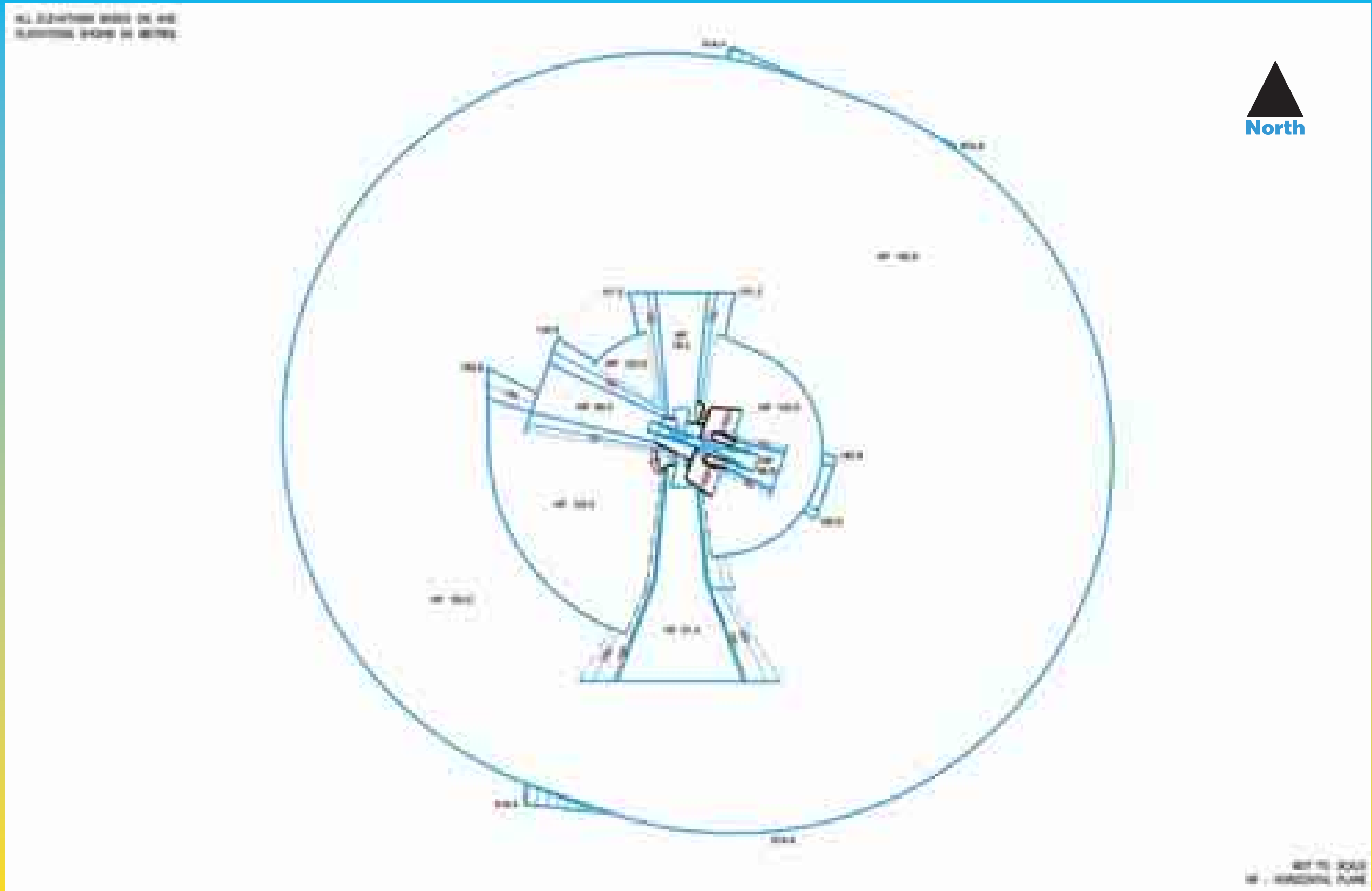


Diagram 7.4 Future PANS-OPS

7. Airspace Protection

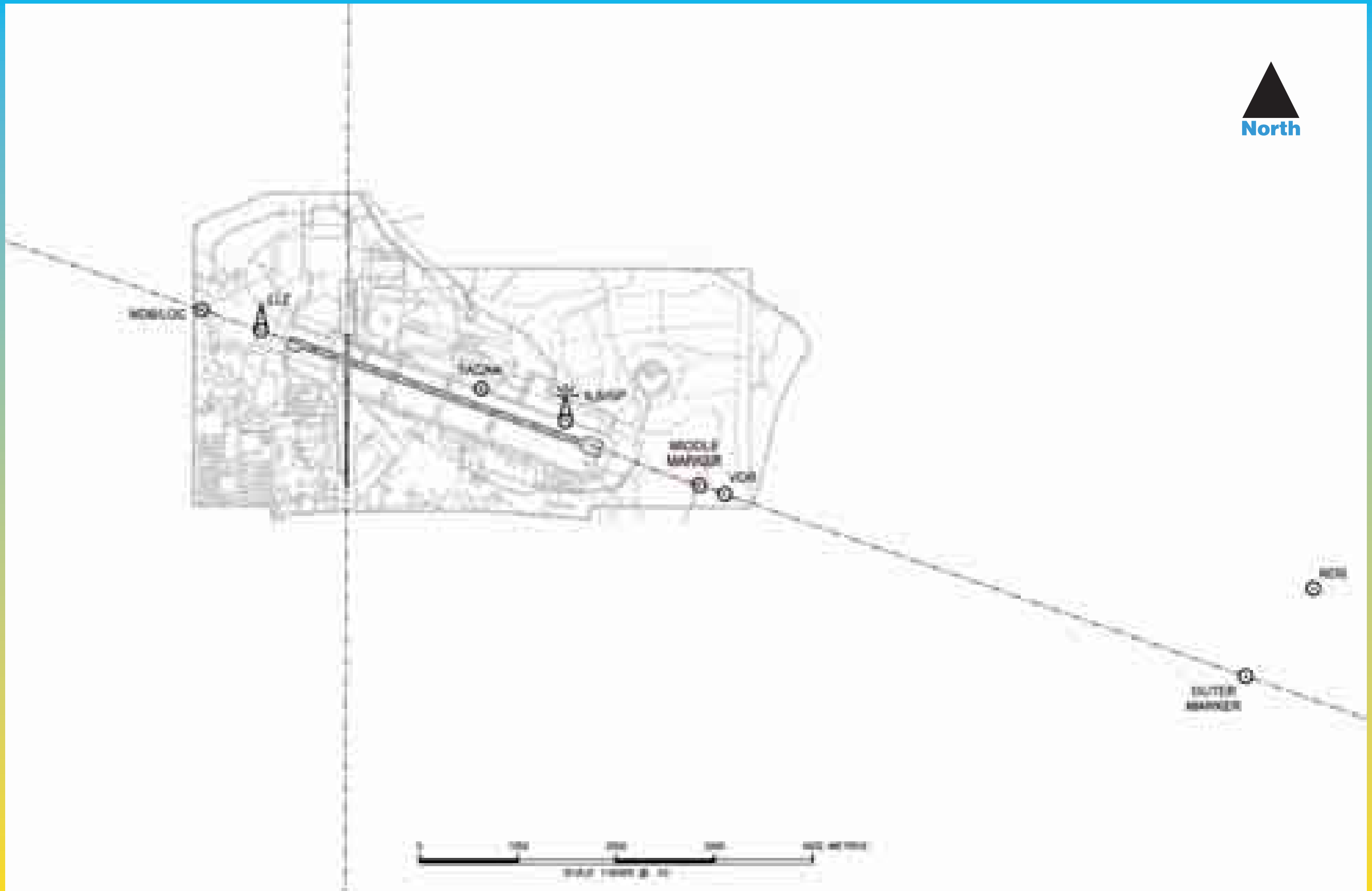


Diagram 7.5 Radio and Electronic Aids