



# JURIEN BAY AERODROME DEVELOPMENT PLAN

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Prepared by



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## 1.0 INTRODUCTION

The Jurien Bay Aerodrome Development Plan provides a structure plan for future aerodrome development, both airside and landside.

It is a balanced statement for competing needs of the aviation industry and the non-aviation commercial sector.

The Aerodrome Development Plan enables the Shire of Dandaragan to act upon and respond to the development interests of all parties and to facilitate the continued growth of public and private sector flying interests at Jurien Bay aerodrome.

The specific planning and development objectives addressed by this report are listed as follows.

### Key Planning and Development Objectives

- Existing aerodrome facilities.
- Economic drivers.
- Aviation traffic and growth projections.
- Airside planning.
- Landside planning.

## 2.0 EXISTING AERODROME FACILITIES

The aerodrome resides on State Government Reserve 35408 and the Shire of Dandaragan operates the aerodrome under a management order. Development approvals at the aerodrome are sought from the State but the Shire of Dandaragan is the effective owner/operator of the aerodrome.

The aerodrome comprises a single, sealed runway of length 1,200 metres by 20 metres wide, which is a typical dimensional standard for the operation of Royal Flying Doctor Service (RFDS) aeroplanes. Runway direction alignment is 02/20.

This constructed standard was achieved in a major re-development program undertaken in 2005 and included a new public apron and taxiway constructed approximately 200 metres to the north of the general aviation apron and taxiway. The development works met with standards established by the Civil Aviation Safety Authority (CASA).

A mains overhead power feed was also established from Bashford Street to the new building area as a single phase overhead supply terminating as a 25KVA transformer. This enabled installation of mains power airfield lighting.

Power does not presently extend to the current four established hangar sites. It does provide power to the ambulance transfer building erected at the site of the new apron.

The runway strip and its adjoining apron areas are fenced to their cleared perimeters. The northern and eastern portions of the property remain uncleared<sup>1</sup>.

The aerodrome provides a permanent operating site for air support in suppressing bush fires with a water storage facility located adjoining the general aviation apron.

The aerodrome has no instrument procedure published for arrivals but to the immediate south of the aerodrome site is a VOR<sup>2</sup>, owned and operated by Airservices Australia. This navigation aid provides for enroute navigation for the national airway routes.

The aerodrome reserve (R41333) and the adjoining public reserves are incorporated within the Jurien Bay Structure Plan.

### **3.0 Economic Drivers**

The Shire of Dandaragan has a total estimated population of 2,883. This figure is based on 'place of usual residence' from Census data collected in June 2006.

The towns of Jurien Bay, Cervantes, Badgingarra, Dandaragan and Regans Ford are all part of the Shire of Dandaragan, which covers an area of 6,934 square kilometres.

Jurien Bay is situated 257 km north of Perth, and was first gazetted in 1956. The economy of the region is dependant upon the development of natural resources for fishing, tourism, mining, natural gas production and agriculture.

The Central Coast Regional Strategy (1996) recognised Jurien Bay as a major regional centre for the region supporting primary industry activities, commercial and tourism developments.

There has been significant Government support for release of residential land and the construction of the Indian Ocean Drive, which will provide direct surface transport connection of the coastal towns of Leeman, Greenhead, Jurien Bay and Cervantes to Perth.

Direct economic drivers from such developments include ongoing construction industry stimuli, direct household expenditure on goods and services and ongoing demand for social infrastructure and services.

Jurien Bay is a very popular holiday location and its proximity to Perth has led to a strong interest by the recreation pilot for fly-in and fixed base presence at the Jurien Bay aerodrome.

Further, its rural catchment visitation adds to the seasonal tourism population, which approximately doubles the Shire's resident population at its peak.

The potential for population growth at Jurien Bay will lead to an increase in potential use of the Jurien Bay aerodrome. Although not directly quantifiable a good indicator is the recent application by a private developer to the Shire of Dandaragan for land lease to develop an airfield estate on the aerodrome.

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<sup>1</sup> Drawing JUR – 003 Jurien Bay Aerodrome Aerial View

<sup>2</sup> VOR is a VHF Omni Range beacon.

The proposal for 10 airfield accommodation hangars, to be built in two stages, is aimed at meeting the recreation pilot demand for coastal holiday visitation.

The proponent estimates there are 1,800 privately owned aircraft and 5,000 pilots in Western Australia alone who will generate the demand for this short stay holiday accommodation at the aerodrome.

This is an aviation tourism model that reflects the growth of recreational aviation in Western Australia.

#### **4.0 AVIATION TRAFFIC AND GROWTH PROJECTIONS**

There is no Regular Public Transport (RPT) air service hence all aircraft movements can be deemed General Aviation (GA). GA aircraft is non-airline traffic and comprises charter, private flying, flying training and Royal Flying Doctor Service activity.

The aircraft traffic is not recorded or charged so quantification can only be made by examining each sector.

Recreation use of the Jurien Bay aerodrome is the principal driver of aviation traffic. Itinerant visitors may comprise single aircraft or group fly in for recreational stop. At an estimated 8 per week this amounts to 416 arrivals per annum.

It is estimated that there may be up to 20 per annum RFDS medical evacuation transfers from the Jurien Bay regional Health Centre when Perth hospital services are required.

Occasional corporate and ministerial charter flights could amount to one a month or 12 per annum.

Water bomber aircraft maybe deployed if bush fire response is required. This could generate 30 flights in an operating situation.

Jurien Bay Skydive operate throughout the year and generate up to 250 operations per annum.

Collectively, this is 728 operations or 14 per week.

It is feasible that with the growth of the Jurien Bay residential community that Fly-in Fly-out (FIFO) charter operations could occur, subject to the availability of workers suitable for company operations. Aircraft type Dash 8 with 34 seats or Beech 1900 with 19 seats for instance could operate into the emerging resource rich Mid West region.

FIFO operations from regional centres such as Busselton, Geraldton and Broome all presently exist, capturing the resident workforce.

If the residential hangar accommodation development progresses then this would add to the recreational flying use of the Jurien Bay aerodrome.

GA activity, measured by flying hours, has grown in Australia by 6% over the 20 year period 1984 to 2004 and by 7% from 2004 to 2007 giving an average annual growth of 0.8%<sup>3</sup>.

GA charter work has done the best of all GA activity groups over the period with growth of 13.8% in 2007. Flying training and aerial work also experienced annual average growth of 0.9% and 0.3% respectively.

There is scope for additional activity with current movements estimated at 1,456 versus a realistic annual service volume for a single runway configuration of 150,000 movements<sup>4</sup> per annum.

It is concluded that the aerodrome has ample capacity that is sufficient to accommodate operational growth for the foreseeable future.

## 5.0 AIRSIDE PLANNING

Aerodrome facility planning is interrelated to the selected Aerodrome Reference Code, which is determined by the design aircraft type.

It provides a simple method of grouping the numerous specifications concerning the characteristics of aerodromes to suit a range of aircraft that are intended to operate.

The determination of the design aircraft type requires the selection of the most critical from the choice of potential operating aircraft types.

The following table sets out the code and the associated aerodrome movement area standards for a considered range of aircraft type potentially able to operate into Jurien Bay aerodrome.

### AERODROME PLANNING CRITERIA BY AIRCRAFT TYPE

Aerodrome Specifications	Movement Area	C172 C310	B200 C441 (Existing)	B1900	Dash 8
Aerodrome Reference Code (ARC)		1A	1B	2B	2C
Aircraft Reference Field Length (metres)*		245	592	811	1122
Runway width requirement (metres)		18	18	23	30
Approach Inner Edge width Instrument Non-Precision Approach (metres)**		90	90	90	90
Non-instrument Approach		60	80	80	80
Take-off Inner Edge width (metres)		60	60	80	80
Shoulder pavement width requirement (metres)***		3.0	3.0	3.0	3.5
Taxiway width requirement (metres)		7.5	10.5	10.5	15

Notes:

\* The Aircraft Reference Field Length (ARFL) is the minimum runway length required for aircraft take-off at maximum take-off mass, at sea level, in standard atmospheric conditions, in still air and with zero runway slope. Actual runway length requirements are determined by the aircraft operator taking account of the actual operating conditions and usually are significantly greater.

<sup>3</sup> BTRE general aviation analysis 2007

<sup>4</sup> Movement is defined as a landing or a takeoff.

\*\* The Approach Inner Edge width for an Instrument Non-Precision Approach relates to the runway strip width standard should a GPS approach procedure be designed for the runway.

\*\*\* Shoulders to the runway and taxiway pavements are not mandatory for code letter A, B, or C where aircraft operations are below 22,700 kg. Construction of runway shoulders relates to the pavement engineering requirements.

The code letter relates to the aircraft's manoeuvring characteristics taking account of the wing span and the outer main gear wheel span.

The code number relates to the runway length requirements.

The Jurien Bay aerodrome site has potential development up to ARC 2C standard or Dash 8 aircraft. There are similarities in the design characteristics between 1B, 2B and 2C with the significant variables being runway/taxiway width and the required runway length.

The current development standard is RFDS standard or ARC 1B.

### AIRCRAFT CHARACTERISTICS

Aircraft Specifications	Cessna 172	B200 King Air (Existing)	B1900	Dash 8
Max take off mass MTOM (tonnes)	1.2	5.7	7.53	16.5
Operating mass empty OME (tonnes)	0.6	3.7	4.33	10.4
Overall length (m)	8.3	13.3	17.6	22.3
Wing span (m)	10.9	16.6	16.6	25.9
Outer Main Gear Wheel Spacing (m) *	2.5	5.6	5.8	8.5
Approx. passenger seating	4	12	19	36
Tyre Pressure (Kpa)	180	735	-	805

Note:

\* The OMGWS is the distance between the outer edges of the main gear wheels and is an element considered in determining the Aerodrome Reference Code.

### Ultimate Infrastructure Requirements

The proposed ultimate aerodrome development standard of ARC 2C, which equates to Dash 8 and Beech 1900 operations, would permit larger charter aircraft type operations that may arise if future aviation demand for FIFO workers arose.

Such operations would necessitate;

- Runway expansion from 1,200 metres to 1,500 metres length, subject to air operator confirmation, and runway widening to 30 metres.
- Provision of a graded 90 metres runway strip. (current standard).
- Provision of Runway End Safety Areas (RESA's) to enhance potential overshoot and undershoot situations
- Taxiway width expansion from 10.5 metres to 15 metres.
- Expansion of the public apron parking area.
- Associated modification of airfield lighting.

This Jurien Bay Development Plan is depicted by the plans appended.

### **Runway and Runway Strip**

When required, expansion of the main runway, out to its ultimate length of 1500 metres, can be achieved by a further 300 metre extension to the north, provided the approach and takeoff surfaces are protected by managing the height and nature of development within the splay area.

Approach slope clearances of 3.3% are required.

Runway length requirements are subject to fuel load, payload, ambient temperature, prevailing wind plus the aircraft's performance capability on takeoff to clear published gradients.

Runway width for the design aircraft type is 30 metres. Current width of sealed runway is 20 metres. Widening to each side can be achieved readily.

The runway is centrally positioned around a graded runway strip. The current 90 metre runway strip width applies for ARC 2C standards.

Runway End Safety Areas (RESA's) are required for registered and certified aerodromes. CASA regulatory compliance would arise if charter flights of FIFO nature were introduced.

For Code 1 or 2 runways RESA dimensions of 60 metres by 60 metre width symmetrical about the runway centerline, commencement from the strip end, apply.

The RESA is designed to protect an aircraft in the event of an undershoot on landing or an overrun in a takeoff. The surface must be clear and trafficable but not has no specified construction strength.

### **Taxiways and Aprons**

Taxiway widths for Code A, B and C aircraft type are 7.5 metre, 10.5 metre and 15 metre respectively.

Taxiways of 15 metre width have been adopted for ultimate development to all apron areas, including the proposed airfield estate development. The incremental width development can occur as required to suit aircraft type utilisation.

Design standards require apron parking areas to be located at a distance offset from the runway strip such that aircraft parked do not infringe the transitional surfaces that arise from the runway strip edge.

Actual apron dimensions are to suit the manoeuvring requirements of the aircraft intending to use the apron.

It has been deemed appropriate to preserve a suitable future apron reserve for public purposes. This includes RFDS patient transfer, itinerant GA aircraft and potential charter of Dash 8 type.

The public apron reserve is depicted by the drawings and expands upon the current 60 metre x 30 metre to ultimate dimension of 150 metre by 55 metre. Its location is sufficiently offset to ensure tail height clearance of parked aircraft from arising transitional surfaces off the runway strip.



The current apron dimension is suitable for parking and manoeuvring of two RFDS type aeroplanes.

The ultimate concept makes allowance for a separate parallel taxiway connection from the expanded public apron and a stub taxiway from the northern runway end to facilitate access to the airfield estate development site. This allows for private aviators taxiing to the resident hangar estate facilities to be separated from itinerant, public or fixed base operators.

A third taxiway and apron to the GA hangar reserve south of the new public apron area currently exists and serves the development sites for fixed base operators.

This existing GA hangar reserve is at its limit of development to the south. It cannot extend south beyond the fourth existing hangar because the clearances from both the runway strip and airstrip road, that forms the western boundary, effectively converge to diminish the available building area.

However, the apron and hangar reserve for GA hangars is able to extend north toward the public apron area.

### **Airfield Lighting**

Strategically the existing runway lights have been installed at 32 metres width to facilitate future runway widening from 20 metres to 30 metres without disruption to the in ground airfield lighting installation.

Longitudinal spacing is 60 metres, which is a CASA compliant spacing, and this would be continued to any future runway length extension.

Taxiway lighting currently extends to the public apron area and would need to extend to future taxiway improvements upon demand.

Apron areas require floodlighting for security and parking reasons. Installation of apron flood lighting requires an illumination design to meet coverage of all areas.

Visual approach slope lighting is not required for non-jet operations.

## **6.0 LANDSIDE PLANNING**

### **Terminal and Building Area**

Provision for a future passenger terminal that can be utilised by charter, flying training organisations and private operators is an essential planning requirement. A terminal reserve has been preserved for this purpose.

Although RPT traffic is not envisaged at Jurien Bay aerodrome the GA industry equally benefits from terminal facilities.

For instance closed charter services associated with FIFO, ministerial flights, corporate and aerial work flights such as scenic flights all require an interface with the public and the pilot. Public facilities would typically include ablutions and waiting areas. These are basic comfort needs of any pilot and their passengers.

GA terminals have proven very successful at other regional airports and areas within can be leased to charter and flying training organisations.

The floor space to be provided would be based on the number of persons accommodated at any one time. Building planning and design is a matter for consideration once peak passenger and public numbers expected to use the building have been established.

The landside terminal reserve area must also cater for car parking and provision of other engineering service buildings, such as an equipment store.

### **Fuel Facilities and Depot**

Although a fuel storage facility is not currently required it is a future consideration, particularly if fixed base general aviation establishes in numbers.

Siting requirements of the fuel storage and dispensing facilities would be considered at the time but it would need to dispense to aircraft using the public apron area.

Swipe card AVGAS dispensing facilities are now appearing at regional airports and such an installation would be a commercial consideration.

### **Access Roads and Fencing**

Security of the aerodrome is important and the fence line becomes the interface between landside (public) access and airside (security controlled) access.

Fences, gates and signage to limit unauthorised access airside are all in the interests of best practice and safety.

### **Airfield Estate**

The depicted curvilinear landside development area for the proposed 10 hangar/accommodation sites comprises an area of approximately 11,550 square metres.

Each building lot would be 20 metres in length x 10.5 metres in depth. The associated apron area to be leased would be 34.5 metres in depth. A 5 metre buffer end area is proposed.

Road access is to be excluded from lease areas as it is important to manage through traffic to sites opened for development beyond or adjoining the airfield estate.

Taxiways to the development area should also remain public and controlled by the aerodrome operator.

### **Commercial Sites**

Commercial development sites are depicted by the Jurien Bay Building Area North drawing<sup>5</sup>.

These are large unallocated land parcels that maybe further subdivided for non-aviation use. The sites have prime exposure to Airstrip road and Bashford Street.

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<sup>5</sup> Drawing JUR -003 Sht 1 of 4

The subdivision criteria that may apply to these notionally depicted large holdings is a matter for further consideration.

Commercial development of non-aviation use land is a strong focus of airport operators to support the financial viability of the airport business.

### **External Land Use**

The approaches and takeoff splays for the ultimate developed runway need to be protected.

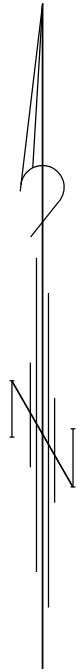
Care must be taken to ensure structures, such as street lights, do not create obstacles with the obstacle clear gradient of 3.3% to be preserved arising from the runway strip ends and extending out a distance of 2,500 metres.

The structure plan for the expansion of Jurien Bay urban areas should also be carefully considered to avoid high density residential in the immediate approach and departure paths of the runway. This is not for aircraft or public safety rather for noise management.

The Jurien Bay aerodrome is situated in close proximity to the townsite and urban areas and with invariable aviation growth over time there is potential for noise issues to arise within the community, for instance from night operations or flying training activity, unless approach paths are taken into account with residential development planning.

## 7.0 ATTACHMENTS

Jurien Bay Airport – Building Area North	JUR-003 Sheet 1 of 4
Jurien Bay Airport – Building Area South	JUR-003 Sheet 2 of 4
Jurien Bay Airport – Ultimate Development Plan	JUR-003 Sheet 3 of 4
Jurien Bay Airport - Ultimate Development Aerial View	JUR-003 Sheet 4 of 4



- Proposed Ultimate Runway
- Existing Runway & Apron
- New Airside Development
- Landside Development
- Cadastral Boundary

SHEET 1 JOINS SHEET 2



PO Box 63,  
GUILDFORD  
W.A. 6935  
Tel: 08 9201 0034 CAD FILE - Jurien Development Concept.dgn

16.01.11  
14.03.10  
DATE

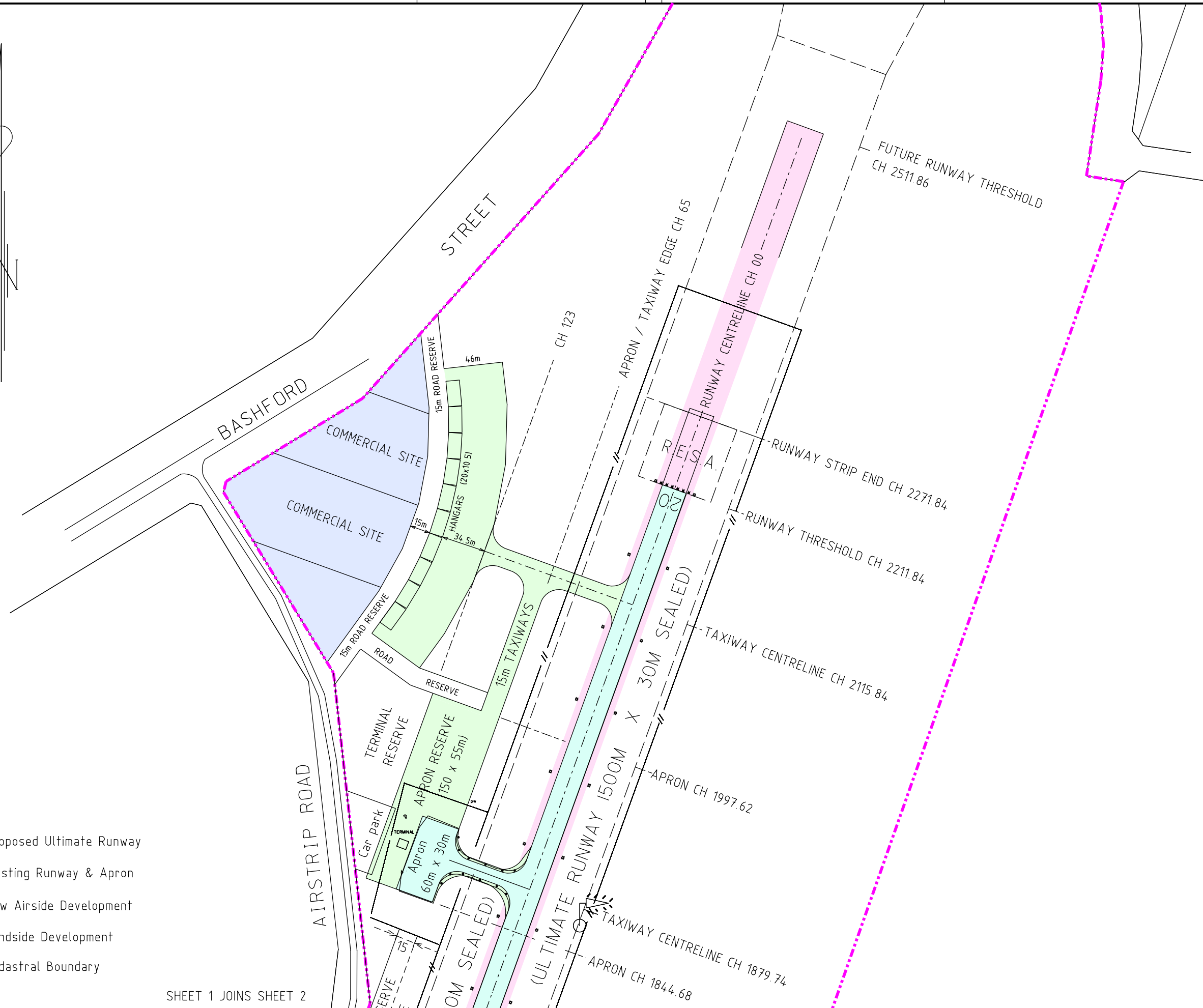
GA HANGAR RESERVE ADDED  
DRAWN

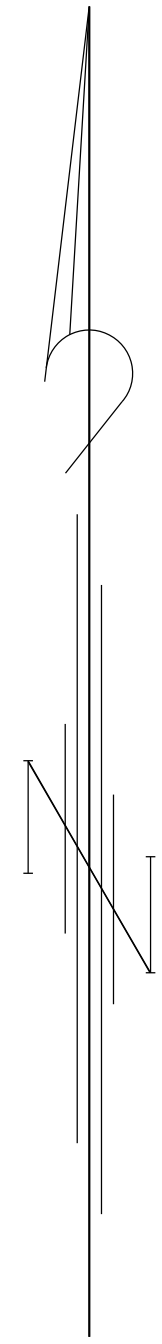
AMENDMENTS

SLE A/JF 2  
SLE A/JF 1  
DRN APP/IS

SHIRE OF DANDARAGAN  
JURIEN BAY AIRPORT  
BUILDING AREA NORTH

SCALE	1 : 3000 @ A3
SHEET	1 OF 3
DRAWING No	JUR -003





R 31884  
(RECREATION)

R35408  
(AIRPORT)

R 18865

R 38590  
(GOLF COURSE)

- Proposed Ultimate Runway
- Existing Runway & Apron
- New Airside Development
- Landside Development
- Cadastral Boundary

AIRSTRIP ROAD

PRIVATE GA  
HANGAR SITES

L2  
L1  
L3  
L4  
84.0m

GA HANGAR RE  
APRON RESERV  
(RUNWAY 1200M X 2

02-20 RUNWAY STRIP 1320 X 90m

RUNWAY LIGHTING  
ELEVATED OMNIDIRECTIONAL  
WHITE LIGHT  
LONGITUDE SPACING 60m  
LATERAL SPACING 32m

R.E.S.A.  
RUNWAY THRESHOLD  
CH 1011.86



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16.01.11  
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DATE

GA HANGAR RESERVE ADDED  
DRAWN

AMENDMENTS

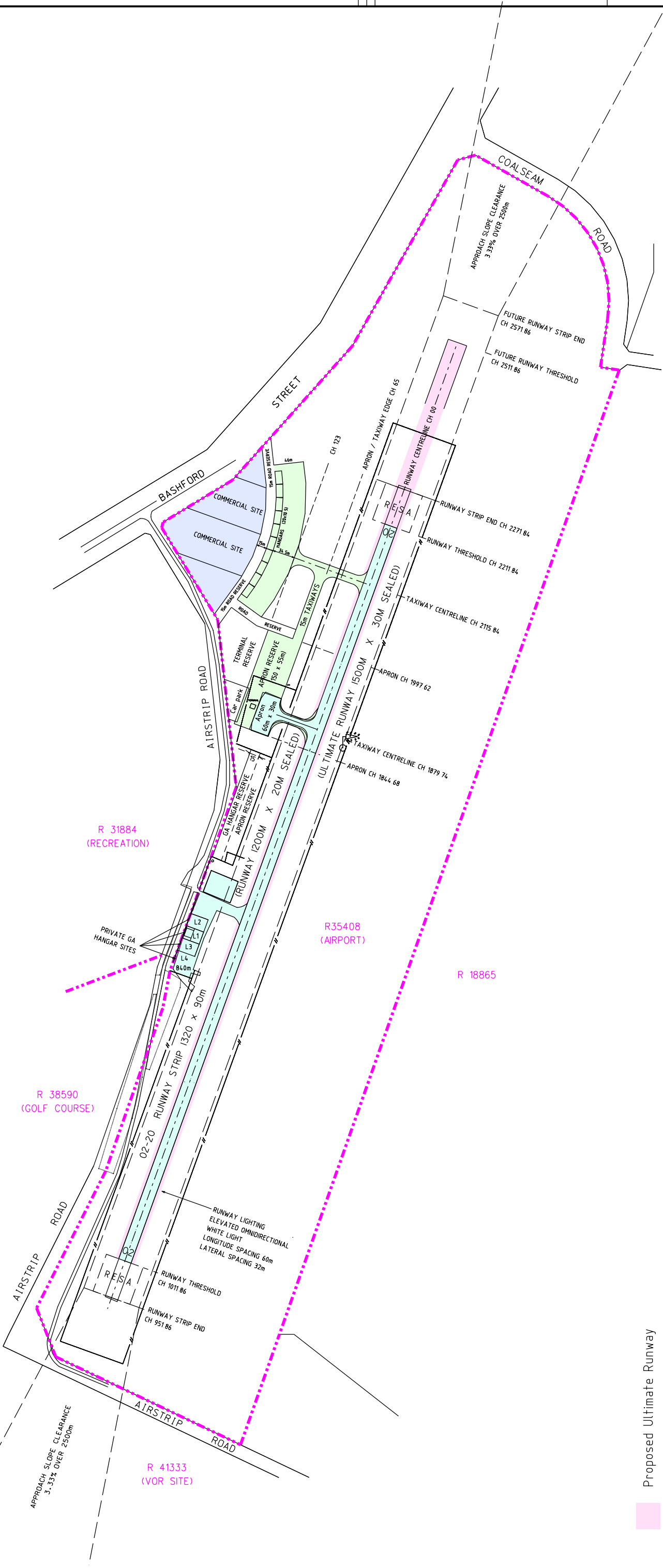
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SHIRE OF DANDARAGAN  
JURIEN BAY AIRPORT  
BUILDING AREA SOUTH

SCALE	1 : 3000 @ A3
SHEET	2 OF 3
DRAWING No	JUR - 003

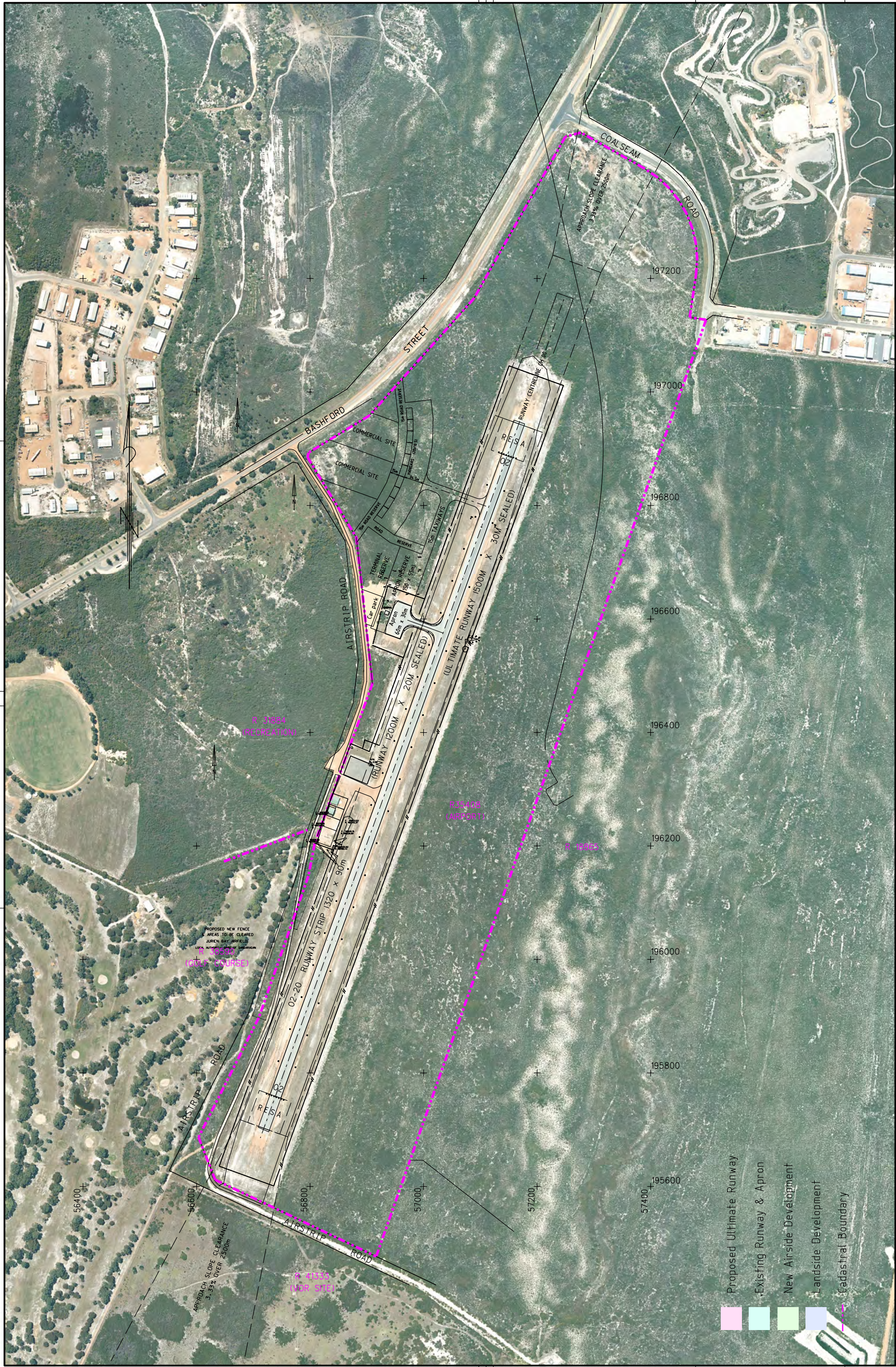


- Proposed Ultimate Runway
- Existing Runway & Apron
- New Airside Development
- Landside Development
- Cadastral Boundary

SHIRE OF DANDARAGAN		SCALE 1 : 6000 @ A3
JURIEN BAY AIRPORT		SHEET, 3 OF 3
ULTIMATE DEVELOPMENT PLAN		DRAWING NO JUR - 003
	S.E. A.F. 2 S.E. A.F. 1	DRN APP/JS
	GA HANGAR RESERVE ADDED DRAWN	AMENDMENTS
	16.01.11 14.03.10	DATE

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- Proposed Ultimate Runway
- Existing Runway & Apron
- New Airside Development
- Landside Development
- Cadastral Boundary

SCALE	1 : 6000 @ A3
SHEET	4 of 4
DRAWING NO	JUR - 003

SHIRE OF DANDARAGAN  
 JURIE BAY AIRPORT  
 ULTIMATE DEVELOPMENT PLAN  
 AERIAL VIEW

S/E A/F 1	DRN/APP/IS
DATE	AMENDMENTS
14.03.10	

14.03.10 DRAWN DATE  
 AMENDMENTS  
 CAD FILE - Jurien Development Concept.dgn / Aerial View

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