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Busselton-Margaret River Regional Airport Expansion Project

s38 Referral under the Environmental Protection Act 1986 - Environmental Review

Prepared for
City of Busselton
by Strategen

July 2016

strategen
ENVIRONMENTAL

Busselton-Margaret River Regional Airport Expansion Project

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July 2016

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Client: City of Busselton

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
				Form	Date
Draft Report	A	Client review	H Morgan / D Newsome	Word	26/4/2016
Draft Report	B	Client review	H Morgan / D Newsome	Word	23/5/2016
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Draft Report	E	Client review	H Morgan / D Newsome	Word	27/6/2016
Draft Report	F	Client review	H Morgan / D Newsome	Word	5/7/2016
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1. Proponent and key proposal characteristics

1.1 The proponent

The Proponent for the Busselton-Margaret River Regional Airport expansion ('the Proposal') is the City of Busselton ('the Proponent'). The Proponent is the organisation responsible for development and operation of the Proposal.

The Proponent for this Proposal is:
City of Busselton
38 Peel Terrace
Locked Bag 1
BUSSELTON WA 6280

The key contact for this Proposal is:
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1.2 Key proposal characteristics

The key characteristics of the Proposal have been described in accordance with Environmental Assessment Guideline for Defining the Key Characteristics of a Proposal (EAG1) (EPA 2012), which identifies how projects should be described under Part IV of the *Environmental Protection Act 1986* (EP Act).

The key proposal characteristics (KPCs) are presented in Table 1-1 and been developed with consideration to the preliminary key environmental factors identified for the Proposal, which relate to disturbance from aircraft activities rather than ground disturbance.

Table 1-1: Key proposal characteristics

Summary of the Proposal

Item	Description
Proposal title	Busselton-Margaret River Regional Airport.
Proponent name	City of Busselton.
Short description	The proposal is to operate an airport at Lot 9001 (383) Vasse Highway Yalyalup WA 6280, including operation of aircraft to Code 4C.

Physical elements

Element	Location	Proposed extent authorised
Runway	See Figure 1-1	Heading 030º / 210 º, length 2460 m (TORA[1]), width 45 m.
Associated infrastructure	See Figure 1-1	Within development envelope shown in Figure 1-1.

Operational elements

Element	Proposed extent authorised
Aircraft operations	• General and recreational aviation • Emergency services • Open, closed charter, RPT and freight services • Jet aircraft to Code 4C.

[1] TORA ~ Takeoff Runway Available

The location of the development envelope (230 ha) is shown on Figure 1-1. The development envelope specifies the areas in which surface disturbance for expansion of the runway and construction of associated infrastructure will take place.

The surface disturbance within the development envelope will include clearing of native vegetation as follows:

- approximately 20-25 isolated trees along Neville Hyder Drive
- approximately nine scattered trees in a cleared paddock west of the existing airport hangars and two trees in a cleared paddock south of the existing runway
- sedgeland in two small seasonal wetlands to the north-west of the runway.

In addition to surface disturbance within the development envelope, there is the potential requirement for clearing and/or pruning of vegetation south of the airport, along Vasse Highway, Acton Park Road and to the south of Vasse Highway, to accommodate changes in the Obstacle Limitation Surface (OLS).

Although the environmental factors associated with surface disturbance have been described in this Environmental Review, the preliminary key environmental factors identified for the Proposal relate to disturbance from aircraft operations, namely Amenity and Terrestrial Fauna.

Figure 1-1: Proposal development envelope and potential clearing/pruning for OLS

2. General description of the proposal

2.1 Description

The Proponent proposes to develop the Proposal through an expansion of the existing Busselton-Margaret River Regional Airport (BMRRA) facilities situated on Vasse Highway, Busselton, WA. The existing BMRRA supports predominantly General Aviation (GA) and closed charter Fly-In-Fly-Out (FIFO) operations, which are forecast to grow in the future under the existing EP Act approval. The Proposal is planned to allow additional aircraft operations to Code 4C jet aircraft, such as Boeing 737-800 (B737) and Airbus 320-200 (A320). The proposed aircraft operations will include Regular Public Transport (RPT), freight and/or open and closed charter operations.

The Proposal is a State Government funded project, with a total capital outlay of $59.95 million, of which $45.9 million is funded via the State Government's Royalties for Regions program, $10 million from the WA Department of Transport's Regional Aviation Development Scheme program, $3.5 million from the City of Busselton and $300,000 from the South West Development Commission and $250,000 from Tourism WA.

The location of the Proposal is shown on Figure 2-1. The Proposal area is surrounded by agricultural properties, with the closest urban residential areas located along Bussell Highway, 2 km to the north-west, and the main Busselton town site located approximately 6.5 km to the north-west of the Proposal area.

The Proposal development works are proposed to commence in December 2016 and be completed by December 2018, with the first Code 4C jet aircraft operations commencing in late 2018. The Proposal will be for a long term infrastructure asset, with a lifetime of at least 50 years.

The existing BMRRA operates subject to a Noise Management Plan (NMP 2015), which is approved under Ministerial Statement (MS) 1009. The Proponent proposes to revise the NMP 2015 as part of the Proposal, to allow the objectives of the BMRRA Development Project and State Government Funding Agreement / Project Governance Committee to be met. This includes flexibility to attract and support Code 4C jet aircraft operations, improved practicability of NMP implementation, and improved consistency with Australian Standard AS2021:2015 *Acoustics – Aircraft noise intrusion – Building siting and construction* and accepted Aviation Industry practices.

The existing BMRRA is classified as 'G' (uncontrolled) airspace and consequently the Proponent does not have control over aircraft movements such as those that occur at larger airports (e.g. Perth or Jandakot Airports) which have defined flight paths and air traffic control systems. The uncontrolled airspace limits the effectiveness of the current regulatory regime under MS 1009, where certain conditions (e.g. timing of aircraft movements) are imposed on the Proponent who is then unable to enforce them. This results in non-compliance with conditions requiring procedural reporting under the EP Act for no environmental improvement. As part of the Proposal, the Proponent proposes to implement a more appropriate noise management framework that is consistent with systems and procedures employed at Perth and Jandakot Airports, including a comprehensive NMP, Fly Neighbourly Agreement, aircraft noise modelling, landuse planning (special control areas), stakeholder consultation and complaints resolution. The proposed noise management framework is considered best practice and exceeds systems and procedures in place at other regional airports in Western Australia.

2.1.1 Development works

The Proposal comprises the following development works:

- extension, widening and strengthening of the runway from existing 1800m long x 30m wide to 2460m long (TORA) x 45m wide
- new terminal building
- additional 600 carpark bays
- new entry statement and internal road networks

- 2 new aircraft parking bays and single taxiway
- drainage infrastructure and service utilities
- land acquisition
- vegetation clearing/pruning to accommodate changes in the OLS.

A conceptual layout of the existing BMRRA is shown in Figure 2-2. The development envelope and conceptual layout for the Proposal development works is shown in Figure 2-3.

The development works will lie within a development envelope of approximately 205 ha.

The surface disturbance will mostly occur over the existing airport site or adjacent cleared agricultural land. However, the Proposal will comprise some clearing of native vegetation as follows:

- approximately 20-25 isolated trees along Neville Hyder Drive (Lot 9001 Plan 32476), including *Eucalyptus gomphocephala*, *Agonis flexuosa*, *Melaleuca rhaphiophylla*, *M. viminea* and *M. nesophila* species
- approximately nine scattered trees of in a cleared paddock west of the existing airport hangars (within Lot 9001 Plan 32476) and one tree in the cleared paddock south of the runway (Lot 1 Plan 53715). These trees comprise *Corymbia calophylla* and *Eucalyptus gomphocephala* species
- *Pallidus juncus* sedgeland in two small seasonal wetlands to the north-west of the runway (Lot 3819 Plan 153196).

In addition to clearing within the development envelope, clearing and/or pruning of vegetation may be required to accommodate changes to the OLS, which is necessary to maintain aviation safety standards in the vicinity of the airport. The extent of clearing and/or pruning of vegetation for changes in the OLS has been mapped and subject to CASA approval is expected to include removal of a small number of specific tress and pruning of other trees, located along Vasse Highway (Lot 57 Plan 5398), Acton Park Road and in Lot 591 Plan 126664 south-west of Vasse Highway. These areas in total include up to 4.6 ha of *Corymbia calophylla* (Marri) woodland as well as mixed woodland of planted (eastern states) *Eucalyptus* species, *Allocasuarina* species and *Melaleuca preissiana*, however a significantly smaller area is expected to be cleared/pruned.

Figure 2-1: Proposal location

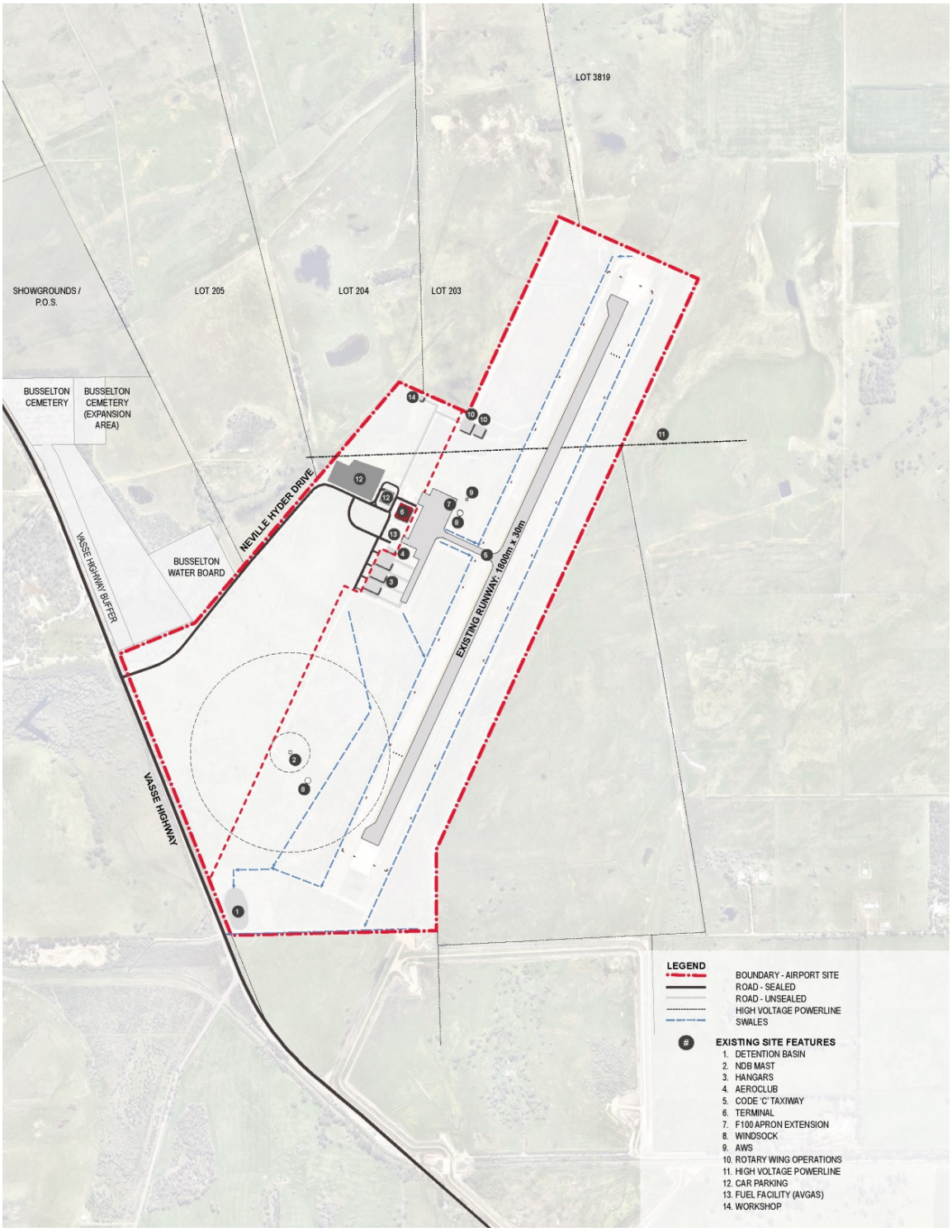

Figure 2-2: Existing Busselton Margaret River Regional Airport layout

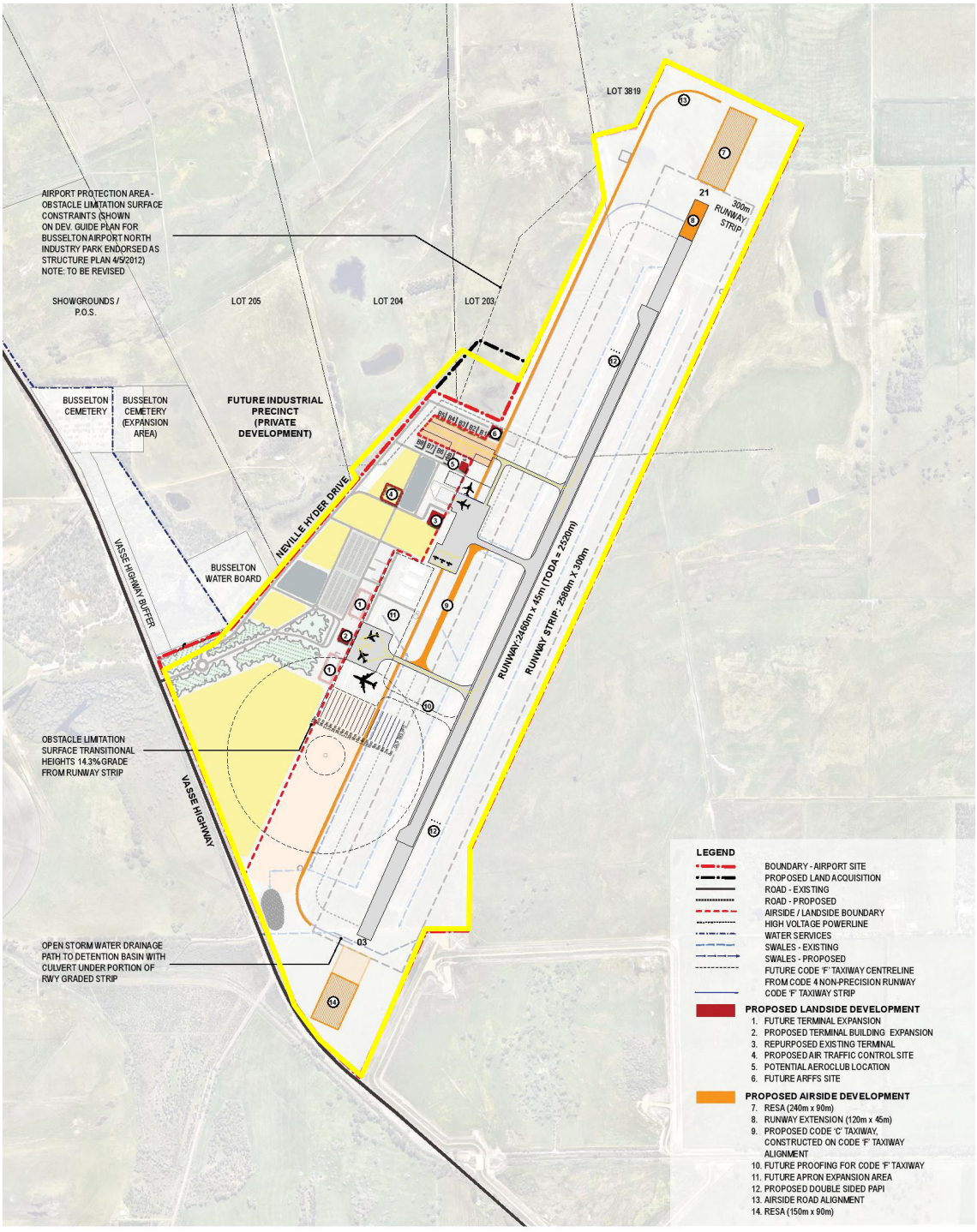

Figure 2-3: Proposal development envelope and conceptual layout

2.1.2 Aircraft movements

The number and timing of the proposed Code 4C jet aircraft movements remains unconfirmed and will be determined in negotiation with commercial airlines; however an indicative forecast of aircraft movements was developed by the Proponent during the preparation of the State Government Business Case Proposal[2] and is presented in Table 2-1. The table presents the average movements per week, with an aircraft flight comprising two movements: an arrival and a departure and was also used in the noise modelling prepared by the Proponent, as discussed in Section 5.2.2. The proposed Code 4C jet aircraft movements are highlighted in blue and are forecast at 10 movements (5 flights) per week in 2018/19, rising to a total of 30 movements (15 flights) per week in 2038/39.

Table 2-1: Aircraft movement forecast (weekly movements)

Year of operation	Current	Year 1	Year 5	Year 10	Year 20
Aircraft class	2015/16	2018/19	2023/24	2028/29	2038/39
Proposal – forecast flights					
Code 4C jet aircraft - RPT	0	6	14	16	24
Code 4C jet aircraft - freight	0	4	6	6	6
Subtotal - Proposal	***0***	***10***	***20***	***22***	***30***
Approved – forecast growth under existing approval					
FIFO – closed charter	20	22	24	24	24
General Aviation	230	242	254	266	270
Subtotal – Approved	*250*	*264*	*278*	*290*	*294*
Total weekly movements	**250**	**274**	**298**	**312**	**324**
Proportion of total movements increase due to Proposal	**Nil**	**4%**	**7%**	**7%**	**9%**

The BMRRA aircraft movement projections taken from the Business case for 2015/16 total approximately 250 aircraft movements per week[3], the majority (90%) of which comprise General Aviation (GA, small aircraft), with the remainder comprising Fly In Fly Out (FIFO) closed charter flights (Fokker 100 jet aircraft). It is expected that the closed charter and GA flights will grow gradually at the airport, irrespective of the Proposal taking place, with the forecast number of movements of closed charter and GA aircraft rising from the current 250 per week to 294 per week as of 2038/39. The airport will thus continue to be a mostly GA aerodrome, with GA comprising more than 80% of movements as of 2038/39, and the Proposal resulting in an increase of 9% of total aircraft movements as of 2038/39.

2.1.3 Aircraft noise management

Aircraft noise resulting from BMRRA is managed in accordance with the NMP 2015 approved under MS 1009, including the following operational requirements:

- flight paths
- noise abatement zones
- standard hours of operation
- fly neighbourly agreement
- flight training guidelines.

[2] State Government Business Case projected aircraft movement numbers have been adjusted to remove scheduled aircraft movements that have been withdrawn since preparation of the business case.

[3] Actual aircraft movements for BMRRA 2015 calendar year totalled 100 aircraft movements.

In addition to aircraft operations, the NMP 2015 includes provisions for land use planning, noise assessment and monitoring, noise amelioration, communication and consultation, and noise complaints. The proposed NMP (2016) is presented in Appendix 1 and discussed in further detail in Section 5.2.5 of this document.

The Proponent proposes to include a revised NMP 2016 as part of the Proposal, including changes to standard hours of operation as presented in Table 2-2. The changes allow for 24 hour operations (subject to City approval on a case by case basis) in order to provide flexibility for commercial airlines operating Code 4C aircraft (charter, RPT and freight services); particularly in the initial period of operations as the South-West becomes an established destination. The number of Code 4C jet aircraft flights that could occur between 23:00 and 06:00 is uncertain but is expected to be no more than five flights per week in the first year of operations.

As part of the Proposal, the Proponent proposes to implement a noise management framework that is consistent with the systems and procedures employed at Perth and Jandakot Airports, including a comprehensive NMP, Fly Neighbourly Agreement, noise exposure modelling, stakeholder consultation and complaints resolution. The noise management framework is presented in Section 5.3.5 of this document.

Table 2-2: Updated Hours of Operation under the proposed Noise Management Plan 2016

Aircraft	Existing Noise Management Plan Standard Hours of Operation	Updated Noise Management Plan Standard Hours of Operation
Emergency Services	Unrestricted	Unrestricted
Light Aviation	Unrestricted Single engine < 2000 kg MTOW[4] Flight training subject to City approval (maximum 1500 kg MTOW)	Unrestricted Flight training subject to City approval (maximum1500 kg MTOW) City approval required for >5,700 kg MTOW
General Aviation	07:00 to 19:00 (May-Nov) 06:00 to 21:00 (Dec-Apr)	Unrestricted City approval required for >5,700 kg MTOW
Open and Closed Charter Flights	06:00 to 22:00	Unrestricted City Approval required
RPT / Freight	06:00 to 23:00	Unrestricted City Approval required

2.1.4 Aircraft flight paths

The existing BMRRA is currently classified as G-airspace, which is uncontrolled airspace, and a reclassification of airspace is not required as part of the Proposal. As the airspace is uncontrolled there are no mandatory defined flight paths, with pilots operating on the basis of weather, safety and economic factors.

However, the City has prepared indicative flight paths (see Figure 2-4 and Figure 2-5) to use as the basis for aircraft noise modelling, assessment of aircraft noise impacts, and for the purposes of community and stakeholder consultation. These indicative flight paths are based on the existing Departure and Approach Procedures (DAPs) published by Airservices Australia through the Aeronautical Information Package (AIP) and operational knowledge of the flight paths typically taken by aircraft.

The indicative flight paths presented in Figure 2-4 and Figure 2-5 are denoted 'Runway 03' for arrivals from the south-west and departures to the north-east, and 'Runway 21' for arrivals from the north-east and departures to the south-west.

[4] MTOW ~ Maximum Takeoff Weight.

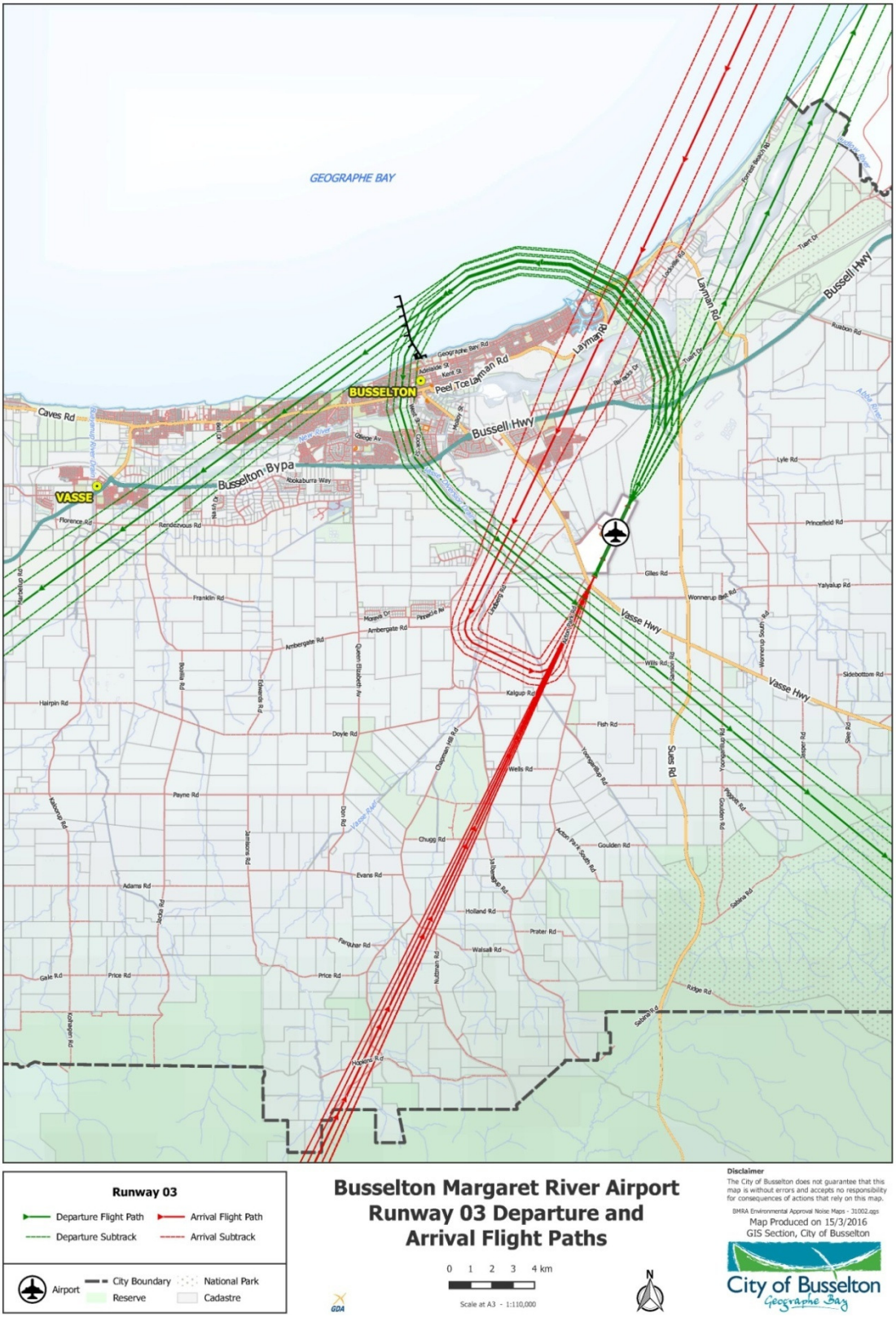

Figure 2-4: Indicative flight paths – Runway 03

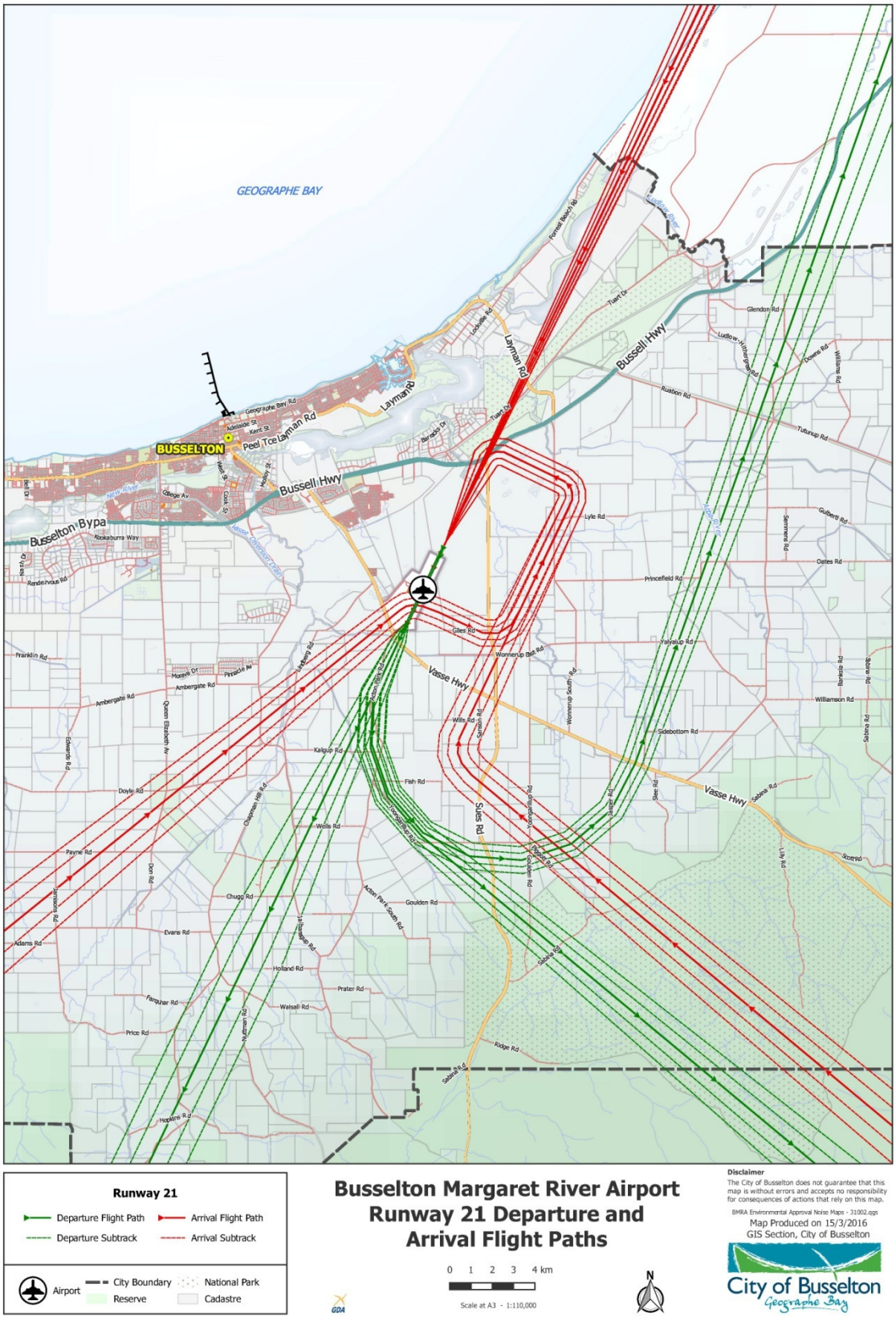

Figure 2-5: Indicative flight paths – Runway 21

2.2 Other approvals

The Proposal has been referred to the Department of the Environment under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), with reference EPBC 2016/7675. The Proponent is currently awaiting a decision on whether or not the Proposal is a controlled action under the EPBC Act.

The Proposal is consistent with the Town Planning Scheme No. 21 and the Busselton Airport Structure Plan.

Groundwater is currently abstracted from the wet retention basin on the south-west corner of the airport, which intersects the groundwater table, and utilised for landscaping and irrigation purposes only. Groundwater abstraction is licensed under GWL150672 issued under the *Rights in Water Irrigation Act 1914* (RIWI Act). It is expected that the allocation under GWL150672 will be sufficient to meet the requirements of the expanded BMRRA and no amendment to the licence is proposed.

The City is in the process of acquiring the following portions of land as detailed in Table 2-3 below and has lodged separate subdivision applications and to date has received separate conditional Western Australian Planning Commission (WAPC) approvals for:

- Part Lot 3819 Plan 153196 (the Manning Subdivision); and
- Part Lot 1 Plan 53715 (the Watercorp Subdivision).

The City has a binding contract for the Provence Subdivision (0.35 ha of Lot 203 on Deposited Plan 32475) and is close to finalising the contract for the Provence Subdivision (2.9 ha of Lot 203 and Lot 204 on Deposited Plan 32475). Both of these subdivisions will be subject to the usual WAPC subdivision and amalgamation approval processes.

2.3 Proposal tenure and zoning

The Proposal disturbance envelope comprises a total of six lots as presented in Table 2-3 below. One of the lots and parts of three others will be amalgamated into the expanded airport site, with the remaining two lots to involve clearing and/or pruning of native vegetation for the OLS.

Under Town Planning Scheme No. 21 the vicinity of the Proposal area is generally zoned for agriculture, with the land immediately to the north-west zoned for industrial development.

Table 2-3: Proposal Lot Details

Lot details	Development intent	Tenure	Owner	Zoning
Lot 9001 Plan 32476	Existing airport lot – to be amalgamated into expanded airport site	Freehold	City of Busselton	Special Purpose: Busselton Regional Airport
Part Lot 1 Plan 53715	Rural lot –11.3ha be acquired and amalgamated into expanded airport site	Freehold	Water Corporation	Rural
Part Lot 3819 Plan 153196	Rural lot – 26.13ha to be acquired and amalgamated into expanded airport site	Freehold	R & S Manning	Rural
Part Lot 203 / 204 Plan 32475	Rural lot – 3.25ha to be acquired and amalgamated into expanded airport site (two areas of 0.35ha + 2.9ha)	Freehold	Provence 2 Pty Ltd	Rural
Lot 57 Plan 5398	Vasse Highway – potential clearing and/or pruning of native vegetation for OLS	Crown Land	Main Roads	Road
Lot 591 Plan 126664	Rural lot – potential clearing and/or pruning of native vegetation for OLS	Freehold	K & M Kalka	Rural

3. Stakeholder consultation

The Proponent has developed a BMRRA Development Project Communication Plan (Appendix 3) outlining the goals and objectives, communication approach and methodology to be utilised for stakeholder and community consultation for the proposed project. The Proponent has formed a BMRRA Consultative Group, with the terms of reference for the group presented in Appendix 2. The Group will consist of representatives from the Proponent, business/industry (Tourism, Chamber of Commerce), airport users, Community members and adjacent airport neighbours. The Group will provide a forum for interested parties to raise issues and concerns to the Proponent relating to the Proposal.

Comments and advice received from government agencies and other relevant stakeholders were incorporated into the design of the Proposal. A summary of stakeholder consultation undertaken to date is summarised below in Table 3-1.

Table 3-1: Consultation summary

Stakeholder	Date	Topics/issue raised	Consultation details and Proponent response/outcome
State Government agencies			
Department of Water (DoW)	25 January 2016 23 February 2016	Stormwater management Spill management Groundwater control Groundwater abstraction	DoW are supportive of the Proposal. DoW referred to District Water Management Strategy (DWMS) for Busselton Airport Structure Plan. Strategen reviewed the DWMS and concluded the document was not directly applicable for the Proposal as it covered land to the north with a different catchment. DoW agreed to this conclusion. DoW recommended vegetated stormwater drainage systems from roads and paved areas, with water efficiency features and rainwater harvesting and reuse for buildings. DoW are satisfied with proposed use of spill kits and interceptor drains to capture any spills from aircraft refuelling. DoW advised that groundwater control should be considered given the shallow groundwater in the area; however it is likely that existing approach at the airport will be adopted. DoW advised that the risk to downstream water bodies (Vasse Estuary) is low, however an option to manage perceived risk is use of a shut-off valve on the wet retention basin on site, to be closed if a spill event occurs at the airport. DoW advised that a license is required for any abstraction of water from the wet retention basin, as the basin intersects the groundwater. Limited groundwater is available from the superficial aquifer however the deeper Yarragadee and Leederville aquifers are fully allocated. The Proponent will incorporate the DoW's recommendations into the design, construction and operation of the Proposal. Any abstraction of groundwater will be licensed in accordance with the RIWI Act.
Department of Parks and Wildlife (DPaW)	14 December 2015	Bird strike Aircraft noise disturbance to waterbirds	DPaW noted key issues as impacts to resident birds during breeding (winter-spring), juvenile ducks (spring) and migratory waders/shorebirds during feeding (summer-autumn). DPaW recommended that arrivals come from the south rather than the north. Small planes do not appear to be an issue. DPaW requested additional information including arrival altitudes, flight paths and proposed ground works. DPaW noted concern of birdstrike, including lapwings, kestrels and straw necked ibis. Flock of ibis move between paddocks and roosting areas, could be an issue for planes.

Stakeholder	Date	Topics/issue raised	Consultation details and Proponent response/outcome
	5 January 2016	Bird strike Aircraft disturbance to waterbirds	DPaW noted that during carrying out December 2015 bird counts, they observed waterbirds being disturbed by Fokker 100 aircraft arrivals along the Wonnerup Estuary. They noted that the Vasse Wonnerup system is an important wetland in the South West, with a relatively high density of birds. Proponent provided information on flight paths, arrival/departure altitudes and aircraft noise contours; also a map of the proposed ground works. DPaW recommended that a specialist be engaged to review the risk posed by aircraft disturbance to birds. The Proponent engaged Bamford Consulting Ecologists to undertake a literature review and assessment of the risk posed by aircraft disturbance to waterbirds. The Proponent will promote the Fly Neighbourly Agreement to commercial airlines to minimise flights over the Vasse-Wonnerup wetlands. The Proponent will grade and maintain the airport grounds to minimise nesting habitats for birds and thus potential for bird strike. Records by the Australian Transport Safety Bureau (see Appendix 10) indicate a total of 25 bird strike incidents from 2005 to 2015 the majority of which involved single birds and occurred within the airport precinct, or an average of 2.5 bird strikes per year.
Office of the Environmental Protection Authority (OEPA)	20 November 2015	Overview of project Preliminary key environmental factors	OEPA noted that amenity (aircraft noise) is a key environmental factor and that a peer reviewer should be engaged to review noise modelling prepared as part of the EP Act referral as the OEPA does not have this expertise. OEPA recommended consultation with DPaW regarding risk posed to Vasse-Wonnerup wetlands and waterbirds. OEPA requested a statement of how water quality into the Vasse Diversion Drain will be maintained or improved. OEPA advised that human health risks from aircraft noise may be a concern to members of the public. Proponent engaged GHD to undertake a peer review of the aircraft noise modelling and engaged To70 (Australia) to revise the modelling to incorporate the peer review comments. Proponent consulted with DPaW as presented in this table. Proponent has addressed water quality and human health within 'Other Environmental Factors' of this document.
Department of Transport	Monthly / Ongoing	Development Project	Department of Transport are members of the Project Control Group and Project Governance Committee for the Airport Development Project which meets monthly and quarterly respectively. They are consulted on all aspects of the project.
Department of Aboriginal Affairs (DAA)	22 March 2016	Aboriginal heritage	DAA advised that there are no known Aboriginal heritage sites within the vicinity of the Proposal and there are no known Aboriginal heritage implications relating to the Proposal. The Proponent has addressed Aboriginal heritage within 'Other Environmental Factors' of this document.
Australian Government agencies			
Department of the Environment	Meetings 22 January 2016 20 April 2016 31 May 2016 EPBC referral 4 April 2016	Aircraft noise disturbance to waterbirds Water quality impacts to Ramsar wetlands Presence of Vasse Featherflower (*Verticordia plumosa var. vassensis*) along Vasse Highway	Strategen issued an initial briefing note to DotE on 21 January 2016 and further information on traffic forecasts, location, EPBC assessments for other airports, and water quality on 3 and 17 February 2016. Proponent submitted an EPBC referral to DotE (EPBC 2016/7675) on 4 April 2016 addressing Matters of National Environmental Significance including Ramsar wetlands and threatened/migratory species. Within the referral the Proponent concluded the Proposal is not a controlled action. DotE has requested further information on risks posed to Vasse Featherflower during clearing/pruning for OLS changes, and aircraft spill management at the airport, to which the Proponent responded on 29 April 2016. DotE requested further information on shorebird usage in the region, to which Strategen responded on 5 July 2016.
Airservices Australia (ASA)	16 November 2015 - ongoing	Aviation noise and DAPs	No issues were raised by ASA with respect to the Proposal. The Proponent will formally request ASA to review and prepare new DAPs for the Proposal.

Stakeholder	Date	Topics/issue raised	Consultation details and Proponent response/outcome
Civil Aviation Safety Authority (CASA)	December 2015 - ongoing	Aviation safety and environmental issues	No issues were raised by CASA with respect to the Proposal. The Proponent will formally request CASA to review the airside design and construction works and where appropriate approve /sign off on aviation related requirements.
Other stakeholders			
Community members	Public advertisement Letter (Dec 2015/ January 2016) and aircraft noise brochure mail out to nearby residents inviting them to one-to-one meetings or to attend community information sessions. Community information sessions 15-22 February 2016 - Understanding Noise Management Noise Management Plan and aircraft noise brochure advertised on webpage 14 March – 1 April 2016 First Noise Modelling Report and Contours available on City webpage from 23 March 2016 Final (peer reviewed) Noise Modelling Reports and Contours available on City webpage from 8 June 2016	Airport Development Project Fact Sheet Flight paths and aircraft noise Noise Contours (ANECs/N-contours) Change to Standard Hours of operations (2300hrs-0600hrs) Aircraft noise disturbance to waterbirds	Proponent provided information on aircraft movements, indicative flight paths and aircraft noise information, as presented in Appendix 3 of this document in one-to-one meetings and community information sessions. Proponent will liaise with Airservices Australia on flight path design and put forward community concerns during the process to ensure that aircraft noise resulting from flight paths situated over residential areas is minimised either through design or sharing of flight path approaches/departures from different directions. The Noise Management Plan contains the processes by which residents/community members can submit noise complaints or requests for noise monitoring and if appropriate noise amelioration. Proponent engaged Bamford Consulting Ecologists to undertake a literature review and risk assessment of aircraft disturbance to waterbirds. The Proponent has responded to each community submission received as part of the public comment process for the proposed Noise Management Plan (2016), as presented in Appendix 4.

4. Environmental studies and survey effort

Details of environmental studies and surveys undertaken are provided in Table 4.1 including the appendix number of the attached reports. The order of the studies/surveys and associated appendices is related to the order in which the environmental factors are presented in Sections 5 and 6 of this document.

Table 4-1: Summary of environmental studies and surveys

Factor	Consultant	Survey/investigations name	Study area, type and timing	Study standard/guidance and limitations	Appendix
Amenity (aircraft noise)	To70 Aviation (Australia)	Noise Modelling Report, Busselton-Margaret River Regional Airport (May 2016) Busselton Noise Modelling Report – Freighters, Busselton-Margaret River Regional Airport (May 2016)	Aircraft noise modelling and preparation of aircraft noise contours for the airport. Initial report completed December 2015. Updated reports completed May 2016 incorporating peer review comments.	Federal Aviation Administration (FAA) Integrated Noise Model (INM) version 7.0d Guidance Notes. Bureau of Metrology (BoM) Nov 2014-Oct 2018 average weather settings.	*Appendix 5*
Amenity (aircraft noise)	GHD	Busselton-Margaret River Regional Airport, Peer Review of Noise Modelling	Peer review of aircraft noise modelling. Report completed March 2016. Close out letter report completed May 2016.	Noise Modelling Report, Busselton-Margaret River Regional Airport (To70 Australia, December 2015) Busselton INM system inputs & data.	Appendix 6
Terrestrial fauna	Bamford Consulting	Assessment of the risk of disturbance to waterbirds of the Vasse-Wonnerup wetlands from the proposed expansion of the Busselton-Margaret River Regional Airport	Vasse-Wonnerup wetlands. Desktop literature review. Report completed February 2016.	Desktop literature review and risk assessment. Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).	*Appendix 8*
Terrestrial fauna	Bamford Consulting	Shorebird count mapping – Mandurah to Dunsborough	Mapping of Shorebird 2020 count data for wetlands from Mandurah to Dunsborough.	Shorebird 2020 count data (Birdlife Australia 2016) for shorebird count areas from Mandurah to Dunsborough.	Appendix 9
Vegetation and flora	Natural Area Management	Flora, Vegetation and Fauna Survey, Busselton Airport Development	Desktop literature review and field survey of Proposal disturbance envelope. Field survey undertaken February 2016. Report completed March 2016.	Level 1 flora and vegetation survey. EPA Guidance Statement No. 51.	*Appendix 11*
Terrestrial fauna	Natural Area Management	Flora, Vegetation and Fauna Survey, Busselton Airport Development	Desktop literature review and field survey of Proposal disturbance envelope. Field survey undertaken February 2016. Report completed March 2016.	Targeted level 1 flora fauna survey. EPA Guidance Statement No. 56.	*Appendix 11*
Terrestrial Environmental Quality	Golder Associates	Geotechnical and Preliminary Acid Sulfate Soils Investigation, Busselton Margaret River Airport Redevelopment Project	Desktop review and field investigation of development works area. Field investigation undertaken January 2016. Report completed February 2016.	Preliminary acid sulphate soils investigation. DER Guideline (2015) Identification and investigation of acid sulphate soils and acidic landscapes.	Appendix 12

Factor	Consultant	Survey/investigations name	Study area, type and timing	Study standard/guidance and limitations	Appendix
Heritage	Brad Goode & Associates	Report of a Desktop Aboriginal Heritage Survey of the Busselton Regional Airport Development Plan in the South West Region, Western Australia	Area bounded by Bussell Highway in the north, Vasse Highway in the west/south and Sues Road in the east. Desktop review report. Reported completed January 2013.	Desktop review of previous surveys and consultation *Aboriginal Heritage Act 1972* (AH Act). EPA Guidance Statement No. 41.	*Appendix 13*

5. Assessment of preliminary key environmental factors

5.1 Preliminary key environmental factors

On the basis of the EPA Environmental Assessment Guideline No. 8: Environmental Principles, Factors and Objectives (2013b) and discussions with OEPA and Government agencies, the following are identified as preliminary key environmental factors for the Proposal:

1. Amenity.
2. Terrestrial fauna.

Potential impacts, their mitigation and management and the proposed regulatory mechanisms for ensuring mitigation are presented using relevant studies to demonstrate the Proposal meets the EPA objective for each preliminary key environmental factor.

Environmental factors determined as 'other' environmental factors and not key environmental factors are discussed in Section 6.

Table 5-1: Preliminary Key Environmental Factors Table

Factor	Envelope	Environmental Aspect	Impact
Amenity	Vicinity of airport	Aircraft noise emission	Noise disturbance
Terrestrial fauna	Vasse-Wonnerup wetlands	Aircraft movements and noise emission	Disturbance to migratory birds and waterbirds

A summary of the assessment of each preliminary key environmental factor is presented in Table 5-2, with details provided in the following sections.

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Table 5-2: Assessment table

Inherent Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation	Outcome to demonstrate that the proposal meets EPA objective Predicted environmental outcome
Amenity - *To ensure that impacts to amenity are reduced as low as reasonably practicable.*				
<u>Context:</u> • Airport is in the vicinity of scattered rural residences, with urban residential areas to the north along Bussell Highway. • Airport has been operating since 1997, with general and light aviation aircraft and closed charter (FIFO) jet aircraft movements (including single and twin engine propeller and jet aircraft). • Airport has G class uncontrolled airspace, with uncontrolled flight paths, some aircraft overfly nearby residences. • Operations are restricted between 11:00pm and 06:00am, with only emergency aircraft operations allowed between these hours. • Intermittent disturbance of residences from existing aircraft flights. • Airport Noise Management Plan approved in 2012 and 2015, including noise abatement zones over urban residential areas in the vicinity. <u>Key study findings:</u> • Introduction of additional jet operations up to Code 4C aircraft. • Introduction of 24 hour operations, with a small number Code 4C jet aircraft flights expected to occur between 11:00pm and 06:00am. • Frequency of Code 4C jet aircraft flights likely to rise gradually, from forecast 10 movements per week (1.4 per day) in 2018/19 to 22 per week (3.1 per day) in 2028/29 and 30 per week (4.3 per day) in 2038/39. As of 2038/39, Code 4C jet aircraft movements forecast to be approximately 9% of total aircraft movements. • Some Code 4C jet aircraft flights likely to overfly rural residences and rural/urban residential areas. • Code 4C jet aircraft flights expected to increase peak aircraft noise levels from existing peak aircraft noise levels • Frequency of 70 dB(A) aircraft noise events as of 2038/39 (20 years of operation) expected to be less than five per day for most residences, with approximately 25-30 residences exposed to 5-10 events per day, approximately 5 residences exposed to 10-20 events per day and no residences exposed to 20 or more events per day. These frequencies lie well within the limit of 30 events per day at 70 dB(A) recommended in AS2021:2015 for general aviation aerodromes without ANEF charts. • No urban/rural residential zoned areas or existing residences likely to lie within the Australia Noise Exposure Concept (ANEC) 20 contour based on 2038/39 aircraft forecast, in compliance with AS2021:2015. <u>Impacts (without mitigation):</u> • Additional infrequent noise disturbance to residential properties close to flight paths, including potential for some night time noise disturbance that may interrupt sleep for some residents.	Aircraft noise emissions	<u>Avoidance</u> • Fly Neighbourly Agreement to be recommended to airlines for adoption in new Code 4C jet aircraft operations, to minimise noise impacts over residential areas. <u>Minimisation</u> • Design new Departure and Approach Procedures (DAP) that provide alternative flight paths that avoid noise sensitive areas, for incorporation into the En Route Supplement Australia (ERSA) so they may be considered by aircraft operators. • Noise amelioration process available for all residential buildings falling within noise mitigation criteria specified in the Noise Management Plan (NMP). Land use planning and noise amelioration included in the NMP to inform on indoor design sound levels remain within levels specified in AS2021:2015. • Land use Planning: Town Planning Scheme amendment to include a revised Airport Special Control Zone (based on noise modelling contours) will be progressed in 2017. • Noise modelling and generation of noise contours for public consultation, including ANEI, ANEC and N70 contours, at five yearly intervals and/or at predetermined trigger points (significant increase in air traffic). <u>Residual impacts</u> • Additional infrequent disturbance of residences close to flight paths, including potential for some night time noise disturbance that may interrupt sleep for some residents.	• Proposed Noise Management Plan (2016). • Fly Neighbourly Agreement. • Land use planning: Town Planning Scheme amendment. • Airservices Australia noise complaints system. • West Australian Ombudsman. • Aircraft Noise Ombudsman.	Yes. Aircraft noise exposure is expected to fall within levels deemed acceptable in AS2021:2015. Proposal management measures would ensure that impacts to amenity are minimised to meet the EPA's objective.

Inherent Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation	Outcome to demonstrate that the proposal meets EPA objective Predicted environmental outcome
Terrestrial fauna - *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.*				
<u>Context:</u> • Airport is in the vicinity of the Vasse-Wonnerup wetlands, a Ramsar wetland of international importance. • Migratory shorebird habitat and usage extends from Mandurah to Busselton, which indicates that waterbirds have options should they be disturbed within particular habitat areas. • Airport has been operating since 1997, with general and light aviation propeller aircraft and closed charter (FIFO) jet aircraft movements. • Airport has G class uncontrolled airspace, with uncontrolled flight paths, however some aircraft flight paths overfly the wetlands. • Intermittent disturbance of waterbirds from existing aircraft flights. • Occasional mortality to birds (2.5 strikes per year) due to collision with existing aircraft flights (Appendix 10). <u>Key study findings:</u> • Introduction of additional jet operations up to Code 4C jet aircraft. • Frequency of Code 4C flights likely to rise gradually, from forecast 10 movements per week (1.4 per day) in 2018/19 to 22 per week (3.1 per day) in 2028/29 and 30 per week (4.3 per day) in 2038/39. As of 2038/39, Code 4C jet movements forecast to be approximately 9% of total aircraft movements. • Some Code 4C jet aircraft flights likely to overfly the wetlands. • Code 4C jet aircraft flights likely to increase peak aircraft noise levels from existing peak aircraft noise levels over the wetlands, but at levels less than 85 dB(A). • Disturbance not expected to adversely affect waterbirds provided that 300 m vertical buffer and 85 dB(A) noise limit are maintained. <u>Impacts (without mitigation):</u> • Additional infrequent noise disturbance of waterbirds from Code 4C jet aircraft flights. • Continuing occasional mortality to birds due to collision with aircraft flights.	Aircraft movements	<u>Avoidance</u> • Fly Neighbourly Agreement to be recommended to airlines for adoption in new Code 4C jet aircraft operations, to minimise flights over the Vasse-Wonnerup wetlands, particularly arrivals. • Awareness to be raised amongst all aircraft operators, including Code 4C jet aircraft, FIFO and general aviation, of the sensitivity of the Vasse-Wonnerup wetlands, particularly during the late winter/early spring breeding season of Black Swans, and the need to avoid low flights over the wetlands. <u>Minimisation</u> • Design Departure and Approach Procedures (DAP) that provide alternative flight paths that avoid the wetlands, for incorporation into the En Route Supplement Australia (ERSA) so they may be considered by aircraft operators. • Maintain a minimum 300 m vertical buffer and 85 dB(A) aircraft noise limit over the wetlands, to be incorporated into the Noise Management Plan and Fly Neighbourly Agreement. • Airport grounds to be graded and maintained to minimise nesting habitat for birds and potential for bird strike. <u>Residual impacts</u> • Additional infrequent noise disturbance of waterbirds in the Vasse-Wonnerup wetlands. • Continuing occasional mortality to birds due to collision with aircraft flights.	• Noise Management Plan. • Fly Neighbourly Agreement. • DAP incorporated into ERSA.	Yes. Code 4C jet aircraft flights will be infrequent and maintain a vertical buffer of 300 m and noise limit of 85 dB(A) over the Vasse-Wonnerup wetlands. Bird strike mortality expected to remain highly infrequent and not pose a significant impact to bird populations. Proposal management measures would ensure impacts to terrestrial fauna populations are minimised to meet the EPA's objective.

5.2 Assessment of preliminary key environmental factors – Amenity

5.2.1 Aircraft noise metrics

The assessment of noise exposure within Western Australia is typically undertaken with reference to the *Environmental Protection (Noise) Regulations 1997* and State Planning Policy 5.4 *Road and Rail Transport Noise and Freight Considerations in Land Use Planning*. However, these instruments do not apply to aircraft noise. In these situations, EAG 13 (EPA 2014) states that the EPA may nominate other acceptable standards to which the proposal must comply.

The established land use planning standard within Australia for assessing aircraft noise exposure is AS2021:2015 *Acoustics – Aircraft noise intrusion – Building siting and construction* (Standards Australia 2015) which provides criteria for building siting suitability on the basis of Australian Noise Exposure Forecast (ANEF), or on the basis of maximum noise level (LA_{max}) and frequency (flights per day) for smaller aerodromes subject to general aviation flights and without ANEF charts.

Current industry practice used by airport operators in Australia for aircraft noise is to compliment the use of the ANEF with the supplementary metrics listed below, which collectively describe the location, intensity, duration and frequency of aircraft noise events:

- flight paths and altitude plots
- number of events above xx db(A) contours (N or Nxx contours)
- maximum noise level (LA_{max}).

The ANEF was primarily developed as a land use planning tool aimed at controlling encroachment on airports by urban land development, in particular noise sensitive buildings. The ANEF is accepted as the current Australian standard for forecasting aircraft noise. It is a forecast of the cumulative noise effect over a twelve month period of airport operations, including all projections of aircraft movements and weather patterns, divided by 365 to show an average annual day exposure. ANEF contours are given values of 5, 10, 15, 20, 25, 30, 35 and 40, with the higher the contour value, the greater the noise effect. The ANEF system is made up of the following three noise exposure indicators that all use the same calculation models but are based on different inputs and have different purposes.

- ANEF (Australian Noise Exposure Forecast) noise contours show the anticipated/forecast noise exposure patterns around an airport and are mainly used by land use planning authorities to manage land development in the vicinity of airports
- ANEI (Australian Noise Exposure Index) contours show the historic noise exposure patterns (based on actual aircraft movements and weather patterns) and are generally used in environmental reporting and benchmarking
- ANEC (Australian Noise Exposure Concept) are scenario contours and are used to predict ('what if') noise contours resulting from proposed changes to airport operations.

ANEF are noise exposure contours approved by Airservices Australia, whereas preliminary noise exposure contours using the ANEF calculation method are termed ANEC. The noise impact assessment undertaken for the Proposal therefore uses the terminology ANEC for the noise exposure contours.

ANEF is an established land use planning tool used for most large aerodromes throughout Australia and, combined with the supplementary metrics listed above, has been used in recent aircraft noise impact assessments undertaken for Brisbane Airport[5], Sunshine Coast Airport[6], and introduction of the F-35A Lighting by Department of Defence[7].

The flight paths, N contours and LA_{max} together provide an indication of the location, frequency and magnitude of aircraft noise disturbance, and are used to assess the effects of aircraft noise on existing sensitive receivers.

Flight paths and altitude plots provide an indication of the horizontal and vertical position of aircraft flights and their proximity to sensitive receivers. The flight paths and altitudes are well defined for major City airports with controlled airspaces, as aircraft operators are required to follow directions of air traffic control. The Proposal involves uncontrolled airspace and while indicative flight paths (Figure 2-4 and Figure 2-5) have been prepared for the Proposal, the actual flight paths could vary depending on individual pilot preferences, and on flight path designs and DAPs to be developed.

The 'number of events above' or N contours present an estimate of the average number of times per day that a certain noise level in dB(A) will be exceeded. The most widely used N contour is the N70, which is the number of times per day that outdoor noise levels will exceed 70 dB(A). The N70 is widely used for aircraft noise assessment, as an outdoor noise level of 70 dB(A) roughly correlates to an indoor noise level of 60 dB(A), which is the range at which conversation and associated activities can be disrupted. The N70 metric thus provides an indication of the frequency of noticeable indoor noise disturbance from aircraft activities.

LA_{max} contours present an estimate of the maximum noise levels that may be experienced at ground level from an individual aircraft movement. The LA_{max} is measured in A-weighted decibels or dB(A) and so can be compared against 'everyday' noise sources (e.g. road traffic, domestic appliances) to provide an indication of the magnitude of noise disturbances that could occur.

ANEF, N-contours and Lamax contours are considered the most appropriate tools for both land use planning and community consultation regarding aircraft noise. The Commonwealth *Airports Act 1996*, which regulates federally leased Airports, requires Airport operators to prepare a draft or final Master Plan that includes an ANEF for areas surrounding the airport. Department of Infrastructure and Regional Development and AirServices Australia also provide information for both community and airport operators on understanding and communicating aircraft noise and the tools for describing potential impacts, including ANEF, N-contours, flight paths and aircraft movements. It is industry practice for Australian airport operators, federally leased and regional, to prepare ANEFs and N-Contours for the purposes of assessing aircraft noise impacts and master planning.

BMRRA is not subject to the *Airports Act 1996* as it is owned and operated by City of Busselton. However, the City has prepared ANECs, N-contours and Lamax contours for the assessment of the Proposal and for community consultation undertaken for the Proposal.

Australian Standard AS2021:2015 provides criteria for land use planning based on ANEF ranges, as shown in Table 5-3. These criteria were developed following the National Acoustic Laboratories (NAL) 1982 study Aircraft Noise in Australia: A Survey of Community Reaction (Standards Australia 2015).

[5] Brisbane Airport New Parallel Runway, Environmental Impact Statement. Available from: *http://www.bne.com.au/corporate/bne-major-projects/new-parallel-runway/eismdp*.

[6] Sunshine Coast Airport Expansion, Environmental Impact Statement. Available from: *http://www.statedevelopment.qld.gov.au/assessments-and-approvals/sca-expansion-project-eis-documents.html*.

[7] Flying Operations of the F-35A Lighting II, Environmental Impact Statement. Available from: *http://www.defence.gov.au/AirCraftNoise/Environment/F35EIS.asp*.

Table 5-3: Building site acceptability based on ANEF / ANEC

Building type	Acceptable	Conditionally acceptable	Unacceptable
Residential Educational Hospital, nursing home	< 20 ANEF	20 to 25 ANEF	> 25 ANEF
Public	< 20 ANEF	20 to 30 ANEF	> 30 ANEF
Commercial	< 25 ANEF	25 to 35 ANEF	> 35 ANEF
Light industrial	< 30 ANEF	30 to 40 ANEF	> 40 ANEF

Source: *Standards Australia 2015, Table 2.1*.

Although ANEFs/ANECs are widely used for land use planning and to identify acceptability of buildings in the vicinity of airports, the metric is not typically used to assess the effects of aircraft noise on existing sensitive receivers. Members of the public can misinterpret ANEF criteria to expect that no aircraft noise disturbance will occur outside the ANEF 20 contour, however this may not be the case. As shown in Figure 5-1, there is the potential for a substantial proportion of people to be affected at an ANEF less than 20 and hence the supplementary metrics of flight paths, N-contours, LA_{max} are used in combination with ANEF in the assessment of aircraft noise impacts.

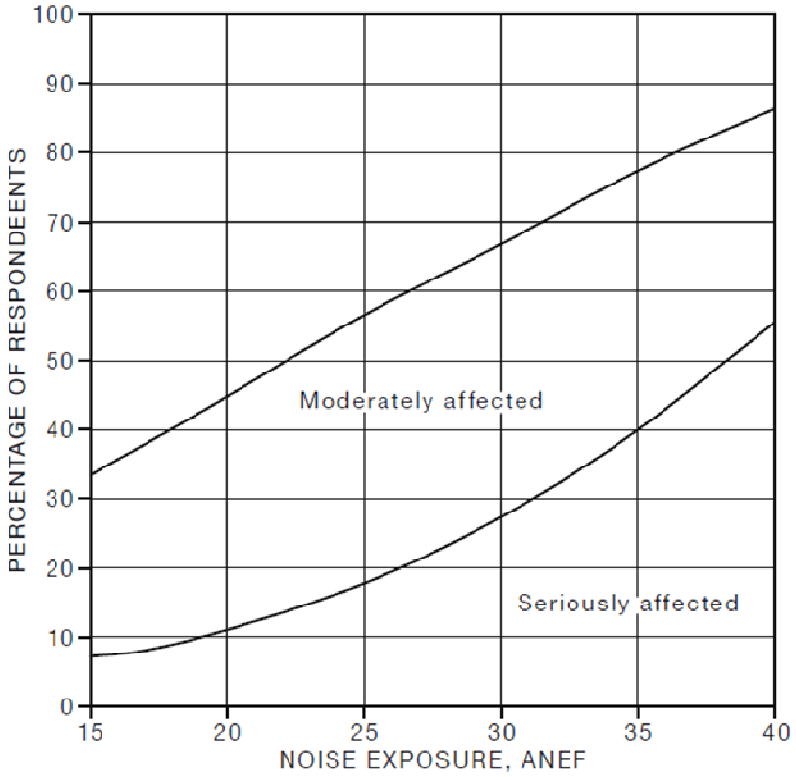

Figure 5-1: Relationship between ANEF and community reaction in residential areas

Source: *Standards Australia 2015, Figure A1*

5.2.2 Aircraft noise modelling

Aircraft noise modelling of the proposal was undertaken by To70 Aviation Australia Pty Ltd (To70) including LA_{max}, N65, N70, N75, N80 and ANEC contours. The modelling was undertaken in a staged manner as follows:

- preliminary noise modelling (December 2015) for stakeholder consultation
- peer review by GHD (March 2016) with a close out report (May 2016)
- revised noise modelling (May 2016) incorporating peer review comments.

The revised modelling reports are presented in Appendix 5. The presented noise contours and assessment of noise impacts are based on the revised noise modelling incorporating peer review comments.

The preliminary noise modelling undertaken by To70 (2015) was subject to peer review by GHD, which covered the following scope:

- review and assess data sources and attribution for aircraft movement forecasts, aircraft type selection and flight paths/tracks, track maps with labels and track assignment assumptions, details of circuit operations, stage lengths for departures and forecast horizons
- review and assess airport setup, runway description, temperature, headwind and humidity assumptions, calculations of airport capacity runway usage assumptions, day/night split assumptions and sources used as input for the INM model
- INM model setup including version, aircraft type selection, details of terrain files (if used), base map coordinate systems etc.
- documentation of inputs and outputs.

The peer review report and close comments by GHD are presented in Appendix 6.

It is important to recognise that noise modelling has been undertaken based on a number of key assumptions including:

1. The growth and mix of aircraft movements prepared for the Business Case plus freight.
2. Indicative flight paths for arrivals and departures.

In the case of the growth and mix of aircraft movements, the forecasts used were based on traffic forecasts formulated for the Business Case approved by the State Government for funding the Proposal. The actual aircraft that operate in the future may vary due to actual provision of services by commercial airlines depending on a range of commercial factors, as well as changes to aircraft models which may occur over time. In the case of indicative flight paths, as noted previously BMRRA will have uncontrolled airspace and not have defined flight paths. Accordingly, there may be variation in the actual flight paths from those assumed in the noise modelling report. The variation in flight paths presents a greater degree of uncertainty for LA_{max} and N contours than would be the case for aircraft noise assessments for larger airports (e.g. Brisbane, Sunshine Coast) which have controlled airspaces and defined flight paths.

The Proponent will arrange for flight path designs to be undertaken, to enable development of Departure and Arrival Procedures (DAPs) for the expanded airport runway infrastructure. The flight paths and DAPs will be developed with consideration to the preliminary key environmental factors assessed in this Environmental Review, subject to aviation navigation and safety requirements. The DAPs will be submitted to Air Services Australia for publication in the AIP EN Route Supplement Australia (ERSA) for consideration by aircraft operators and airlines.

5.2.3 Aircraft noise effects on existing properties

N70 and LA_{max} contours are presented below and, together with indicative flight paths (Figure 2-4 and Figure 2-5) provide an indication of the maximum noise levels and frequency of noise events that may occur for areas surrounding the Proposal.

LA_{max} contours (Figure 5-2 and Figure 5-3) are presented for the Code 4C aircraft that are expected to operate from the developed BMRRA. For comparison, the LA_{max} are also presented for the F100 aircraft that operate as closed charter FIFO flights, the largest aircraft operating currently from BMRRA. The LA_{max} contours presented are representative of a single aircraft movement arriving from or departing to the south-west or north-east.

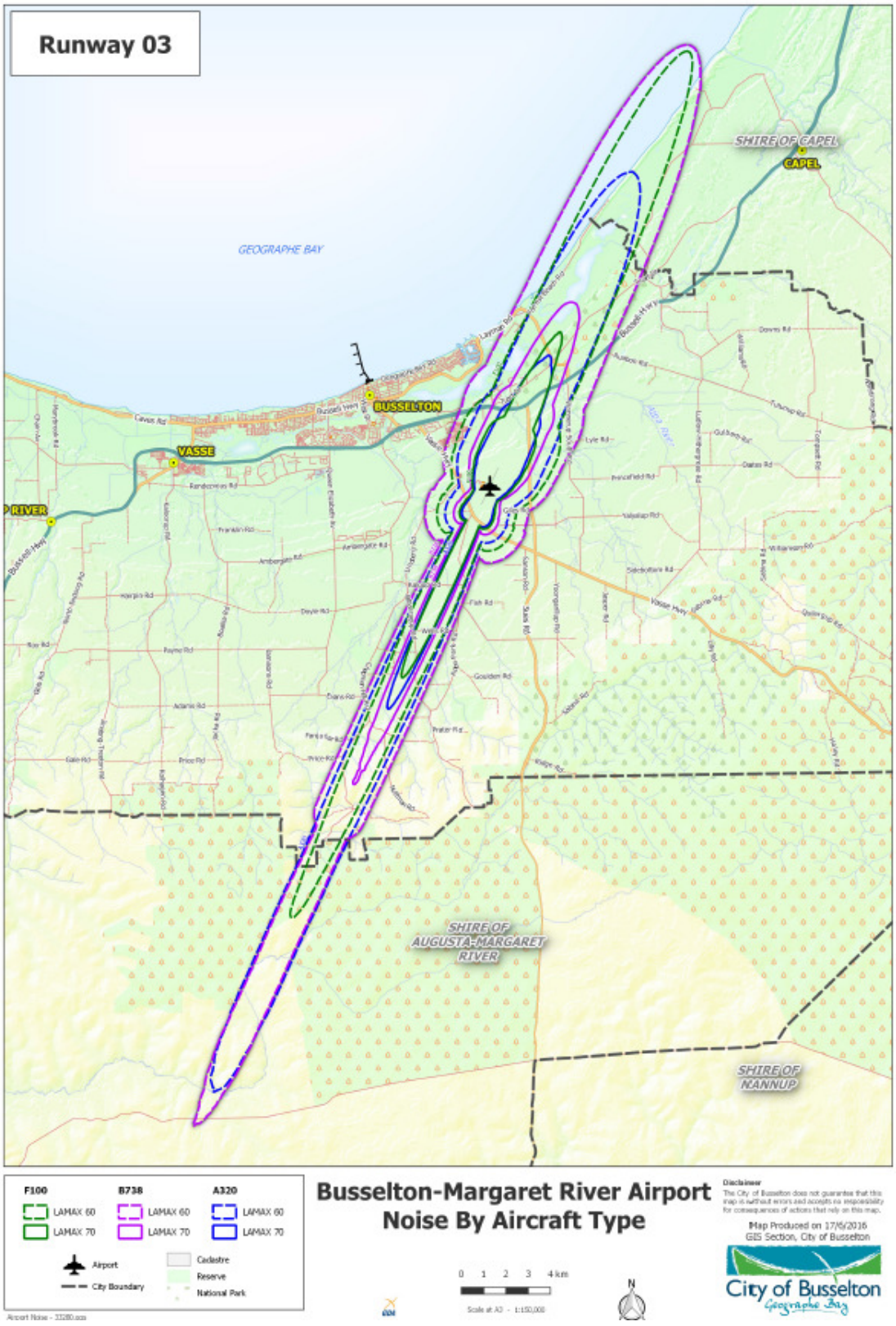

Figure 5-2: LA_{max} contours for F100, B737 and A320 aircraft – Runway 03

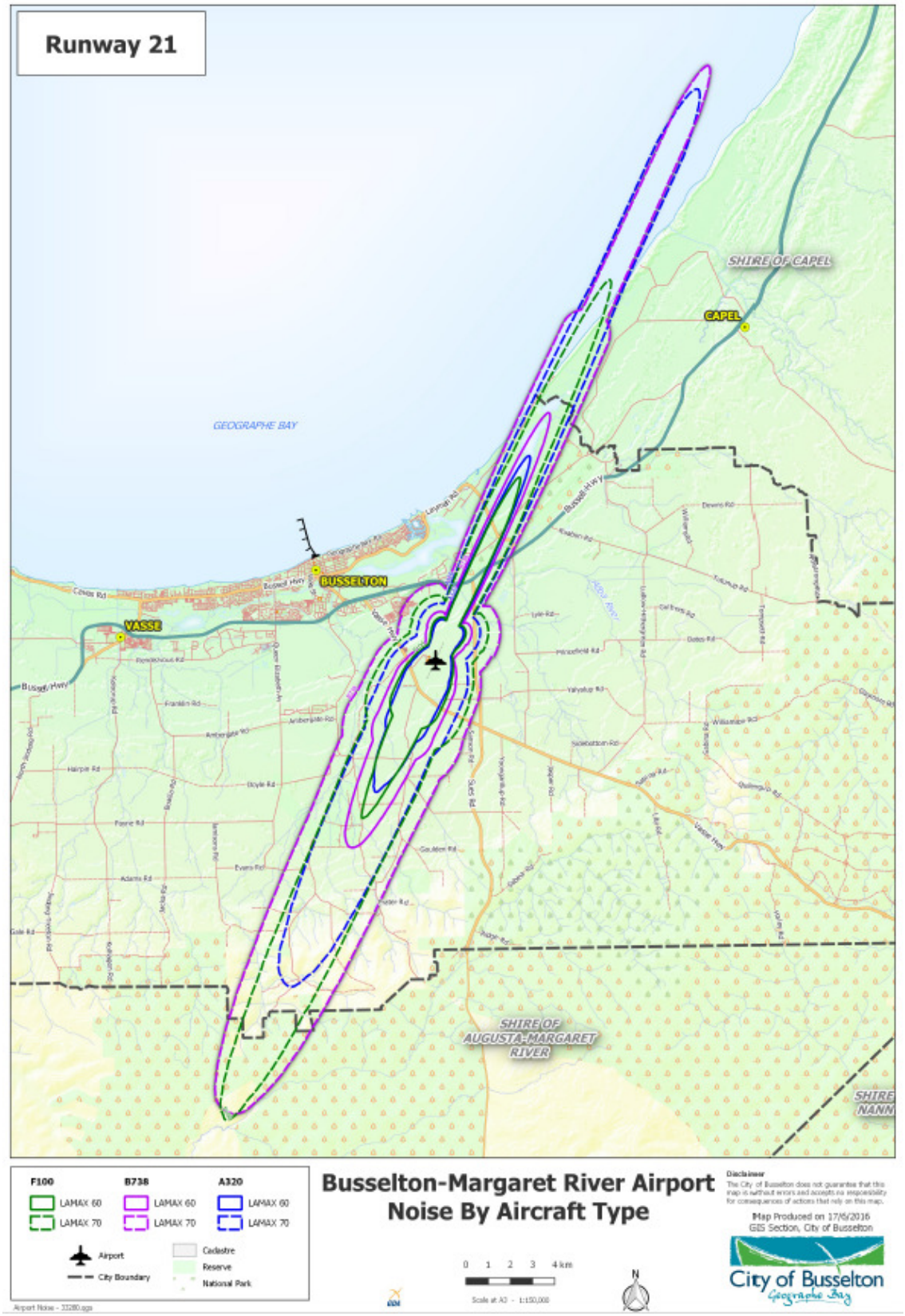

Figure 5-3: LA_{max} contours for F100, B737 and A320 aircraft – Runway 21

LA_{max} contours indicate that the maximum noise levels from A320 aircraft are generally similar to that of the Fokker 100 aircraft, being slightly lower for departures and slightly higher for arrivals, while the maximum noise levels from B737 aircraft for arrivals and departures will be higher than that of the Fokker 100 aircraft.

LA_{max} contours suggest that the existing Fokker 100 aircraft movements create outdoor noise levels of 70 dB(A) or higher at isolated residences at nearby rural properties, which would likely cause intermittent disturbance to indoor conversation as the aircraft pass over. Depending on the actual flight paths of the aircraft, there is the potential for similar intermittent disturbance to occur to residential areas north of the airport along Bussell Highway, Tuart Drive and Layman Road. Similarly, the proposed B737 and A320 aircraft are expected to cause intermittent disturbance at nearby isolated rural properties and at residential areas to the north along Bussell Highway, Tuart Drive and Layman Road.

The Proposal includes a revised Noise Management Plan (2016) to enable 24 hour operations (subject to City of Busselton operational approval) in order to provide flexibility for commercial airlines in operating Code 4C jet aircraft services, particularly in the initial period as the South-West becomes an established destination. The number of flights that could occur between 11:00pm and 06:00am is uncertain but is expected to be no more than five per week for the first year of operations with passenger demand anticipated to call for daytime services.

Existing Fokker 100 aircraft and proposed B737 and A320 aircraft are predicted to create outdoor noise levels of 60 db(A) or more over a wider area, including residential areas north of the airport along Bussell Highway, Tuart Drive and Layman Road. The B737 departures in particular have the potential to create outdoor noise levels of 60 dB(A) or more over the Yalyalup urban residential area. An outdoor noise level of 60 dB(A) roughly correlates to an indoor noise level of 50 dB(A), which is the range at which sleep disturbance can occur. Night flights generating 60 dB(A) noise levels could therefore cause intermittent sleep disturbance to the above areas, however the frequency of night flights is expected to be no more than five flights per week in the first year of operations.

N70 contours (see Figure 5-4 and Figure 5-5) indicate that areas that will be subject to more frequent aircraft noise disturbance and will be limited to the vicinity of the airport and generally in alignment with the runway, as this is where the varying individual flight paths coalesce. N70 contours indicate that, after twenty years of aviation growth (2038/39), most of the isolated rural residences in the vicinity of BMRRA will still be exposed to less than five events of 70 dB(A) or more per day, with approximately 25-30 residences exposed to between five and ten 70 dB(A) events per day and approximately five residences exposed to between ten and twenty 70 dB(A) events per day. No residences are expected to be exposed to more than twenty 70 dB(A) events per day.

It should be noted that the N70 contours incorporate consideration of the impact of night flights, with each movement occurring between 19:00 and 07:00 counted as four movements in the number of 70 dB(A) events per day.

The aircraft noise modelling thus indicates that the existing aircraft activities at BMRRA cause intermittent noise disturbance to isolated rural residences in the vicinity of the airport and in residential areas to the north along Bussell Highway, Tuart Drive and Layman Road. The frequency of aircraft noise disturbance from the existing operations at the BMRRA is expected to increase over time in-line with a gradual growth in GA and closed charter activity.

The Proposal will introduce Code 4C aircraft, which will marginally increase the total aviation activity from an average of 42 movements per day to 46.3 movements per day as of 2038/39, or an increase of 4.3 movements per day (approximately 9% of the total). It should be noted that Code 4C aircraft movements may not all use the same flight paths or direction and therefore nearby residences may only experience on average a few additional disturbances per day, with aircraft noise disturbance distributed between approaches and departures from/to the north and the south.

The addition of the Code 4C aircraft movements will result in a marginally increased frequency of aircraft noise disturbance at nearby isolated rural residences and in residential areas north of the airport. However, the frequency of noise disturbance greater than 70 db(A) (disturbing conversation) will remain less than five events per day for most residences, with a relatively small number of residences experiencing disturbance of more than five events per day and no residences experiencing disturbance of 20 or more events per day.

In terms of significance, the forecast frequency of 70 dB(A) events at existing residences will be well within the 30 events per day recommended in AS2021:2015 for residential buildings in the vicinity of aerodromes subject to general aviation and without ANEF charts. This includes a weighting of each night movement as four events, as calculated for the N70 contours. The BMRRA aircraft movements will be dominated by general aviation (more than 80% of movements) and thus criterion of 30 events per day at 70 dB(A) is considered to be generally applicable to the Proposal.

The introduction of night time flights could result in intermittent sleep disturbance for some residents in nearby rural and residential areas. However, the frequency of night time noise disturbances would be limited, with at most five flights per week.

The limited frequency of aircraft noise disturbance is reflected in the ANEC contours for the Proposal, which are discussed below.

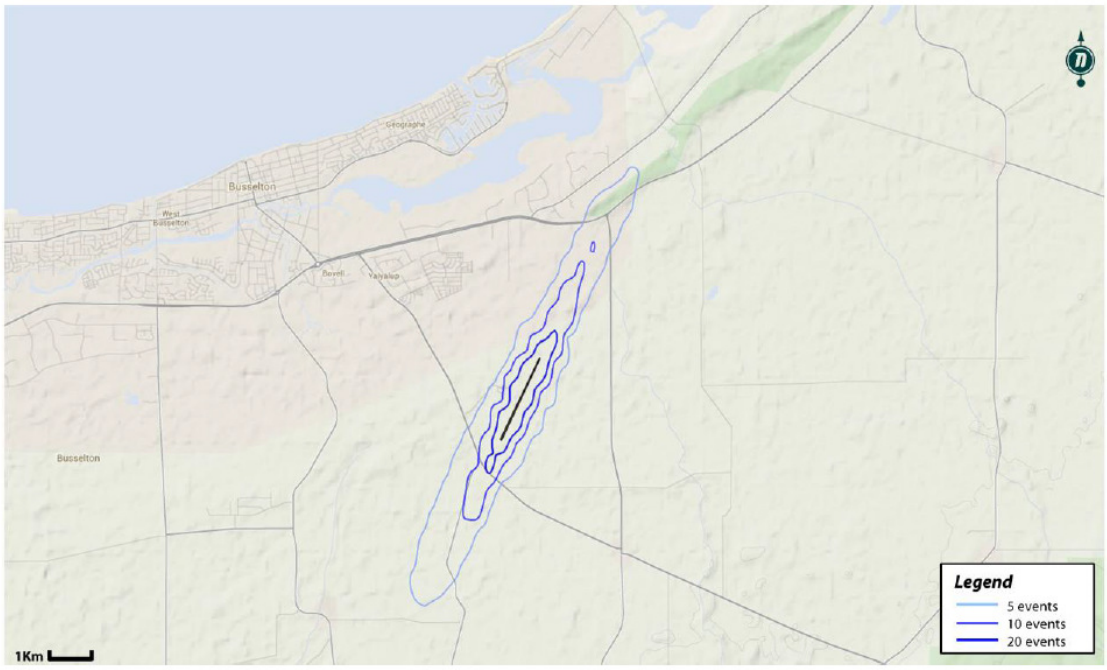

Figure 5-4: N70 contours for existing airport 2014/2015
Source: To70 Australia (2016)

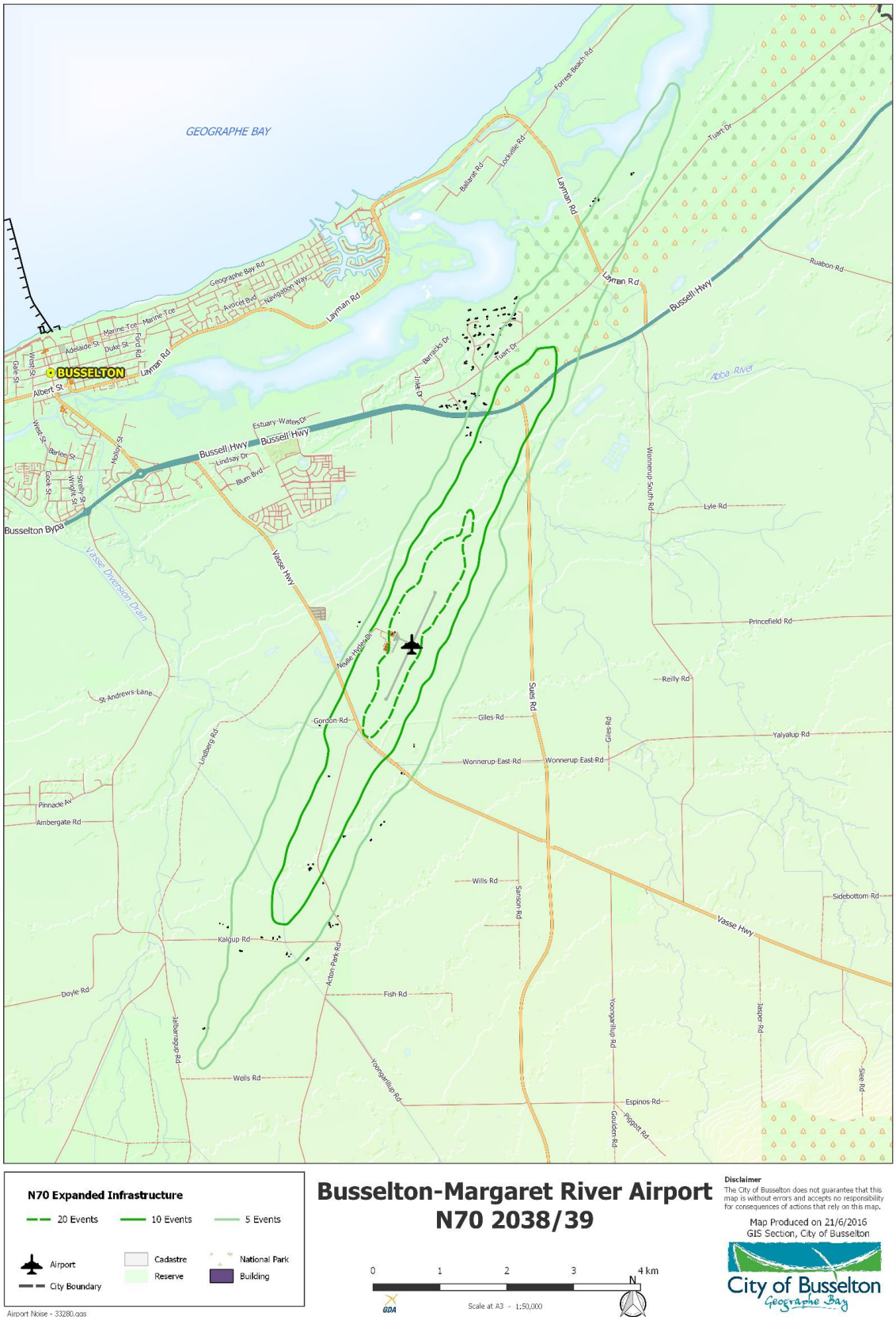

Figure 5-5: N70 contours for expanded airport (2038/2039)

5.2.4 Predicted ANEC

Predicted ANEC for the existing airport operations (2014/15), the existing airport operations after 20 years of growth (2034/35) and the expanded airport operations after 20 years of growth (2038/39) are presented in Figure 5-6 and Figure 5-7. Although ANEC criteria for land and building suitability relate to levels of 20 or greater, the ANEC 15 contours are also presented for more conservative analysis.

As noted above, the ANEF/ANEC are used for land use planning rather than assessment of existing properties, and hence the ANEC have been compared to the land use zoning under the City of Busselton Town Planning Scheme 21. Excerpts from Town Planning Scheme No 21 showing the zoning in the vicinity of BMRRA are presented in Appendix 7. The Proponent has commenced the process of developing a broad land use strategy and Town Planning Scheme amendment to provide protection for BMRRA as a continuing acceptable land use and protect future amenity for noise sensitive land uses. This includes defining a Special Control Area where additional building requirements and title notifications are specific development requirements. This will ensure a level of awareness and acceptance by prospective property owners regarding aircraft noise impact.

As shown in Appendix 7, the land to the east, south and west of BMRRA is predominantly zoned for agriculture. Land to the north-east of BMRRA is zoned for agriculture south of Bussell Highway, with land north of the highway zoned for rural residential, conservation and recreation (Tuart Forest). The land to the north-west, between BMRRA and Bussell Highway is zoned for a mix of uses under the Busselton Airport Structure Plan, within Industrial Development zoning for the Airport Industrial Park immediately north-west of the airport, and rural residential, urban residential and public purposes (schools) zoning for the Yalyalup development adjacent to the Bussell Highway.

As shown in Figure 5-7, the ANEC 20 does not currently overlay any residential properties and is not expected to extend to any rural or urban residential zoned areas out to 2038/39 and therefore BMRRA operations will not constrain residential development within Busselton.

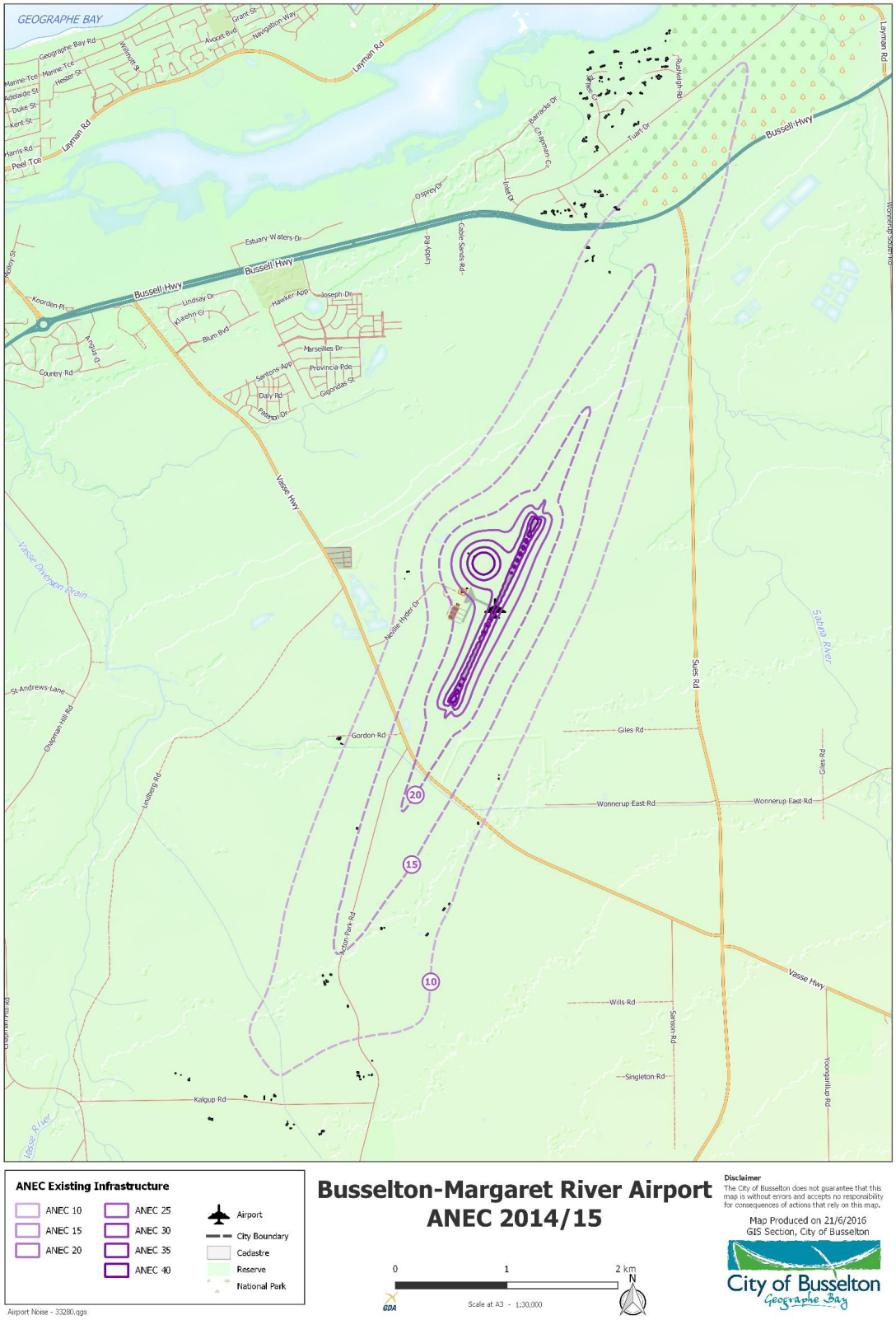

Figure 5-6: ANEC for existing airport (2014-15)

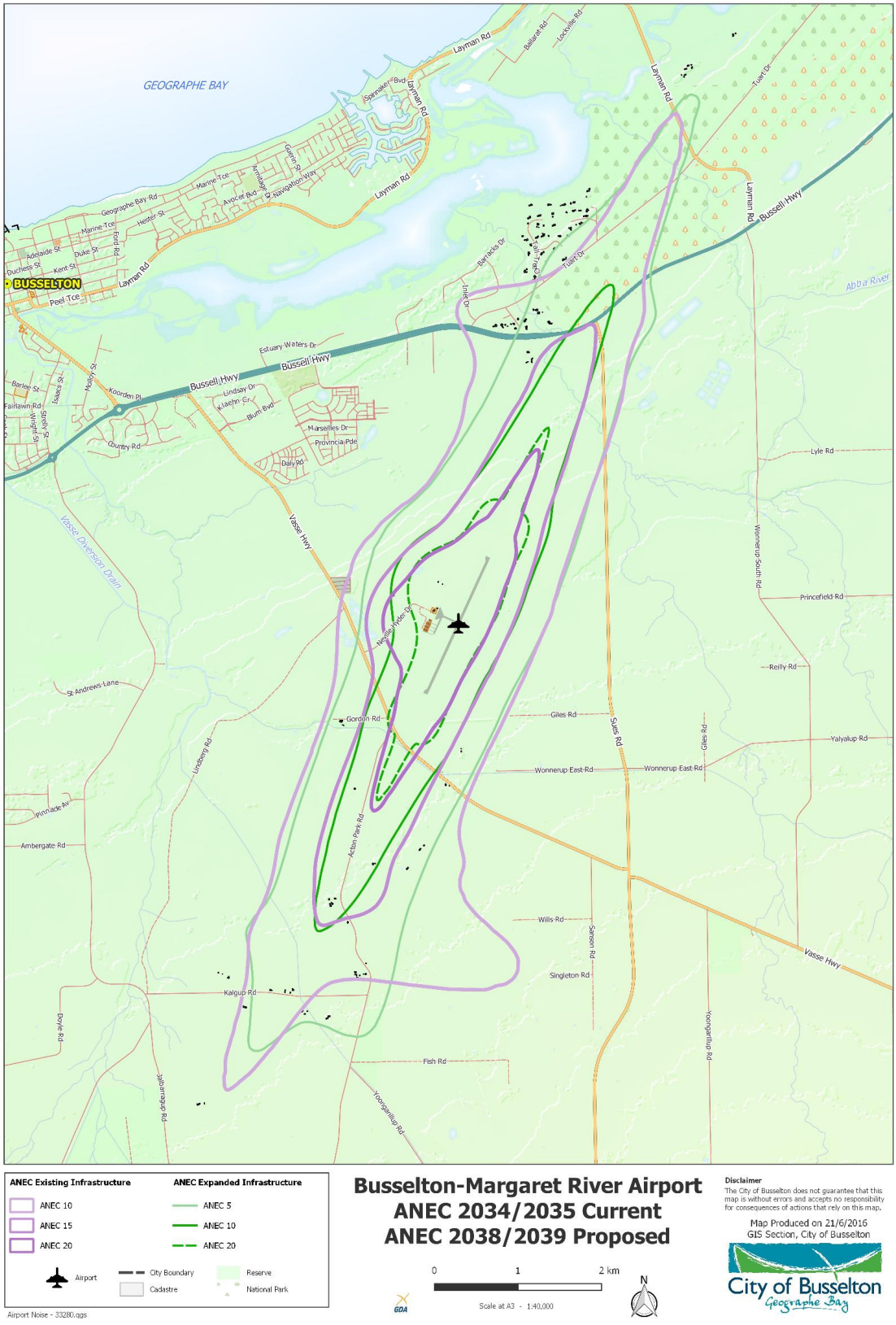

Figure 5-7: ANEC for existing airport (2034-35) and expanded airport (2038-39)

5.2.5 Predicted residual impacts and management mechanisms

The existing BMRRA operates subject to a comprehensive Noise Management Plan (2015), which is approved under MS 1009. The first revision of the BMRRA NMP was reviewed by the EPA and approved by the Minister for the Environment; Heritage in 2012 for implementation, following which a revised NMP was submitted under section 46 of the EP Act and approved in 2015.

The Proponent proposes to revise the NMP as part of the Proposal, to support State Government economic development objectives in funding the Proposal. This includes flexibility to attract and support new Code 4C aircraft operations, improved practicability of NMP implementation, and improved consistency with Australian Standard AS2021:2015 *Acoustics – Aircraft noise intrusion – Building siting and construction*.

The revised NMP (2016) has been subject to public consultation as outlined in Section 3, following which the NMP was endorsed by the City of Busselton Council for inclusion in this EP Act referral. The revised NMP (2016) is presented in Appendix 1 and a discussion of the proposed updates is presented below.

The revised NMP continues to provide a comprehensive approach to aircraft noise management, covering the following:

1. Principles and statement of intent.
2. Management of operational activities:
    - flight paths
    - noise abatement zones
    - standard hours of operation
    - Fly Neighbourly Agreement
    - flight training guidelines.
3. Land use planning.
4. Noise assessment and monitoring.
5. Noise amelioration.
6. Communication and consultation.
7. Noise complaints.
8. Implementation and review.

However, the revised NMP (2016) includes principles for BMRRA that align with the economic development objectives for the South West region (i.e. supporting tourism and freight) in that the operational hours have been extended to enable 24 hour operations, subject to City approval. Further, the revised NMP removes the requirement for light and general aviation aircraft to prove that their aircraft do not exceed noise emissions of 65dB(A) for unrestricted operations.

As noted previously, flight paths and DAPs for BMRRA will be re-designed as part of the Proposal, with consideration of noise sensitive properties in the vicinity of the airport (e.g. to the north along Bussell Highway and Tuart Road), subject to aviation navigation and safety requirements. New DAPs will be submitted to Airservices Australia for publication, following which they will be incorporated into the EN Route Supplement Australia (ERSA) published by Airservices Australia, for consideration by aircraft operators and airlines.

The Fly Neighbourly Agreement (FNA) is a code of practice to be observed by users of BMRRA to minimise noise impacts to neighbouring areas. The FNA contains a number of key requirements including:

- observing flight path principles and noise abatement zones
- flying at minimum heights within circuit areas and over noise sensitive areas
- observing noise emission limits
- observing take off and circuit procedures to reduce noise.

The Proponent will recommend the FNA to airlines for adoption for all new Code 4C aircraft operations, to minimise noise impacts over residential areas.

The Proponent has commenced the process of developing a broad land use strategy and Town Planning Scheme amendment to provide protection for BMRRA as a continuing acceptable land use and protect future amenity for noise sensitive land uses. This includes defining Special Control Areas where additional building requirements and title notifications are specific development requirements. This will ensure a level of awareness and acceptance by prospective property owners regarding aircraft noise impact.

The NMP (2016) includes provisions for noise amelioration (acoustic insulation) to residential buildings where the noise exposure exceeds ANEC 20 or where the number of aircraft noise disturbance events exceeds the following:

- 85 dB(A)
- 15 events per day at LA_{max} of 80-85 dB(A)
- 30 events per day at LA_{max} 75-80 dB(A).

Where noise exposure criteria are exceeded, acoustic insulation shall be provided for the affected buildings to provide indoor design sound levels in accordance with AS2021:2015 (Standards Australia 2015).

The aircraft noise modelling results indicate that no residences are expected to fall within the ANEC 20 contour as of 2038/39, and the N70 contours indicate that no residences are expected to be exposed to 30 or more events per day at 70 dB(A) as of 2038/39. Accordingly, no noise amelioration is expected to be required for the forecast aircraft activity associated with the Proposal as of 2038/39, however amelioration may be required in the event of future aviation growth beyond 2038/39.

Consistent with approaches at Perth and Jandakot Airports, the Proponent will continue to update noise modelling and generate noise contours for public consultation following commencement of Code 4C operations. The noise contours will include ANEI, ANEC and N70 and be updated based on recorded aviation movements and updated aviation forecasts. The contours will be updated on a five yearly basis and also upon the following trigger points (which will be reviewed on an annual basis):

- change in aircraft models used for RPT and freight operations from those assumed in the aircraft modelling (B737 and A320)
- increase of more than 20% from the aviation movement forecasts used in the current noise modelling at the time
- re-design of flight paths and DAPs.

In summary, BMRRA will be operated through a comprehensive noise management framework, including a revised NMP, Fly Neighbourly Agreement, noise modelling (ANEC and Nxx contours), landuse planning (special control areas), stakeholder consultation and complaints resolution. Noise complaints will be managed by the Proponent as well as through Airservices Australia, which is subject to review by the Aircraft Noise Ombudsman. This noise management framework is similar to systems and procedures employed at Perth and Jandakot Airports as required under the Commonwealth *Airport Environment Protection Regulations 1997*. The BMRRA noise management framework is therefore considered best practice within Australia, consistent with EPA Guidance Statement 55 *Implementing best practice in proposals submitted to the environment impact assessment process,* and exceeds the mechanisms currently in place for other regional airports within Western Australia.

5.3 Assessment of preliminary key environmental factors – Terrestrial Fauna

5.3.1 Vasse-Wonnerup wetlands

The Proposal area lies approximately 3.5 km to the south of the Vasse Wonnerup wetlands system, which is a declared Ramsar wetlands site.

The Vasse-Wonnerup system is an extensive, shallow, nutrient-enriched wetland system of highly varied salinities and hydroperiods (i.e. flooded in winter, with large areas drying out in summer). The system is fringed by samphire and rushes with some melaleuca woodlands on higher ground. The Tuart Forest component of the Vasse-Wonnerup wetlands Ramsar site is dominated by open forest of mature Tuart (*Eucalyptus gomphocephala*) and Peppermint (*Agonis flexuosa*) trees. Tree hollows in these areas provide important breeding sites for Australian Wood Duck, Australian Shelduck and possibly other duck species. The native Rakali or Water-Rat (*Hydromys chrysogaster*) has been recorded at several locations. The wetlands cover an area of approximately 1,115 ha and support tens of thousands of resident and migrant waterbirds of a wide variety of species. The Wonnerup Estuary is noted for shorebirds and, in late winter/spring, a large breeding colony of Black Swans, whereas the waterbirds of the Vasse Estuary are dominated by ducks.

The wetlands are of national and international importance and are justified as a Ramsar wetland on the basis that they meet two of the nine criteria:

- Criterion 5: More than 33,000 waterbirds have been counted at the Vasse-Wonnerup System. Waterbird data indicate that more than 20,000 waterbirds use the Ramsar site each year, suggesting that the wetland regularly supports 20,000 waterfowl. This includes species such as Red-necked Avocets, Banded and Black-winged Stilts, Wood Sandpiper, Sharp-tailed Sandpiper, Long-toed Stint, Curlew Sandpiper and Common Greenshank
- Criterion 6: At least 1% of the Australian population of Black-winged Stilt and at least 1% of the world population of Red-necked Avocet use the Vasse-Wonnerup System in most years.

5.3.2 Bird-strike

Birdstrike statistics for the existing Busselton Regional Airport are recorded by the Australian Transport Safety Bureau (see Appendix 10). The statistics show a total of 25 recorded bird strike incidents (two reported bird strikes are duplicates) from 2005 to 2015, or an average of 2.5 bird strikes per year. The majority of the bird strike incidents have involved single birds and have occurred within the airport precinct. The level of bird strike is not expected to pose a significant impact to populations of threatened or migratory species.

It is expected that occasional bird strikes will continue to occur following the Proposal, some of which may potentially involve Code 4C aircraft.

The Proponent will minimise the potential for bird strikes through its Wildlife Management Plan and mitigating strategies such as grading and maintaining the airfield grounds, which will minimise the nesting habitat for birds. The Proponent will continue to record all bird activity on the Airport precinct, including bird strikes which are reported to the Australian Transport Safety Bureau.

5.3.3 Literature review

The Proponent engaged Bamford Consulting Ecologists (2016) to conduct a literature review and risk assessment of aircraft disturbance to waterbirds at the Vasse Wonnerup wetlands. A copy of the report is provided in Appendix 8 and a summary of their findings presented below.

Based on a small number of observations by DPaW personnel, Fokker 100 aircraft movements associated with the existing BMRRA disturb waterbirds occasionally, but the responses appear to be short term and of a low intensity.

Research from around the world, including Australia, suggests that waterbirds will tolerate at least moderate levels of aircraft movement and noise. This includes breeding colonies of most waterbird groups. Research also identifies low-flying aircraft as the greatest risk, although there is some lack of consistency due to the many variables that can affect the response of waterbirds to a stimulus. In general, waterbirds habituate to regular stimuli and this could make small, manoeuvrable aircraft more of a concern, rather than the larger Code 4C het aircraft proposed. The research suggest a vertical buffer of greater than 300m, a horizontal buffer of greater then 200m and a noise limit of 85 dB(A) are appropriate to minimise impacts to waterbirds (Bamford Consulting Ecologists 2016).

5.3.4 Risk of disturbance to waterbirds

The indicative flight paths (Figure 2-4 and Figure 2-5) suggest that some Code 4C jet aircraft will overfly the Vasse-Wonnerup wetlands, particularly on Runway 03 departures and Runway 21 arrivals. The Code 4C aircraft are predicted to remain at a height greater than 300m over the wetlands, particularly for departures which ascend more steeply than arrivals. The aircraft are therefore expected to comply with the vertical buffer suggested by the literature review. The aircraft noise modelling contours (Figure 5-2 and Figure 5-3) indicate maximum noise levels (LA_{max}) of 65-78 dB(A) for B737 and A320 aircraft over the Vasse-Wonnerup wetlands, which is within the 85 dB(A) noise limit suggested by the literature. B737 and A320 aircraft noise levels will be higher than the estimated 60-70 dB(A) LA_{max} for existing Fokker 100 aircraft over the wetlands, or an increase of 5-8 dB(A).

The highest noise levels will be in the southern portion of the Wonnerup Estuary, while the lowest noise levels will be in the northern portion of the estuary, where there is the large breeding colony of Black Swans.

The frequency of Code 4C jet aircraft movements over the wetlands are uncertain but are expected to be a fraction of the total Code 4C jet aircraft movements, as Code 4C jet aircraft flights may use southern or eastern flight paths (Figure 2-4 and Figure 2-5) rather than a northern approach/departure flight path over the wetlands. For example, it is forecast that by the year 2038/39 the Code 4C jet aircraft operations will have grown to 30 movements per week, or an average of 4.3 movements per day. Of these movements, some may overfly the Vasse-Wonnerup wetlands depending on the flight paths adopted by the aircraft operators. Irrespective of the Proposal, it is expected that there will be an increase in general aviation, comprising small propeller planes, and closed charter FIFO flights, some of which would overfly the wetlands.

5.3.5 Predicted residual impacts and management mechanisms

Bamford Consulting Ecologists (2016) concluded that the observations of waterbirds near aircraft from many studies indicates that the predicted increases in aircraft activity due to the Proposal will not adversely affect waterbirds assuming buffers and noise limits are adhered to. Likewise, the impact assessments undertaken for major expansion projects at Brisbane Airport (EPBC 2005/2121), Sunshine Coast Airport (EPBC 2011/5823) and RAAF Base Williamtown (EPBC 2010/5747) indicated that the more frequent jet aircraft operations at those aerodromes did not pose a significant impact to waterbirds at nearby Ramsar sites, nor were additional measures such as monitoring and management proposed for the wetlands / waterbirds as part of the expansion projects.

The regional habitat and usage by migratory shorebirds was considered through a review of Shorebirds 2020 data maintained by Birdlife Australia, which includes shorebird counts for the following key wetland aggregations:

- Peel-Yalgorup Lakes
- Leschenault Estuary
- Vasse Wonnerup
- Broadwater.

The shorebird counts data was processed and mapped as pie charts (see Appendix 9) showing the proportion of species recorded in each count area, with the area of the pie charts related to the magnitude of total birds counted in each count area.

The shorebird count mapping indicates that the Vasse-Wonnerup wetlands are one of several aggregations of estuarine/coastal wetlands along the South-West coast. In terms of waterbird numbers the Vasse-Wonnerup wetlands are dwarfed by the Peel-Yalgorup wetlands, which are also much larger in spatial extent. The Leschenault Estuary has fewer recorded numbers but that may be an artefact of fewer sampling events/areas. There was no data from more inland wetlands and lakes in the Shorebird 2020 database and these wetlands tend to support large numbers of ducks rather than shorebirds.

The shorebird count mapping indicates that species assemblages are broadly similar from Mandurah to Dunsborough, with the assemblage of the Vasse-Wonnerup wetlands being similar to that of the Peel Harvey wetlands, and the Yalgorup lakes being distinctive (dominated by Banded Stilt which favour extensive saline shallows). The most abundant species observed are non-migrants, namely the two stilts, avocet and red-capped plover.

The Vasse-Wonnerup is notable for Red-necked Stint (Malbup bird hide site) and both the stint and the Sharp-tailed Sandpiper (Broadwater). These are migratory species and are thus not currently using the sites close to the BMRRA in large numbers.

The abundance of waterbirds across the South-West coast (Mandurah to Dunsborough) reflects the availability of a range of habitats, which indicates that there are likely to be options available to waterbirds when certain habitats are not available (e.g. due to high tide or disturbance). Furthermore, the extent of waterbird counts across Vasse-Wonnerup wetlands and Broadwater indicates that there are local habitat options for waterbirds should they be disturbed within a particular area, as well as the options further north.

Based on the findings of the literature review, the findings of recent impact assessments for major airport expansions, the limited frequency of the Code 4C jet aircraft operations (up to an average of 4.3 movements per day), and the habitat options available locally and further north, it is considered that the Proposal is unlikely to cause a significant impact to waterbird populations or the Vasse-Wonnerup wetlands Ramsar site.

The Proponent has developed a Fly Neighbourly Agreement (FNA) for the existing airport, which is a voluntary code of practice to be observed by aircraft operators to assist with the minimisation of aircraft noise impacts in the vicinity of the airport. The FNA will be extended to include the Vasse-Wonnerup wetlands as a noise sensitive area, including the sensitivity of the Wonnerup Estuary during the late winter/early spring breeding season for Black Swans.

The Proponent will provide awareness to all flight operators of the sensitivity of the Vasse-Wonnerup system, particularly during the late winter/early spring period. The Proponent will also recommend the FNA to commercial airlines for adopting in the new Code 4C jet aircraft flights in order to minimise aircraft disturbance to the Vasse Wonnerup wetlands.

The disturbance to waterbirds has been addressed in the EPBC Act referral for the Proposal (EPBC 2016/7675), including provision of shorebird usage information based on the Shorebirds 2020 database. The Proponent is currently awaiting a decision on whether or not the Proposal is a controlled action under the EPBC Act.

6. Other environmental factors

A review of the proposal and its environmental context and consultation with the OEPA identified 'other' environmental factors that have the potential to be affected by the proposal. These include:

- flora and vegetation (clearing)
- terrestrial fauna (clearing and bird strike)
- terrestrial environmental quality
- hydrological processes
- inland waters environmental quality
- heritage
- human health.

Due to the low level of impact, application of industry standard controls and other regulatory mechanisms, these factors are not expected to be required to be assessed in detail by the EPA. Table 6-1 provides the relevant information requested by the EPA in accordance with EAG14 (EPA 2015b).

Table 6-1: Other environmental factors

Potential Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation
Flora and vegetation – *To maintain representation, diversity, viability and ecological function at the species, population and community level.*			

• Loss of native vegetation and potential habitat for rare flora.	Clearing of native vegetation during construction, and maintenance of obstacle limitation surface (OLS).	<u>Avoidance</u>
		• Development envelope comprises mostly cleared agricultural land covered by introduced grasses.
		• Clearing restricted to approximately 20-25 isolated trees along Neville Hyder Drive, approximately 10 scattered trees within cleared paddocks, sedgeland within degraded seasonal wetlands, and clearance or pruning of approximately 4.6 ha of woodland for changes to the OLS.
		• Limited habitat for threatened flora species, with no rare or threatened species identified during field survey (Appendix 11). No pruning or clearing of Featherflower shrubs (rare or common) required for the OLS changes, only higher canopy trees. All Featherflower plants in the area proposed for clearing/pruning will be identified, tagged and avoided during clearing/pruning activities.
		
		<u>Minimisation</u>
		• Native vegetation within OLS shall be pruned in preference to clearing where this is practicable.
		• Preparation and implementation of a Construction Environmental Management Plan (CEMP) to include:
		  * site inductions on threatened fauna and vegetation clearing
		  * all Featherflower individuals (rare species or otherwise) along Vasse Highway clearing area to be identified, tagged and avoided during pruning or clearing of trees for OLS
		  * interface treatments including fencing and setbacks
		  * management of access
		  * design of construction sites to ensure no machinery is parked near significant vegetation
		  * native vegetation to be retained will be clearly marked on all construction plans as ‘no go zones’.
			• An approved CEMP.

Potential Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation
Terrestrial fauna - *To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.*			

• Loss of native fauna habitat including potential habitat for Black Cockatoo species and Western Ringtail Possum.
• Injury to native fauna during clearing.
	Clearing of native vegetation during construction, and maintenance of obstacle limitation surface (OLS).	<u>Avoidance</u>
		• Development envelope comprises mostly cleared agricultural land covered by introduced grasses.
		• Clearing restricted to approximately 20-25 isolated trees along Neville Hyder Drive, approximately 10 scattered trees within cleared paddocks, sedgeland within degraded seasonal wetlands, and clearance or pruning of approximately 4.6 ha of woodland for changes to the OLS.
		• Limited habitat for threatened fauna species identified during field survey (Appendix 11).
		
		<u>Minimisation</u>
		• Native vegetation within OLS shall be pruned in preference to clearing where this is practicable.
		• Preparation and implementation of a Construction Environmental Management Plan (CEMP) to include:
		  * site inductions on threatened fauna and vegetation clearing
		  * a qualified wildlife spotter/handler will be on site during clearing of native vegetation
		  * interface treatments including fencing and setbacks
		  * management of access
		  * design of construction sites to ensure no machinery is parked near significant vegetation
		  * native vegetation to be retained will be clearly marked on all construction plans as 'no go zones'.
			• An approved CEMP.

• Death of native fauna.	Fauna-aircraft collisions.	<u>Avoidance</u> • Development envelope comprises mostly cleared agricultural land covered by introduced grasses. <u>Minimisation</u> • Grading and maintenance of grassed airfield to minimise bird nesting.	N/A.

Potential Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation
Terrestrial Environmental Quality – *To maintain the quality of land and soils so that the environment values, both ecological and social, are protected.*			
• Acidification of ASS. • Soil contamination.	Excavation of ASS and contaminated materials during construction.	<u>Avoidance</u> • Development envelope comprises cleared agricultural land, with no known contaminated areas present. • The majority of excavation will be less than 1 m depth from the surface, minimising the risk of oxidising ASS. <u>Minimisation</u> • A preliminary ASS investigation has been undertaken for the development work area (see Appendix 12), which indicates that some areas of ASS may be present and that groundwater levels may be within than 1 m from the surface in some areas. • Preliminary site investigation (PSI) to be undertaken for all proposed excavation areas to identify any significant contamination.	• ASS management plan (ASSMP) to be prepared for all development work areas involving excavation below maximum groundwater table, including coffee rock layers. • ASSMP to be approved by DER prior to excavation works proceeding. • Detailed site investigation (DSI) to be undertaken if PSI identifies contamination risk and (if necessary) a remediation action plan (RAP) prepared and implemented. • DSI sampling and analysis plan (SAP) and RAP to be approved by DER prior to works commencing.
• Soil contamination.	Leaks and spills of fuel and oils during operations.	<u>Minimisation</u> • Spill control procedures and clean up equipment maintained at the airport. • Spill capture interceptors installed on apron areas. • Department of Fire and Emergency Services (DFES) engaged for any major spills.	• Pollution events reported to DER.
Hydrological Processes – *To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.*			
• Increased stormwater runoff.	Increased impervious surface during operations.	<u>Minimisation</u> • Vegetated open drainage systems from paved areas to increase infiltration. • Expansion of existing wet retention basin to attenuate stormwater flows prior to discharge off-site.	N/A.

Potential Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation
Inland Waters Environmental Quality – *To maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.*			
• Surface water and groundwater contamination.	Nutrient runoff during operations. Leaks and spills of fuel and oils during operations. Erosion and sediment runoff during operations.	<u>Avoidance</u> • The airport area will comprises mostly un-irrigated grassed airfield areas, pavements and buildings, none of which will require fertiliser application. • Airport site discharges into Vasse Diversion Drain, which diverts approximately 70% of flow from the Vasse River and discharges directly into Geographe Bay. Therefore the majority (estimated 70%) of runoff from the airport will discharge direct to Geographe Bay rather than the Vasse River / Estuary. <u>Minimisation</u> • Fertiliser application to be limited to landscaping of landside entrance and access roads, carparks and terminal building. • Total landscaping area estimated at less than 5 ha, or 2.5% of the 205 ha airport area. • Native species and soil amendment to be used for landscaping, as per City of Busselton guidelines and specifications. • Vegetated open drainage systems to increase stormwater infiltration and sediment capture. • Expansion of existing wet retention basin to attenuate stormwater flows and capture sediment prior to discharge off-site. • Spill control procedures and clean up equipment maintained at the airport. • Spill capture interceptors installed on apron areas. • Department of Fire and Emergency Services (DFES) engaged for any major spills.	• City of Busselton landscaping guidelines and specifications. • Pollution events reported to DER.
• Surface water and groundwater contamination.	Excavation of ASS and contaminated materials during construction.	<u>Avoidance</u> • Development envelope comprises cleared agricultural land, with no known contaminated areas present. • The majority of excavation will be less than 1 m depth from the surface, minimising the risk of oxidising ASS. <u>Minimisation</u> • A preliminary ASS investigation has been undertaken for the development work area (see Appendix 12), which indicates that some areas of ASS may be present and that groundwater levels may be within than 1 m from the surface in some areas. • Preliminary site investigation (PSI) to be undertaken for all proposed excavation areas to identify any significant contamination. • CEMP to include procedures for managing unexpected finds of contamination, including notification of DER.	• ASS management plan (ASSMP) to be prepared for all development work areas involving excavation below maximum groundwater table, including coffee rock layers. • ASSMP to be approved by DER prior to excavation works proceeding. • Detailed site investigation (DSI) to be undertaken if PSI identifies contamination risk and (if necessary) a remediation action plan (RAP) prepared and implemented. • DSI sampling and analysis plan (SAP) and RAP to be approved by DER prior to works commencing.

Potential Impact	Environmental Aspect	Mitigation actions to address residual impacts	Proposed regulatory mechanism for ensuring mitigation
• Sediment impacts to downstream waterways.	Erosion and sediment runoff during construction.	Minimisation • CEMP to include erosion and sediment control plan.	N/A.
Heritage – *To ensure that historical and cultural associations, and natural heritage, are not adversely affected.*			
• Potential impact to Aboriginal heritage sites.	Ground disturbance during construction.	Avoidance • Development envelope avoids known heritage sites in the vicinity (Appendix 13). Minimisation • Development envelope lies within land that is highly degraded from previous clearing and grazing and is unlikely to contain heritage sites. • CEMP to include procedures for managing unexpected finds of potential heritage materials, including notification of the Department of Aboriginal Affairs (DAA).	• DAA to manage under s18 of the AH Act.
• Human Health – *To ensure that human health is not adversely affected.*			
• Potential health impacts associated with aircraft noise.	Aircraft noise emissions.	Avoidance • Fly Neighbourly Agreement to be recommended to airlines for adoption in new Code 4C jet aircraft operations, to minimise noise impacts over residential areas. Minimisation • Provide noise amelioration (acoustic insulation) to all residential buildings falling within criteria specified in the Noise Management Plan. Noise amelioration to ensure that design indoor sound levels remain within levels specified in AS2021:2015. Residual impacts • Intermittent noise disturbance to residential properties close to flight paths, including potential for some night time noise disturbance that may interrupt sleep for some residents. • Frequency of night flights expected to be no more than five flights per week and significantly lower than experienced at metropolitan airports such as Perth. • No residences likely to lie within the ANEC 20 contour based on 2038/39 aircraft forecast.	• Noise Management Plan. • Fly Neighbourly Agreement. • Airservices Australia noise complaints system.

7. Principles of the Environmental Protection Act

The EP Act identifies a series of principles for environmental management. Environmental principles are the highest level goals that a proposal or scheme must meet in order to be found environmentally acceptable by the EPA. City of Busselton has considered these principles listed in EAG 8 (EPA 2015a) in relation to the development and implementation of the Proposal. Table 7-1 outlines how the principles relate to the proposal.

Table 7-1: EP Act principles

Principle	How it will be addressed by the proposal
Precautionary principle Where there are threats of serious irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by: a. careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and b. an assessment of the risk weighted consequences of various options.	The Proposal has used existing environmental data during design and has supplemented it with a series of studies that are identified in Section 4. The Proponent will implement a noise management framework that is similar to systems and procedures applied at Perth and Jandakot Airports and considered best practice within Australia. Noise sensitive areas have been identified and included in the Fly Neighbourly Agreement and Noise Management Plan. The Noise Management Plan includes both ANEC and LA_{max} criteria for small aerodromes subject to general aviation flights only, as a conservative approach to provision of noise amelioration (acoustic insulation) to affected residences. The Proponent has consulted with relevant government agencies to minimise any uncertainty surrounding the environmental impact of the proposal. The Proposal has been referred to the Commonwealth Department of the Environment under the EPBC Act. Detailed design plans, construction management plans and post construction management plans will avoid or minimise impacts on identified constraints.
Intergenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	The Proposal can be designed and implemented without significant impacts on the health, diversity or productivity of the environment. The Proposal will provide direct connectivity between the South-West and Code 4C jet aircraft destinations, reducing the traffic, noise and air/carbon emissions associated with road transport between Perth and the South-West.
Conservation of biological diversity and ecological integrity Conservation of biological diversity and ecological integration should be a fundamental consideration.	The Fly Neighbourly Agreement and Noise Management Plan will be updated to note the sensitivity of the Vasse-Wonnerup wetlands and to minimise noise impacts over the wetlands. The majority of the development envelope comprises cleared agricultural land with limited ecological value. A survey of flora and fauna has been undertaken for the development envelope, which indicates that the native vegetation to be cleared represents poor habitat value for threatened species, with no threatened flora species found within the clearing areas. Clearing/pruning of vegetation for OLS changes will comprise canopy trees and not affect any Featherflower shrubs (rare or common).

Principle	How it will be addressed by the proposal
Improved valuation, pricing and incentive mechanisms 1. Environmental factors should be included in the valuation of assets and services. 2. The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement. 3. The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste. 4. Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which benefit and/or minimise costs to develop their own solutions and responses to environmental problems.	Environmental impact mitigation costs have been considered in the design and construction of the Proposal. The Noise Management Plan includes provision for noise amelioration of affected residences, which will be funded under the airport business and cost structure, thus the cost of mitigation will ultimately be paid for by aircraft operators and their customers (e.g. RPT passengers).
Waste minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment	Waste will be minimised by adopting the hierarchy of waste controls; avoid, minimise, reuse, recycle and safe disposal. Excavated material not suitable for reuse will be disposed of according to the relevant management plans, guidelines and legislation as they apply.

8. Conclusion

8.1 Proponent's conclusion

The location of the existing Busselton-Margaret River Regional Airport and the selected alignment of its runway was based on consideration of alternative sites and the location of noise sensitive receptors (CMPS&F 1995). Accordingly, the Proposal has a firm foundation for impact avoidance and mitigation in the expansion of the existing airport facilities.

8.1.1 Amenity

The proposed jet aircraft operations, while increasing beyond current approved levels, are relatively infrequent and limited in size to Code 4C (Boeing 737 and Airbus 320), in contrast to the more frequent aircraft movements and larger Code 4D/E/F aircraft typical of City airports. This is reflected in the findings of aircraft noise modelling, which indicate that as of 2038/39 the frequency of 70 dB(A) aircraft noise events are expected to be less than five per day for most residences, with 25-30 residences exposed to five to ten events per day, approximately five residences exposed to 10 to 20 events per day, and no residences exposed to 20 or more events per day. This frequency is well within the limit recommended in AS2021:2015 for general aviation aerodromes without ANEF charts.

Noise modelling also indicates that as of 2038/39 no rural or urban residential zoned areas are expected to be exposed to an ANEC of 20 or more, in compliance with AS2021:2015, and thus aircraft noise is unlikely to constrain residential development in Busselton. The introduction of night time flights could result in intermittent sleep disturbance for some residents, however the frequency of night time flights would be limited to at most five flights per week or a few flights per night.

The BMRRA Noise Management Plan (NMP) provides a comprehensive approach to aircraft noise mitigation, including aircraft operational controls, land use planning, noise assessment and monitoring, noise amelioration, communication and consultation, and complaints investigation. The Proponent will arrange for design of flight paths and development of Departure and Approach Procedures (DAPs) that include consideration of noise sensitive areas as far as is practicable. The Fly Neighbourly Agreement (FNA) will be recommended to commercial airlines for adoption in Code 4C jet aircraft flights. Land use planning will establish a Special Control Area that requires additional building measures such as noise insulation, and title notifications to facilitate awareness and acceptance by prospective owners.

The NMP includes a process for noise amelioration of residences where noise exposure exceeds acceptable levels as defined in AS2021:2015. In these cases, noise amelioration will be provided to ensure that indoor noise levels at the residences meet the requirements of AS2021:2015. Noise modelling indicates that forecast noise exposure as of 2038/39 will be within acceptable levels and accordingly amelioration is not expected to be required, however amelioration may be required in the event of further aviation growth beyond 2038/39.

In summary, BMRRA will be operated through a comprehensive noise management framework, including a revised NMP, FNA, noise modelling (ANEC and Nxx contours), landuse planning (special control areas), stakeholder consultation and complaints resolution. Noise complaints will be managed by the Proponent as well as through Airservices Australia, which is subject to review by the Aircraft Noise Ombudsman. This noise management framework is generally consistent with systems and processes employed at Perth and Jandakot Airports as required under the Commonwealth *Airport Environment Protection Regulations 1997*. The BMRRA noise management framework is therefore considered best practice within Australia, consistent with EPA Guidance Statement 55 *Implementing best practice in proposals submitted to the environment impact assessment process,* and exceeds the noise management arrangements currently in place for other regional airports within Western Australia. This best practice noise management framework is expected to achieve environmental benefits within the limitation of the class 'G' uncontrolled airspace at BMRRA and avoid the potential for non-compliance with conditions that require procedural reporting under the EP Act for no environmental improvement.

8.1.2 Terrestrial fauna

Aircraft flights over the Vasse-Wonnerup wetlands have the potential to cause intermittent disturbance to waterbirds, the impacts of which are not expected to be significant on the basis of literature review findings, the limited frequency of the Code 4C jet aircraft flights (estimated at up to 4.3 movements per day as of 2038/39), the expected altitude of and noise levels generated by the aircraft as they cross the wetlands and the habitat options available to waterbirds in the region. However, to adopt a precautionary approach the Proponent will extend the existing FNA to include the Vasse-Wonnerup system as a noise sensitive area. The Proponent will provide awareness to all flight operators of the sensitivity of the Vasse-Wonnerup system and will recommend the FNA to the commercial airlines for adoption in Code 4C jet aircraft operations. The Proponent will arrange for design of flight paths and development of DAPs that include consideration of the Vasse-Wonnerup wetlands as far as is practicable.

8.1.3 Other factors and considerations

The development envelope comprises mostly cleared agricultural land and existing airport facilities, with limited clearing of native vegetation required and where much of this vegetation is in a degraded condition and posing limited habitat value for threatened species. Clearing of vegetation to accommodate changes in the OLS will be limited to the extent required, with pruning undertaken as a preference. No Featherflower plants (rare or common) will be affected by the clearing/pruning for the OLS, which will involve canopy trees only. Any Featherflower plants (rare or common) identified within the clearing/pruning area for the OLS will be identified, tagged and avoided during clearing/pruning activities.

The Proponent has undertaken comprehensive stakeholder consultation in the planning of the Proposal, including public advertisement, letter drops, email alerts and updates and community information sessions (see Section 3). The community consultation has built on the previous consultation undertaken by the Proponent during the development of the Noise Management Plan for the existing airport. The Proponent has formed a BMRRA Consultative Group, with terms of reference presented in Appendix 2, which will provide a forum for interested parties to raise issues and concerns relating to the Proposal. Consultation will continue to develop as the Proposal progresses into detailed design, construction and operational phases.

'Key' and 'other' environmental factors have been considered against EPA objectives and relevant guidelines, as summarised in Appendix 14. Through the actions and controls identified within the design of the proposal to avoid, manage and mitigate the potential environmental impacts, the proposal is expected to meet the EPA objectives.

8.2 Application of the significance framework

The information provided in the assessment table (Table 5-2) has been integrated into a conceptual illustration (Figure 8-1) in accordance with EAG14 (EPA 2015b) to provide an overview of important environmental assessment considerations and conclusions. The figure is conceptual only and illustrates the Proponent's view of the level of uncertainty remaining and the mitigation measures which are to be adopted to provide confidence to the EPA that its objectives for each 'key' environmental factor will be met.

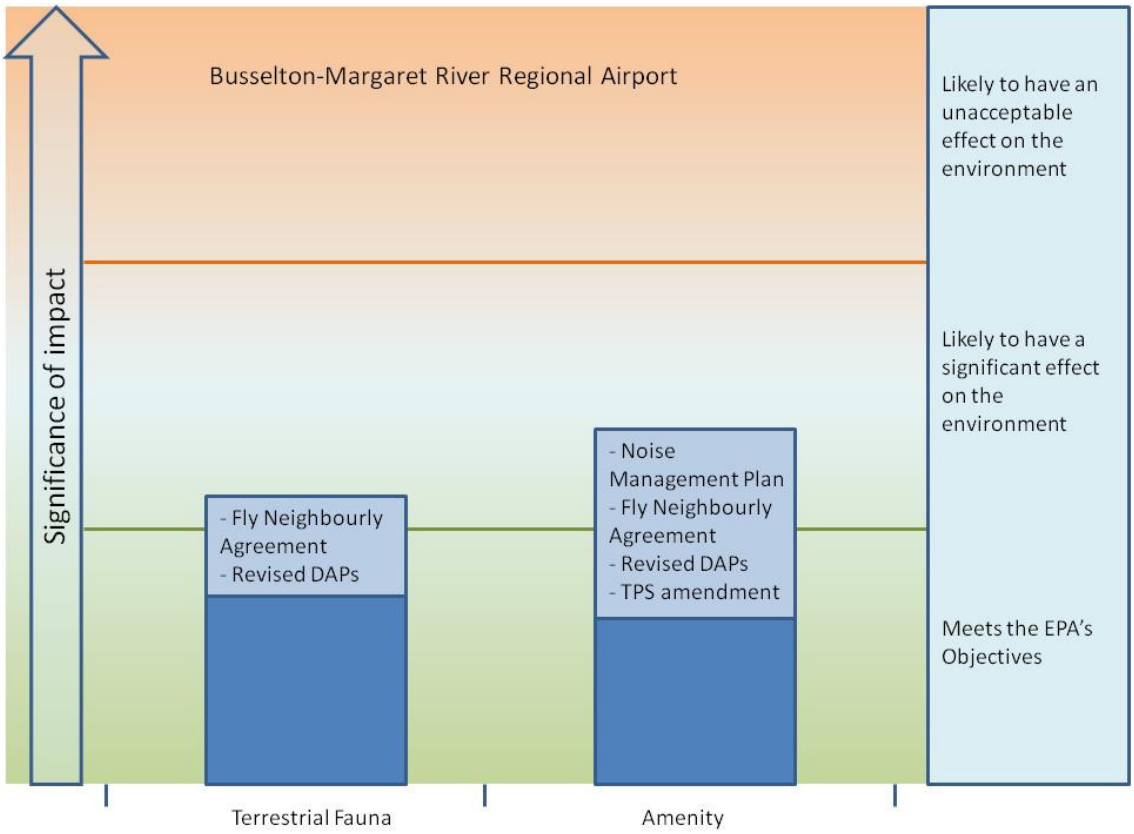

Figure 8-1: Proponent's conceptual application of the EPA's Significance Framework

8.3 Alignment with EPA Policies

The Proponent has had regard with the relevant EPA policies, guidelines and procedures during the preparation of this Environmental Review document. A summary of the alignment of Environmental Review with the relevant policies, guidelines and procedures is presented in Appendix 14.

9. References

Bamford Consulting Ecologists 2016, *Assessment of the risk of disturbance to waterbirds of the Vasse-Wonnerup wetlands from the proposed expansion of the Busselton-Margaret River Regional Airport*, prepared for the City of Busselton, February 2016.

Brad Good & Associates 2013, *Report of a desktop Aboriginal heritage survey of the Busselton Regional Airport Development Plan in the South West Region, Western Australia*, prepared for the City of Busselton, January 2013.

CMPS&F 1995, *Proposed Busselton Regional Aerodrome, Consultative Environmental Review*, April 1995.

Environmental Protection Authority 2012, *Environmental assessment guideline1: defining the key characteristics of a proposal*, Environmental Protection Authority, Western Australia.

Environmental Protection Authority 2013, *Environmental assessment guideline 6: timelines for environmental impact assessment of proposals*, Environmental Protection Authority, Western Australia.

Environmental Protection Authority 2014, *Environmental assessment guideline 13: Consideration of environmental impacts from noise*, Environmental Protection Authority, Western Australia.

Environmental Protection Authority 2015a, *Environmental assessment guideline 8: Environment Principles, Factors and Objectives*, Environmental Protection Authority, Western Australia.

Environmental Protection Authority 2015b, *Environmental assessment guideline 14 for preparation of an API – category A environmental review document*, Environmental Protection Authority, Western Australia.

GHD 2016a, *Busselton-Margaret River Regional Airport – Peer Review of Noise Modelling*, prepared for City of Busselton, March 2016.

GHD 2016b, *Busselton-Margaret River Regional Airport – Peer Review of Noise Modelling,* letter report closing out comments, issued for City of Busselton, May 2016.

Golder Associates 2016, *Geotechnical and preliminary acid sulphate soils investigation, Busselton Margaret River Airport Redevelopment Project*, prepared for City of Busselton, February 2016.

Natural Area Holdings 2016, *Flora, vegetation and fauna survey, Busselton Airport Development*, prepared for City of Busselton, March 2016.

Standards Australia 2015, *AS 2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction*.

To70 Aviation (Australia) 2015, *Noise modelling report, Busselton-Margaret River Airport*, prepared for the City of Busselton, December 2015.