Busselton-Margaret River Airport Expansion - Assessment No. 2105

Environmental Review Document

Prepared for
City of Busselton
by Strategen

June 2017
Busselton-Margaret River
Airport Expansion -
Assessment No. 2105

Environmental Review Document

Strategen is a trading name of
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ACN: 056 190 419

June 2017
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Client: City of Busselton

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Filename: CIB15316_01 R004 Rev 2 - 23 June 2017
The Environmental Protection Authority (EPA) invites people to make a submission on the environmental review for this proposal.

The City of Busselton currently operates an airport at 86 Neville-Hyder Drive, Yalyalup WA 6280.

The Proposal is to modify the existing Busselton Margaret River Airport operations to:

- allow additional aircraft types and aircraft operator types to use the airport
- change the hours of operation.

The EPA has set the level of assessment for the Proposal as Public Environmental Review. The EPA has identified one preliminary key environmental factor, Social Surroundings and has identified the potential impacts and risk associated with this factor as:

*Noise emissions from aircraft has the potential to impact on social surroundings, including amenity of people. Implementation of the proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time.*

The EPA has also identified Terrestrial Fauna (Waterbirds) as an 'other environmental factor'.

The Environmental Review Document addresses both the preliminary key environmental factor and other environmental factor and has been prepared in accordance with the EPA’s Procedures Manual (Part IV Divisions 1 and 2). The ERD is the report by the proponent on their environmental review which describes this proposal and its likely effects on the environment.

The ERD is available for a public review period of 6 weeks from 3 July 2017, closing on 14 August 2017.

Information on the proposal from the public may assist the EPA to prepare an assessment report in which it will make recommendations on the proposal to the Minister for Environment.

**Why write a submission?**

The EPA seeks information that will inform the EPA’s consideration of the likely effect of the proposal, if implemented, on the environment. This may include relevant new information that is not in the Environmental Review Document, such as alternative courses of action or approaches.

In preparing its assessment report for the Minister for Environment, the EPA will consider the information in submissions, the proponent’s responses and other relevant information.

Submissions will be treated as public documents unless provided and received in confidence, subject to the requirements of the Freedom of Information Act 1992.

**Why not join a group?**

It may be worthwhile joining a group or other groups interested in making a submission on similar issues. Joint submissions may help to reduce the workload for an individual or group. If you form a small group (up to 10 people) please indicate all the names of the participants. If your group is larger, please indicate how many people your submission represents.
Developing a submission

You may agree or disagree with, or comment on information in the Environmental Review Document.

When making comments on specific elements in the ER document:

- Clearly state your point of view and give reasons for your conclusions.
- Reference the source of your information, where applicable.
- Suggest alternatives to improve the outcomes on the environment.

What to include in your submission

Include the following in your submission to make it easier for the EPA to consider your submission:

- Your contact details – name and address.
- Date of your submission
- Whether you want your contact details to be confidential.
- Summary of your submission, if your submission is long.
- List points so that issues raised are clear, preferably by environmental factor.
- Refer each point to the page, section and if possible, paragraph of the ERD.
- Attach any reference material, if applicable. Make sure your information is accurate.

The closing date for public submissions is: 14 August 2017.

The EPA prefers submissions to be made electronically via the EPA’s Consultation Hub at https://consultation.epa.wa.gov.au.

Alternatively submissions can be:

- posted to: Chairman, Environmental Protection Authority, Locked Bag 10, EAST PERTH WA 6892, or
- delivered to: the Environmental Protection Authority, Level 8, The Atrium, 168 St Georges Terrace, Perth 6000.

If you have any questions on how to make a submission, please contact the Office of the Environmental Protection Authority on 6145 0800.
### Scoping Checklist

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<th>Page No.</th>
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<td>1.</td>
<td>Discuss the application of the mitigation hierarchy to avoid or minimise impacts on social surroundings, where possible.</td>
<td>5.9</td>
<td>83</td>
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<tr>
<td>2.</td>
<td>Identify all aspects of the proposal that are likely to have an impact on social surroundings.</td>
<td>5.2</td>
<td>24</td>
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<td>3.</td>
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<td>5.5</td>
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<td>4.</td>
<td>Undertake analysis and modelling of noise emissions (existing operations combined with proposed operations) to predict the extent, severity and duration of impacts on social surroundings, particularly on the amenity of surrounding residents, against noise criteria discussed in 3. In predicting impacts of the proposal, clearly differentiate between current and future noise impacts from the proposal.</td>
<td>5.7</td>
<td>43</td>
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<tr>
<td>5.</td>
<td>Show the current and forecast aircraft noise contours, identified from 4, superimposed over a map of residents and sensitive receptors.</td>
<td>5.7</td>
<td>43</td>
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<tr>
<td>6.</td>
<td>Clearly show and explain all assumptions and inputs used in the analysis and modelling and demonstrate why the assumptions and inputs used are realistic and reasonable for this proposal.</td>
<td>5.5.5 &amp;</td>
<td>5.5.6</td>
</tr>
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<td>7.</td>
<td>Discuss the level of confidence in the predicted impacts to amenity including the risk should those predictions be incorrect.</td>
<td>5.7.6</td>
<td>73</td>
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<td>8.</td>
<td>Present and explain the predicted impacts of the proposal in a way that can be understood by the layperson. (People likely to be affected by the proposal need to understand the likely outcomes of the proposal on social surroundings with a particular focus on amenity).</td>
<td>5.8</td>
<td>77</td>
</tr>
<tr>
<td>9.</td>
<td>Discuss how assumptions and parameters used in the modelling would be monitored and managed during the implementation of the proposal. For example, to what extent could flight paths and flight numbers used in the modelling in 4, be monitored and managed by the proponent.</td>
<td>5.8</td>
<td>77</td>
</tr>
<tr>
<td>10.</td>
<td>Propose management, mitigation and contingency measures to cover all operational aspects of the proposal identified in 2 that are technically and practically feasible. This should be set out in a draft revised Noise Management Plan and shall be included in the PER document.</td>
<td>5.9</td>
<td>83</td>
</tr>
<tr>
<td>11.</td>
<td>Describe planning and land use control measures to maintain buffers to prevent encroachment of sensitive land uses near the proposal and minimise amenity impacts in the future.</td>
<td>5.9</td>
<td>83</td>
</tr>
<tr>
<td>12.</td>
<td>Based on the above discuss how the proposal meets the EPA’s objectives for Social Surroundings.</td>
<td>5.10</td>
<td>90</td>
</tr>
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</table>
13 June, 2017

Dr Tom Hatton  
Chairman  
Office of the Environmental Protection Authority  
Locked Bag 10,  
EAST PERTH WA 6892

Attention: Amy Sgherza

Dear Dr Hatton,

BUSSELTON-MARGARET RIVER REGIONAL AIRPORT EXPANSION - ASSESSMENT NO 2105 - AUTHORITY TO ACT

I refer to your letter dated 2 March 2017 advising of the City’s requirement to prepare the Environmental Review Document (ERD) in accordance with the EPA’s instructions and template.

As required within those instructions I authorise Jennifer May, Manager Commercial Services at the City of Busselton to act on my behalf and the City’s consultants, Strategen, authority to submit the ERD.

Yours faithfully

Mike Archer  
CHIEF EXECUTIVE OFFICER
Executive Summary

The City of Busselton (the Proponent) currently operates the Busselton Margaret River Airport (BMRA) (situated on Vasse Highway, Busselton) that provides for general aviation, light aviation, emergency services, regular passenger transport, open and closed charter operations. The Proposal is to modify the existing airport operations to:

- allow additional aircraft types and aircraft operator types to use the airport (freight)
- change the hours of operation.

BMRA was constructed in 1996 following a Consultative Environmental Review (CMPS&F 1995) and assessment by the Environmental Protection Authority (EPA) in 1995 (Bulletin 785). The Minister approved the airport development under Part IV of the *Environmental Protection Act 1986* (EP Act) and issued Statement 399 on 16 October 1995.

The BMRA currently operates under Ministerial Statements 901 and 1009. Ministerial Statement 901 required the development and implementation of a Noise Management Plan (NMP). Ministerial Statement 1009 was issued on 7 July 2015 and amends two of the conditions of Ministerial Statement 901, including the requirements for an updated NMP and provision for limited aircraft movements outside of the restricted operating hours.

The NMP provides 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.
5. Noise amelioration.
6. Land use planning.
7. Communication and consultation.

The Proposal initially incorporated both the modification to airport operations and the physical infrastructure required to support the modified operations. Subsequent to the referral, the Proposal was amended under s 43A of the EP Act to remove the physical infrastructure components from the Proposal. The physical infrastructure components were then assessed separately and approved under s 45C of the EP Act.

The existing airport operations are predominantly General Aviation (GA), emergency services and closed charter Fly-In-Fly-Out (FIFO) operations which are forecast to grow in the future under the existing EP Act approval. The airport is also approved for Regular Public Transport (RPT) operations.

Table ES1 provides a summary of the Proposal. Table ES2 provides a description of the location and proposed extent of physical and operational elements of the existing project and the Proposal. Table ES3 provides a summary of potential impacts, proposed mitigation and outcomes for the Proposal.
Table ES1: Summary of the proposal

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Proposal title</td>
<td>Busselton-Margaret River Airport.</td>
</tr>
<tr>
<td>Proponent name</td>
<td>City of Busselton.</td>
</tr>
<tr>
<td>Short description</td>
<td>The proposal is to operate an airport at 86 Neville-Hyder Drive, Yalyalup WA 6280.</td>
</tr>
<tr>
<td>Runway heading</td>
<td>$30^\circ / 210^\circ$.</td>
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Table ES2: Location and proposed extent of physical and operational elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Location</th>
<th>Existing approval Statement 901 / 1009</th>
<th>Proposed change</th>
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<tr>
<td>Airport operations</td>
<td>Figure 2-1</td>
<td>• Emergency Services</td>
<td>• Introduction of additional aircraft types.</td>
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<tr>
<td></td>
<td></td>
<td>• Light Aviation, excluding flight training</td>
<td>• Introduction of additional aircraft operator types to include Freight Flights</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• General Aviation</td>
<td>• Modified operating hours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Open and Closed Charter Flights</td>
<td></td>
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<td></td>
<td></td>
<td>• Regular Passenger Transport Flights</td>
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<tr>
<td></td>
<td></td>
<td>• Introduction of additional aircraft types.</td>
<td>• Emergency Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Light Aviation, flight training by approval only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• General Aviation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Open and closed charter flights</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Regular Public Transport Flights</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Freight Flights.</td>
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Table ES3: Summary of potential impacts, proposed mitigation and outcomes

<table>
<thead>
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<th>Element</th>
<th>Description</th>
</tr>
</thead>
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<tr>
<td>Social Surroundings</td>
<td>To protect social surroundings from significant harm.</td>
</tr>
<tr>
<td>EPA objective</td>
<td>There is no Western Australia Government policy that specifically applies to the assessment or management of aircraft noise from a regional airport. 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, neither of these instruments apply to aircraft noise. Commonwealth guidance indicates that noise acceptability criteria are not applied and the preferred approach for assessment is to provide information that enables the individual to decide on acceptability, rather than prescribe an 'acceptable' number of jet aircraft movements and/or number of movement louder than a measure. Australian Standard (AS) 2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction (Standards Australia 2015) which provides criteria for suitability of building sites on the basis of Australian Noise Exposure Forecast (ANEF), or on the basis of maximum noise level ($L_{A_{max}}$) and frequency (flights per day) for smaller aerodromes subject to general aviation flights and without ANEF charts. The National Airports Safeguarding Framework (NASF) is a national land use planning framework that aims to improve community amenity by minimising aircraft noise sensitive developments near airports. NASF provides guidelines for zoning of noise sensitive uses on the basis of ANEF and number of daily noise events exceeding 60 dB(A), 65 dB(A) and 70 dB(A).</td>
</tr>
<tr>
<td>Policy and guidance</td>
<td>Noise emissions from aircraft has the potential to impact on social surroundings, including amenity. Implementation of the proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time.</td>
</tr>
<tr>
<td>Potential impacts</td>
<td>Avoid:</td>
</tr>
<tr>
<td></td>
<td>Flight paths, Departure and Arrival Procedures and Fly Neighbourly Agreement guide aircraft to avoid flights over noise sensitive receptors. Land use planning restricts noise sensitive development in the vicinity of BMRA.</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
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<tr>
<td><strong>Minimise:</strong></td>
<td>Fly Neighbourly Agreement guides aircraft to minimise flights over noise sensitive receptors. Land use planning includes Special Control Areas requiring additional building requirements and land title notifications. A cap on night flights at a maximum of 5 flights (10 movements) per week between the hours of 0000 and 0600.</td>
</tr>
<tr>
<td><strong>Mitigate:</strong></td>
<td>Noise amelioration is available for eligible affected properties. In the event that the noise amelioration assessment process determines that amelioration is applicable to a property, options for appropriate and effective amelioration will be identified. Options for building treatments applicable can include but may not be limited to: • seal gaps around window frames and doors • seal open eaves • replace existing hollow core external doors with solid core doors with acoustic seals • provide mechanical ventilation / reverse cycle air-conditioning to allow windows and doors to remain closed • upgrade or replace window treatments (options include thicker glass, double glazing, replace sliding windows with casement or awning style windows with compressible seals) • add thermal or acoustic insulation to ceiling • insulate wall cavities • lay plasterboard over joists and add additional insulation above plasterboard • install a loaded vinyl noise blanket over insulation and joists • increase thickness of ceiling by adding an extra layer of plasterboard.</td>
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<tr>
<th>Outcomes</th>
<th>Residual Impact:</th>
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<tr>
<td>The Proposal is expected to cause a small increase in the frequency of aircraft noise disturbance in the vicinity of the BMRA and an average of one night time noise disturbance per day at four nearby residences south of the BMRA. The Proponent has committed to a cap on night flights at a maximum of 5 flights (10 movements) per week between the hours of 0000 and 0600. The Proposal will result in a small but noticeable change in loudness at residences in the vicinity of the BMRA, with the duration of noise disturbance comparable to that of existing aircraft flights operating from the airport. The Proposal is not expected to cause a constraint for land proposed for future residential development to the west and north-west of the BMRA. The aircraft noise disturbance will be well within criteria for residential development together with the modelling conservatism that concentrates impacts in the vicinity of indicative flight paths and provides a level of confidence that the impacts to Social Surroundings will not be significant. BMRA will continue to operate under a comprehensive noise management framework, including a revised Noise Management Plan, Fly Neighbourly Agreement, noise modelling, noise monitoring and amelioration, land use 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 well as other capital city Airports, as required under the Commonwealth Airports Act 1996. The BMRA noise management framework is therefore considered best practice within Australia and exceeds the mechanisms currently in place for other regional airports within Western Australia who are not required to be regulated or undertake such measures. Based on the robust findings of the noise modelling and the comprehensive management framework afforded by the Noise Management Plan, it is expected that the Social Surroundings in the vicinity of BMRA will not be subject to significant harm and thus the Proposal will meet the EPA objective for the factor.</td>
<td></td>
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1. Introduction

1.1 Purpose and scope

The City of Busselton (the Proponent) currently operates the Busselton Margaret River Airport (BMRA) (situated on Vasse Highway, Busselton) that provides for general aviation, light aviation, emergency services, Regular Public Transport flights and open and closed charter flights. The Proposal is to modify the existing airport operations to:

- allow additional aircraft types and aircraft operator types to use the airport (freight)
- change the hours of operation.

The EPA has set the level of assessment for the Proposal as Public Environmental Review. The EPA have identified one preliminary key environmental factor, Social Surroundings and has identified the potential impacts and risk associated with this factor as:

*Noise emissions from aircraft has the potential to impact on social surroundings, including amenity of people. Implementation of the proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time.*

The EPA has also identified Terrestrial Fauna (Waterbirds) as an 'other environmental factor'.

Aspects of the proposal have the potential to increase the aircraft noise experienced by people. The aspects of the proposal with the potential to increase noise include:

- the potential for larger aircraft to utilise the BMRA
- a potential increase in the number of flights using the BMRA
- the introduction of night time flights.

The new RPT/freight aircraft movements are expected to have comparable flight paths, altitudes and duration of noise disturbance as the existing Fokker 100 (FIFO) aircraft movements, with a small but noticeable increase in loudness compared to the F100, and a gradual increase in frequency of noise disturbance. The proposal will marginally increase flight numbers when compared with actual and forecast movements that are currently approved.

The proposal includes a change of hours of operation to allow night flights and whilst the numbers of flights are proposed to be restricted, this change will be noticeable to affected members of the community.

This Environmental Review Document (ERD) has been prepared to support assessment of the Proposal by the Environmental Protection Authority (EPA). This document has been prepared in accordance with EPA Instructions on how to prepare an Environmental Review Document (EPA 2016a) and the Environmental Scoping Document (ESD). The purpose of the ERD is to provide sufficient information on the Proposal for the public to review and comment, and for assessment by the EPA.

The information contained within this ERD and provided by the Proponent during community consultation undertaken for the Proposal to date has been designed to meet the following broad principles that are espoused in the Discussion Paper: Expanding Ways to Describe and Assess Aircraft Noise, Australian Department of Transport and Regional Services (DTRS 2000), being:

- Transparency - communicating in everyday language, using information that can be easily verified by the layperson
- Inclusiveness - not excluding people from information because the ‘standard’ indicates that noise is not a problem
- Empowerment of the individual - placing the individual in a position where they can form their own view on the acceptability of future noise.
1.2 Proponent

The Proponent for the Proposal is the City of Busselton. The Proponent is the organisation responsible for development and operation of the Proposal.

The Proponent for this Proposal is:

City of Busselton  
ABN 87 285 608 991  
38 Peel Terrace  
Locked Bag 1  
BUSSELTON WA 6280

The key contact for this Proposal is:

Jennifer May  
Manager Commercial Services  
38 Peel Terrace  
Locked Bag 1  
BUSSELTON WA 6280  
Ph: (08) 9781 0389  
Email: Jennifer.May@busselton.wa.gov.au

1.3 Environmental impact assessment process

The Proposal is subject to both Commonwealth and Western Australian legislation. This section provides a summary of the Commonwealth and State statutory requirements relating to the construction, development, and operation of the project.

1.3.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is administered by the Commonwealth Department of the Environment and Energy (DoEE). Commonwealth approval is required if Matters of National Environmental Significance (MNES), as defined in the EPBC Act, are potentially impacted, including migratory birds, listed rare flora, fauna, or Threatened Ecological Communities, listed heritage sites or Commonwealth marine areas, Commonwealth land, Commonwealth activities, and nuclear actions.

1.3.2 Environment Protection Act 1986

The Western Australian Environmental Protection Act 1986 (EP Act) is the primary legislation governing environmental protection and impact assessment in the state. Projects with the potential to significantly impact on the environment, or of sufficient public interest, are assessed under Part IV of the EP Act.

The environmental impact assessment (EIA) is an orderly and systematic process for evaluating a proposal (including its alternatives) and its effects on the environment. The EIA process is guided by the EP Act and supporting guidance material including the Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016 and the Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual 2016. The assessment includes considering ways in which the proposal, if implemented, could avoid, reduce and ameliorate the impacts on the environment.

The EPA can decide to formally assess a proposal at various levels of assessment. Common level of assessment descriptors are provided below:

- Referral information – EPA assesses proposal on referral information
- Environmental Review – proposals where an environmental review is required but is not made available for public review
- Public Environmental Review (PER) - proposals where an environmental review is required and is made available for public review.
In deciding the level of assessment the EPA considers the following:

- the information and the level of detail provided in the referral
- any information obtained from any requests for further information and/or the EPA’s own investigations and inquiries
- the number and complexity of preliminary key environmental factors relevant to the proposal
- whether it is a common type of proposal where there is an established condition-setting framework for that type of proposal
- the level of public interest about the likely effect of the proposal, if implemented, on the environment.

The EPA has determined that the Proposal requires assessment at PER level.

1.4 Other approvals and regulation

The Proposal does not require any other approval or regulation. The approvals and regulation associated with the infrastructure components of the expansion are described in the Environmental Review submitted with the Proposal referral under s 38 of the EP Act (Strategen 2016).
2. **The proposal**

2.1 **Background**

2.1.1 **Referral of proposal**

The Proponent referred the Proposal to the EPA on 7 July 2016. On 30 November 2016, the EPA determined that the Proposal required a Public Environment Review level of assessment, with a six week public review period. The EPA issued the ESD to guide the preparation of the ERD on 2 March 2017.

2.1.2 **Modifications to the proposal since referral**

Subsequent to the referral, the Proposal was amended under s 43A of the EP Act to remove the physical infrastructure components from the Proposal. The physical infrastructure components were then assessed separately and approved under s 45C of the EP Act.

2.1.3 **Existing airport approval**

BMRA was constructed in 1996 following a Consultative Environmental Review (CMPS&F 1995) and assessment by the EPA (Bulletin 785). The Minister approved the airport development under Part IV of the EP Act and issued Statement 399 on 16 October 1995. The approval conditions for the airport have been amended as described in Table 2-1 which presents a summary of the changes in the Ministerial Statements issued for the BMRA approval under the EP Act.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Year</th>
<th>Content of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>825</td>
<td>2010</td>
<td>To permit one specific flight.</td>
</tr>
<tr>
<td>856</td>
<td>2011</td>
<td>To permit one specific flight.</td>
</tr>
<tr>
<td>878</td>
<td>2011</td>
<td>To permit three specific flights.</td>
</tr>
<tr>
<td>887</td>
<td>2012</td>
<td>To permit one specific flight.</td>
</tr>
<tr>
<td>901</td>
<td>2012</td>
<td>Replaced all previous conditions and procedures in Ministerial Statements 399,825, 856, 878, and 887.</td>
</tr>
<tr>
<td>1009</td>
<td>2015</td>
<td>Change to conditions 4 and 5 of MS 901.</td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td>s45C - Amend the description of the location of the Busselton Regional Aerodrome runway to incorporate land acquired and ceded to the City of Busselton to the north, south and northwest of the existing airport lot by increasing the development envelope.</td>
</tr>
</tbody>
</table>

The BMRA operates under Ministerial Statements 901 and 1009. Ministerial Statement 901 required the development and implementation of a Noise Management Plan (NMP). Ministerial Statement 1009 was issued on 7 July 2015 and amends two of the conditions of Ministerial Statement 901, including the requirements for an updated NMP and provision for limited aircraft movements outside of the restricted operating hours.

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1 An assessment previously used under the EP Act, equivalent to a PER with a four week public review period.
The NMP provides 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.
5. Noise amelioration.
6. Land use planning.
7. Communication and consultation.

The existing airport operations are predominantly General Aviation (GA), emergency services and closed charter Fly-In-Fly-Out (FIFO) operations which are forecast to grow in the future under the existing EP Act approval. The airport is also approved under Ministerial Statement 1009 for Regular Public Transport (RPT) operations, which have previously involved intrastate (Perth to Busselton) flights; however, these ceased as of 2015.

Existing operational flight paths, altitudes, duration of noise disturbance and maximum noise levels as experienced by the existing Fokker 100 (FIFO) aircraft movements provide the community with an operational baseline which is similar to the proposal. Whilst night flights after 2200 hours are not common, there are occasional jet aircraft flights (F100) after this time whilst flights after 2000 occur more regularly.

2.1.4 Current proposal

The Proposal initially incorporated both the modification to airport operations and the physical infrastructure required to support the modified operations. Subsequent to the referral, the Proposal was amended under s 43A of the EP Act to remove the physical infrastructure components from the Proposal. The physical infrastructure components were separated from the proposal as the runway upgrades, including the runway, taxiway and apron overlay, extensions and strengthening are required to meet the current and future (existing) approved operations of the Airport, particularly as the runway, aprons and taxiways are nearing the end of their functional life and pavement deterioration and failures have already occurred. The physical infrastructure components were then assessed separately and approved under s 45C of the EP Act.

The current proposal comprises modified airport operations including the recommencement of RPT and new freight aircraft flights and amendment of hours of operation.

The Proponent referred the Proposal to the EPA under s 38 of the Environmental Protection Act 1986 (EP Act) on 7 July 2016. On 30 November 2016, the EPA determined the Proposal required a Public Environment Review level of assessment, with a six week public review period. EPA Assessment No. 2105 identified the level of assessment was based on the following:

‘Preliminary key environmental factor is complex. Detailed and technical assessment is required to determine the extent, severity and duration of the potential noise impacts from changes to the number and timing of aircraft movements at the airport on the surrounding residents.’

On 2 March 2017, the EPA issued an ESD to guide the preparation of the ERD document. The ESD is presented in Appendix 1. Details of the referral, EPA decision and ESD are presented in Section 2.1.

The ESD identified Social Surroundings (aircraft noise) as the preliminary ‘key environmental factor’ to be addressed in the ERD, with Terrestrial Fauna (waterbirds) to be addressed as an ‘other’ environmental factor.
The Proponent has consulted with the Australian Government Department of Environment and Energy (DEE) regarding the Proposal and referred the Proposal to the Minister for Environment under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The referral (2016/7675) was advertised on 31 March 2016 and was determined as a non-controlled action under the EPBC Act on 26 July 2016. This means that the Proposal does not represent a significant impact on the matters of national environmental significance. A copy of the EPBC Act referral decision is presented in Appendix 2.

2.2 Justification

The Proposal is a strategic action with the purpose of broadening the economy of the South West region through enabling interstate and international flights for passengers and freight. The provision of direct interstate and international flights will facilitate growth in tourism and agricultural export industries which have been identified as critical to attracting investment and providing jobs to service the population growth forecast for the region.

The development of the BMRA is identified as being a top strategic priority of the City of Busselton Council and is identified as a key opportunity and driver to stimulate the economic and social growth of the region as outlined in the South West Development Commission (SWDC) Regional Blueprint 2014, Department of Planning South West Regional Planning and Infrastructure Framework 2015, and the cabinet endorsed Tourism WA, State Government Strategy for Tourism in WA (2020). Further, the expansion of the Airport is supported by key business and industry associations throughout the South West Region, including the Margaret River Busselton Tourism Association (MRBTA) and South West Regional Chambers of Commerce.

To progress the realisation of this strategic priority, in 2013 the South West Development Commission (SWDC) submitted a Business Case that examined and evaluated future opportunities of an upgraded BRA to service the South West region in the years to come. The major elements that justified the Business Case were, and still remain, as follows:

- the Busselton and Margaret River Regions are established communities that are ever expanding and consistently provide world class attractions and events making it a popular destination for visitors within Australia and all over the world
- the BRA is regarded as the most strategically located of all airports in the region, having the right physical characteristics, central location, proximity to the ‘Margaret River Region’ and lack of expansion impediment making it the ideal South West Regional Airport facility capable of conducting regular RPT
- the developed BRA will be an enabling mechanism to deliver more tourists to the region to bolster the tourism industry, including occupancy increases, event attendance and incentive to invest in further development of major tourism infrastructure
- the developed BRA will bring with it substantial profit and wage impacts for the region as identified in the ACIL Tasman analysis suggesting the investment would deliver at least a $2.7 billion gross outcome
- the development will allow for the expansion of fly-in fly-out capacity to mine sites in the East Pilbara to assist in underpinning the State’s iron ore production industry with the use of larger aircraft. With expanded infrastructure at the BRA, the opportunity to base FIFO aircraft and crews at the airport is a future possibility
- there is strong empirical research and evidence within Australia and globally that points to direct aviation access as providing the stimulus for increased new visitation into a region or city resulting in economic and social growth and in turn long term regional sustainability.
The Business Case further outlined the key direct benefits of a developed BRA, those being the delivery of wider regional benefits as summarised below (note that the below points are over a 30 year period):

- construction workforce of 126
- 94 new direct and indirect ongoing jobs over a 30 year period
- $95.5m in Gross Value Add to the South West Region over a 30 year period
- $55m in additional income
- $220m in additional economic output.

Consideration was given to investigating alternative sites however the original environmental approvals for the construction of the BMRA in 1995 investigated eleven sites for the location of the BMRA. The existing site (referred to as Four Mile Hill site) was found to be the most appropriate site of all eleven sites and was subject to a detailed evaluation. As such, it was determined by the City of Busselton and at the State Government level that the existing BMRA site and infrastructure was suitable for redevelopment as opposed to identifying a new, ‘greenfield’ site.

Demonstrating the clear economic benefits, the Business Case Proposal attracted $59.95 million in funding, including $45.9 million 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, $300,000 from the South West Development Commission and $250,000 from Tourism WA.

In June 2016, the Federal Government announced a funding commitment of $9.78 million to enable further expansion of the BMRA to support international flights.

The modification of hours of operation is required to provide flexibility for commercial airlines operating interstate and international RPT and freight flights, particularly in the initial period of operations as the BMRA becomes an established destination. It is expected that flights will revert to day time services over a period of 3-5 years from commencement of operations.

### 2.3 Proposal description

#### 2.3.1 Proposal overview

The Proposal involves modification of existing airport operations involving aircraft types, airport operator types (introduction of freight) and hours of operation. The modification to operations have resulted in amendments to the existing NMP, specifically the hours of operation and noise criteria. These amendments have been subject to public consultation and the revised NMP has been endorsed by the City of Busselton Council.

The Proposal is planned to allow interstate and international RPT and freight operations at BMRA. The interstate and international airport operations are expected to comprise Code 4C jet aircraft; however, up to Code 4E aircraft and above may be introduced at some point in the future. Code 4C and Code 4E are International Civil Aviation Organisation (ICAO) Aerodrome Reference Codes. Code 4C aircraft have a wing span between 24 m and 36 m and include Boeing 737 and Airbus 320 aircraft. Code 4E aircraft have a wing span between 52 m and 64 m and include Airbus 330 aircraft.

The location of BMRA is shown on Figure 2-1. BMRA 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 airport. The Ramsar listed Vasse-Wonnerup wetlands are approximately 3.5 km to the north-west of the airport.

The modified airport operations are proposed to commence in late 2018 and continue on an ongoing basis. BMRA is a long-term infrastructure asset, with a lifespan of at least 50 years.
2.3.2 Key proposal characteristics

The key characteristics of the Proposal are presented in Table 2-2 and Table 2-3. The key proposal characteristics have been developed in accordance with EPA Instructions on how to define the key characteristics of a proposal (EPA 2016b), which describe the key elements of the proposal and quantify the proposed extent of impacts of the key elements on the environment.

Table 2-2: Summary of the Proposal

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposal title</td>
<td>Busselton-Margaret River Airport.</td>
</tr>
<tr>
<td>Proponent name</td>
<td>City of Busselton.</td>
</tr>
<tr>
<td>Short description</td>
<td>The proposal is to operate an airport at 86 Neville-Hyder Drive, Yalyalup WA 6280.</td>
</tr>
<tr>
<td>Runway heading</td>
<td>30°/210°.</td>
</tr>
</tbody>
</table>

Table 2-3: Location and proposed extent of physical and operational elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Location</th>
<th>Existing approval</th>
<th>Proposed change</th>
<th>Proposed content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport operations</td>
<td>Figure 2-1</td>
<td>Statement 901 / 1009</td>
<td>• Introduction of additional aircraft types.</td>
<td>• Emergency Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Introduction of additional aircraft operator types to include Freight Flights</td>
<td>• Light Aviation, flight training by approval only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Modified operating hours.</td>
<td>• General Aviation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Emergency Services</td>
<td>• Open and closed charter flights</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Light Aviation, flight training by approval only</td>
<td>• Regular Public Transport Flights</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• General Aviation</td>
<td>• Freight Flights</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Open and closed charter flights</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Regular Public Transport Flights</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Freight Flights</td>
<td></td>
</tr>
</tbody>
</table>

2.3.3 Aircraft movements

The Proposal involves modified airport operations to support new RPT and freight aircraft movements in addition to existing airport operations, including planned operational growth.

The number and timing of the new RPT and freight aircraft movements remains unconfirmed and will be determined in negotiations with commercial airlines. During the preparation of the State Government Business Case Proposal, an indicative forecast of aircraft movements was developed by the Proponent and modified upon securing Commonwealth funding for international freight flights and is presented in Table 2-4.

Table 2-4 presents the average projected movements per week, with an aircraft flight comprising two movements (i.e. an arrival and a departure). The proposed new RPT and freight aircraft movements are highlighted in blue and are forecast at five flights (10 movements) per week in 2018-19, rising to a total of 15 flights (30 movements) per week in 2038-39. Night flights will be capped to a maximum of five flights (10 movements) per week (see Section 2.3.4).

---

2 Projected aircraft movement numbers have been adjusted to remove the scheduled aircraft movements that were withdrawn since preparation of the business case.
Table 2-4: Aircraft movement forecast (weekly movements)

<table>
<thead>
<tr>
<th>Year of operation</th>
<th>Current (2015-16)</th>
<th>Year 1 (2018-19)</th>
<th>Year 5 (2023-24)</th>
<th>Year 10 (2028-29)</th>
<th>Year 20 (2038-39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proposal – forecast new aircraft movements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPT</td>
<td>Nil</td>
<td>6</td>
<td>14</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>Freight</td>
<td>Nil</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td><strong>Subtotal – Proposed</strong></td>
<td>Nil</td>
<td>10</td>
<td>20</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td><strong>Existing airport operations – forecast growth in approved movements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIFO – closed charter</td>
<td>24</td>
<td>22</td>
<td>26</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>General and Recreational Aviation</td>
<td>151</td>
<td>131</td>
<td>140</td>
<td>146</td>
<td>146</td>
</tr>
<tr>
<td>Emergency services – fixed wing</td>
<td>9</td>
<td>15</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Emergency services – helicopters</td>
<td>15</td>
<td>96</td>
<td>99</td>
<td>104</td>
<td>109</td>
</tr>
<tr>
<td><strong>Subtotal – existing airport operations</strong></td>
<td>200</td>
<td>264</td>
<td>281</td>
<td>296</td>
<td>301</td>
</tr>
<tr>
<td><strong>Modified airport operations – Proposal plus existing airport operations</strong></td>
<td>200</td>
<td>274</td>
<td>301</td>
<td>318</td>
<td>333</td>
</tr>
<tr>
<td>Modified airport operations increase as a proportion of existing airport operations</td>
<td>Nil</td>
<td>+4%</td>
<td>+7%</td>
<td>+7%</td>
<td>+10%</td>
</tr>
</tbody>
</table>

The BMRA aircraft movement projections taken from the Business Case for 2015-16 total approximately 200 aircraft movements per week, the majority (88%) comprise General Aviation, Recreational Aviation (small aircraft) and Emergency Services (fixed wing Royal Flying Doctor Service and helicopters), with the remaining 12% comprising FIFO closed charter flights (Fokker 100 jet aircraft). Irrespective of the Proposal taking place, it is expected that existing airport operations will grow over the next 20 years from an average of 200 movements per week to an average of 301 movements per week in 2038-39.

Of particular note is the forecast increase in emergency services helicopter (SLSWA, DFES, Parks and Wildlife) activities in 2018-19, increasing from 15 in 2015-16 to 96 movements per week (2018-19). This increase is approved under the existing airport operations irrespective of the Proposal taking place, and will increase the aircraft noise exposure for existing airport operations (2015-16 – 2018-19) as described in Section 5.7.3.

The modified airport operations in 2018-19 represent 4% of the total increase (existing and modified operations) of aircraft movements, rising to 10% of the total increase in 2038-39 for the forecast aviation growth at BMRA.

2.3.4 Hours of operation

In addition to the increase in the number of flights (as described in Section 2.3.3), the Proposal includes modification to the standard hours of operation for the BMRA. As presented in Table 2-5, the modification will enable up to five flights per week during the hours of 0000-0600hrs for open and closed charter, RPT and freight flights, subject to City approval on a case-by-case basis.

The modification of hours of operation to include a limited number of night flights is required to provide flexibility for commercial airlines operating RPT, particularly in the initial period of operations as the BMRA becomes an established destination. Once demand has been proven, it is expected that night flights will convert to day time services.

---

3 Actual aircraft movements for BMRA 2015 calendar year totalled 100 aircraft movements.
Table 2-5: Proposed modification to hours of operation

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Existing Standard Hours of Operation</th>
<th>Proposed Standard Hours of Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Services</td>
<td>Unrestricted</td>
<td>Unrestricted. Emergency situations and normal flight patterns. Training flights require approval.</td>
</tr>
<tr>
<td>Light Aviation</td>
<td>Unrestricted Single engine &lt; 2000 kg MTOW⁴</td>
<td>06:00 to 22:00. Flight training approval required (only available for aircraft below 1500kg MTOW and flight training conditions apply). Aircraft above 5,700kg MTOW – City approval required.</td>
</tr>
<tr>
<td>General Aviation</td>
<td>07:00 to 19:00 (May-Nov) 06:00 to 21:00 (Dec-Apr)</td>
<td>06:00 to 22:00. Aircraft above 5,700kg MTOW – City approval required.</td>
</tr>
<tr>
<td>Open and Closed Charter Flights</td>
<td>06:00 to 22:00</td>
<td>24 hrs Restricted. 06:00 to 00:00*. <em>Five flights</em> per week approved between 00:00 to 06:00. City approval required for all flights.</td>
</tr>
<tr>
<td>RPT / Freight</td>
<td>0600-2300hrs</td>
<td>24 hrs Restricted. 06:00 to 00:00*. <em>Five flights</em> per week approved between 00:00 to 06:00. City approval required for all flights.</td>
</tr>
</tbody>
</table>

* Each flight entails two movements, arrival and departure

⁴ MTOW – Maximum Takeoff Weight.
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2.4 Local and regional context

As shown in Figure 2-2, BMRA is surrounded by agricultural lands comprising isolated residential properties. The closest urban residential area is Yalyalup approximately 2 km to the north-west, which incorporates Georgiana Molloy Anglican School. Reinscourt rural residential area is located approximately 2.7 km to the north of BMRA while the main CBD area of Busselton town site is located approximately 6.5 km to the north-west.

Recreational areas in the vicinity of BMRA include the Tuart Forest National Park approximately 3 km to the north-east, managed by Department of Parks and Wildlife (Parks and Wildlife) and used by members of the public for forest walks and bird watching. Sporting facilities include the Stewart Bovell Sporting Complex approximately 3.4 km to the north-west and Busselton Golf Club approximately 2.7 km to the west. Busselton cemetery is located less than 1 km to the north-west of BMRA.

Key economic activities in the vicinity of BMRA include agriculture (dairy and beef cattle), as well as mineral sand mining and extractive industry. Mineral sand mining operations by Cristal Mining currently take place approximately 2.3 km north east of BMRA, east of Sues Road, with operations planned to occur immediately north and north-east of BMRA, commencing in 2017. Extractive industry is also occurring approximately 4 km to the south-south-west of the airport, along Acton Park Road, with Council approval for sand extraction for 11 years. The extractive industry is approved for a maximum of 50 truck movements per day (50 entering and 50 exiting) using Acton Park Road, Vasse Highway and Sues Road as haulage routes.

The BMRA 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 comprising 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 most years.
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3. **Stakeholder engagement**

3.1 **Key stakeholders**

The key stakeholders relevant to the Proposal are as follows:

- Office of the Environmental Protection Authority
- Department of Parks and Wildlife
- Department of Water
- Department of Transport
- Airservices Australia
- Civil Aviation Services Authority
- Community members.

Additional stakeholder consultation was also undertaken with respect to the infrastructure development for the BMRA expansion and is outlined in the referral for the Proposal (Strategen 2016).

3.2 **Stakeholder engagement process**

The Proponent has undertaken a comprehensive approach to stakeholder consultation including briefings with key agencies and public consultation comprising advertisement in newspapers, the City of Busselton website, letter drops, public information sessions and one-on-one meetings with individuals.

The Proponent has developed a BMRA Development Project Communication Plan outlining the goals and objectives, communication approach and methodology to be utilised for stakeholder and community consultation for the Proposal. The Proponent has formed a BMRA Consultative Group, with the terms of reference for the Group presented in Appendix 4. The Group comprises representatives from the City of Busselton (the Proponent), business/industry (Tourism, Chamber of Commerce), airport users, Community members from potential noise affected areas, and adjacent airport neighbours. The Group provides a forum for interested parties to raise issues and concerns in relation to the Proposal, to the Proponent.

Comments and advice received during public consultation with the community, government agencies and other relevant stakeholders has been considered in the NMP update. The previous draft NMP (2016), developed to support the Proposal, proposed unrestricted operations for all aircraft. Following feedback from the community during two separate public consultation periods the current draft NMP (2017) proposes that GA hours of operations remain restricted and closed/open charter, RPT and freight hours of operations are 24 hrs restricted, with up to 5 flights per week approved between 0000 - 0600 hrs. This restricted arrangement has been established to provide the community with confidence that night time flights will be limited whilst enabling the attraction of commercial airlines. Night flights will continue until the BMRA becomes an established destination, at which point flights are expected to convert to day time services. The ‘capping’ of night time flights between the hours of 0000 and 0600, provides a high level of confidence in the assessment of potential impacts of aircraft noise. A copy of the updated NMP (2017) is presented in Appendix 3.
### 3.3 Stakeholder consultation

A summary of stakeholder consultation undertaken to date is summarised in Table 3-1.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Date</th>
<th>Topics/issue raised</th>
<th>Consultation details and Proponent response/outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State Government agencies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Water (DoW)</td>
<td>25/01/2016</td>
<td>Spill management</td>
<td>DoW are supportive of the Proposal. DoW are satisfied with proposed use of spill kits and interceptor drains to capture any spills from refuelling aircraft. DoW advised that the risk to downstream water bodies (Vasse Estuary) is low; however, an option to manage perceived risk is the use of a shut-off valve on the wet retention basin on site which is to be closed should a spill event occur at the airport. The Proponent will incorporate DoW’s recommendations into the design, construction and operation of the Proposal.</td>
</tr>
<tr>
<td></td>
<td>23/02/2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Parks and Wildlife (Parks and Wildlife)</td>
<td>14/12/2015</td>
<td>Bird strike</td>
<td>Parks and Wildlife noted key issues as impacts to resident birds during breeding (winter-spring), juvenile ducks (spring) and migratory waders/shorebirds during feeding (summer-autumn). Parks and Wildlife recommended that arrivals come from the south rather than the north. Small planes do not appear to be an issue. Parks and Wildlife requested additional information including arrival altitudes, flight paths and proposed ground works. Parks and Wildlife noted concern of birdstrike, including lapwings, kestrels and straw necked ibis. Flock of ibis move between paddocks and roosting areas which could be an issue for planes.</td>
</tr>
<tr>
<td></td>
<td>5/01/2016</td>
<td>Bird strike</td>
<td>Parks and Wildlife noted that while undertaking December 2015 bird counts they observed waterbirds being disturbed by Fokker 100 aircraft arrivals along the Wonnerup Estuary. They noted 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. Parks and Wildlife recommended that a specialist be engaged to review the risk posed to birds by aircraft disturbance. The Proponent engaged Bamford Consulting Ecologists to undertake a literature review and assessment of the risk posed to waterbirds by aircraft disturbance. The Proponent will promote the Fly Neighbourly Agreement (FNA) 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 minimise potential for bird strike. Records by the Australian Transport Safety Bureau (refer to Section 6.1.2) indicate a total of 25 bird strike incidents from 2005 to 2015 (an average of 2.5 bird strikes per year), the majority of which involved single birds and occurred within the airport precinct.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Date</td>
<td>Topics/issue raised</td>
<td>Consultation details and Proponent response/outcome</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>---------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Office of the Environmental Protection Authority (OEPA)</td>
<td>20/11/2015</td>
<td>Overview of project Preliminary key environmental factors</td>
<td>OEPA noted that amenity (aircraft noise) is a key environmental factor and as the OEPA does not have the required expertise, recommended that a peer reviewer be engaged to review noise modelling prepared as part of the EP Act referral. OEPA recommended consultation with Parks and Wildlife regarding risk posed to Vasse-Wonnerup wetlands and waterbirds. 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 subsequently engaged To70 (Australia) to revise the modelling to incorporate peer review comments. Proponent consulted with Parks and Wildlife as presented in this table. Proponent has addressed terrestrial fauna – waterbirds within ‘Other Environmental Factors’ of this document.</td>
</tr>
<tr>
<td>Department of Transport</td>
<td>Monthly / Ongoing</td>
<td>Development Project</td>
<td>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.</td>
</tr>
</tbody>
</table>

**Australian Government agencies**

| Department of the Environment (DotE, now Department of Environment and Energy) | Meetings: 22/01/2016 20/04/2016 31/05/2016 EPBC referral 4/04/2016 | Aircraft noise disturbance to waterbirds Water quality impacts to Ramsar wetlands | Strategen issued an initial briefing note to DotE on 21/01/2016 and further information on 3/02/2016 and 17/02/2016 detailing traffic forecasts, location, EPBC assessments for other airports, and water quality. Proponent submitted an EPBC referral to DotE (EPBC 2016/7675) on 4/04/2016 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 requested further information on shorebird usage in the region, to which Strategen responded on 5/07/2016. The project was determined to be a non-controlled action on 26/07/2016. |
| Airservices Australia (ASA) | 16/11/2015 - ongoing 4/04/2016 | 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. |
| 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**

<p>| Community members | Public advertisement Letter (Dec 2015/ Jan 2016) and aircraft noise brochure mail-out to nearby residents inviting them to one-to-one meetings or to attend community information sessions | Airport Development Project Fact Sheet Flight paths and aircraft noise Noise Contours (ANECs/N-contours) Change to Standard Hours of operation (2300hrs-0600hrs) Aircraft noise disturbance to waterbirds | Proponent provided information on aircraft movements, indicative flight paths and aircraft noise information in one-to-one meetings and community information sessions. The materials presented during community consultation in 2015-16 prior to the referral of the Proposal are included in Appendix 3 of the Environmental Review Document accompanying the s 38 referral of the Proposal (Section 2.1.4). 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 near residential areas is minimised either through design or sharing of flight path approaches/departures from different directions. The NMP (2017) contains information on 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. |</p>
<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Date</th>
<th>Topics/issue raised</th>
<th>Consultation details and Proponent response/outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community information sessions</td>
<td>15/2/16-22/02/2016 - Understanding Noise Management</td>
<td>Draft NMP (2017) advertised for 21 days between the dates of 20 February – 19 March 2017. A total of 127 submissions were received, of which 81 submissions were received from individuals, businesses and tourist operators supportive of the draft NMP (2017) and specifically in allowing for unrestricted hours of operations. A total of 9 submissions were received generally supportive of the Airport Development Project however not supportive of the unrestricted standard hours of operations for Open/Closed Charters, RPT and commercial operators and raised questions or concerns about the flight paths. 37 submissions were received objecting to the draft NMP (2017); these submissions mainly represented residents from the areas of Reinscourt, Yalyalup, Yoongarillup and Kalgup.</td>
<td>The Proponent responded to each community submission received as part of the public comment process in 2015-16 prior to the referral of the Proposal, as presented in Appendix 4 of the Environmental Review Document accompanying the s 38 referral of the Proposal (Section 2.1.4).</td>
</tr>
<tr>
<td>First Noise Modelling Report and Contours available on City webpage from 23/03/2016</td>
<td>Draft NMP (2017) public comment period and City’s Website ‘Your Say’ information Advertising in the Busselton Dunsborough Mail of the Draft NMP (2017) for public comment and provision of Community Information Sessions for the Community for the following dates: • 22/3/17 • 1/3/17 • 8/3/17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The City provided a written response to each of the submissions which can be viewed in the Council report for the 22 March 2017 Council meeting ([https://www.busselton.wa.gov.au/Council/Meetings/Council-Meetings](https://www.busselton.wa.gov.au/Council/Meetings/Council-Meetings)). The public submissions are included in Appendix 5.
<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Date</th>
<th>Topics/issue raised</th>
<th>Consultation details and Proponent response/outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community information session relating to the Draft NMP (2017)</td>
<td></td>
<td>• Brief background on Draft NMP (2017)</td>
<td>Invitations and NMP flyer listing community information sessions and City’s public comment webpage (‘Your Say’) posted to all Reinscourt, Yalyalup, Kalgup and Yoongarillup residents. City’s Website ‘YourSay’ Draft NMP (2017), N70s. LA max B737/F100. Information sheet on understanding noise modelling contours. Information on External websites and agencies for further information. Reinscourt Residents Thursday 2/3/17 at 5.30pm: 44 residents attended (note* only 35 registered on the night). Yalyalup Residents Tuesday 7/3/17 at 5.30pm: 17 residents attended. All Interested Residents Thursday 9/3/17 at 6pm: 5 residents attended. Kalgup and Yoongarillup Residents Monday 13/3/17 at 5.30pm: 17 residents attended.</td>
</tr>
<tr>
<td>• Reinscourt Residents</td>
<td>Thursday 2/3/17 at 5.30pm</td>
<td>• Noise Management Plan review and proposed changes</td>
<td></td>
</tr>
<tr>
<td>• Yalyalup Residents</td>
<td>Tuesday 7/3/17 at 5.30pm</td>
<td>• Predicted flight movements including day/night splits</td>
<td></td>
</tr>
<tr>
<td>• All Interested Residents</td>
<td>Thursday 9/3/17 at 6pm</td>
<td>• Predicted noise impacts including N-Contours, LA max and flight paths</td>
<td></td>
</tr>
<tr>
<td>• Kalgup and Yoongarillup Residents</td>
<td>Monday 13/3/17 at 5.30pm</td>
<td>• Information on how to comment/make a submission</td>
<td></td>
</tr>
<tr>
<td>Ongoing</td>
<td>ERD public comment advertisement ERD public comment – 6 week period open</td>
<td>Email / flyer mail out to all community residents located adjacent to the Airport (Reinscourt, Yalyalup, Kalgup, Yoongarillup) and community members who attended the NMP Information sessions advising of the ERD public comment period.</td>
<td></td>
</tr>
<tr>
<td>BMRA Consultative Group Meetings bimonthly</td>
<td>Airport Development Project updates Airport operations updates</td>
<td>Ongoing. BMRA Consultative Group meets bimonthly. Minutes can be viewed on the Busselton Margaret River Airport website (<a href="http://www.busseltonmargaretriverairport.com.au/development-project/community-engagement">http://www.busseltonmargaretriverairport.com.au/development-project/community-engagement</a>).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Report on any environmental, aircraft noise activities/reports relating to the BMRA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Environmental principles

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 in relation to the development and implementation of the Proposal. Table 4-1 outlines how the principles relate to the proposal.

<table>
<thead>
<tr>
<th>Principle</th>
<th>How it will be addressed by the proposal</th>
</tr>
</thead>
</table>
| **The precautionary principle**  
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 Proponent will continue to implement a noise management framework that is similar to systems and procedures applied at large City Airports (such as Perth and Jandakot Airports) and considered best practice within Australia. An existing Airport Protection Area is established under Town Planning Scheme No. 21 and will be updated via a Special Control Zone to be established under a TPS amendment, which will restrict noise sensitive development in the vicinity of BMRA. Noise sensitive receptors have been identified and included in the NMP within Noise Abatement Zones and where implemented, will be included in Fly Neighbourly Agreements. 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 and Energy (DEE) under the EPBC Act and has been determined to be a non-controlled action under that Act.  
A cap on night flights at a maximum of 5 flights (10 movements) per week between the hours of 0000 and 0600. |
| **The principle of Intergenerational equity**  
Conservation of biological diversity and ecological integration should be a fundamental consideration. | The Proposal represents a limited change from the existing approved operations and can be implemented without significant impacts on the health, diversity or productivity of the environment. The modelled impacts demonstrate a local and limited impact that does not limit the health, diversity or productivity of the environment for future generations. |
| **The principle of the conservation of biological diversity and ecological integrity** | The Proponent has consulted with relevant government agencies to minimise any uncertainty surrounding the environmental impact of the proposal. The proposal represents  
The NMP (2017) has been updated to note the sensitivity of the Vasse-Wonnerup wetlands and to minimise noise impacts over the wetlands. The Proposal has been referred to the Commonwealth DEE under the EPBC Act and has been determined to be a non-controlled action under that Act. |
<table>
<thead>
<tr>
<th>Principle</th>
<th>How it will be addressed by the proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Principles relating to improved valuation, pricing and incentive mechanisms</strong></td>
<td></td>
</tr>
<tr>
<td>1. Environmental factors should be included in the valuation of assets and services.</td>
<td>The NMP includes criteria for the provision of noise amelioration for affected residences, which will be funded under the airport business and cost structure.</td>
</tr>
<tr>
<td>2. The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td><strong>The principle of waste minimisation</strong></td>
<td></td>
</tr>
<tr>
<td>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</td>
<td>Waste from airport operations will be minimised by the implementation of the City of Busselton’s waste management procedures and practices which includes waste separation and recycling.</td>
</tr>
</tbody>
</table>
5. **Key environmental factor – Social Surroundings**

5.1 **EPA objective**

The EPA’s objective for the factor Social Surroundings is:

‘To protect social surroundings from significant harm.’

Section 3(2) of the EP Act defines Social Surroundings as follows:

‘For the purposes of the definition of environment in subsection (1), the social surroundings of man are his aesthetic, cultural, economic and social surroundings to the extent that those surroundings directly affect or are affected by his physical or biological surroundings.’

The EPA have has identified the potential impacts and risk associated with this factor as:

*Noise emissions from aircraft has the potential to impact on social surroundings, including amenity of people. Implementation of the proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time.*

5.2 **Proposal aspects that may impact Social Surroundings**

Aspects of the proposal that have the potential to impact the social surroundings of people include:

- introduction of larger aircraft
- introduction of night time flights
- increased number of movements.

The impact from the modified airport operations relates to noise emissions from aircraft movements. The assessment of impacts on social surroundings is therefore an assessment of the impacts of aircraft noise.

5.3 **Understanding Aircraft Noise**

5.3.1 **The nature of noise**

Sound is a vibration travelling as a wave of pressure through the air from a source to a receiver, such as the human ear. The frequency of a sound is what gives it a distinctive pitch or tone – the rumble of distant thunder is an example of a low frequency sound and a whistle is an example of a high frequency sound. The human ear is more sensitive to high frequency sounds.

The loudness of a sound depends on its sound pressure level, which is expressed in decibels (dB). Most sounds we hear in our daily lives have sound pressure levels in the range of 30-90 decibels. A-weighted decibels (dBA) are generally used for the purposes of assessment and have been adjusted to account for the varying sensitivity of the human ear to different frequencies of sound. The main effect of the adjustment is that low and very high frequencies are given less weight.

The sound level in a typical residential home is about 40 dBA. The average noise level of conversation is about 60-65 dBA. Typical levels for listening to music at home are about 85 dBA, while a loud rock concert would produce about 110 dBA. Image 1 illustrates indicative sound levels measured in dBA for these and other typical situations.
In terms of sound perception, 3 dBA is the minimum change in sound level that most people can detect and every 10 dBA increase in sound level is perceived as a doubling of loudness. However, individuals may perceive the same sound differently and may be more or less affected by a particular sound. For example, experience has shown that many factors can influence an individual’s response to aircraft noise, including:

- the specific characteristics of the noise (e.g. the frequency, intensity and duration of noise events) and the time of day noise events occur
- their personal circumstances and expectations about the number, frequency, loudness and timing of noise events
- their individual sensitivities and lifestyle (e.g. whether they spend a lot of time outdoors or sleep with a window open)
- their reaction to a new noise source (in the case of a new airport or new runway infrastructure) or to changed airport operational procedures
- their understanding of whether the noise is avoidable and their notions of fairness
- their attitudes towards the source of the noise (e.g. general views about aviation activities and airports).

Note: Noise levels adapted from Melbourne Airport website

Image 1: Indicative dBA noise levels in typical situations
5.3.2 Typical profile of aircraft noise

Graph 1 shows the measured duration and noise level from an overflight of a jet aircraft. The figure on the left shows the noise profile for a flight passing directly overhead of a noise monitor while the figure on the right shows the noise profile measured at a horizontal distance of approximately three kilometres from the flight path.

As indicated above, these key differences in measured noise level and duration from typical aircraft overflights would be perceived differently by individuals in different locations, potentially leading to a different reaction to the measured noise level. Generally speaking, aircraft noise levels would decrease with distance from the proposed airport primarily as a result of the higher altitude of aircraft operations.

Source: Burgess and McCarty, Acoustics Australia Vol 38 August 2010 No 2

Graph 1: Noise profile for a typical jet aircraft overflight
5.4 Environmental Scoping Document guidance

5.4.1 Structure of assessment for Social Surroundings

Table 5-1 identifies how the assessment has been structured to meet the work required in the ESD for Social Surroundings.

Table 5-1: Structure of Social Surroundings assessment

<table>
<thead>
<tr>
<th>Section</th>
<th>Heading</th>
<th>Item</th>
<th>Relevant required work item identified in ESD</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>Receiving Environment</td>
<td>2</td>
<td>Identify all aspects of the proposal that are likely to have an impact on social surroundings.</td>
</tr>
<tr>
<td>5.5</td>
<td>Policy and Guidance</td>
<td>3</td>
<td>Discuss noise ‘acceptability’ criteria that typically apply to this type of airport, having regard to any relevant legislation, standards and guidelines. This may include having regard to similar airports operating in other jurisdictions.</td>
</tr>
<tr>
<td>5.7</td>
<td>Potential Impacts</td>
<td>4</td>
<td>Undertake analysis and modelling of noise emissions (existing operations combined with proposed operations) to predict the extent, severity and duration of impacts on social surroundings, particularly on the amenity of surrounding residents, against noise criteria discussed in 3. In predicting impacts of the proposal, clearly differentiate between current and future noise impacts from the proposal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>Show the current and forecast aircraft noise contours, identified from 4, superimposed over a map of residents and sensitive receptors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
<td>Clearly show and explain all assumptions and inputs used in the analysis and modelling and demonstrate why the assumptions and inputs used are realistic and reasonable for this proposal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>Discuss the level of confidence in the predicted impacts to amenity including the risk should those predictions be incorrect.</td>
</tr>
<tr>
<td>5.8</td>
<td>Assessment of Predicted Impacts</td>
<td>8</td>
<td>Present and explain the predicted impacts of the proposal in a way that can be understood by the layperson. (People likely to be affected by the proposal need to understand the likely outcomes of the proposal on social surroundings with a particular focus on amenity).</td>
</tr>
<tr>
<td>5.9</td>
<td>Mitigation</td>
<td>1</td>
<td>Discuss the application of the mitigation hierarchy to avoid or minimise impacts on social surroundings, where possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9</td>
<td>Discuss how assumptions and parameters used in the modelling would be monitored and managed during the implementation of the proposal. For example, to what extent could flight paths and flight numbers used in the modelling in 4, be monitored and managed by the proponent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>Propose management, mitigation and contingency measures to cover all operational aspects of the proposal identified in 2 that are technically and practically feasible. This should be set out in a draft revised Noise Management Plan and shall be included in the PER document.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11</td>
<td>Describe planning and land use control measures to maintain buffers to prevent encroachment of sensitive land uses near the proposal and minimise amenity impacts in the future.</td>
</tr>
<tr>
<td>5.10</td>
<td>Predicted Outcome</td>
<td>12</td>
<td>Based on the above discuss how the proposal meets the EPA’s objectives for Social Surroundings.</td>
</tr>
</tbody>
</table>
5.5 Assessment of aircraft noise

5.5.1 Policy framework for aircraft noise in Western Australia

There is no Western Australian or Commonwealth Government policy that specifically applies to the assessment or management of aircraft noise from a regional airport. The BMRA is the only Western Australian regional airport regulated under Part IV of the EP Act and nationally it is uncommon for regional airports to be subject to formal environmental assessment given the low frequency of flights and associated limited impact.

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, neither of these instruments apply to aircraft noise.

Aircraft noise at major airports located on Commonwealth land (such as Perth or Jandakot airport) is assessed and managed under the Commonwealth Airports Act 1996. As BMRA is not located on Commonwealth land the Commonwealth Airports Act 1996 does not apply. Notwithstanding this, as identified in Section 5.5 there is an established set of measures that are used to describe and assess aircraft noise in Australia and these have been adopted for this ERD. The measures used are consistent with those identified in the Discussion Paper: Expanding Ways to Describe and Assess Aircraft Noise, Australian Department of Transport and Regional Services (DTRS 2000), and are consistent with a number of recent environmental impact assessments undertaken for major airports in Australia, including the Western Sydney Airport EIS, 2016.

5.5.2 Policy and guidance for assessing aircraft noise

The impact of aircraft noise is dependent on a number of factors, of which four key variables are:

- aircraft noise levels
- frequency of occurrence
- duration of each event (aircraft movement)
- the character of aircraft noise (i.e. low frequency rumble, etc.).

In addition to these factors, individuals show varying sensitivity to noise. These factors have led to the development of a range of noise measures being developed globally and in Australia as a means of communicating aircraft noise impacts to the community and assessing impacts.

This assessment of aircraft noise is based on measures outlined in Australian Standard 2021:2015 and the National Airports Safeguarding Framework. These guidelines emphasise the challenge of communicating the complex nature and extent of aircraft noise and advocate using a number of different measures to aid interpretation of predicted noise exposure levels. While this ERD has used a range of measures for describing noise exposure, it is important to note that aircraft noise impacts would be experienced outside the areas depicted by the various noise exposure contours. Individuals and communities newly exposed to aircraft noise are likely to show an enhanced sensitivity to changes in the noise environment.

The noise measures used in this assessment are detailed in subsequent sections. Each measure has different purposes and may include some or all of the factors that influence the impact of aircraft noise. Consistent with best practice communication of aircraft noise impacts, it is important to describe noise using a range of descriptors and to understand the differences in the outputs produced. Table 5-2 summarises each of the measures used in this ERD and how they combine each of the four key aircraft noise variables listed above. A more detailed explanation of each measure is provided below the table.

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CIB15316_01 R004 Rev 2
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Table 5-2: Noise measures and their factors

<table>
<thead>
<tr>
<th>Noise measure</th>
<th>Aircraft noise levels</th>
<th>Number of events</th>
<th>Duration of events</th>
<th>Aircraft noise character</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANEF/ANEC</td>
<td>Yes, this variable is included in calculating ANEF/ANEC values but this information is not discernible from the output.</td>
<td>Yes, this variable is included within the calculations but this information is not discernible from the output.</td>
<td>Yes, this is included within the calculations but this information is not discernible from the output.</td>
<td>Yes, ANEF/ANEC is based on the Effective Perceived Noise Level (EPNL), which includes modification for noise tonal characteristics.</td>
</tr>
<tr>
<td>N70/60</td>
<td>Partially – this is included in the calculations but noise level information is grouped within bands and areas exposed to higher noise levels are not readily discernible.</td>
<td>Yes, this information is illustrated in contours of equal numbers of noise events.</td>
<td>No.</td>
<td>No.</td>
</tr>
<tr>
<td>Single event or maximum noise level (LAmax)</td>
<td>Yes, the output indicates the maximum noise level from a single (chosen) aircraft type.</td>
<td>No.</td>
<td>No.</td>
<td>No.</td>
</tr>
</tbody>
</table>

5.5.3 Standards for land use planning and building siting near airports

Australian Standard (AS) 2021:2015

The established standard within Australia for planning land use in the vicinity of airports is Australian Standard (AS) 2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction (Standards Australia 2015) which provides criteria for suitability of building sites 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. However, AS 2021:2015 is not intended to be used for the assessment of the effects of aircraft noise on existing properties, but rather for the assessment of new land developments in the vicinity of existing airports.

Australian Standard AS 2021:2015 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).

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

<table>
<thead>
<tr>
<th>Building type</th>
<th>Acceptable</th>
<th>Conditionally acceptable</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>&lt; 20 ANEF</td>
<td>20 to 25 ANEF</td>
<td>&gt; 25 ANEF</td>
</tr>
<tr>
<td>Educational Hospital, nursing home</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>&lt; 20 ANEF</td>
<td>20 to 30 ANEF</td>
<td>&gt; 30 ANEF</td>
</tr>
<tr>
<td>Commercial</td>
<td>&lt; 25 ANEF</td>
<td>25 to 35 ANEF</td>
<td>&gt; 35 ANEF</td>
</tr>
<tr>
<td>Light industrial</td>
<td>&lt; 30 ANEF</td>
<td>30 to 40 ANEF</td>
<td>&gt; 40 ANEF</td>
</tr>
</tbody>
</table>

Source: Standards Australia (2015), Table 2.1

Although ANEFs/ANECs are widely used for land use planning and to identify acceptability of new buildings in the vicinity of existing airports, the metric is not typically used to assess the effects of changing airport operations on existing sensitive receivers. They can, however, provide an effective reference for impact assessment when considering existing sensitive receptors and whether they would be precluded from being built in the present day based on their association with ANEF / ANEC contours.
**Aircraft Noise Exposure Forecast (ANEF)**

ANEF was primarily developed as a land use planning tool aimed at controlling encroachment on airports by urban land development, in particular noise sensitive land uses. ANEF is accepted as the current Australian Standard for forecasting aircraft noise and provides a forecast of the cumulative noise effect over a 12 month period of airport operations (including all projections of aircraft movements and weather patterns) which are then 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 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 is an established land use planning tool used for most large aerodromes throughout Australia; combined with the supplementary metrics listed above, has been used in recent aircraft noise impact assessments.

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

**National Airports Safeguarding Framework (NASF)**

The National Airports Safeguarding Framework (NASF) is a national land use planning framework that aims to improve community amenity by minimising aircraft noise sensitive land uses near airports. NASF provides guidelines for zoning of noise sensitive land uses on the basis of ANEF and number of daily noise events exceeding 60 dB(A), 65 dB(A) and 70 dB(A), including night time events (aircraft movement) exceeding 60 dB(A). Similar to AS 2021:2015, the NASF is used for the assessment of new land developments in the vicinity of existing airports rather than the effects of aircraft noise on existing properties.

**5.5.4 Aircraft noise assessment of changing airport operations**

In their discussion paper on aircraft noise the Australian Department of Transport and Regional Services (DTRS 2000) considered the use of ANEF / ANEC as effective in:

- defining where and what type of development can take place around airports
- determining eligibility of certain buildings for aircraft noise insulation
- technical assessments of airport operating options in environmental impact assessments.
The Department considered, however, that there were significant limitations in using ANEF as a way to describe aircraft noise exposure to the layperson (DTRS 2000). The Department therefore suggested that environmental impact assessments continue to use the ANEF / ANEC metric, but supplemented with other information in order to better describe noise exposure to the public (DTRS 2000). This supplementary noise information included relational indices that enable a person to form a mental image of the noise:

- flight path maps
- average daily movements
- respite periods
- contours of number of events above specified db(A) (termed - ‘N’ contours).

Since the release of the DTRS discussion paper, a number of environmental impact assessments have been undertaken within Australia that have assessed the effect of aircraft noise impacts from changing airport operations on existing sensitive receptors (receptors refer to building use types such as residential, schools, hospitals, hotels, commercial and industry). The industry practice (established by these impact assessments) is to compliment the use of the ANEF with aircraft noise metrics listed below, which collectively describe the location, frequency and magnitude of aircraft noise events:

- flight paths and altitude plots
- number of events above specified db(A) contours (termed - ‘N’ contours)
- maximum noise level (LAmax).

Flight paths and altitude plots provide an indication of the horizontal and vertical position of aircraft flights and their proximity to noise sensitive receptors. As BMRA is classified as ‘uncontrolled airspace’ the flight paths and altitudes are not well defined. Figure 5-1 and Figure 5-2 present indicative flight paths; however, the actual flight paths could vary depending on individual pilot preferences, flight path designs and DAPs which may be available.

Noise measures based on the intensity and frequency of individual aircraft noise events provide a more realistic and effective way of conveying information to the public about aircraft noise impacts. These measures potentially offer a more easily interpreted measure of noise impact compared to cumulative measures such as the ANEC/ANEF, for example, as indicators of disturbance to communication, sleep and every-day activities such as listening to the television or the radio.

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 A-weighted decibels or dB(A) will be exceeded. The events are depicted as contours, where the contours represent the number of events i.e. 5, 10, 20 etc. 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 experienced from aircraft activities. In calculating the N70 contours (based on aircraft traffic forecasts, flight paths, weather conditions) each flight movement at night is weighted as four events compared to each day movement which is weighted as one event. This is a standardised modelling approach designed to acknowledge the difference in the daytime and night time perception of noise.

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In addition to the use of the N70, the N60 (night time) has been used in this ERD to assess the number of times per night (23:00 to 06:00) that outdoor noise levels will exceed 60 dB(A). The N60 is used for night time noise assessment as 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. In a local context, the N60 (night time) noise metric has been used by Airservices Australia (2015) in the assessment of aircraft noise at Perth Airport.

While ‘Number Above’ data show the number of events that are predicted to exceed a certain noise level at a given location, they do not show the intensity of noise to be experienced at that location from individual flyovers. That is, two different locations having the same N70 value may be exposed to different noise exposure levels (e.g. one location may generally experience noise levels in the 70 dBA to 75 dBA range, while another location closer to an airport may generally experience the same number of events but at a noise level of between 80 dBA to 85 dBA).

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 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.

5.5.5 Aircraft noise modelling

The established approach for estimating aircraft noise metrics is to undertake numerical modelling using the computer software package Integrated Noise Model (INM). The INM software enables prediction of aircraft noise levels for existing and future airport operations in the form of ANEFs, ANECs, N-contours and LA_{max} contours for areas surrounding the airport. Aircraft noise modelling using INM is undertaken on a regular basis for all major airports across Australia (including Perth and Jandakot) and has been used for environmental impact assessments of major airport developments such as the Brisbane International Airport New Parallel Runway.

Aircraft noise modelling of the Proposal was undertaken to generate contours for the LA_{max}, N70, night time N60, ANEI and ANEC noise metrics, which together describe the expected extent and severity of aircraft noise impacts (see Section 5.8). The noise modelling was undertaken by To70 Aviation Australia Pty Ltd (To70) in a staged manner as follows:

- preliminary modelling (December 2015) for initial stakeholder consultation
- peer review by GHD (March 2016) with a close out report (May 2016)
- revised modelling (May 2016) incorporating peer review comments, for inclusion in the Proposal referral documentation
- additional modelling (October 2016) to provide further detail to EPA for their decision on the Proposal referral.

The preliminary noise modelling undertaken by To70 (2015) was subject to peer review by GHD (GHD 2016a, 2016b), 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, 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 7.
This ERD presents noise contours and assessment of noise impacts based on the May 2016 noise modelling, which incorporates the peer review comments and provides the greatest detail on aircraft noise levels. The May 2016 noise modelling report is presented in Appendix 6.

5.5.6 Aircraft noise modelling assumptions

The aircraft noise modelling has been undertaken based on a number of key assumptions including:

1. The growth and mix of forecast aircraft movements provided in Table 2-4.
2. Indicative flight paths for arrivals and departures as presented in Figure 5-1 and Figure 5-2.
3. Historic weather conditions specific to the BMRA.
4. Terrain data relevant to the BMRA location.

Details of the assumptions used in the aircraft noise modelling are provided in the noise modelling report presented in Appendix 6 and are summarised as follows.

Weather

INM requires the input of weather conditions observed at the airport. Average weather settings are derived from the Bureau of Meteorology (BoM) for Nov-14 to Oct-15. The annual average temperature and pressure at BMRA weather station (station 009603) is used as input for this INM study.

The weather settings are as follows:

- Temperature   19.6 degrees C
- Pressure     764.22 mm-Hg
- Relative humidity  59.3 %
- Headwind     14.8 km/h (default INM value)

Terrain data has been downloaded from the NASA website. The Shuttle Radar Topography Missions digital topographic data has been converted to an INM compatible format and imported into the INM study in the World Geodetic System 1984 (WGS84) coordinates.

Aerodrome Reference Point

The BMRA Aerodrome Reference Point (ARP) is shown below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARP</td>
<td>-33.692500</td>
<td>115.395278</td>
<td>17</td>
</tr>
</tbody>
</table>

Runway coordinates

To70 has modelled the revised/masterplan layout (Busselton Margaret River Airport Master Plan General Arrangement - 2A), which will include a 360m extension to runway end 21 and 300m extension to runway end 03. There are no displaced thresholds. Details of the runway are below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Length x Width</th>
<th>Elevation (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>-33.697328</td>
<td>115.396362</td>
<td>2460 x 45</td>
<td>17</td>
</tr>
<tr>
<td>21</td>
<td>-33.677320</td>
<td>115.407818</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>

Helipad

The study uses the existing helipad location.

<table>
<thead>
<tr>
<th>Description</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Elevation (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helipad</td>
<td>-33.683626</td>
<td>115.401024</td>
<td>17</td>
</tr>
</tbody>
</table>
Traffic Forecast

Aircraft traffic forecasts for the noise modelling were based on forecast data derived during the preparation of the State Government Business Case to maintain consistency between the business case and environmental approvals for the redevelopment project. The business case forecasts were based on a report compiled by KPMG (Busselton Airport Demand and Route Profitability Analysis and Forecasting) which, using demand forecasting analytics projected the future passenger demand between Interstate capital cities and Busselton with Sydney and Melbourne supporting RPT services from 2015. The projected existing traffic movements were increased by an Annual Average Growth Rate (AAGR) ranging between 2-6% depending on aircraft category type (general aviation, recreational aviation, Royal Flying Doctor Service) derived from the Busselton Regional Airport Master Plan (July 2011).

The only difference between the business case and the aircraft traffic forecasts used in the modelling are the emergency helicopter movements which have increased by approximately 650% reflecting the increased activity expected with Surf Lifesaving Australia and Department of Fire and Emergency Services (not included in KPMG’s analysis and updated in 2015 following consultation with Emergency services agencies) and the introduction of freight aircraft services. The detailed aircraft traffic forecasts can be found below.

<table>
<thead>
<tr>
<th>Year of operation</th>
<th>Current</th>
<th>Year 1</th>
<th>Year 5</th>
<th>Year 10</th>
<th>Year 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPT</td>
<td>Nil</td>
<td>6</td>
<td>14</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>Freight</td>
<td>Nil</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Subtotal – Proposed</td>
<td>Nil</td>
<td>10</td>
<td>20</td>
<td>22</td>
<td>32</td>
</tr>
</tbody>
</table>

Existing airport operations – forecast growth in approved movements

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FIFO – closed charter</td>
<td>24</td>
<td>22</td>
<td>26</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>General and Recreational Aviation</td>
<td>151</td>
<td>131</td>
<td>140</td>
<td>146</td>
<td>146</td>
</tr>
<tr>
<td>Emergency services – fixed wing</td>
<td>9</td>
<td>15</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Emergency services – helicopters</td>
<td>15</td>
<td>96</td>
<td>99</td>
<td>104</td>
<td>109</td>
</tr>
<tr>
<td>Subtotal – existing airport operations</td>
<td>200</td>
<td>264</td>
<td>281</td>
<td>296</td>
<td>301</td>
</tr>
</tbody>
</table>

Modified airport operations – Proposal plus existing airport operations

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>274</td>
<td>301</td>
<td>318</td>
<td>333</td>
<td></td>
</tr>
</tbody>
</table>

Modified airport operations increase as a proportion of existing airport operations

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>+4%</td>
<td>+7%</td>
<td>+7%</td>
<td>+10%</td>
<td></td>
</tr>
</tbody>
</table>

Flight Track Allocation

Arrival, departure and circuit tracks have been assigned for each runway end and for the relevant destinations. Tracks are based on the existing model produced by To70 in 2014, which were developed with a local expert and have been adjusted to ensure they are flyable by the aircraft that are assigned to them. An assumption has been made for RPT operations conducting a 270 degree turn to the east for departures, this is based on the separation requirements between RPT and GA aircraft types. In addition to this, an assumption has been made on the separation requirements flown by jet and non-jet RPT aircraft due to performance characteristics and the ability for smaller aircraft to conduct a smaller radius turn.

The spread of the GNSS arrival tracks are assumed to be 0.1 NM as the aircraft operating at BRMA will conduct an RNAV approach, which is a very narrow approach path when compared to visual approach.

RPT, and closed charter movements are assigned to tracks based on shortest distance to origin/destination and is represented in the following table.
Other traffic (such as general aviation) is assigned to tracks as follows, as per previous noise modelling. As an assumption, freight tracks to Singapore are assigned to the RPT and Charter tracks to the north.

<table>
<thead>
<tr>
<th>Origin/Destination</th>
<th>Runway 03 track</th>
<th>Runway 21 track</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrivals</td>
<td>Departures</td>
</tr>
<tr>
<td>Perth, Boolgeeda, West</td>
<td>WEST</td>
<td>STROUT</td>
</tr>
<tr>
<td>Angeles, Jandakot</td>
<td>GNSSA</td>
<td>EAST</td>
</tr>
<tr>
<td>Melbourne, Sydney</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Traffic</th>
<th>Runway</th>
<th>Operation</th>
<th>Track</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Aviation / Recreation Aviation / Emergency Services</td>
<td>03</td>
<td>A</td>
<td>GNSSB</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>WEST</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WEST</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EAST</td>
<td>33%</td>
</tr>
<tr>
<td>Military</td>
<td>03</td>
<td>A</td>
<td>GNSSB</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>STROUT</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>A</td>
<td>GNSSE</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>STROUT</td>
<td>100%</td>
</tr>
<tr>
<td>Helicopter</td>
<td>Helipad</td>
<td>A</td>
<td>HIN</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>OUT</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>WEST</td>
<td>100%</td>
</tr>
<tr>
<td>Freight</td>
<td>03</td>
<td>D</td>
<td>STROUT</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>A</td>
<td>GNSSG</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>NORTH</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Runway usage**

To70 has assumed the following runway use based on information provided by COB based on current operations:

- Runway 03 40%
- Runway 21 60%
The aircraft forecasts used were based on traffic forecasts formulated for the Business Case approved by the State Government for funding the BMRA expansion, plus additional freight flights afforded by the Commonwealth funding. The actual aircraft and frequencies that operate in the future may vary due to provision of services by commercial airlines (dependent on a range of commercial factors), as well as changes to aircraft models occurring over time.

5.5.7 Aircraft flight paths and altitude

The existing BMRA is currently classified as G-airspace, which is uncontrolled airspace; 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.

The indicative flight paths for BMRA are presented in Figure 5-1 and Figure 5-2, which are based on existing DAPs published by Airservices Australia and operational knowledge of flight paths typically taken by aircraft. The BMRA operates left hand circuits and the Proponent would need to seek approval from CASA to implement any changes to this. The indicative flight paths presented in Figure 5-1 and Figure 5-2 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.

As shown in Figure 5-1 and Figure 5-2 there are a wide range of arrival and departure paths that aircraft may potentially take in the vicinity of BMRA.

The expected altitude of aircraft as they arrive or depart from BMRA is presented in Graph 2 and Graph 3. As shown in the figures the departing aircraft have a steeper ascent from BMRA, with arrivals having a more gradual descent. The proposed RPT and freight aircraft are expected to have a comparable ascent and descent to existing jet aircraft operating at BMRA.

Graph 2: Estimated aircraft altitude – arrivals
Social Surroundings include aesthetic, cultural, economic and social surroundings of humans that could affect or be affected by physical or biological surroundings. An overview of the existing and future Social Surroundings that may potentially be affected by the Proposal aspects (aircraft noise emissions) are presented below.

Figure 5-3 presents an overview of the existing Social Surroundings in the vicinity of BMRA. As shown in Figure 5-3, BMRA is surrounded by agricultural land comprising isolated residential properties. The closest urban residential area is Yalyalup approximately 2 km to the north-west, which incorporates Georgiana Molloy Anglican School. Reinscourt rural residential area is located approximately 2.7 km to the north of BMRA, while the main CBD area of Busselton town site is located approximately 6.5 km to the north-west.

Recreational areas in the vicinity of BMRA include the Tuart Forest National Park approximately 3 km to the north-east, managed by Parks and Wildlife and used by members of the public for forest walks and bird watching. Sporting facilities include the Stewart Bovell Sporting Complex approximately 3.4 km to the north-west and Busselton Golf Club approximately 2.7 km to the west. Busselton cemetery is located less than 1 km to the north-west of BMRA.

Key economic activities in the vicinity of BMRA include agriculture (dairy and beef cattle), as well as mineral sand mining by Cristal Mining. Mineral sand mining operations currently take place approximately 2.3 km north east of BMRA, east of Sues Road, with operations planned to occur immediately north and north-east of BMRA, commencing in 2017. Extractive industry is operational approximately 4 km to the south-south-west of the airport, along Acton Park Road, with Council approval for sand extraction for 11 years. The extractive industry is approved for a maximum of 50 truck movements per day (50 entering and 50 exiting) using Acton Park Road, Vasse Highway and Sues Road as haulage routes.

Figure 5-4 presents land use zoning under Town Planning Scheme No. 21, which provides an indication of the future Social Surroundings in the vicinity of BMRA. As shown in Figure 5-3, the BMRA will continue to be surrounded by agricultural land, with a proposed expansion of the Yalyalup urban residential area to north-west and north of BMRA, and proposed industrial development to the immediate west and north-west of the BMRA. The proposed industrial development immediately north-west of the BMRA will provide a buffer between the airport and the more noise sensitive Yalyalup urban residential area.
Town Planning Scheme No. 21 includes an Airport Protection Area, which restricts noise sensitive uses (e.g. residential, schools) in the vicinity of BMRA. The Proponent has commenced the process of developing a broad land use strategy and Town Planning Scheme amendment to provide protection for BMRA as a continuing acceptable land use and to 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.
Figure 5-1
Indicative flight paths
Runway 03
Figure 5-3
Overview of Social Surrounds of the Proposal
Figure 5-4: Zoning under Town Planning Scheme No. 21

Source: PlanWA, Department of Planning, Street Map by Landgate
5.7 Assessment of Impacts

5.7.1 Assessment parameters

The ESD requires this ERD to present an assessment of the potential for impacts to occur to the health, welfare, convenience and comfort of people arising from changes to the timing and number of aircraft movements, particularly at night time, and consideration of the extent, severity and duration of impacts. Based on the review of policies, standards and assessments conducted at major Australian City airports, this PER presents an assessment of aircraft noise impacts using the following established aircraft noise metrics:

- aircraft flight paths and altitude
- frequency of aircraft noise disturbance – N70 contours
- frequency of night time noise disturbance – N60 night time contours
- magnitude of aircraft noise disturbance – $L_{A\text{max}}$ contours
- constraint to future land uses – ANEC contours.

The above aircraft noise metrics are considered to characterise the extent and severity of impacts on Social Surroundings as required under ESD Item 4. In addition, an assessment has been made of the duration of aircraft noise disturbances to address ESD Item 4 relating to the duration of impacts to Social Surroundings.

It can be noted from the above information and from the subsequent discussion that the concept of noise acceptability criteria are not applied explicitly to an assessment of impact in this assessment or to Australian airports generally beyond the guidance provided by ANEF / ANEC criteria presented in AS2021: 2015. As identified in the discussion paper on aircraft noise by the Australian Department of Transport and Regional Services (DTRS 2000), the preferred approach is to provide information that enables the individual to decide on acceptability, rather than prescribe an ‘acceptable’ number of jet aircraft movements and/or number of movement louder than a measure such as 70 dB(A) on an average day.

The approach applied to this ERD therefore reflects current and best practice in the description and assessment of aircraft noise in Australia, providing a range of metrics through which the potential impacts of noise are described.

Whilst noise acceptability criteria are not explicitly applied in an assessment of impacts a noise threshold is applied through the BMRA NMP for the management and mitigation of noise levels that may be experienced by people as a result of the proposal. This mechanism for amelioration of noise level experienced inside a property, is designed to reduce the proposal's potential to interfere with the health, welfare, convenience and comfort of people.

5.7.2 Potential impacts

This section of the ERD presents the methodology and outputs of aircraft noise modelling, in accordance with the requirements (Items 4, 5, 6 and 7) of the ESD.

Section 5.5.5 describes the aircraft noise modelling methodology, with Section 5.5.6 describing the assumptions used in the modelling (Item 6 of the ESD) and Section 5.7.6 describing the confidence in the modelling predictions (Item 7 of the ESD).

Sections 5.7 to 5.8.6 present the aircraft noise contours generated by the noise modelling (Items 4 and 5 of the ESD).

The assessment of aircraft noise impacts and their significance against noise acceptability criteria (Items 3 and 4 of the ESD) are presented in the following Section 5.8.
The ESD describes the potential impacts and risks to Social Surroundings as:

“Noise emissions from aircraft has the potential to impact on social surroundings, including amenity of people” where “Implementation of proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time”.

This ERD identifies the below potential impacts of the proposal which may impact on amenity as:

- aircraft overflight noise including noise generated during flight, take-off and landing
- aircraft overflight noise generated at night resulting from night flights (night hours assessed and modelled as 2300-0600hrs).

The current (approved) operations of the BMRA include light and general aviation, emergency services and jet aircraft operations for Fly in Fly out operations (closed charter) since 2007. RPT flight operations occurred between 2010 -2015 with Fokker 50 twin propeller aircraft.

The BMRA also operates a number (<12) of closed charter Fokker100 services throughout the year, including approved charters operating after 2200hrs as non-conforming activities defined in the NMP (12 flights per year).

The current jet aircraft operations occur between Tuesdays and Thursdays and start from 0600hrs with the latest flight being 2000hrs. The operation of these services suggests that residential properties to the north of the airport (Reinscourt, Yalyalup) and rural properties to the south of the airport currently experience jet aircraft noise which has increased gradually since commencement of operations in 2007.

Operation of the proposal would result in changes to the pattern of aircraft movements in airspace due to introduction of new destinations (Sydney/Melbourne) and aircraft types. The impacts of these operations are discussed in Section 5.8 and are seen as a minor increase in aircraft frequency, loudness and duration compared to the current jet aircraft operations.

The modified operations of night flights expected in the first few years of operations will result in a slightly increased aircraft noise footprint (as night time aircraft noise is weighted to reflect night time conditions) which is discussed in Section 5.8.3 N60 night time contours as compared to current night time operations.

The potential impacts of aircraft noise are dependent on a number of factors, including the following and discussed later sections:

- aircraft flight paths and altitude
- frequency of aircraft noise disturbance
- frequency of night time noise disturbance
- magnitude of aircraft noise disturbance
- duration of aircraft noise disturbance.

5.7.3 Frequency of aircraft noise disturbance – N70 contours

The N70 noise contours generated from the noise modelling are presented in Figure 5-5 to Figure 5-16. Separate figures are presented for southern and northern aspects of the airport to provide more detail for members of the public to interpret the frequency of aircraft noise disturbance (i.e. number of events per day above 70 dB(A)) that may affect their properties or areas of interest.
The N70 noise contours are presented in sequence as follows, corresponding to the forecast aircraft movements presented in Table 2-4 (refer to Section 2.3.3):

- Figure 5-5 and Figure 5-6: existing airport operations at 2015-16 (current)
- Figure 5-7 and Figure 5-8: existing airport operations at 2018-19 (expansion of helicopter activities)
- Figure 5-9 and Figure 5-10: existing airport operations at 2038-39
- Figure 5-11 and Figure 5-12: modified airport operations at 2018-19 (introduction of new RPT and freight flights)
- Figure 5-13 and Figure 5-14: modified airport operations at 2038-39
- Figure 5-15 and Figure 5-16: modified airport operations at 2018-19, 2023-24, 2028-29 and 2038-39 (rate of change of aircraft noise disturbance).

The above sequence enables members of the public to assess the following:

- the increase in the frequency of aircraft noise disturbance that is expected to occur with the forecast growth in existing airport operations
- the additional increase in aircraft noise disturbance that will occur due to the Proposal.

Table 5-4 presents a guide to interpreting the N70 noise contours, with an example of the effect of forecast growth in existing and modified airport operations.

For ease of reference, the N70 noise contour figures highlight the locations of buildings that are located within the five event per day contour as of 2038-39. It should be noted that in producing the noise contour figures, that due to limitations in the Geographical Information System (GIS) all buildings have been identified including residential houses, sheds and dairies. However, where this ERD states that a number of specific noise sensitive receptors have been potentially impacted, this number reflects the actual count of occupied residential houses.
Table 5-4: Guide to interpreting N70 Noise contours

**A guide to interpreting N70 noise contours**

Figure 5-6 presents the N70 contours north of the airport, for existing airport operations in 2015-16.

- - - - - Represents 5 events* or more of 70 dB(A) for 2015-16

A building located near to, but outside the 5 event contour line may experience between 0 – 5 events of aircraft noise up to 70 dB(A) recorded outdoors on a typical day.

* An ‘event’ is the noise experienced from an aircraft overflying an area. It is termed as ‘average number of events’ as the noise contours are generated using all projected aircraft movements over a 365 day period, historic average weather conditions and predicted use of flight paths.

Figure 5-8 presents the N70 contours for existing airport operations in 2018-19. The existing airport operations in 2018-19 include the expected increase in emergency services helicopter operations.

- - - - - Represents 5 events* or more of 70 dB(A) for 2018-19 for existing airport operations

- - - - - Represents 10 events* or more of 70 dB(A) for 2018-19 for existing airport operations

A building located between the 5 -10 event contours may experience anywhere between 5 - 10 events of aircraft noise up to 70 dB (A) recorded outdoors on a typical day.

Figure 5-12 presents the N70 contours for modified airport operations in 2018-19. The modified airport operations in 2018-19 include the forecast growth of existing airport operations as presented in Figure 5-8 plus the new RPT and freight flights.

- - - - - Represents 5 events* or more of 70 dB(A) for 2018-19 for new airport operations

- - - - - Represents 10 events* or more of 70 dB(A) for 2018-19 for new airport operations
Figure 5-5
N70 contours – existing airport operations at 2015-16 – south of airport
Figure 5-6
N70 contours – existing airport operations at 2015-16 – north of airport
Figure 5-7
N70 contours – existing airport operations at 2018/19
south of airport
Figure 5-9
N70 contours – existing airport operations at 2038-39 – south of airport
Figure 5-10
N70 contours – existing airport operations at 2038-39 - north of airport
Figure 5-11
N70 contours – modified airport operations at 2018/19 south of airport
Figure 5-15
N70 contours – change from 2015-16 to 2038-39 – south of airport

Legend:
- Existing Aircraft
- New Aircraft
- 2015/16 10 Events
- 2016/19 10 Events
- 2022/23 10 Events
- 2028/29 10 Events
- 2030/39 10 Events
- Building

Scale: 0 - 400 m

DISCLAIMER:
The City of Busselton End User acknowledges that the map is intended as an aid and accepts full responsibility for consequences of actions that rely on this map.

GIS Section, City of Busselton
Figure 5-16
N70 contours – change from 2015-16 to 2038-39 – north of airport
5.7.4 Frequency of night time noise disturbance – N60 (night time) contours

The Proposal involves modification to the hours of operation of the BMRA, with the introduction of up to five night flights per week (between the hours of 0000-0600) for RPT, freight and closed/open charter aircraft. Accordingly, this ERD includes an assessment of the impacts of night time noise disturbance caused by the change in hours of operation.

The N60 night time noise contours generated from the noise modelling are presented in Figure 5-17 and Figure 5-18. The night time noise contours represent noise generated by night time airport operations (23:00 to 06:00) and are presented for the period of 2018-19 to 2038-39. Separate figures are presented for south of the airport and north of the airport to provide more detail for members of the public to interpret the frequency of night time noise disturbance (i.e. number of events per night above 60 dB(A)) that may affect their residences.
Figure 5-17
N60 night time contours south of airport
5.7.5 Magnitude of aircraft noise disturbance – LA_{max} contours

An assessment of the magnitude (i.e. loudness) of aircraft noise disturbance is presented through LA_{max} contours, which are the maximum noise levels predicted to occur at a given location during an aircraft movement (departure or arrival). The LA_{max} represents the noise from a single aircraft movement and so varies depending on the flight path of the aircraft.

The LA_{max} contours are presented for the following indicative flight paths:

- Figure 5-19: runway 03 arrival GNSSB^6
- Figure 5-20: runway 03 arrival West
- Figure 5-21: runway 03 departure Straight Out
- Figure 5-22: runway 03 departure East
- Figure 5-23: runway 21 arrival GNSSE
- Figure 5-24: runway 21 departure Straight Out
- Figure 5-25: runway 21 arrival East.

The LA_{max} contours are presented for the existing Fokker 100 (F100) aircraft as the noisiest aircraft currently operating at BMRA, and for the Boeing 737-800 aircraft as the noisiest of the aircraft expected to comprise the most frequent proposed RPT and freight flights.

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^6 GNSS refers to Global Navigation Satellite System. GNSSB and GNSSE are arrival flight paths using GNSS rather than visual approaches and so have a more narrow approach path.
Table 5-5: Guide to interpreting \( \text{LA}_{\text{max}} \) noise contours

A guide to interpreting \( \text{LA}_{\text{max}} \) noise contours

Figure 5-19 presents \( \text{LA}_{\text{max}} \) contours for an arrival from the south-west for F100 and B737-800 aircraft.

The F100 aircraft are the noisiest aircraft currently operating at BMRA and service the FIFO flights for Busselton based workers.

The following \( \text{LA}_{\text{max}} \) contours are for F100 aircraft:

- 70dB(A) contour
- 80 dB(A) contour
- 85 dB(A) contour

The B737-800 aircraft are expected to comprise the noisiest of the aircraft used for new RPT or freight flights. Other aircraft (e.g. Airbus 320) are expected to be quieter than the B738.

The following \( \text{LA}_{\text{max}} \) contours are for B737-800 aircraft:

- 70dB(A) contour
- 80 dB(A) contour
- 85 dB(A) contour
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5.7.6 Level of confidence in modelling predictions and risk to amenity should predictions be incorrect

The modelling findings indicate that aircraft noise disturbance will be well within industry accepted standards and criteria for residential property and future development and this, combined with modelling conservatism that concentrates impacts in the vicinity of indicative flight paths, provides a high level of confidence that the impacts to Social Surroundings will not be significant. Confidence in the noise modelling results is considered high due to the following:

- To70 Pty Ltd scope of works was to prepare noise contours (ANEC, ANEIs, N-contours and $L_{A_{max}}$) to meet Airservices Australia endorsement criteria.

- An independent peer review performed by GHD Pty Ltd include the following:
  - 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, 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 7.

The aircraft noise modelling has been undertaken based on a number of assumptions including the growth and mix of aircraft movements and indicative flight paths, which may change in time and thus vary the actual aircraft noise exposure from the model predictions. The risk posed by this variation is addressed through the NMP, ongoing operational monitoring (Section 5.9.5) and through five yearly updates to the aircraft noise modelling as well as trigger criteria in the event that there are significant changes to airport operations such as aircraft types, forecast frequencies and flight paths assumed for the modelling (Section 5.9.5). This will ensure that any changes in actual aircraft movements are reflected in updated noise contours to enable a re-evaluation of the risk posed to amenity.

In general the noise modelling is expected to over-predict the frequency of aircraft noise disturbance in the vicinity of the indicative flight paths, particularly as distance from the runway increases. The noise modelling requires an input set of defined flight paths and thus generates a predicted noise disturbance concentrated in the vicinity of the input flight paths, whereas the actual flight paths selected by pilots will be more dispersed and hence the actual aircraft noise disturbance distributed over a wider area. The modelling is therefore considered conservative in over-estimating the frequency of aircraft noise disturbance to residents in the vicinity of the airport.

Further the Proponent has committed to review the DAPs and flight paths with Airservices Australia. If improvements in the flight paths can be identified and endorsed/published by Airservices Australia, these are then expected to direct aircraft away from urban or residential areas resulting in a positive outcome and reduced aircraft noise footprint for the community.
Figure 5-26
ANEI contours – existing airport operations
2015-16 and Local Planning Scheme 21
5.8 Assessment of predicted impacts

This section assesses the impacts of the Proposal in accordance with Item 8 of the ESD. To assist readers understand the assessment Table 5-4 and Table 5-5 are provided in Section 5.7 to provide details on how to interpret N70 Noise contours and LA\textsubscript{max} noise contours, respectively.

5.8.1 Aircraft flight paths and altitude

The expected altitude of aircraft as they arrive or depart from BMRA is presented in Graph 2 and Graph 3. As shown in the figures the departing aircraft have a steeper ascent from BMRA, with arrivals having a more gradual descent. The proposed RPT and freight aircraft are expected to have a comparable ascent and descent to existing jet aircraft operating at BMRA. A description of the flight paths included in the ERD are as follows:

- aircraft arriving from the north-east (Runway 21 arrival GNSSE, Figure 5-2) are expected to have an altitude of approximately 300m (1000ft) as they pass near Reinscourt at a distance of approximately 3.3km from the runway.
- aircraft arriving from the west of the airport (Runway 03 arrival West, Figure 5-1) are expected to have an altitude of approximately 500m (1640ft) as they pass over Yalyalup at a flight distance of approximately 8 km from the runway. The flight distance of 8 km for Yalyalup is due to the extended flight path that aircraft will take (rather than a direct path) as they fly south over Yalyalup and Busselton Golf Course before turning east and then north-east to arrive into the airport.
- aircraft departing to the north-east (Runway 03 departure Straight Out, Figure 5-1) are expected to have an altitude of approximately 500-750 m as the pass near Reinscourt. Should aircraft departing to the north-east then turn west to loop over Port Geographe and Busselton townsite before heading south east (Runway 03 departure East, Figure 5-1), they are expected to have an altitude of approximately 800 m over Port Geographe (6 km flight distance from the runway) and approximately 1250-1500 m over Busselton townsite.

As discussed above the majority of the proposed new RPT and freight aircraft movements are expected to overfly urban residential areas (including the CBD and Yalyalup) at an altitude greater than 1250 - 1500 m (4000 - 5000 ft). The new RPT and freight aircraft movements will use flight paths similar to existing aircraft, which include overflying the rural residential area of Reinscourt north of the airport, as well as isolated rural residences to the north-east and south-west of the airport.

The proposed new RPT and freight aircraft are expected to have a comparable ascent and descent profile to that of existing jet aircraft operating at BMRA. Based on the assessment undertaken for this ERD, the Proposal is not expected to cause a significant impact in terms of frequency of aircraft noise disturbance.

5.8.2 Frequency of aircraft noise disturbance – N70 contours

The N70 noise contours generated from the noise modelling are presented in Figure 5-5 to Figure 5-16. Table 5-6 discuss the potential impacts identified from the assessment of the N70 contours and Table 5-7 discusses a summary of the number of residences affected by aircraft exposure greater than 70 dB(A).
<table>
<thead>
<tr>
<th>Scenario</th>
<th>Figures</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing airport operations</td>
<td></td>
<td><strong>Table 5-6: Discussion of N70 noise contours</strong></td>
</tr>
<tr>
<td>(GA, Emergency services and FIFO)</td>
<td></td>
<td><strong>Figure 5-5</strong></td>
</tr>
<tr>
<td>(2015-16)</td>
<td><strong>Figure 5-6</strong></td>
<td>Existing airport operations are expected to cause approximately 5 residences to experience between 5 - 10 events per day above 70 dB(A) and no residences to experience more than 10 events per day above 70 dB(A).</td>
</tr>
<tr>
<td>Existing airport operations</td>
<td></td>
<td><strong>Figure 5-7</strong></td>
</tr>
<tr>
<td>(GA, Emergency services and FIFO)</td>
<td><strong>Figure 5-8</strong></td>
<td>Growth in existing airport operations are expected to cause approximately 6 residences to experience between 5 - 10 events per day above 70 dB(A), and 2 residences to experience between 10 - 20 events per day. This increase is predominantly due to the introduction of significantly expanded helicopter operations at the BMRA as of 2018-19, which will occur irrespective of the Proposal.</td>
</tr>
<tr>
<td>Existing airport operations</td>
<td></td>
<td><strong>Figure 5-9</strong></td>
</tr>
<tr>
<td>(GA, Emergency services and FIFO)</td>
<td><strong>Figure 5-10</strong></td>
<td>After 20 years of forecast growth, the existing airport operations are expected to cause approximately 6 residences to experience between 5 - 10 events per day above 70 dB(A), and 3 residences to experience between 10 - 20 events per day. This represents a limited increase in the number of residences expected to experience 5 events or more per day above 70 dB(A) between 2018-19 and 2038-39. The limited increase is due to the anticipated incremental growth of operations over the 20 year period, with the largest increase in operations expected between 2015-16 and 2018-19 in helicopter operations.</td>
</tr>
<tr>
<td>Modified airport operations</td>
<td></td>
<td><strong>Figure 5-11</strong></td>
</tr>
<tr>
<td>(GA, Emergency services, FIFO, RPT and freight)</td>
<td><strong>Figure 5-12</strong></td>
<td>Introduction of modified airport operations will marginally increase noise disturbance over existing airport operations, with one additional residence experiencing between 10 - 20 events per day above 70 dB(A). This is due to the small number of RPT and freight flights occurring (approximately 5 flights [or 10 movements] per week).</td>
</tr>
<tr>
<td>Modified airport operations</td>
<td></td>
<td><strong>Figure 5-13</strong></td>
</tr>
<tr>
<td>(GA, Emergency services, FIFO, RPT and freight)</td>
<td><strong>Figure 5-14</strong></td>
<td>After 20 years of forecast growth, the modified airport operations will marginally increase the frequency of noise disturbance beyond that of existing airport operations. However, the 5 event N70 contour will extend over pockets of residences located in Reinscourt to the north of the BMRA, and to the south-west along Jalbarragup Road. Accordingly, a total of approximately 20 residences are expected to experience 5 - 10 events per day above 70 dB(A), which is approximately an additional 15 residences compared to the existing airport operations at 2038-39. It should be noted that the additional 15 residences will have been just under 5 events per day (i.e. 4 events per day) from the existing airport operations at 2038-39 and the contribution due to modified airport operations at the 15 residences is only expected to be an additional one event per day pushing them up into the 5 - 10 events per day interval. The Proposal is expected to result in one additional residence being exposed to 10 - 20 events per day above 70 dB(A) compared to the existing airport operations at 2038-39, with no residences exposed to more than 20 events per day above 70 dB(A) at 2038-39.</td>
</tr>
<tr>
<td>Existing and modified airport operations</td>
<td></td>
<td><strong>Figure 5-15</strong></td>
</tr>
<tr>
<td>(GA, Emergency services, FIFO, RPT and freight)</td>
<td><strong>Figure 5-16</strong></td>
<td>These figures present the rate of change in the aircraft noise disturbance between 2015-16 and 2038-39, presented through the use of the 10 event N70 contour over this period. Modelling indicates there will be a substantial increase in aircraft noise disturbance between 2015-16 and 2018-19 associated with an expansion in emergency services helicopter activities, with a modest increase in aircraft noise disturbance between 2018-19 and 2038-39 (i.e. the Proposal) associated with the modified airport operations over the 20 year period. The increase in emergency services helicopter movements is independent of this Proposal and would occur under the existing approval.</td>
</tr>
</tbody>
</table>

Busselton-Margaret River Airport Expansion - Assessment No. 2105
Table 5-7: Summary of number of residences affected by aircraft exposure greater than 70 dB(A)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total number of residences affected by greater than 5 events per day &gt; 70 dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5-10 events per day</td>
</tr>
<tr>
<td>2015-16</td>
<td>5</td>
</tr>
<tr>
<td>2018-19 existing airport operations</td>
<td>6</td>
</tr>
<tr>
<td>2018-19 modified airport operations</td>
<td>6</td>
</tr>
<tr>
<td>2038-39 existing airport operations</td>
<td>6</td>
</tr>
<tr>
<td>2038-39 modified airport operations</td>
<td>20</td>
</tr>
</tbody>
</table>

The N70 contours presented in Section 5.7.3 indicate that the Proposal will result in a marginal increase in the frequency of aircraft noise disturbances at nearby residences, with an additional one residence experiencing 10 - 20 events per day above 70 dB(A) compared to existing airport operations as of 2038-39, and no residences experiencing more than 20 events per day above 70 dB(A) as of 2038-39.

There are no established criteria as to the acceptability of aircraft noise disturbance on existing noise sensitive receptors. However, to provide context, AS 2021:2015 recommends that residential buildings in the vicinity of airports subject to general aviation should not be situated on land exposed to more than 30 events per day above 70 dB(A) (Standards Australia 2015). Similarly, the NASF recommends that residential development not occur in areas exposed to 20 or more events per day above 70 dB(A). The expected aircraft noise disturbance from the Proposal, which is modelled at less than 20 events per day above 70 dB(A) is therefore expected to fall within the recommendations of AS 2021:2015 and the NASF with respect to existing residential development in the vicinity of airports. Based on the assessment undertaken for this ERD, the Proposal is not expected to cause a significant impact in terms of frequency of aircraft noise disturbance.

5.8.3 Frequency of night time noise disturbance – N60 (night time) contours

The N60 night time noise contours generated from the noise modelling are presented in Figure 5-17 and Figure 5-18 with discussion of findings presented in Table 5-8.

Table 5-8: Discussion of N60 night time noise contours

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Figures</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing and modified airport operations</td>
<td>Figure 5-17, Figure 5-18</td>
<td>No N60 night contours are provided for 2015-16 operations as operational hours restrict night flights (except RFDS) and hence residences in the vicinity of BMRA would not experience (on average) one event per night above 60 dB(A). Modified airport operations are expected to result in an average of approximately one event per night above 60 dB(A) for four residences along Acton Park Road, south of the airport. Other residences in the vicinity of BMRA, including at Yalyalup and Reinscourt, are expected to experience on average less than one event per night above 60 dB(A). By 2028-29 the night time noise exposure is expected to reduce for all residences to an average of less than one event per night above 60 dB(A). The reason for the decrease in night time noise exposure between 2022-23 and 2028-29 is that night flights are expected to be necessary in the first few years of operations to establish commercial service flights to BMRA, following which the BMRA is expected to become an established destination and RPT flights converted to day time flights.</td>
</tr>
</tbody>
</table>
The N60 night contours presented indicate that the Proposal will result in a total of four residences experiencing on average approximately one event per night above 60 dB(A), with other residences in the vicinity of BMRA experiencing on average less than one event per night above 60 dB(A). Airservices Australia in evaluating a night time departure trial at Perth Airport considered that where there is an increase in excess of three additional flights per night, the change is expected to be noticeable and potentially significant under the EPBC Act (Airservices Australia 2015). The NASF recommends that residential development may require restriction or noise amelioration if exposed to six or more night time events per day above 60 dB(A).

Whilst Perth Airport operates in an urban environment and acknowledged as operating under a different noise environment to that experienced in proximity to the Proposal the noise experienced from aircraft is directly comparable and guidance on noise levels that interrupt sleep are also comparable. The Perth Airport study provides guidance on the rate of change at which ‘significance’ of impact is considered to apply. At less than one movement per night, the Proposal falls well below this significance threshold.

In considering the EIS undertaken for Western Sydney Airport 2016, it can be seen that between 600 and 1200 people will experience 20 - 50 events per night above 60 dB(A) and between 1,400 and 840 people will experience 10 - 20 events per night above 60 dB(A). The number of people impacted is expressed as a range to reflect the four operating strategies that are under consideration in the EIS. The four operating strategies include the future flight paths and the management by the Airport of take-off and landing directions for those flight paths. The EIS also identifies that a number of the sensitive receptors included in the modelling that are impacted are rural residences. None of the sensitive receptors modelled and identified as being impacted by night time flights, be they urban or rural residents, currently experience night time aircraft noise.

The Western Sydney Airport is currently in the final stages of environmental assessment and approval which includes the noise modelling presented in the EIS, with the Minister for Infrastructure and Regional Development in the process of approving the final Airport Plan which may include any environmental conditions or provisions specified by the Minister for Environment.

The expected night time noise disturbance from the Proposal at an average of approximately one event per night above 60 dB(A) is thus expected to fall within recommendations made by Commonwealth Government agencies with respect to night time noise exposure from airports.

Based on the assessment undertaken for this ERD, the Proposal is not expected to cause a significant impact in terms of frequency of night time aircraft noise disturbance.

### 5.8.4 Magnitude of aircraft noise disturbance – LA$_\text{max}$ contours

Figure 5-19 to Figure 5-24 indicate that the Proposal is expected to result in an increase in the LA$_\text{max}$ of between 3 - 5 dB(A) at the residences closest to the BMRA. An increase of 3 - 5 dB(A) is identified as being a small but noticeable change in loudness (Fahy and Thompson 2015). A more detailed discussion of the LA$_\text{max}$ contours is presented in Table 5-9 while Table 5-5 presents a guide to interpreting the LA$_\text{max}$ noise contours.

<table>
<thead>
<tr>
<th>Flight path</th>
<th>Figure</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway 03 arrival GNSSB Arrival from the south-west</td>
<td>Figure 5-19</td>
<td>Maximum noise levels to the south of the airport are expected to increase by approximately 4 dB(A) for the B737-800, compared to F100 aircraft. The maximum noise level at any residence south of the airport is estimated to be slightly above 85dB(A) during arrival of B737-800 aircraft.</td>
</tr>
<tr>
<td>Runway 03 arrival West Arrival from the north that passes airport and turns east then turns north to arrive from the south-west</td>
<td>Figure 5-20</td>
<td>Maximum noise levels to the west of the airport are expected to increase by approximately 4 - 5 dB(A) [but remain below 75 dB(A)] for the B737-800, compared to the F100 aircraft. South of the airport the maximum noise levels are expected to be similar as for Runway 03 arrival GNSSB (Figure 5-19), with an increase of approximately 4 dB(A) for nearby residences and a maximum LA$_\text{max}$ is estimated to be slightly above 85dB(A) during arrival of B737-800 aircraft.</td>
</tr>
<tr>
<td>Flight path</td>
<td>Figure</td>
<td>Interpretation</td>
</tr>
<tr>
<td>-------------</td>
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<td>----------------</td>
</tr>
<tr>
<td>Runway 03 departure Straight Out Departure to the north-east</td>
<td>Figure 5-21</td>
<td>Residences at Reinscourt are subject to an ( L_{A_{max}} ) of approximately 60 - 70 dB(A) from existing F100 aircraft, which is expected to increase to approximately 65 - 80 dB(A) for B737-800 aircraft. Two residences south of Bussell Highway are subject to an ( L_{A_{max}} ) of approximately 70 - 75 dB(A) from the F100, which is expected to increase to approximately 80 dB(A) from B737-800 aircraft.</td>
</tr>
<tr>
<td>Runway 03 departure East Departure to the north which turns in an approximate 270 degree loop over Port Geographe and Busselton townsite before continuing to the east</td>
<td>Figure 5-22</td>
<td>Residences at Reinscourt are subject to an ( L_{A_{max}} ) of approximately 60 - 75 dB(A) from existing F100 aircraft, which is expected to increase to approximately 65 - 80 dB(A) for B737-800 aircraft. Two residences south of Bussell Highway are subject to an ( L_{A_{max}} ) of approximately 75 dB(A) from the F100, which is expected to increase to approximately 80 dB(A) from B737-800. The flight path loop flies over Busselton town site and is expected to result in an increase in ( L_{A_{max}} ) from approximately 60 dB(A) - 65 dB(A) over the town.</td>
</tr>
<tr>
<td>Runway 21 arrival GNSSE Arrival from the north-east</td>
<td>Figure 5-23</td>
<td>Residences at Reinscourt are subject to an ( L_{A_{max}} ) of approximately 60 - 70 dB(A) from existing F100 aircraft, which is expected to increase to approximately 65 - 75 dB(A) for B737-800 aircraft. Two residences south of Bussell Highway are subject to an ( L_{A_{max}} ) of approximately 65 - 70 dB(A) from the F100, which is expected to increase to approximately 70 - 75 dB(A) from B737-800 aircraft.</td>
</tr>
<tr>
<td>Runway 21 departure Straight Out Departure to the south-west</td>
<td>Figure 5-24</td>
<td>The nearest residences to the south-west along Acton Park Road are subject to an ( L_{A_{max}} ) of approximately 75 - 80 dB(A) from existing F100 aircraft, which is expected to increase to approximately 80 - 85 dB(A) for B737-800 aircraft. This suggests an approximate 5 dB(A) increase in the ( L_{A_{max}} ) at the nearest residences. Maximum noise levels are expected to increase by approximately 3 - 4 dB(A) at several other residences located to the south, west and east of the airport. The maximum ( L_{A_{max}} ) expected at any residence south of the airport is slightly below 85 dB(A) during departure of B737-800 aircraft.</td>
</tr>
<tr>
<td>Runway 21 arrival East Arrival from the south-east which turns to the north, then north-west, then south-west before arriving from the north-east</td>
<td>Figure 5-25</td>
<td>Residences to the east of the airport along Wonnerup South Road, Sues Road and Vasse Highway are subject to an ( L_{A_{max}} ) of approximately 60 - 75 dB(A) from existing F100 aircraft, which is expected to increase to approximately 85 - 90 dB(A) for B737-800 aircraft. Residences at Reinscourt north of the airport are expected to be affected by this flight path similar to the Runway 21 arrival GNSSE flight path (Figure 5-23).</td>
</tr>
</tbody>
</table>

The \( L_{A_{max}} \) contours indicate that the Proposal is expected to cause an increase in the \( L_{A_{max}} \) of between 3 - 5 dB(A) at the residences closest to the BMRA; this is expected to be experienced as a small but noticeable change in loudness. The \( L_{A_{max}} \) is expected to be less than 85 dB(A) at all residences in the vicinity of the BMRA, except for one residence to the south-west of the airport along Acton Park Road. The one residence expected to experience an \( L_{A_{max}} \) of 85 dB(A) or more may qualify for noise amelioration subject to noise monitoring confirming the predicted noise levels (refer to Section 5.9.2). Based on the small but noticeable change in loudness and the provision of noise amelioration for any properties experiencing aircraft noise above 85 dB(A), the Proposal is not expected to cause a significant impact in terms of the magnitude of aircraft noise disturbance.

### 5.8.5 Duration of aircraft noise disturbance

The duration of noise disturbance from the new RPT and freight aircraft will be limited and comparable to that of existing F100 (FIFO) aircraft flights at BMRA. Each aircraft noise disturbance is expected to be experienced at a low level (e.g. less than 60 dB(A)) for a duration of approximately 50 seconds and then rise to a peak for a duration of approximately 10 seconds. The Proposal is therefore deemed to not cause a significant increase in the duration of aircraft noise disturbance in the vicinity of BMRA.
5.8.6 Constraint to future land uses – ANEC contours

Figure 5-26 presents the estimated ANEI for the existing airport operations at 2015-16 and Figure 5-27 presents the predicted ANEC for the existing and modified airport operations at 2038-39. As per Section 5.5.3, ANEI is equivalent to ANEC but is produced from actual aircraft movements in 2015-16, whereas the ANEC uses forecast aircraft movements for 2038-39.

Although ANEC criteria for land and building suitability relate to levels equal to or greater than the ANEC 20 contour (Standards Australia 2015), the ANEC 15 contours are also presented for more conservative analysis. It can be observed that all existing residential areas (including Reinscourt and Yalyalup to the north; and residences along Acton Park Road and Kalgup Road to the south) fall outside of the ANEC 10 contour, demonstrating that new residential buildings constructed in these areas would be considered acceptable under AS2021:2015, based on the forecast noise to 2038-39.

As noted in Section 5.5.3, 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 Town Planning Scheme No. 21. The Proponent has commenced the process of preparing a Town Planning Scheme amendment to provide protection for BMRA as a continuing operational airport and to protect adjacent land development for noise sensitive land uses. This includes defining a Special Control Area which may require specific building requirements and/or title notifications. This will ensure a level of awareness and acceptance by prospective property owners regarding aircraft noise impact.

As shown in Figure 5-27, the combination of growth in existing airport operations and introduction of modified airport operations will result in an increase in the ANEC contour extent surrounding BMRA. However, as of 2038-39, the ANEC 20 contour is not expected to extend to any areas zoned for rural residential or urban residential development. The ANEC 30 contour is expected to fall within the boundary of the BMRA and is not expected to extend into any areas zoned for industrial development to the west and north-west of the BMRA. Accordingly, the Proposal is not expected to result in a constraint to future urban residential or industrial development in the vicinity of BMRA.

5.8.7 Summary of impacts

In summary, the assessments undertaken for this ERD indicate that the Proposal is not expected to cause a significant impact to the health, welfare, convenience and comfort of people, either through the flight paths or altitudes of aircraft; the frequency, magnitude or duration of aircraft noise disturbance; or impose a constraint on future urban development.

The modified airport operations will affect residences that generally experience noise disturbance from the existing airport operations. Residents in the vicinity of BMRA may therefore consider their current experience of aircraft noise disturbance from existing airport operations as a tangible basis for considering the effect that modified airport operations may have on them. The new RPT/freight aircraft movements are expected to have comparable flight paths, altitudes and duration of noise disturbance as the existing Fokker 100 (FIFO) aircraft movements, with a small but noticeable increase in loudness compared to the F100, and a gradual increase in frequency of noise disturbance as indicated by the aircraft movements forecast in Table 2-4 and the N70 contour plots in Section 5.7.3.

The N70 contours presented in Section 5.7.3 indicate that the Proposal will result in a marginal increase in the frequency of aircraft noise disturbances at nearby residences, with an additional one residence experiencing 10 - 20 events per day above 70 dB(A) compared to existing airport operations as of 2038-39, and no residences experiencing more than 20 events per day above 70 dB(A) as of 2038-39.

AS 2021:2015 recommends that residential buildings in the vicinity of airports subject to general aviation should not be situated on land exposed to more than 30 events per day above 70 dB(A) (Standards Australia 2015). Similarly, the NASF recommends that residential development not occur in areas exposed to 20 or more events per day above 70 dB(A). The expected aircraft noise disturbance from the Proposal at less than 20 events per day above 70 dB(A) is therefore expected to fall within the recommendations of AS 2021:2015 and the NASF with respect to new residential development in the vicinity of airports. Based on the assessment undertaken for this ERD, the Proposal is not expected to cause a significant impact in terms of frequency of aircraft noise disturbance.
The expected night time noise disturbance from the Proposal at an average of approximately one event per night above 60 dB(A) fall within any previous assessments and recommendations made by Commonwealth Government agencies with respect to night time noise exposure from airports. The Proponent has committed to a cap of no more than 5 flights (10 movements) per week between the hours of 0000 and 0600.

The $L_{A_{max}}$ contours indicate that the Proposal is expected to cause an increase in the $L_{A_{max}}$ of between 3 - 5 dB(A) at the residences closest to the BMRA; this is expected to be experienced as a small but noticeable change in loudness. The $L_{A_{max}}$ is expected to be less than 85 dB(A) at all residences in the vicinity of the BMRA, except for one residence to the south-west of the airport along Acton Park Road. The one residence expected to experience an $L_{A_{max}}$ of 85 dB(A) or more may qualify for noise amelioration subject to noise monitoring confirming the predicted noise levels (refer to Section 5.9.2). Based on the small but noticeable change in loudness and the provision of noise amelioration for any properties experiencing aircraft noise above 85 dB(A), the Proposal is not expected to cause a significant impact in terms of the magnitude of aircraft noise disturbance.

All existing residential areas fall outside of the ANEC 10 contour, demonstrating a high degree of conservativeness in the protection of residential properties from noise generated by the BMRA and that new residential buildings constructed adjacent to the existing residences in the vicinity of BMRA, would be considered acceptable under AS2021:2015, based on the forecast noise to 2038-39.

The ESD describes the potential impacts and risks to Social Surroundings as:

‘Noise emissions from aircraft have the potential to impact on social surroundings, including amenity of people. Implementation of the proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time.’

The modified airport operations under the Proposal are not expected to cause a significant impact to human health, due to the limited night flights (on average less than one per night) and thus limited potential for sleep disturbance, with the frequency of night time noise disturbance well below the threshold considered significant by the Commonwealth Government.

The modified airport operations will create only a marginal increase in the frequency and loudness of noise disturbance compared to existing airport operations, with noise disturbance complying with standards for new residential developments. That is, new residential buildings if constructed adjacent to existing buildings in the vicinity of BMRA would be considered acceptable under AS2021:2015 and the NASF (i.e. they would be exposed to an acceptable level of aircraft noise without the need for noise insulation). The limited increase in aircraft noise disturbance is due to the limited frequency of the new RPT/freight aircraft movements, at an average of approximately 1.4 movements (0.7 flights) per day initially, rising gradually over a period of 20 years to an average of approximately 4.6 movements (2.3 flights) per day, with movements distributed over a number of flight paths. Based on the gradual and marginal increase in aircraft noise disturbance that falls within AS2012:2015 and the NASF, the modified airport operations at BMRA are not expected to cause a significant impact to the welfare, convenience and comfort of people. Based on a consideration of the above criteria, the Proposal is not expected to cause a significant impact to Social Surroundings (either existing or future) in the vicinity of BMRA.

5.9 Mitigation

This section includes a description of the mitigation hierarchy in Section 5.9.1 in accordance with Item 1 of the ESD. Section 5.9.2 to Section 5.9.5 describes management measures in accordance with Item 10 of the ESD.

Ongoing and reactive monitoring is described in Section 5.9.5 in accordance with Item 9 of the ESD.

Land use planning is described in Section 5.9.4 in accordance with Item 11 of the ESD.
5.9.1 Mitigation hierarchy

The noise mitigation hierarchy to avoid, minimise and mitigate impacts to Social Surroundings is summarised in Table 5-10 below, with details of each noise management component described in subsequent sections.

Table 5-10: Aircraft noise mitigation hierarchy

<table>
<thead>
<tr>
<th>Mitigation hierarchy</th>
<th>Noise management element</th>
<th>Relevant ERD section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid</td>
<td>DAPs and the FNA guide aircraft to avoid flights over noise sensitive receptors.</td>
<td>Section 5.9.3</td>
</tr>
<tr>
<td></td>
<td>Land use planning restricts development of noise sensitive land uses within the Airport Protection Area in the vicinity of BMRA.</td>
<td>Section 5.9.4</td>
</tr>
<tr>
<td>Minimise</td>
<td>DAPs and the FNA guide aircraft to minimise flights over noise sensitive receptors and include noise reduction flight procedures.</td>
<td>Section 5.9.3</td>
</tr>
<tr>
<td></td>
<td>Land use planning includes Special Control Areas requiring additional building requirements and land title notifications.</td>
<td>Section 5.9.4</td>
</tr>
<tr>
<td>Mitigate</td>
<td>Noise amelioration is available for eligible affected properties.</td>
<td>Section 5.9.2</td>
</tr>
</tbody>
</table>

5.9.2 Noise Management Plan

The existing BMRA operates subject to a comprehensive NMP (2015), which is approved under Ministerial Statement 1009. The first revision of the BMRA NMP was reviewed by the EPA and approved for implementation by the Minister for the Environment; Heritage in 2012, following which a revised NMP was submitted under s 46 of the EP Act and subsequently approved in 2015.

The Proponent proposes to revise the NMP as part of this Proposal, to support State Government economic development objectives in funding the Proposal. This revised NMP reflects the proposed changes to aircraft types and hours of operation, and provides improved consistency with Australian Standard AS 2021.2015 Acoustics – Aircraft noise intrusion – Building siting and construction.

A draft NMP (2016) has been subject to public consultation as outlined in Section 3, following which a revised draft NMP (2017) was prepared and endorsed by the City of Busselton Council for inclusion in this ERD. The revised draft NMP (2017) is presented in Appendix 3 and a discussion of the proposed updates is presented below. Following public consultation on the draft NMP (2017), the Proponent has committed to cap night flights to a maximum of five night flights per week between the hours of 0000-0600.

The draft NMP (2017) continues to provide a comprehensive approach to aircraft noise management, which is summarised below:

1. Principles and statement of intent.
   The City of Busselton is committed to a balanced approach with regards to aircraft noise management at the BMRA. The BMRA will be developed in a manner that respects residential amenity, recognising the impacts to the community associated with its operations, particularly noise, while providing economic, social and tourism benefits to the City and the South West. The City will manage noise proactively by implementing the NMP.

2. Management of operational activities:
   - flight paths
     Operators, as far as practicable and in accordance with applicable regulatory requirements, guidance, procedures and limitations, are to maximise the use of flight paths over coastal waters and non-residential areas, rural land and State forest. The over flight of residential areas, including rural residences and other noise-sensitive premises, particularly at less than 1500 feet (AGL), are to be minimised. Operators shall also utilise descent profiles with low-power and low-noise operations.
     Future development of alternative flight paths for the BMRA will observe these guidelines.
   - noise abatement zones
Noise Abatement Zones identifying existing and future planned residential development around the BMRA have been identified in the NMP. Operators shall, as far as practicable and in accordance with air safety standards, minimise the over flight at less than 1500 feet (AGL) in these areas. Noise abatement zones will also be observed in any future development of flight paths.

- **standard hours of operation**

  Standard hours of operation have been established to advise airport users of those operations that need City approval and to specify overall limits on operations to limit impact for the community, this is detailed in the table below:

  **Table 5-11: Operational limitations and approved parameters**

<table>
<thead>
<tr>
<th>Operator / Aircraft Type</th>
<th>Standard Hours of Operation</th>
<th>Conditions</th>
</tr>
</thead>
</table>
| Emergency Services                      | UNRESTRICTED               | Emergency situations and normal flight patterns
|                                          |                            | • training flights require approval under the Flight Training Guidelines. |
| Light Aviation / General Aviation        | RESTRICTED 0600hrs – 2200hrs| Maximum noise level of 85dB (A). Flight Training approval required (only available for aircraft below 1500kg MTOW and flight training conditions apply). Aircraft above 5700kg MTOW requires City approval. |
| Open, Closed Charters, RPT / Commercial Operators | RESTRICTED** 0600hrs – 0000hrs **Five flights per week approved between 0000 – 0600hrs. | Maximum noise level of 85dB (A). City approval required. |

- **Fly Neighbourly Agreement**

  Under the Fly Neighbourly Agreement (FNA), pilots utilising BMRA are to observe the following requirements:
  
  - observe the flight path principles
  - observe residential noise abatement zones
  - pilots should endeavour to maximise flight paths over coastal water, forest and highways while avoiding residential areas and rural homes wherever possible
  - avoid flying below 1000 feet AGL within the circuit area, and avoid flying below 1500 feet AGL over built up areas
  - observe the Standard Hours of Operation
  - observe the noise generation specifications
  - during takeoff:
    - utilise the full length of the runway where possible
    - aircraft to climb out at best rate climb (Vy) or for Jet aircraft to conduct jet noise abatement climb procedures
    - consider neighbours when selecting power and propeller pitch control settings by reducing power as soon as possible after takeoff.
  - when flying in the circuit:
    - light and rotary wing aircraft should not fly below 1000 feet (AGL)
    - jet and turbo prop aircraft should not fly below 1500 feet (AGL)
    - rotary wing aircraft should avoid ‘rotor slap’ conditions in the circuit area
    - avoid using individual houses as circuit reference points
    - do not increase propeller to full RPM until power has been reduced to final approach power.
Flight training guidelines.

Flight training guidelines have been developed to ensure maximum Airport usage in a manner that does not unduly impact upon the amenity of the residents of the City of Busselton. An application for a permit will need to be lodged to the City of Busselton to consider proposals associated with pilot training and pilot training schools at BMRA. A commitment to observe the requirements of the Flight Training Guidelines and other aspects of the NMP is required with the application.

The guidelines cover the following:

- aircraft operations classifications (aircraft type, frequency and type of use)
- flying heights for training operations
- times of operation
- flight training movements
- emergency response
- noise
- Fly Neighbourly Agreement
- revocation of approval.

Emergency Services are exempted from flight training, however, an approval will still be required to be applied for.


The City of Busselton will manage the BMRA through implementing the NMP and promoting Fly Neighbourly practices, however, the City recommends that all noise complaints are lodged with the Airservices Australia Noise Complaints and Information Service (NCIS) in the first instance. ASA works to minimise the effects of aircraft noise on communities through operating the national aircraft noise and flight path monitoring system and managing all aircraft noise complaints through the NCIS. Residents may also direct their noise complaints to the Aircraft Noise Ombudsman (ANO).

When a noise complaint is also made to the City, a procedure will be required to be followed in order for the complaint to be investigated by the City. Where a noise complaint is determined outside of the City’s jurisdiction, the complainant will be advised to make a formal complain to the ASA NCIS if not already submitted.


Noise monitoring and noise modelling for the purposes of providing for the amenity of existing and future residents in noise sensitive areas are part of the City’s ongoing compliance with its requirements to deliver a viable airport operation on behalf of the community and to provide protection from undue noise impact for affected residents.

Noise monitoring will be undertaken in response to requests or complaints or significant change in operations at affected noise-sensitive premises. Noise monitoring for land use planning purposes will be carried out during assessment of the proposal at the relevant subject site.

The City has undertaken noise modelling based on ANEC/ANEI and N65, N70 and N75 contours and will continue to be utilised to provide direction for land use planning considerations and the BMRA develops. Noise modelling will be reviewed every five years or upon trigger points stated in the NMP.

5. Noise amelioration.

The City of Busselton will utilise the Australian Standard AS2021:2015 for the basis of its noise assessment and amelioration process. The NMP (2017) 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 regularly exceeds the following:

- 85 dB(A)
- 15 events per day at LAmax of 80 - 85 dB(A)
- 30 events per day at LAmax 75 - 80 dB(A).
Where noise exposure criteria are regularly exceeded, the revised NMP (2017) includes provision for noise monitoring to confirm the actual noise exposure occurring and if proven to exceed the above criteria, provide acoustic insulation for the affected buildings to provide indoor design sound levels as far as is practicable in accordance with AS 2021:2015 (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. It is thus not expected that residences would be exposed to more than 15 events per day at 80 - 85 dB(A) or more than 30 events per day at 75 - 80 dB(A). However, one residence to the south-west of the BMRA along Acton Park Road is expected to potentially experience an LAmax of 85 dB(A) or more and so may be eligible for noise amelioration subject to confirmation of noise levels through noise monitoring.

Aircraft noise amelioration in buildings is an established management tool. The reduction of aircraft noise achievable through amelioration within a residence is dependent on the building materials; however, a reduction of approximately 30-35 dB(A) between outdoor and indoor noise levels is expected to be achievable through refurbishment of existing buildings (Herring Storer 2011).

Options for building treatments applicable can include but may not be limited to:

- seal gaps around window frames and doors
- seal open eaves
- replace existing hollow core external doors with solid core doors with acoustic seals
- provide mechanical ventilation / reverse cycle air-conditioning to allow windows and doors to remain closed
- upgrade or replace window treatments (options include thicker glass, double glazing, replace sliding windows with casement or awning style windows with compressible seals)
- add thermal or acoustic insulation to ceiling
- insulate wall cavities
- lay plasterboard over joists and add additional insulation above plasterboard
- install a loaded vinyl noise blanket over insulation and joists
- increase thickness of ceiling by adding an extra layer of plasterboard.


Community access to information is a key component of the management of noise impact associated with BMRA. The City will utilise the following range of mechanisms to ensure the community is informed and involved:

- an advisory committee or similar established body to provide specific input to various proposals and to assist with stakeholder communication and consultation
- update the City's BMRA website regularly with airport operations information
- ensure that airport noise complaints procedures are advertised and available on the website
- make related noise exposure contour maps available to the public by placing them on the website and various other means
- provide land use planning information in various formats along with the noise contour information
- utilise a range of media forms, as well as community meetings and advisory community meetings
- ensure members of the community have an opportunity to have input at the formative stage of any change to operations, policy or procedure
- direct communication with interested members of the public with information containing any imminent happenings
- noise amelioration Information Package.
The draft NMP (2017) includes principles for BMRA 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 hours restricted operations with up to five flights per week between the hours of 0000-0600hrs for RPT, freight and charter aircraft flights, subject to City approval. Further, the NMP (2017) 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.

5.9.3 Guidance for aircraft operators

As noted previously, flight paths and DAPs for BMRA will be reviewed as part of the Proposal to assess if improvements can be implemented to reduce aircraft noise over residential areas adjacent to the airport (e.g. Yalyalup and Reinscourt), subject to aviation navigation and safety requirements. If appropriate, new DAPs will be submitted to Airservices Australia for endorsement after which they will be incorporated into the En Route Supplement Australia (ERSA) published by Airservices Australia, for consideration by aircraft operators and airlines.

The FNA is a code of practice to be observed by users of BMRA 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 over noise sensitive receptors
- observing noise emission limits
- observing take off and circuit procedures to reduce noise.

The Proponent will recommend airlines adopt the FNA for all new RPT, freight and charter flights in order to minimise noise impacts over residential areas.

5.9.4 Land use planning

Town Planning Scheme No. 21 includes an Airport Protection Area, which restricts noise sensitive land uses (e.g. residential, schools) in the vicinity of BMRA.

In addition to the existing provisions, the Proponent has commenced the process of developing a broad land use strategy and Town Planning Scheme amendment to provide protection for BMRA as a continuing acceptable land use and to 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.

5.9.5 Operational monitoring and management and noise modelling updates

The Proponent currently has operational monitoring processes in place which captures the following information for all scheduled flight arrivals and departures:

- runway (03/21) arrivals and departures are recorded providing an overview of where aircraft are overflying in relation to the runway
- date and time
- weather conditions for the day.

The Proponent also has purchased a third party flight recording system (Flightradar) that provides the following information that will enable the Proponent to record and monitor actual flight operations against those used in the noise modelling:

- 365 day flight history
- GPS altitudes for aircraft
- lightning, rain and cloud satellite overlay
- inbound and outbound waypoints (IFR aircraft).
Further the Proponent has committed to review the DAPs and flight paths with Airservices Australia. If improvements in the flight paths can be identified and endorsed/published by Airservices Australia, these are then expected to direct aircraft away from urban or residential areas resulting in a positive outcome and reduced aircraft noise footprint for the community.

Consistent with approaches at Perth and Jandakot Airports, the Proponent will monitor aircraft noise exposure through regular updating of noise modelling in order to generate noise contours for public consultation. The noise contours will include ANEI, ANEC and N70 and be updated based on recorded aviation movements and updated aviation forecasts.

The modelling and 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 types used for RPT and freight flights from those assumed in the aircraft noise modelling
- 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.

The monitoring of aircraft noise exposure through updated noise modelling and public consultation will enable reactive management of aircraft noise at BMRA as airport operations progressively grow and evolve. This approach will support community consultation and consideration of noise reduction flight procedures such as updates to flight path design and DAPs. This information will also support updates to the NMP as required to avoid and minimise impacts to Social Surroundings.

In addition to monitoring aircraft noise exposure via noise modelling updates, the Proponent will undertake reactive noise monitoring in response to requests or complaints regarding noise-affected premises. This process is outlined in the revised draft NMP (2017) and will involve a targeted investigation by a qualified environmental noise professional using noise monitoring equipment at the affected premises and consideration of the prevailing weather conditions during aircraft flights. The purpose of the noise monitoring will be to confirm the actual aircraft noise exposure occurring at the affected premises and whether the premises is eligible for noise amelioration (see Section 5.9.2), as well as to verify compliance with the NMP and the FNA.

**5.9.6 Summary of aircraft noise management**

In summary, BMRA will continue to operate under a comprehensive noise management framework as articulated by the revised NMP, including:

- noise modelling (ANEI and N contours)
- restricted operations (hours of operations)
- monitoring through updated noise modelling (ANEI and N contours)
- operational monitoring and management
- reactive monitoring at noise-affected premises
- noise amelioration at eligible noise-affected premises
- FNA
- DAP
- land use planning (Airport Protection Area and Special Control Areas)
- public consultation
- 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 Airports Act 1996. The BMRA noise management framework is therefore considered best practice within Australia and exceeds the mechanisms currently in place for other regional airports within Western Australia.

5.10 Predicted outcome

This section summarises the impact assessment to predict the outcome of the Proposal against the objectives for Social Surroundings in accordance with Item 12 of the ESD.

The results of noise modelling indicate that the Proposal is expected to result in a small increase in the frequency of aircraft noise disturbance in the vicinity of the BMRA and an average of one night time noise disturbance at four nearby residences south of the BMRA. The Proposal will result in a small but noticeable change in loudness at residences in the vicinity of the BMRA, with the duration of noise disturbance comparable to that of existing aircraft flights operating from the airport. ANEC contours indicate that the Proposal is not expected to cause a constraint for land proposed for future residential development to the west and north-west of the BMRA.

The modified airport operations under the Proposal are not expected to cause a significant impact to human health, due to the small increase in daytime noise events and limited night flights (on average less than one per night) and thus limited potential for sleep disturbance, with the frequency of night time noise disturbance well below the threshold considered significant by the Commonwealth Government.

The modified airport operations will create only a marginal increase in the frequency and loudness of noise disturbance compared to existing airport operations, with noise disturbance complying with standards for new residential developments. That is, new residential buildings if constructed adjacent to existing buildings in the vicinity of BMRA would be considered acceptable under AS2021:2015 and the NASF (i.e. they would be exposed to an acceptable level of aircraft noise without the need for noise insulation). The limited increase in aircraft noise disturbance is due to the limited frequency of the new RPT/freight aircraft movements, at an average of approximately 1.4 movements (0.7 flights) per day initially, rising gradually over a period of 20 years to an average of approximately 4.6 movements (2.3 flights) per day, with movements distributed over a number of flight paths. Based on the gradual and marginal increase in aircraft noise disturbance that falls within AS2012:2015 and the NASF, the modified airport operations at BMRA are not expected to cause a significant impact to the welfare, convenience and comfort of people.

The aircraft noise modelling has been undertaken based on a number of assumptions including the growth and mix of aircraft movements and indicative flight paths, which may change during operations and thus vary the actual aircraft noise exposure from the model predictions. The risk posed by this variation is addressed through the NMP via five yearly updates to the aircraft noise modelling as well as trigger criteria in the event that there are substantial changes to the aircraft types, forecast frequencies and flight paths assumed for the modelling (Section 5.9.5). This will ensure that any changes in actual aircraft movements are reflected in updated noise contours to enable a re-evaluation of the risk posed to amenity.
BMRA will continue to operate under a comprehensive noise management framework including a revised NMP comprising:

- noise modelling (ANEC and N contours)
- restricted operations (hours of operations) monitoring through updated noise modelling (ANEC and N contours)
- reactive monitoring at noise-affected premises
- noise amelioration at eligible noise-affected premises
- FNA
- DAP
- land use planning (Airport Protection Area and Special Control Areas)
- public consultation
- complaints resolution.

This noise management framework is similar to systems and procedures employed at Perth and Jandakot Airports as required under the Commonwealth Airports Act 1996. The BMRA noise management framework is therefore considered best practice within Australia and exceeds the mechanisms currently in place for other regional airports within Western Australia.

Based on the robust findings of the noise modelling and the comprehensive management framework afforded by the NMP, it is expected that the Social Surroundings in the vicinity of BMRA will not be subject to significant harm and thus the Proposal will meet the EPA objective for the factor.
6. Other environmental factors or matters

6.1 Terrestrial fauna - waterbirds

6.1.1 Vasse-Wonnerup wetlands

The Proposal area is located 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 comprising 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 most years.

6.1.2 Birdstrike

Birdstrike statistics for the existing BMRA are recorded by the Australian Transport Safety Bureau (refer to Appendix 10). The statistics show a total of 25 recorded bird strike incidents (two reported bird strikes are duplicates) from 2005 - 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 new RPT and freight aircraft.

The Proponent will minimise the potential for bird strikes through implementation of 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.

6.1.3 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, with a summary of findings presented below.

Based on a small number of observations by Parks and Wildlife personnel, F100 aircraft movements associated with the existing BMRA occasionally disturb waterbirds; however, 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 a 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 as they may not operate as predictably as the larger RPT and freight aircraft proposed. The research suggests a vertical buffer of greater than 300 m, a horizontal buffer of greater than 200 m and a noise limit of 85 dB(A) are appropriate to minimise impacts to waterbirds (Bamford Consulting Ecologists 2016).

6.1.4 Risk of disturbance to waterbirds

The indicative flight paths (Figure 5-1 and Figure 5-2) suggest that some RPT and freight aircraft will overfly the Vasse-Wonnerup wetlands, particularly on Runway 03 departures and Runway 21 arrivals. The RPT and freight aircraft are predicted to remain at a height greater than 300 m over the wetlands (particularly for departures which ascend more steeply than arrivals) (Graph 2 and Graph 3). The aircraft are therefore expected to comply with the vertical buffer suggested by the literature review. The aircraft noise modelling contours (Figure 5-21 and Figure 5-23) indicate maximum noise levels (LA_{max}) of less than 80 dB(A) for B737-800 aircraft over the Vasse-Wonnerup wetlands, which is within the 85 dB(A) noise limit suggested by the literature.

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 that supports the large breeding colony of Black Swans.

The frequency of RPT and freight aircraft movements over the wetlands are uncertain but are expected to comprise a fraction of the total RPT and freight aircraft movements, as aircraft flights may use southern or eastern flight paths (Figure 5-1 and Figure 5-2) rather than a northern approach/departure flight path over the wetlands. For example, it is forecast that by the year 2038-39 the total RPT and freight 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 as well as helicopters and closed charter FIFO flights, some of which would overfly the wetlands.

6.1.5 Predicted residual impacts and management mechanisms

Assuming buffers and noise limits are adhered to, Bamford Consulting Ecologists (2016) concluded from many studies that the observations of waterbirds near aircraft indicates that the predicted increases in aircraft activity due to the Proposal will not adversely affect waterbirds. 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 airport 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 required 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 (refer to 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; however, 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 thus are not currently using sites close to the BMRA 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 should certain habitats not be 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 present 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 RPT and freight 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 an 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 receptor, 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 adoption on new RPT and freight aircraft flights in order to minimise aircraft disturbance to the Vasse-Wonnerup wetlands.

6.1.6 EPBC Act decision

The disturbance to the Vasse-Wonnerup wetlands and waterbirds, including aircraft noise disturbance and bird strike, has been addressed in the EPBC Act referral for the Proposal (EPBC 2016/7675). On 26 July 2016 the Commonwealth Government deemed that the Proposal was not a controlled action under the EPBC Act, which implies that the Proposal is not considered to pose a significant risk to the Vasse-Wonnerup wetlands.
7. Holistic impact assessment

Consistent with the guidelines for preparing an Environmental Review Document, this section considers the holistic impact of the Proposal. However, as only one key environmental factor was identified in the ESD, Table 7-1 summarises only the outcomes of the assessment for Social Surroundings and does not consider potential interactions with any other factors.

Table 7-1: Summary of potential impacts, proposed mitigation and outcomes

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Social Surroundings</strong></td>
<td></td>
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<tr>
<td>EPA objective</td>
<td>To protect social surroundings from significant harm.</td>
</tr>
<tr>
<td>Policy and guidance</td>
<td>There is no Western Australia Government policy that specifically applies to the assessment or management of aircraft noise from a regional airport. 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, neither of these instruments apply to aircraft noise. Commonwealth guidance indicates that noise acceptability criteria are not applied and the preferred approach for assessment is to provide information that enables the individual to decide on acceptability, rather than prescribe an 'acceptable' number of jet aircraft movements and/or number of movement louder than a measure. Australian Standard (AS) 2021:2015 Acoustics – Aircraft noise intrusion – Building siting and construction (Standards Australia 2015) which provides criteria for suitability of building sites 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. The National Airports Safeguarding Framework (NASF) is a national land use planning framework that aims to improve community amenity by minimising aircraft noise sensitive developments near airports. NASF provides guidelines for zoning of noise sensitive uses on the basis of ANEF and number of daily noise events exceeding 60 dB(A), 65 dB(A) and 70 dB(A).</td>
</tr>
<tr>
<td>Potential impacts</td>
<td>Noise emissions from aircraft has the potential to impact on social surroundings, including amenity. Implementation of the proposal may unreasonably interfere with the health, welfare, convenience and comfort of people from changes to the timing and number of aircraft movements, particularly at night time.</td>
</tr>
<tr>
<td><strong>Mitigation</strong></td>
<td></td>
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<tr>
<td>Avoid</td>
<td>Flight paths, Departure and Arrival Procedures and Fly Neighbourly Agreement guide aircraft to avoid flights over noise sensitive receptors. Land use planning restricts noise sensitive development in the vicinity of BMRA.</td>
</tr>
<tr>
<td>Minimise</td>
<td>Fly Neighbourly Agreement guides aircraft to minimise flights over noise sensitive receptors. Land use planning includes Special Control Areas requiring additional building requirements and land title notifications.</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
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</table>
| Mitigate: | Noise amelioration is available for eligible affected properties. In the event that the noise amelioration assessment process determines that amelioration is applicable to a property, options for appropriate and effective amelioration will be identified. Options for building treatments applicable can include but may not be limited to:  
- seal gaps around window frames and doors  
- seal open eaves  
- replace existing hollow core external doors with solid core doors with acoustic seals  
- provide mechanical ventilation / reverse cycle air-conditioning to allow windows and doors to remain closed  
- upgrade or replace window treatments (options include thicker glass, double glazing, replace sliding windows with casement or awning style windows with compressible seals)  
- add thermal or acoustic insulation to ceiling  
- insulate wall cavities  
- lay plasterboard over joists and add additional insulation above plasterboard  
- install a loaded vinyl noise blanket over insulation and joists;  
- increase thickness of ceiling by adding an extra layer of plasterboard. |
| Outcomes  | Residual Impact:  
The Proposal is expected to cause a small increase in the frequency of aircraft noise disturbance in the vicinity of the BMRA and an average of one night time noise disturbance per day at four nearby residences south of the BMRA. The Proposal will result in a small but noticeable change in loudness at residences in the vicinity of the BMRA, with the duration of noise disturbance comparable to that of existing aircraft flights operating from the airport. The Proposal is not expected to cause a constraint for land proposed for future residential and residential development to the west and north-west of the BMRA.  
The aircraft noise disturbance will be well within criteria for residential development together with the modelling conservatism that concentrates impacts in the vicinity of indicative flight paths provides a level of confidence that the impacts to Social Surroundings will not be significant.  
BMRA will continue to operate under a comprehensive noise management framework, including a revised Noise Management Plan, Fly Neighbourly Agreement, noise modelling, land use 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 well as other capital city Airports, as required under the Commonwealth Airports Act 1996. The BMRA noise management framework is therefore considered best practice within Australia and exceeds the mechanisms currently in place for other regional airports within Western Australia who are required to be regulated or undertake such measures. Based on the robust findings of the noise modelling and the comprehensive management framework afforded by the Noise Management Plan, it is expected that the Social Surroundings in the vicinity of BMRA will not be subject to significant harm and thus the Proposal will meet the EPA objective for the factor. |
8. **Acronyms**

<table>
<thead>
<tr>
<th>Acronym/short title</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIP</td>
<td>Aeronautical Information Package</td>
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<tr>
<td>ANEC</td>
<td>Australian Noise Exposure Concept</td>
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<tr>
<td>ANEF</td>
<td>Australian Noise Exposure Forecast</td>
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<td>ANEI</td>
<td>Australian Noise Exposure Index</td>
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<td>AS</td>
<td>Australian Standard</td>
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<td>ASA</td>
<td>Airservices Australia</td>
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<td>BMRA</td>
<td>Busselton Margaret River Airport</td>
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<tr>
<td>CASA</td>
<td>Civil Aviation Safety Authority</td>
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<tr>
<td>DAPs</td>
<td>Departure and Arrival Procedures</td>
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<tr>
<td>dBA</td>
<td>A-weighted decibels</td>
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<tr>
<td>DEE</td>
<td>Department of Environment and Energy</td>
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<tr>
<td>DoT</td>
<td>Department of the Environment</td>
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<tr>
<td>DoW</td>
<td>Department of Water</td>
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<tr>
<td>EP Act</td>
<td>Environmental Protection Act 1986</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Authority</td>
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<tr>
<td>EPBC Act</td>
<td>Environment Protection and Biodiversity Conservation Act 1999</td>
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<tr>
<td>ERD</td>
<td>Environmental Review Document</td>
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<td>ERSA</td>
<td>EN Route Supplement Australia</td>
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<td>ESD</td>
<td>Environmental Scoping Document</td>
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<tr>
<td>F100</td>
<td>Fokker 100</td>
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<tr>
<td>FIFO</td>
<td>Fly-In-Fly-Out</td>
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<tr>
<td>FNA</td>
<td>Fly Neighbourly Agreement</td>
</tr>
<tr>
<td>GA</td>
<td>General Aviation</td>
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<tr>
<td>INM</td>
<td>Integrated Noise Model</td>
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<tr>
<td>LA</td>
<td>Maximum noise level</td>
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<tr>
<td>MTOW</td>
<td>Maximum Takeoff Weight</td>
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<tr>
<td>NAL</td>
<td>National Acoustic Laboratories</td>
</tr>
<tr>
<td>NASF</td>
<td>National Airports Safeguarding Framework</td>
</tr>
<tr>
<td>NMP</td>
<td>Noise Management Plan</td>
</tr>
<tr>
<td>OEPA</td>
<td>Office of the Environmental Protection Authority</td>
</tr>
<tr>
<td>Parks and Wildlife</td>
<td>Department of Parks and Wildlife</td>
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<tr>
<td>RPT</td>
<td>Regular Public Transport</td>
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<tr>
<td>The Proponent</td>
<td>City of Busselton</td>
</tr>
<tr>
<td>To70</td>
<td>To70 Aviation Australia Pty Ltd</td>
</tr>
</tbody>
</table>
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.


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