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# Aircraft and Traffic Noise Intrusion Report

Proposed Subdivision
Lot 30 DP 1198692, Mundamia, NSW

REPORT NUMBER
**5402-1.1R Rev C**

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**Prepared For:**
Jemalong Mundamia Pty Ltd
C/- Allen Price and Associates
75 Plunkett Street
Nowra NSW 2541

Attention: Ms Debbi Szota

## Revision History

| Status | Date | Prepared | Checked | Comment |
|---|---|---|---|---|
| Draft 1 | 20/06/2014 | Matthew Harwood | Stephen Gauld | Emailed to client for review |
| Final | 23/06/2014 | Matthew Harwood | Stephen Gauld | |
| Rev A | 01/12/14 | Matthew Harwood | | Amended site plan |
| Rev B | 16/01/15 | Matthew Harwood | | Amended Lot Numbers |
| Rev C | 13/05/15 | Matthew Harwood | | Amended Lot Numbers |

Document 5402-1.1R REV C, 14 pages plus attachments

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# TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY ..... 4
2.0 CONSULTING BRIEF ..... 5
3.0 DESCRIPTION OF PROPOSED SUBDIVISION AND ENVIRONS ..... 6
4.0 ACOUSTICAL CIRTERIA ..... 7
4.1 Department of Planning and Infrastructure ..... 7
4.2 Traffic Noise Criteria ..... 7
4.3 Aircraft Noise Criteria ..... 8
5.0 ROAD TRAFFIC NOISE ..... 10
5.1 Existing Traffic Noise Levels ..... 10
5.2 Future Traffic Noise Levels ..... 10
5.2.1 Traffic Volumes ..... 10
5.2.2 Traffic Noise Predictions ..... 11
5.3 Required Road Traffic Noise Reduction ..... 12
6.0 RECOMMENDED ACOUSTICAL TREATMENT ..... 13
7.0 CONCLUSION ..... 14

## 1.0 EXECUTIVE SUMMARY

Jemalong Mundamia Pty Ltd proposes to develop a residential subdivision at Lot 30 DP 1198692, Mundamia, NSW as shown in Figure 1. Mundamia is located approximately 3 kilometres south west of the township of Nowra and approximately 6 kilometres north of HMAS Albatross, Naval Air Station.

The subdivision will comprise 319 residential lots to be constructed over 11 stages as shown in the attached Appendix A. To the south west of the site is the University of Wollongong (UOW), Nowra Campus and adjoining the site to the west is vacant land owned by Shoalhaven City Council, also proposed for residential subdivision in the future by an unrelated proponent.

The NSW Department of Planning and Infrastructure has requested a noise intrusion assessment to accompany the Development Application. The assessment is to address the potential for noise intrusion from road traffic as well as aircraft associated with HMAS Albatross.

In assessing the potential for noise impact from aircraft, consideration has been given to Australian Standard AS2021:2000 *"Aircraft Noise Intrusion – Building Siting and Construction".* The site is located approximately 3.8 kilometres outside of the HMAS Albatross Australian Noise Exposure Forecast (ANEF) 2014 contour 20. Consequently an aircraft noise intrusion assessment is not required for this proposal as the site is assessed as being acceptable for residential development.

In assessing the potential for noise impact from on-road traffic, consideration has been given to Clause 102 of SEPP (Infrastructure) 2007. Traffic volumes in the vicinity of the site, both currently and following development of all proposals in the area are significantly below the trigger of 40,000 vehicle movements per day. Consequently a traffic noise intrusion assessment is also not required for this proposal.

However, an assessment has been undertaken of the potential for traffic generated by the subdivision and adjacent proposed subdivision to impact future dwellings within the subdivision. Future traffic noise levels have been established from projected future traffic volumes generated by both proposals as detailed in Section 5 of this report.

These levels have been used to determine compliance with the NSW Department of Planning and Infrastructure's *"Development near Rail Corridors and Busy Roads – Interim Guidelines"* 2008. The Guidelines set internal noise level criteria of 35 dBA ($L_{eq}$) inside bedrooms and 40 dBA ($L_{eq}$) inside other habitable spaces, for road and rail noise emission.

The acceptable internal noise limits can be achieved for all future dwellings within the subdivision using standard construction methods as outlined in Section 6 of this report.

## 2.0 CONSULTING BRIEF

Day Design Pty Ltd was commissioned by Jemalong Mundamia Pty Ltd to carry out a road and aircraft noise intrusion study for a proposed residential subdivision at Lot 30 DP 1198692, Mundamia, NSW.

This commission involves the following:

- Prepare a location plan showing the juxtaposition of the proposed site to the nearest major roads and HMAS Albatross, Naval Air Station.
- Determine acceptable noise levels in accordance with Australian Standard AS2021:2000 *"Aircraft Noise Intrusion – Building Siting and Construction".*
- Determine acceptable noise levels in accordance with the NSW Department of Planning and Infrastructure's document *"Development Near Rail Corridors and Busy Roads – Interim Guidelines"* (2008).
- Measure or determine the level of road and aircraft noise emission at the site if required.
- Carry out a traffic noise intrusion computer analysis of future dwellings and provide recommendations for noise control if required.
- Prepare an Aircraft and Traffic Noise Intrusion Report.

## 3.0 DESCRIPTION OF PROPOSED SUBDIVISION AND ENVIRONS

Jemalong Mundamia Pty Ltd proposes to develop a residential subdivision at Lot 30 DP 1198692, Mundamia, NSW as shown in Figure 1. Mundamia is located approximately 3 kilometres south west of the township of Nowra and approximately 6 kilometres north of HMAS Albatross.

The subdivision will comprise 319 residential lots to be constructed over 11 stages as shown in the attached Appendix A. To the south west of the site is the University of Wollongong (UOW), Nowra Campus and adjoining the site to the west is vacant land also proposed for residential subdivision in the future by an unrelated proponent. The adjacent proposal will comprise 65 low density and 69 medium density residences as well as a child care centre and a retail / commercial component.

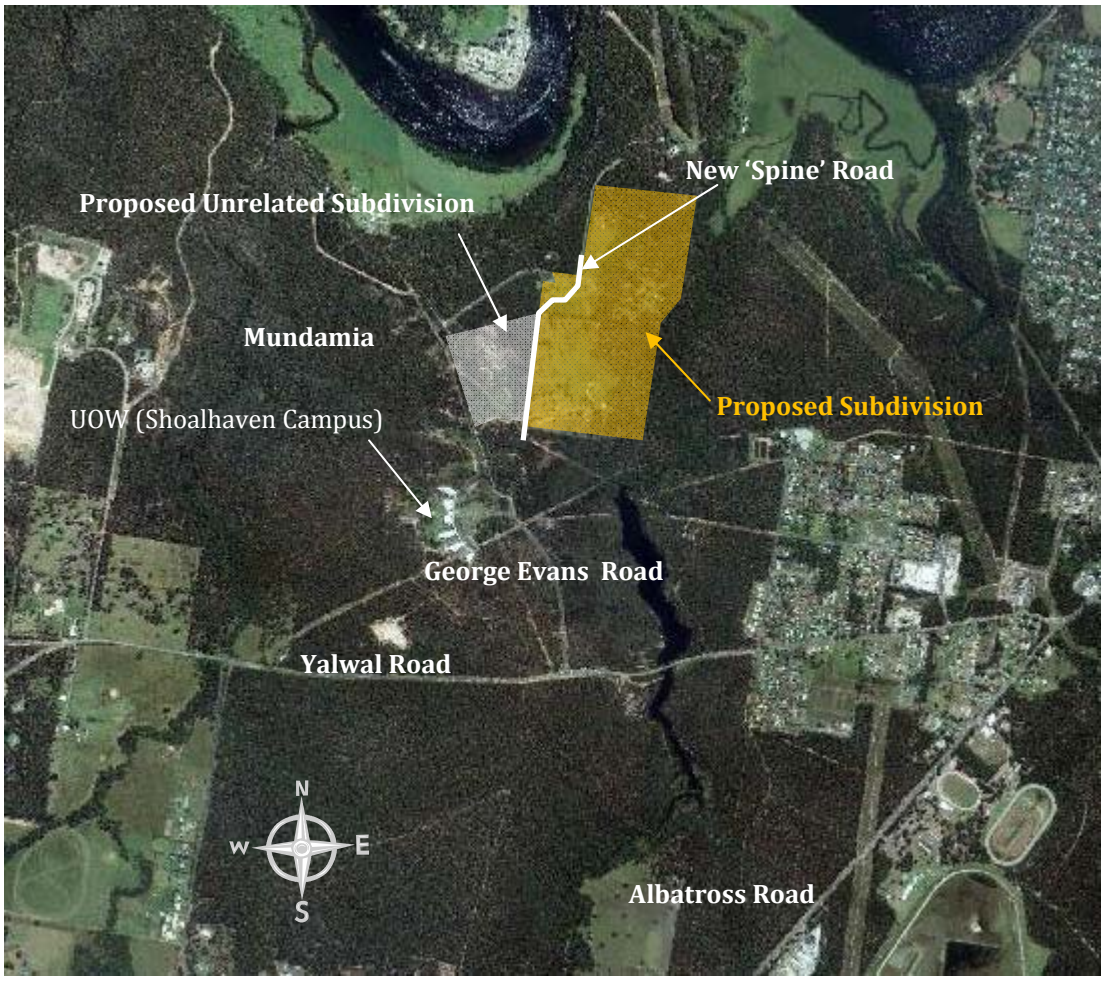



***Figure 1. Location Plan – Mundamia, NSW.***

## 4.0 ACOUSTICAL CIRTERIA

### 4.1 Department of Planning and Infrastructure

In their letter Jemalong Mundamia Pty Ltd, reference MP08_0141 dated 2/8/13, the Department states:-

*"**10. Noise Impacts.***

- *A revised noise impact assessment should be provided that includes assessment of aircraft noise and road traffic noise impacts and include recommendations regarding measures required to mitigate any adverse noise impacts. (Note: in this regard and for comparison refer to the noise assessment submitted with the environmental assessment for project application MP09_0056)."*

### 4.2 Traffic Noise Criteria

The NSW Department of Planning and Infrastructure published the *"Development Near Rail Corridors and Busy Roads – Interim Guidelines"* in 2008. The Guidelines refer to Clause 102 (Road) of the State Environment Planning Policy (Infrastructure) 2007.

Clause 102 *"Impact of road noise or vibration on non-road development"*, sates:

> *"(1) This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transit way or any other road with an annual traffic volume of more than 40,000 vehicles per day (based on the traffic volume data published on the website of the RTA* [RMS]*) and the consent authority considers is likely to be adversely affected by road noise or vibration:*
>
> *(a) a building for residential use,*
>
> *(b) a place of public worship,*
>
> *(c) a hospital,*
>
> *(d) an education establishment or child care centre.*
>
> *(2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purposes of this clause and published in the Gazette.*
>
> *(3) If the development is for the purposes of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following $L_{Aeq}$ levels are not exceeded:*
>
> *(a) in any bedroom in the building – 35 dB(A) at any time between 10 pm and 7 am;*
>
> *(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time."*

## 4.3 Aircraft Noise Criteria

Australian Standard AS 2021:2000 *"Aircraft Noise Intrusion – Building Siting and Construction",* together with Australian Noise Exposure Forecast (ANEF) charts, provides guidelines for determining whether the extent of aircraft noise intrusion makes building sites 'acceptable', 'unacceptable' or 'conditionally acceptable' for the types of activity to be, or being, undertaken.

Building site acceptability is determined from Table 2.1 of AS 2021:2000 by comparing the building type under consideration with the ANEF zone in which it is located.

Section 2.3.1 defines 'Acceptable' as follows:-

*"If from Table 2.1, the building site is classified as 'acceptable', there is usually no need for the building construction to provide protection specifically against aircraft noise. However, it should not be inferred that aircraft noise will be unnoticeable in areas outside the ANEF 20 contour. (See Notes 1, 2 and 3 of Table 2.1)."*

Table 2.1 of AS 2021:2000 is reproduced in Figure 2 below.

**TABLE 2.1**

**BUILDING SITE ACCEPTABILITY BASED ON ANEF ZONES**
**(To be used in conjunction with Table 3.3)**

| Building type | ANEF zone of site | | |
|---|---|---|---|
| | Acceptable | Conditionally acceptable | Unacceptable |
| House, home unit, flat, caravan park | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
| Hotel, motel, hostel | Less than 25 ANEF | 25 to 30 ANEF | Greater than 30 ANEF |
| School, university | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
| Hospital, nursing home | Less than 20 ANEF (Note 1) | 20 to 25 ANEF | Greater than 25 ANEF |
| Public building | Less than 20 ANEF (Note 1) | 20 to 30 ANEF | Greater than 30 ANEF |
| Commercial building | Less than 25 ANEF | 25 to 35 ANEF | Greater than 35 ANEF |
| Light industrial | Less than 30 ANEF | 30 to 40 ANEF | Greater than 40 ANEF |
| Other industrial | Acceptable in all ANEF zones | | |

NOTES:

1 The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for building sites outside but near to the 20 ANEF contour.

2 Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate (see also Figure A1 of Appendix A).

3 There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases Table 2.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by Table 3.3.

***Figure 2. AS 2021:2000 Table 2.1.***

HMAS Albatross ANEF 2014 contours are shown in the attached Appendix B. The subject site is located approximately 3.8 kilometres outside the 20 ANEF contour as shown in the attached Appendix C.

This location is not considered to be near to the 20 ANEF contour (see Note 1 in Figure 2) in any sense as it is 3.8 km outside the 20 ANEF contour. The location of the site is considered ‘acceptable’ without the need for building construction to provide protection for aircraft noise.

No further assessment of aircraft noise intrusion is required.

# 5.0 ROAD TRAFFIC NOISE

## 5.1 Existing Traffic Noise Levels

The subject site is not near a major road as can be seen in Figure 1. The author visited the site on a number of occasions throughout May and June 2014 and traffic noise was not measurable or consistently audible at any time, with the exception of the occasional passing heavy vehicle on Yalwal Road.

In our opinion and in accordance with Clause 102 of the SEPP (Infrastructure) 2007, as detailed in Section 4.2 of this report, a traffic noise assessment is not required based on the current traffic flows.

## 5.2 Future Traffic Noise Levels

### *5.2.1 Traffic Volumes*

Day Design has reviewed the following documents in relation to predicted traffic volumes arising from the proposed developments:-

- 'Transport Report for Proposed Residential Subdivision, Mundamia', prepared by Colston, Budd, Hunt & Kafes Pty Ltd, reference 8351, dated May 2012 (Report 1);
- 'Mundamia Traffic Impact Study', prepared by Bitzios Consulting Pty ltd, reference P1110.002R Mundamia TIS, dated 14/12/12 (Report 2);
- 'Noise Assessment, Proposed Rezoning, George Evans Road, Mundamia', prepared by Atkins Acoustics, reference 42.6788.L1.Rev01:CFCD6, dated 18/12/2012 (Report 3); and
- NSW Roads and Maritime Services' letter to Shoalhaven City Council, reference STH08/02218/02, dated 11/06/2013 (Letter).

Report 1, Section 3.17 states *"The proposed development will generate some 310 to 330 vehicles per hour two-way during the morning and afternoon peak periods."* This relates to the Jemalong Mundamia Pty Ltd subdivision only.

Report 2 in Table 2.3 predicts that the developments will generate an average 563.5 peak hour vehicle trips. This relates to both proposed subdivisions combined (see Figure 1).

Neither report predicts 'daily' vehicle movements, however Report 3, section 4.2, states *"Information from Bitzios Consulting and additional details from SET Consultants confirm the following daily traffic volumes:-*

- *Spine Road (south of town centre) 3000 – 4000 vpd*
- *Spine Road (north of town centre) 1000 – 2000 vpd."*

The Letter contends that some predictions are understated, however this relates specifically to volumes on existing roads and not volumes generated by the proposals themselves.

In any event, a review of all the data shows that the proposed subdivisions will produce annual traffic volumes significantly less than 40,000 per day on both the Spine Road within the development area, as well as combined with existing traffic on Yalwal Road to the south of the subdivision.

Consequently, a traffic noise assessment is not required for this proposal in accordance with Clause 102 (1) of SEPP (Infrastructure 2007) as detailed in Section 4.2 of this report.

### *5.2.2 Traffic Noise Predictions*

Notwithstanding the above, we have considered the potential noise impact for vehicle movements generated by the subdivision developments on future dwellings fronting the Spine Road.

Assuming the worst-case scenario of 4000 vpd passing any given residence on the proposed Spine Road, we have calculated potential traffic noise levels as follows:-

Day Design Pty Ltd has previously measured the sound exposure level of a number of vehicles passing at a fixed measurement location. Based on this data we have established an average sound exposure level (SEL) of **69 dBA** for a typical car pass by travelling at approximately 50 km/h, at a distance of 15 metres.

Day time and night time traffic noise levels can then be calculated from the formula:

- $L_{eq,\ day\ /\ night}$ = SEL + 10 $\log_{10}$ (N) – 10 $\log_{10}$ (T) where N is the number of vehicle movements and T is the time in seconds.

We have assumed in accordance with Report 3 that 80 % of vehicle movements occur during the day (7 am to 10 pm) and 20 % at night (10 pm to 7 am), i.e. 3200 and 800 respectively.

Table 1 below shows the calculated traffic noise levels at the closest façade of the nearest proposed future dwellings to the Spine Road, assumed to be 15 metres.



**Table 1 Predicted $L_{eq}$ Road Traffic Noise Levels**

| Description | | Measured Sound Pressure Levels (dB) at Octave Band Centre Frequencies (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **dBA** | **63** | **125** | **250** | **500** | **1k** | **2k** | **4k** | **8k** |
| Daytime time $L_{eq,\ 15\ hr}$ Road Traffic noise level | **57** | 59 | 59 | 51 | 52 | 55 | 49 | 39 | 30 |
| Night time $L_{eq,\ 9\ hr}$ Road Traffic noise level | **51** | 53 | 53 | 45 | 46 | 49 | 43 | 33 | 26 |

The octave band spectrum is based on actual noise measurements of passing vehicles.

These outdoor traffic noise levels are used in this assessment to determine the potential for compliance with the acceptable indoor road traffic noise criteria.

### 5.3 Required Road Traffic Noise Reduction

Based on the acceptable internal noise levels established in Section 4.2 of this report, the required noise reduction from road traffic is as follows:-

- (57 – 40 =) 17 dB for habitable rooms during the day (7 am to 10 pm), and
- (51 – 35 =) 16 dB for Bedrooms at night (10 pm to 7 am).

## 6.0 RECOMMENDED ACOUSTICAL TREATMENT

We have modelled the façade of an indicative dwelling on computer and calculated the level of road traffic noise intrusion through the roof, walls, windows and doors, for example:-

- Bedroom - 4 m x 3 m x 2.4 m carpeted with one window (2100 x 2400 mm); and
- Living / Dining – 8 m x 5 m x 2.4 m wooden or tiled flooring with one glazed sliding door (2100 x 2700 mm) and extra windows (2100 x 2400 mm).

Based on the level of required noise reduction generated by traffic from the proposed subdivisions, the acceptable internal noise limits can be met for any future dwellings using standard construction methods, for example as follows:-

- Brick veneer or fibre cement composite clad external walls;
- A pitched, tiled or sheet metal roof with sarking, one layer of 10 mm standard plasterboard on the underside of timber ceiling joists lined with standard thermal insulation; and
- Minimum 4 mm float glass throughout.

It should be noted that traffic noise levels will be lower still in practice as the above predictions assume all 4000 daily vehicle movements pass within 15 metres of any given dwelling, which will not be the case for the majority of dwellings, if any.

## 7.0 CONCLUSION

An assessment of the potential noise intrusion from aircraft and traffic has been undertaken at the site of a proposed residential subdivision at Lot 30 DP 1198692 Mundamia, NSW.

The site is located approximately 3.8 kilometres beyond HMAS Albatross' Australian Noise Exposure ANEF 20 contour. Therefore standard building construction may be used in the construction of residential dwellings in the subdivision, in accordance with AS2021.

The site is not located near any road way with existing or future annual traffic volumes of more than 40,000 vehicles per day. Consequently a road traffic noise intrusion assessment is not required in accordance with Clause 102 (Road) of the State Environment Planning Policy (Infrastructure) 2007.

However, an assessment of the potential noise intrusion from road traffic generated by the proposed subdivision combined with future proposals in the area has been undertaken to determine the potential impact on future dwellings within the subdivision.

The internal noise level recommendations set by the Department of Planning and Infrastructure, in their *"Development Near Rail Corridors and Busy Roads – Interim Guidelines"* (2008) can be achieved for all future dwellings within the development using standard construction methods as outlined in Section 6 of this report.

**Matthew Harwood MAAS**.

Senior Acoustical Consultant
for and on behalf of Day Design Pty Ltd.

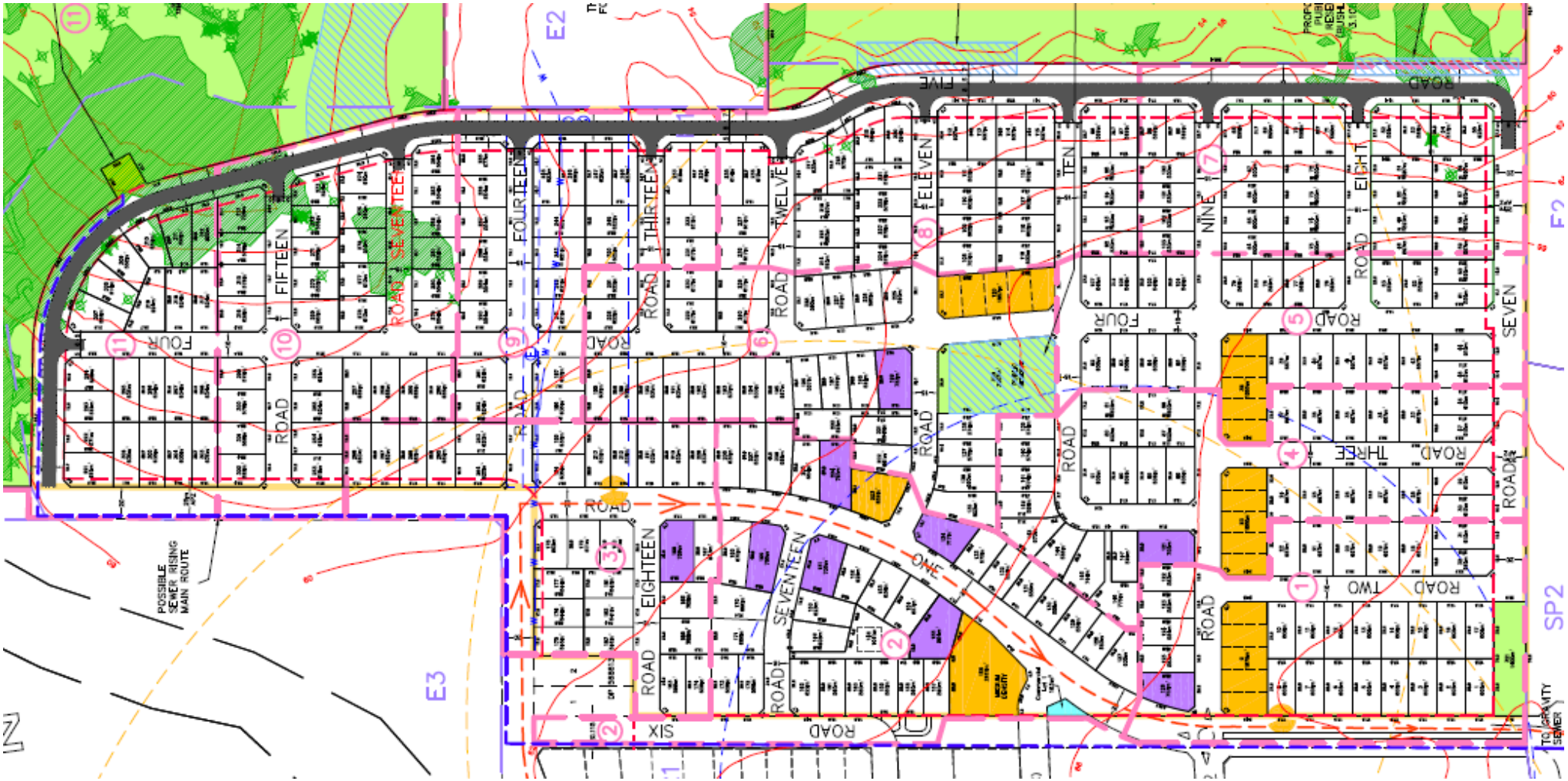
**A.A.A.C. MEMBERSHIP**
Day Design Pty Ltd is a member company of the Association of Australian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

**Attachments:**

- Appendix A – Proposed Subdivision Layout
- Appendix B – HMAS Albatross ANEF 2014 contours
- Appendix C – Proposed development location in relation to HMAS ANEF 20 contour

**Proposed Residential Development**
**Lot 30 DP 1198692, Mundamia, NSW**
(Source: Allen, Price and Associates, ref 25489-11, rev 07, dated 09/04/2015)

5402-1
Appendix A



**Building site acceptability based on ANEF zones**

| Building Type | ANEF zone of site | | |
|---|---|---|---|
| | Acceptable | Conditionally acceptable | Unacceptable |
| House, home unit, flat, caravan park | Less than 20 ANEF (Note 1) | 20 to 25 ANEF (Note 2) | Greater than 25 ANEF |
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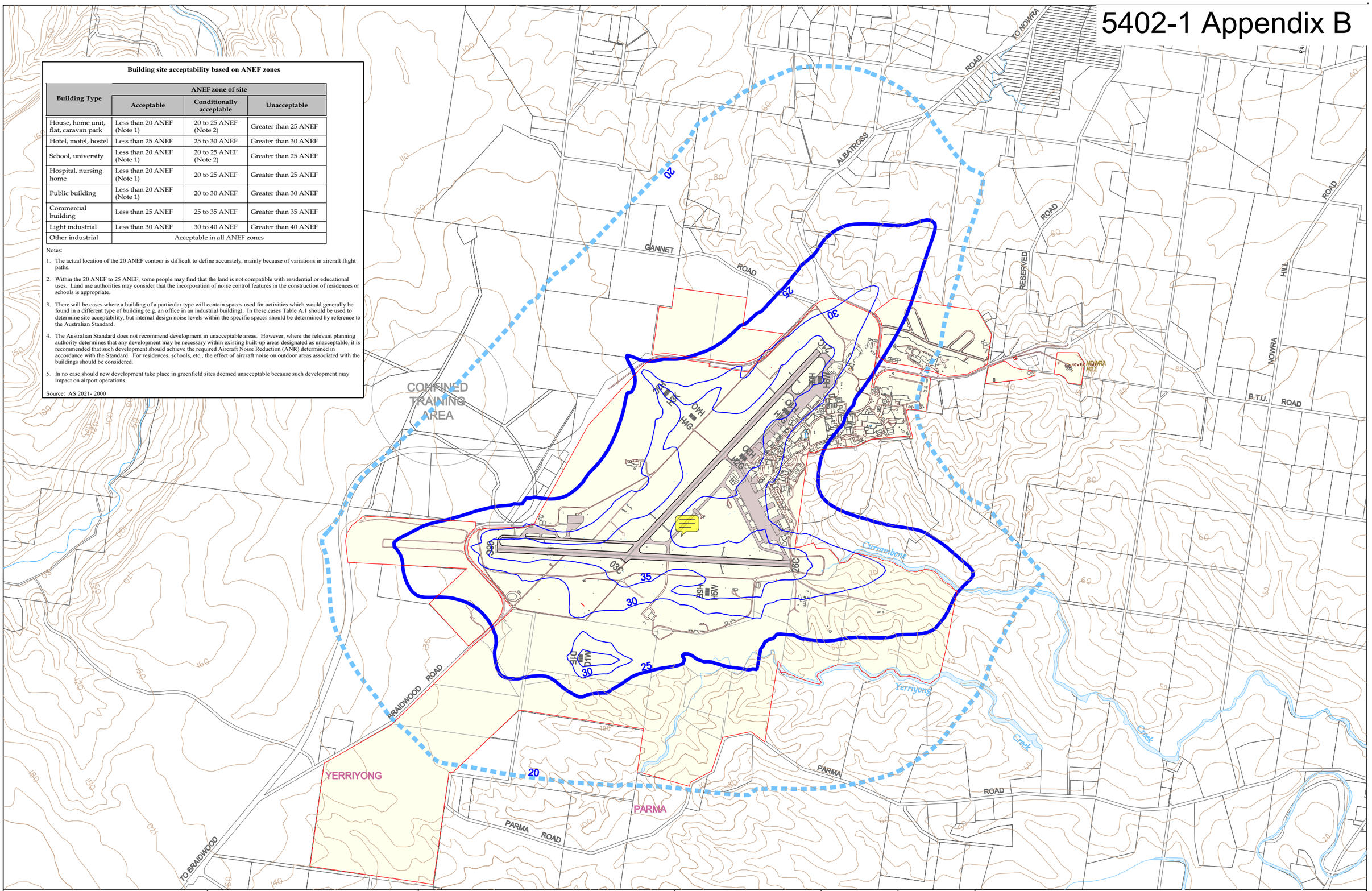
| Commercial building | Less than 25 ANEF | 25 to 35 ANEF | Greater than 35 ANEF |
| Light industrial | Less than 30 ANEF | 30 to 40 ANEF | Greater than 40 ANEF |
| Other industrial | Acceptable in all ANEF zones | | |

Notes:

1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variations in aircraft flight paths.
2. Within the 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate.
3. There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (e.g. an office in an industrial building). In these cases Table A.1 should be used to determine site acceptability, but internal design noise levels within the specific spaces should be determined by reference to the Australian Standard.
4. The Australian Standard does not recommend development in unacceptable areas. However, where the relevant planning authority determines that any development may be necessary within existing built-up areas designated as unacceptable, it is recommended that such development should achieve the required Aircraft Noise Reduction (ANR) determined in accordance with the Standard. For residences, schools, etc., the effect of aircraft noise on outdoor areas associated with the buildings should be considered.
5. In no case should new development take place in greenfield sites deemed unacceptable because such development may impact on airport operations.

Source: AS 2021- 2000




*LEGEND:*

20
25
ANEF CONTOURS, SHOWING ANEF VALUES

*NOTES :*

1. *ANEF CONTOURS WERE GENERATED USING INM v6.1.*
2. *FOR TRACK, PROFILE AND AIRCRAFT MOVEMENT DETAILS REFER TO HMAS ALBATROSS 2014 ANEF SUMMARY REPORT (GHD), September 2004*

*This 2014 ANEF contour plan of HMAS Alatross is endorsed by*

Signature: Chris Bee (ASSPED) Date: 17 Jan 05

Chris Bee
Assistant Secretary Strategic Planning and Estate Development

SCALE IN METRES
250 0 250 500
( 1 : 25,000 for A3 size )

GHD
MANAGEMENT
ENGINEERING
ENVIRONMENT

23/10839/ALB DGN/SUMMARY/FIGURE 21 ANEF.DGN

AUSTRALIA
Department of Defence
SEPTEMBER 2004

# HMAS ALBATROSS, NOWRA NSW
# 2014 ANEF SUMMARY REPORT

## 2014 ANEF

# Proposed Residential Development in relation to HMAS ANEF 20 Contour

(not to scale)

5402-1
Appendix C