

20211249.6/0305A/R4/TH

3/03/2023

Health Infrastructure (89 600 377 397)
ABN 89 600 377 397
1 Reserve Road
ST LEONARDS NSW 2065

Attn: Lynn Walker

92 Albatross Road, West Nowra - RFS Helicopter Noise Impact Assessment

1 INTRODUCTION

This report presents our assessment of expected acoustic impacts associated with the operation of the newly constructed helicopter landing site (HLS) at 92 Albatross Road, West Nowra.

The site is operated by the Rural Fire Service (RFS). An additional temporary use is proposed for the site, that is for emergency helicopter transport operations associated with the Shoalhaven District Memorial Hospital (along with those uses required by the RFS).

It is expected that the use of the HLS by the hospital would only be required for the duration of works to upgrade the main hospital site, which is expected to be 3 years.

This report has been undertaken in consultation with AviPro and addresses the following:

- Review of the proposed location and surrounds of the helipad.
- Review of relevant guidelines for noise emitted from helicopter movements.
- Identification of potentially impacted residential receivers.
- Assessment of expected noise level impacts to residents.
- Noise mitigation measures where practicable.

2 SITE DESCRIPTION AND PROPOSAL

The location of the future HLS is to be at roof level of the Acute Services Building (ASB) following its construction. The elevated helipad location means that there would be additional distance separation to the ground receivers and therefore, assuming similar flight paths are used, future helicopter noise levels would be reduced. Noise impacts from the operation of the future HLS to areas within the hospital development have been addressed in the 'Main Works Noise Impact Assessment' SSDA report prepared by this office 02/09/2022 (ref: 20211249.1/0209A/R1/VF) in accordance with Health Infrastructure NSW guidelines and are not included in this report.

A temporary helipad is required throughout the construction period. The proposed location is on grade at the existing RFS HLS. This site is situated along Albatross Road with residences to the north and west. Immediately east of the site is a vegetative zone around Nowra Creek which extends to the Princes Hwy.

Figures 1 and 2 below detail the location of the HLS and the greater site context.

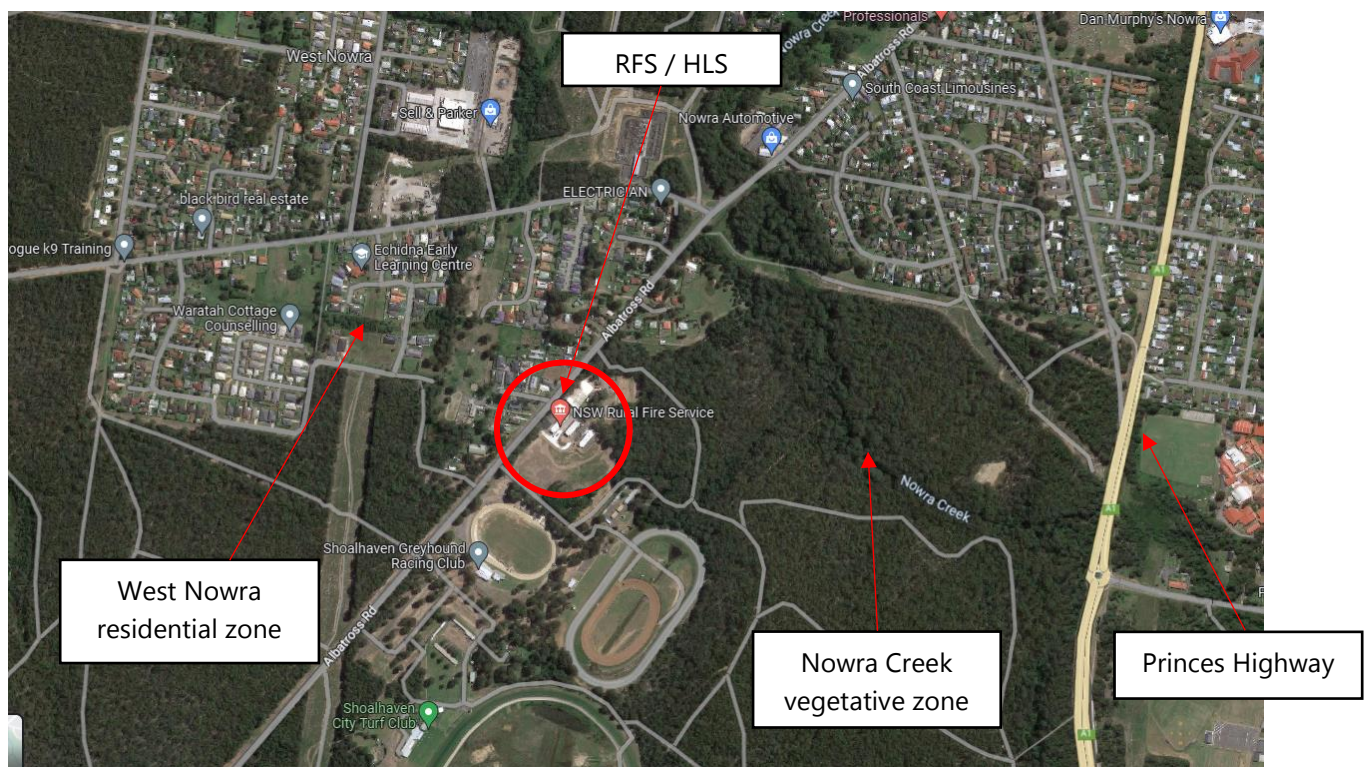


Figure 1 – Overall site context for existing, future and temporary HLS (taken from Google Maps)



**Figure 2 – RFS HLS overlay and surrounds
(taken from AviPro presentation document)**

2.1 ACOUSTIC GUIDELINES

Noise emissions from emergency aircraft operations are not assessed in the same way as commercial aircraft. Similar to ambulance operations on roadways, noise limits are not typically applied to receivers around an emergency helipad.

Australian Standard AS2021-2015 “Acoustics- Aircraft noise intrusion- Building siting and construction” provides noise acceptability as below for commercial aerodromes and airports. This standard indicates it should not be used to assess emergency operations.

Other relevant (though non-mandatory) guidelines are:

- The EPA Noise Control Manual. Although no longer used by the EPA, the Noise Control Manual provides some guidance for helicopter noise. The Noise Control Manual recommends:
 - Peak noise events – noise not to exceed 82dB(A)_{L_{max}} at residential properties and 85dB(A)_{L_{max}} at commercial properties.
 - Average noise levels (ie – the noise level averaged over the entire day) should not exceed 55dB(A) at residential properties and 65dB(A) at commercial properties.

The Noise Control Manual, however, does not apply to emergency vehicles.

- Air Services Australia *Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise*. Principle 7 states – *There should be a current agreed aircraft noise exposure level above which no person should be exposed, and agreement that this level should be progressively reduced. The goal should be 95dB(A).* (This performance goal was adopted at Royal North Shore Hospital, where there are typically 3-4 helicopter movements per week).

We note, **the above guidelines are intended for commercial operations only and are not applicable to emergency vehicles or aircraft.** These noise limits are for information only.

3 HELICOPTER NOISE IMPACT ASSESSMENT

3.1 DESCRIPTION OF CRAFT TYPE AND MOVEMENTS

The design helicopter used as a basis of the assessment is the AW139. This is the predominant aircraft to be used by the hospital as advised by AviPro.

Noise measurements of this craft have been undertaken by this office on several other projects. From these measurements, a sound power level of 135dB(A)_{L_{Max}} has been determined for the aircraft. This is the peak noise level which will typically only be reached during acceleration of the craft after initial departure procedures. Noise levels during approach, landing and hover/taxi are expected to be lower than this. Notwithstanding, the sound power level of 135dB(A) _{L_{Max}} has been adopted wholistically as a conservative measure.

It is advised to us that the craft used in RFS emergency operations is the Bell 149. Information obtained from the type-certificate data noise data sheets and studies undertaken by Airservices Australia and this office indicate this craft is typically 2dB(A) louder than the AW139.

The following has been assumed based on previous advice from AviPro regarding helicopter movements:

- Helicopters will adopt performance class 1 take off procedures. This will involve either a vertical climb or backup procedure. The climb height depends on weight, air density (density altitude) calculated on a case-by-case basis. A minimum climb height of 11m is assumed representing a worst-case noise scenario.
- Normal approach/departure angles are between 10-15 degrees. 12.5 degree average has been adopted in this assessment.
- Approach and departure paths will be subject to prevailing winds at the time approach/departure. As such, the helicopter could potentially approach from any direction.
- Two approach/departure paths have been assumed in this assessment:
 - Easterly – Over Nowra Creek vegetative area (preferred).
 - North-westerly – directly of West Nowra residential receivers. This is representative of a worst-case noise scenario.

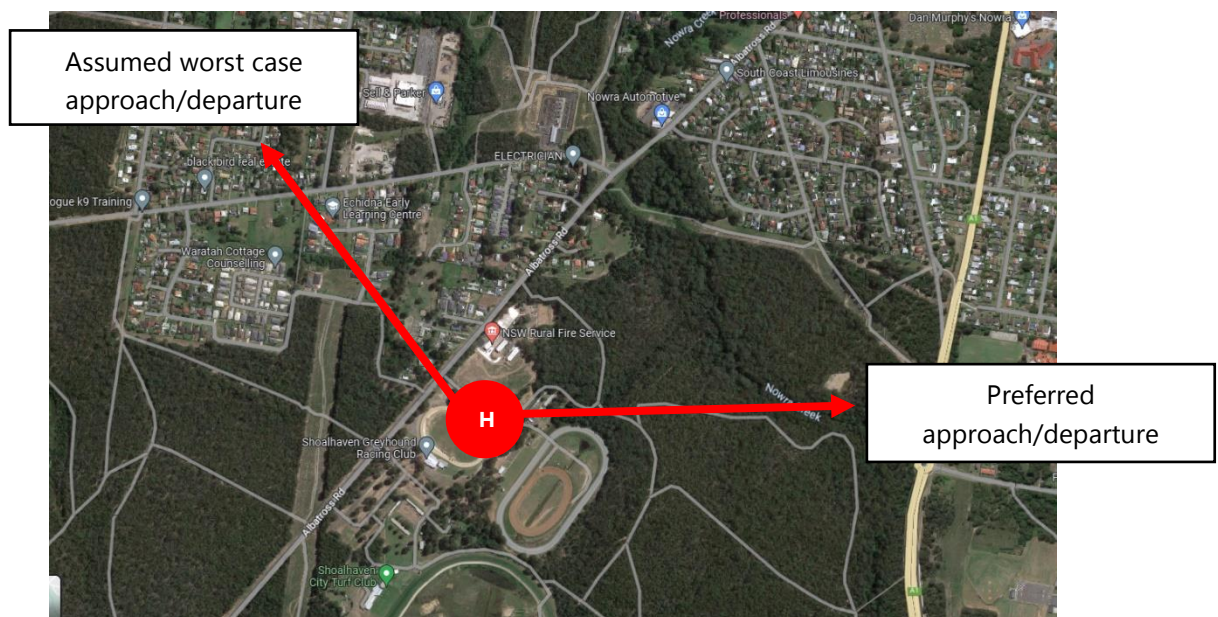


Figure 3 – Assumed Approach and departure paths for exiting and temporary HLS.

3.2 SOUNDPLAN ANALYSIS

Although noise from emergency vehicle movements is exempt from acoustic controls, a review of expected noise levels has been undertaken to quantify the impact at the nearby properties.

In order to determine the potential acoustic impact of the helipad on the surrounding properties, noise modelling of helicopter movements has been conducted within SoundPLAN software.

SoundPLAN modelling software implements the ISO 9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation" noise propagation Standard. This Standard predicts noise levels through directivity and spherical spreading effects and includes variables for atmospheric absorption, ground attenuation and screening.

The noise levels of the helicopters adopted in this analysis are as follows:

- Sound power level generated by the design helicopter (AW139) is 135dB(A) L_{Max} .
- Sound power level generated by the RFS craft (Bell 142) is 137dB(A) L_{Max} .
- A take-off/ approach gradient of 12.5
- Vertical climb up to 11m above ground level.

The above-mentioned data was input into SoundPLAN to develop a noise contour level model taking into account the orientation of surrounding residences, building heights, air-absorption and screening effects where applicable.

Based on the assumed approach/departure gradient, the likely distance between the helicopter and the residential premises can be determined, and the resultant noise level is calculated.

Figure 4 and Figure 5 below detail helicopter noise modelling contours overlain on surrounding residential locations under the scenarios described in 3.1.

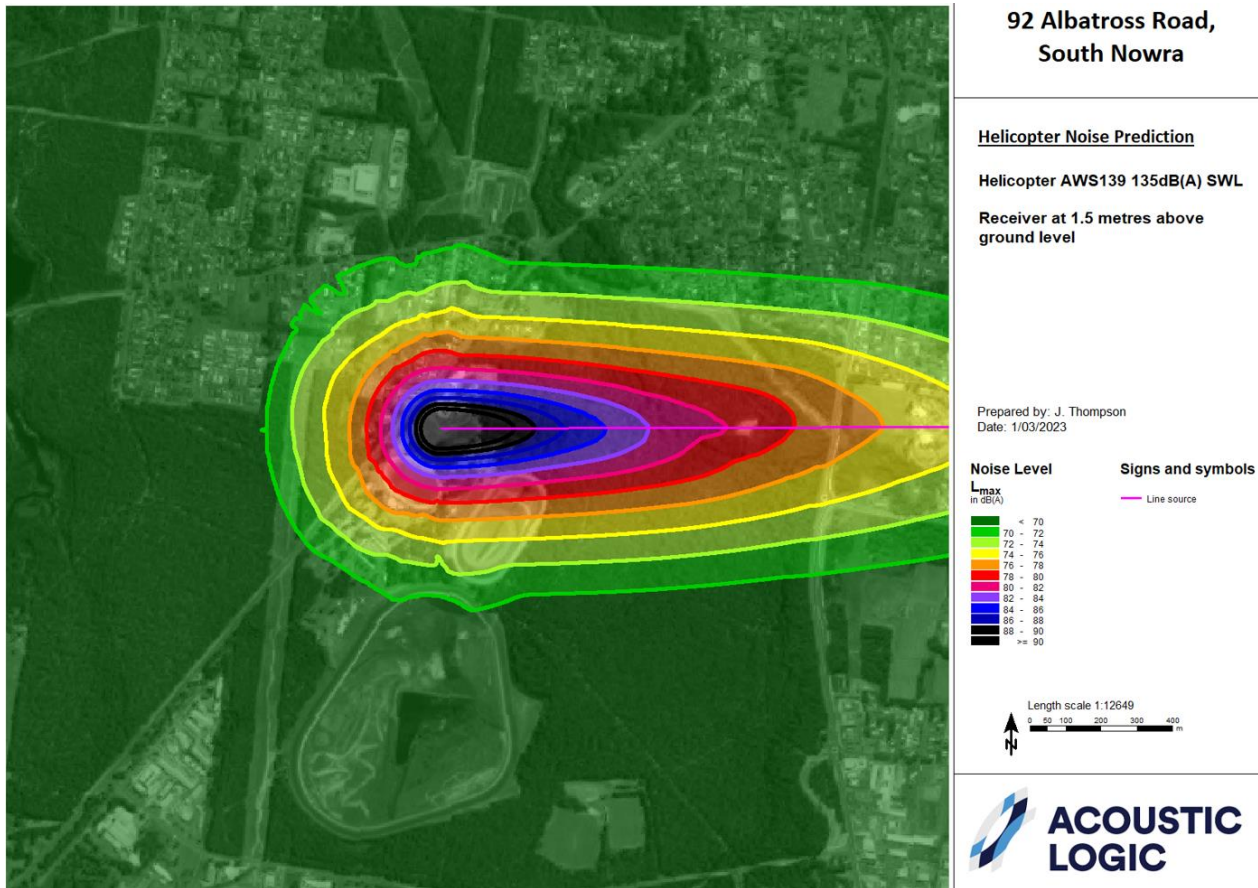


Figure 4 –AW139 grid noise map – Preferred approach/departure path.

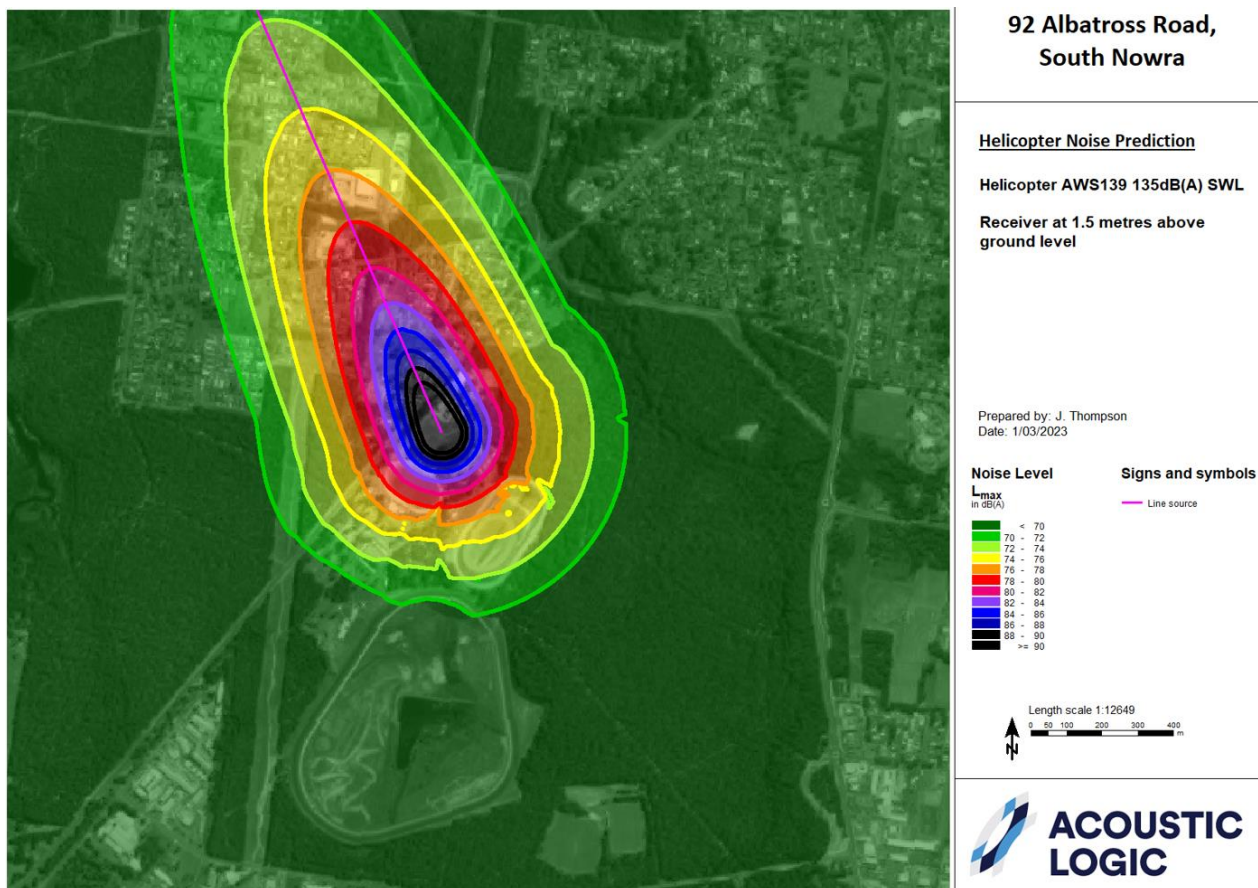


Figure 5 - AW139 grid noise map – Worst-case noise scenario approach/departure path.

Table 2 details the resultant predicted noise levels for the under the two approach/departure scenarios for both AW139 and Bell 412.

3.3 CALCULATED HELICOPTER NOISE LEVELS

Table 1 – Comparative Helicopter Noise Levels

Receiver Location	Approach/Departure Scenario	HLS in use	Calculated Maximum External Noise Level
105-113 Albatross Road residences - nearest to HLS	Easterly	AW139	84 dB(A) L_{max}
		Bell 412	86 dB(A) L_{max}
	North-Westerly	AW139	93 dB(A) L_{max}
		Bell 412	95 dB(A) L_{max}

3.4 DISCUSSION OF NOISE IMPACTS EXTERNALLY TO THE DEVELOPMENT – RESIDENTIAL RECEIVERS

With respect to the calculated noise levels of existing and future helicopter movements, we note the following:

- Depending on the specific approach/departure path of the craft, maximum external noise levels will be within a 9dB(A) range (approximately) at the potentially worst affected residential locations.
- Though measurably lower, the perceived loudness of individual helicopter noise events is expected to be similar between AW139 and Bell 412 craft.
- Emergency helicopter operations associated with the hospital are for critical and emergency care which can occur at any time during the day or night. Conversely, it is advised to us that RFS operations would only occur during daylight hours only. As such, there is greater risk of resident disturbance from movements associated with the AW139 as movements may occur during normal sleeping hours.
- Maximum noise levels within nearest residential locations are calculated to be approximately 71dB(A) L_{max} from an AW139 craft. This assumes a north westerly approach/departure path (worst case). This assumes a 22dB(A) noise reduction through a closed façade and could be higher or lower depending on the specific façade make-up of the dwelling.
- Where helicopters approach or depart from the east (preferred path), the resulting maximum internal noise level from an AW139 craft is predicted to be approximately 62dB(A) L_{max} .
- Adopting an easterly path, not only would maximum noise levels be lower, but fewer residences would be impacted.
- The NSW Road Noise Policy, typically utilised in the assessment of sleeping disturbance, summarises relevant research on the topic as follows:
 - *maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
 - *one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

From the above, advice from AviPro and guidance from the RNP, we make the following comments:

- There is potential for residential awakenings from individual helicopter movements associated with HLS relocation.
- The overall risk of disturbance to surrounding residents would likely be determined by the frequency and noise level each event.
 - We are advised the frequency of movements is expected as 10-15 per month based on the previous year's data which could occur at any time of the day.
 - We are advised that the easterly path is the preferred option (subject to prevailing winds). This path is more likely to be used at night when winds speeds are lower due to diurnal temperature changes.
- Notwithstanding the above, approach and departure paths will be determined based on prevailing winds as necessary; options cannot reasonably be restricted or pre-determined for the purposes of noise abatement.
- Considering the limited number of flights and the availability of the preferred approach/departure path during the night, AW139 movements are not expected to significantly affect health and wellbeing of surrounding residents.
- Given that use of the HLS by the hospital is to be temporary, noise exposure to residents nearest to the site would be limited to the duration of works to construct the future HLS atop the ASB building.

4 CONCLUSION

This document presents an assessment of expected noise impacts associated with the temporary relocation of Shoalhaven Hospital helicopter landing site to the newly completed RFS HLS.

The assessment concludes that maximum noise levels at potentially worst affected residences will be similar to those from RFS operations, though the frequency of events will increase with some occurring during the night-time.

Opportunities for noise abatement are limited since movements are needed for emergency/critical care, though use of an easterly approach/departure path where available will be effective in reducing noise impacts to surrounding residents.

Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'THOMAS HUTCHENS', written over a faint circular stamp.

Acoustic Logic Consultancy Pty Ltd
Thomas Hutchens