



Operational Noise Emission Assessment

1268 Oxley Bridge Rd, Uranquinty, NSW



Client:
Bison Energy
C/o- Habitat Planning

26 July 2022

Sydney Head Office

Suite 2
174 Willoughby Rd
St Leonards NSW 2065
T: 02 9908 1270

Melbourne Office

Suite 11
70 Racecourse Rd
Nth Melbourne VIC 3051
T: 03 7015 5112

ABN: 36 105 797 715

PO Box 270

Neutral Bay NSW 2089

E: info@acousticdynamics.com.au

W: www.acousticdynamics.com.au

Client	Bison Energy
C/o	Habitat Planning
Contact	Mr Matthew Yeomans
Address	409 Kiewa St ALBURY NSW 2640
Phone	02 6021 0662
Email	matthew@habitatplanning.com.au

Notice

The information contained in this document produced by Acoustic Dynamics is solely for the use of the client identified on front page of this report. Our client becomes the owner of this document upon full payment of the Tax Invoice for its provision. This document must not be used for any purposes other than those of the document's owner. Acoustic Dynamics undertakes no duty to or accepts any responsibility to any third party who may use information from this document.

All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored, or transmitted in any form without the written permission of Acoustic Dynamics.

© Acoustic Dynamics 2022

Document	Rev	Date	Prepared	Reviewed	Authorised	Approved
5653R002.NW.220629	0	26 July 2022	NW	RH	RH	

CONTENTS

Glossary.....	3
1 Introduction.....	4
1.1 Executive Summary.....	4
1.2 Description of Proposal.....	4
1.3 Scope	4
2 Assessment Criteria and Standards.....	5
2.1 Wagga Wagga City Council Criteria.....	5
2.2 NSW Environment Protection Authority.....	5
2.3 NSW Protection of the Environment Operations Legislation.....	11
3 Assessment Methodology	11
3.1 Modelling Assumptions	11
3.2 Noise Sources and Operations	12
3.3 Receivers.....	12
4 Operational Noise Emission Assessment.....	12
4.1 External Noise Emission	13
4.2 Road Traffic Noise	14
4.3 Sleep Disturbance.....	14
5 Discussion	15
6 Conclusion	15
Appendix A – Location Map, Images and Drawings.....	2 pages

GLOSSARY

NOISE

Noise is produced through rapid variations in air pressure at audible frequencies (20 Hz – 20 kHz). Most noise sources vary with time. The measurement of a variable noise source requires the ability to describe the sound over a particular duration of time. A series of industry standard statistical descriptors have been developed to describe variable noise, as outlined in **Section 2** below.

NOISE DESCRIPTORS

L_{eq} – The sound pressure level averaged over the measurement period. It can be considered as the equivalent continuous steady-state sound pressure level, which would have the same total acoustic energy as the real fluctuating noise over the same time period.

L_{Aeq(15min)} – The A-weighted average equivalent sound level over a 15-minute period.

L_{A90} – The A-weighted noise level that has been exceeded for 90% of the measurement duration. This descriptor is used to describe the background noise level.

RBL – Rating Background Level. The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24hr period used for assessment background level) This is the level used for assessment purposes.

dB – Decibels. The fundamental unit of sound, a Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell. Probably the most common usage of the Decibel in reference to sound loudness is dB sound pressure level (SPL), referenced to the nominal threshold of human hearing. For sound in air and other gases, dB(SPL) is relative to 20 micropascals (μPa) = 2×10^{-5} Pa, the quietest sound a human can hear.

A-WEIGHTING

"A-weighting" refers to a prescribed amplitude versus frequency curve used to "weight" noise measurements in order to represent the frequency response of the human ear. Simply, the human ear is less sensitive to noise at some frequencies and more sensitive to noise at other frequencies. The A-weighting is a method to present a measurement or calculation result with a number representing how humans subjectively hear different frequencies at different levels.

NOISE CHARACTER, NOISE LEVEL AND ANNOYANCE

The perception of a given sound to be deemed annoying or acceptable is greatly influenced by the character of the sound and how it contrasts with the character of the background noise. A noise source may be measured to have only a marginal difference to the background noise level but may be perceived as annoying due to the character of the noise.

Acoustic Dynamics' analysis of noise considers both the noise level and sound character in the assessment of annoyance and impact on amenity.

1 INTRODUCTION

1.1 EXECUTIVE SUMMARY

Acoustic Dynamics is engaged by **Habitat Planning** on behalf of **Bison Energy** to conduct an acoustic assessment of operational noise emission associated with the proposed solar farm located at 1268 Oxley Bridge Road, Uranquinty.

This document provides an assessment of noise emission resulting from various noise sources associated with the operation of the proposed solar farm at the potentially most affected sensitive receiver locations.

This assessment is prepared in accordance with the various acoustic requirements of:

- (a) Wagga Wagga City Council;
- (b) NSW Environment Protection Authority; and
- (c) Australian Standards.

1.2 DESCRIPTION OF PROPOSAL

The subject proposal is for a solar farm to be located at 1268 Oxley Bridge Rd, Uranquinty. The site is zoned Primary Production (RU1).

The boundaries of the site are shared with other RU1 zoned lots, with residences located on some of these lots. The closest residential receivers are located at:

- **[R₁]**: 1268 Oxley Bridge Road;
- **[R₂]**: 122 Harveys Road;
- **[R₃]**: 120 Harveys Road; and
- **[R₄]**: 1345 Oxley Bridge Road.

The proposed solar farm is shown in the Location Map, Aerial Image and Site Plan presented within **Appendix A**. The various noise sources and operations associated with the proposal are predicted to include:

- Mechanical plant and equipment; and
- Vehicle movements.

1.3 SCOPE

Acoustic Dynamics has been engaged to provide an acoustic assessment suitable for submission to the relevant authorities.

The scope of the assessment is to include the following:

- Review of local council planning and development control instruments, state guidelines, federal legislation and international standards relevant to noise emission at the subject site;
- Rely on assumed background noise levels to determine the existing noise environment and establish relevant noise emission criteria;
- Perform relevant calculations and noise modelling associated with the operations of the development to determine noise emission at nearby receiver locations; and
- Provide recommendations for design measures to be incorporated to achieve compliance with the relevant criteria and reduce potential noise impacts at nearby receiver locations.

2 ASSESSMENT CRITERIA AND STANDARDS

Acoustic Dynamics has conducted a review of the local council, state government and federal legislation that is applicable to noise emission assessment from the subject site. The relevant sections of the legislation are presented below. The most stringent criteria which have been used in this assessment of the subject development are summarised below.

2.1 WAGGA WAGGA CITY COUNCIL CRITERIA

2.1.1 COUNCIL PLANNING & DEVELOPMENT CONTROL INSTRUMENTS

Acoustic Dynamics has conducted a review of the following documents:

- Wagga Wagga Local Environmental Plan (LEP) 2010; and
- Wagga Wagga Development Control Plan (DCP) 2010.

A review of the above documents found no relevant numeric criteria relating to noise emission from the subject site.

2.2 NSW ENVIRONMENT PROTECTION AUTHORITY

2.2.1 NSW EPA'S NOISE POLICY FOR INDUSTRY (NPFI) 2017

The NSW EPA, in its *Noise Policy for Industry (NPFI) 2017* document, outlines and establishes noise criteria for industrial or other noise sources in various zoning areas.

The guideline includes both intrusive and amenity criteria that are designed to protect receivers from noise significantly louder than the background level, and to limit the total noise level from all noise sources near a receiver.

The NPfI noise criteria are planning levels and are not mandatory limits required by legislation, however the noise criteria assist regulatory authorities to establish licensing conditions. Where noise limits are predicted to be exceeded, feasible and reasonable noise mitigation strategies should be considered. In circumstances where noise criteria cannot be achieved, negotiation is required between the regulatory authority to evaluate the economic, social and environmental costs and benefits of the development against the noise impacts. The regulatory authority then sets statutory compliance levels that reflect the achievable and agreed noise limits from the development.

2.2.1 PROJECT INTRUSIVENESS CRITERIA

The intrusive noise criterion controls the relative audibility of operational noise compared to the background level at residential receivers. The intrusive criterion is determined by a 5 dB addition to the measured (or adopted) background level with a minimum of 35 dB. The NPfI recommends that the intrusive noise criteria for the evening period should not exceed the daytime period and the night-time period should not exceed the evening period. The intrusive noise criteria are only applicable to residential receivers.

For all surrounding receiver property locations, this assessment has adopted **minimum** rural background noise levels (RBL) as detailed within Section 2.3 of the NPfI:

“2.3 Project intrusiveness noise level

Minimum assumed RBLs apply in this policy. These result in minimum intrusiveness noise levels as follows:

Table 2.1: Minimum assumed RBLs and project intrusiveness noise levels.

<i>Time of day</i>	<i>Minimum assumed rating background noise level (dB[A])</i>	<i>Minimum project intrusiveness noise levels ($L_{Aeq,15min}$ dB[A])</i>
<i>Day</i>	35	40
<i>Evening</i>	30	35
<i>Night</i>	30	35

2.2.2 PROJECT AMENITY CRITERIA

The amenity criterion limits the total level of extraneous noise for all receiver types. The amenity criteria are determined based on the overall acoustic characteristics of the receiver area and the existing level of noise, excluding other noises that are uncharacteristic of the usual noise environment.

Residential receiver areas are characterised into ‘urban’, ‘suburban’, or ‘rural’ categories based on land uses and the existing level of noise from industry, commerce, and road traffic. With consideration to the NPfI ‘Noise Amenity Area’ classification, the residential receivers identified in this assessment have been classified as ‘rural’.

2.2.3 MODIFYING FACTOR ADJUSTMENTS

The NPfI requires that modifying factor adjustments are added to the measured or predicted noise levels if the noise sources contain tonal, low frequency, intermittent or impulsive characteristics, which have the potential to increase annoyance. The modifying factor adjustments are summarised in **Table 2.1**.

Table 2.1 EPA's NPfI Modifying Factor Corrections

Factor	Assessment / Measurement	When to Apply	Correction ¹
Tonal noise	One-third octave band analysis using the objective method of assessing the audibility of tones in noise – simplified method (ISO1996.2-2007 – Annex D)	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: - 5 dB or more if the centre frequency of the band containing the tone is in the range 500-10,000 Hz - 8 dB or more if the centre frequency of the band containing the tone is in the range 160-400 Hz - 15 dB or more if the centre frequency of the band containing the tone is in the range 25-125 Hz	5 dB ²
Low frequency noise	Measurement of C-weighted and A-weighted level	Measure/assess C- and A- weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: • Where any of the third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period • Where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5-dB(A) positive adjustment to measured/predicted A-weighted levels applies for the evening/night period and a 2 dB(A) positive adjustment applies for the daytime period.	2 or 5 dB ²
Intermittent noise	Subjectively assessed but should be assisted with measurement to gauge the extent of change in noise levels	The source noise heard at the receiver varies by more than 5 dB(A) and the intermittent nature of the noise is clearly audible	5 dB
Duration	Single-event noise duration may range from 1.5 min to 2.5 h	One event in any assessment period	0 to 20 dB(A)
Maximum adjustment	Refer to individual modifying factors	Where two or more modifying factors are indicated	Maximum correction of 10 dB(A) ² (excluding duration correction)

Notes: 1) Corrections to be added to the measured or predicted levels.

2) Where a source emits tonal and low-frequency noise, only one 5 dB correction should be applied if the tone is in the low frequency range.

2.2.4 METEOROLOGICAL CONDITIONS

Noise propagation can be enhanced by wind conditions and temperature inversions. The NPfI states:

“Two options are available to a proponent to consider meteorological effects:

- 1. Adopt the noise-enhancing meteorological conditions for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur – a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night.*

Or

- 2. Determine the significance of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.”*

Acoustic Dynamics has adopted the noise enhancing meteorological conditions for all assessment periods in accordance with NPfI Option 1. This approach considers wind vectors for all receiver locations and F Class temperature inversions, with wind speeds up to 2 m/s. Such an assessment methodology is conservative and is likely to predict the worst-case noise impacts at a receiver location.

A maximum correction factor of **+5 dB** is applied at all sensitive receiver locations in consideration of noise enhancing conditions.

2.2.5 PROJECT SPECIFIC NOISE CRITERIA

The project specific noise criteria reflect the most stringent noise level requirements derived from the intrusive and amenity criteria.

For residential and noise sensitive receivers, the noise criteria are provided in **Table 2.2**. The operations should aim to not exceed these levels when the land is in use.

Table 2.2 Operational Noise Criteria – All Surrounding Receivers

Receiver Area	Time Period	L _{A90} Rating Background Noise Level (RBL) [dB]	Project Intrusiveness Noise Level L _{Aeq(15minute)} [dB]	Project Amenity Noise Level L _{Aeq} [dB] ¹	Project Noise Trigger Level L _{Aeq} [dB]
Residential Receiver(s)	Daytime (7am to 6pm)	35	40	48	40 L _{Aeq(15minute)}
	Evening (6pm to 10pm)	30	35	43	35 L _{Aeq(15minute)}
	Night-time (10pm to 7am)	30	35	38	35 L _{Aeq(15minute)}

Note: 1) With consideration to the NPfI's 'noise amenity area' classification, the residential receivers surround the proposed development site have been classified as 'rural'.

2.2.6 NSW EPA'S ROAD NOISE POLICY (RNP) 2011

The NSW EPA presents guidelines for assessment of road traffic noise in its *Road Noise Policy (RNP) 2011*. The document provides road traffic noise criteria for proposed roads as well as other developments with the potential to have an impact in relation to traffic noise generation.

The noise criteria applicable to the subject site is presented below.

Table 2.4 Road Traffic Noise Assessment Criteria for Residential Land Uses

Road category	Type of project / land use	Assessment Criteria [dB]	
		Day (7am – 10pm)	Night (10pm – 7am)
Local roads	6. Existing residences affected by additional traffic on existing local roads generated by land use developments	L _{Aeq} , (1 hour) 55 (external)	L _{Aeq} , (1 hour) 50 (external)

Accepted application of the Section 2.4 of the RNP is that where road traffic noise levels already exceed the assessment criteria, an increase of less than 2 dB represents a minor impact that is barely perceptible to the average person.

2.2.7 NSW EPA'S SLEEP DISTURBANCE CRITERION

Acoustic Dynamics advises that sleep disturbance is a complex issue, and the potential for sleep disturbance to occur depends on both the level of noise at a residential receiver, and the number of events that occur.

The NSW EPA has investigated overseas and Australian research on sleep disturbance. The assessment of noise for sleep disturbance relies on the application of a screening that indicates the potential for this to occur. The EPA's *Noise Guide for Local Government (NGLG) 2013* provides the following guidance for such a screening test:

"Currently, there is no definitive guideline to indicate a noise level that causes sleep disturbance and more research is needed to better define this relationship. Where likely disturbance to sleep is being assessed, a screening test can be applied that indicates the potential for this to occur. For example, this could be where the subject noise exceeds the background noise level by more than 15 dB(A). The most appropriate descriptors for a source relating to sleep disturbance would be $L_{A1(1 \text{ minute})}$ (the level exceeded for 1% of the specified time period of 1 minute) or L_{Amax} (the maximum level during the specified time period) with measurement outside the bedroom window."

Additionally, the guidelines of the NSW EPA's NPfI provide the following additional information:

"Where the subject development/premises night-time noise levels at a residential location exceed:

- *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater; and/or*
- *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is greater".*

Further to the above information, the following summarizes the sleep disturbance criterion:

$$L_{Aeq,15min} \leq 40 \text{ dB or } L_{Aeq,15min} \leq (RBL + 5 \text{ dB}), \text{ whichever is greater}$$

AND

$$L_{Amax} \text{ Or } L_{A1(1 \text{ minute})} \leq L_{A90} + 15 \text{ dB or } 52 \text{ dB(A)}, \text{ whichever is greater}$$

In addition to the above, the EPA has previously published the following additional information relating to findings of significant research carried out for sleep disturbance:

"Maximum internal noise levels below 50-55 dBA are unlikely to cause awakening reactions... One or more noise events per night, with maximum internal noise levels of 65-70 dBA, are not likely to affect health and wellbeing significantly."

In accordance with the NGLG and NPfI guidelines detailed above, the following sleep disturbance screening criterion has been applied for this project:

Sleep Disturbance Criteria:

$$L_{Aeq,15min} \leq 40 \text{ dB}$$

AND

$$L_{Amax} \text{ Or } L_{A1(1 \text{ minute})} \leq 52 \text{ dB}$$

2.3 NSW PROTECTION OF THE ENVIRONMENT OPERATIONS LEGISLATION

2.3.1 PROTECTION OF THE ENVIRONMENT OPERATIONS (POEO) ACT 1997

Noise emission from any items of mechanical plant must comply with the requirements of the *Protection of the Environment Operations (POEO) Act 1997*. The POEO Act 1997 requires that the subject mechanical equipment must not generate “*offensive noise*”.

“*Offensive noise*” is defined as follows:

““**offensive noise**” means noise:

- (a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:
 - (i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or
 - (ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or
- (b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.”

3 ASSESSMENT METHODOLOGY

Acoustic modelling was undertaken using noise modelling software (*CadnaA Version 2020*) to predict operational noise levels generated by the development. CadnaA calculates environmental noise propagation according to the applicable international and ISO standards, including the ISO 9613 algorithm.

Within our calculations and acoustic modelling, noise emission contributions from the development have been considered taking the following factors into account:

- Airborne noise losses due to distance and ground topography;
- Losses due to direction and diffraction;
- Increases due to reflections; and
- Acoustic shielding.

3.1 MODELLING ASSUMPTIONS

The following assumptions were made regarding the noise model configuration:

1. The noise-generating mechanical systems are to be non-enclosed and situated in the centre of the site;
2. The site and mechanical plant will operate 24 hours a day; and
3. Vehicle access will consist of one staff vehicle visiting the site once a week.

3.2 NOISE SOURCES AND OPERATIONS

Acoustic Dynamics has established and assessed the following noise sources and operations associated with the development.

The noise data presented in **Table 4.1** has been established based on information provided by the proponent, short-term measurements and inspections conducted on-site, or referenced from our database of nearfield measurements at similar developments.

Table 4.1 Associated Noise Sources and Operations

Source	Quantity	Sound Power Level L_w [dB(A)]
Mechanical Equipment		
MPVS SC4950 Power Conversion Unit	1	99
ST2752UX Battery Energy Storage System	4	94
Vehicle Movements		
Car pass-by	1	92

3.3 RECEIVERS

The cumulative noise impact has been assessed to the potentially most affected point at the adjacent sensitive receiver properties and presented in **Table 4.2** below.

Table 4.2 Nearest Sensitive Receiver Locations

Source	Location	Direction
Residential Receivers		
R₁	1268 Oxley Bridge Road	North
R₂	122 Harveys Road	North
R₃	120 Harveys Road	North
R₄	1345 Oxley Bridge Road	North

Acoustic Dynamics advises that by achieving compliance with the nearest sensitive receiver locations, compliance will also be achieved at all other sensitive receiver locations further away.

4 OPERATIONAL NOISE EMISSION ASSESSMENT

The calculated maximum noise emission levels at the nearest receiver locations against the relevant criteria are presented below. It is advised that by achieving compliance with the nearest sensitive receiver locations, compliance will also be achieved at all other receiver locations.

The assessment location for **external noise emission** is defined as the most affected point on or within any sensitive receiver property boundary. Examples of this location may be:

- 1.5m above ground level;
- On a balcony at 1.5m above floor level; and
- Outside a window on the ground or higher floors, at a height of 300mm below the head of the window.

The assessment location for **internal noise emission** is defined as the most affected point within the nearest room of any sensitive receiver property, assuming windows are closed.

4.1 EXTERNAL NOISE EMISSION

The calculated maximum **external** noise emission levels at the nearest receiver locations are presented against the relevant noise emission criteria in Table 4.1 below.

Table 4.1 Calculated External Noise Emission Levels at Residential Receivers

Receiver	Relevant Assessment Period	Calculated Maximum L_{Aeq} External Noise Level [dB]		Noise Emission Objective [dB]	Complies?
		Calm Conditions	Noise-Enhancing Conditions ³		
R ₁	Night ^{1,2} (10pm to 7am)	27	32	35	Yes
R ₂		23	28		Yes
R ₃		19	24		Yes
R ₄		20	25		Yes

- Note:
- 1) Compliance with the night-time criteria will ensure compliance with the less stringent day time and evening periods.
 - 2) Night time period being 10:00pm to 7:00am weekdays and 10:00pm to 8:00am on Sundays and Public Holidays.
 - 3) Calculated result includes corrections for noise character. Typical noise emission levels are likely to be lower than those presented above.

Acoustic Dynamics advises the calculated **external** noise emission levels are conservatively based on **maximum capacity** operations at the development. Acoustic Dynamics advises that such a scenario is unlikely to occur and noise levels are likely to be below those calculated for the majority of the time.

4.2 ROAD TRAFFIC NOISE

Acoustic Dynamics understands that staff will access the development via surrounding local roads. Vehicles utilising local roads are assessed in consideration of the NSW EPA's RNP criteria outlined in **Section 2**.

The calculated maximum noise emission levels at the nearest residential receivers, due to the vehicles utilising surrounding local roads, are presented in **Table 4.2** below. Acoustic Dynamics advises that by achieving compliance with the nearest sensitive receiver locations, compliance will also be achieved at all other sensitive receiver locations further away.

Table 4.2 Calculated Road Traffic Noise Emission Levels & Relevant Noise Criteria

Sensitive Receiver	Predicted Maximum $L_{eq,1hr}$ Sound Pressure Level [dB] ¹	Relevant $L_{Aeq,1hr}$ Criterion [dB] ^{2,3}	Complies?
Residential receivers along Oxley Bridge Rd	7	50	Yes

Note:

- 1) Predicted L_{Aeq} noise level is the maximum noise level measured within a 1-hour period.
- 2) Measured noise level within a 1-hour period during the night-time assessment period (10:00pm until 7:00am on weekdays, or 8:00am on weekends and public holidays).
- 3) Compliance with this most sensitive assessment period criterion ensures compliance during all other less stringent assessment periods.

Acoustic Dynamics advises that noise emission due to additional traffic on surrounding local roads is **predicted to comply** with the relevant road traffic noise criterion at the nearest sensitive receivers and at all other receivers located further away.

4.3 SLEEP DISTURBANCE

Acoustic Dynamics advises that there are no significant impact noise events associated with the use of the site, thereby achieving compliance with the $L_{A1(60 \text{ Sec})}$ requirement. Furthermore, Acoustic Dynamics advises that the noise levels provided above achieve compliance with the $L_{Aeq,15min}$ requirement. The site is therefore likely to comply with the sleep disturbance guidelines.

5 DISCUSSION

The calculated noise emission levels associated with the operations of the proposed development indicate the following:

1. Noise emission resulting from the use and operations of the proposed development is **predicted to comply** with the relevant noise emission criteria of Wagga Wagga City Council, the NSW EPA and federal legislation during the proposed hours of operation when assessed at the nearest sensitive receivers;
2. Noise emission associated with additional traffic on surrounding local roads is **predicted to comply** with the NSW EPA's *Road Noise Policy (RNP) 2011* when assessed at the nearest sensitive receivers;
3. Maximum instantaneous external noise events are **predicted to comply** with the NSW EPA's guidelines on sleep disturbance when assessed at the nearest sensitive receivers;
4. There is **low risk** of acoustic disturbance to the nearest sensitive residential receivers during the proposed hours of operation;
5. To ensure the assessment is conducted in a conservative manner, noise emission has been assessed as a **worst-case** scenario (i.e. all noise generating activities and noise sources occurring simultaneously and at maximum capacity). Generally, noise emission associated with the operation of the facility is **predicted to be lower** than the calculations presented; and
6. The noise calculations and operational assumptions should not be considered prescriptive. They are modelling assumptions that have been used to demonstrate typical noise sources and operations associated with the facility **can be designed to achieve compliance** with the relevant criteria.

6 CONCLUSION

Acoustic Dynamics has conducted an acoustic assessment of operational noise emission associated with the proposed development located at proposed solar farm located at 1268 Oxley Bridge Road, Uranquinty.

A review of the applicable local council, state government, federal legislation and international standards was conducted. Noise levels were assessed in accordance with the requirements of:

- (a) Wagga Wagga City Council;
- (b) NSW Environment Protection Authority (EPA); and
- (c) Australian Standards.

The assessment predicted noise impacts at nearby sensitive receiver locations. Noise modelling was conducted using assumed **worst-case** operational scenarios in **Section 5**.

Acoustic Opinion

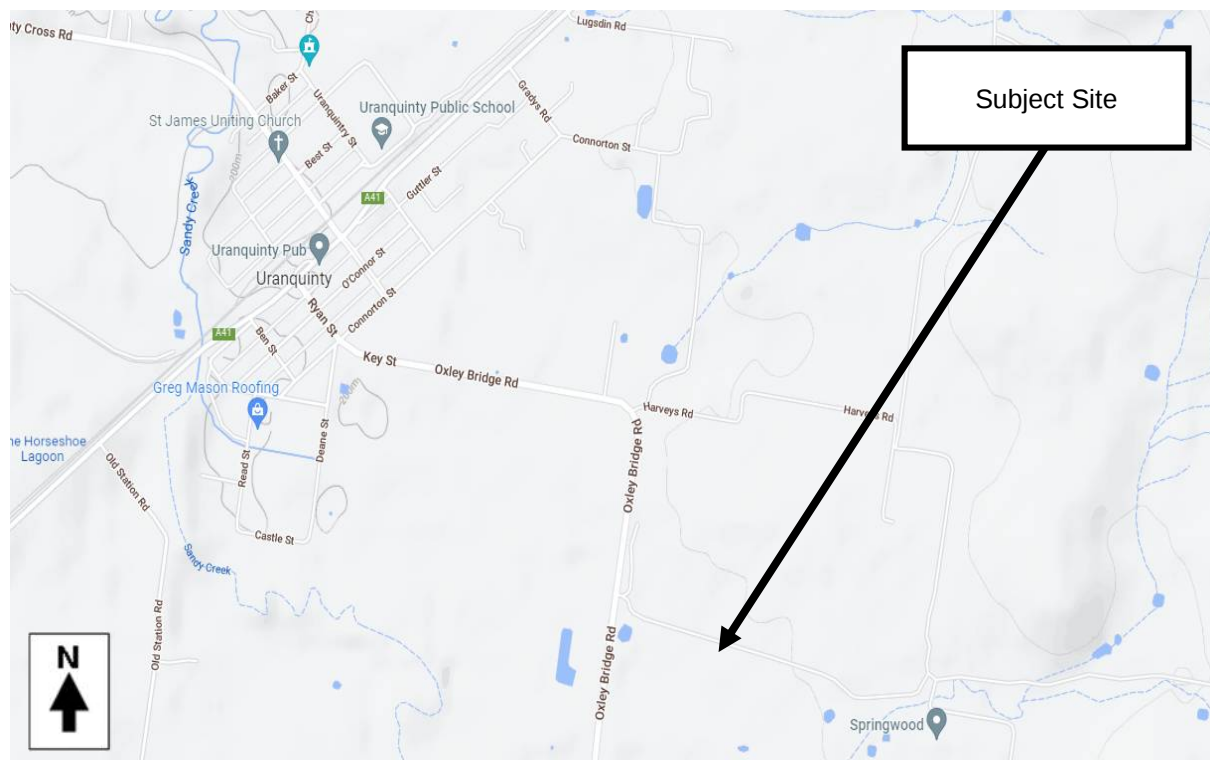
Further to our review of the relevant acoustic criteria and requirements, and our calculations, Acoustic Dynamics advises that the proposed development can be designed to comply with the relevant acoustic criteria of Wagga Wagga City Council, the NSW EPA and Australian Standards.

It is our opinion that the acoustic risks associated with the proposal can be adequately controlled and the amenity of neighbouring properties and residents can be satisfactorily protected.

We trust that the above information meets with your present requirements and expectations. Please do not hesitate to contact us on 02 9908 1270 should you require more information.

APPENDIX A – LOCATION MAP, AERIAL IMAGE AND DRAWINGS

A.1 LOCATION MAP



A.2 AERIAL IMAGE (COURTESY OF SIXMAPS.COM)



A.3 DRAWINGS

