Construction Noise & Vibration Management Plan

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 2065
T: 02 9908 1270

Melbourne Office
Suite 11
70 Racecourse Rd
Nth Melbourne 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

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CONTENTS

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.

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

L_{A90} – The A-weighted noise level that has been exceeded for 90% of the measurement duration.

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.

1 INTRODUCTION

1.1 SUMMARY

Acoustic Dynamics is engaged by **Habitat Planning** on behalf of **Bison Energy** to assess and, where required, make recommendations to reduce and manage the noise and vibration impact at the nearest potentially affected receivers resulting from associated activities of the proposed construction works for the solar farm located at 1268 Oxley Bridge Road, Uranquinty

This report presents the relevant construction noise and vibration emission objectives, construction noise and vibration prediction calculations, an impact assessment and recommendations for mitigation and management measures to be implemented, to minimise the potential for adverse impact at the nearest potentially affected receivers, resulting from demolition and construction works.

This report is prepared in accordance with the requirements and guidelines of Wagga Wagga City Council, the NSW Environment Protection Authority (EPA), and relevant Australian Standards.

1.2 DESCRIPTION OF PROPOSAL

The subject construction works will be undertaken at 1268 Oxley Bridge Rd, Uranquinty. The subject site is zoned Primary Production (RU1), with works involving the re-purposing of the vacant land for use as a solar farm.

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:

- **[R_1]:** 1268 Oxley Bridge Road;
- **[R_2]:** 122 Harveys Road;
- **[R_3]:** 120 Harveys Road; and
- **[R_4]:** 1345 Oxley Bridge Road.

Acoustic Dynamics also understands there to be a water supply easement, located underground at the north-western corner of the subject lot. The proposed development is shown in the Location Map, Aerial Image and Site Plan presented within **Appendix A**.

Based on information provided by the proponent, Acoustic Dynamics understands that excavation and construction works will occur for 3 months. Acoustic Dynamics is advised that use of noise generating equipment during the proposed works will be undertaken between the following operating hours, as shown in **Table 1.1**.

Table 1.1 Operating Hours of Noise Generating Equipment

Activity	Work Hours
All construction and site work, including site deliveries	• Monday to Friday – 7am to 4pm • Saturdays – 9am to 12pm • Sundays & public holidays – No work permitted

2 ASSESSMENT CRITERIA AND STANDARDS

The following sections outline the relevant construction noise emission criteria and conditions applicable to the works.

2.1 WAGGA WAGGA CITY COUNCIL CRITERIA

2.1.1 DEVELOPMENT APPLICATION DA22/0122

Acoustic Dynamics understands that Council have requested further information prior to the determination of the development application, as follows:

> *"The SEE contains very limited assessment on potential noise impacts. Please provide a more detailed assessment of any potential noise impacts and how they will be mitigated, if required. Please note that Council may request an Acoustic Report prepared by a suitably qualified person if considered necessary"*

2.1.2 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 criteria relating to the management of demolition, excavation and construction noise.

2.2 AUSTRALIAN STANDARDS

Acoustic Dynamics has conducted a review of relevant Australian Standards in relation to the subject development. The following details this review.

2.2.1 AS2436 *"GUIDE TO NOISE CONTROL ON CONSTRUCTION … SITES"*

Australian Standard 2436-2010: *"Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites"* provides guidance on noise control in respect of engineering construction, maintenance and demolition works, including guidance in investigation and identification of noise sources, measurement of sound, and its assessment, with a view to planning of measures for noise control.

Acoustic Dynamics advises that AS 2436 contains the following information relating to appropriate noise emission goals for construction sites:

> *"**3.2 NOISE AND VIBRATION IMPACTS ON THE COMMUNITY***
>
> *Whether or not noise from a construction, maintenance or demolition site is likely to constitute a problem depends upon a number of considerations, such as –*
>
> *(a) existing background noise level;*
> *(b) distance between the site and the areas likely to be affected by the construction noise;*
> *(c) nature of buildings and the activity therein, where the noise is likely to be heard;*
> *(d) the likely duration of construction, maintenance and demolition operations and the hours during which the above operations will be carried out (whether during the day, night or weekends);*
> *(e) the nature of the noise, e.g. audible pure tone components and impulsive character; and*
> *(f) the number of items of major plant and equipment being utilized simultaneously on the site for their cumulative impact.*
>
> *Some construction or demolition activities are by their very nature noisy. The authorities responsible for setting noise level criteria for essential works will take note of the constraints imposed by such activities, especially when they are of short duration."*

Acoustic Dynamics advises that determination of appropriate noise emission goals for the proposed works in accordance with the EPA's guidelines will satisfy the recommendations and guidelines detailed within AS 2436.

We advise that assessment of the proposed works, detailed within this document, has been carried out in accordance with the information and guidelines detailed within AS 2436.

2.3 NSW EPA INTERIM CONSTRUCTION NOISE GUIDELINE

In this section, the relevant construction noise emission criteria and conditions applicable to the works are outlined, based on the NSW Environment Protection Authority's (EPA's) *Interim Construction Noise Guideline* (ICNG).

The NSW EPA's ICNG is developed to manage noise from construction works. The ICNG advises that a quantitative methodology of assessment of construction noise emission may be undertaken for long-term (greater than three weeks) works.

Acoustic Dynamics advises that the most appropriate methodology for the assessment of noise emission from the proposed works is a quantitative assessment, to ensure noise emission from the works is minimised. Note should be made that the ICNG states that when developing noise mitigation strategies for reducing construction noise emission focus should be given to *"applying all 'feasible' and 'reasonable' work practices to minimise construction noise impacts"*.

Accordingly, relevant noise emission goals have been determined for the proposed works, in accordance with the information contained within the ICNG, which should be achieved where possible.

The ICNG provides information on management levels (noise emission goals) for construction noise emission at residential receivers, and other various sensitive receivers. The management noise levels at residential receivers are dependent upon the relevant rated background level (RBL) at the residential receiver, and the time of day that the construction noise is to be generated.

In lieu of conducting on-site noise measurements, Acoustic Dynamics has determined the daytime background noise environment at the nearest residential receivers through assuming **minimum** rural background noise levels (RBL) as detailed within Section 2.3 of the Noise Policy for Industry (NPfI). The adopted minimum daytime RBL is presented in **Table 2.1**.

Table 2.1 Assumed Ambient Noise Environment

Location	Period	Adopted RBL (L_{A90}) [dB]
Nearest Residential Receivers	Daytime	35

Based on the assumed background noise environment, **Table 2.2** presents the construction noise emission management levels/objectives, as detailed in the EPA's ICNG, for the nearest receivers:

Table 2.2 Site Specific Construction Noise Objectives at Residential Receivers

Time of Day	EPA Management Level ($L_{Aeq\ (15\ min)}$)	Site specific construction noise emission goals $L_{Aeq\ (15\ min)}$ [dB]
Recommended Standard Hours: Monday to Friday 7am to 4pm Saturday 9am to 12pm No work on Sundays or P/Hols	Residences: Noise affected	**45** **(RBL + 10 dB)**
	Residences: Highly noise affected	**75**

Based on the information contained within the EPA's ICNG, Acoustic Dynamics recommends that noise emission from the proposed works achieves the following noise emission goals, when possible. Note should be made that as night-time works are not expected to occur, the assessment of sleep disturbance is not required.

2.4 CONSTRUCTION VIBRATION CRITERIA

Structural and cosmetic damage vibration criteria are guided by the vibration levels presented within the standards BS 7385 and DIN 4150 and the NSW EPA document *"Assessing Vibration - a technical guide"*.

In terms of the most recent relevant vibration damage criteria, British Standard 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2 - Guide to damage levels from ground-borne vibration" *represents a definitive standard against which the likelihood of building damage from ground vibration can been assessed.*

Although there is a lack of reliable data on the threshold of vibration-induced damage in buildings both in countries where national standards already exist and in the UK, BS 7385: Part 2 has been developed from an extensive review of UK data, relevant national and international documents and other published data.

The standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

Sources of vibration, which are considered in the standard, include blasting (carried out during mineral extraction or construction excavation), excavation, piling (sheet, bored, contiguous), ground treatments (e.g. compaction), construction equipment, tunnelling, road and rail traffic and industrial machinery.

The guide values from this standard for transient vibration judged to result in a minimal risk of cosmetic damage to residential buildings and industrial buildings are presented numerically in **Table 2.3** and graphically in **Figure 2.4**.

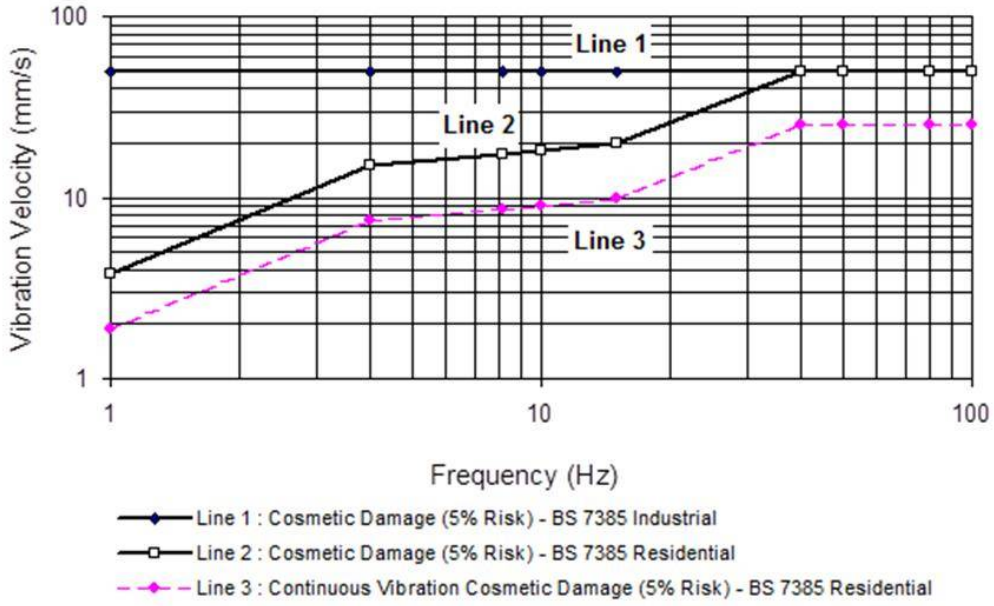
Table 2.3 Transient Vibration Guide Values - Minimal Risk of Cosmetic Damage

Line	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

In relation to guide values for continuous vibration relating to cosmetic damage, the standard states that the guide values in **Table 2.3** relate predominantly to transient vibration, which does not give rise to resonant responses in structures, and to low-rise buildings.

Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at lower frequencies where lower guide values apply, then the guide values in **Table 2.3** may need to be reduced by up to 50%, as is the case with continuous vibration from rock breaking.

Figure 2.4 Graph of Transient Vibration Guide Values for Cosmetic Damage



The standard goes on to state that minor damage is possible at vibration magnitudes, which are greater than twice those given in **Table 2.3**, and major damage to a building structure may occur at values greater than four times the tabulated values.

It is noteworthy that in addition to the guideline values presented in **Table 2.3**, the standard also states the following:

> *"Some data suggests that the probability of damage tends towards zero at 12.5 mm/s peak component particle velocity. This is not inconsistent with an extensive review of the case history information available in the UK."*

Note is made that **cosmetic damage** to buildings occurs at vibration levels significantly lower than those causing **structural damage**.

- British Standard 7385 indicates a 5% risk of **cosmetic damage** to commercial/industrial buildings at 50 mm/s from transient vibration and at 25 mm/s from continuous vibration; and

- British Standard 7385 indicates a 5% risk of **cosmetic damage** to residential and light framed structures at 15 mm/s at 4 Hz from transient vibration and at 7.5 mm/s at 4 Hz from continuous vibration.

In addition to the above standard, the German Standard DIN 4150 provides guideline values of vibration velocity for evaluating the effects of short-term vibration. Table 1 of DIN 4150 is reproduced as **Table 2.5** below.

Table 2.5 Guideline values of vibration velocity, vi, for evaluating the effects of short-term vibration

Line	Type of structure	Vibration Velocity, v_i, in mm/s			
		Foundation			Plane of floor of uppermost full storey
		At a frequency of			Frequency mixture
		Less than 10 Hz	10 to 50 Hz	50 to 100* Hz	
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that, because of their particular sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8
*) For frequencies above 100 Hz, at least the values specified in this column should be applied.					

In view of the foregoing, the following **conservative** site assessment control limits could be adopted for the purposes of monitoring and evaluating the measured vibration levels from the excavation works, should this be required:

Residential Structures Adjacent to Proposed Works:

- All buildings and structures adjacent to works – 7.5 mm/s peak component particle velocity (site control level).

3 ASSESSMENT METHODOLOGY

Acoustic Dynamics has performed calculations to predict maximum L_{Aeq} noise emission levels at adjacent receiver locations resulting from the proposed works and operations.

Acoustic Dynamics has conducted operator-attended noise monitoring of similar/equivalent equipment at various other sites on numerous occasions. Based on previous operator-attended surveys of similar activities and equipment, prediction calculations have been undertaken to predict the noise impact at adjacent receiver locations, resulting from the proposed works, in accordance with the information and guidelines detailed **Section 2**.

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 NOISE SOURCES AND OPERATIONS

Acoustic Dynamics advises that the project is likely to be undertaken in two main stages; excavation and construction, for a total period of 3 months.

Acoustic Dynamics understands that the following items of noise emitting equipment and machinery are likely to be used during the proposed works. For the purpose of noise assessment, the likely maximum *"at source"* noise levels (A-weighted sound pressure levels at 1 metre) have been used as detailed below.

Table 4.1 Predicted Noise Sources and Operations

Source	Sound Pressure Level @ 1m L_p [dBA]
Excavation Works	
5-Tonne Excavator (including attachments)	90
Bobcat	80
Trucks (for removal of materials)	92
Construction Works	
Hammers	85
Piling rig	93
Kanga Hammers	103
Saws	101
Grinders	80
Drills	80
Mud/cement mixers	85
Compressors	92
Nail guns	85
Concrete trucks/pumps	95
Trucks (for delivery of materials)	92
Trades	N/A
Other typical building tools and equipment	90

3.2 NEAREST 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		
R_1	1268 Oxley Bridge Road	North
R_2	122 Harveys Road	North
R_3	120 Harveys Road	North
R_4	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 NOISE AND VIBRATION EMISSION PREDICTION AND ASSESSMENT

In this section Acoustic Dynamics provides an assessment of noise emission from proposed construction works at the subject site.

4.1 PREDICTED EXTERNAL NOISE EMISSION LEVELS

The results from Acoustic Dynamics' noise prediction calculations and modelling are presented in **Table 5.1** below, and represent calculated **maximum** received external noise emission levels resulting from the use and operation of the highest noise emitting items listed above. As the works are to be performed across a large surface area within the site, Acoustic Dynamics has assumed the nearest possible works location for each receiver, based on the proposed location of the solar farm systems, in order to assess the worst-case noise emission.

Note should be made that the highest noise emitting items of plant and equipment are unlikely to be used for long durations. The predicted noise levels presented in **Table 5.1** below, are the **maximum** predicted L_{Aeq} noise levels at the nearest boundaries of the listed properties, resulting from proposed excavation and construction works at the subject site. Typically, received L_{Aeq} noise emission levels would be expected to be lower than these during the majority of the works. Significantly lower noise levels than those presented in the table would also be expected within (inside) the nearby dwellings.

Table 5.1 Maximum Excavation and Construction Works Noise Emission and Criteria

Receiver Location	Stage of Works	Predicted Range of L_{Aeq} Noise Levels[1] [dB]	EPA L_{Aeq} Noise Management Levels [dB]		Achieves EPA Guidelines?	
			Noise Affected	Highly Noise Affected	Noise Affected	Highly Noise Affected
R_1	Excavation	37 - 37	40	75	**Yes**	**Yes**
	Construction	46 - 47			**No[2]**	**Yes**
R_2	Excavation	34 - 34	40	75	**Yes**	**Yes**
	Construction	43 - 44			**No[2]**	**Yes**
R_3	Excavation	36 - 36	40	75	**Yes**	**Yes**
	Construction	45 - 46			**No[2]**	**Yes**
R_4	Excavation	33 - 33	40	75	**Yes**	**Yes**
	Construction	42 - 43			**No[2]**	**Yes**

Note: 1) Calculated noise level at nearest residential boundary or nearest exposed facade.
2) Instances considered "highly noise affected" will be infrequent, and are unlikely to unreasonably disturb the adjoining properties.

4.2 EXTERNAL NOISE EMISSION ASSESSMENT

The predicted noise emission levels presented in **Table 5.1** above indicate:

1. L_{Aeq} noise emission associated with all proposed excavation works is expected to **comply** with the relevant "Noise Affected" construction noise management level at all receivers;

2. L_{Aeq} noise emission associated with the proposed works during the construction stage is expected to **exceed** the relevant "Noise Affected" construction noise management level at all receivers; and

3. L_{Aeq} noise emission associated with all proposed excavation and construction works is expected to **comply** with the relevant "Highly Noise Affected" construction noise management level at all receivers.

Although all construction activities are **expected to comply** with the relevant "*Highly Noise Affected*" noise management level set by the EPA Guidelines, the magnitude of the predicted exceedance may lead to complaint and appropriate strategies should be developed for management of noise emission and community liaison.

To ensure that construction noise emission levels from the proposed works are kept to a minimum, Acoustic Dynamics provides recommendations for feasible and reasonable noise mitigation and management in **Section 6**, which should be incorporated into the noise management plan for the proposed construction works.

4.3 PREDICTED VIBRATION EMISSION LEVELS

Acoustic Dynamics has been advised that mechanical excavation methods will be utilised, and based on this information advises that this excavation methodology is likely to result in minimal perceivable vibration levels (human comfort) at nearby/adjacent residential dwellings.

Acoustic Dynamics advises that where rock is to be removed from the site, excavation should incorporate the use of saw cuts in rock to enable smaller, rather than large, rock-breakers to be used to break the rock away from the saw cut.

Such sawing has been shown to produce significantly lower vibration levels and substantially reduce the potential for structural (or even cosmetic) damage to adjacent buildings and structures.

Acoustic Dynamics has predicted likely vibration levels at the nearest potentially affected adjacent receiver locations. Acoustic Dynamics' prediction calculation results are presented in **Table 5.2** below.

Table 5.2 Predicted Excavation Works Vibration Emission Levels and Criteria

Construction Stage	Receiver Location	Predicted Vibration Levels (PPV)[1]	5% Risk of Cosmetic Damage Criterion	Likely to Comply?
Excavation & piling works	**R_1**	< 1 mm/s	7.5 mm/s	**Yes**
	R_2	< 1 mm/s		**Yes**
	R_3	< 1 mm/s		**Yes**
	R_4	< 1 mm/s		**Yes**

Note: 1) Predicted received peak component particle velocity (PPV) at structure.

Acoustic Dynamics advises that predicted vibration emission levels to adjacent residential and commercial receivers indicate that low levels of vibration are predicted for the excavation stage of works.

The predicted vibration levels resulting from all other stages of the proposed works are below structural damage criteria presented within **Section 2.5** of this report.

5 DISCUSSION AND RECOMMENDATIONS

Further to the predicted noise emission levels presented in **Section 5**, Acoustic Dynamics advises that measures are required to minimise and manage noise emission and impact from the proposed demolition and construction works at the subject site.

Acoustic Dynamics recommends that the use of noise generating equipment during the proposed works at the subject site only be carried out during the following construction hours:

- Monday to Friday 7am to 5pm; and
- Saturday 8am to 1pm.

Acoustic Dynamics recommends the following measures be implemented to minimise and manage noise and vibration emission from the subject excavation and construction:

1. Noise & vibration induction of all site staff – including the explanation of noise and vibration control and minimisation and a discussion of project specific reduction strategies;

2. Implementation of an appropriate community liaison procedure – including a noise and vibration management and noise and vibration complaint procedure and continual liaison with nearby potentially affected receivers;

3. Implementation of a noise and vibration monitoring and reporting programme (where necessary – to protect the interest of all parties or should complaints arise);

4. Use of quietest available equipment and lowest vibration generating equipment for works (where feasible and reasonable);

5. Implementation of periods of respite, where highly intensive activities produce loud noise (i.e. greater than **75 dB(A)** at nearby residences) to minimise disturbance on nearby receivers; and

6. Should trucks or other vehicles be required to be on site for longer than five minutes, Acoustic Dynamics advises that engines should be switched off for the duration.

The following sections provide detail about the various measures listed above and how they are to be incorporated into the noise management procedures for the proposed works.

5.1 NOISE AND VIBRATION INDUCTION OF ALL SITE STAFF

Acoustic Dynamics recommends all site staff be inducted, ensuring each person is aware of the noise and vibration management and mitigation procedures applicable to the site and subject site works.

5.2 COMMUNITY LIASON PROCEDURE

Acoustic Dynamics recommends implementation of an appropriate community liaison procedure, including a noise management and compliant procedure, and continual liaison with the nearby potentially affected receivers. The following should be carried out by the proponent:

1. A sign is to be located near the entry to the site with 24-hour contact details (mobile phone numbers and email addresses for receipt of complaints);

2. A detailed (physical) log of all complaints relating to noise is to be kept on site. Such a log should include details of:
    i. the address of the complainant;
    ii. the date and time of the complaint;
    iii. the date and time the subject noise was heard;
    iv. a description of the activities being undertaken at the time of the subject complaint;
    v. a contact telephone number for the complainant;
    vi. detail of the person who fielded and logged the complaint;
    vii. the signature of the project manager or site foreman confirming the complaint has reached an appropriate level of responsibility;
    viii. detail of the action taken to respond to the complaint and the timing of this response; and
    ix. the signature of the project manager or site foreman signing off confirmation that the complaint has been appropriately addressed.

3. Neighbouring residents should be notified in writing prior to the commencement of excessively noisy activities. Notices should include an approximate timeframe of the works and a site contact phone number. The following would be suitable phrasing to include within a notification letter:

    “Dear Resident

    We are writing to inform you of the upcoming works and activities that will be occurring at 28 Douglas Street.

    Between date YYMMDD and date YYMMDD, we will be conducting demolition activities, removal of site waste and construction activities.

The works will be occurring weekdays (7:00am to 5:00pm) and Saturdays (8:00am to 1:00pm).

To ensure amenity impacts are controlled, we are implementing management measures such as restricting the duration of noisy activities, allowance for respite periods and selecting low noise equipment.

The contact details for the site manager are listed below should you wish to discuss any aspect of the noise impacts associated with the works.

We appreciate your understanding during this inconvenience."

NB: Note is made that should the complaint require the services of an independent consultant to investigate or conduct measurements, such services shall be engaged promptly and dates and times of contact with such a consultant shall be maintained/detailed within the complaints log.

5.3 TEMPORARY NOISE BARRIERS

Where feasible and reasonable, Acoustic Dynamics recommends the use of temporary noise barriers to assist with reducing noise emission during high noise generating activities to the surrounding residences.

5.4 QUIETEST AVAILABLE EQUIPMENT FOR WORKS

Acoustic Dynamics recommends that plant and equipment used during the proposed works be selected to ensure that the quietest available equipment will be used.

As indicated within **Section 6**, Acoustic Dynamics can carry out operator-attended noise measurements of site equipment and operations (as required/requested), to ensure quietest techniques and equipment are being used for the subject works.

5.5 EXCAVATION METHODOLOGY (IF REQUIRED)

Acoustic Dynamics advises that there is minimal excavation associated with the proposed works. Where excavation is performed, the following methodology should be implemented.

The excavation methodology should incorporate the use of saw cuts in the rock wherever feasible to enable smaller rock-breakers to be used to remove the rock. Such sawing has been shown to produce significantly lower vibration levels and substantially reduce the potential for structural (or even cosmetic) damage to adjacent buildings and structures.

In addition, Acoustic Dynamics recommends the following:

- Use of hand-held jackhammers for rock-breaking activities **within 5m** of adjacent structures;
- No use of small rock-breakers **within 5m** of adjacent structures; and
- No use of large rock-breakers **within 10m** of adjacent structures.

5.6 DILAPIDATION SURVEY OF ADJACENT BUILDINGS AND STRUCTURES

Where there is any risk of damage, a detailed dilapidation survey of adjacent buildings and structures completed prior to the commencement of any excavation works would provide an appropriate reference condition, against which post works inspections can be compared.

6 CONCLUSION

Acoustic Dynamics has undertaken a quantitative assessment of the noise impact at the nearest potentially affected receivers resulting from the excavation and construction activities for the proposed works at 1268 Oxley Bridge Road, Uranquinty, in accordance with the requirements of Wagga Wagga City Council, the NSW EPA's guidelines and relevant Australian Standards.

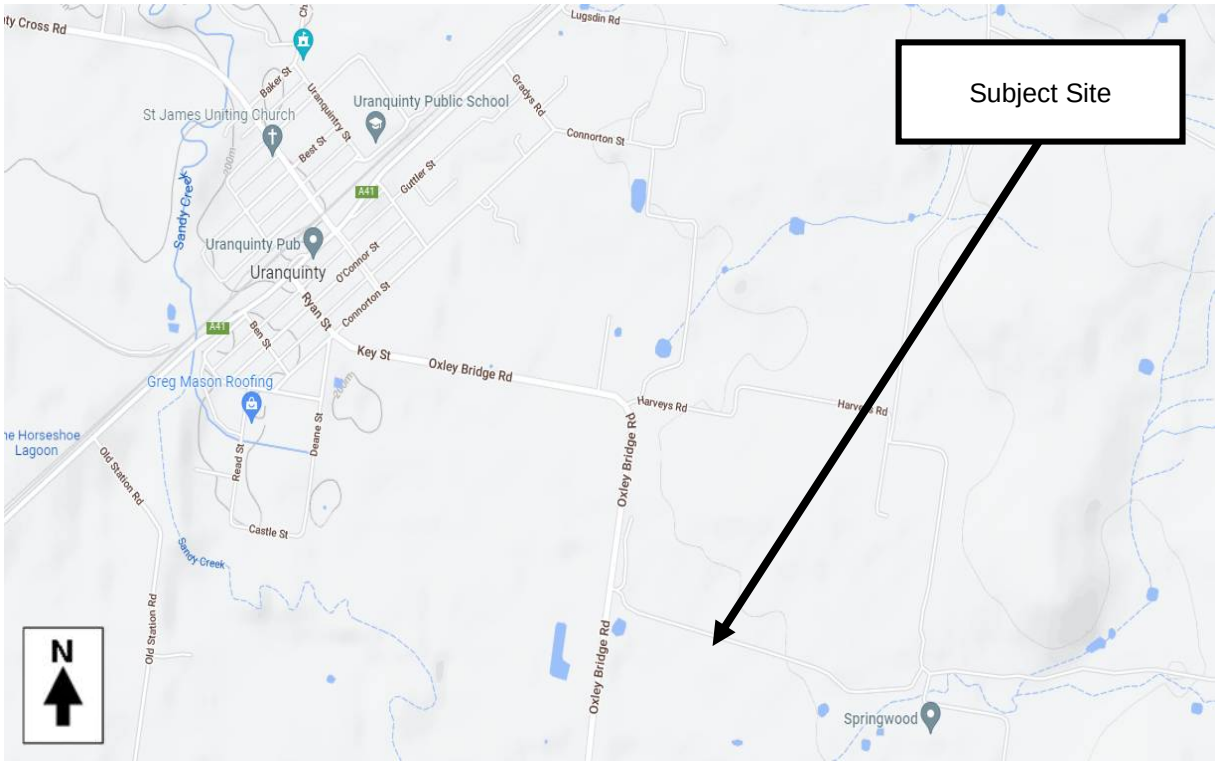
The magnitude of the predicted noise exceedances above the construction noise goals (determined in accordance with the EPA's ICNG) may lead to minor complaint (adverse comment) and appropriate strategies should be developed for management of noise emission and community liaison.

Acoustic Dynamics advises that implementation of the recommendations contained in **Section 6** of this report will assist with the mitigation and management of noise emission from excavation and construction activities at the subject development site.

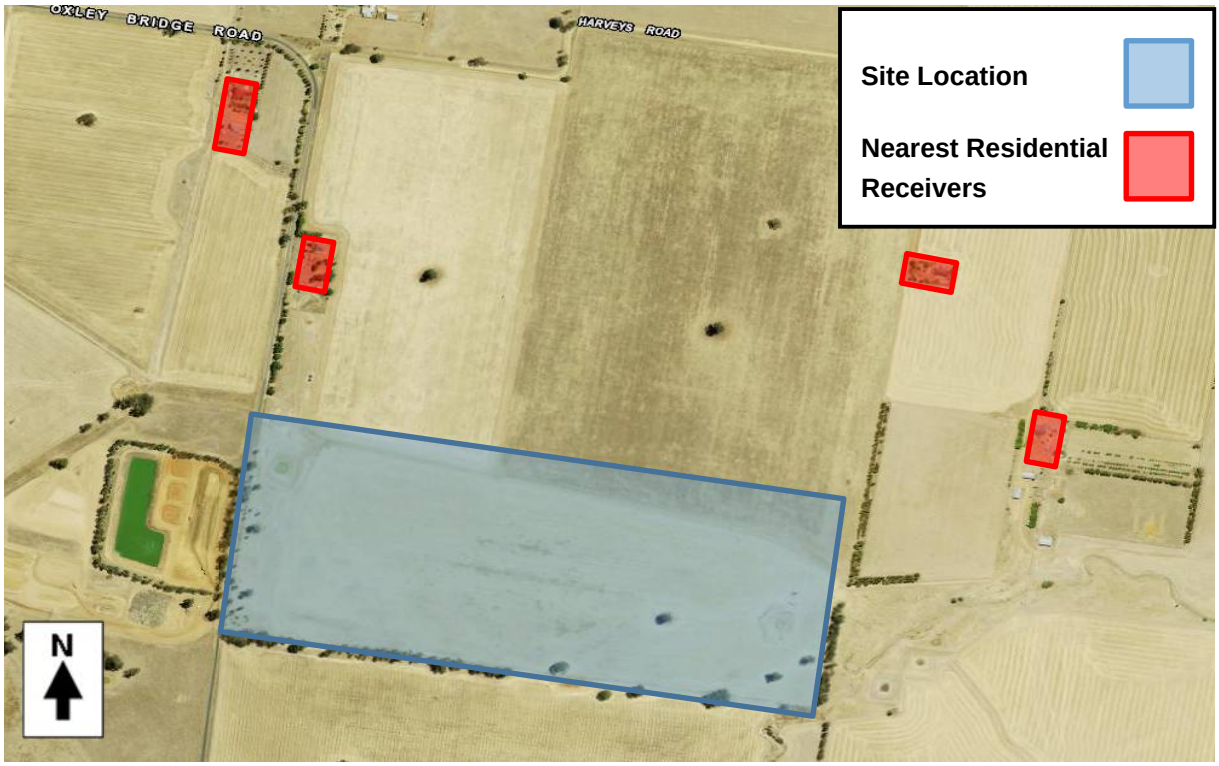
Should further information be required relating to this report please contact Acoustic Dynamics on 02 9908 1270.

APPENDIX A – LOCATION MAP, AERIAL IMAGE AND DRAWINGS

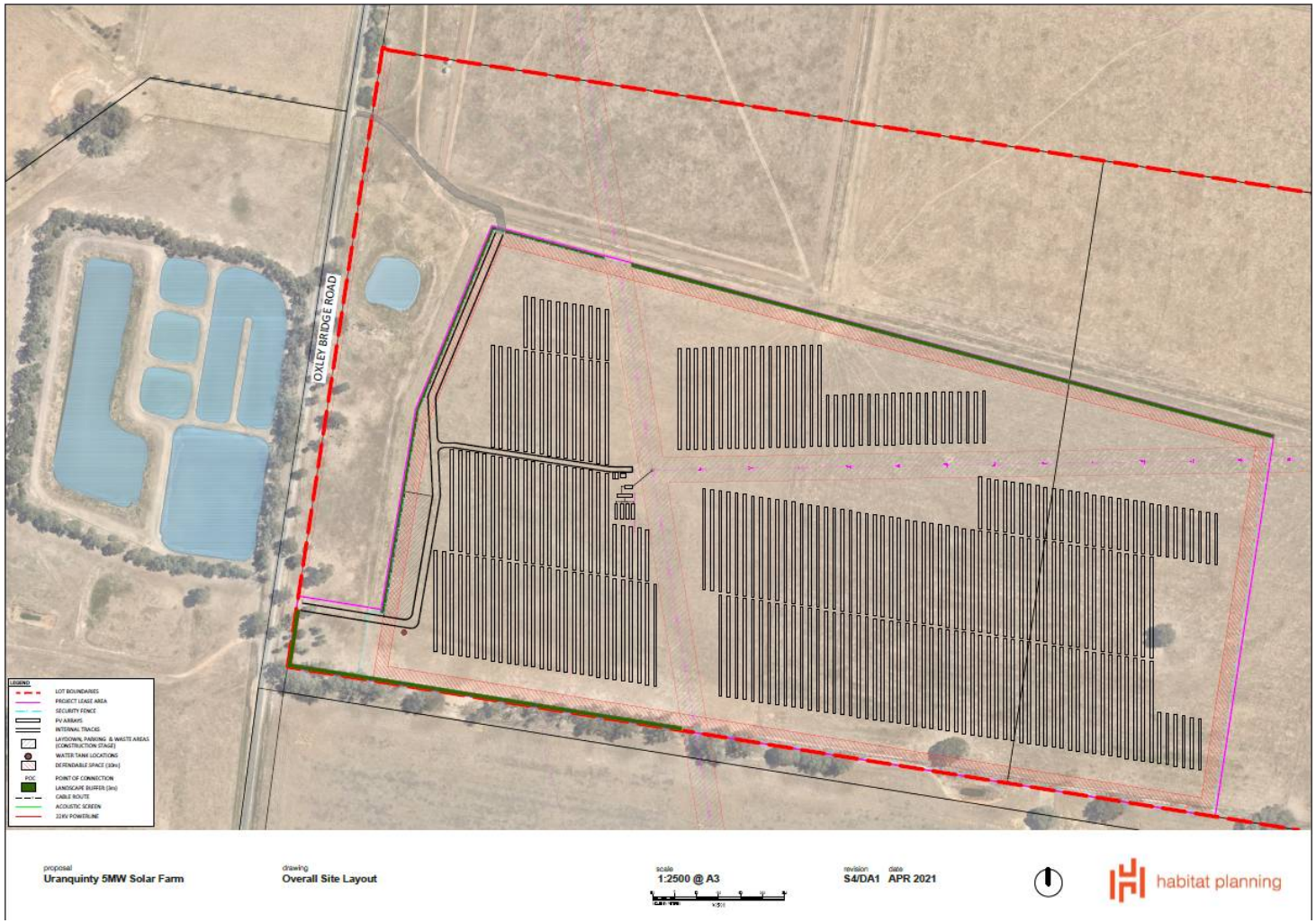
A.1 LOCATION MAP



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



A.3 DRAWINGS


OXLEY BRIDGE ROAD
LOT BOUNDARIES
PROJECT LEASE AREA
SECURITY FENCE
PV ARRAYS
INTERNAL TRACKS
LAYDOWN, PARKING & WASTE AREAS (CONSTRUCTION STAGE)
WATER TANK LOCATIONS
DEFENDABLE SPACE (10m)
POC
POINT OF CONNECTION
LANDSCAPE BUFFER (3m)
CABLE ROUTE
ACOUSTIC SCREEN
22kV POWERLINE
proposal
Uranquinty 5MW Solar Farm
drawing
Overall Site Layout
scale
1:2500 @ A3
revision
S4/DA1
date
APR 2021
habitat planning