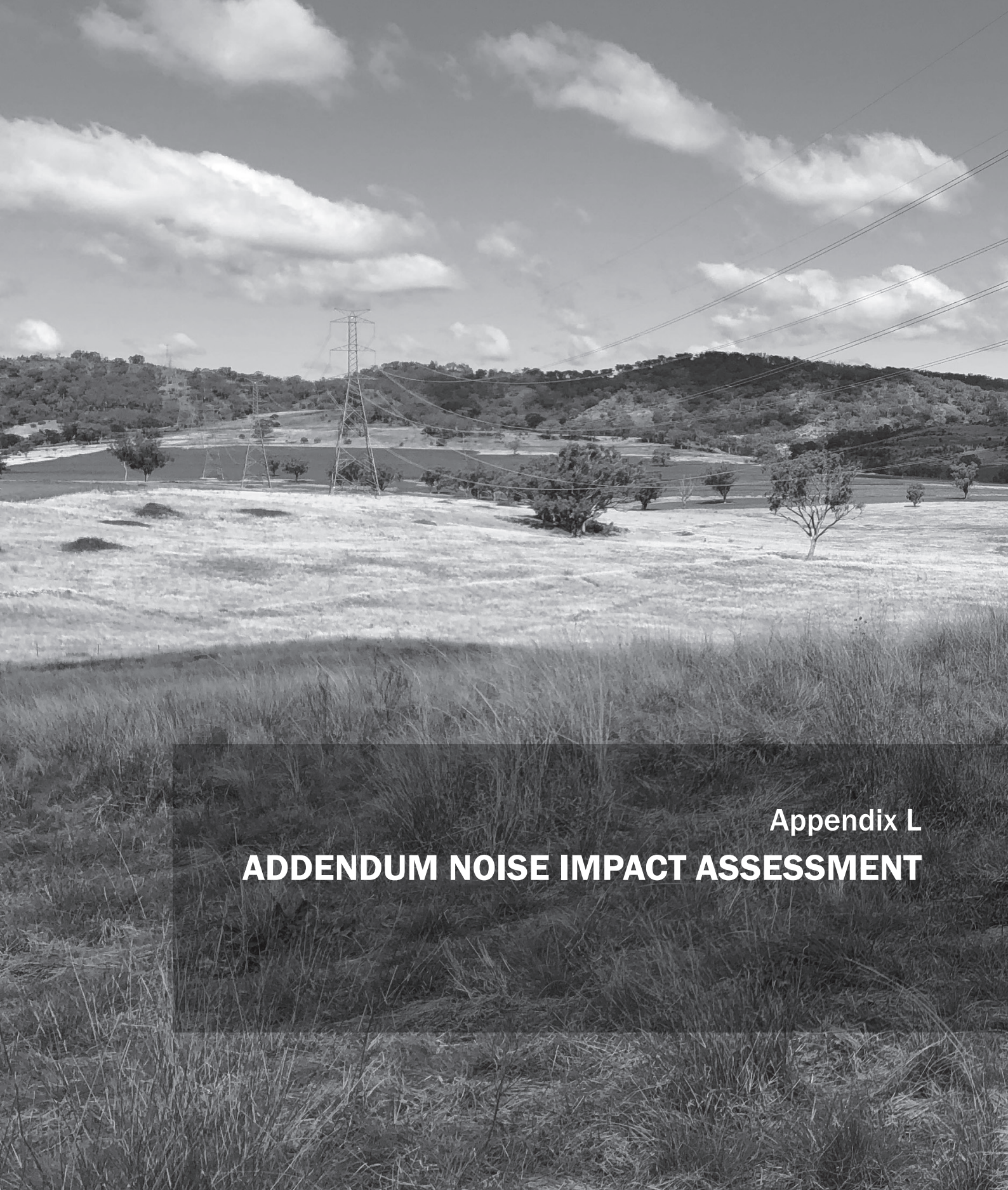




Appendix L

ADDENDUM NOISE IMPACT ASSESSMENT

Addendum Report - Noise Impact Assessment

Sundown Solar Farm

Prepared for Recurrent Energy Pty Ltd

June 2025

Addendum Report - Noise Impact Assessment

Sundown Solar Farm

Recurrent Energy Pty Ltd

E231160 RP#5

June 2025

Version	Date	Prepared by	Reviewed by	Comments
.01	22 January 2025	Lucas Adamson	Carl Fokkema	Draft for Recurrent comment
1	24 February 2025	Lucas Adamson	Carl Fokkema	Final
2	4 June 2025	Lucas Adamson	Carl Fokkema	Final (updated)

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4 June 2025

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ABN: 28 141 736 558

Executive Summary

EMM Consulting Pty Ltd (EMM) has prepared this Addendum Report - Noise and Vibration Impact Assessment (NVIA) for the Sundown Solar Farm Project. This addendum reviews impacts and benefits identified in the *Noise and Vibration Impact Assessment: Sundown Solar Farm* (EIS NVIA, EMM 2023) to address changes to construction noise impacts under the refined project description, incorporating minor refinements to the access road design and location of solar arrays, as well as the inclusion of perimeter fencing.

The addendum assessment largely follows the same approach as used in the NVIA for the Environmental Impact Statement (EIS). The only changes relate to the stages in which the construction works have been assessed, in order to provide more realistic impact assessments.

It documents the methods results and initiatives built into the project design to avoid and minimise associated impacts, and mitigation and management measures proposed to address any residual impacts not able to be avoided by applying feasible and reasonable measures.

There were no material changes to the operational noise, construction vibration, operational vibration, or operational road traffic noise assessments as a result of the proposed refinements and, as such, these outcomes remain as per the NVIA 2023.

Construction noise levels were assessed for standard daytime construction hours under noise-enhancing meteorological conditions.

During Stage 1 (Access Road widening works), construction noise levels under noise-enhancing meteorological conditions are predicted to satisfy the relevant NML at most assessment locations during ICNG standard construction hours. However, noise levels above the relevant NML are predicted at three residences during Stage 1 construction works adjacent the access road alignment.

These impacts would be of a short-term duration (i.e. 1 to 2 weeks) whilst construction works are progressing nearest to the relevant properties. Once the construction works have progressed away from the respective residences, it is expected that noise levels would be below the relevant NML.

During Stage 2 (Site establishment) and Stage 3 (Civil, mechanical and electrical works and deliveries), construction noise levels under noise-enhancing meteorological conditions are predicted to satisfy the relevant NML at all assessment locations during ICNG standard construction hours.

No exceedances of the highly affected NML of 75 dB are predicted at any assessment locations during any stage of construction.

With the effective management and incorporation of mitigation measures listed in Chapter 6, noise and vibration emissions from the project are generally predicted to satisfy relevant guidelines, standards and policies.

Glossary

Several technical terms are discussed in this report. These are explained in Table G.1.

Table G.1 **Project and technical terms**

Term	Meaning
Amenity noise criteria	The amenity noise criteria relate to existing industrial noise. Where industrial noise approaches base amenity noise criteria, then noise levels from new industries need to demonstrate that they will not be an additional contributor to existing industrial noise.
Day period	Monday-Saturday: 7:00 am to 6:00 pm, on Sundays and public holidays: 8:00 am to 6:00 pm.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dBc	Noise is measured in units called decibels (dB). There are several scales for describing noise, with the 'C-weighted' scale typically used to assess low frequency noise.
Evening period	Monday-Sunday and Public Holidays: 6:00 pm to 10:00 pm.
Highly noise-affected NML	The highly noise affected level ($L_{Aeq,15minute}$ 75 dB) represents the point above which there may be strong community reaction to noise. It is applicable during ICNG standard construction hours only.
Intrusive noise criteria	The intrusive noise criteria refers to noise that intrudes above the background level by more than 5 dB.
L_1	The noise level exceeded for 1% of the time.
L_{10}	The noise level which is exceeded 10% of the time. It is roughly equivalent to the average of maximum noise level.
L_{90}	The noise level that is exceeded 90% of the time. Commonly referred to as the background noise level.
L_{eq}	The energy average noise from a source. This is the equivalent continuous sound pressure level over a given period. The $L_{Aeq,15minute}$ descriptor refers to a L_{Aeq} noise level measured over a 15-minute period.
L_{max}	The maximum sound pressure level received during a measuring interval.
L_{min}	The minimum sound pressure level received during a measuring interval.
Night period	Monday-Saturday: 10:00 pm to 7:00 am, on Sundays and public holidays: 10:00 pm to 8:00 am.
NML	The noise affected level represents the point above which there may be some community reaction to noise. It is calculated as the relevant RBL + 10 dB during ICNG standard construction hours and the relevant RBL + 5 dB outside of ICNG standard construction hours.
Project area	The area required to access and build project infrastructure, including surface and tunnel components of the project
PNTL	The project-noise trigger level (PNTL) is criteria for a particular industrial noise source or industry. The Project Specific Noise Level (PSNL) is the lower of either the intrusive noise criteria or amenity noise criteria.
RBL	The rating background level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the average background levels.

Term	Meaning
Sound power level (L_W)	A measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.
Temperature inversion	A meteorological condition where the atmospheric temperature increases with altitude.

Common noise levels

It is useful to have an appreciation of the decibel (dB), the unit of noise measurement. Table G.2 gives an indication as to how an average person perceives changes in noise level in the environment. Examples of common noise levels are provided in Figure G.1.

Table G.2 Perceived change in noise

Change in sound level (dB)	Perceived change in noise
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times as loud (or quarter) as loud

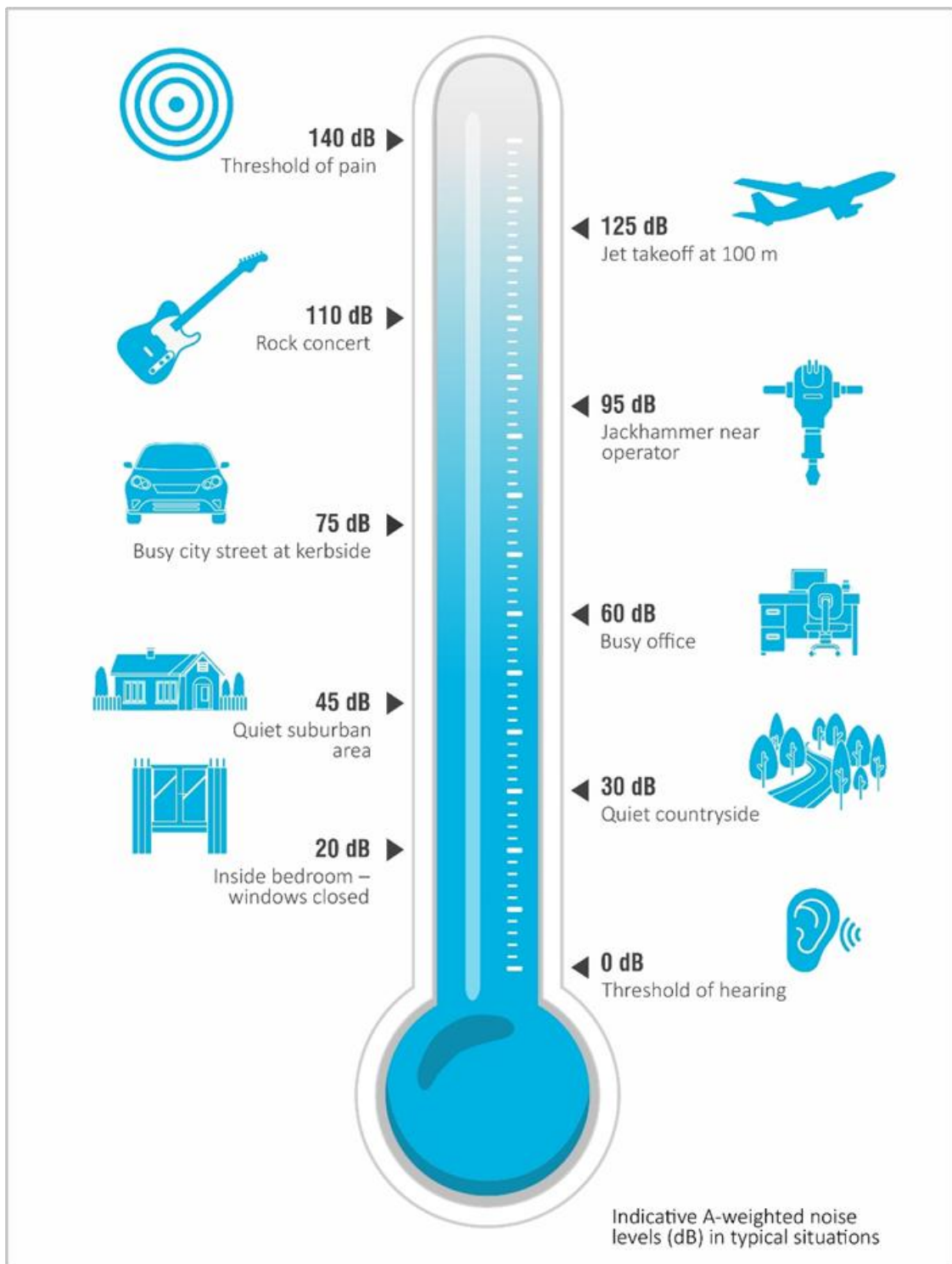


Figure G.1 Common noise levels

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1 Introduction

EMM Consulting Pty Ltd (EMM) has prepared this Addendum Report - Noise and Vibration Impact Assessment (NVIA) for the Sundown Solar Farm Project. This addendum reviews impacts and benefits identified in the *Noise and Vibration Impact Assessment: Sundown Solar Farm* (EIS NVIA, EMM 2023), to address changes to construction noise impacts under the refined project description, incorporating minor refinements to the access road design and location of solar arrays, as well as the inclusion of perimeter fencing. The context for this NVIA addendum is outlined below.

1.1 Background and previous steps

Sundown Solar Pty Ltd (Sundown Solar) proposes to develop a large-scale solar photovoltaic (PV) generation and battery energy storage system (BESS) facility in Spring Mountain, approximately 30 kilometres (km) east of Inverell in the New England Tablelands region of northern NSW.

The project involves the development, construction and operation of a solar PV electricity generation facility and associated BESS. The project will also include the upgrade of the access road (Spring Mountain Road and Sturmans Road) and the Gwydir Highway/Spring Mountain Road intersection.

During the preparation of the Environmental Impact Statement (EIS), the development footprint within the project boundary has been refined to consider any environmental constraints identified, outcomes of stakeholder engagement, community consultation and design of project infrastructure with the objective of developing an efficient project that avoids and minimises environmental impacts.

The project's targeted generating capacity is up to 360 megawatts (MW) (AC) and up to 150 MW (AC) four-hours of energy storage. The final number of PV modules will be dependent on detailed design, availability, and commercial considerations at the time of construction.

Electricity generated by the project will be injected into the grid via a new onsite substation connected to TransGrid's 330 kilovolt (kV) transmission line that traverses the site.

The project will be assessed as a State Significant Development (SSD) under *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Accordingly, an EIS for the project is required under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). Secretary's Environmental Assessment Requirements (SEARs) were issued in 2017 and re-issued in August 2020.

Following the public exhibition of the EIS, submissions were received from state government agencies and councils, special interest groups and community members. A Submissions Report (EMM, 2024) has been prepared to respond to matters raised in these submissions and agency advice.

This Addendum Impact Assessment has changed the way noise is assessed for the project. Given that Stage 1 in the original NVIA included both access road widening works and site establishment, predictions in the NVIA overestimated likely construction noise levels received by some residences (particularly those in close proximity to the access road). To remedy this, and give more realistic impact assessments, this addendum report has separated access road widening works and site establishment into independent stages to assess impacts.

This Addendum Report is intended to assist the community, government agencies and the approval authority to understand the noise and vibration implications of the refined project.

1.2 Proposed refinements

In response to matters raised in submissions and outcomes of ongoing engagement with the local community, government agencies, project landholders, and other stakeholders; Recurrent Energy has made refinements to the project. These relate to two key areas:

- the layout of solar arrays
- perimeter fencing.

These refinements are discussed further in Section 2.1.

1.3 Assessment guidelines and requirements

This Addendum Report supports the project NVIA prepared for the EIS, in delivering assessment of noise and vibration impacts and benefits in accordance with the SEARs, as well as relevant government assessment requirements, guidelines, and policies, including:

- NSW Department of Environment Climate Change (DECC) 2009, *The Interim Construction Noise Guideline* (ICNG)
- NSW Environment Protection Authority (EPA) 2017, *NSW Noise Policy for Industry* (NPfI).

1.4 Purpose of this document

Recurrent Energy has requested EMM to prepare this Addendum Noise and Vibration Impact Assessment for the Sundown Solar Farm Project. This addendum report has updated where relevant the predictions made in *Noise and Vibration Impact Assessment: Sundown Solar Farm* (EIS NVIA, EMM 2023).

This document was prepared in response to matters raised in submissions and outcomes of ongoing engagement with the local community, Government agencies, project landholders, and other stakeholders.

2 Description of refinements

2.1 Overview of the proposed refinements

Following exhibition of the EIS, Recurrent Energy identified refinements to the project that was presented in the EIS. These refinements provide functional improvements to the project design, reduce impacts wherever possible and confirm elements of the project that were highlighted as opportunities in the EIS.

A summary of the refinements are provided in Table 2.1.

Table 2.1 Overview of the project refinements in comparison to the original project

Project element	Description of change
Project layout	
Location of solar arrays	Refinements have been made to the location of solar arrays within the development footprint. The changes resulted from comments made by the Biodiversity Conservation Division (BCD) in relation to retention of vegetation on the site and fragmentation of habitat. The project layout in the EIS precluded solar arrays from a number of locations in order to protect listed species under the <i>Biodiversity Conservation Act 2017</i> which were recorded within the development footprint. Biodiversity Conservation Division's view is that avoiding these small areas would result in the creation of small, unviable 'islands' of retained habitat, and it asked Sundown Solar to accordingly revise the development footprint.
Perimeter fencing	The proposed development footprint also now includes a perimeter fence. This has necessitated further ecology surveys. Given the seasonal nature of the surveys, the Biodiversity Development Assessment Report (BDAR) for the project will be revised early in 2025, and its results will be presented in an Addendum Submissions Report.

3 Existing environment

3.1 Site description

The project is located at Spring Mountain, approximately 30 km east of Inverell in the Inverell Shire Council local government area (LGA), and in the New England Tablelands region of northern NSW. The site will be accessed from the Gwydir Highway, Spring Mountain Road and Sturmans Road. The project is located within the New England Renewable Energy Zone (REZ).

3.2 Noise and vibration assessment locations

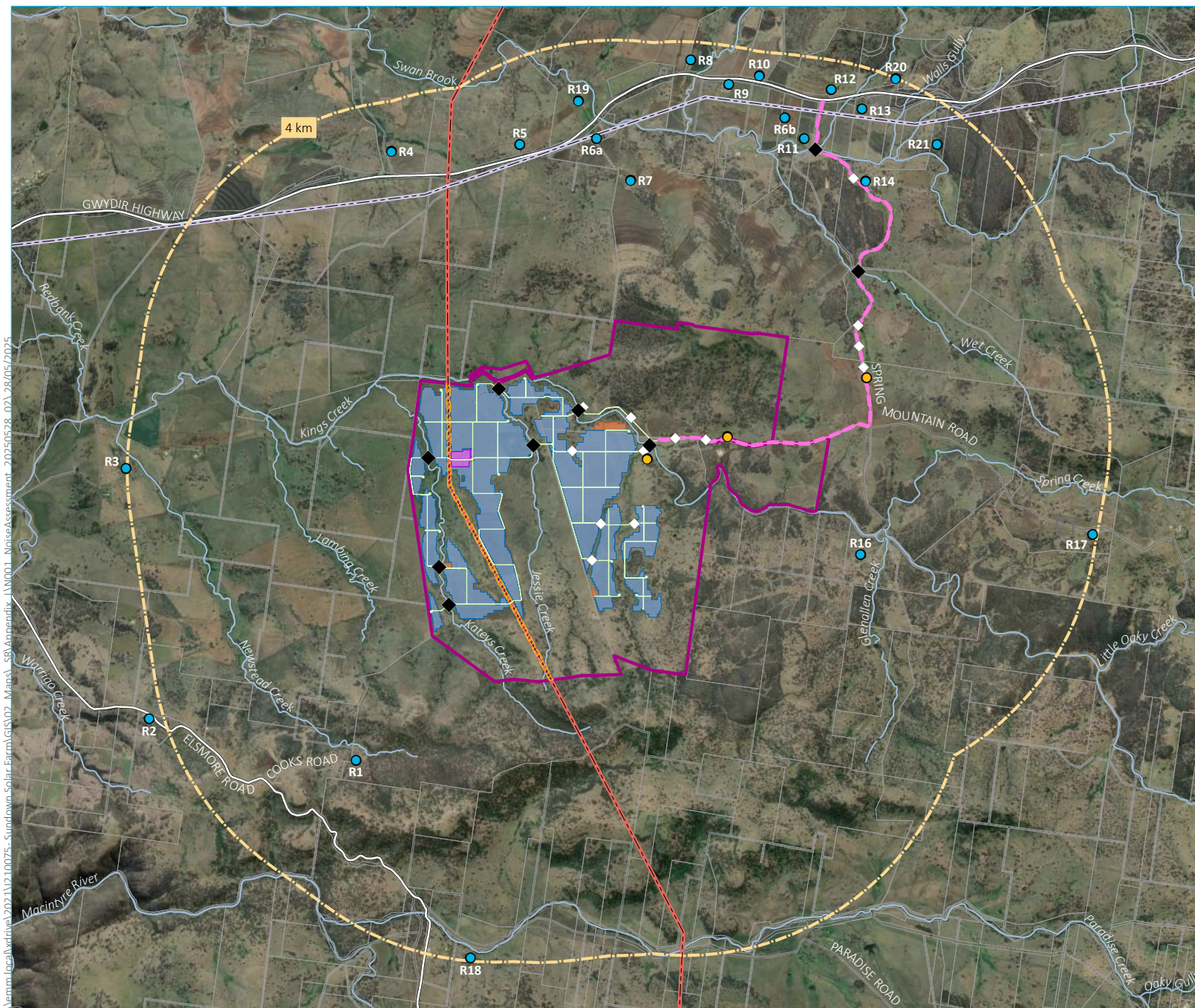
The nearest representative noise sensitive locations to the project have been identified for the purpose of assessing potential noise and vibration impacts. Details are provided in Table 3.1 and their locations are shown in Figure 3.1. They are referred to in this report as assessment locations.

Table 3.1 Noise assessment locations

ID	Address	Classification	Easting	Northing
R1	Lachlana, 122 Cooks Road, Newstead NSW 2360	Residential	345292	6696323
R2	St Lawrence, 2312 Elsmore Road, Newstead NSW 2360	Residential	342345	6696911
R3	Newstead, 4157 Gwydir Highway, Newstead NSW 2360	Residential	342016	6700484
R4	3692 Gwydir Highway, Swan Vale NSW 2370	Residential	345796	6704993
R5	3598 Gwydir Highway, Swan Vale NSW 2370	Residential	347626	6705096
R6a ¹	3382 Gwydir Highway, Swan Vale NSW 2370	Residential	348719	6705178
R6b	3382 Gwydir Highway, Swan Vale NSW 2370	Residential	351401	6705475
R7	77 Inverness Road, Swan Vale NSW 2370	Residential	349204	6704581
R8	3236 Gwydir Highway, Swan Vale NSW 2370	Residential	350061	6706299
R9	3163 Gwydir Highway, Swan Vale NSW 2370	Residential	350603	6705951
R10	3112 Gwydir Highway, Swan Vale NSW 2370	Residential	351037	6706073
R11	32 Spring Mountain Road, Swan Vale NSW 2370	Residential	351677	6705176
R12	3018 Gwydir Highway, Swan Vale NSW 2370	Residential	352063	6705874
R13	2963 Gwydir Highway, Swan Vale NSW 2370	Residential	352499	6705604
R14	155 Spring Mountain Road, Swan Vale NSW 2370	Residential	352552	6704570
R16	170 Northcotts Road, Spring Mountain NSW 2360	Residential	352480	6699255
R17	Kokoda, 934 Spring Mountain Road, Spring Mountain NSW 2360	Residential	355787	6699536
R18	2929 Elsmore Road, Paradise NSW 2360	Residential	346924	6693507
R19	Yarrawa Park, 3382 Gwydir Highway, Swan Vale NSW 2370	Residential	348460	6705714

ID	Address	Classification	Easting	Northing
R20	Alkoomie, 2962 Gwydir Highway, Swan Vale NSW 2370	Residential	352981	6706030
R21	Pieta, 2861 Gwydir Highway, Swan Vale NSW 2370	Residential	353570	6705097

Notes: 1. R6a and R6b share the same postal address but the property has two separate residential properties, approximately 2–3 km apart from each



- KEY**
- Proposed Sundown Solar Farm (Project area)
 - Proposed Sundown Solar Farm (Project area)- 4 km buffer
 - Noise assessment locations**
 - Noise assessment location
 - Associated property
 - Development footprint**
 - Access road
 - 330 kV OHL easment (60 m)
 - Internal access road
 - BESS/switchroom/substation
 - Construction and laydown
 - Potential PV area
 - Potential water crossing**
 - ◆ Named watercourse
 - ◇ Drainage line
 - Existing overhead transmission line**
 - Armidale to Dumaresq (330 kV)
 - Glen Innes to Inverell (132 kV)
 - Existing environment**
 - Major road
 - Minor road
 - Vehicular track
 - Named watercourse
 - Cadastral boundary

Assessment locations

Sundown Solar Farm
Addendum Noise Impact Assessment
Figure 3.1

3.3 Background noise survey

3.3.1 Ambient noise environment

Given the nature of the project area and its surrounds, existing ambient noise levels at assessment locations are likely to be dominated by rural noise sources and natural elements. The rating background levels (RBLs) are expected to be relatively low (i.e. at or below NPfI minimum RBLs) and therefore the NPfI minimum RBLs of 35 dB and 30 dB have been adopted for this assessment for the daytime and evening/night-time periods, respectively in accordance with the NPfI (EPA 2017). This is a conventional assumption for such areas and leads to the most stringent noise targets available being applied. A summary of adopted background noise levels is given in Table 3.2.

Table 3.2 Summary of adopted rating background levels

Monitoring location	Period ¹	RBL ² , dB(A)
All residential assessment locations	Day	35
	Evening	30
	Night	30

3.4 Meteorology

The NPfI (EPA 2017) requires assessment of noise under standard and noise enhancing meteorological conditions. The NPfI defines these as follows:

- **Standard meteorological conditions:** defined by stability categories A through to D with wind speeds up to 0.5 metres per second (m/s) at 10 m above ground level (AGL) for day, evening and night periods.
- **Noise-enhancing meteorological condition:** defined by stability categories A through to D with light winds (up to 3 m/s at 10 m AGL) for the day and evening periods; and stability categories A through to D with light winds (up to 3 m/s at 10 m AGL) and/or stability category F with winds up to 2 m/s at 10 m AGL.

The NPfI specifies the following two options 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.

For the purposes of noise modelling, this assessment has adopted the noise-enhancing meteorological conditions as outlined in the NPfI. This approach provides a conservative assessment.

3.4.1 Adopted meteorological conditions

As a conservative approach, this assessment has adopted the meteorological conditions within the International Standard *ISO 9613-2:1996 'Acoustics – Attenuation of sound during propagation outdoors'* (ISO 9613). As per Section 1 of ISO 9613:

The method predicts the equivalent continuous A-weighted sound pressure level (as described in parts 1 to 3 of ISO 1996) under meteorological conditions favourable to propagation from sources of known sound emission.

These conditions are for downwind propagation, as specified in 5.4.3.3 of ISO 1996-2:1987 or, equivalently, propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs at night.

The ISO 9613 meteorological conditions adopted in this assessment to account for the influence of wind and temperature inversion conditions on modelled noise levels are considered to be consistent with the 'noise-enhancing' meteorological conditions shown in Table D1 of the NPfI.

A summary of modelled meteorological conditions is shown in Table 3.3.

Table 3.3 Meteorological parameters adopted for the noise modelling

Assessment period ¹	Meteorological conditions	Air temperature	Relative humidity
Day	ISO 9613	20°C	70%
Evening	ISO 9613	10°C	90%
Night	ISO 9613	10°C	90%

4 Assessment methodology

The addendum assessment largely follows the same approach as used in the NVIA for the EIS.

The only changes relate to the stages in which the construction works have been assessed. Given that Stage 1 in the original NVIA included both access road widening works and site establishment, predictions in the NVIA overestimated likely construction noise levels received by some residences (particularly those in close proximity to the access road). To remedy this, and give more realistic impact assessments, this addendum report has separated access road widening works and site establishment into independent stages to assess impacts.

Table 4.1 compares the differences of the modelled construction stages from the original NVIA to this addendum report. It is of note that as Stage 4 (commissioning and testing) is not expected to change as a result of the project refinements, the results as per the original NVIA remain relevant and it has not been assessed herein.

Table 4.1 Modelled stages

Stage	Original NVIA	Addendum report
1	Site establishment (including access road widening works)	Access road widening works
2	Civil, mechanical and electrical works and deliveries	Site establishment
3	Commissioning and testing.	Civil, mechanical and electrical works and deliveries
4	N/A	Commissioning and testing

Construction noise modelling has been updated to include the design changes associated with the addendum report (refer to Section 2.1). Construction noise levels from the project were predicted using a computer-generated model using DGMR iNoise noise modelling software. These changes have been assessed in Section 5.1.

The construction assessment considered three scenarios, outlined below, which were determined to be the typical 'worst-case' in terms of phasing and scale of the overall construction activity.

The construction noise impact assessment has adopted sound power levels from Department of Environment, Food and Rural Affairs (DEFRA) and EMM's noise database for plant and equipment items used on similar projects. Plant and equipment items, sound power levels and quantities adopted in the noise modelling are summarised in Table 4.2.

Table 4.2 Construction noise source sound power levels

Stage	Equipment	Quantity	Item $L_{Aeq,15minute}$, dB	Overall $L_{Aeq,15minute}$, dB
Stage 1: Access Road widening works	Vibratory (pad foot) roller ¹	1	112	117
	Grader	1	97	
	Scraper	1	110	
	Flatbed float	1	99	
	Excavator	1	110	
	Water truck	1	111	
	Tipper truck	1	103	

Stage	Equipment	Quantity	Item $L_{Aeq,15\text{minute}}$, dB	Overall $L_{Aeq,15\text{minute}}$, dB
Stage 2: Site establishment	Vibratory (pad foot) roller	5	112	124
	Dozer	5	117	
	Grader	5	97	
	Scraper	4	110	
	Flatbed float	5	99	
	Excavator	5	110	
	Bobcat	5	103	
	Concrete truck	5	105	
	Crane	3	108	
	Trenching equipment	1	108	
	Water truck	1	111	
Stage 3: Civil, mechanical and electrical works and deliveries	Vibratory (pad foot) roller	5	112	126
	Hydraulic hammer	2	117	
	Pile driver	15	97	
	Dozer	5	110	
	Grader	5	99	
	Scraper	4	110	
	Flatbed float	5	99	
	Excavator	5	110	
	Bobcat	5	103	
	Concrete truck	5	105	
	Drilling rig	10	111	
	Crane	3	108	
	Forklift	30	80	
	Water truck	1	111	

Notes: 1. The vibration mode on the vibratory roller will not be used (i.e. static mode only) when working within 100 m of any privately owned residence.

The proposed project refinements have no material effect on the operational noise assessment, construction and operational vibration assessments, or the operational road traffic noise assessment refinements and, as such, outcomes of these assessments remain as per the NVIA (EMM 2023).

5 Impact assessment

5.1 Construction noise

In accordance with procedures outlined in the NVIA, predictions of construction noise levels are provided in Table 5.1 for ICNG standard construction hours. The level presented for each assessment location represents the energy-average noise level over a 15-minute period and assumes all listed plant operating concurrently. The predicted noise level above the ICNG noise affected NML at each assessment location is also provided.

During Stage 1 (Access Road widening works), construction noise levels under noise-enhancing meteorological conditions are predicted to satisfy the relevant NML at most assessment locations during ICNG standard construction hours.

However, noise levels above the relevant NML are predicted at three assessment locations R11, R12 and R14 which are adjacent the access road alignment. These impacts are anticipated to be for a short duration (i.e. 1 to 2 weeks) whilst construction works are progressing nearest to the relevant properties. Once the construction works have progressed away from the respective residences, it is expected that noise levels would be below the relevant NML.

It is also noted that since the EIS was exhibited, the owner of R15 has entered into an agreement with Recurrent Energy and R15 is now an associated residence for the purpose of assessments. R15 is therefore excluded from the assessment.

During Stage 2 (Site establishment) and Stage 3 (Civil, mechanical and electrical works and deliveries), construction noise levels under noise-enhancing meteorological conditions are predicted to satisfy the relevant NML at all assessment locations during ICNG standard construction hours.

No exceedances of the highly affected NML of 75 dB are predicted at any assessment locations during any stage of construction.

Table 5.1 Predicted construction noise levels

Assessment location	Period	Predicted noise level, $L_{Aeq,15\text{minute}}$, dB			Noise affected NML, dB	Highly noise affected NML, dB	Predicted noise level above NML dB
		Stage 1	Stage 2	Stage 3			
R1	Day	<35	38	40	45	75	Nil
R2	Day	<35	35	37	45	75	Nil
R3	Day	<35	36	38	45	75	Nil
R4	Day	<35	37	38	45	75	Nil
R5	Day	<35	37	39	45	75	Nil
R6a	Day	<35	37	39	45	75	Nil
R6b	Day	43	35	36	45	75	Nil
R7	Day	<35	38	39	45	75	Nil
R8	Day	<35	<35	36	45	75	Nil
R9	Day	37	35	36	45	75	Nil
R10	Day	37	<35	36	45	75	Nil
R11	Day	50	35	37	45	75	5 dB (Stage 1 only)

Assessment location	Period	Predicted noise level, $L_{Aeq,15minute}$, dB			Noise affected NML, dB	Highly noise affected NML, dB	Predicted noise level above NML dB
		Stage 1	Stage 2	Stage 3			
R12	Day	46	<35	35	45	75	1 dB (Stage 1 only)
R13	Day	44	<35	35	45	75	Nil
R14	Day	54	35	36	45	75	9 dB (Stage 1 only)
R16	Day	36	38	40	45	75	Nil
R17	Day	<35	<35	35	45	75	Nil
R18	Day	<35	<35	<35	45	75	Nil
R19	Day	<35	36	38	45	75	Nil
R20	Day	37	<35	35	45	75	Nil
R21	Day	39	<35	35	45	75	Nil

6 Management of impacts

6.1 Mitigation and management measures

During construction (particularly during access road widening works in Stage 1) up to four assessment locations are expected to experience noise above relevant NML. No assessment locations are predicted to experience noise above the highly affected NML.

This section outlines the recommended noise and vibration mitigation and management measures.

The project's construction environmental management plan (CEMP) will include a suite of best practice noise and vibration management and mitigation measures, as outlined in Table 6.1.

Table 6.1 Noise and vibration mitigation measures

Reference	Mitigation measure	Responsibility	When
Universal work practices			
N1	Ensure the importance of minimising noise and vibration is reinforced at toolbox meetings.	Construction contractors	Construction
N2	Minimise unnecessary metal-on-metal contact.	Construction contractors	Construction
N3	Minimise the need for vehicle reversing for example, by arranging for one-way site traffic routes where possible.	All staff	At all times
N4	Ensure access road is maintained.	All staff	At all times
Plant and equipment			
N5	Ensure potentially noisy plant and equipment is maintained in accordance with manufacturer specifications.	All staff	At all times
N6	Where practical, use quieter plant and equipment.	All staff	At all times
N7	Minimise unnecessary movement of equipment/material/plant.	All staff	At all times
N8	Operate plant and equipment in the quietest and most efficient manner.	All staff	At all times
N9	Undertake regular inspections/maintenance of plant and equipment to ensure that all noise reduction devices are operating effectively.	All staff	At all times
Work scheduling			
N10	Construction work to be limited to standard construction hours, including delivery of plant and equipment. Exceptions to these hours may be required on limited occasions. Regulatory authorities (including the Inverell Shire Council) and surrounding landholders will be notified of any exceptions prior to any works being undertaken.	Construction contractors	Construction
Vibration			
V1	Wherever practicable, ensure that vibration intensive activities are undertaken outside of the safe working distances. Where this is not practicable: • use less vibration intensive methods of construction or equipment where practicable • limit vibration intensive works to the least sensitive times of the day, in consultation with the relevant sensitive receivers, and/or • undertake vibration monitoring to ensure compliance with DIN-4150 criteria.	Construction contractor	Construction

Reference	Mitigation measure	Responsibility	When
V2	If ongoing works are required ¹ , and where monitoring has confirmed actual vibration levels are nearing the DIN-4150 criteria, consider installation of a monitoring system to warn operators when vibration levels are approaching the cosmetic damage criteria (e.g. flashing light, audible alarm, etc.).	Construction contractor	Construction
V3	The vibration mode on the vibratory roller will not be used (i.e. static mode only) when working within 100 m of any privately owned residence.	Construction contractor	Construction

Notes 1. Ongoing works are defined by long-term works occurring for a period greater than 3 weeks.

The relative effectiveness of various forms of noise control is outlined in Table 6.2.

Table 6.2 Relative effectiveness of various forms of noise control

Noise control	Nominal noise reduction possible, dB
Increase source to receiver distance ¹	Approximately 6 dB for each doubling of distance
Reduce equipment operating times or turn off idling machinery ¹	Approximately 3 dB per halving of operating time
Operating training on quiet operation ²	Up to 3 to 5 dB
Screening (e.g. noise barrier) ¹	Normally 5 to 10 dB, maximum 15 dB
Enclosure (e.g. shed/building) ¹	Normally 15 to 25 dB, maximum 50 dB
Silencing (e.g. exhaust mufflers) ¹	Normally 5 to 10 dB, maximum 20 dB

Notes: 1. Sourced from AS2436-2010.

2. Based on EMM's measurement experience at construction and mining sites.

6.2 Additional noise mitigation measures

Following the implementation of standard noise mitigation measures (refer to Section 6.1), noise levels from the proposed works may remain above the relevant NML. It is recommended that if noise levels remain above NML following the implementation of standard mitigation measures, additional mitigation measures could be implemented as per Table 9 of the Transport for NSW (TfNSW) Construction Noise and Vibration Guideline (CNVG), which has been reproduced in Table 6.3.

Table 6.3 Triggers for additional noise mitigation measures

Construction hours	Perception	dB(A) above RBL	dB(A) above NML	Additional mitigation measures
Standard hours	Noticeable	5 to 10	0	-
Monday-Friday 7am-6pm	Clearly audible	> 10 to 20	≤10	-
Saturday 8am-1pm	Moderately intrusive	> 20 to 30	> 10 to 20	PN, V
	Highly intrusive	> 30	> 20	PN, V
	75 dB(A) or greater			PN, V, SN
OOHW Period 1	Noticeable	5 to 10	≤5	-
Monday-Friday 6pm-10pm	Clearly audible	> 10 to 20	> 5 to 15	PN, RP, DR
Saturday 7am-8am, 1pm-10pm	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RO, RP, DR
Sunday/PH 8am-6pm	Highly intrusive	> 30	> 25	PN, V, SN, RO, RP, DR
OOHW Period 2	Noticeable	5 to 10	≤5	PN
Monday-Saturday 12am-7am, 10pm-12am	Clearly audible	> 10 to 20	> 5 to 15	PN, V, SN, RO, RP, DR
Sunday/PH 12am-8am, 6pm-12am	Moderately intrusive	> 20 to 30	> 15 to 25	PN, V, SN, RO, RP, DR
	Highly intrusive	> 30	> 25	PN, V, SN, RO, RP, DR, AA

Source: TfNSW Construction Noise and Vibration Guideline, 2023

Notes: PN = Periodic notification; SN = Specific notification, individual briefings, or phone call; V = Verification of monitoring; AA = Alternative accommodation; DR = Duration reduction; RO = Project-specific respite offer; RP = Respite period.

6.3 Additional vibration mitigation measures

Following the implementation of standard vibration mitigation measures (refer to Section 6.1), vibration levels from the proposed works may remain above the maximum allowable levels. It is recommended that where levels are likely to remain above the maximum allowable levels following the implementation of standard vibration mitigation measures, additional mitigation measures could be implemented as per Table 11 of the TfNSW CNVG, which has been reproduced in Table 6.4.

Table 6.4 Triggers for additional vibration mitigation measures

Construction hours	Receiver perception	dB(A) above GNML	Additional mitigation measures
Standard hours Monday-Friday 7am-6pm	Human disturbance	>HVML	PN, V, RO
Saturday 8am-1pm	Building damage	>DVML	V, AC
OOHW Period 1 Monday-Friday 6pm-10pm	Human disturbance	>HVML	PN, V, SN, RO, RP, DR
Saturday 7am-8am, 1pm-10pm Sunday/PH 8am-6pm	Building damage	>DVML	V, AC
OOHW Period 2 Monday-Saturday 12am-7am, 10pm-12am Sunday/PH 12am-8am, 6pm-12am	Human disturbance	>HVML	PN, V, SN, RO, RP, DR, AA
	Building damage	>DVML	V, AC

Source: TfNSW Construction Noise and Vibration Guideline, 2023

Notes: PN = Periodic notification, SN = Specific notification, individual briefings, or phone call; V = Verification of monitoring; AA = Alternative accommodation; DR = Duration reduction; RO = Project-specific respite offer; RP = Respite period; AC = Alternative construction methodology

7 Conclusion

This Addendum Report has been prepared to address the effects of the proposed changes to the project on the noise and vibration impact assessment outcomes. It has documented the methods and results, initiatives built into the project design to avoid and minimise associated impacts, and mitigation and management measures proposed to address any residual impacts not able to be avoided by applying feasible and reasonable measures.

During Stage 1 (Access Road widening works), construction noise levels under noise-enhancing meteorological conditions are predicted to satisfy the relevant NML at most assessment locations during ICNG standard construction hours. However, noise levels above the relevant NML are predicted at assessment locations R11, R12 and R14 which are adjacent the access road alignment.

These impacts would be of a short-term duration (i.e. 1 to 2 weeks) whilst construction works are progressing nearest to the relevant properties. Once the construction works have progressed away from the respective residences, it is expected that noise levels would be below the relevant NML.

During Stage 2 (Site establishment) and Stage 3 (Civil, mechanical and electrical works and deliveries), construction noise levels under noise-enhancing meteorological conditions are predicted to satisfy the relevant NML at all assessment locations during ICNG standard construction hours.

No exceedances of the highly affected NML of 75 dB are predicted at any assessment locations during any stage of construction.

There were no material changes to the operational noise, construction vibration, operational vibration, or operational road traffic noise assessments due to the proposed refinements and, as such, these outcomes remain as per the NVIA.

With the effective management and incorporation of mitigation measures listed in Chapter 6, noise and vibration emissions from the project are generally predicted to satisfy relevant guidelines, standards and policies.

References

NSW Environment Protection Authority (EPA) 2017, *NSW Noise Policy for Industry* (NPfI)

NSW Environmental Protection Authority (EPA) 2009, *The Interim Construction Noise Guideline* (ICNG)

EMM Consulting 2023, *Noise and Vibration Impact Assessment: Sundown Solar Farm* (EIS NVIA)

EMM Consulting 2024, *Submissions Report: Sundown Solar Farm*

Transport for NSW (TfNSW) 2016, *Construction Noise and Vibration Guideline* (CNVG)

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