Appendix A – Noise Assessment Report

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Noise Impact Assessment
Darlington Point Solar Farm and Battery Project Proposed Modification
Darlington Point, NSW

Prepared for:

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EXECUTIVE SUMMARY

A noise and vibration impact assessment has been conducted for the proposed increase of capacity of a battery energy storage system (BESS) adjacent to the TransGrid Darlington Point substation located approximately 10 kilometres (km) south of Darlington NSW. The proposed operating hours are as follows.

Proposed Hours of Operation

Activity	Monday to Friday	Saturdays	Sundays or Public Holidays
General Activities	24 hrs	24 hrs	24 hrs

Documents referred to in conducting the assessment include:

- NSW Noise Policy for Industry (NPI), EPA (2017);
- Darlington Point Solar Farm – Construction & Operational Noise & Vibration Impact Assessment, Arup (2018)

Construction, vibration and traffic noise assessments conducted by Arup (2018) found no exceedances of the respective criteria and further quantitative assessment was not considered necessary in the present study.

The assessment of cumulative noise emissions from the DPSF and the upgraded BESS has determined that levels would remain below established criteria at all assessed receivers.

Accordingly, it is considered that there will be no additional noise impacts from the consolidated operations.

1.0 INTRODUCTION

1.1 The Proposal

Edify Energy Pty Ltd (the "Applicant"), proposes to increase the capacity of its battery energy storage system (DP BESS) from 100 MWh to 400 MWh at 336 Donald Ross Drive, Darlington Point, NSW, adjacent to the Darlington Point Solar Farm (DPSF). DPSF and the proposed DP BESSS are both currently approved developments under the State Significant Development Application (SSDA) process (Application no. SSD 8392). Operations occur within Lot 1 DP1249830 which is part of the Murrumbidgee Council Local Government Area (LGA). Access to the site is via Donald Ross Drive. The location of the site is shown as **Figure 1** and the extent of the site encompassing approved operations shown as **Figure 2**.

This noise impact assessment has been prepared in accordance with the provisions of the Environmental Planning and Assessment Act 1979 (EP&A Act) and is submitted to Murrumbidgee Council for assessment and consideration accordingly.

1.2 Receiver Locations

Land owners around the Project Site are identified in **Figure 3**, and the Project Site location is specifically shown in **Figure 4**. Representative private residences considered in this assessment are reproduced from Arup (2018) and shown in **Table 1**.

TABLE 1
ASSESSED RESIDENTIAL RECEIVERS

Receiver	Property Name	Distance from project footprint
R1	14713 Sturt Highway	1750m
R2	122 Donald Ross Drive	790m
R3	336 Donald Ross Drive	100m
R4	382 Donald Ross Drive	100m
R5	456 Donald Ross Drive	700m
R6	510 Donald Ross Drive	1250m
R7	537 Donald Ross Drive	1500m
R8	Tubbo Homestead	1650m

Figure 1. Project Site – Local Area

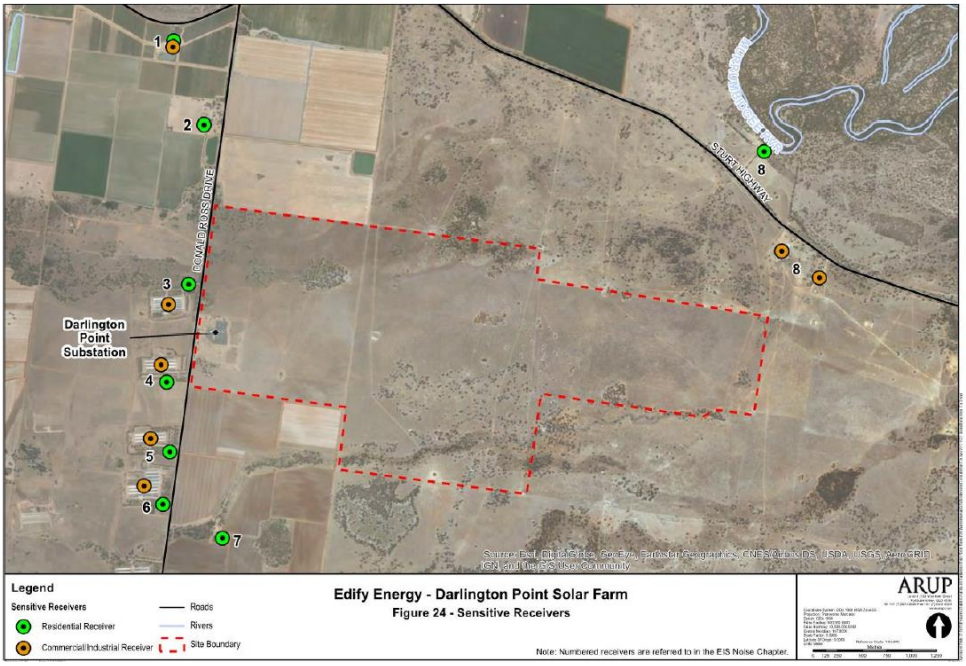


Figure 2. Project Site and Residential Receivers (Source: Arup (2018))

2.0 THE PROPOSAL

2.1 Battery Storage Operations Modification

The proposed activities relate to the existing approved 100MWh battery energy storage system activities at the site. This application seeks to increase the capacity of this system to 400MWh, and conduct the proposed modified operations within the same disturbance footprint. For the purposes of this noise assessment, the proposed HV step-up transformer is assumed to be located in the south western corner of Lot 1 DP 1249830 as shown in **Figure 4**.

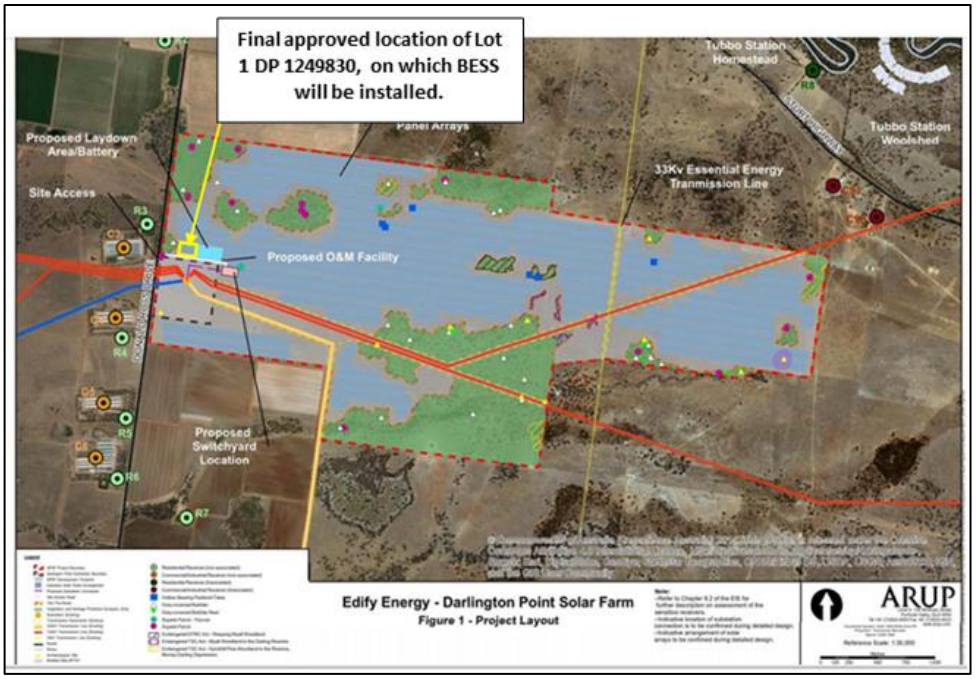


Figure 3. Proposed site layout (Source: Arup (2018))

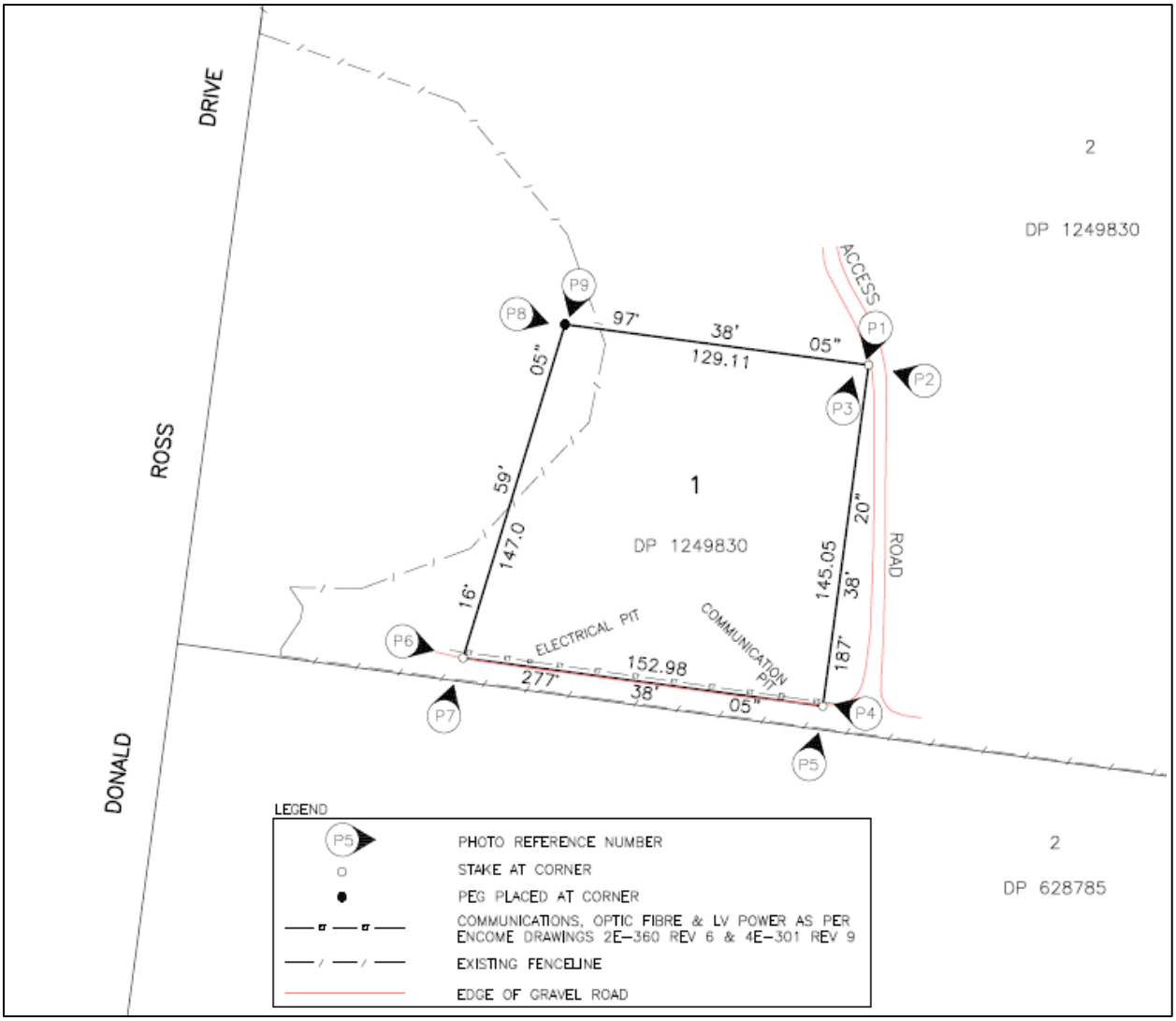


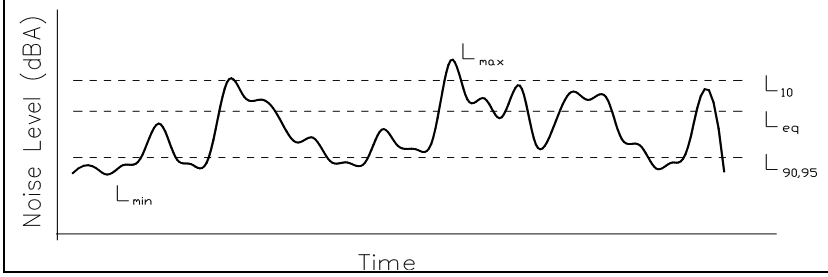
Figure 4. Site survey results

3.0 DESCRIPTION OF TERMS

Table 2 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

TABLE 2
DEFINITION OF ACOUSTICAL TERMS

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.



4.0 EXISTING ENVIRONMENT AND NOISE CRITERIA

The existing meteorological and acoustical environments of the site have been adopted from Arup (2018) to determine prevailing conditions and to allow noise goals to be set.

4.1 Meteorology

Meteorological conditions of G-Class Pasquill stability and 3 m/s source to receiver winds were established in Arup (2018). These conditions will be adopted for assessment of noise emissions from the upgraded DP BESS.

4.2 Existing Acoustic Environment

Arup (2018) states that short term attended noise measurements were undertaken at various sensitive receivers and other representative background locations to determine the level of existing background noise in the area of the proposed development. Noise measurements were short 5-minute duration using a Bruel & Kjaer 2236 sound level meter. Taking a conservative approach, the INP default minimum background noise level of 30 dB(A),L_{90} was determined and will be adopted at all receivers for this assessment.

4.3 Construction Noise Goals

Construction noise trigger levels, as reproduced in Table 3, were established in Arup (2018) for all receivers, both residential and commercial, and will be adopted for this assessment.

TABLE 3
Construction Noise Trigger Levels

Receiver	Background Noise Level (RBL), L_{A90}	Noise Trigger Level (NTL), $L_{Aeq(15\text{-minute})}$
Residential	30[1]	45
Commercial	30	70
Industrial	30	75

1. Section 3.1.2 of the NSW INP states that where measured background noise levels are below 30 dB(A), background noise levels should be set to 30 dB(A)

4.4 Project Specific Noise Goals

The project specific noise goal of 35dB(A),Leq(15min) for day, evening and night periods established in Arup (2018) will be adopted for this assessment. It is noted that the 35 dB(A) criterion was established by Arup (2018) under the now superseded NSW Industrial Noise Policy where the default minimum daytime background noise level was 30 dB(A),L90. The proponent has taken the conservative approach of retaining this criterion for the present assessment, although a daytime noise "trigger level" of 40 dB(A),Leq(15min) would result from application of the current NSW Noise Policy for Industry.

4.5 Vehicle Noise

Arup (2018), states that operations vehicle noise will be negligible relative to the existing operational noise impacts from the site and will not be discussed any further.

5.0 ASSESSMENT METHODOLOGY

5.1 Construction Noise

Arup (2018), states that construction noise levels at nearby receiver locations were determined for the various construction activities outlined in Section 5.1 of the report. Predictions were calculated using SoundPLAN 7.4 acoustic modelling software and the CONCAWE environmental prediction algorithm.

Extensive construction noise management options were provided in Arup (2018) for construction of the solar farm. It is assumed that similar noise management would be adopted for construction of the BESS and no further quantitative assessment is required.

5.2 Operational Noise Sources

Operational equipment, as per Arup (2018), is listed in **Table 4**.

TABLE 4 NOISE SOURCES AND SOUND POWER LEVELS, Lw dB(A)		
Equipment	**Indicative Number**	**Lw dB(A),$L_{eq(15minute)}$**
Medium Voltage Power Station Unit	55	92
Main transformer	1	100

The modelling was undertaken in Arup (2018) for the atmospheric conditions described in Section 4.1.

5.3 Road Traffic Noise

Existing and predicted future worst case road traffic noise levels of 60dB(A) and 63dB(A), respectively, were determined in Arup (2018). No further consideration of road traffic noise is considered necessary for the small scale activities associated with the BESS compared with construction of the solar farm.

6.0 RESULTS AND DISCUSSION

6.1 Predicted Operational Noise Levels

Noise levels from the solar farm were modelled using SoundPLAN 7.4 by Arup (2018). Point calculations were performed for all receivers in **Table 1**. Regarding the BESS, Arup (2018) stated the following:

"…the solar farm operational plant have higher sound power levels and quantities than the BESS facility (except for the solar arrays, which appear to have a lower sound power level than the batteries, but higher quantities). This suggests that the noise to be generated by the batteries will be at a lower intensity (lower sound power levels and quantities) than compared to other solar farm operational plant. Therefore, it is considered that the operation of the BESS facility is unlikely to significantly contribute to an exceedance of the operational noise criteria for sensitive receivers …".

Edify Energy has provided manufacturer's data from two potential suppliers of battery packs. One of these sets of data contained comprehensive sound power levels and will be adopted for this assessment, noting that Spectrum Acoustics has previously conducted as assessment for another battery facility based on these data, which are typical across the various manufacturers.

Noise emission calculations were performed using the Environmental Noise Model (ENM, v3.06) and the meteorological conditions discussed in Section 4.1. Operational noise levels for the DPSF from Arup (2018), the upgraded BESS facility and the cumulative noise levels are summarised in **Table 5**.

TABLE 5
Predicted Noise Levels, dB(A),Leq(15min)

Receiver	Location	DPSF	BESS	TOTAL	Criterion
1	14713 Sturt Highway	15	<20	<20	35
2	122 Donald Ross Drive	21	<20	21	35
3	336 Donald Ross Drive	32	29	34	35
4	382 Donald Ross Drive	29	24	30	35
5	456 Donald Ross Drive	24	<20	24	35
6	510 Donald Ross Drive	20	<20	20	35
7	537 Donald Ross Drive	20	<20	20	35
8	Tubbo Homestead	17	<20	<20	35

The results in Table 5 show that the calculated cumulative noise emissions from DPSF and the BESS remain below the conservatively adopted 35 dB(A),Leq(15min) criterion under the worst case atmospheric conditions.

7.0 SUMMARY

An acoustic assessment of a proposal to increase the capacity of the approved DP BESS from 100 MWh to 400 MWh adjacent to the DPSF at 336 Donald Ross Drive, Darlington Point, NSW, has been conducted.

The assessment of cumulative noise emissions from the DPSF and the upgraded BESS has determined that levels would remain below established criteria at all assessed receivers.