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12 October 2021

[redacted]
Planner
Department of Environment, Land, Water and Planning
[redacted]

Sent via email to [redacted]

Dear [redacted]

Response to Request for Further Information - Planning Permit Application No. PA2000978, West Mokoan Solar Farm

1.0 INTRODUCTION

AECOM Australia Pty Ltd (AECOM) continue to act on behalf of 892 Yarrawonga Development (the Applicant) in relation to Planning Permit Application No. PA2000978. The planning application was submitted to Department of Environment, Water, Planning and Land (DELWP) on 07 October 2020 and amended pursuant to Section 50 of the *Planning and Environment Act 1987* (P&E Act) on 18 June 2021. The application is for

> *use and development of a Renewable Energy Facility and Utility Installation (solar farm and energy storage) and associated buildings and works, removal of native vegetation, display of business identification signage, removal and creation of easements and creation or alteration of access to a Road Zone Category 1* (the Project).

The Project is located at 892 Benalla-Yarrawonga Road, Goorambat; Benalla-Yarrawonga Road, Benalla, 616 Benalla-Yarrawonga Road, Benalla, Crown Land and road reserves of Benalla-Yarrawonga Road and Lake Mokoan Road (the subject site).

The purpose of this letter is to provide a Project update and a response to the email received from DELWP on 31 August 2021 seeking further clarification in relation to point six of DELWP's Request for Further Information (RFI) made pursuant to Section 54 of the P&E Act, dated 16 July 2021, and AECOM's subsequent response dated 26 August 2021.

In support of this further RFI response, the following documents are provided:

- Updated Application Form, at Attachment A
- Updated Acoustic Assessment (AECOM, 17 September 2021), at Attachment B
- Updated Application Plans (AECOM 12 October 2021), at Attachment C

2.0 PROJECT UPDATE

On 22 September 2021, ownership of the Project Applicant (892 Yarrawonga Development) was transferred from South Energy to Lightsource bp. South Energy retain ownership of the subject site and therefore an interest in the Project.

On this basis, and for the purposes of ongoing Project development, including public notification, the Application Form at Attachment A and Application Plans at Attachment C have been updated. No other application documents have been updated as the Applicant (892 Yarrawonga Development) remains the same.

Lightsource bp will be undertaking community consultation for the Project later this year, prior to putting the application on public notice. The purpose of this consultation is to update the community on the Project since the last community consultation was undertaken in June 2019.

3.0 DELWP NOISE QUERIES RESPONSE

The following information is provided in order of the points raised within the DELWP email dated 31 August 2021.

The noise produced by the PCUs appears to be related to cooling fan operating speed. The data that has been provided is in relation to solar radiation. No correlation has been explained between these two factors and I couldn't assume there would be a linear relationship.

The Acoustic Assessment (refer to Attachment A) has been updated at Section 4.3. This confirms South Energy advice about the forecasting modelling, and in particular that the proposed solar farm:

- will start generating power from 5am at the earliest
- will cease power generation at 7:59pm at the latest, and
- will not exceed 50% generation capacity during the hours defined as the 'Night period'.

The following summary provides further detail in relation to the forecasting modelling and the generation capacity of the solar farm.

Factors Attributed to Inverter Noise Level

Solar inverters contain many electrical components and therefore need to be kept cool in order to function properly. The noise produced by an inverter is predominantly related to its cooling fan operating speed (i.e. with greater fan speed comes greater noise emission).

The fan speed however is also related to ventilation requirements of the inverter in different working conditions, which include the ambient temperature and the amount of power generated by solar panels which the inverter needs to convert from direct current (DC) to alternating current (AC). The power from solar panels directly correlates with solar irradiance, subject to weather conditions and time of day. Figure 1 shows the relationship between these factors.

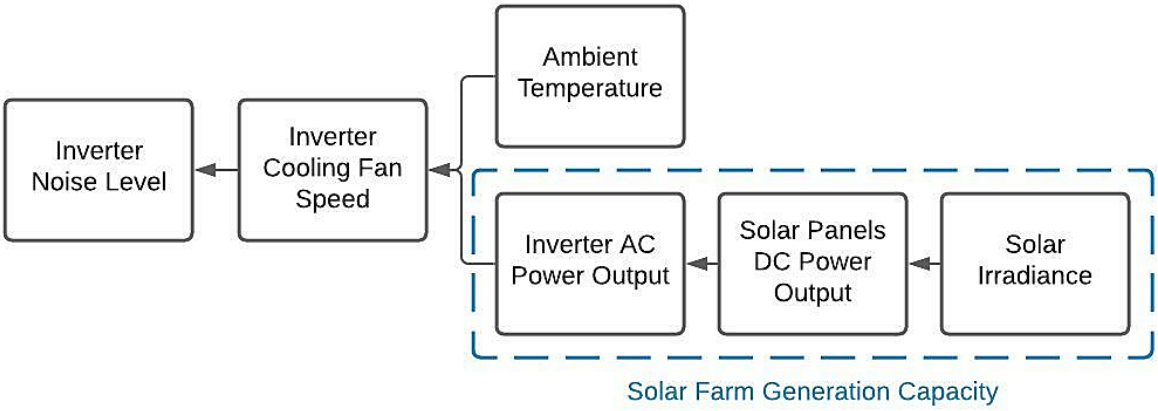

Figure 1 Factors Attributed to Inverter Noise Level

Solar Farm Generation Capacity

The Applicant has undertaken a Generation Capacity Forecast (the Forecast) for the Project using historical solar irradiation data sourced from SolarGIS (a certified data source considered widely acceptable to banks and financial institutions when considering funding for solar projects) and processed in PVsyst (the most commonly used software in the solar industry) to show the typical meteorological data for a year.

The Forecast for all hours was provided at Attachment H of the RFI response submitted to DELWP on 26 August 2021. The 'Hour' in the Forecast represents the start point of an hour (i.e. 5am means the duration of 5:00am – 5:59am). The 'Performance Ratio' in the Forecast is the generation capacity as a percentage of the maximum capacity.

The Forecast shows that the Project will start generating power from 5am at the earliest and cease operation at 7:59pm at the latest.

With regard to the 'Night period' (10pm to 7am) as defined by the *Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues* (Noise Protocol), the Forecast shows that the Project would not operate at greater than 50% capacity within this 'Night period'.

There are only three instances where the Forecast indicates a 50% generation capacity, being 19 November and 10 and 11 December in the 6am – 6:59am time period. At all other times within the 'Night period', the Forecast shows capacity being less than 50%.

Figure 2 shows the data from the Forecast for a Summer day illustrating that the percentage of maximum power does not exceed 50% within the 'Night period'.

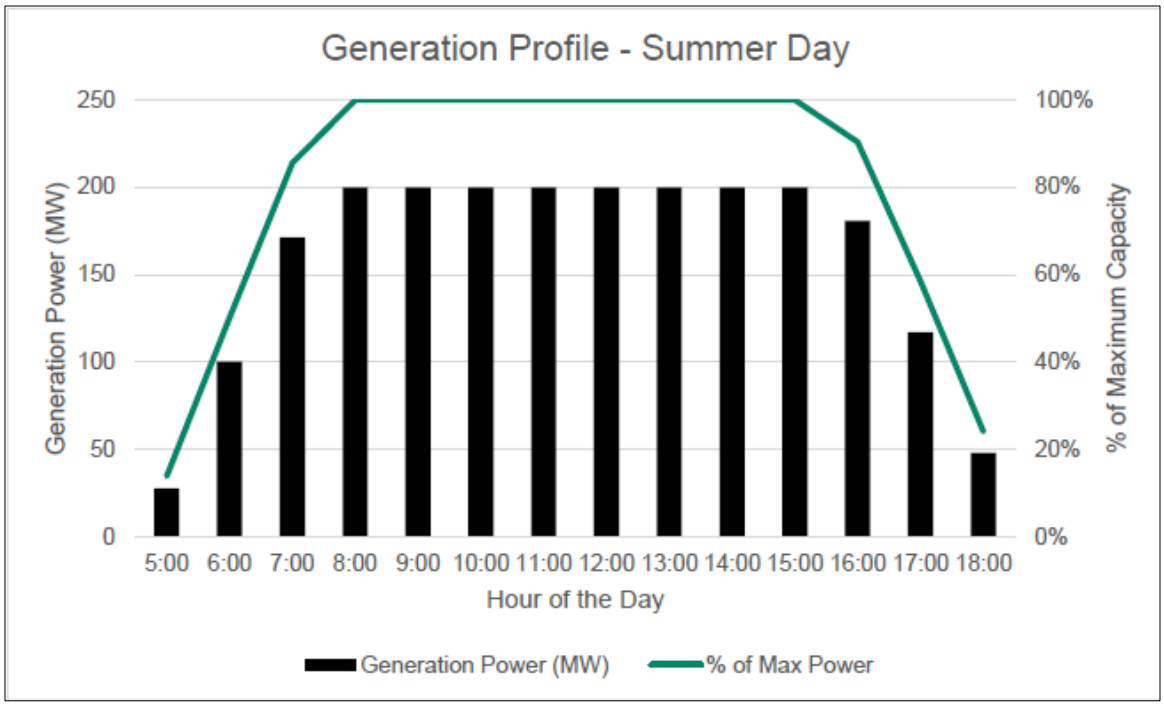

Figure 2 Generation Profile – Summer Day

Inverter Cooling Fan Speed

The inverter cooling fan is powered by the solar farm's auxiliary service. To increase efficiency of the system and the life expectancy of the fan, the fan is designed to operate at different speed levels according to the inverter's working conditions, including the ambient temperature and the inverter output power level (in Volt-ampere (VA), a measurement of power in a DC electrical circuit).

Table 1 shows the cooling fan energy consumption in different working conditions, with a maximum energy consumption of 4700 VA occurring when the cooling fan operates at 100% speed level and the ambient temperature is high (40-50°C). When the inverter operates at 50% of maximum capacity, the energy consumed by the fan is in a range of 1220 VA - 2469 VA and as compared to the maximum energy consumption, this is equivalent to 26% - 52% of its maximum speed.

Table 1 Cooling Fan Energy Consumption Summary (Source: Ingeteam)

Ambient Temperature	Inverter Output Power (expressed in % of maximum capacity)					
	5%	25%	50%	65%	80%	100%
0 °C	60 VA	218 VA	1220 VA	1220 VA	2670 VA	2670 VA
10 °C	60 VA	271 VA	1220 VA	1220 VA	2670 VA	2670 VA
20 °C	60 VA	324 VA	1220 VA	1907 VA	2670 VA	2670 VA
30 °C	60 VA	350 VA	1220 VA	2309 VA	2670 VA	2670 VA
40 °C	60 VA	1220 VA	1220 VA	2670 VA	4567 VA	4700 VA
50 °C	325 VA	2469 VA	2469 VA	4700 VA	4700 VA	4700 VA
> 50 °C	Inverter ceases operation					

Acoustic Report

Based on the evidence provided above, the updated Acoustic Assessment (refer to Attachment A) continues to assess the solar farm at 100% operation in the day and evening periods and 50% in the night period. The Acoustic Assessment has been updated in response to the revised Concept Plan which now includes noise control measures (refer Section 4.4 Noise Control Measures and 6.0 Summary) and based on the new EPA Noise Protocol. The Acoustic Assessment considers that:

- Required noise reductions presented in the Concept Plan are based on the Ingeteam model "*Ingecon Sun Power B Series*" inverter noise output specifications and the presented noise reductions are only applicable if this model inverter is used
- If quieter or louder plant items are installed, different noise reduction targets will apply
- Advancements in solar inverter technology may lead to the availability of quieter equipment items at the time of final plant selection for the Project, such that the full extent of noise control measures (as discussed in the Acoustic Assessment) may not be required.

It is therefore requested that an appropriately worded condition be considered, that will require that prior to commencement of construction, during the detailed design stage of the Project, the Acoustic Assessment be revisited or refreshed based on the latest technology available at that point in time. It is anticipated that any updated assessment would be provided to DELWP for endorsement prior to construction.

Some of the PCUs that cause the noise limit non-compliance are located at the BESS site. The BESS will be able to discharge energy at all hours of the day, not just between 7am and 10pm – so how can we be sure these fans will not be operating at full speed outside these hours?

As discussed at Section 4.3 of the Acoustic Assessment (refer to Attachment A), *'the inverters associated with the BESS facility were modelled at the louder condition (fans at 100% and nominal power), as this plant could potentially operate at full capacity during any period.'*

More generally I am concerned that this application is not resolving the problem of noise up-front. The acoustic report recommends PCUs be located further from dwellings, but this design response is not shown on the proposed development plans. The acoustic report recommends noise walls around PCUs of up to 5m high but does not show this on the development plans or assess the visual impact of these. What we need is a solution to the noise problem to be integrated into the proposal, rather than worked out later. Preferably, utilising all of the proposed methods, so a worst-case-scenario can be assessed with regard to matters such as visual impacts.

The Application Plans (refer to Attachment B) have been updated to include the noise control measures outlined in the Acoustic Assessment (refer Section 4.4 Noise Control Measures and 6.0 Summary). These proposed mitigation measures include:

- 14 PCUs fitted with enclosures to achieve 10 dB of noise reduction, or an overall Sound Power Level of 84 dB(A) with the fans running at 100% and nominal power operation
- 5 PCUs with enclosures fitted to achieve 10 dB of noise reduction, plus acoustic screening to further reduce the noise emissions by 5 dB
- All PCUs in the BESS facility fitted with enclosures to achieve 10 dB of noise reduction.

The only PCUs with proposed acoustic screens are sited along Lake Mokoan Road, and immediately south of 81 Lake Mokoan Road, where the PCU's are not elevated. Here, the PCU's reach a height of approximately 2.5 metres, and the acoustic screens will reach approximately 3 metres. Further, the acoustic screens will be located behind the proposed 10 metre dense landscaping in these locations (refer to the Landscape Plan provided in the 18 June 2021 RFI Response and S50 Amendment and section 3.3.2 of the Early Works Strategy provided in the 26 August 2021 RFI Response). The acoustic screens can also be painted to blend into the landscape.

Figure 3 shows an extract of the application plan legend showing the symbols that indicate the four different types of PCU's and the two different types of noise mitigation that apply to the PCUs, as outlined above.

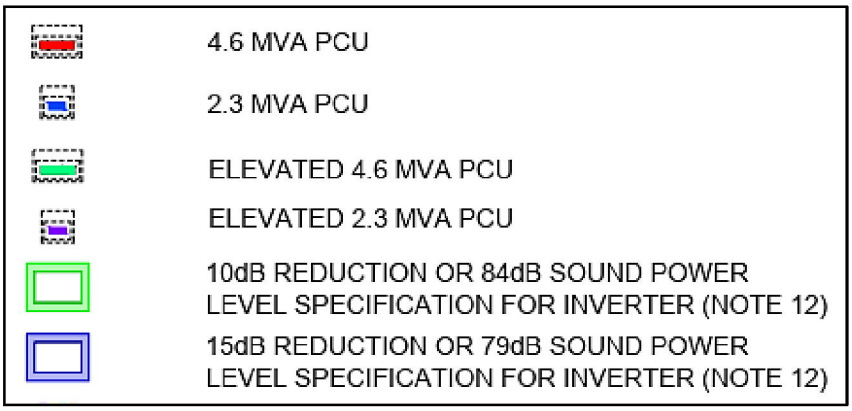

Figure 3 Application Plan Legend Extract – PCUs

4.0 CONCLUSION

We trust that the further information provided in this letter and the enclosed documentation satisfies DELWP's further RFI and that the application can now proceed to the notice and review process, noting that Lightsource bp intend to undertake some consultation activities in the coming weeks, prior to the formal public notification period.

Should you require any additional information or would like to discuss any aspect of the application please do not hesitate to contact me.

Yours faithfully

[redacted]

Associate Director - Planning

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