ADP Consulting : Engineering

Yelta Solar Farm

Noise Impact Assessment

Prepared for: Green Gold Energy

Project No: MEL3099
Date: 4 March 2022
Revision: 02

Creating great environments with great people

Project:	Yelta Solar Farm
Location:	6 Meridian Road Yelta, VIC 3505
Prepared by:	ADP Consulting Pty Ltd Level 11, 60 Albert Road South Melbourne VIC 3205
Project No:	MEL3099
Revision:	02
Date:	4 March 2022

Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisa-tion & QA	Signature
00	24.11.2021	DRAFT	AS		TC		TC	
01	17.12.2021	Final	AS		TC		TC	
02	04.03.2022	RFI response	JMa		TC		TC	

Project Team	
Client / Principal	Green Gold Energy

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1. Introduction

1.1 Document purpose

ADP Consulting has been engaged by Green Gold Energy C/o Chris Smith & Associates to conduct a noise impact assessment for a Solar Farm to be located at 6 Meridian Road, Yelta.

This report has been prepared to provide acoustic design advice for documentation by others and addresses the impact on noise sensitive receivers from the operation of the proposed development.

It is understood that this document will be submitted in support of a planning application lodged to the relevant authorities.

It is the responsibility of the contractor to ensure the implementation of the acoustic design intent of this document, including compliance with any criteria, codes, standards, specifications.

1.2 Referenced drawings, codes and standards

The following drawings, conditions and other project-specific information have been referenced in the preparation of this report:

- Department of Environment Land, Water and Planning's Request for Further Information (Appl. Ref. PA2201498), dated 14 February 2022. (DELWP RFI)
- Green Gold Energy, 6 Meridian Road Site Plan, Rev B, dated 03 November 2021.
- SMA Solar Technology, Sunny Central UP Datasheet Version 2.6
- SMA Solar Technology, White Paper BU-LS-001: Sunny Central UP, dated 23 September 2019.
- NEXTracker, Motor Sound Test Summary, dated March 2017.

The following guidelines, standards and regulatory requirements have been used to define the site-specific acoustic criteria for the development and conduct an acoustic assessment:

- EPA Victoria, Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Publication 1826.4), dated 4 May 2021 (EPA Noise Protocol)

1.3 Department of Environment Land, Water and Planning Request for Further Information

In their request for further information (RFI), the DELWP request the following:

4. Updated Acoustic Assessment to include:

> *Modelling of noise emissions from the solar farm of all sensitive receivers within 500m of the site. Please confirm the acoustic assessment covers relevant sensitive receivers to confirm the entire project has been sufficiently considered. The acoustic plans should be updated to demonstrate this.*

Sensitive receivers identified in requested boundary have been assessed in Section 3.2.

1.4 Project summary

The following is understood by ADP Consulting regarding the proposed Yelta Solar Farm:

> The power export system will consist of 12,844 modules, distributed across 494 strings
> The strings will be attached to tracking motors, which will orient the panels throughout daylight hours
> There will be one (1) centralised inverter located on site, make/model SMA Solar Technology 4600
> The power export capability of the site will be 6.42 MW

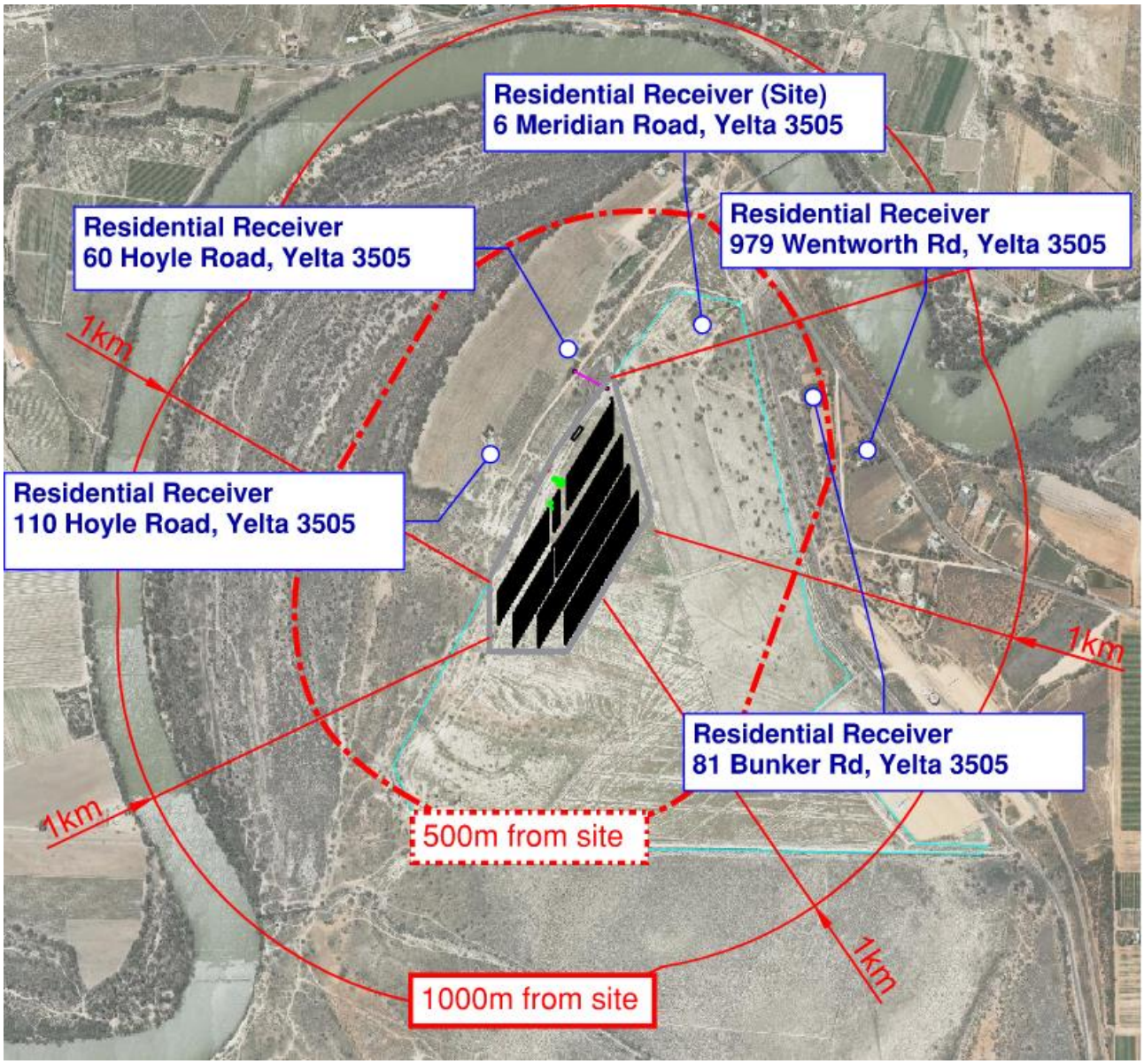
1.5 Site investigations

Based on our desktop site investigations we have identified the following as the nearest noise-sensitive receivers to the proposed development:

> 60 Hoyle Road, Yelta 3505: residential dwelling, approximately 150 metres to the northwest
> 110 Hoyle Road, Yelta 3505: residential dwelling, approximately 180 metres to the west
> 6 Meridian Road, Yelta 3505: residential dwelling, approximately 280 metres to the northeast (on site)
> 81 Bunker Road, Yelta 3505: residential dwelling, approximately 500 metres to the east
> 979 Wentworth Road, Yelta 3505: residential dwelling, approximately 600 metres to the east

Figure 1 contains a markup of the site layout with locations of the noise-sensitive receivers.

Figure 1 Proposed site plan with equipment layout and locations of the nearest noise-sensitive receivers



2. Noise emission criteria

Noise emission restrictions apply to the operation of the proposed development. These must be planned, designed and installed to include suitable sound attenuation, and other necessary acoustic treatments. This report provides an approach that needs to be incorporated in the proposed development to meet the noise emission requirements of the EPA Noise Protocol.

2.1 Criteria – EPA Noise Protocol

Noise emission criteria for the proposed development have been determined based on the methodology contained in the EPA Noise Protocol for commercial, industrial and trade premises.

The project site is located in a Farming (FZ) zone. The Hoyle Road residential receivers are in a FZ zone with an intervening PCRZ zone separating the Solar Farm and the dwellings. All other residences are located in FZ zones with no intervening zones

The noise emission criteria have been determined from the receiver zone levels and distance adjustments scheduled in Part I of the EPA Noise Protocol. It should be noted that the cumulative noise emissions from the operations of the proposed development are to meet the specified noise criteria in Table 1. We note that

Table 1 Noise emission criteria summary

Receiver	Time Period, 24 Hr	Site Specific EPA Noise Protocol, Criteria, dB(A)
110 Hoyle Road	Day (07:00-18:00)	44
	Evening (18:00-22:00)	39
	Night (22:00-07:00)	34
60 Hoyle Road	Day (07:00-18:00)	45
	Evening (18:00-22:00)	40
	Night (22:00-07:00)	35
6 Meridian Road (on site)	Day (07:00-18:00)	46
81 Bunker Road	Evening (18:00-22:00)	41
979 Wentworth Road	Night (22:00-07:00)	36

3. Noise assessment and recommendations

3.1 Equipment noise levels

The sound power levels of major equipment to be used in the development are scheduled in Table 2. We note that in some instances these have been estimated, and the noise levels are to be used as a guide only. The major source of noise emission is expected to be from the inverter station and SVG.

Table 2 Sound power levels of major plant and equipment

Equipment	Sound Power Level, dB(A)
Solar Inverter - SMA Sunny Central UP (each, 1off)	91
Tracker Motor – NEXTracker (each, approx. 169off)	49
SVG – Static Var Generator (each, 1off)	90

It has been noted that photovoltaic inverters typically generate noise which can be characterised as a hum and are likely to tonal in nature (as defined in the EPA Noise Protocol). We have factored in these tonal characteristics in our calculations.

3.2 Noise assessment

A prediction of the noise emission from the proposed equipment operating on-site has indicated compliance with the EPA Noise Protocol criteria in Section 2.1.

In our assessment, the following was considered:

- The maximum sound power levels of equipment, scheduled in Section 3.1.
- Equipment may operate in the early morning (particularly in summer) before 7am.
- The main source of noise emission from SVG enclosures is from fans, which are orientated such that the noisy component is facing away from the noise-sensitive receivers.
- Noise emission penalties apply due to the tonal characteristics of the photovoltaic inverters.

As the solar inverters are likely to be tonal in nature, we have applied the qualitative tonality adjustment using the methodology presented in the Noise Protocol. This resulted in a total penalty adjustment of 2 dB(A) for solar inverter noise emission.

We have used distance sound attenuation formulas for the solar inverters and tracking motors in an unshielded free field (i.e., free from buildings, barriers, mounds or hills, etc.). We believe that this is the most conservative approach as any shielding between the inverters and receivers has not been included.

Table 3 schedules the calculated noise levels at the worst affected noise-sensitive receivers and checks for compliance with the Noise Protocol criteria. We note that compliance at these locations would indicate compliance at other nearby noise-sensitive receivers.

Table 3 Noise emission assessment, EPA Noise Protocol criteria

Receiver	Time of Day	Predicted Noise Levels, dB(A)	EPA Noise Protocol Criteria, dB(A)	Complies? (Yes/No)
110 Hoyle Road, Yelta	Day (07:00-18:00)	33	44	Yes
	Evening (18:00-22:00)	33	39	Yes
	Night (22:00-07:00)	33	34	Yes
60 Hoyle Road, Yelta	Day (07:00-18:00)	29	45	Yes
	Evening (18:00-22:00)	29	40	Yes
	Night (22:00-07:00)	29	35	Yes
6 Meridian Road (on site)	Day (07:00-18:00)	28	46	Yes
	Evening (18:00-22:00)	28	41	Yes
	Night (22:00-07:00)	28	36	Yes
81 Bunker Road	Day (07:00-18:00)	27	46	Yes
	Evening (18:00-22:00)	27	41	Yes
	Night (22:00-07:00)	27	36	Yes
979 Wentworth Road	Day (07:00-18:00)	26	46	Yes
	Evening (18:00-22:00)	26	41	Yes
	Night (22:00-07:00)	26	36	Yes
All other receivers	Day (07:00-18:00)	<26	46	Yes
	Evening (18:00-22:00)	<26	41	Yes
	Night (22:00-07:00)	<26	36	Yes

3.3 Recommendations

We understand that the main source of noise emission from SVG enclosures is from ventilation fans. Based on this assumption, we recommend that the enclosure should be orientated such that noise emitting components (ie. the fans) are facing away from the residential receivers on Hoyle Road to the west.

4. Conclusion

Current regulations and standards associated with the proposed development have been reviewed and assessed in accordance with existing site constraints.

Noise emissions have been predicted at the nearest noise-sensitive receivers using a conservative approach, that indicates compliance with site-specific EPA Noise Protocol criteria.

Based on our assessment, we believe that there are no site conditions or statutory requirements that would preclude this development from complying with the criteria defined in this report.

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