Limondale Sun Farm
Modification 1 SSD 8025

Environmental Impact Assessment

Limondale Sun Farm Pty Ltd | 29 Jun 2018

Limondale Sun Farm

Final

Report J180139RP1 | Prepared for Limondale Sun Farm Pty Ltd | 29 June 2018

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1 Introduction

1.1 Development context

The Limondale Sun Farm is a large-scale solar photovoltaic (PV) generation facility approximately 14 kilometres (km) south of Balranald in south-western NSW (the project). The project is State significant development (SSD) and was granted development consent (SSD 8025) under Section 4.38 (previous Section 89E) of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 31 August 2017.

The project will have an estimated nominal export capacity in the order of 250 megawatts (MW) that will connect to the TransGrid Balranald substation. The proponent of the approved project is Limondale Sun Farm Pty Ltd (Limondale).

1.2 Site description

The approved project site encompasses an area of approximately 2,049 hectares (ha) of privately owned land, of which 1,025 ha comprises the development footprint. The legal description of the project site is given in Table 1.1.

Table 1.1 Legal description of approved project site

Lot number	Deposit Plan (DP)	Tenure	Project elements
4, 12, 13, 15, 21, 71	751179	Freehold	Solar farm infrastructure
11, 12	751173	Freehold	
2	1017111	Freehold	
1, 2	1190069	Freehold	
7306, 7307	1158277	Travelling stock reserve	Site access road
48	1015985	TransGrid substation	Connection infrastructure to existing TransGrid substation

The site is zoned RU1 Primary Production under the Balranald Local Environmental Plan 2010 (Balranald LEP).

1.3 Overview of the proposed modification

A modification to the approved project is sought, and involves the following:

- subdivision of Lot 12 DP 751179, which incorporates the approved substation for the Limondale Sun Farm within the approved development footprint, into two allotments of approximately 2 ha and 17.8 ha respectively. The 2 ha allotment will accommodate the TransGrid owned infrastructure, with 17.8 ha comprising the balance of the parcel of land after subdivision; and

- amendment to the proposed height of the solar panels, from 2 metres (m) to 4 m, and improved panel arrangement.

1.4 Approvals pathway

A development consent may be modified under Clause 4.55, Part 4 of the EP&A Act provided that a development consent is in place and that the proposed modification is substantially the same development as the development for which the consent was originally granted.

Clause 4.55 further provides for three types of modification:

(1) modifications involving minor error, misdescription or miscalculation;

(1A) modification involving minimal environmental impact; and

(2) Other modifications.

This modification represents at type 1A modification.

Further information on the planning and assessment process is provided in Chapter 3.

1.5 The applicant

The applicant for the Limondale Sun Farm project is Limondale Sun Farm Pty Ltd ("Limondale").

Limondale's contact details are:

Mr Brett Thomas, Director
Limondale Sun Farm Pty Ltd
23 Milton parade, Malvern, VIC 3144
Email: Brett.thomas@overlandsunfarming.com.au

1.6 Report structure

This document describes the site, proposed modification and environmental assessment of the likely impacts over and above the existing impacts and is structured as follows:

- Chapter 1 – Introduction. This chapter introduces the project, the site, the applicant and the report structure.
- Chapter 2 – Proposed modification. This chapter describes the objectives and justification of the proposed modification.
- Chapter 3 – Legislative context. This chapter discusses the relevant planning legislation, planning instruments and planning pathway.
- Chapter 4 – Consultation. This chapter outlines stakeholder consultation for the proposed modification.
- Chapter 5 – Environmental assessment. This chapter discusses potential environmental impacts of the proposed modification.
- Chapter 6 – Conclusion. This chapter describes the amendments to development consent SSD 8025.

2 Proposed modification

2.1 Overview

The proposed modification comprises two elements:

- subdivision of the existing Lot 12 DP 751179 (currently 19.8 ha) into two new lots to provide for the sale of approximately 2 ha of Lot 12, being the land associated with the approved electricity substation; and
- amendment to the proposed height of the solar panels, from 2 metres (m) to 4 m, and improved panel arrangement.

The proposed modification is described below.

2.2 Subdivision

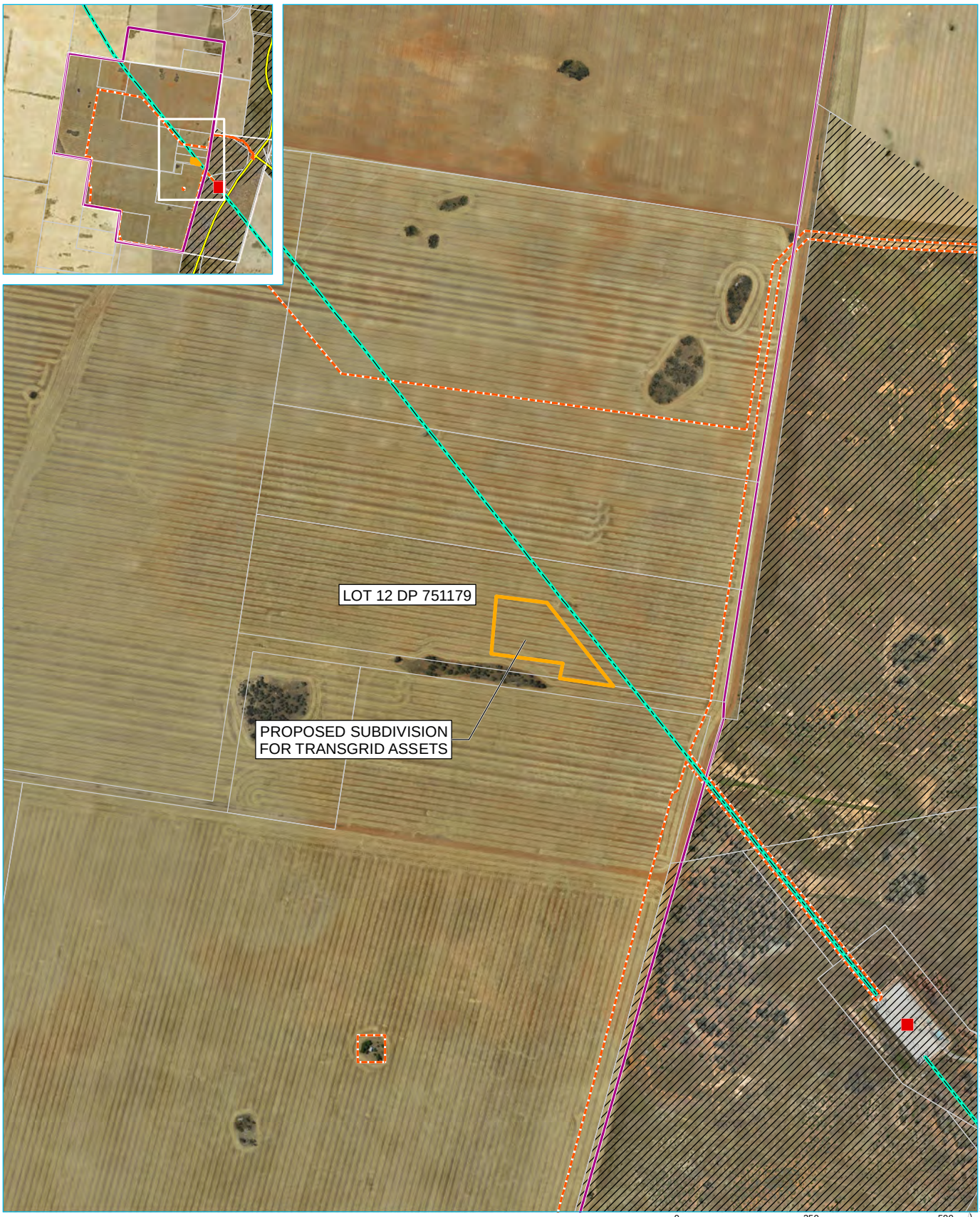
The proposed modification seeks to subdivide Lot 12 DP 751179, which incorporates the substation site, into two allotments. These new lots are temporarily identified as Lot 1 and Lot 2 in this assessment. Lot 1 will be approximately 2 ha and Lot 2 will be approximately 17.8 ha, after subdivision. The proposed lot boundaries after subdivision are presented in Figure 1.

The subdivision is to allow for the sale of land in Lot 1 to the Electricity Transmission Ministerial Holding Corporation (for TransGrid).

TransGrid will own components of the substation and telecommunications equipment to be developed and these will be wholly within the boundaries of the proposed Lot 1. Ownership of the land underlying its portion of the substation allows TransGrid to install appropriate control and protection equipment in the substation to continue to support and ensure safe operation of the electricity network in the western area of NSW, and to meet the network control and protection requirements under the National Electricity Rules.

The facilities to be situated within the proposed new lot, Lot 1, are consistent with the *Limondale Sun Farm Environmental Impact Assessment* (EIS) (EMM Consulting Pty Ltd (EMM) 2017), and would be as follows:

- Lot 1 comprising TransGrid owned assets. The concept design indicates that the lot will be approximately 2 ha. The lot will accommodate the TransGrid owned components of the approved onsite substation that includes ancillary connection equipment, transformers, connecting transmission lines, maintenance building, staff amenities, associated switchgear, control and telecommunications equipment, security fence, access track and gravel areas.
- Lot 2 comprising a portion of the Limondale Sun Farm, with a size of approximately 17.8 ha. This includes the solar array infrastructure as well as the Limondale Sun Farm components of the substation.



Source: Overland Sun Farming Company (2017); EMM (2017); LPMA (2011); DECCW (2010)

0 250 500 m

GDA 1994 MGA Zone 54

N

KEY

- Balranald substation
- 220 kV electricity transmission line
- Major road
- Cadastral boundary
- Travelling stock reserve
- Site boundary
- Development footprint
- Proposed subdivision for Transgrid assets

Proposed subdivision

Limondale Sun Farm
Modification 1
Figure 1

EMM

\\Emmsvr1\emmJobs\2018\J180139 - Limondale and Hillston SSD MOD1\GIS\02_Maps\G001_SiteFeatures_20180606_02.mxd 6/06/2018

2.3 Panel height amendment

The project's design is undergoing a detailed engineering design process to enable commencement of construction in 2018. This process has identified an opportunity to improve the energy generating efficiency of the project and provide additional electrical support to the TransGrid network system through the adoption of proven solar tracking and module technology constructed within the infrastructure area approved under the development.

A modification to the solar tracking and module technology is proposed, which would result in a height increase of solar panel infrastructure. The function of the solar module tracking system is to track the trajectory of the sun which results in the maximum height of the solar module occurring typically for a portion of time during the early morning and later afternoon. Under the approved project, a tracker row would comprise a row of single PV solar panels, typically in a portrait orientation, with an average height of approximately 1.2 m and a maximum of 2 m during the morning and afternoon periods. Photographs 2.1 and 2.2 illustrate typical solar panels under the approved project.

The proposed modification involves a revised panel arrangement comprising four panels in either a landscape or portrait orientation installed along a tracker row. This would require an increase in the maximum height of the solar arrays from the approved 2 m to a proposed 4 m. This change results from an increase in the height of the tracking base frame above the ground and an improved panel arrangement on each tracking row. Tracker rows would be spaced further apart compared to the approved project, which would improve efficiencies for installation, operations and maintenance.

Photograph 2.3 is an example of a possible panel arrangement under the proposed modification, which illustrates four solar panels orientated in a landscape arrangement along each row. Photograph 2.4 illustrates the two solar panel arrangements (ie approved and proposed); the multiple rows of panels in the top half of the photograph are representative of the panels under the approved project; the two bottom rows are typical of the type of panel arrangement under the proposed modification. The later illustrates four panels fixed in a landscape orientation, with a greater number of panels incorporated along a tracker row compared to the rows of single panels in the top half of the photograph. The wider spacing between tracker rows is also illustrated. The photographs are typical of the type of solar tracking and module technology proposed, however the final design and arrangement is subject to detailed design.

The footprint of the solar array infrastructure would reduce from approximately 790 ha to approximately 740 ha. An updated general layout is provided in Figure 2. A comparison of the PV solar panel footprint of the approved project compared to the solar tracking layout under the proposed modification is presented in Figure 3.

The proposed amendment will enable Limondale to install a more efficient PV solar panel array, a change from modules with approximately 17% efficiency to a module with greater than 19% efficiency, which provides additional support to the TransGrid electrical network within the approved development footprint. The amended PV solar panel arrangement will allow greater PV surface area, optimised PV-string bundling thus minimising impacts on ground such as additional piles driven in the ground and excavations for cablings. The solar arrays would be fixed to a more advanced sub-structure solution, reducing the materials required for the solar plant and its overall footprint. The changes to the tracking system will allow the construction of the solar farm utilising less materials and requiring less installation effort. The total number and surface area of PV panels will be dependent on detailed design and final technology adopted.

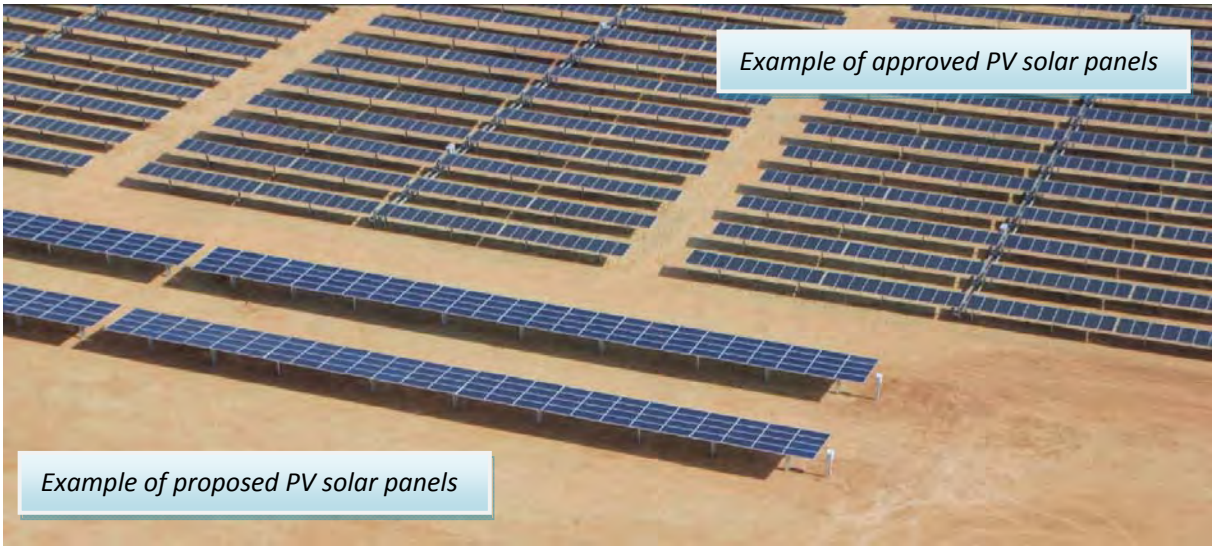
The revised panel arrangement will be wholly within the approved development footprint for the Limondale Sun Farm. No additional areas outside those previously assessed and approved are required to achieve the improvements.

Overall, the incorporation of more efficient panels will increase the solar energy generation efficiency of the project by approximately 0.9% for the same sent out energy generation as initially proposed (being 250 MW), whilst reducing the solar field footprint area by approximately 6.3%.

Photograph 2.1 **Example of typical PV solar arrays for the approved project – photomontage of rows of single PV solar panels along tracking rows**

Photograph 2.2 **Example of typical PV solar arrays for the approved project comprising single PV solar panels along tracking rows**

Photograph 2.3 **Example of typical arrangement of PV solar panel arrays for the proposed modification – typical tracker rows comprising four PV solar panels orientated in a landscape arrangement along the length of the row**



Photograph 2.4 **Example of PV solar arrays for the approved project (single axis tracking panels) and solar panel arrays under the proposed modification**

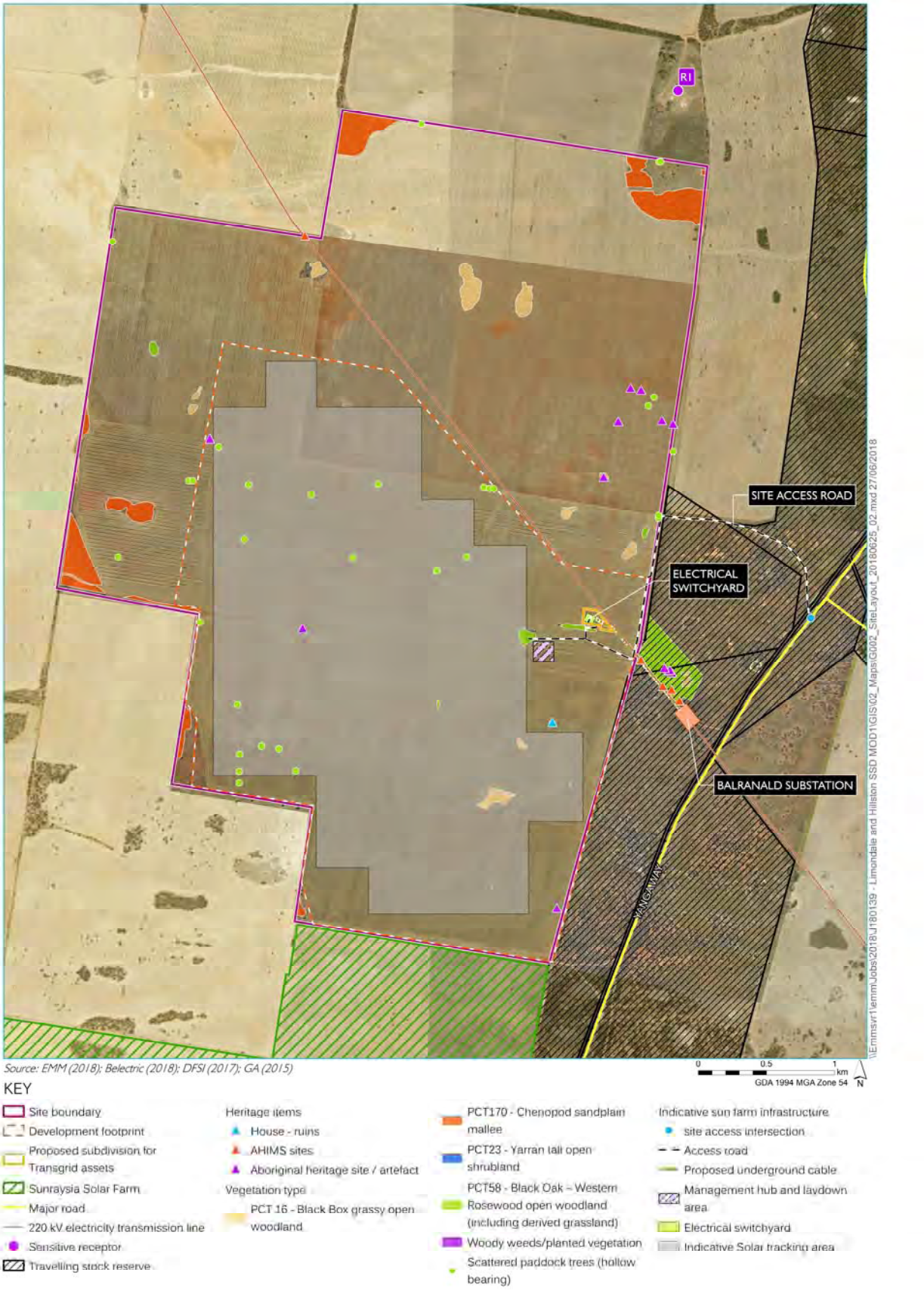


Figure 2 Revised general layout of the Limondale Sun Farm

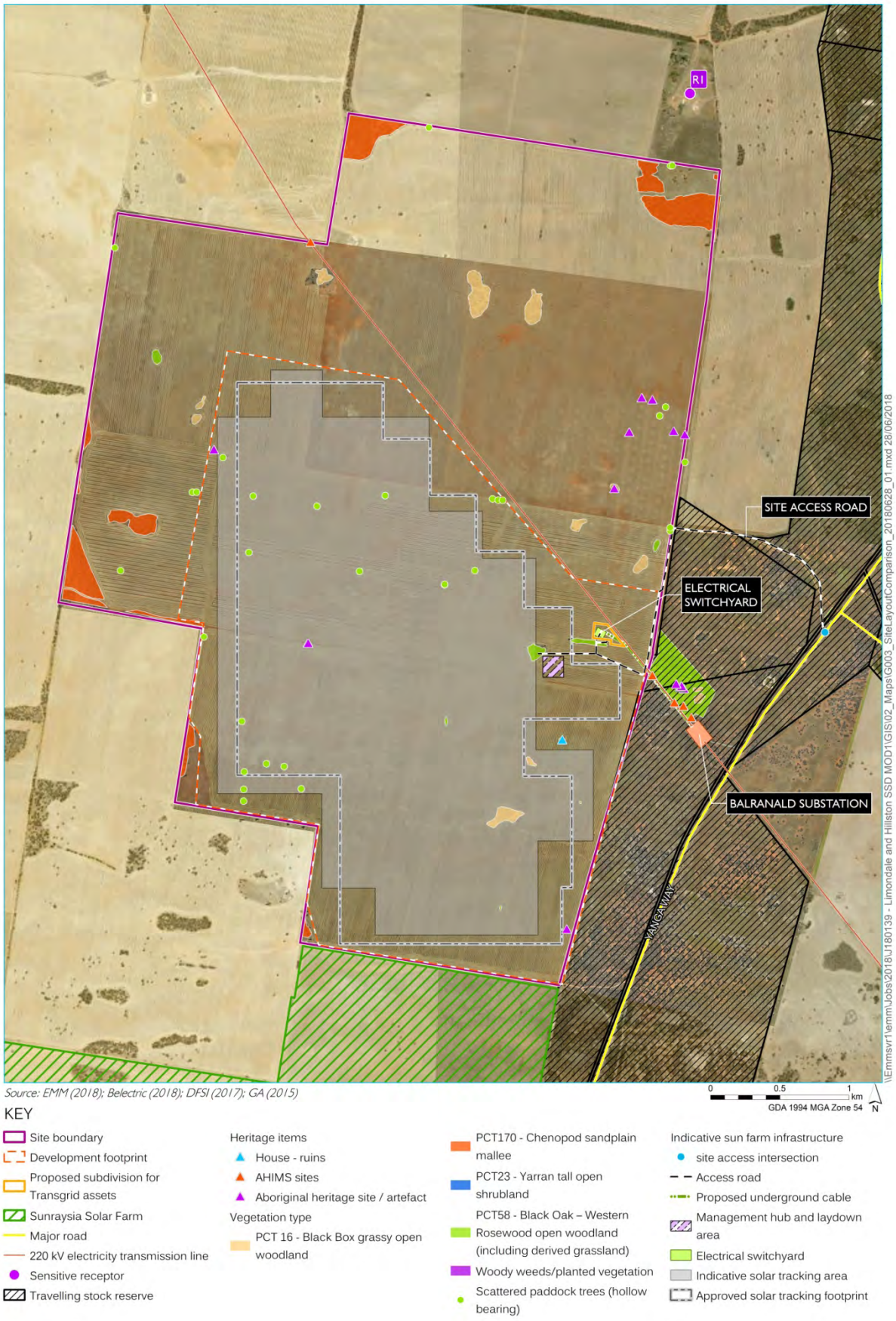


Figure 3 **Comparison of the approved solar panel layout with the proposed solar tracking layout**

3 Legislative context

3.1 Environmental Planning and Assessment Act 1979

3.1.1 Modification of a development consent

Development consents, in general, may be modified under Section 4.55 (previously Section 96), Part 4 of the EP&A Act.

The relevant clause under 4.55 'Modification of consents – generally' of the EP&A Act states:

> 1A. Modifications involving minimal environmental impact
>
> A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:
>
> a) it is satisfied that the proposed modification is of minimal environmental impact, and
>
> b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before the consent as originally granted was modified (if at all), and
>
> c) it has notified the application in accordance with:
>
> i) the regulations, if the regulations so require, or
>
> ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and
>
> d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

The proposed modification is substantially the same development as the development for which the consent was originally granted and is of minimal environmental impact. Further information on the impact assessment is provided in Chapter 5.

3.1.2 Subdivision certificate

Under Clause 6.2, Part 6 of the EP&A Act, the Act defines subdivision of land as the division of land into two or more parts that, after the division, would be obviously adapted for separate occupation, use or disposition.

The same Clause states that subdivision of land includes the procuring of the registration in the office of the Registrar-General of a plan of subdivision within the meaning of Section 195 of the *Conveyancing Act 1919* (Conveyancing Act).

Plan of subdivision defined under the Conveyancing Act means a plan that shows the division of an existing lot into two or more new lots.

A subdivision certificate is required for the subdivision of land under Division 6.2 of the EP&A Act. It is a certificate that authorises the registration of a plan of subdivision under Part 23 of the Conveyancing Act. When issued, the subdivision certificate is taken to be part of the development consent that authorised the carrying out of the subdivision.

3.2 Conveyancing Act 1919

Under Section 23F of the Conveyancing Act, a transaction in land can be for the conveyance or transfer of part of an existing lot.

The plan must be a deposited plan of subdivision; bear a completed subdivision certificate (refer to Section 3.1.2), and be a survey, complying with the normal requirements for plan preparation and lodgement.

3.3 Environmental Planning and Assessment Regulation 2000

The relevant Clause 115 under Division 12 Development consents – extension, completion and modification of the Environmental Planning and Assessment Regulation 2000 (the Regulation) states that an application for modification of a development consent under Section 4.55 (1), (1A) or (2) or 4.56 (1) of the EP&A Act must contain the tabulated in Table 3.1.

Table 3.1 Information required for a modification application

Relevant clause	Requirement	Section addressed
(1) (a)	the name and address of the applicant;	Chapter 1
(b)	a description of the development to be carried out under the consent (as previously modified);	Chapter 1
(c)	the address, and formal particulars of title, of the land on which the development is to be carried out;	Chapters 1 and 2
(d)	a description of the proposed modification to the development consent;	Chapter 2
(e)	a statement that indicates either:	
(i)	that the modification is merely intended to correct a minor error, misdescription or miscalculation, or	N/A
(ii)	that the modification is intended to have some other effect, as specified in the statement;	Chapter 2
(f)	a description of the expected impacts of the modification;	Chapter 5 and Appendix B
(g)	an undertaking to the effect that the development (as to be modified) will remain substantially the same as the development that was originally approved;	Chapter 5 and 6
(g1)	in the case of an application that is accompanied by a biodiversity development assessment report, the reasonable steps taken to obtain the like-for-like biodiversity credits required to be retired under the report to offset the residual impacts on biodiversity values if different biodiversity credits are proposed to be used as offsets in accordance with the variation rules under the Biodiversity Conservation Act 2016;	N/A
(h)	if the applicant is not the owner of the land, a statement signed by the owner of the land to the effect that the owner consents to making of the application (except where the application for the consent the subject of the modification was made, or could have been made, without the consent of the owner);	Provided separately

Table 3.1 Information required for a modification application

Relevant clause	Requirement	Section addressed
(i)	a statement as to whether the application is being made to the Court (under Section 4.55) or to the consent authority under section 4.56), and, if the consent authority so requires, must be in the form approved by that authority.	N/A

3.4 Balranald Local Environmental Plan 2010

Balranald LEP is the local planning instrument relevant to the site. Any subdivision of land to which the Balranald LEP applies requires development consent.

The lot the subject of the proposed subdivision is zoned RU1 Primary Production.

Under Part 4 of the Balranald LEP, land in the rural zones including RU1 may be subdivided, with development consent, for the purpose of primary production to create a lot of a size that is less than the minimum size. The minimum lot size for the subject site is 40 hectares.

The proposed subdivision does not meet the requirements of the Balranald LEP.

Section 4.38 of the EP&A Act (previous Section 89E) provides at sub-section (3) that, with respect to State significant development,

> Development consent may be granted despite the development being partly prohibited by an environmental planning instrument

The development is characterised as electricity generating works (solar farm) and the subdivision is characterised as a minor part of that development. Accordingly the proposed subdivision may be determined by the consent authority notwithstanding the non-compliance with the minimum lot size requirements of the Balranald LEP.

3.5 Approvals required

As outlined above, the proposed modification requires development consent under Clause 4.55 (1A), Part 4 of the EP&A Act.

4 Consultation

Key stakeholders identified for consultation regarding the proposed modification include:

- Department of Planning and Environment (DPE);
- Balranald Shire Council;
- TransGrid; and
- Landowner.

4.1 Department of Planning and Environment

The applicant consulted with representatives from the DPE. Teleconferences were held on 23 and 28 February 2018 outlining the proposed modification to seek comment.

4.2 Balranald Shire Council

A letter of support from Balranald Shire Council (the Council) dated 10 May 2018 for the proposed subdivision of land was received (refer to Appendix A).

The Council was informed of the requirement to subdivide Lot 12 DP 751179 to enable NSW Electricity Networks Operations Pty Limited (as trustee for NSW Electricity Networks Operations Trust and trading as TransGrid) to host the required electrical infrastructure for connection of the project to the Balranald substation and National Electricity Market (NEM).

The Council supports the proposed subdivision request in principle as it is not likely to create additional impacts to those described in the original EIS. However, Council would encourage DPE to impose mechanism to facilitate compliance with the Balranald LEP after the site is decommissioned.

4.3 TransGrid

TransGrid issued a letter of support on 11 May 2018 for the proposed subdivision of Lot 12 DP 751179 for the purposes of the construction, operation and maintenance of an electrical substation that will form part of the project connection works (refer to Appendix A) for the Limondale Sun Farm.

TransGrid considers the proposed subdivision of no additional impacts to those described in the original EIS.

4.4 Landowner

The applicant consulted with the landowner of Lot 12 DP 751179 and the landowner has agreed to the subdivision for the purposes of the substation.

5 Impact assessment

This section assesses the potential environmental, social and economic impacts arising from the proposed modification. An initial assessment by the proponent of environmental impacts resulting from the proposed modification indicated that visual impacts associated with the panel height amendment were the primary consideration. Consultation with DPE regarding the proposed modification confirmed that an assessment of visual impacts is required to support the modification. Consideration of the other environmental, social and economic aspects as a consequence of the proposed amendment is provided in this section.

The environmental factors were addressed in the original EIS have been considered in respect of the modification:

- biodiversity;
- aboriginal cultural heritage;
- land;
- noise and vibration;
- traffic and transport;
- visual
- water;
- hazards;
- air quality;
- socio-economic; and
- cumulative impacts.

The assessment of the proposed subdivision is provided in Section 5.1, and the proposed panel height amendment is assessed in Section 5.2.

5.1 Proposed subdivision

The assessment of the environmental impacts is tabulated below. No additional adverse impacts are expected as a result of the proposed subdivision.

Table 5.1 Impact assessment – proposed subdivision

Environmental factor	Response	Impact
Biodiversity	A biodiversity assessment report was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the subdivision and, therefore, no additional impact on native vegetation, fauna and fauna habitat.	No additional impact

Table 5.1 Impact assessment – proposed subdivision

Environmental factor	Response	Impact
Aboriginal cultural heritage	An Aboriginal cultural heritage assessment report was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed subdivision and, accordingly, no additional impact on any item or feature of Aboriginal cultural heritage.	No additional impact
Land	The proposed subdivision remains within the development footprint from the original EIS. Any impact from infrastructure that may affect land use has been considered and assessed in the original EIS. The lot size created by the subdivision is less than the minimum lot size provided in the Balranald LEP but the establishment of an electricity substation on the new lot remains consistent with the stated aims of the LEP. Therefore, the proposed subdivision will have a negligible impact on the land use.	Negligible impact
Noise and vibration	The proposed subdivision will not generate noise and vibration, therefore, there will be no impact on the closest receiver, approximately 1.1 km away.	No additional impact
Traffic and transport	The proposed subdivision will not require additional road infrastructure or access arrangements that may affect traffic, transport or road safety that was considered in the original EIS. Therefore, it will not have any additional impact on traffic and transport.	No additional impact
Water	The proposed subdivision will not change the nature of the potential hydrology, water use and water quality impacts. Therefore, no additional impact is identified.	No additional impact
Hazards	The proposed subdivision will not contaminate the land and will not cause bushfire hazard. No additional impact is identified.	No additional impact
Air quality	The proposed subdivision will not generate air pollution. Therefore, no additional impact is identified.	No additional impact
Socio-economic	The proposed subdivision will not generate any adverse community or socio-economic impact. The subdivision will, however, enable the establishment of the substation and this will provide a crucial link to the renewable energy market, which will deliver positive social and economic impacts.	Positive impact

The proposed subdivision will have negligible adverse impact on the environment, and is consistent with Clause 4.55 (1A) which relates to modifications of minimal environmental impact, which are substantially the same development as the development for which the consent was originally granted.

5.2 Proposed panel height amendment

5.2.1 Visual

The proposed modification involves increasing the maximum height of the PV solar panels from 2 m to up to 4 m. A viewshed analysis has been completed for the PV solar panels at the proposed maximum height of 4 m. For consistency, the updated viewshed analysis has been conducted from the eight viewpoints considered as part of the visual impact assessment from the EIS. The visual assessment of the proposed modification is provided in Appendix B.

Due to existing mature vegetation, variable elevation and undulation in the landscape, the project's infrastructure will not be visible from three of the eight viewpoints (viewpoints 1, 2 and 7). This is consistent with the approved project. Project infrastructure will be visible from one additional viewpoint compared to the approved project, Viewpoint 3 (refer Figure 2). The magnitude of change in visibility from Viewpoint 3 is considered to be low, and combined with a low visual sensitivity (ie passing motorists), the modification will not result in a significant impact.

The increase in the maximum height of the PV solar panels (ie from 2 m to 4 m) will result in some changes to the visibility of project infrastructure from viewpoints 4, 5, 6 and 8 (refer Figure 3), which are representative of motorists travelling along Yanga Way and Windomal Road. The amendment of the panel height will slightly increase the extent of the view affected by project infrastructure from these four viewpoints. However, vegetation and topography, combined with distance and the low visual sensitivity of passing motorists means that visual impacts will not change significantly compared to the approved project.

Furthermore, the modification to the height of the solar module tracking system would not alter the general visual appearance of infrastructure, which would be consistent with the approved project.

The proposed modification will result in only minor impacts compared to the approved project. Additional mitigation measures are not warranted. This visual assessment concludes that the visual impacts from the proposed modification will be generally consistent with the approved project.

5.2.2 Traffic and transport

A traffic impact assessment prepared as part of the original EIS predicted that the project will not adversely impact on the surrounding road network. The proposed amendment will not increase the type or number of heavy vehicle movements to and from the site. The heavy vehicle movements specified in the conditions of consent will continue to be adequate for the project. No changes to traffic and transport impacts will occur as a result of the proposed amendment.

5.2.3 Other environmental, social and economic aspects

An assessment of the other environmental, social and economic aspects as a consequence of the proposed amendment is provided in Table 6. This assessment is commensurate with the negligible levels of projected impacts on each aspect arising from the proposed amendment.

Table 5.2 Other environmental, social and economic aspects

Environmental factor	Assessment	Impact
Biodiversity	A biodiversity assessment report was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed amendment and, therefore, no additional impact on native vegetation, fauna and fauna habitat.	No additional impact
Aboriginal heritage	An Aboriginal cultural heritage assessment report was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed amendment and, accordingly, no additional impact on any item or feature of Aboriginal cultural heritage.	No additional impact
Historic heritage	An assessment of the potential impact of the project on historic heritage was completed as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed amendment and, accordingly, no impact on any items of local, State, National or World heritage significance.	No additional impact
Land	An assessment of the potential impact of the project on agricultural land and flood prone land, paying particular attention to compatibility of the project with the existing land uses on the site and adjacent land was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed amendment and, accordingly, no additional impact on agricultural land or existing land uses on adjacent land.	No additional impact

Table 5.2 Other environmental, social and economic aspects

Environmental factor	Assessment	Impact
Noise and vibration	A noise and vibration impact assessment prepared as part of the EIS predicted that potential construction and operation noise levels will be below relevant criteria at all assessment locations. Given there will be no significant change to any aspect of the project's construction and operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers, increases in noise emissions are not predicted.	No additional impact
Water	An assessment of the potential impacts of the project on flooding, groundwater and surface water resources was completed as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed amendment and, therefore, no additional impact on flooding, groundwater or surface water resources.	No additional impact
Hazards	As noted in the EIS, all project infrastructure will be designed in accordance with relevant industry standards. The level of hazards and risks will not increase as a result of the proposed amendment.	No additional impact
Air quality	Given there will be no significant change to any aspect of the project's construction, operations or road traffic generation which have the potential to generate emissions to the atmosphere, increases in emissions are not predicted as part of the proposed amendment.	No additional impact
Socio-economic	As noted in the EIS, the project will make important contributions to the production of renewable energy in NSW while creating employment opportunities, diversifying local revenue streams and generating direct and indirect benefits to the local economy during the life of the project. The proposed amendment will not generate additional employment over and above that approved.	No additional impact

6 Conclusion

The proposed modification involves a subdivision for the purposes of TransGrid infrastructure, and amendment of the proposed height of the solar panels to up to 4 m, including an improved panel arrangement.

The subdivision component seeks to subdivide Lot 12 DP 751179, which incorporates the substation site for the Limondale Sun Farm within the existing approved development footprint, into two allotments. These new lots are temporarily identified as Lot 1 (2 ha) in which the TransGrid owned infrastructure will be located, and Lot 2 (17.8 ha) comprising the balance of the parcel of land after subdivision. The subdivision is to allow for the sale of land in Lot 1 to the Electricity Transmission Ministerial Holding Corporation (for TransGrid). Ownership of the land underlying its portion of the substation allows TransGrid to install appropriate control and protection equipment in the substation to continue to support and ensure safe operation of the electricity network in the western area of NSW, and to meet the network control and protection requirements under the National Electricity Rules.

The proposed panel height amendment presents an opportunity to improve the energy generating efficiency of the project, and can be achieved within the assessed and approved development footprint. The amended solar panel arrangement will enable the adoption of proven solar tracking and module technology and provide additional electrical support to the TransGrid network system. The proposed modification will not result in significant changes to visual impacts compared to the approved project, nor changes to other environmental, social and economic aspects considered as part of the EIS.

The proposed modification is of minimal environmental impact and the development, as modified, would be substantially the same development as the development for which the consent was originally granted.

Appendix A

Letters of support – Balranald Shire Council and TransGrid

ANNEXURE A

TransGrid

BALRANALD SHIRE COUNCIL

ALL COMMUNICATIONS
MUST BE ADDRESSED TO
THE GENERAL MANAGER

Contact: RM:D18.5766

70 Market Street, Balranald NSW 2715
PO Box 120, Balranald NSW 2715
Tel: 03 5020 1300
Fax: 03 5020 1620
Email: council@balranald.nsw.gov.au
Web: www.visitbalranald.com.au

10 May 2018

Mr Iwan Davies
Senior Planner
Department of Planning & Environment
320 Pitt Street
SYDNEY NSW 2000

Dear Iwan,

Re: Limondale Solar Farm (SSD 8025) Subdivision of Land

We have been informed by Overland Sun Farming Pty. Ltd. on behalf of Limondale Solar Farm Pty Ltd (Limondale), the developer of the Limondale Solar Farm located within the Balranald Shire, that Limondale is required to subdivide a portion of land within the current bounds of Lot 12 DP751179 to enable NSW Electricity networks Operations Pty Limited (as trustee for NSW Electricity Networks Operations Trust and trading as TransGrid) to host the required electrical infrastructure for connection of the project to the Balranald substation and National Electricity Market.

Council concurs with the Department of Planning and Environment undertaking the assessment processes of the subdivision in alignment with the State Significant Development Approval.

Balranald Shire Council supports the proposal for subdivision in principle as it is not likely to create additional impact to those described in the project documentation submitted to the NSW Department of Planning & Environment under the project Environment Impact Statement.
However, Council would be appreciative of the department imposing mechanism/s to facilitate compliance with Council's Local Environmental Plan 2010 (LEP) when the site is decommissioned. For example, a requirement to consolidate the allotments to meet the minimum lot size requirement from the LEP on cessation of the use of the allotments for solar energy production.

For further enquiries in relation to this matter please do not hesitate to contact the undersigned on 03 5020 1300 during normal office hours.

Yours faithfully,

Ray Mitchell
Health & Development Officer
For the GENERAL MANAGER

TransGrid

ABN 70 250 995 390
180 Thomas Street, Sydney
PO Box A1000 Sydney South
NSW 1235 Australia
T (02) 9284 3000
F (02) 9284 3456

11/05/2018

Mr Iwan Davies
Senior Planner
New South Wales, Department of Planning & Environment
320 Pitt Street
Sydney, NSW 2000

Dear Iwan

Limondale Solar Farm (SSD 8025)
Subdivision of Land – Support from TransGrid

We confirm that Limondale Solar Farm Pty Ltd (Limondale), the owner of the Limondale Solar Farm project located within the Balranald Shire, has entered into agreements with NSW Electricity Networks Operations Pty Limited (as trustee for NSW Electricity Networks Operations Trust and trading as TransGrid) for the purpose of constructing and connecting a solar energy generation facility to the TransGrid electrical network at the Balranald substation. We further confirm that such agreements require the subdivision of existing land referred to as Lot 12/DP751179 (substantially in the form attached as Annexure A) for the purposes of the construction, operation and maintenance of an electrical substation that will form part of the project connection works.

TransGrid supports the proposal for subdivision of Lot 12/DP751179 and considers that such subdivision will have no additional impacts to those described in the project documentation submitted to the NSW Department of Planning & Environment under the project Environment Impact Statement dated 10 April 2017.

Yours faithfully,

Nigel Buchanan
Manager Infrastructure Services | Business Growth

Appendix B

Visual impact assessment of panel height amendment

27 June 2018

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Mr Iwan Davies
Senior Environmental Assessment Officer
Resource and Energy Assessments – Planning Services
NSW Department of Planning and Environment
Via email: iwan.davies@planning.nsw.gov.au

Re: Limondale Sun Farm – Modification to height of solar module tracking system

Dear Iwan,

1 Introduction

1.1 Project consent

The Limondale Sun Farm is a large-scale solar photovoltaic (PV) generation facility approximately 14 kilometres (km) south of Balranald in south-western NSW (the project). The project was granted development consent (SSD 8025) under Section 89E of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 31 August 2017 ("development consent"). The project will have an estimated nominal export capacity in the order of 250 megawatts (MW) that will connect to the TransGrid Balranald substation.

1.2 The proponent

The proponent for the Limondale Sun Farm project is Limondale Sun Farm Pty Ltd ("Limondale").

Limondale's contact details are:
Mr Brett Thomas
Director
Limondale Sun Farm Pty Ltd
23 Milton parade, Malvern, VIC 3144
Email: Brett.thomas@overlandsunfarming.com.au

1.3 Proposed modification

A modification to the approved project is sought, and involves the following:

- subdivision of the existing Lot 12 DP 751179 (approximately 17.9 ha) into two new lots to provide for the sale of approximately 1.9 ha of Lot 12, being the land associated with the approved electricity substation; and
- amendment to the height of the solar panels, from 2 metres (m) to 4 m, and improved panel arrangement.

This letter provides an assessment of the visual impacts of the amendment to the height of the solar panels. The impacts of the subdivision and the other environmental impacts (ie other than visual impacts) associated with the panel height amendment are considered in the modification report.

1.4 Need for the panel height amendment

The project's design is currently undergoing a detailed engineering design process to enable commencement of construction in 2018. This process has identified an opportunity to improve the energy generating efficiency of the project and provide additional electrical support to the TransGrid network system through the adoption of proven solar tracking and module technology constructed within the infrastructure area approved under the development.

The function of the solar module tracking system is to track the trajectory of the sun which results in the maximum height of the solar module occurring typically for a portion of time during the early morning and later afternoon. The proposed modification to the solar tracking and module technology would require an increase in the maximum height of the solar arrays during these periods from the approved 2 metres (m) to a proposed 4 m. This change results from an increase in the height of the tracking base frame above the ground and an improved panel arrangement on each tracking row.

The proposed modification will enable Limondale to install a more efficient PV solar panel array that provides additional support to the TransGrid electrical network within the approved development footprint and infrastructure area. The amended PV solar panel arrangement will allow greater PV surface area, optimised PV-string bundling thus minimising impacts on ground such as additional piles driven in the ground and excavations for cablings.

1.5 Purpose and context

This letter has been prepared by EMM Consulting Pty Limited (EMM) on behalf of Limondale and describes the potential visual impacts of the panel height amendment to support an application for modification of the development consent for the Limondale Sun Farm.

2 Visual impact assessment

2.1 Introduction

An initial assessment by the proponent of environmental impacts resulting from the proposed modification indicated that visual impacts were the primary consideration. Consultation with DPE regarding the proposed modification confirmed that an assessment of visual impacts is required to support the request for modification. Consideration of the other environmental, social and economic aspects as a consequence of the proposed modification is provided in the main modification report.

2.2 Visual assessment

EMM prepared a visual impact assessment for the project as part of the original environmental impact statement (EIS) (EMM 2017), which included an assessment of the likely visual impacts of the project (including glare, reflectivity and night lighting) on surrounding residences, scenic or significant vistas, air traffic and road corridors in the public domain. The visual impact assessment (the original VIA) assumed an average height of the dominant project infrastructure (ie PV solar panels) as approximately 1.2 m, and a maximum height of approximately 2 m, noting that the PV panels rotate to track the movement of the sun from east to west and that the maximum height typically occurs for periods during early morning and later afternoon when the panels are at their most vertical orientation. The viewshed analysis presented in the original VIA was based on project infrastructure with a height of 2 m.

The original VIA included consideration of potential visual impacts at eight viewpoints (viewpoints 1-8), selected based on having views of the site and their proximity to receptors and road corridors (ie Yanga Way and Windomal Road) near to the site (Figure 1).

To assess the impacts of the proposed panel height amendment, the visibility of project infrastructure at the maximum height of 4 m has been assessed using viewshed analysis. A comparison has been made between the visibility of the approved project (ie PV solar panels at up to 2 m height) to the project as proposed (ie PV solar panels with a height of up to 4 m). As noted above, panels will typically be at the most vertical orientation (and greatest height) during the early morning and late afternoon. The height of the solar panels will vary between approximately 2 m and 4 m over the course of a day.

2.2.1 Existing environment

The Limondale Sun Farm is located within the Balranald Shire local government area (LGA), on a site approximately 14 km south of the township of Balranald. The site comprises a development footprint of approximately 1,103 hectares (ha). The site has been highly modified by previous and current land uses, including land clearing, cropping, and livestock grazing. It is currently used for broad acre cropping, most recently wheat.

The site is zoned RU1 Primary Production under the Balranald Local Environmental Plan 2010 (Balranald LEP). The site's eastern boundary is adjacent to a parcel of Crown land approximately 1.5 km wide, which forms part of a travelling stock reserve (TSR) that extends further north and south. Yanga Way runs through this Crown land and provides access from the site to the regional road network including the Sturt and Murray Valley highways.

TransGrid's Balranald Substation is within the TSR, approximately 500 m from the site's eastern boundary. TransGrid's 220 kV transmission line, which runs from Darlington Point to Broken Hill, traverses the site.

The site is in a semi-rural setting, with the wider region characterised by grazing and cropping properties, large-scale farm businesses (including a property adjacent to the site's northern boundary), conservation areas, forestry (including a forest logging business approximately 5 km north of the site), scattered rural residences, villages and towns and major transport routes such as the Sturt Highway. The majority of land surrounding the site is zoned RU1 Primary Production under the Balranald LEP.

The nearest sensitive receptors are dwellings. The nearest receptor, R1, is approximately 2.9 km north of the development footprint, with a further five receptors, R2, R3, R4, R5 and R6, within approximately 6 km.

Elevation across the site varies, ranging between 62-70 m above sea level, with elevation generally increasing from north to south.

No notable scenic or significant vistas within proximity of the site have been identified.

2.2.2 Assessment method

The assessment method used in the visual impact assessment prepared as part of the EIS was based on methods outlined in the *Guidelines for Landscape and Visual Impact Assessment Third Edition* (2013) (the GLVIA), prepared by the Landscape Institute and Institute of Environmental Management and Assessment; and the *Wind Energy: Visual Assessment Bulletin AB 01 For State significant wind energy development* (2016) prepared by the DPE (the VA Bulletin). The assessment involved seven key stages:

Stage 1: View type and context – the existing landscape baseline is described noting its character and complexity;

Stage 2: **Visibility baseline assessment** – the zone of visual influence of the project is established, where appropriate through the use of computer generated zones of theoretical visibility, based on topographical data, or through fieldwork analysis. This establishes the locations where views of the project may be possible. Fieldwork is undertaken to establish the types and locations of receptors within this theoretical zone;

Stage 3: Viewpoint selection – representative public and private viewpoints of the site are selected and the project's level of exposure to them is determined;

Stage 4: Magnitude of change - the magnitude of visual change and the changes arising from the project are assessed and the need for mitigation measures evaluated;

Stage 5: Visual sensitivity – the capacity of the landscape to absorb change without a loss of quality (its visual sensitivity) is determined;

Stage 6: Evaluation of significance – the significance of change in the landscape is a function of the magnitude of change when considered against the view type/context and the sensitivity of a receptor; and

Stage 7: Mitigation – the modified and mitigated project (if applicable) is assessed and final visual impacts are described and illustrated and their significance documented.

To determine potential visibility of project infrastructure within the development footprint, the viewshed analysis for the project has been updated. The updated viewshed analysis has adopted a height of 4 m for all infrastructure within the development footprint, which is a materially conservative assumption as the maximum height of the PV solar panels will only occur during partial periods of a typical day being early morning and late afternoon and some general infrastructure will be less than this height. The viewshed analysis simulates the effects of existing vegetation (based on aerial imagery and ground-truthing) and topography on screening views.

Consistent with the methodology used in the visual impact assessment, the significance of a change in the landscape is considered to be a function of the magnitude of that change when considered against the view type/context and the sensitivity of a receptor. Typically, a noticeable change in the landscape in a rural or natural landscape, combined with a high visual sensitivity, would be considered to be significant, whereas a change in an already heavily modified landscape would be considered slight or moderate.

i Magnitude of change

The magnitude of change on the visual landscape is one factor in determining the significance of visual impacts of the project. In accordance with GLVIA, this assessment has considered the following criteria in determining the magnitude of change on a receptor, noting that the magnitude of change has been considered in respect of the change compared to the approved project:

- whether the impact is temporary or permanent – impacts that are for a limited duration are considered less significant than those which occur for an extended period or are permanent;
- scale of change – the loss or addition of features in the view and changes in the proportion of the view affected by the project;
- degree of contrast – level of integration of new features with existing or remaining landscape elements, having regard to form, scale, height, colour, and texture;

- distance of the viewer from the altered elements in the landscape – close proximity to an altered landscape will increase the significance for private residences. In the case of motorists, mid-ground changes can be greater than foreground elements as they can result in longer viewing times;
- viewing direction – whether the change is to the primary view from the receptor;
- extent of view affected – impacts that are visible over a greater portion of a view are more significant than those where only a part of the view is impacted. Intervening topography and vegetation will also affect the magnitude of change; and
- length of viewing time – views from a residence are constant whereas some views from roadways as experienced by motorists may be brief dependent upon speed and viewing direction.

ii Visual sensitivity

Visual sensitivity is a measure of the landscape's ability to absorb development without a significant change in the character. It is a function of the view type and context. In this assessment, the major factor influencing visual sensitivity is the level of contrast between the project-related infrastructure and the rural landscape setting in which it will be set.

The physical characteristics of the landscape, including existing development features, are integral components in determining the visual sensitivity. For example, a low visual sensitivity would enable a modification or addition to be made to the landscape which would only cause minimal contrast and result in a high level of integration with the surrounding landscape. Similarly, a high visual sensitivity would mean the same modification or addition to the surrounding landscape would cause high contrast to the surrounding landscape.

Consistent with the visual impact assessment prepared as part of the EIS, visual sensitivity has been assessed based on the viewer sensitivity level classification given in the VA Bulletin, presented in Table 1.

Table 1 Viewer sensitivity

Sensitivity	Description
High	Residential areas and rural villages (defined as land zoned R1, R2, R3, R4, R5 and RU5 in the NSW Standard Local Environmental Plan [LEP]). Recreation, cultural or scenic sites and viewpoints of National or State significance. Any buildings, historic rural homesteads/residences on the State or local Government Heritage List.
Moderate	Rural dwelling. Tourist and visitor accommodation (definition in the NSW Standard LEP). Recreation, cultural or scenic sites and viewpoints of regional significance.
Low	Interstate and state passenger rail lines with daily daylight services. State highways, freeways and classified main roads, classified tourist roads. Land management roads with occasional recreation traffic. Walking tracks of moderate local significance or infrequent recreation usage. Other low use and low concern viewpoints and travel routes. Navigable waterways.

The VA Bulletin establishes sensitive land use designations, including key National and State sensitive land use designations and potentially sensitive land use zones under the local environmental plans prepared under the EP&A Act. The site is not within a sensitive land use zone; the nearest sensitive land use zone is approximately 2.7 km east of the site and is zoned E1 National Parks and Nature Reserves under the Wakool Local Environmental Plan 2013 (Wakool LEP).

iii Evaluation of significance

The significance of a change in the landscape is a function of the magnitude of that change when considered against the view type/context and the sensitivity of a receptor.

Table 2 illustrates how the magnitude of a change in the landscape is assessed, and its significance rated, against the sensitivity of a viewpoint.

Table 2 Evaluation of significance matrix

Magnitude of change	**Visual sensitivity**		
	High	**Moderate**	**Low**
High	Substantial	Moderate/ Substantial	Moderate
Moderate	Moderate/ Substantial	Moderate	Slight / Moderate
Low	Moderate	Slight / Moderate	Slight
Negligible	Slight	Slight	Negligible
Impact significance:	Significant	Not significant	

The primary assessment tools for determining the significance of impact of the project were the site inspections and photographs of the views from the selected viewpoints, which were taken as part of the visual impact assessment prepared for the EIS. This enabled an assessment of potential visual impact, taking into consideration the nature of the landscape, topography, the distance between the viewpoint and the proposed infrastructure, as well as the type of view experienced.

iv Viewshed analysis

The proposed modification involves increasing the maximum height of the PV solar panels from 2 m to 4 m.

To determine the change in potential visibility of project infrastructure within the development footprint, the viewshed analysis for the project has been updated. The updated viewshed analysis assumes a conservative height of 4 m for all infrastructure within the development footprint. The viewshed analysis simulates the effects of existing vegetation (based on aerial imagery and ground-truthing) and topography on screening views. Vegetation has been interpreted from aerial imagery and ground truthing, with a standard height value of 4 m assigned. The viewshed model used as part of this analysis assumes that the site will not be graded. Project infrastructure has been installed on top of existing terrain and topography within the development footprint.

The focus of the updated viewshed analysis has been on identifying the differences between the previous results, which assumed a maximum height of 2 m for project infrastructure within the development footprint, and the updated results, which assumed a maximum height of 4 m for project infrastructure within the development footprint.

Figures 2 and 3 provide a comparison of the viewshed results for the approved project (2 m) and the updated viewshed with the increase in panel height (4 m). As discussed in Section 2.2, panels will typically be at the most vertical orientation (and greatest height) during the early morning and late afternoon, varying between a height of approximately 2-4 m over the course of a day. Therefore, while Figures 2 and 3 present a comparison between the maximum approved (2 m) and proposed maximum height (4 m), they can also be interpreted as representing the visibility of the solar panels over the course of day, with 2 m representing the lower height and 4 m representing the maximum height.

v Viewpoint selection

The updated viewshed analysis was conducted from the eight viewpoints surrounding the site, which were assessed as part of the EIS. The viewpoints were selected to represent views close to sensitive receptors and road corridors (ie Yanga Way and Windomal Road) nearest to the site. The locations of the eight viewpoints are illustrated in Figure 1. The rationale for the selection of each of the viewpoints analysed are summarised in Table 3 and is consistent with that presented in the project EIS.

The nearest sensitive receptors are six dwellings which range between 2.9-6 km from the site (Table 4). The viewpoints identified in Table 3 are considered to be representative of visibility of project infrastructure from those receptors within 5 km. Beyond this distance, views of project infrastructure are considered to be negligible.

Table 3 Assessed viewpoints and sensitive receptors

Assessment location	Viewpoint type	Rationale for selection
Viewpoint 1	Dwellings	Views are representative of sensitive receptors (ie dwellings) to the south of the site (see Figure 1) including: R5 – 3 km; and R6 – 4.7 km.
Viewpoint 2 Viewpoint 3 Viewpoint 4 Viewpoint 5 Viewpoint 6	Motorist	Views are representative of those experienced by motorists travelling along Yanga Way. These viewpoints were selected on the basis that motorists travelling along Yanga Way at these locations may experience views of project infrastructure. Daily traffic estimates indicate that between 396 and 596 vehicles travel along Yanga Way per day. Views from Viewpoint 5 are also representative of those experienced by stationary motorists waiting to exit Balranald Road and turn left or right on to Yanga Way (Figure 1). This location is approximately 150 m north of the proposed site access for the project. The existing traffic movements using the intersection from the Balranald Road direction are not known but are assumed to be approximately 100 daily vehicle movements.
Viewpoint 7	Motorist Industry Dwellings	Views are representative of those experienced by motorists travelling along Windomal Road, north of the site. This viewpoint was selected on the basis that motorists travelling along this road corridor may experience limited views of project infrastructure. The existing traffic movements using Windomal Road are not known but are assumed to be approximately 100–200 daily vehicle movements. This location is approximately 200 m east of the forest logging business north of the site. This location is also representative of views from two sensitive receptors outside of the 5 km radius considered as part of the visual assessment prepared as part of the EIS.
Viewpoint 8	Motorist	Views are representative of those experienced by motorists travelling along Windomal Road, north-west of the site. This viewpoint was selected on the basis that motorists travelling along this road corridor may experience views of project infrastructure. The existing traffic movements using Windomal Road are not known but are assumed to be approximately 100–200 daily vehicle movements.

Table 4 Nearest receptors

Receptor (dwelling)	Distance to development footprint (km)	Representative viewpoint
R1	2.9	Not assessed. This dwelling is located on the Maffra property immediately north of the site. The dwelling is at an elevation of approximately 74 m, and elevated position relative to the site. There is screening vegetation present immediately around the dwelling, as well as dense vegetation in the north-eastern corner of the Limondale site boundary that would partially screen views. Based on aerial photograph interpretation, the eastern half of the development footprint is likely to be obscured from view by the aforementioned vegetation; however, there may be views of solar infrastructure in the western half of the development footprint. The property owner, Cadell Orchards (International Farming), was consulted in June 2018. Visibility of project infrastructure is not a concern of the property owner and was confirmed via written correspondence.
R2	6.3	Not assessed due to this property being more than 5 km from the site, and nature of topography and presence of screening vegetation.
R3	6.4	Not assessed due to this property being more than 5 km from the site, and nature of topography and presence of screening vegetation.
R4	3.5	R4 is around 2 km to the east of Viewpoint 5, and 3.5 km from the site. Due to the nature of topography and presence of screening vegetation observed between R4 and the site, this receptor was not selected as a viewpoint.
R5	3	Viewpoint 1 is representative of views from this dwelling. The dwelling is at an elevation of approximately 67 m, with topography between the dwelling and the site reaching 73 m, (a dune crest running east-west approximately half way between the site and the dwelling) while the elevation of the portions of the site containing infrastructure between 62-66 m. The dwelling is surrounded by relatively large stands of vegetation. This dwelling is within the boundary of the Sunraysia Solar Farm site, and the vegetation stands around this dwelling are identified as greater than 10 m in height. Therefore, views of the site would be shielded by topography and existing vegetation.
R6	4.7	Viewpoint 1 is representative of views from this dwelling. This dwelling is at a slightly elevated position compared to the surrounding topography, however there is substantial screening vegetation between the site and this dwelling, as well as being located close to 5 km from the southern boundary of the site.

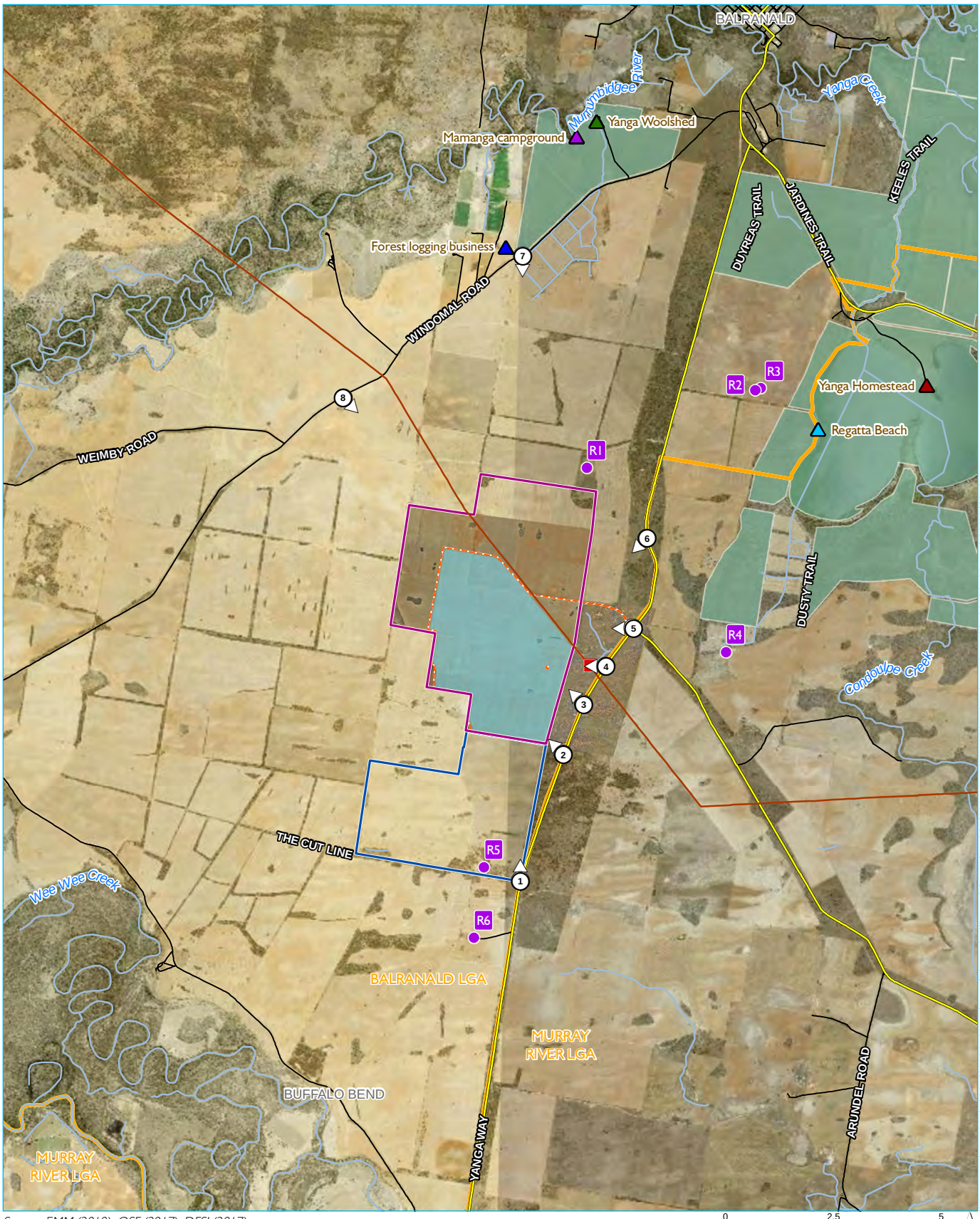
2.2.3 Impact assessment

i Construction

Construction of the project will alter the landscape through the installation of project infrastructure, which will add new features to the visual landscape. The modification to panel heights will not change the visual impacts during construction.

ii Operation

The change in height of the PV solar panels will result in some minor changes to the potential visibility of project infrastructure within the development footprint when compared with the results for the approved project presented in the EIS. The results of the updated viewshed analysis indicate that, at a height of 4 m, project infrastructure will be visible from viewpoints 3, 4, 5, 6 and 8 (Figure 2 and Figure 3). Compared to the approved project, this represents one additional viewpoint, Viewpoint 3, from which project infrastructure will be visible.



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Source: EMM (2018); OSF (2017); DFSI (2017)

0 2.5 5 km
GDA 1994 MGA Zone 54

N

KEY

- Viewpoint location and direction
- Site boundary
- Development footprint
- Infrastructure area
- Sunraysia Solar Farm (proposed)
- Sensitive receptor
- Balranald substation
- 220 kV Transgrid electricity transmission line
- Main road
- Local road
- Watercourse / drainage line
- LGA boundary
- NPWS reserve

Viewpoint locations

Limondale Sun Farm
Amendment to height of solar module tracking system
Figure 1

EMM

The maximum height of 4 m would only occur at certain times of the day (periods in the morning and afternoon). For the remainder of the day the panel would be at heights of between 2-4 m, compared to the approved project where the height would vary from between 1.2-2 m over the course of a day. As a result of the modification, the panels will be visible for a greater period of time over the course of a given day. However as the viewpoints from which the infrastructure is visible are primarily representative of motorists who are transient, the assessment of the maximum height is considered to be a conservative approach, and consistent with the assessment of the maximum height of 2 m in the original VIA for the approved project.

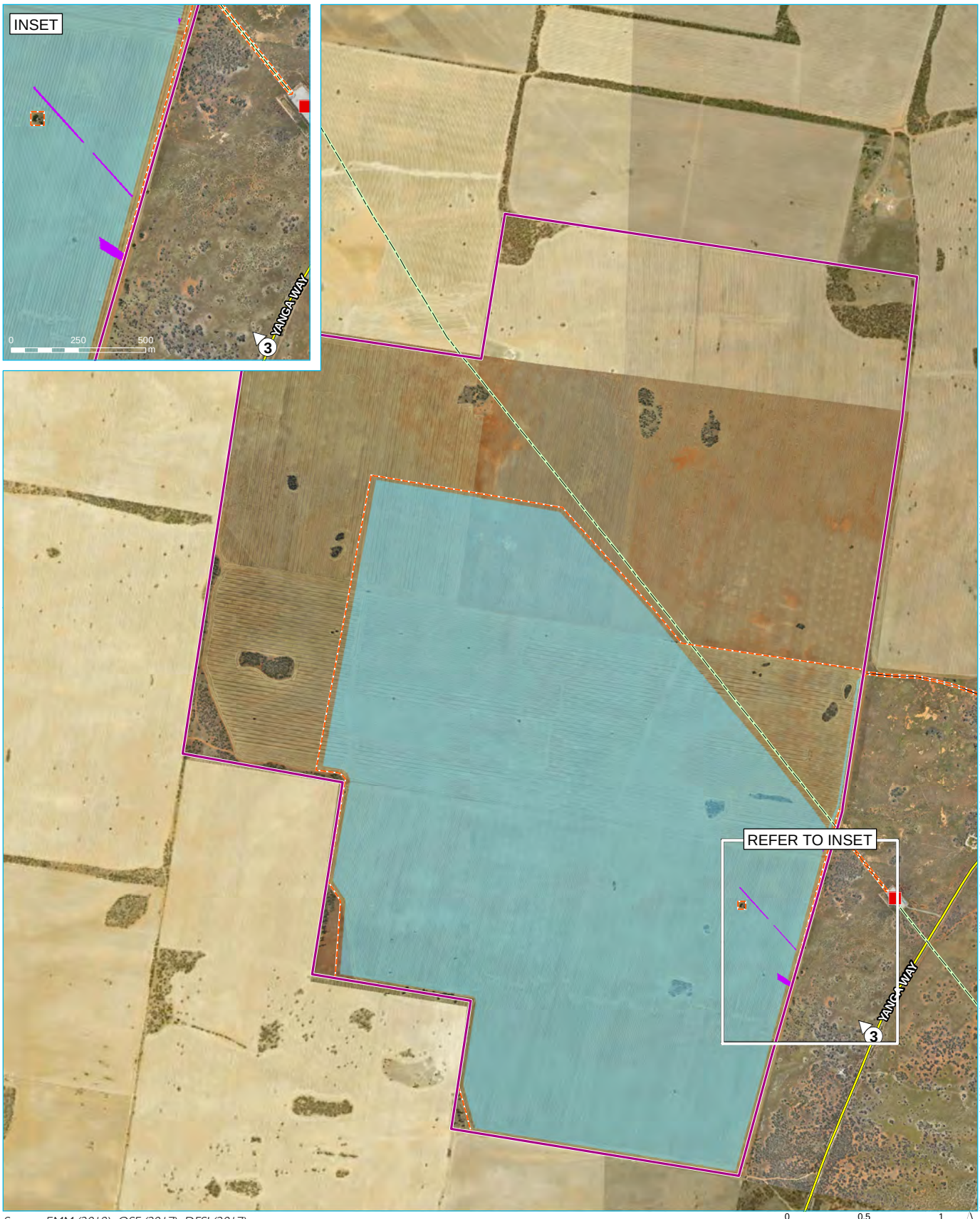
A summary of the results of the assessment of visual impacts for each of the eight viewpoints is provided in Table 5 and discussed below.

Table 5 Summary of results of visual impacts at each viewpoint based on updated viewshed analysis

Viewpoint	Distance to development footprint (km)	Project infrastructure visible based on viewshed analysis?		Impact assessment of increase in panel height				
		Approved project (2 m height)	Proposed modification (4 m panel height)	Magnitude of change	Visual sensitivity	Evaluation of significance	Significant impact?	Additional mitigation required?
1	3	No	No			Nil – not visible		
2	0.5	No	No			Nil – not visible		
3	0.6	No	Yes	Low	Low	Slight	No	No
4	0.9	Yes	Yes	Low	Low	Slight	No	No
5	1.3	Yes	Yes	Low	Low	Slight	No	No
6	3	Yes	Yes	Low	Low	Slight	No	No
7	5.3	No	No			Nil – not visible		
8	4.4	Yes	Yes	Negligible	Low	Slight	No	No

Figure 2 illustrates that project infrastructure may now be visible from one additional viewpoint, Viewpoint 3 (refer Figure 2) as a result of the amendment. However, as illustrated in Figure 2, the visible area of project infrastructure very small, and would primarily be visible by passing motorists who would have brief glimpses through vegetation.

As discussed in Tables 3 and 4, it is assumed the focus of motorists will be their direction of travel along Yanga Way. As such, the magnitude of change in visibility from Viewpoint 3 is considered to be low, and combined with a low visual sensitivity (ie passing motorists), the modification will only result in negligible impacts from Viewpoint 3. Figure 3 provides a comparison between the viewshed analysis results from the approved project for viewpoints 4, 5, 6 (Yanga Way) and 8 (Windomal Road), and the proposed modification.



Source: EMM (2018); OSF (2017); DFSI (2017)

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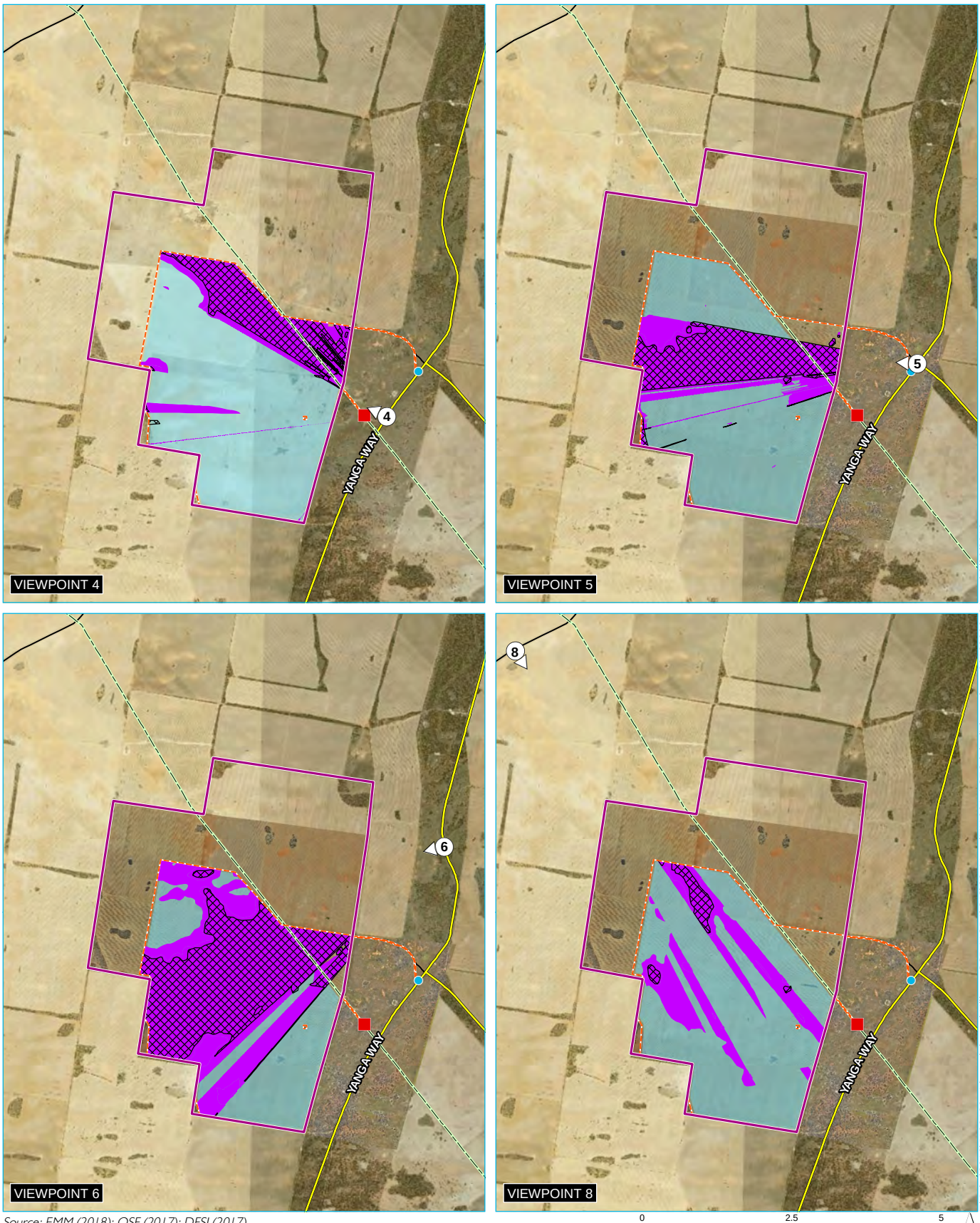
KEY

- Site boundary
- Development footprint
- Infrastructure area
- Proposed site access
- Balranald substation
- 220 kV transmission line
- Main road
- Local road
- Viewpoint location and direction
- Amended project – visible development footprint from viewpoint (infrastructure height 4 m)

Viewshed analysis within the development footprint from Viewpoint 3

Limondale Sun Farm
Amendment to height of solar module tracking system
Figure 2

EMM



Source: EMM (2018); OSF (2017); DFSI (2017)

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KEY

- Site boundary
- Development footprint
- Infrastructure area
- Proposed site access
- Balranald substation
- 220 kV transmission line
- Main road
- Local road
- Viewpoint location and direction
- Approved project – visible development footprint from viewpoint (infrastructure height 2 m)
- Amended project – visible development footprint from viewpoint (infrastructure height 4 m)

Viewshed analysis within the development footprint from viewpoints 4, 5, 6 and 8

Limondale Sun Farm
Amendment to height of solar module tracking system
Figure 3

EMM

a. Viewpoints 4, 5 and 6

As identified in Table 4, viewpoints 4, 5 and 6 are representative of views of motorists travelling along Yanga Way and Windomal Road, and have a low visual sensitivity. Viewpoints 4, 5 and 6 are between 0.9 - 3 km from the development footprint, with the TSR providing a vegetated buffer between the site and motorists viewing the site from these locations. Photograph 1 provides an example of typical vegetation present either side of Yanga Way near the site, which will screen views of the site.

Photograph 1 Vegetation present along Yanga Way near the southern boundary of the development footprint (photo taken looking north)

As a result of the proposed increase in height of PV panels, the modelled visibility of infrastructure at its maximum height of 4 m has slightly increased from the assessed viewpoints as shown on Figure 3. The amendment of the panel height will slightly increase the extent of the view affected by project infrastructure from viewpoints 4, 5 and 6 along Yanga Way. However, changes to the visual landscape compared to the approved project are of low significance due to:

- the presence of substantial screening vegetation within the TSR between Yanga Way and the site (refer to Photograph 1);
- the distance between Yanga Way and the site;
- the low visual sensitivity of passing motorists; and
- the amendment to the height of the solar module tracking system would not alter the general visual appearance of infrastructure, which would be consistent with the approved project.

b. Viewpoint 8

As identified in Table 4, Viewpoint 8 is representative of views of motorists travelling along Windomal Road, and has a low visual sensitivity. Viewpoint 8 is approximately 4.4 km from the nearest boundary of the development footprint. The viewpoint type is primarily motorists with a low visual sensitivity. It is assumed the focus of motorists will be in the direction of travel, and not towards the site.

The amendment of the panel height will slightly increase the extent of the view affected by project infrastructure, however the magnitude of change in the visual landscape will be negligible due to distance and the low visual sensitivity of passing motorists. From this viewpoint at a distance of greater than 4 km, the increase in panel height is likely to be imperceptible.

iii Summary of impacts

While the proposed increase in the height of PV solar panels will alter the visibility of project infrastructure within the development footprint, the visual impacts of the modification will be generally consistent with the approved project. Viewpoints 1 and 7 are the only viewpoints representative of dwellings. Due to existing mature vegetation, variable elevation and undulation in the landscape, the visual impact assessment conducted as part of the EIS concluded that the project's infrastructure would not be visible from these viewpoints. The visibility of project infrastructure from these viewpoints will not change as a result of the proposed modification.

The proposed modification is not considered to be significant or warrant any additional mitigation measures.

2.3 Management and mitigation

Condition 15 in Schedule 3 of the development consent stipulates that the proponent must:

- minimise the off-site visual impacts of the development, including the potential for any glare or reflection from the solar panels;
- ensure the visual appearance of all ancillary infrastructure (including paint colours) blends in as far as possible with the surrounding landscape; and
- not mount any advertising signs or logos on-site, except where this is required for safety purposes.

Based on the results of the updated viewshed analysis, no additional specific management and mitigation measures are warranted. Management of potential visual impacts will continue in accordance with Condition 15 in Schedule 3 of the development consent.

2.4 Other environmental matters

2.4.1 Traffic and transport

A traffic impact assessment prepared as part of the EIS predicted that the project will not adversely impact on the surrounding road network. The proposed modification will not increase the type or number of heavy vehicle movements to and from the site. The heavy vehicle movements specified in the conditions of consent will continue to be adequate for the project. No changes to traffic and transport impacts will occur as a result of the proposed modification.

2.4.2 Other environmental, social and economic aspects

An assessment of the other environmental, social and economic aspects as a consequence of the proposed modification is provided in Table 6. This assessment is commensurate with the negligible levels of projected impacts on each aspect arising from the proposed modification.

Table 6 Other environmental, social and economic aspects

Environmental aspect	Assessment
Biodiversity	A biodiversity assessment report was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed modification and, therefore, no additional impact on native vegetation, fauna and fauna habitat.
Aboriginal heritage	An Aboriginal cultural heritage assessment report was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed modification and, accordingly, no additional impact on any item or feature of Aboriginal cultural heritage.
Historic heritage	An assessment of the potential impact of the project on historic heritage was completed as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed modification and, accordingly, no impact on any items of local, State, National or World heritage significance.
Land	An assessment of the potential impact of the project on agricultural land and flood prone land, paying particular attention to compatibility of the project with the existing land uses on the site and adjacent land was prepared as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed modification and, accordingly, no additional impact on agricultural land or existing land uses on adjacent land.
Noise and vibration	A noise and vibration impact assessment prepared as part of the EIS predicted that potential construction and operation noise levels will be below relevant criteria at all assessment locations. Given there will be no significant change to any aspect of the project's construction and operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers, increases in noise emissions are not predicted.
Water	An assessment of the potential impacts of the project on flooding, groundwater and surface water resources was completed as part of the EIS. There will be no changes to the development footprint or additional surface disturbance associated with the proposed modification and, therefore, no additional impact on flooding, groundwater or surface water resources.
Hazards	As noted in the EIS, all project infrastructure will be designed in accordance with relevant industry standards. The level of hazards and risks will not increase as a result of the proposed modification.
Air quality	Given there will be no significant change to any aspect of the project's construction, operations or road traffic generation which have the potential to generate emissions to the atmosphere, increases in emissions are not predicted as part of the proposed modification.
Socio-economic	As noted in the EIS, the project will make important contributions to the production of renewable energy in NSW while creating employment opportunities, diversifying local revenue streams and generating direct and indirect benefits to the local economy during the life of the project. The proposed modification will not generate additional employment over and above that approved.

3 Conclusion

The proposed modification involves increasing the maximum height of the PV solar panels from 2 m to up to 4 m. A viewshed analysis has been completed for the PV solar panels at the proposed maximum height of 4 m. For consistency, the updated viewshed analysis has been conducted from the eight viewpoints considered as part of the visual impact assessment from the EIS.

Due to existing mature vegetation, variable elevation and undulation in the landscape, the project's infrastructure will not be visible from three of the eight viewpoints (viewpoints 1, 2 and 7). This is consistent with the approved project. Project infrastructure will be visible from one additional viewpoint compared to the approved project, Viewpoint 3 (refer Figure 2). The magnitude of change in visibility from Viewpoint 3 is considered to be low, and combined with a low visual sensitivity (ie passing motorists), the modification will not result in a significant impact.

The increase in the maximum height of the PV solar panels (ie from 2 m to 4 m) will result in some changes to the visibility of project infrastructure from viewpoints 4, 5, 6 and 8 (refer Figure 3), which are representative of motorists travelling along Yanga Way and Windomal Road. The amendment of the panel height will slightly increase the extent of the view affected by project infrastructure from these four viewpoints. However, vegetation and topography, combined with distance and the low visual sensitivity of passing motorists means that visual impacts will not change significantly compared to the approved project. Furthermore, the modification to the height of the solar module tracking system would not alter the general visual appearance of infrastructure, which would be consistent with the approved project.

The proposed modification will result in only minor impacts compared to the approved project. Additional mitigation measures are not warranted. This visual assessment concludes that the visual impacts from the proposed modification will be generally consistent with the approved project.

The proposed modification presents an opportunity to improve the energy generating efficiency of the project, and can be achieved within the assessed and approved development footprint. The amended solar panel arrangement will enable the adoption of proven solar tracking and module technology and provide additional electrical support to the TransGrid network system. The proposed modification will not result in significant changes to visual impacts compared to the approved project, nor changes to other environmental, social and economic aspects considered as part of the EIS.

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