15 June 2018

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Mr Anthony Ko
Senior Environmental Assessment Officer
Resource and Energy Assessments – Planning Services
NSW Department of Planning and Environment
Via email: anthony.ko@planning.nsw.gov.au

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

Dear Anthony,

1 Introduction

1.1 Project consent

The Hillston Sun Farm is a large-scale solar photovoltaic (PV) generation facility approximately 3.5 kilometres (km) south of the township of Hillston in the Riverina region of south-western NSW (the project). The project was granted project approval (SSD 7955) under Section 89E of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 26 October 2017 ("development consent"). Once constructed, it will have an estimated nominal export capacity in the order of 85 megawatts (MW) that will connect to Essential Energy's Hillston substation.

1.2 The proponent and legal description of the site

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

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

The legal property description of the site is Lots 22, 43, 61, 76, 77, 85, 100 of Deposited Plan (DP) 755189 and 101 and Lot 2 of DP 626213.

1.3 Proposed modification

A modification to the approved project is sought, comprising an amendment to the maximum height of the solar panels, from 2 metres (m) to 4 m, and improved panel arrangement.

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 Essential Energy network system through the adoption of proven solar tracking and module technology constructed within the infrastructure area approved under the development.

Section 2.3 of this letter lists the conditions within the development consent relating to visual impacts, including the establishment of a vegetation buffer to screen potential views of project infrastructure from a nearby sensitive receptor (R17 – refer Figure 1). Visual impacts from the PV panel arrays at the proposed height of 4 m can be adequately managed in accordance with the existing conditions of consent (refer Section 2.2).

1.4 Need for the panel height amendment

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

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 late afternoon. The proposed amendment 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 panel height amendment and improved layout will be wholly within the approved development footprint for the Hillston Sun Farm. No additional areas outside those previously assessed and approved are required to achieve the improvements. There is no change to the general layout of the Hillston Sun Farm as presented in Appendix 1 of the development consent.

The proposed modification to the Hillston Sun Farm for the inclusion of a maximum 4 m high solar tracking system will increase the solar energy generation efficiency of the project by approximately 0.8% for the same sent out energy generation as initially proposed (being 85 MW).

1.5 Approval 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.

Clause 115 under Division 12 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 information in Table 3.1.

Table 1 Information required for a modification application

Relevant clause	Requirement	Section addressed
(1) (a)	the name and address of the applicant;	Section 1.2
(b)	a description of the development to be carried out under the consent (as previously modified);	Section 1.1
(c)	the address, and formal particulars of title, of the land on which the development is to be carried out;	Section 1.1
(d)	a description of the proposed modification to the development consent;	Section 1.3
(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;	Section 1.3
(f)	a description of the expected impacts of the modification;	Section 2
(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;	Section 3
(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
(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

1.6 Purpose and context

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

2 Environmental assessment and management

2.1 Introduction

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 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 Section 2.4.

2.2 Visual assessment

EMM prepared a visual impact assessment for the project as part of the environmental impact statement (EIS), 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 1.2 m for the dominant project infrastructure (ie PV solar panels), 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 late 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 development consent contains a number of conditions relating to visual impacts (Schedule3, Conditions 8, 9 and 16), including planting of vegetation buffers to screen views. These are discussed further in Section 2.3.

The original VIA included consideration of potential visual impacts at nine viewpoints, selected based on having views of the site and their proximity to receptors and road corridors (ie Kidman Way, The Springs Road and Lachlan Valley Way) near to the site (Figure 1).

To assess the impacts of the proposed panel height amendment, the visibility of project infrastructure at the proposed 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. At other times, the height of infrastructure will be lower than 4 m. 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 site has been highly modified by past disturbances associated with land clearing, cropping, livestock grazing and weed invasion, and is currently used for broad acre cropping. Elevation across the site is relatively uniform at approximately 117-120 m above sea level. Land around the site generally slopes from north-east to south-west.

The site is in a semi-rural setting, with the wider region characterised by grazing properties, small-scale farm businesses, natural areas, forestry, scattered rural dwellings, villages and towns and major transport infrastructure such as the Kidman Way, Cobb and Mid-Western highways.

The nearest sensitive receptors are dwellings. The nearest receptor, R1, is approximately 700 m north of the development footprint, with a further 20 receptors within approximately 3 km. The majority of these sensitive receptors, including R1, are separated from the site by existing vegetation and surrounding road corridors. Receptor R17, which is approximately 1.6 km to the west of the site boundary, has an opening in existing vegetation that permits a distant view of the site.

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 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

As noted above, 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 2.

Table 2 Visual 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 2.2 km north-west of the site and is zoned R5 Large Lot Residential under the Carrathool 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. 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 be considered slight or moderate.

Table 3 illustrates how the magnitude of a change in the landscape is assessed, and its significance rated, against the sensitivity of a viewpoint.

Table 3 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
Key:	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. Figure 2 includes the viewshed model and the location of vegetation shaded in light grey. The viewshed model used as part of this analysis assumes that the site will not be graded. Project infrastructure is assumed to be 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 viewshed analysis for the increase in panel height was conducted from the nine 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 Kidman Way, The Springs Road and Lachlan Valley Way) nearest to the site. The locations of the nine 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 21 dwellings which range between 700 m-3 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 3 km. Beyond this distance, views of project infrastructure are considered to be negligible.

Table 4 Assessed viewpoints and sensitive receptors

Assessment location	Viewpoint type	Rationale for selection
Viewpoint 1	Motorist	Views are representative of those experienced by motorists travelling along Kidman Way. Daily traffic estimates indicate that between 554 and 630 vehicles travel along Kidman Way per day.
Viewpoint 2	Motorist	Views are representative of those experienced by motorists travelling along Kidman Way. Daily traffic estimates indicate that between 554 and 630 vehicles travel along Kidman Way per day.
Viewpoint 3	Motorist	Views are representative of those experienced by motorists travelling along Kidman Way. Daily traffic estimates indicate that between 554 and 630 vehicles travel along Kidman Way per day.
Viewpoint 4	Electricity workers at Hillston Substation	The view from this location is representative of the view of the existing Hillston Substation, the 132 kV transmission line and associated infrastructure as seen from Essential Energy's access point. This viewpoint was selected on the basis that the project may contribute to a cumulative visual impact for workers accessing the Hillston Substation and associated infrastructure and for motorists travelling south from this location.
Viewpoint 5	Dwellings	Views are representative of sensitive receptors (ie dwellings) to the north of the site, including those closest to the site (R1, R2 and R3): R1 – 700 m; R2 – 950 m; R3 – 1 km; R13 – 2.2 km; and R21 – 1.2 km.
Viewpoint 6	Motorist	Views are representative of those experienced by motorists travelling along The Springs Road, east of the site. This viewpoint was selected on the basis that motorists travelling along this road corridor may experience views of project infrastructure.
Viewpoint 7	Dwellings	Views are representative of sensitive receptors (ie dwellings) to the south-east of the site: R15 – 1.2 km; and R14 – 1.7 km.
Viewpoint 8	Dwellings Motorist	Views are representative of a sensitive receptor (ie dwelling) west of the site, R17, approximately 1.6 km from the site's western boundary. Views are also representative of sensitive receptors (ie dwellings) further west of the site: R18 – 2.8 km; and R19 – 2.4 km. Views are also representative of those experienced by motorists travelling along Lachlan Valley Way, west of the site. Motorists travelling along this road corridor may experience views of project infrastructure.

Table 4 Assessed viewpoints and sensitive receptors

Assessment location	Viewpoint type	Rationale for selection
Viewpoint 9	Dwellings	Views are representative of sensitive receptors (ie dwellings) to the north-east of the site: R4 – 1.1 km; R5 – 1.6 km; R6 – 1.6 km; R7 – 1.8 km; R8 – 2.3 km; R9 – 2.6 km; R10 – 2.7 km; R11 – 2.9 km; and R12 – 2.7 km.

2.2.3 Impact assessment

i Construction impacts

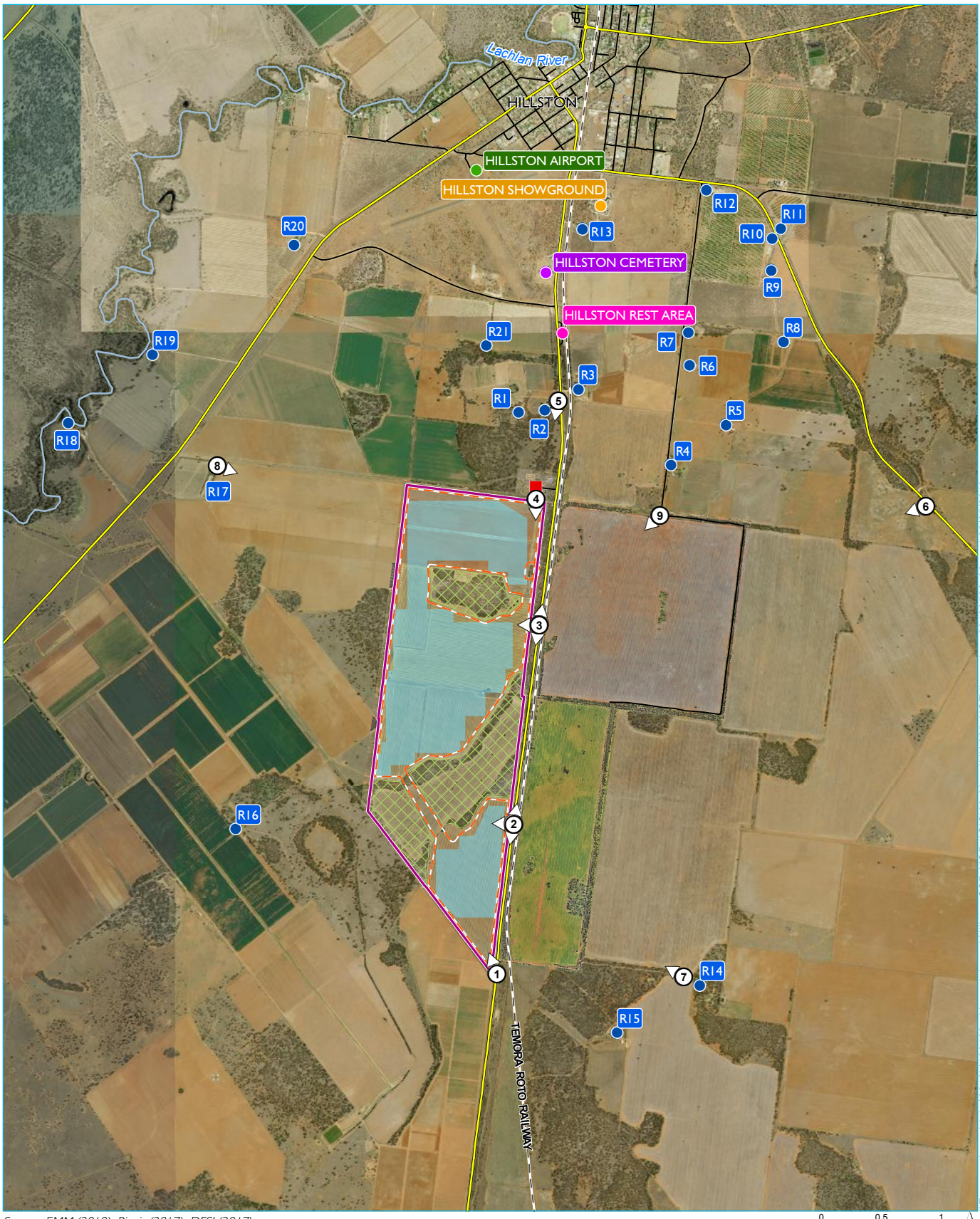
Construction of the project will alter the landscape through the installation of project infrastructure, which will add new features to the visual landscape. The amendment to panel heights will not change the visual impacts during construction.

ii Operation impacts

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 original VIA. The results of the updated viewshed analysis indicate that, at a height of 4 m, project infrastructure will be visible from viewpoints 1, 2, 3, 7, 8 and 9 (Figure 2 and Figure 3). 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.

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 nine viewpoints is provided in Table 5 and discussed below. It noted that the development consent contains a number of conditions relating to mitigation of visual impacts (Schedule3, Conditions 8, 9 and 16). Vegetated buffers required under the conditions of consent have not been modelled in the viewshed analysis.



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

0 0.5 1 km
GDA 1994 MGA Zone 55

N

KEY

- Viewpoint location and direction
- Site boundary
- Development footprint
- Conceptual infrastructure layout
- Remnant vegetation and overland flowpath to be avoided
- Sensitive receptor
- Hillston substation (132kV)
- Rail line
- Main road
- Local road
- Watercourse / drainage line

Viewpoint locations

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

EMM

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

Viewpoint	Distance to development footprint	Project infrastructure visible based on viewshed analysis?		Impact assessment of increase in panel height				
		Approved project (2 m panel height)	Proposed modification (4 m panel height)	Magnitude of change	Visual sensitivity	Evaluation of significance	Significant impact?	Additional mitigation required?
1	40 m	Yes	Yes	Low	Low	Slight	No	No
2	40 m	Yes	Yes	Low	Low	Slight	No	No
3	40 m	Yes	Yes	Low	Low	Slight	No	No
4	150 m	No*	No*	Low	Low	Slight	No	No
5	850 m	No	No	Negligible	Moderate	Slight	No	No
6	3 km	Yes**	No**			Nil – not visible		
7	1.7 km	Yes	Yes	Negligible	Moderate	Slight	No	No
8	1.6 km	Yes	Yes	Low	Moderate	Slight / Moderate	No	No
9	1 km	Yes	Yes	Negligible	Moderate	Slight	No	No

**The viewshed analysis models vegetation between the development footprint and this viewpoint as providing complete screening of project infrastructure. Based on site observations, it is likely that some project infrastructure will be visible from Viewpoint 4; however, due to the low magnitude of change and low visual sensitivity of this viewpoint, no significant impacts are anticipated.*

***The viewshed analysis for the approved project presented in the EIS excluded remnant vegetation between Viewpoint 6 and the development footprint. The updated viewshed analysis has accounted for this vegetation and concludes that project infrastructure will not be visible from this location.*

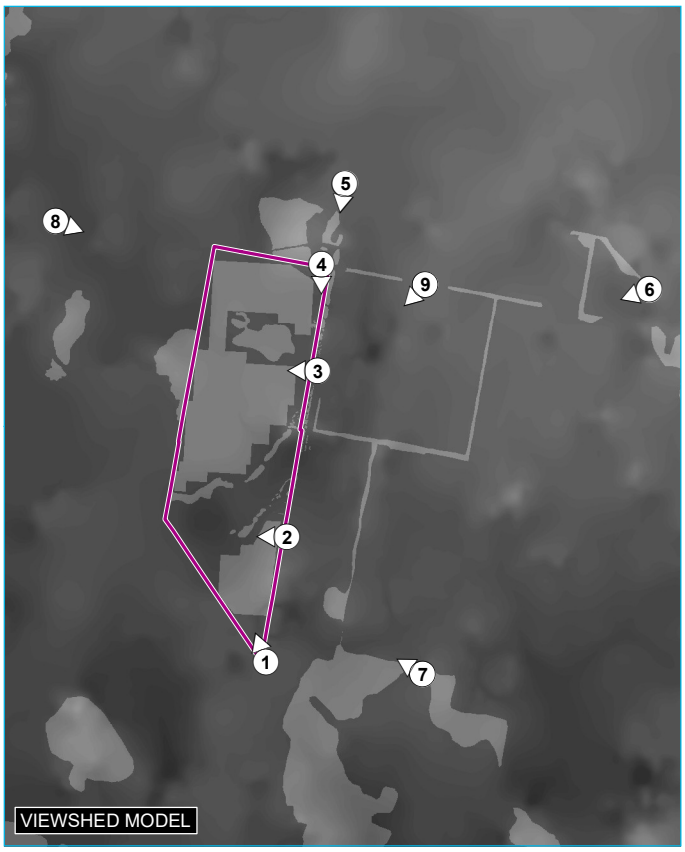
The results of the updated viewshed analysis indicate that the project infrastructure will be visible to varying extents from six of the nine viewpoints (Figure 2 and Figure 3). These results are consistent with the number of viewpoints identified within the visual impact assessment prepared as part of the EIS with the exception of Viewpoint 6. As noted above, the viewshed analysis for the approved project excluded remnant vegetation between Viewpoint 6 and the development footprint. The updated viewshed analysis has accounted for this vegetation and concludes that project infrastructure will not be visible from this location.

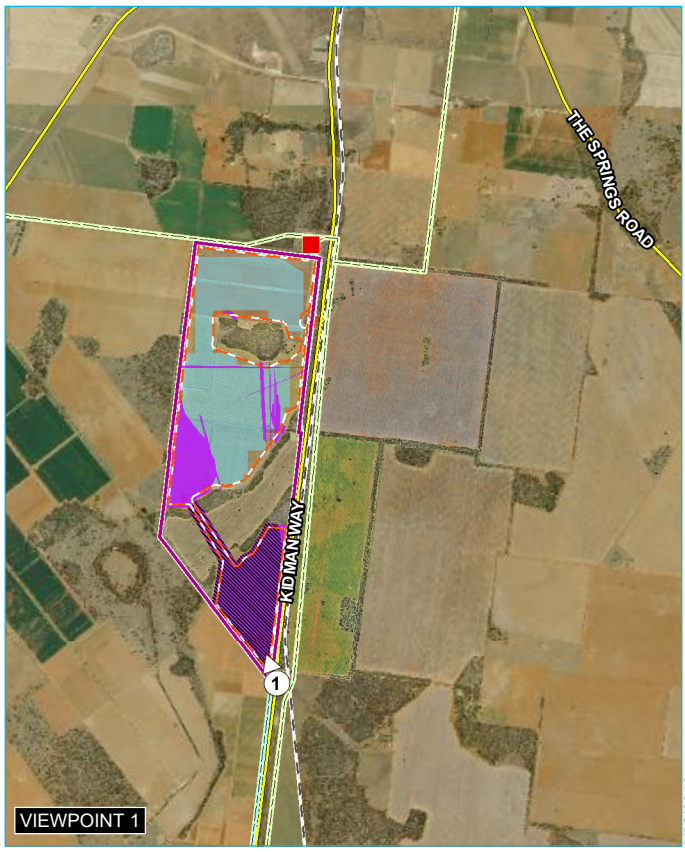
a. Viewpoints 1, 2 and 3

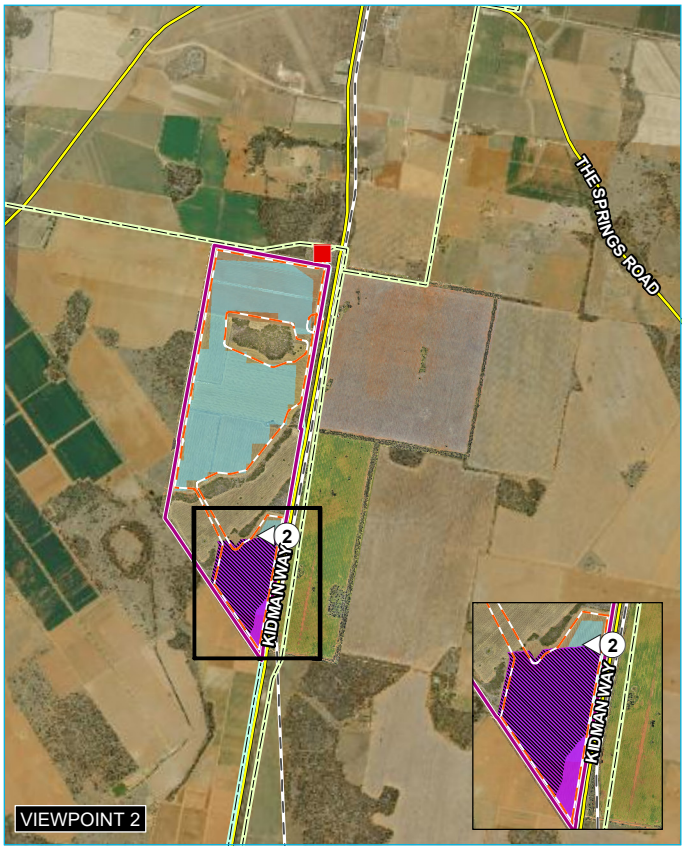
The increase in panel height will not result in significant changes to the visibility of project infrastructure from viewpoints 1, 2 and 3 (refer Figure 2). The viewshed analysis for Viewpoint 1 indicates that some additional areas in the central area of the development footprint will be visible at 4 m, however views of infrastructure in the foreground will be more dominant, and views of the additional areas calculated as visible in the viewshed analysis (Figure 2) will be imperceptible.

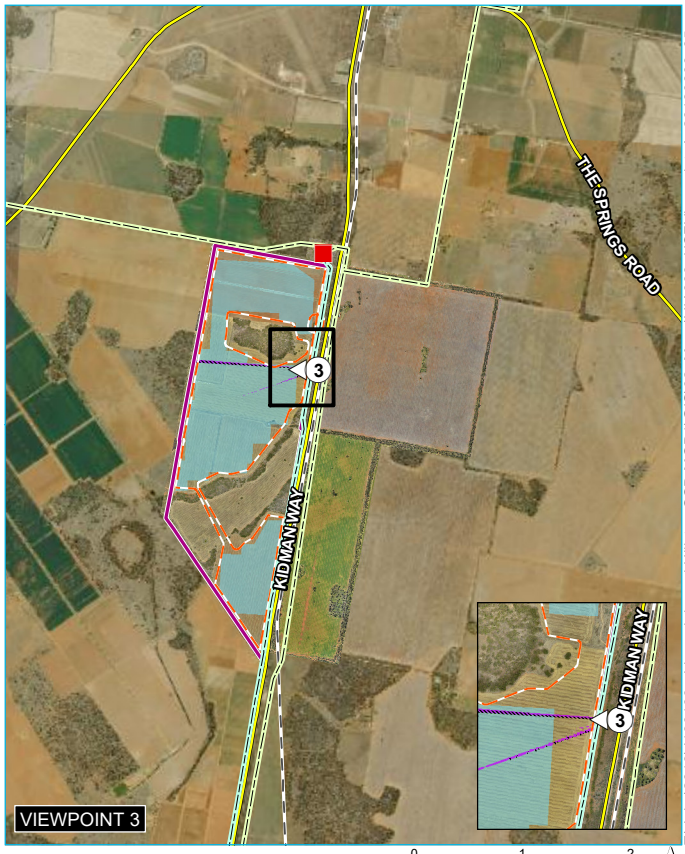
Project infrastructure at these viewpoints would primarily be visible by passing motorists who would have views through vegetation along the road corridor and perimeter of the site. As discussed in Table 4, it is assumed the focus of motorists will be their direction of travel along Kidman Way.

As described above, 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. 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 not result in a significant impact.









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

0 1 2 km
GDA 1994 MGA Zone 55
N

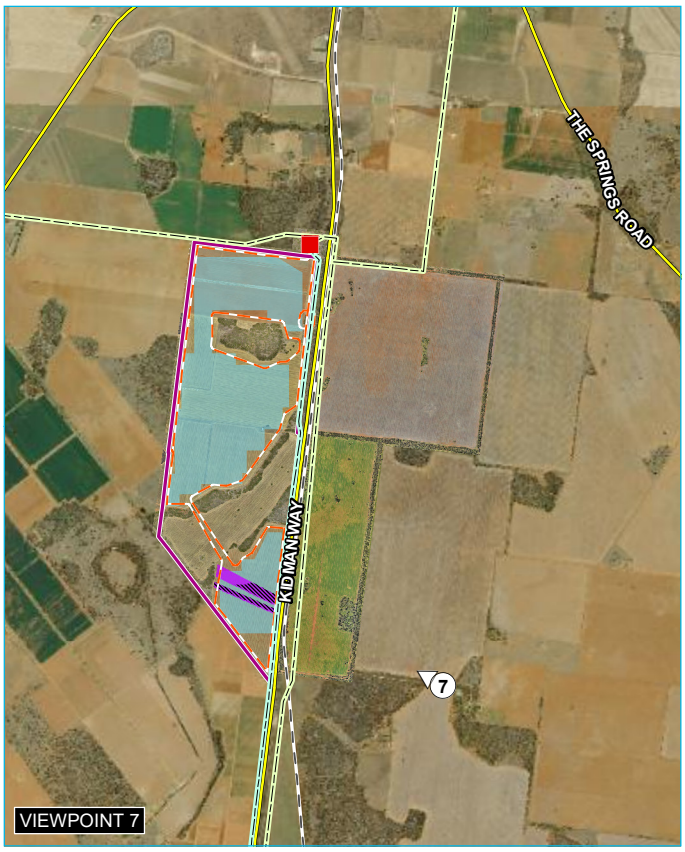
KEY

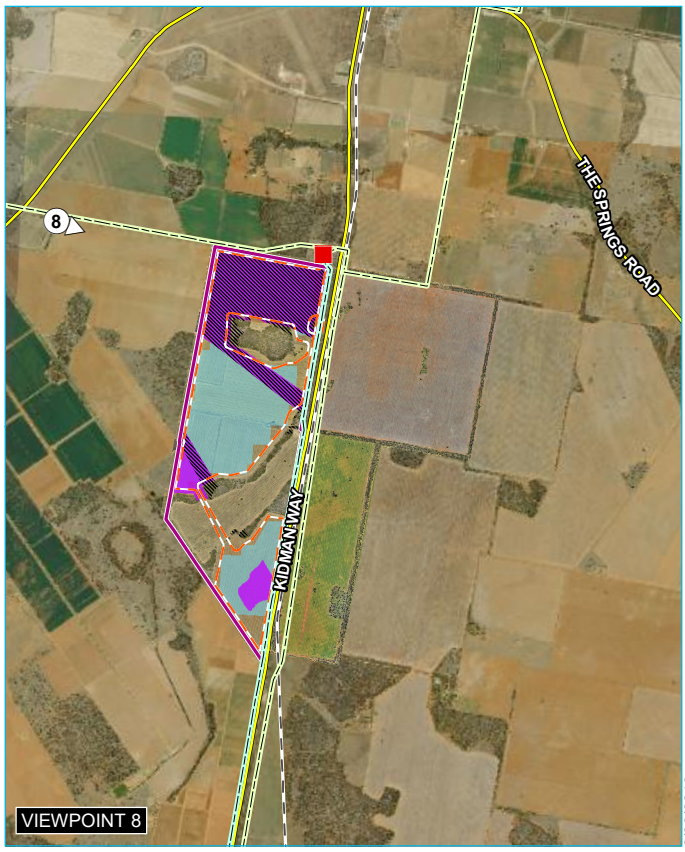
- Site boundary
- Development footprint
- Conceptual infrastructure layout
- Hillston substation (132kV)
- 33kV
- 132kV
- Rail line
- Main road
- Viewpoint location and direction
- Approved project – visible development footprint from viewpoint (infrastructure height 2 m)
- Amended project – visible development footprint from viewpoint (infrastructure height 4 m)

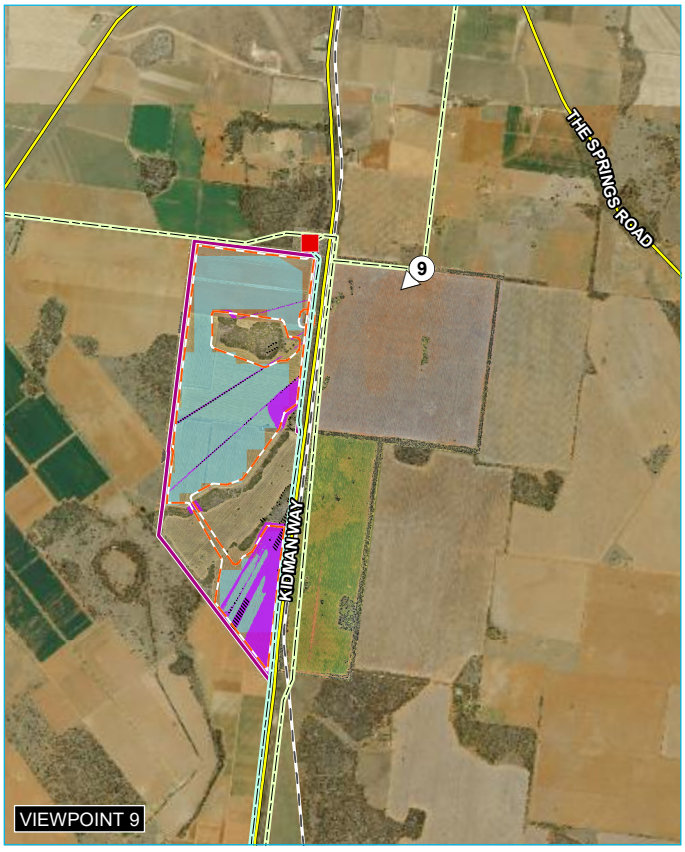
Viewshed analysis within the development footprint from viewpoints 1, 2, and 3

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

EMM







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

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- Rail line
- Main 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)

0 1 2 km
GDA 1994 MGA Zone 55
N

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Viewshed analysis within the development footprint from viewpoints 7, 8 and 9

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

EMM

b. Viewpoint 4

Viewpoint 4 is directly adjacent to the development footprint and, despite the viewshed analysis indicating that there would be no view of project infrastructure. This is because the viewshed analysis models vegetation as a solid barrier. In reality, some project infrastructure will be visible through vegetation given this viewpoint's position immediately adjacent to the northern boundary of the site (Figure 1). The view from this location is representative of the view of the existing Hillston Substation, the 132 kV transmission line and associated infrastructure as seen from Essential Energy's access point. Due to the low magnitude of change and low visual sensitivity of this viewpoint, no impacts are anticipated.

c. Viewpoint 5

The viewshed analysis predicts that project infrastructure will not be visible from Viewpoint 5. Based on site observations, it was noted that views of project infrastructure from this viewpoint will likely be screened by mature vegetation between the northern boundary of the site and sensitive receptors north of the site (ie R1, R2, R3, R13 and R21 – refer Figure 1). No visual impacts are anticipated.

d. Viewpoint 6

The viewshed analysis predicts that project infrastructure will not be visible from Viewpoint 6. Viewpoint 6 is representative of views experienced by motorists travelling along The Springs Road, east of the site. The viewshed analysis for the approved project presented in the EIS did not account for remnant vegetation between Viewpoint 6 and the site. The updated viewshed analysis has accounted for this vegetation and concludes that project infrastructure will not be visible from this location. This has been confirmed through site observations of vegetation between the site and this viewpoint during preparation of the EIS. No visual impacts are anticipated.

e. Viewpoint 7

Viewpoint 7 (Figure 3) is representative of views experienced by sensitive receptors (ie dwellings) south-east of the site (R14 and R15 which are 1.7 km and 1.2 km from the site – refer Figure 1). As noted within the original VIA, an extensive screen of paddock boundary tree plantings exists between Viewpoint 7 and the site (Photograph 1). The results of the updated viewshed analysis presented in Figure 3 indicate that the visible extent of infrastructure under the proposed modification would be generally consistent with the approved project. While the viewshed analysis indicates that a small additional area of project infrastructure would be visible at a height of 4 m, based on site observations it unlikely that project infrastructure would be perceptible due to the distance from the development footprint and screening vegetation present (see Photograph 1).

Photograph 1 Viewpoint 7 – from driveway of dwelling R14, looking north-west towards the development footprint

Distance to the site, coupled with vegetation between viewpoint 7 and the site boundary will limit the scale of change and degree of contrast for views from this location or nearby sensitive receptors. In addition, seasonal variability in cropping and crop height on the agricultural land between the site and dwellings to the south-east of Viewpoint 7 is likely to further reduce the scale of change and degree of contrast experienced from sensitive receptors close to these locations. A review of satellite imagery also indicates that existing landscaping around a number of the sensitive receptors close to these viewpoints would offer further screening of project infrastructure.

f. Viewpoint 8

Viewpoint 8 (Figure 3) is representative of views experienced by receptors (dwellings) west of the site (R17, R18, R19 and R20 – refer Figure 1). The increase in panel height would not significantly alter views from Viewpoint 8 compared to the approved project. The viewshed analysis for Viewpoint 8 indicates that a minor additional area in the southern portion of the development footprint will be visible at 4 m (compared to the approved maximum height of 2 m), however views of infrastructure in the foreground will be more dominant, with views of the additional areas calculated as visible in the viewshed analysis (Figure 3) likely to be imperceptible given the increased distance to these areas and presence in the background.

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.

The average panel height will be 2 m under the modification, compared to 1.2 m under the approved project which would result in a small increase to the scale of infrastructure visible from this location. Specific mitigation measures in the form of a landscaping and vegetation buffer are required for the approved project at receptor R17 under the development consent (see Section 2.3 for further discussion). Combined with a viewing distance of 1.6 km, and with the vegetation buffer required under the development consent, views from R17 would be adequately screened such that impacts would be minor.

Viewpoint 8 is also considered representative of views experienced by motorists travelling along Lachlan Valley Way. It is assumed the focus of motorists will be their direction of travel along Lachlan Valley Way, and the visual sensitivity of passing motorists is considered to be low.

iii Viewpoint 9

Viewpoint 9 is representative of views experienced by sensitive receptors (ie dwellings) north-east of the site (R4 to R12 which vary from 1.1-2.9 km from the site – refer Figure 1). As noted within the visual impact assessment prepared as part of the EIS, substantial roadside vegetation is present along Kidman Way between Viewpoint 9 and the site (Photograph 2). The results of the updated viewshed analysis presented in Figure 3 indicate an increase in the visible extent of infrastructure from this viewpoint as a result of the increase in height. This would translate to the tops of the solar panel arrays being visible just above the tree line when panels are at their maximum height for a small portion of the day.

The additional areas calculated as visible at 4 m in the viewshed analysis (Figure 3) are also generally at greater distances from the receptors, and are likely to be imperceptible when viewed in the context of the infrastructure in the foreground, and other features between the viewpoint and the site, including numerous vegetation stands of varying density, Kidman Way, and the railway line which runs parallel to Kidman Way.

Given the distance and presence of screening vegetation, and based on the fact that the panels would only be at their full vertical position (ie at 4 m height) for a small portion of the day, views of project infrastructure are likely to be imperceptible from this location. The receptors to the north-east of the site that are represented by this viewpoint are located between 1.1-2.9 km away from the closest point of the infrastructure area, and are not likely to be impacted given the distance and presence of screening vegetation between receptors and the site.

Photograph 2 Viewpoint 9 – Norwood Lane looking south-west towards the development footprint

2.3 Management and mitigation

The development consent contains a number of conditions relating to visual impacts (Schedule3, Conditions 8, 9 and 16). Visual impacts from the PV panel arrays at the proposed height of 4 m can be adequately managed in accordance with the existing conditions of consent.

Condition 8 requires the establishment of a vegetation buffer, shown in Figure 4 (replicated from Appendix 1 of the development consent). In accordance with Condition 8:

> The Applicant must establish and maintain a mature vegetation buffer around the site at the locations outlined in the figure in Appendix 1, and supplementary visual impact mitigation measures for Lot 1 DP581150 to the satisfaction of the Secretary. These measures must:
>
> (a) be planted prior to the commencement of operations;
>
> (b) consist of vegetation species that facilitate the best possible outcome in terms of visual screening;
>
> (c) be effective at screening view of the solar panels and ancillary infrastructure on site from surrounding residences within 3 years of the commencement of construction; and
>
> (d) be properly maintained and kept free of weeds.

Condition 9 requires that a detailed landscaping plan be prepared for the site in consultation with relevant agencies and the owner of Lot 1 of DP 581150 (receptor R17) to the satisfaction of the Secretary. The plan must:

> (a) include a description of measures that would be implemented to ensure that the vegetated buffer achieves the objectives of condition 8 (b) – (d) of this consent;
>
> (b) include a program to monitor and report on the effectiveness of these measures; and
>
> (c) include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.

Condition 16 in Schedule 3 of the development consent requires that the applicant must:

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

No additional mitigation measures are considered warranted. Management of potential visual impacts will continue to be in accordance with the development consent.

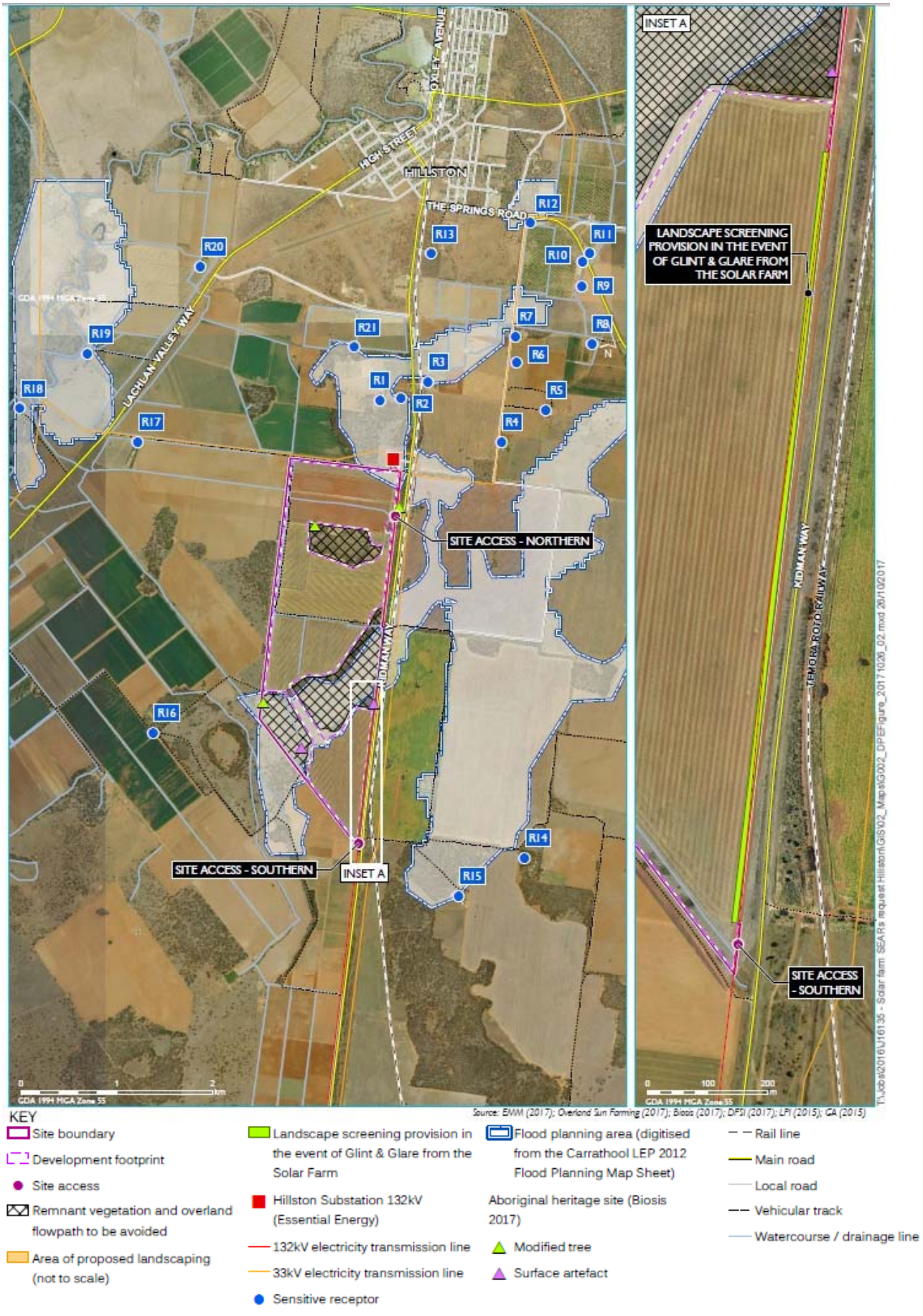

Figure 4 **Vegetation buffer and landscaping plan replicated from Appendix 1 of the development consent**

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 increase in panel height 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 increase in panel height and, accordingly, no additional impact on any item or feature of Aboriginal heritage.
Historic heritage	A desktop 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 increase in panel height and, accordingly, no impact on any items of local, State, National or World heritage significance.
Land	A desktop 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 increase in panel height 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 increase in panel height 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 increase in panel height.
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 increase in panel height.
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 increase in panel height will not generate additional employment over and above that approved.

3 Conclusion

The viewshed analysis has been updated and assumes that the maximum height of the PV solar panels will be 4 m. For consistency, the updated viewshed analysis has been conducted from the viewpoints considered as part of the visual impact assessment performed during the preparation of the EIS. The viewpoints were selected to represent views close to sensitive receptors and road corridors (ie Kidman Way, The Springs Road and Lachlan Valley Way) nearest to the site and the project's development footprint.

The proposed increase in the height of PV solar panels is not anticipated to result in significant impacts on viewpoints or sensitive receptors (ie dwellings). The development consent (Schedule3, Conditions 8, 9 and 16) contains provisions for the mitigation and management of visual impacts from Viewpoint 8 to the west of the site, and viewpoints 1, 2 and 3 along Kidman Way, including a vegetation buffer and landscaping plan. These provisions would take into account the height of infrastructure as part of the proposed modification. 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.

Visual impacts from the PV panel arrays at the maximum height of 4 m can be adequately managed in accordance with the existing conditions of consent and no additional mitigation measures are considered warranted. The proposed modification will result in only minor impacts compared to the approved project. 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 Essential Energy 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.

Kate Cox
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