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To: Daniel Drum, Environmental Team Manager, Premise Australia

From: Suzie Rawlinson, Director

Date: 13 September 2024

Re: Gregadoo Solar Farm, Battery Energy Storage System, modification to approved project
Visual impact assessment – review of proposed modification

Introduction

Gregadoo Solar Farm Pty Ltd (the Applicant) proposes to develop a new 65megawatt (MW) solar farm and associated infrastructure near Gregadoo, 8.5 km south of Wagga Wagga, within the Wagga Wagga local government area. The proposal, Gregadoo Solar Farm project (the "approved project") was approved on 11 December 2018, subject to the conditions outlined in Schedules 2 to 4 of the consent, including implementation of the landscaping plan. The layout of the approved project is shown in **Figure** 1.

Since being approved in 2018, three (3) applications for modification have been lodged:

- Modification1 was submitted on 30 July 2020, seeking to make changed to the approval with respect to the administrative description of the lots. This modification application was subsequently withdrawn.
- Modification 2 was submitted on 8 February 2021 which sought to make an amendment to the schedule of lands to include Lot 1 (which is owned by Transgrid), to make an adjustment to the transmission line design to provide an underground connection, and, to include a subdivision with respect to the onsite substation. This modification was approved on 5 March 2021.
- Modification 3 was submitted on 12 May 2023, seeking to amend the layout and capacity of the solar farm, associated with infrastructure supply lines and improved efficiency of internal layout. This modification was approved on 11 August 2023.

The Applicant now proposes a modification to the approved project, to allow for the replacement of an area of solar panel arrays at the southwestern corner of the site with a Battery Energy Storage System, as shown in **Figure** 2.

This memorandum (memo) provides an assessment of the potential visual impacts of the proposed modification for consistency with the impacts of the approved project.

Approval background and approach

IRIS Visual Planning & Design have been commissioned to assess the landscape character and visual impacts of the proposed modification. A visual impact assessment was prepared by NGH Environmental in 2018 to support the Environmental Impact Statement (EIS) for the application - Appendix F – Visual Impact Assessment (VIA).

Since the approval, DPE have released the Large-Scale Solar Energy Guideline, Technical Supplement – Landscape and Visual Impact Assessment (2022). This guideline does not specifically guide the assessment of BESS and substations, which are the subject of this proposed modification. As the solar array components of the project are not proposed to be changed, this guideline does not provide a relevant methodology for assessment of this modification. Furthermore, the impacts are largely consistent with the existing approved project and would not justify updating of the existing assessment to include the new methodology provided in the Technical Supplement.

Details of the methodology used for this assessment is described in section 5 of this memo.

The approved project

The layout of the approved project is Figure 1 shown in and includes:

- approximately 134,618 solar panels (approximately 2.8 m high) and 12 invertor units (up to 3.5 m high)
- an on-site 132 kV substation and overhead grid connection to existing Transgrid Wagga substation located adjacent to the south-east corner of the site
- internal access tracks, staff amenities, maintenance and equipment buildings, site offices, on-site car parking and security fencing
- New access points from Boiling Down Road for construction and emergency access
- vegetation screening along the boundaries of the site
- subdivision of the project site to facilitate long term leasing of the land.

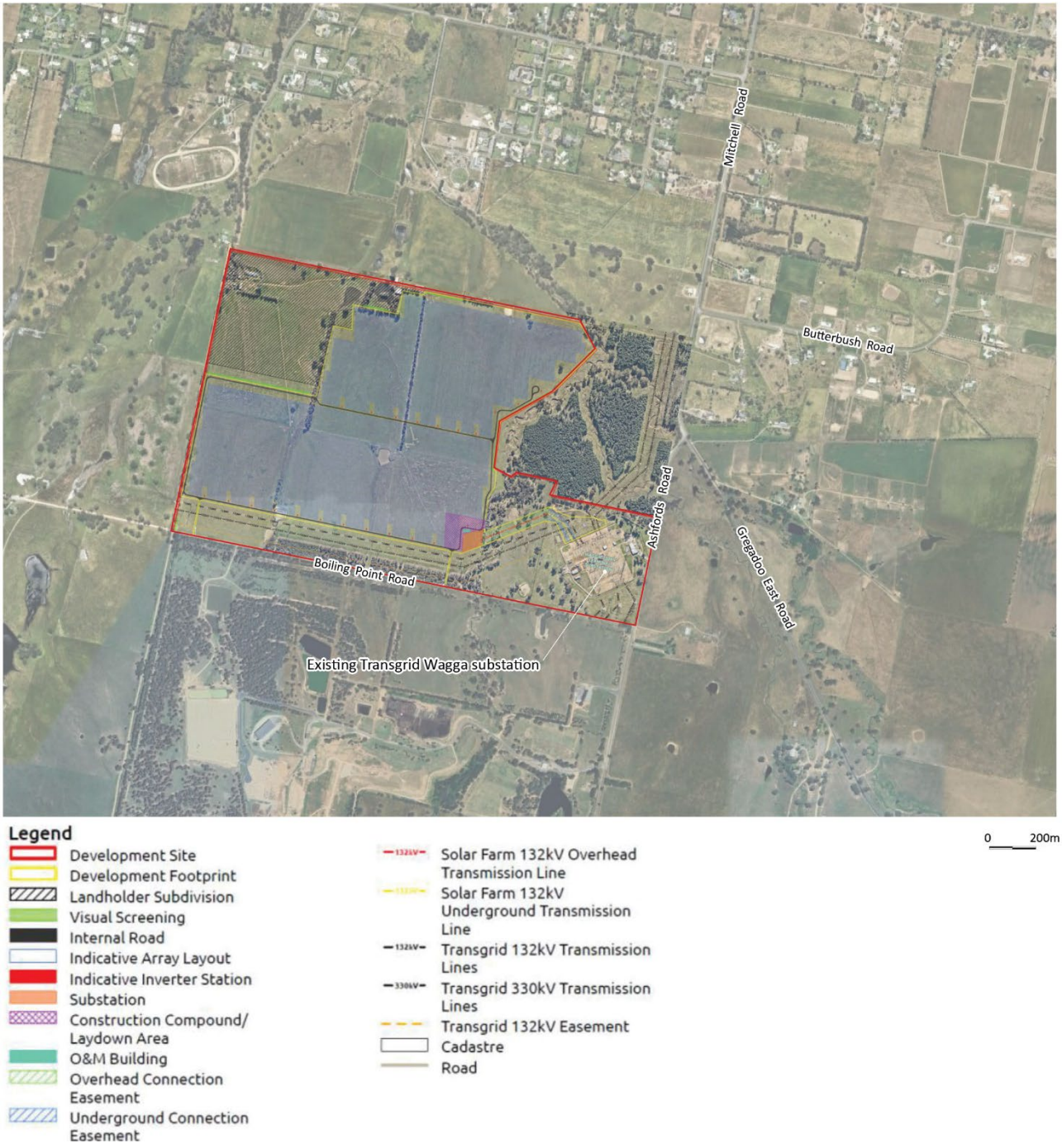

Figure 1 Gregadoo Solar Farm – approved project layout

Description of the proposed modification

The proposed modification to the approved project would include a Battery Storage Energy System (BESS) and adjacent collector substation located at the south eastern corner of the development footprint, replacing an area of the solar panel arrays. The proposed modification also includes a new overhead grid connection between the proposed BESS and the existing Transgrid Wagga substation and an additional access point and internal access track from Boiling Down Road to the overhead transmission line between the Gregadoo Solar Farm Substation and the Transgrid Substation.

The BESS would include including battery enclosures (about 14 metres long x 3 metres wide x 3 metres high) and step-up transformers, separated into rows. Outdoor security lighting (activated by sensor). There would be internal access tracks and the site would continue to be surrounded by chainmesh security fencing and access gates (up to 2.3-metre-tall).

The layout of the proposed modification is shown in **Figure** 2.

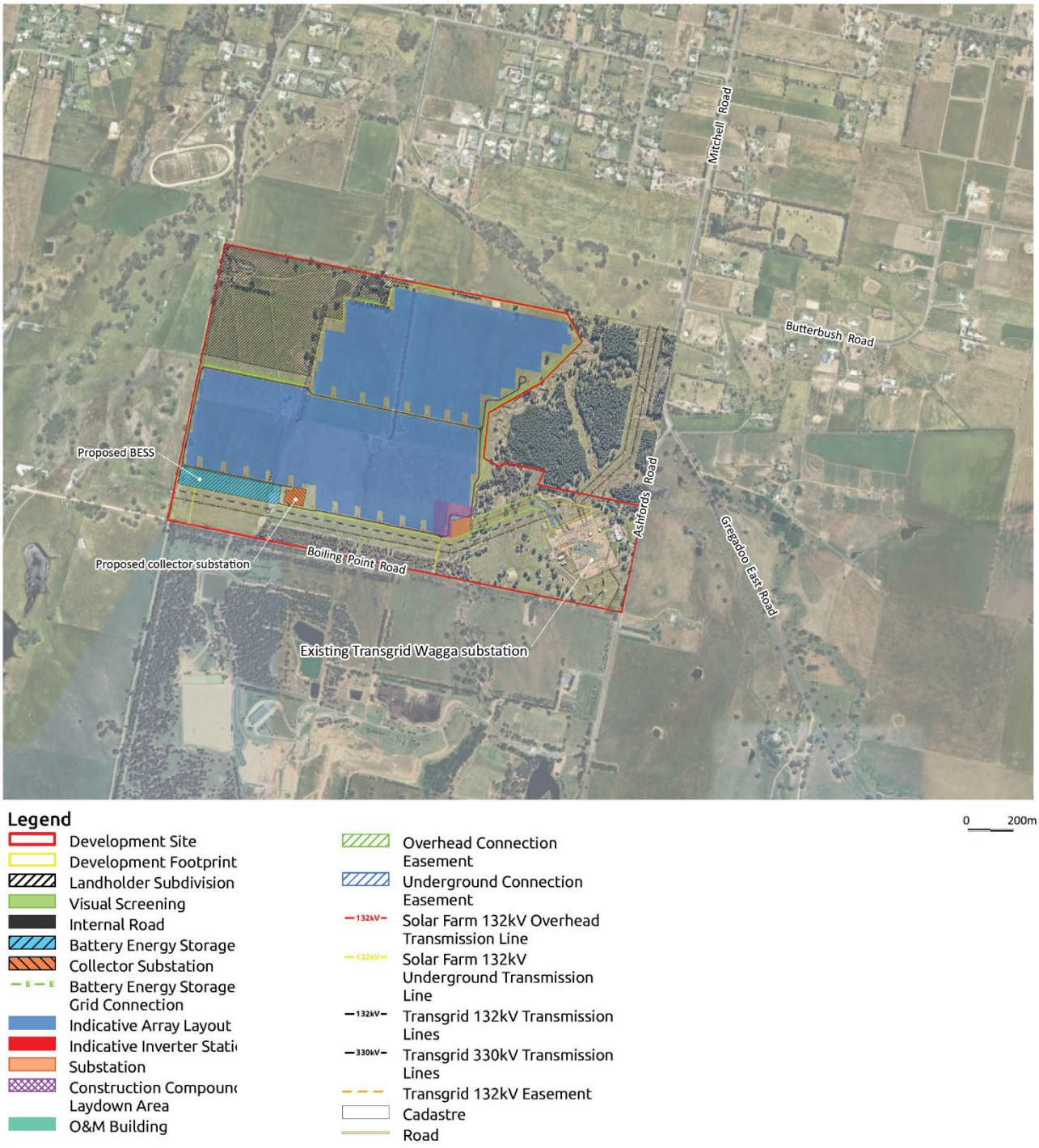

Figure 2 Gregadoo Solar Farm – proposed modification

Method

This memo has been prepared to consider the impacts of the proposed modification and compare these with the landscape and visual impacts identified for the approved project. This includes consideration of the landscapes and views previously assessed for the approved project, and any additional views (if necessary) to confirm this assessment.

Following the steps undertaken for the landscape and visual assessment of the approved project, this assessment includes a:

- Revised assessment of landscape character
- Revised assessment of visual impacts during construction and operation
- Revised assessment of Identification of any changes to or new mitigation measures if required.

The methodology for the EIS assessment is described in Chapter 2, Appendix F – Visual Impact Assessment (VIA) of the Environmental Impact Statement (EIS).

Revised assessment of landscape character

The Visual Impact Assessment provided in the EIS included a description of the existing landscape character within the site and surrounding area. Four landscape character units (LCU) were identified, including:

- Industrial LCU – including roads, electrical, waste management and other large scale built infrastructure in Wagga Wagga
- Rural LCU – including flat to undulating agricultural land and rural residential blocks south of Wagga Wagga, within presence of transmission infrastructure
- Residential LCU – including residential, commercial and mixed-use land uses in the urban area of Wagga Wagga, and
- Recreational LCU – including reserves, parks and other recreational areas in Wagga Wagga.

The scenic quality of each LCU was identified as high, moderate, low. This was then used to inform the sensitivity of the representative viewpoints in the assessment of visual impact.

The approved project, including the areas subject to the proposed modification, is in the Rural LCU. The scenic quality of this LCU was identified in the VIA as moderate.

It is noted that there are additional large-scale projects under construction or proposed in this LCU, including Project EnergyConnect transmission extending west from the existing Transgrid Wagga Wagga substation (under construction) and HumeLink transmission project that would extend southeast from the Wagga Wagga substation, the landscape features that contribute to the character of the Rural LCU are largely the same as those described in the VIA for the approved project. Therefore, the scenic quality of this LCU remains as moderate for this assessment.

Revised assessment of daytime visual impacts

Visibility of the proposed modification

The solar array for the approved project would include panels up to around 2.8 m high metres high, with inverters up to around 3.5 metres high. The modification would replace an area of the solar array with BESS infrastructure, which would include components of around 3 metres tall, which is a similar height to the approved project. The modification would also include a collector substation, in addition to the substation proposed for the approved project. This would include some infrastructure with taller components, located behind (north of) the existing mature vegetation along Boiling Down Road.

Overall, the visibility of the area subject to the modification would be limited due to the existing vegetation, buildings and undulations in landform. In particular, this includes mature vegetation along Boiling Down Road and Redbank Road, Boiling Down Creek, an area of plantation pine forest to the north of the existing Transgrid Wagga substation, and along the fence lines and within the gardens of dwellings near the site.

The proposed BESS and collector substation would be visible from an about 500 metre section of Boiling Down Road, near the Redbank Road intersection, where there is no intervening vegetation or landform to screen the proposal. The VIA for the approved project identified onsite screening vegetation along Boiling Down Road and Redbank Road for a distance of 20m from the intersection, as shown on Figure 1. This would screen views to the proposed BESS from Boiling Down Road and Redbank Road, once established, and planting has reached heights of over 3 metres.

The overall visibility of the project, as described in the EIS would not noticeably change.

Updates to the review of significant vistas

The VIA for the approved project identified four scenic areas located within 15 kilometres of the proposal site, which offer viewing opportunities for the public, including walking tracks, roadside vantage points and lookouts. These scenic areas include:

- Lake Albert
- Willans Hill Park
- Wagga Wagga Botanic Gardens, and
- Pomingalarna Reserve.

The VIA concluded that the proposal would not be visible from these locations.. As the proposed modification occupies an area of the approved project footprint and would be of a similar height and scale, the project if modified would continue to not be visible from these significant viewing locations, due to intervening vegetation and landform.

Updates to the representative viewpoint assessment

The VIA for the approved project included an assessment of the visual impact of the proposal during construction and operation. This included 15 representative viewpoints including views from the public and private property. Photomontages were prepared showing the visual impacts of the proposal at six locations. The location of the 15 representative viewpoints is shown in Figure 3.

A review of these representative viewpoints has been undertaken, to identify those where there would be a potential view of the area of the project subject to this proposed modification (refer to Table 1).

Of the viewpoints assessed for the approved project, five have the potential for a view of the proposed modification (refer to Table 1). These are viewpoint 5, 10, 11, 14 and 15 which have been assessed for consistency with the approved project.

Table 1 Views assessed for the approved project and the proposed modification

		Potential view to the modification (Y/N)	Justification / comments
1	View south from Gregadoo Road	N	Views to proposed modification would be blocked by the approved solar farm and proposed screening vegetation along northern site boundary.
2	View south from Blackbutt Road	N	Views to proposed modification would be blocked by intervening vegetation, any visible areas of the approved solar farm and proposed screening vegetation along northern site boundary.
3	View south west from Gregadoo and Mitchell road intersection	N	Views to proposed modification would be blocked by intervening vegetation, any visible areas of the approved solar farm and proposed screening vegetation along northern site boundary.
4	View south west from Butterbush and Mitchell road intersection	N	The proposed modification would not be visible due to mature plantation vegetation along Ashfords Road.
5	View west from Butterbush Road	Y	Potential distant glimpse to the modification. Refer to Table 2 for viewpoint assessment.
6	View west from dwelling at Mitchell Road	N	Proposed modification would not be visible due to intervening vegetation.
7	View west from Mitchell Road	N	Proposed modification would not be visible due to mature plantation vegetation along Ashfords Road.
8	View north west from Mitchell Road	N	Proposed modification would not be visible due to distance (around 1.5 km) and intervening vegetation along Boiling Down Road.
9	View north from Boiling Down Road	N	Proposed modification would not be visible due to mature vegetation along Boiling Down Road.
10	View north east from Boiling Down and Redbank road intersection	Y	Close range view to proposed BESS area. Refer to Table 2 for revised viewpoint assessment. for photomontage showing the proposed modification.
11	View east from Redbank Road	Y	Close range view to proposed BESS area. Refer to Table 2 for revised assessment of viewpoint 10.
12	View south east from Redbank Road	N	View to the proposed modification would be located behind the approved solar farm and not visible.
13	View south east from Redbank Road	N	View to the proposed modification would be located behind the approved solar farm and not visible.
14	View west from near dwelling at Mitchell Road	Y	Potential distant glimpse to the modification. Refer to Table 4 for viewpoint assessment.
15	View west from entertaining area near dwelling at Mitchell Road	Y	Potential distant glimpse to the modification. Refer to Table 5 for viewpoint assessment.

The following section describes the potential impacts of the proposed modification on those viewpoints where the proposed modification will be seen (viewpoints 5, 10, 11, 14 and 15).

The area of the project subject to the proposed modification has been identified on the photomontages prepared for the EIS. Additional photomontages have also been prepared for viewpoint 5, which is in close proximity to the proposed BESS and did not have a photomontage in the EIS. These photomontages show the location of the modification within the approved project and demonstrate the location and extent of change in these views.

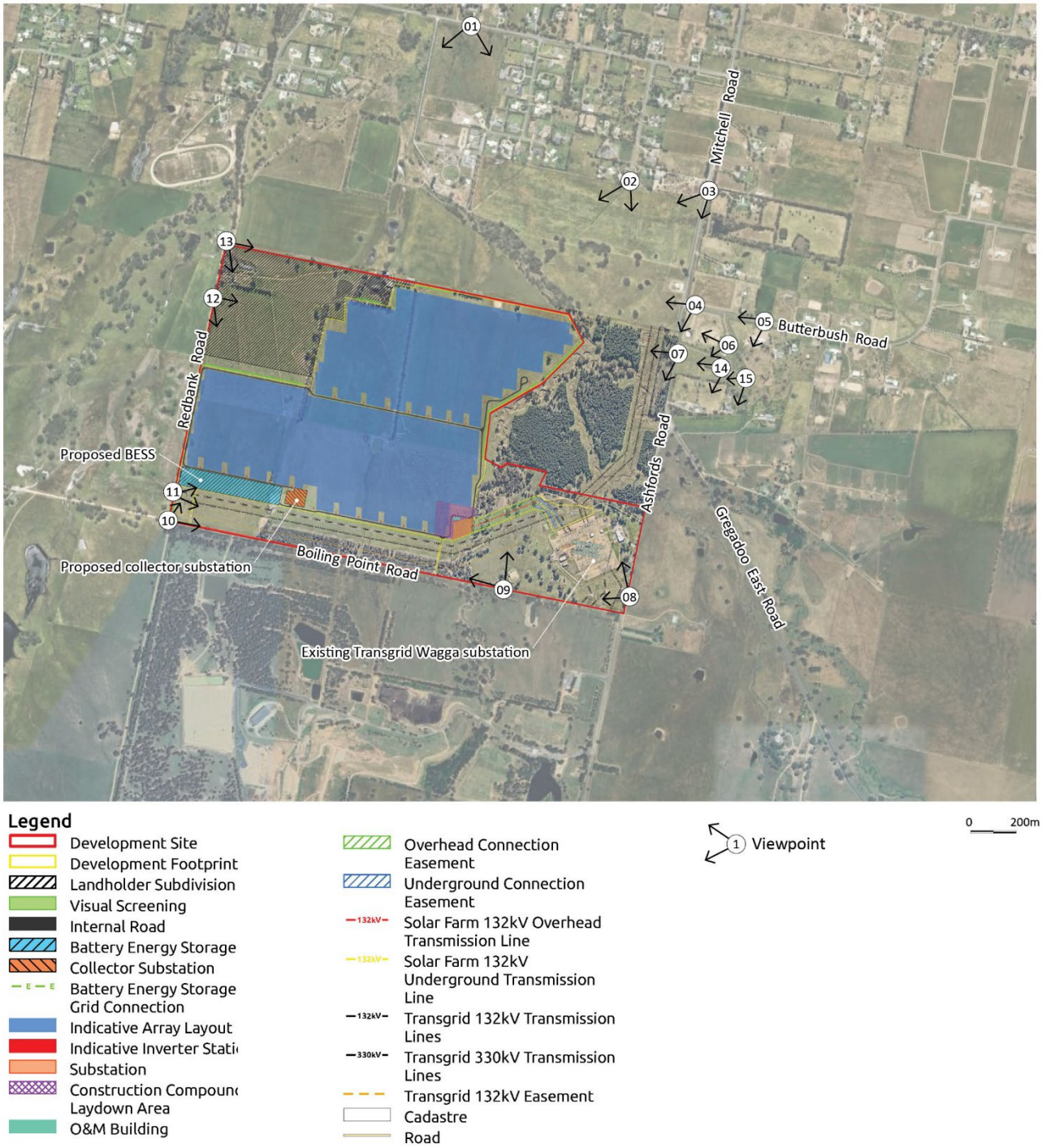

Figure 3 Location of representative viewpoints

Figure 4 Viewpoint 5: View west from Butterbush Road towards the project site – existing view

Table 2 Viewpoint 5: View west from Butterbush Road towards the project site - revised visual assessment

	Approved project - as described in the EIS, 2018	Proposed amendment
Description / magnitude of change:	*'existing view west towards the development site from Butterbush Road, which is located within a rural setting on a slightly elevated area. This viewpoint is located approximately 800 metres from the development site.* *'There are some existing buildings and vegetation within the line of sight from the viewpoint to the development site. However, this only provides partial screening, with most of the solar farm visible from this vantage point. The view will be in contrast to the existing rural scenes, but in line with the remaining industrial land use.* *The view is only afforded to road users, and as such is transient. Although the solar farm is clearly visible in the photomontage from this viewpoint there are many existing transmission towers with vertical form visible. The height and view of the proposed solar farm is expected to reduce as you drive down Butterbush Road towards the Mitchell Road junction. This reduces the contrast of the solar farm within the landscape.'* (p27, VIA NGH, 2018)	The modified area of the project would be located about 1.9km away and glimpsed in the background of this view. It would comprise infrastructure of a similar mass and scale. The BESS infrastructure would have some different visual characteristics, being battery enclosures of potentially lighter colour, and arranged in rows. The collector substation would, be less visible, due to the transparency of this infrastructure when viewed against a backdrop of vegetation. The proposed amendment would have limited visibility and be consistent with the character of the approved project. There would be no change in magnitude from this location.
Sensitivity level	Low	Low
Impact level	Low	Low

Figure 5 Viewpoint 10: View north-east from the intersection of Boiling Down Road and Redbank Road – existing view

Figure 6 Viewpoint 10: View north-east from the intersection of Boiling Down Road and Redbank Road – photomontage showing approved project (photograph taken at 24mm focal length)

Figure 7 Viewpoint 10: View north-east from the intersection of Boiling Down Road and Redbank Road – photomontage showing approved project, zoomed in view

Figure 8 Viewpoint 10: View north-east from the intersection of Boiling Down Road and Redbank Road – photomontage showing proposed modification (photograph taken at 24mm focal length)

Figure 9 Viewpoint 10: View north-east from the intersection of Boiling Down Road and Redbank Road – photomontage showing proposed modification, zoomed in view

Table 3 Viewpoint 10: View north-east from the intersection of Boiling Down Road and Redbank Road - revised visual assessment

	Approved project - as described in the EIS, 2018	Proposed amendment
Description / magnitude of change:	*'The viewpoint is located on Boiling Down Road facing north-east into the proposed solar farm. Dominant features include stands of native vegetation, overhead transmission lines and unsealed road used predominately for local traffic. No residents or sensitive receptors are located along Boiling Down Road within the vicinity of the solar farm. The solar farm will be highly visible to motorists. Whilst the road is of very low use, there is a potential for distraction of motorists at the intersection with Redbank Road.'* *'Onsite screening along Boiling Down Road and Redbank Road for a distance of 20m from the intersection is recommended.'* (p48. VIA NGH, 2018)	The modification would be set back around 140 metres from Boiling Down Road and would be seen in the middle ground this view, beyond the existing transmission lines. In time, the proposed screen planting along Boiling Down and Redbank Road, a condition of the approved project, would filter views to the proposed solar farm, and the modification. The modification would replace solar arrays with BESS infrastructure, in the middle ground of this view. The BESS would generally have a similar mass and scale to the solar arrays. The BESS infrastructure would have some different visual characteristics, being battery enclosures of a potentially lighter colour, arranged in rows, with step-up inverters. The collector substation would be less visible, to the east of this view, beyond the existing vegetation. The modification would continue to be visible to motorists using this unsealed road with a similar visual effect and there would be no change in magnitude from this location. There would be no change in magnitude from this location.
Sensitivity level	Low	Low
Impact level	Medium	Medium

Table 4 Viewpoint 14: View east from Redbank Road - revised visual assessment – revised visual assessment

	Approved project - as described in the EIS, 2018	Proposed amendment
Description / magnitude of change:	*'Screening from the resident's garden, roadside vegetation and the vegetation along Mitchell Road screens the majority of the solar farm' … The solar farm is partially visible, mixed with a view of existing transmission towers, roads and other infrastructure. This reduces the contrast of the solar farm within the landscape. The visual impact is expected to be low.'* *'The panoramic view is taken from the front of the shed and is less representative of the typical views from the home (that has a north-westerly aspect away from the solar farm).'* (p28, VIA NGH, 2018)	View located over 1.5 kilometres from the modification and may be glimpsed in the background of view. The modification would comprise infrastructure of a similar mass and scale to the approved project. The BESS infrastructure would have some different visual characteristics, being battery enclosures of potentially lighter colour, and arranged in rows. However, the collector substation would, be less visible, due to the transparency of this infrastructure when viewed against a backdrop of vegetation. The proposed amendment would have limited visibility and be consistent with the character of the approved project. There would be no change in magnitude from this location.
Sensitivity level	Low	Low
Impact level	Low	Low

Table 5 Viewpoint 15: View west from entertaining area near dwelling at Mitchell Road – Revised visual assessment

	Approved project - as described in the EIS, 2018	Proposed amendment
Description / magnitude of change:	*'The location is over 700 metres from the visible section of the development site. The view is not representative of typical views expected to be seen from other residents, as it situated at a higher elevation than homes on Mitchell Road.'* *Screening from the resident's garden, roadside vegetation and vegetation along Mitchell Road screens a portion of the solar farm' … 'A portion of the solar farm is visible, mixed with a view of existing transmission towers, roads and other infrastructure. The form and colour of the infrastructure is not incongruous with the existing low-lying rectangular forms and bare paddocks in the area. This reduces the contrast of the solar farm within the landscape. The visual impact is expected to be low.'* (p28, VIA NGH, 2018)	View located around 1.9 kilometres from the modification and may be glimpsed in the background of view but would not be prominent in this view, due to the distance, and relatively small footprint and height. The modification would comprise infrastructure of a similar mass and scale to the approved project. The BESS infrastructure would have some different visual characteristics, being battery enclosures of potentially lighter colour, and arranged in rows, however, this would be difficult to decern at this distance. The collector substation would, also be less visible, due to the transparency of this infrastructure when viewed against a vegetated backdrop. The modification would be viewed amongst and in the context of existing and future proposed electrical infrastructure, including the approved Project EnergyConnect transmission lines, the existing Transgrid Wagga substation and the approved Gregadoo Solar Farm. There would be no change in magnitude from this location.
Sensitivity level	Low	Low
Impact level	Low	Low

Summary of revised visual impact assessment

Table 6 Summary of the revised viewpoint assessment

No.	Viewpoint location	Approved project Visual impact level	Proposed Modification Visual impact level
5	View west from Butterbush Road	Low	Low
10	View north east from Boiling Down and Redbank road intersection	Medium	Medium
11	View east from Redbank Road	Medium	Medium
14	View west from near dwelling at Mitchell Road	Low	Low
15	View west from entertaining area near dwelling at Mitchell Road	Low	Low

Construction impacts

The scale and character of the activities required to construct the Solar Farm would be similar to that required for the installation of the BESS and collector substation. The extent of visibility of this work would not noticeably change, as the footprint of the works and scale of the infrastructure remains generally consistent with the approved project.

Views at night

There is the potential for additional lighting around the BESS infrastructure. This lighting would be activated by sensor and would not introduce permanent lighting to this area of the project site.

Management and mitigation measures

Standard mitigation measures to manage landscape and visual impacts for the approved project are identified in the conditions for approval, including screen planting at the corner of Boiling Down and Ashfords Roads, and along sections of the northern and eastern boundaries of the array layout, as shown on **Figure** 1.

This planting, along with existing mature vegetation near the site, as shown on **Figure** 1, would effectively screen the modification and no further mitigation measures are necessary.

To avoid night time visual impacts, it is proposed that any lighting associated with the BESS be controlled by sensors to minimise visible lighting from adjacent areas, and skyglow.

If noise walls are required, these should be painted a neutral colour to ensure they blend into the surrounding landscape when viewed from the adjacent roads and from distant viewpoints where relevant.

Conclusion

Overall, there would be no changes to the landscape character or visual impacts of the project during the daytime during construction or operation due to the proposed modification.

The existing mitigation measures would manage the impacts of the project, with the addition of measures to control any additional lighting and the treatment of noise walls if required.