



Maryvale Solar Farm - Proposed Battery Energy Storage System (BESS)

Visual Impact Assessment



Maryvale Solar Farm

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Visual Impact Assessment

Prepared for: Energy Forms on behalf of Maryvale Solar Farm Pty Ltd
Prepared by: Stacey Brodbeck, *MEnvPlan, BLArch*
AILA Registered Landscape Architect and PIA Registered Planner and
Alison Dodds, *PGCert Public Policy, BPlan, BLArch*
PIA Registered Planner

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ENVISAGE CONSULTING PTY LTD
ABN 89 139 313 296
envisageconsulting.com.au

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1.1 Purpose of this addendum

This report is an addendum to the Maryvale Solar Farm Visual Impact Assessment (VIA, Envisage Consulting, 6 September 2018) prepared on behalf of Maryvale Solar Farm Pty Ltd. The report's purpose is to assess the visual impacts associated with Maryvale Solar Farm Pty Ltd's proposal to add a Battery Energy Storage System (BESS) to the approved Maryvale Solar Farm at 121 Maryvale Road, Maryvale.

Within this report the BESS is sometimes referred to as the 'Proposal' and the approved Maryvale Solar Farm as the 'Approved Project'.

A BESS is a large-scale system used to store energy generated by another source., with either BESS option anticipated to have peak capacity of approximately 125 megawatts (MW) and storage capacity of three (3) hours (or 375MW/per hour). Two alternative battery storage formats are being considered to incorporate the BESS into the Approved Project site, that being:

- Centralised Battery Energy Storage Option
- Distributed Battery Energy Storage Option.

Both options are being put forward for approval and are assessed in this addendum.

This addendum is based on guidance from Department of Planning, Industry and Environment (DPIE) that an addendum is considered appropriate to assess the potential visual impacts of the proposed BESS.

1.2 Methodology

This addendum generally follows the same methodology as defined in the Approved Project's VIA, however, has been tailored to this assessment in this report.

The Approved Project VIA assessed two main types of visual impacts:

1. Effect on the landscape character – the overall impact of a project on an area's character and sense of place.
2. Effect on key viewpoints – the day-to-day visual effects of a project on people's views.

Those two impacts are re-assessed in this report, with the inclusion of either a Centralised BESS or Distributed BESS. The approach considers whether either BESS option would alter the impact levels determined for the Approved Project.

1.3 Field survey

The Approved Project site (121 Maryvale Road, Maryvale) was inspected on 5-6 August 2021. Previous inspections were also undertaken in 2018 during preparation of the Approved Project VIA. Weather during the most recent site inspection was dry, with overcast and sunny periods. Private property was not accessed, with likely viewpoints assessed from the nearest publicly accessible locations.

1.4 Approved Project's Environmental Conditions

The Approved Project is subject to Environmental Conditions. There are three environmental conditions relating to visual concerns (listed in Schedule 3 (Visual, condition 18)), which state that the Applicant must:

- a) minimise the off-site visual impacts of the development, including the potential for any glare or reflection;
- 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 identification or safety purposes.

This assessment assumes application of the three conditions as well as full implementation of the Approved Project's Concept Landscape Plan (shown in **Appendix A**), which was designed to minimise visual impact to surrounding public and private viewpoints.

1.5 Report format

The report is set out in the following format:

- SECTION 2 Describes the visual features of the Proposal
- SECTION 3 Assesses the likely impact to landscape character
- SECTION 4 Assesses the likely impact to views
- SECTION 5 Presents key findings.

Two alternative battery storage formats (or layouts) are being considered for the Proposal as described below. Both options would be contained within the approved infrastructure/impact areas defined in the Development Consent and the General Layout Plan for the Approved Project. The proposed layouts for each option are provided at the end of this section as **Figure 2-5** and **Figure 2-6**.

2.1 Centralised Battery Energy Storage Option

This option would involve a large central “battery” being positioned between the central inverter and the grid, adjacent to the proposed substation on site. This central battery would occupy about four hectares of land (i.e. 3.872 hectares), which is equivalent to around four soccer fields. It would comprise multiple (about 180) shipping container style buildings grouped together to house batteries and the ancillary connection and management equipment enabling the batteries to interface with the solar farm substation and grid.

Figure 2-1 is an indicative image of a solar farm coupled with a centralised BESS, where all battery units and ancillary buildings are located together. The centralised BESS option proposed for the Maryvale Solar Farm would be about five times the size of the system shown in the image.



Figure 2-1: Image of a BESS coupled with a solar farm, with white battery units (for illustration purposes only)

Each proposed battery unit would have approximately the same dimensions as a typical “40 Foot” shipping container (length 12.2m, width 2.4m, maximum height 3.0m). The Approved Project solar panels have a height of 4m (which is taller than the proposed BESS). **Figure 2-2** shows an example of the proposed battery units to illustrate the likely general appearance. Note, however, that it has been assumed in this assessment that the proposed battery units would be colour treated to blend with the surrounding landscape (consistent with the Environmental Conditions of the Approved Project), and not white as shown in **Figure 2-1** and **Figure 2-2**.



Figure 2-2: Close image of a centralised BESS, with white battery units (for illustration purposes only)

2.2 Distributed Battery Energy Storage Option

This option comprises the same number (about 180) of shipping container style buildings (to house the batteries) as the centralised BESS, however, the containers would be distributed across the solar farm and co-located with the Approved Project inverter stations. The two possible designs for the Approved Project inverter stations have a height range of 2.6-2.9m (both a similar height to the proposed BESS), and the Approved Project solar panels have a height of 4m (which is taller than the proposed BESS).

Figure 2-3 and **Figure 2-4** are indicative images of the general appearance of a solar farm with a distributed BESS, where the battery units are distributed throughout the solar farm. Each battery would have approximately the same dimensions as a typical “40 Foot” shipping container (length 12.2m, width 2.4m, maximum height 3.0m). Both figures are of existing constructed projects to illustrate the likely general appearance, note, however, that the proposed battery units are recommended to be colour treated to reduce visual contrast (consistent with the Environmental Conditions of the Approved Project), and not white as shown in **Figure 2-3** and **Figure 2-4**.

2.3 Construction impacts

It has been estimated that construction of either BESS option would add 2-3 months to the construction time, however, there is not anticipated to be a notable additional impact on landscape character or viewpoints, as construction of either BESS option would occur at the same time as the Approved Project and be relatively minor in comparison. Therefore, the visual changes during construction have not been re-assessed in this report and related impacts remain consistent with the Approved Project.



Figure 2-3: Image showing a distributed BESS, with white battery units and inverters (for illustration purposes only)



Figure 2-4: Close up image of battery unit with inverter adjacent to solar panels, with white battery units (for illustration purposes only)

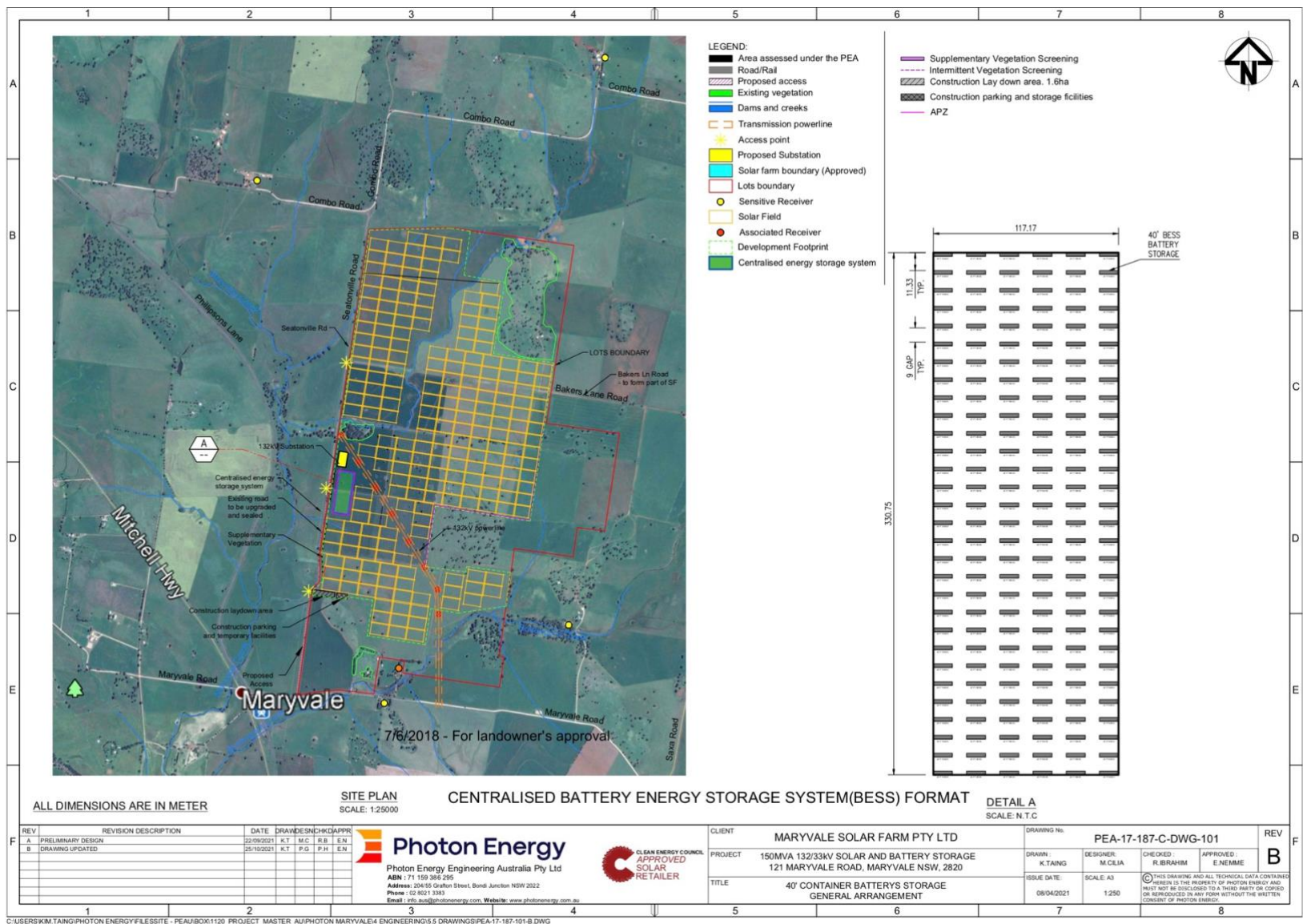


Figure 2-5: Proposed layout - Centralised BESS option

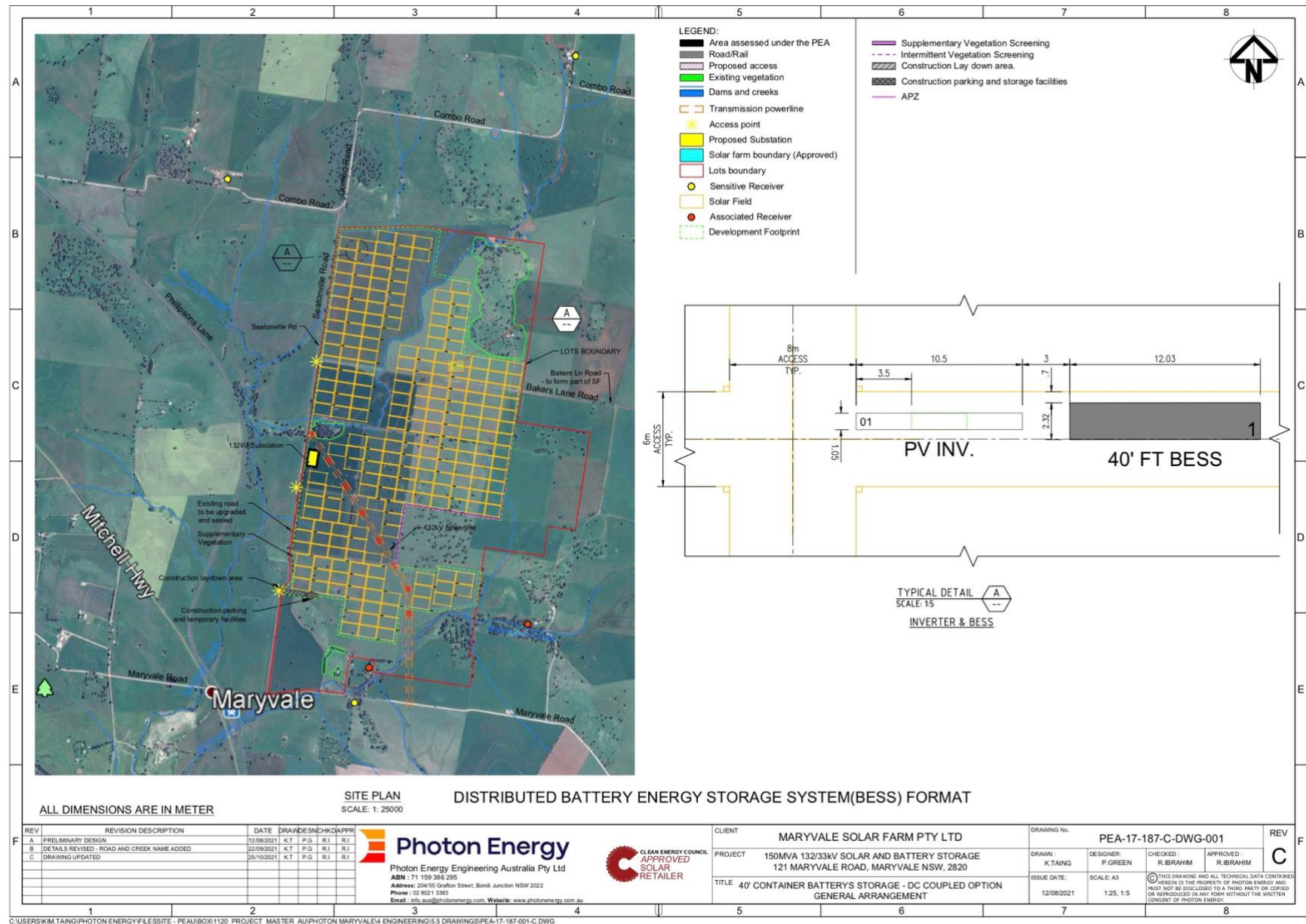


Figure 2-6: Proposed layout - Distributed BESS option

Landscape character impact assessment

3.1 Landscape character and recent changes

The area's landscape character – such as land use, landform and vegetation - was previously described in the Approved Project VIA, however, there have been some recent changes to landscape character resulting from the completion of some nearby renewable energy projects. That includes the Bodangora Wind Farm (some turbines can be seen to the far east) and ongoing construction of the Wellington Solar Farm (seen over 2.5km away from a highpoint on the Mitchell Highway (near the northern intersection of Pronto Falls Road), and possibly from some elevated rural residences west of the highway).

These changes have reduced the more natural qualities of the wider rural landscape around Wellington, however, in the vicinity of the site of the Approved Project the previously described rural landscape character remains dominant.

3.2 Previous assessment of Approved Project and applicability to this assessment

Landscape character was previously described in the Approved Project VIA as having **moderate** sensitivity to change. Although some change has occurred, the previous rating is still considered appropriate and has been applied to this assessment.

The magnitude of change to landscape character for the Approved Project was previously assessed as **moderate** on completion (operation), giving an overall impact to landscape character of **moderate**.

3.3 Impact to landscape character - Centralised BESS

Magnitude of change

The Centralised BESS would be located just south of the approved substation, with both in a natural depression in the landform. There is an existing densely vegetated creekline north of the approved substation site which will be retained and will screen most of the substation from outside views from the north (apart from the tops of some of the taller structures) and would similarly also screen views of the proposed Centralised BESS from the north. The approximate location of the Centralised BESS is shown in the photograph in **Figure 3-1**.

Additional landscape screening is proposed as part of the Approved Project's Concept Landscape Plan (shown in **Appendix A**). That landscape screening would extend along Seatonville Road from the creekline vegetation, past the substation and continue along the road to the south. The landscape screening would also screen the Centralised BESS.



Figure 3-1: Approximate location of Centralised BESS

The assessed magnitude of change to landscape character associated with the addition of the Centralised BESS, remains at **moderate** (same as the Approved Project), as:

- Although the Centralised BESS would cover an area of some four hectares, its location close to the substation means that the change to landscape character is confined to a similar proximity and in a part of the site that has a relatively low visibility due to it being a local low point.
- Proposed landscape screening that is part of the Approved Project would screen the BESS over time.
- The low height of the battery units (3.0m) means the BESS would not be visually prominent at a distance.
- The changes already approved to occur as a result of the Maryvale Solar Farm mean that the Centralised BESS would be a relatively minor addition to the new, more infrastructure-based landscape character.

However, if the battery units are white and not coloured to reduce visual contrast, then the magnitude of change to landscape character would somewhat increase (still in the order of moderate yet with some increase).

Impact to landscape character

The moderate sensitivity ranking of landscape character combined with the moderate magnitude of change post-construction, leads to an overall **moderate** level of impact to landscape character, which is unchanged from the assessed rating of the Approved Project.

However, if the battery units are white and not coloured to reduce visual contrast, then the magnitude of change to landscape character would increase (still in the order of moderate yet with some increase),

3.4 Impact to landscape character – Distributed BESS

Magnitude of change

The Distributed BESS would be distributed across the area of the solar panels, co-located next to the inverters, resulting in pairs of similar-sized components with the colouring of both the inverter stations and battery units matching (such as a dark grey).

The assessed magnitude of change to landscape character, associated with the addition of the Distributed BESS, remains the same as the Approved Project (**moderate**), as:

- The coloured battery units would mean that these components would visually integrate with the solar panels and inverter stations and have a low colour contrast.
- The low height of the battery units (3.0m), which is about the same as the height of the inverters (2.6 – 2.9m) and below that of the solar panels (4m) also means the units would not be visually prominent at a distance.
- Proposed landscape screening along Seatonville Road, including past the substation, as well as along parts of the southern and eastern boundaries (shown in Approved Project's Concept Landscape Plan, **Appendix A**) would increase vegetation around the site and reduce the prominence of the infrastructure within the landscape

However, if the battery units are white and not coloured to reduce visual contrast, then the magnitude of change to landscape character would somewhat increase (still in the order of moderate yet with some increase), across the whole solar farm.

Impact to landscape character

The moderate sensitivity ranking, combined with the moderate magnitude of change post-construction, leads to an overall **moderate** level of impact, which is unchanged from the Approved Project. However, if the battery units are white and not coloured to reduce visual contrast, then the magnitude of change to landscape character would somewhat increase (still in the order of moderate yet with some increase), across the whole solar farm.

3.5 Comparison of landscape character impact – Approved Project and BESS options

Table 3-1 shows the impact ratings for landscape character for the Approved Project, and then re-assessed with the addition of either BESS option. In summary, all assessed ratings for the Approved Project remain unchanged with the addition of either of the BESS options.

Table 3-1: Comparison of impact to landscape character: Approved Project and BESS options

Project	Sensitivity	Magnitude	Landscape character impact
Approved Project	Moderate	Moderate	Moderate
Centralised BESS	Moderate	Moderate*	Moderate*
Distributed BESS	Moderate	Moderate*	Moderate*

*Note: these impact levels would increase if battery units were coloured white

This section compares the potential changes to the viewer experience of the Approved Project, with the addition of each BESS option.

4.1 Identification of viewpoints

The Approved Project VIA identified three types of viewpoints (VPs):

- Private viewpoints which were closer and assessed individually
- Private viewpoints which were more distant and assessed as groups, and
- Linear public viewpoints.

The VIA determined that some sections of the proposed solar farm would potentially be seen from 47 private viewpoints and five public viewpoints and assessed the likely level of visual impact. A map from the Approved Project VIA, indicating those viewpoints and the predicted impact levels prior to screen planting being established, is reproduced in **Appendix B**.

Viewpoints potentially affected by either BESS option have been identified and re-assessed for the two timeframes assessed in the Approved Project VIA, that being:

- at completion (i.e. without established screen planting)
- and after at least five years (i.e. allowing for part-establishment of screen planting).

4.2 Centralised BESS

The Centralised BESS would result in a single battery facility situated south of the approved substation, with screen planting to occur alongside the western (road frontage) side of the BESS along most of Seatonville Road.

Overall, the Centralised BESS would have a relatively low visibility and impact to viewpoints at completion, as:

- All private viewpoints with potential views are more than 1.5km away, except one (VP57, on western side of Seatonville Road, with no views from the residence).
- The only notable public views would be from a short section of the Mitchell Highway, with the closest view of the BESS location about 1.5km away (as shown in **Figure 4-1**).
- The nearest public viewpoint, Seatonville Road along the western boundary, is an unsealed local road with minimal traffic and used by local residents.
- Although the Centralised BESS would cover an area of some four hectares, it would be situated within a local natural depression, and one currently approved for 4m high solar panels.
- There is existing dense vegetation to north (along creekline) which would provide some screening, as well as additional future landscape screening along Seatonville Road as part of the Approved Project.
- The low height of the battery units (3.0m) means the BESS would not be visually prominent at a distance, being below the height of solar panels (4m).

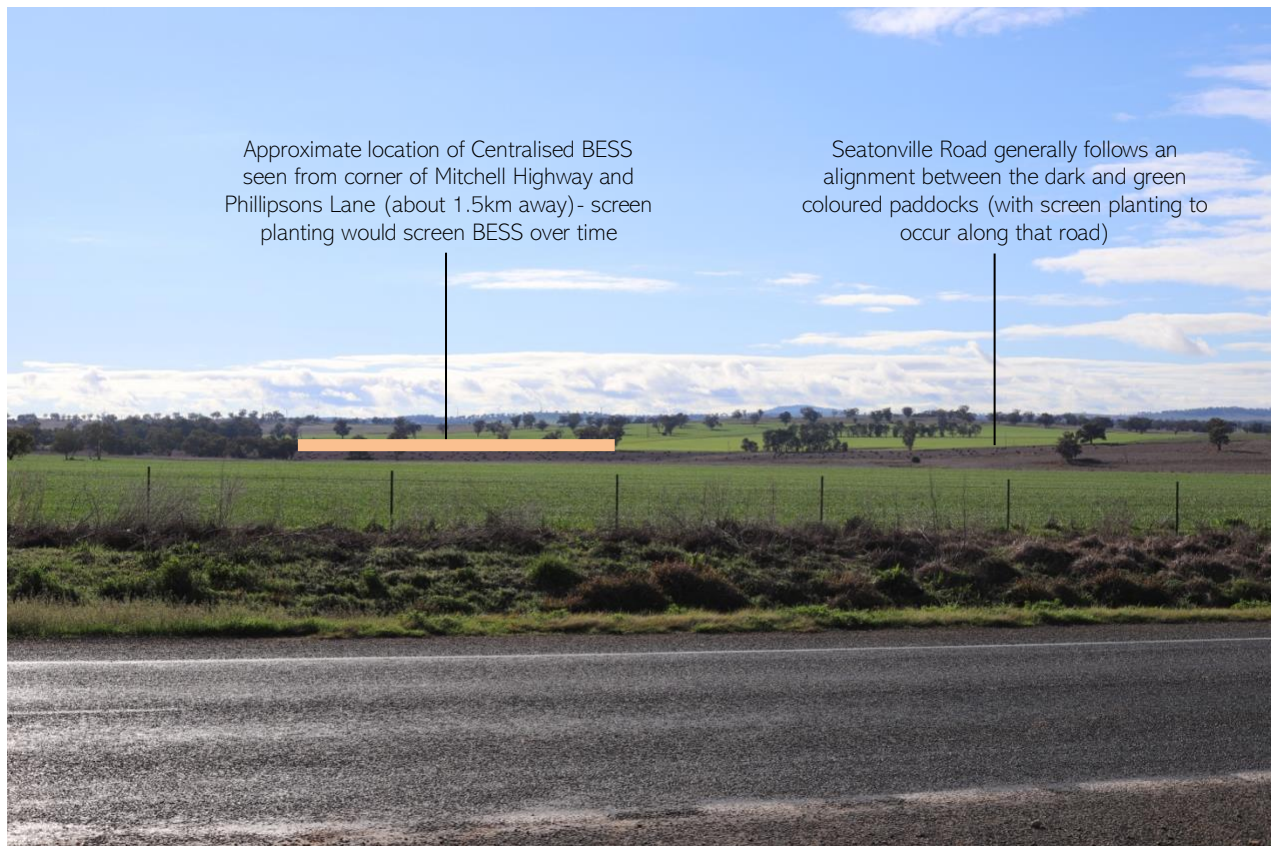


Figure 4-1: Existing view towards proposed site of Centralised BESS from corner of Mitchell Highway and Phillipsons Lane (1.5km away)

Once the screen planting of the Approved Project is established (five plus years), it is considered that the addition of the Centralised BESS would have an impact level similar to the Approved Project across all viewpoints.

However, should the battery units be white, prior to screen planting becoming established, the BESS would be more obvious when seen from the Mitchell Highway (some 1.5km away) and parts of the nearest private property, yet not from the residence (VP57). It could also be seen from about 18 other residences (in viewpoint groups A, B, E – refer map in **Appendix B**).

4.3 Distributed BESS

The Distributed BESS would result in a pairs of about 180 battery units and inverters distributed across the solar farm. As described previously, as part of the Approved Project screen planting will occur alongside the road frontage of most of Seatonville Road, plus to the south and partially to the west. The location of that screen planting has been designed to reduce views from surrounding viewpoints and it would similarly reduce views over the battery units.

The two possible designs for the Approved Project inverter stations have a height range of 2.6-2.9m (both a similar height to the proposed BESS battery units), and the Approved Project solar panels have a height of 4m (which is taller than the proposed BESS). Therefore, the BESS components would not appear taller than the inverter stations, and where near solar panels would be below their height.

The majority of surrounding private viewpoints, and the viewpoints on the Mitchell Highway (minimum of 1km away) are in elevated positions to the west and would have views over the majority of the Approved Project including the additional battery units. However, as the battery units would be situated alongside the inverter stations, with both of a similar scale, the impact to

surrounding viewpoints would not increase substantially (if not of a contrasting colour), either before or after screen planting is established.

Thus, the rating levels previously given for the Approved Project are still applicable for the Distributed BESS – both at completion (i.e. without established screen planting) and after at least five years (i.e. allowing for part-establishment of screen planting), assuming appropriate dark colouring.

4.4 Comparison of visual impact to viewpoints – Approved Project and BESS options

In summary, all assessed ratings for the Approved Project remain unchanged with the addition of either of the BESS options, once landscape screening is established, and assuming battery units are a dark colour.

However, if battery units are white, and prior to screen planting becoming established, the Centralised BESS would be more obvious and have a somewhat higher impact to the Approved Project (yet remain in the order of the impact levels given for the Approved Project), when seen from:

- the Mitchell Highway (some 1.5km away)
- parts of the nearest private property (yet not from the residence (VP57));
- and, from about 18 other residences (in viewpoint groups A, B, E – refer map in **Appendix B**).

The establishment of screen planting is less crucial to reducing the impact of the Distributed BESS to any particular viewpoints, due to their wide distribution, yet would improve the visual outcome over time. If battery units are white, they would be more visually obvious across the whole solar farm and represent a somewhat increase in impact levels to the Approved Project (yet remain in the order of the impact levels given for the Approved Project).

With suitable mitigation, including both the colouring of the battery units (in line with the Approved Project's Environmental Conditions), and screen planting consistent with the Approved Project Concept Landscape Plan, both the Centralised BESS and Distributed BESS would have little effect on the Approved Project's assessed impact to landscape character or surrounding viewpoints.

However, prior to effective screen planting being established (post five years), and if battery units are white (and not colour treated to reduce visual contrast, such as by being a dark grey colour), then under either BESS option:

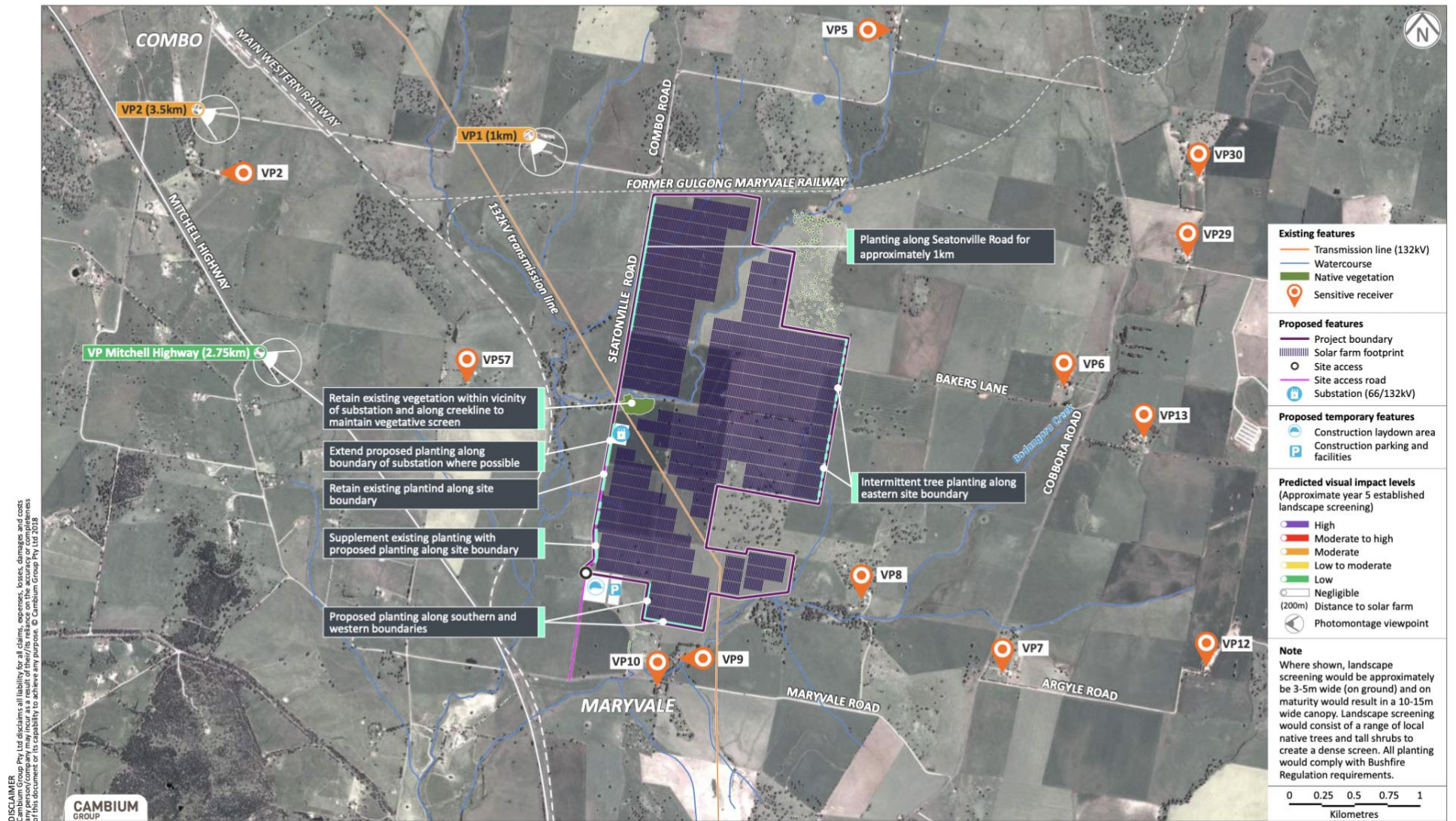
- Impact to landscape character would increase somewhat yet remain in the order of moderate with some level of increase.
- Impact to surrounding viewpoints would also increase somewhat under both BESS options yet remain in the order of the impact levels given for the Approved Project.

Appendix A – Concept Landscape Plan (Approved Project)

FIGURE 9-1

Concept landscape plan

MARYVALE SOLAR FARM - VISUAL IMPACT ASSESSMENT



Appendix B – Assessed viewpoints (from Approved Project VIA)

MARYVALE SOLAR FARM - VISUAL IMPACT ASSESSMENT

