APPENDIX

F

Technical Assessments

Appendix F.2
Addendum visual impact assessment

EMM
creating opportunities

Birriwa Solar and Battery Project

Amendment Report - Landscape and Visual Impact Assessment Addendum

Prepared for ACEN

August 2023

Birriwa Solar and Battery Project

Amendment Report - Landscape and Visual Impact Assessment Addendum

ACEN

J210553 Birriwa Solar and Battery Project - Amendment Report - LVIA Addendum

August 2023

Version	Date	Prepared by	Reviewed by	Comments
V3	30 August 2023	Stephen Bertram	Tadd Anderson Rachel Dodd Nicole Armit	Final for submission to DPE

Approved by

Tadd Andersen
Associate Environmental Planner
30 August 2023

Level 3 175 Scott Street
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Executive Summary

ES1 Introduction

ACEN Australia Pty Ltd (ACEN) proposes to develop the Birriwa Solar and Battery project, a large scale solar photovoltaic (PV) electricity generation facility along with battery storage and associated infrastructure (the project). The solar component of the project will have an indicative capacity of around 600 megawatts (MW) and will include a centralised battery energy storage system (BESS) of up to 600 MW for a 2 hour duration (1,200 MWh). The BESS will enable energy from solar to be stored and then released during times of demand as well as providing grid stability services and back-up capacity to ensure security of supply.

The project is in the localities of Birriwa and Merotherie, approximately 15 kilometres (km) south-west of the township of Dunedoo, New South Wales (NSW) (refer to Figure 1.1). It is within the Central-West Orana (CWO) Renewable Energy Zone (REZ) and is within the Mid-Western Regional and Warrumbungle Shire local government areas (LGA).

The project is State significant development (SSD) pursuant to Schedule 1, Section 20 (electricity generating works) of State Environmental Planning Policy (Planning Systems) 2021. Project approval is sought under Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The development application and environmental impact statement (EIS) (application number SSD-29508870) were submitted to the NSW Department of Planning and Environment (DPE) and publicly exhibited from 14 October 2022 to 10 November 2022.

Following the public exhibition of the EIS, 92 submissions were received from the public, councils, and special interest groups. In addition, 14 government agencies provided advice on the project. A submissions report (EMM 2023a) has been prepared to respond to matters raised in these submissions and agency advice, as well as an amendment report (EMM 2023b). This landscape and visual impact assessment addendum (ALVIA) is an addendum to the Birriwa solar and battery project EIS LVIA. This ALVIA is appended to the amendment report (Appendix F.2 of the amendment report) and should be read in conjunction with the amendment report.

ES2 Proposed amendments

In response to matters raised in submissions and outcomes of ongoing engagement with the local community, government agencies, project landholders, and other stakeholders, ACEN has made amendments to the project, as follows:

1. The addition of a temporary accommodation facility, on an adjacent property south-east of the original project study area presented in the EIS (refer to Figure 1.3), to provide temporary accommodation for up to 500 construction staff during the construction phase of the project.

2. A refinement to the development footprint associated with the solar component of the project, to include the south-eastern corner (approximately 5 ha). This area was conservatively mapped as derived native grassland (DNG) of plant community type (PCT) 80 (and therefore a threatened ecological community) and previously excluded from the EIS and Biodiversity Development Assessment Report (BDAR). Subsequently, this area has been surveyed by EMM ecologists since submission of the EIS and BDAR, and is confirmed as low condition DNG of PCT 479 (rather than DNG of PCT 80), and therefore does not need to be avoided on the basis of ecological constraints.

The temporary accommodation facility will be suitable to accommodate up to 500 people (construction workforce). The accommodation facility will have the potential to expand, enabling capacity for up to 1,000 people subject to future approvals, to accommodate a workforce from future ACEN developments within the CWO REZ, if deemed required and subject to future accommodation needs.

This landscape and visual impact assessment addendum has been prepared to describe potential visual impacts associated with the revised project amendments (the proposed accommodation facility).

ES3 Existing conditions

The landscape typical of the region is predominantly cleared, open grazing land with scattered groupings of remnant native trees. Existing trees are generally found along water courses, roadsides and along the perimeter of paddocks and property boundaries. Woody vegetation is also common on outcrops such as Barneys Reef.

The accommodation facility development footprint is clear of woody vegetation, having been highly modified by historic and recent farming practices.

ES4 Assessment of impacts

The objective of this addendum landscape visual impact assessment (ALVIA) is to determine how the proposed amendment will impact on the existing visual amenity and landscape character. Any potential negative impacts are investigated to determine how they can be mitigated and reduced to an acceptable level.

The amendments have been considered in two parts:

- The refinement to the development footprint associated with the solar component of the project to include the south-eastern corner (approximately 5 ha) has been identified for additional solar panels. This area was assessed within the original LVIA (EMM 2022) and will therefore have no additional visual impact.
- The remainder of this ALVIA considers only the additional visual impact of the accommodation facility.

Visual assessments have been conducted from four representative viewpoints surrounding the accommodation facility development footprint to demonstrate the potential visual impacts of the project. The representative viewpoints were selected based on the following criteria:

- proximity to the accommodation facility development footprint
- the location of residences dwellings and other local features/key locations (i.e. the Central West Cycle Trail)
- the positioning of regional and local roads and potential impacts on passing motorists and cyclists
- local topography
- presence of vegetation with potential to provide screening.

This ALVIA identified that the visual impact rating is low for all viewpoints and no mitigation is required.

Based on variable elevation and undulation in the landscape and the presence of vegetation, combined with the height of the proposed accommodation structures, the impact assessment predicts:

- no visibility of accommodation facility infrastructure from viewpoints 1 and 4
- a low visual impact from viewpoints 2 and 3
- no viewpoint locations have a moderate impact rating
- no viewpoint locations have a high impact rating.

In addition to the viewpoint assessments, each dwelling within 4 km of the development footprint is listed with the potential visual impacts (Table 4.2). The residential viewshed analyses included as Attachment A demonstrates that one dwelling within 4 km of the project will have any view of the accommodation facility (R35 in Figure A.4), and that the impact will be low due to intervening vegetation and distance of views (over 3 km). One dwelling (R37) may see a small portion of the accommodation facility access track. The assessment for dwellings predicts:

- no visibility from R5, R12, R13, R34, R36, R38, R39, R39a and A4
- a low visual impact from R35 and R37
- no dwellings with a moderate impact rating
- no dwellings with a high impact rating.

ES5 Evaluation of the project

Due to the accommodation facility development footprint's location there are few locations from which both (the solar and BESS infrastructure, and the accommodation facility) will be visible, and there are no dwellings from which both will be visible. For this reason, there will be no increase in visual impact for any location that will be impacted by the project as a result of the amendment.

Further, the accommodation facility is temporary during construction of the project and will have no visual impact once decommissioned. Notwithstanding, if the accommodation facility were to be used for other uses post-construction of the project (subject to future approvals), given that it will not create a cumulative impact with the solar and BESS infrastructure of the project, no additional visual impact would occur.

Based on the analysis contained in this report:

- the visual impact of the proposed amendments has been largely mitigated by careful site selection
- the visual impact of the proposed amendment will not require substantial mitigation measures (other than careful site selection)
- no changes are required to the analysis or recommendations of the LVIA prepared for the EIS (included as Appendix G).

ES5.1 Night lighting

The only lighting proposed is for security and maintenance purposes. The night lighting would be inwardly focused and shielded so it does not result in light spill impacts to nearby dwellings or the dark sky requirements.

The project will not impact on the Siding Spring Observatory provided the project lighting follows the Dark Sky Guidelines and AS 4282 *Control of obtrusive effects of outdoor lighting*.

ES6 Cumulative impacts – amended Birriwa solar and battery project

Because of the low potential for visibility, the proposed accommodation facility is expected to cause no more than a negligible increase in the visual impact of the Birriwa solar and battery project.

ES7 Cumulative impacts – external projects

Cumulative visual impacts have also been considered, which can arise from the presence of similar projects and can have a significant visual impact on the landscape when viewed together. There are several state significant development projects approved or proposed in the local area, as identified through DPEs Major Projects Planning Portal at the time of writing the amendment report. A radius of approximately 25 km from the project was used to identify future projects for consideration of potential cumulative impacts. Of the SSD projects:

- the majority are located in the LGAs of Mid-Western Regional and Warrumbungle Shire
- two are approved (Stubbo Solar and Battery project construction has commenced and Dunedoo Solar Farm construction is yet to commence)
- six are in various stages of the SSD planning and assessment process
- one is approved and operational (Beryl Solar Farm).

Anticipated cumulative impacts to the closest identified projects are summarised below:

- Barneys Reef Wind Farm:
  - All but two residences within 4 km of the accommodation facility development footprint will have no view of the of accommodation facility development footprint. For these dwellings there will be no cumulative impact.
  - For the two dwellings (R35 and R37) that may have some view of the accommodation facility development footprint the visual impact of the accommodation facility has been assessed as low. For this reason, and given the small relative scale of the accommodation facility, the potential cumulative impact is minimal.
  - For viewpoint 1 to 4, and for travellers along the Central West Cycle Trail (Merotherie Road and Birriwa Bus Route South) the visual impact of the accommodation facility has been assessed as low. For this reason, and given the small relative scale of the accommodation facility, the potential cumulative impact is minimal.
- Narragamba Solar project:
  - Very low chance of any cumulative impact due to low visibility of the accommodation facility from Merotherie Rd.
- Valley of the Winds:
  - The Valley of the Winds project is not expected to be visible from the accommodation facility location.
- Stubbo Solar project:
  - Located approximately 11 km south of the accommodation facility development footprint, this project is not expected to be visible from the accommodation facility infrastructure.

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Attachments

Tables

Figures

Photographs

Abbreviations

Item	Definition
ABS	Australian Bureau of Statistics
AC	Alternating current
ACEN	ACEN Australia Pty Ltd
ACHA	Aboriginal cultural heritage assessment
AHIMS	Aboriginal Heritage Information Management System
BESS	Battery energy storage system
CEEC	Critically endangered ecological community
CWO	Central-West Orana
DC	Direct current
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Limited
EnergyCo	Energy Corporation of NSW
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	Hectares
km	Kilometres
kV	Kilovolt
LEP	Local Environmental Plan
LGA	Local government area
MNES	Matters of national environmental significance
MW	Megawatts
NO	CWO REZ Network Operator
NSW	New South Wales
PCT	Plant community type
PV	Photovoltaic
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social impact assessment

Item	Definition
SSD	State significant development
T-Link	Transmission link - NSW Energy Corporation's planned new 500/330 kV transmission line, substation(s) and related infrastructure within the CWO REZ.
TEC	Threatened ecological communities

1 Introduction

EMM Consulting Pty Ltd (EMM) has prepared this Landscape Visual Impact Assessment Addendum (ALVIA) for the Birriwa Solar and Battery project (the project) on behalf of ACEN Australia Pty Ltd (ACEN). This ALVIA re-assesses impacts and benefits identified in the Landscape and Visual Impact Assessment (LVIA): Birriwa Solar and Battery project (EMM 2022) to address changes to visual impacts under the amended project description (the amendment). The context for this ALVIA is outlined below.

1.1 Background and previous steps

ACEN Australia Pty Ltd (ACEN) proposes to develop the Birriwa Solar and Battery project, a large scale solar photovoltaic (PV) electricity generation facility along with battery storage and associated infrastructure (the project). The solar component of the project will have an indicative capacity of around 600 megawatts (MW) and will include a centralised battery energy storage system (BESS) of up to 600 MW for a 2 hour duration (1,200 MWh). The BESS will enable energy from solar to be stored and then released during times of demand as well as providing grid stability services and back-up capacity to ensure security of supply.

The project is in the localities of Birriwa and Merotherie, approximately 15 kilometres (km) south-west of the township of Dunedoo, New South Wales (NSW) (refer to Figure 1.1). It is within the Central-West Orana (CWO) Renewable Energy Zone (REZ) and is within the Mid-Western Regional and Warrumbungle Shire local government areas (LGA).

The project is State significant development (SSD) pursuant to Schedule 1, Section 20 (electricity generating works) of State Environmental Planning Policy (Planning Systems) 2021. Project approval is sought under Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The development application and environmental impact statement (EIS) (application number SSD-29508870) were submitted to the NSW Department of Planning and Environment (DPE) and publicly exhibited from 14 October 2022 to 10 November 2022.

Following the public exhibition of the EIS, 92 submissions were received from the public, councils, and special interest groups. In addition, 14 government agencies provided advice on the project. A submissions report (EMM 2023a) has been prepared to respond to matters raised in these submissions and agency advice, as well as an amendment report. This ALVIA is appended to the amendment report (Appendix F.2 of the amendment report) and should be read in conjunction with the amendment report (EMM 2023b).

1.2 Original project summary

The key components of the solar and battery project as described in the EIS (EMM 2022), for which ACEN seeks development consent, include:

- Installation of approximately 1 million solar PV panels and associated mounting infrastructure.
- A BESS with a capacity of up to 600 MW and a storage duration of up to 2 hours (1,200 MWh).
- An on-site substation with a connection voltage of up to 500 kilovolt (kV).
- Electrical collection and conversion systems, including inverter and transformer units, switchyard, control room and staff car park.
- Underground and aboveground cables.
- An operational infrastructure area, including demountable and permanent offices, amenities and equipment sheds.

- Internal access roads.
- A temporary construction compound (during construction and decommissioning phases).
- An access route upgrade from Castlereagh Highway to the project site via Barneys Reef Road and Birriwa Bus Route South.

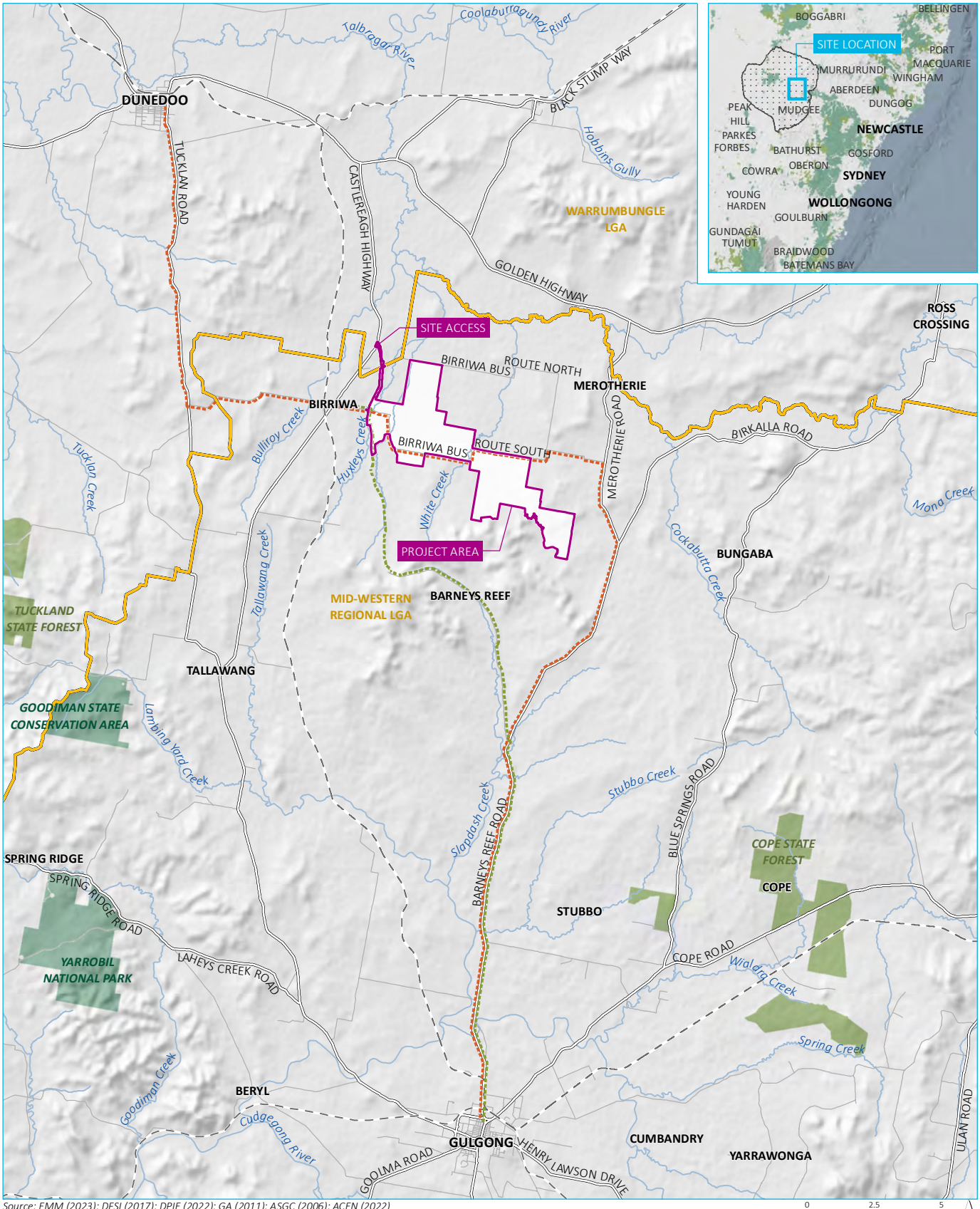
The project layout as presented in the EIS is shown in Figure 1.2.

The solar and battery project will connect to the proposed Merotherie Energy Hub via the connection point (option B), as shown on Figure 1.3. The exact location of the interface point between the solar and battery project and the Merotherie Energy Hub is currently being defined in consultation with EnergyCo.

The project development footprint will be accessed via the Castlereagh Highway, Barneys Reef Road and Birriwa Bus Route. From the project site access point, private internal roads will be used to traverse the project development footprint.

Construction of the project is expected to commence in late 2025, subject to planning approval, labour and equipment availability. The anticipated period of construction for the project is approximately 28 months.

The operational lifespan of the solar component of the project will be in the order of 30 years, unless the solar project is re-powered at the end of the PV modules' technical life. The decision to re-power the solar project will depend on the economics of solar PV technology and energy market conditions at that time. Should the PV modules be replaced during operations, the lifespan of the project may extend to up to 50 years. The BESS' operating life is likely to be 20 years, with the potential for replacing components to extend its life if the market conditions and the cost of the batteries warrant this.



Source: EMM (2023); DFSI (2017); DPIE (2022); GA (2011); ASGC (2006); ACEN (2022)

0 2.5 5 km

GDA 1994 MGA Zone 55

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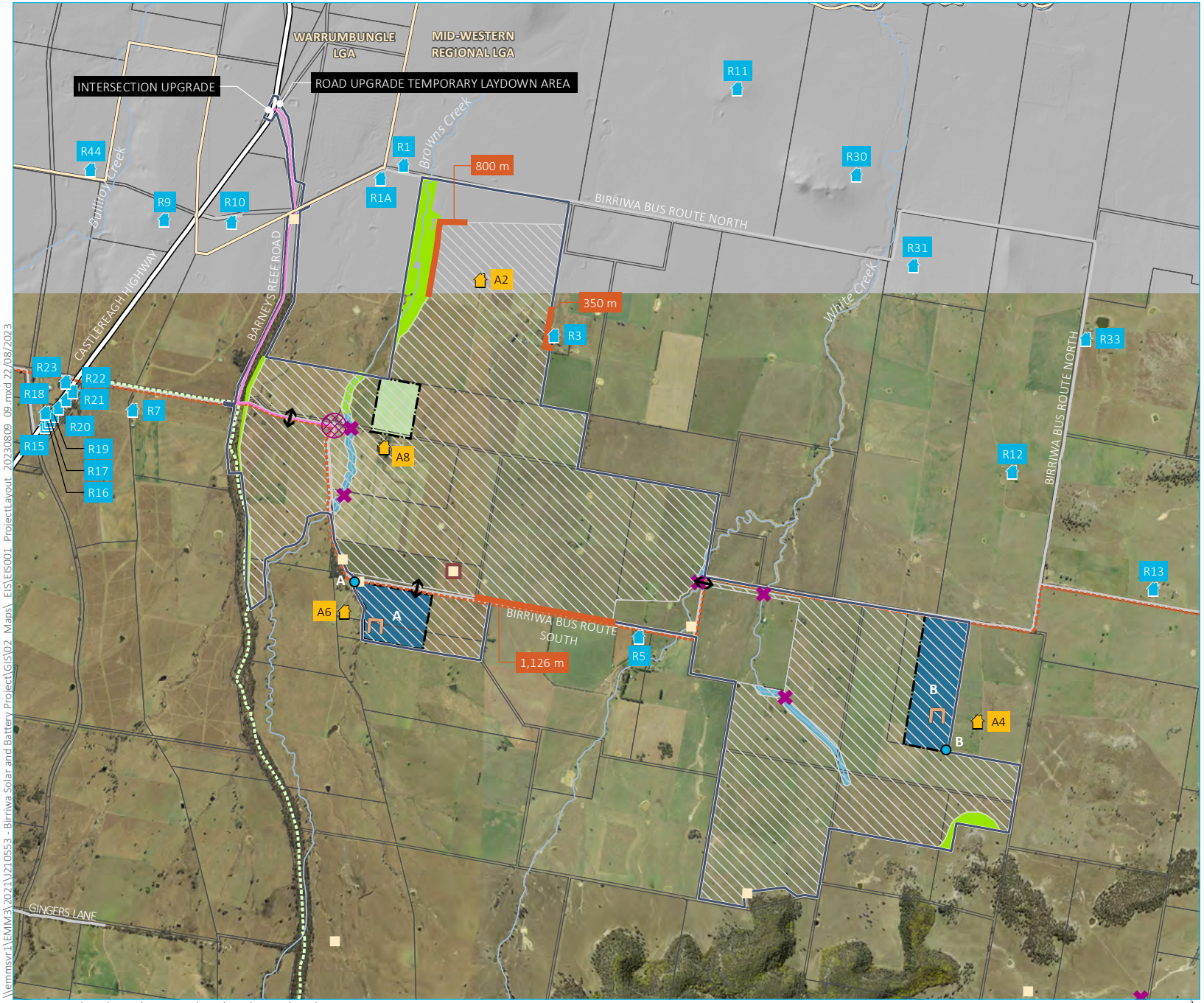
KEY

- Project area
- **Existing environment**
- Rail line
- Major road
- Minor road
- Named watercourse
- Local government area
- Central West Orana Renewable Energy Zone (see inset)
- NPWS reserve
- State forest
- **Central West Cycle (CWC) Trail**
- CWC main route - Gulgong to Dunedoo
- CWC alternate route - Slap Dash Creek side trail

Regional context of the project

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure 1.1

EMM creating opportunities



KEY

- Solar and BESS study area
- Develoment footprint
- Barney's Reef Road upgrade corridor
- Restricted development area
- Potential public road crossing location

Project layout

- Potential creek crossing point (refer to inset below for indicative design)
- Connection point (option A or B)
- Indicative noise wall location
- Landscape screen planting
- Proposed access point to the project
- Proposed operational infrastructure area including substation, operational facility and BESS (option A or B)
- Temporary construction compound

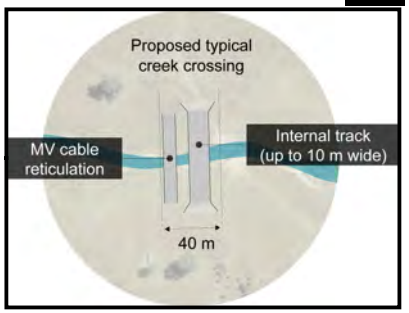
Existing environment

- Dwelling not associated with the project
- Dwelling associated with the project
- Aboriginal heritage site (to be salvaged)
- Aboriginal heritage site (to be avoided)
- Vegetation to be retained
- Major road
- Minor road
- Watercourse
- Cadastral boundary
- Local government area boundary

Central West Cycle (CWC) Trail

- CWC main route - Gulgong to Dunedoo
- CWC alternate route - Slap Dash Creek side trail

INSET



Original project layout

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Source: EMM (2023); DFSI (2017, 2023); GA (2011); ACEN (2023)

0 1 2 km

GDA 1994 MGA Zone 55

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Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure 1.2

EMM creating opportunities

1.3 Proposed amendments

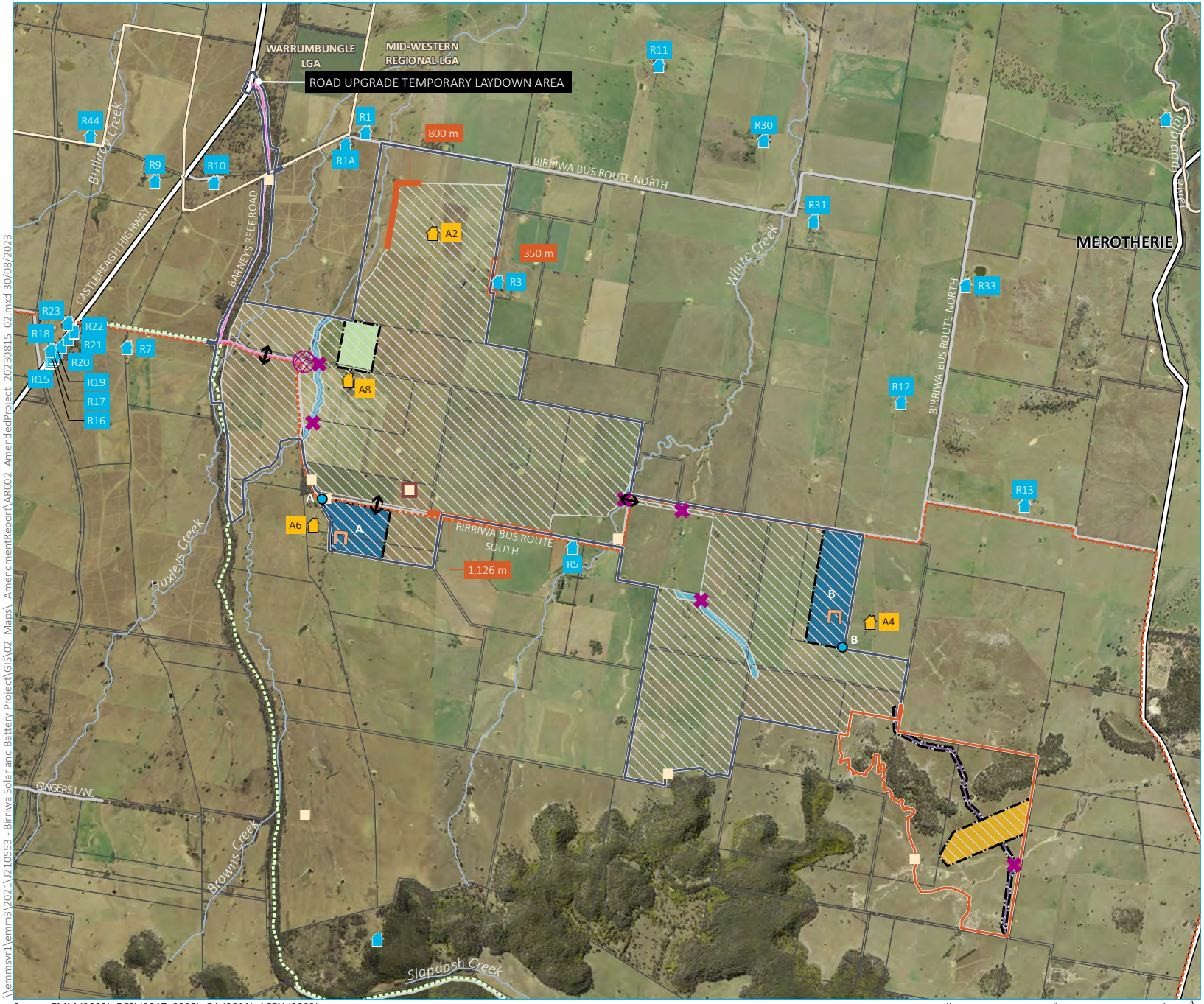
1.3.1 Overview

In response to matters raised in submissions and outcomes of ongoing engagement with the local community, government agencies, project landholders, and other stakeholders, ACEN has made amendments to the project, as follows:

1. The addition of a temporary accommodation facility, on an adjacent property south-east of the original project study area presented in the EIS (refer to Figure 1.3), to provide temporary accommodation for up to 500 construction staff during the construction phase of the project.

2. A refinement to the development footprint associated with the solar component of the project, to include the south-eastern corner (approximately 5 ha). This area was conservatively mapped as derived native grassland (DNG) of plant community type (PCT) 80 (and therefore a threatened ecological community) and previously excluded from the EIS and Biodiversity Development Assessment Report (BDAR). Subsequently, this area has been surveyed by EMM ecologists since submission of the EIS and BDAR, and is confirmed as low condition DNG of PCT 479 (rather than DNG of PCT 80), and therefore does not need to be avoided on the basis of ecological constraints.

The temporary accommodation facility will be suitable to accommodate up to 500 people (construction workforce). The accommodation facility will have the potential to expand, enabling capacity for up to 1,000 people subject to future approvals, to accommodate a workforce from future ACEN developments within the CWO REZ, if deemed required and subject to future accommodation needs.



KEY

- Solar and BESS study area
- Accommodation facility study area
- Develoment footprint
- Road upgrade corridor
- Restricted development area
- Potential public road crossing location

Project layout

- Potential creek crossing point (refer to inset below for indicative design)
- Connection point (option A or B)
- Indicative noise wall location
- Landscape screen planting
- Proposed access point to the project
- Proposed operational infrastructure area including substation, operational facility and BESS (option A or B)
- Birriwa accommodation facility
- Access track
- Temporary construction compound

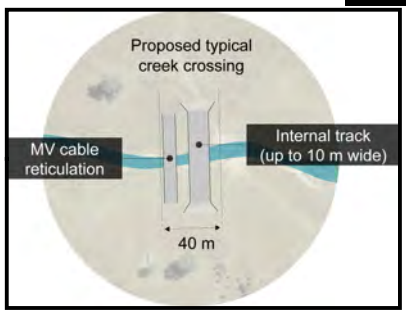
Existing environment

- Dwelling not associated with the project
- Dwelling associated with the project
- Aboriginal heritage site (to be salvaged)
- Aboriginal heritage site (to be avoided)
- Major road
- Minor road
- Named watercourse
- Cadastral boundary
- Local government area boundary

Central West Cycle (CWC) Trail

- CWC main route - Gulgong to Dunedoo
- CWC alternate route - Slap Dash Creek side trail

INSET



Amended project

Source: EMM (2023); DFSI (2017, 2023); GA (2011); ACEN (2023)

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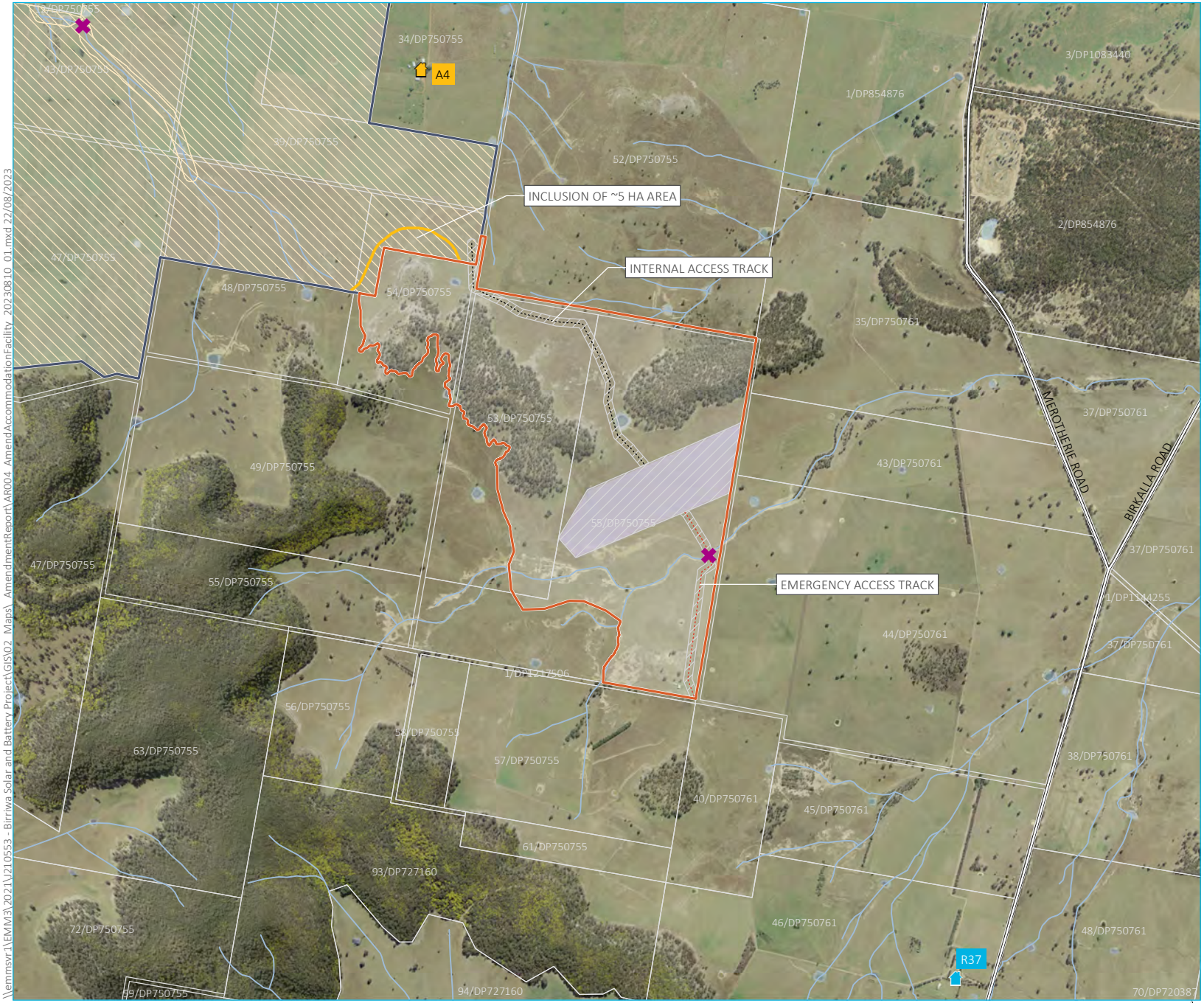
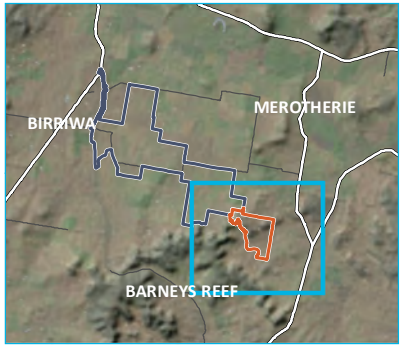
Birriwa Solar and BESS Project
Amendment Report
Bushfire Assessment Report
Figure 1.3

EMM creating opportunities





KEY

- Solar and BESS study area
- Accommodation facility study area
- Solar and BESS develoment footprint
- Accommodation facility infrastructure area
- Accommodation facility development footprint
- Inclusion of ~5 ha area
- Potential creek crossing point
- Associated residence
- Non associated residence
- Access track
- Emergency access track

Existing environment

- Major road
- Minor road (refer to inset)
- Watercourse/drainage line
- Cadastre
- Waterbody

Source: EMM (2023); DFSI (2017, 2023); GA (2011); UPC (2023); ABS (2023)

0 0.5 1 km

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Accommoadation facility study area and development footprint

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure 1.4

EMM creating opportunities

1.3.2 Accommodation facility components

The proposed accommodation facility infrastructure area will comprise prefabricated demountable units, that will be delivered to site. Photograph 1.1 provides examples of a typical accommodation facility for a construction workforce. The final design and layout of the accommodation facility will be confirmed during detailed design; however, all components will sit within the development footprint identified for the accommodation facility as shown in Figure 1.4. The amendment report (EMM 2023b) and associated assessments are based on consideration of reasonable worse case impacts to allow flexibility in design and construction methodology.

Photograph 1.1 Examples of typical construction workforce temporary accommodation facilities

It is proposed that the construction workforce will be accommodated in industry standard four-bed units that feature four self-contained bedrooms with ensuite bathroom facilities. Up to 125 four-bed units will be installed, to accommodate 500 people. A small number of two-person executive style modules may also be installed. Other facilities, such as kitchen, dining room, licensed social area, gymnasium, recreation area, medical centre and laundry, will be provided through communal infrastructure. An example of workforce accommodation units (external view) is provided in Figure 1.5. An example of the typical layout of a four-bed unit is provided in Figure 1.6.

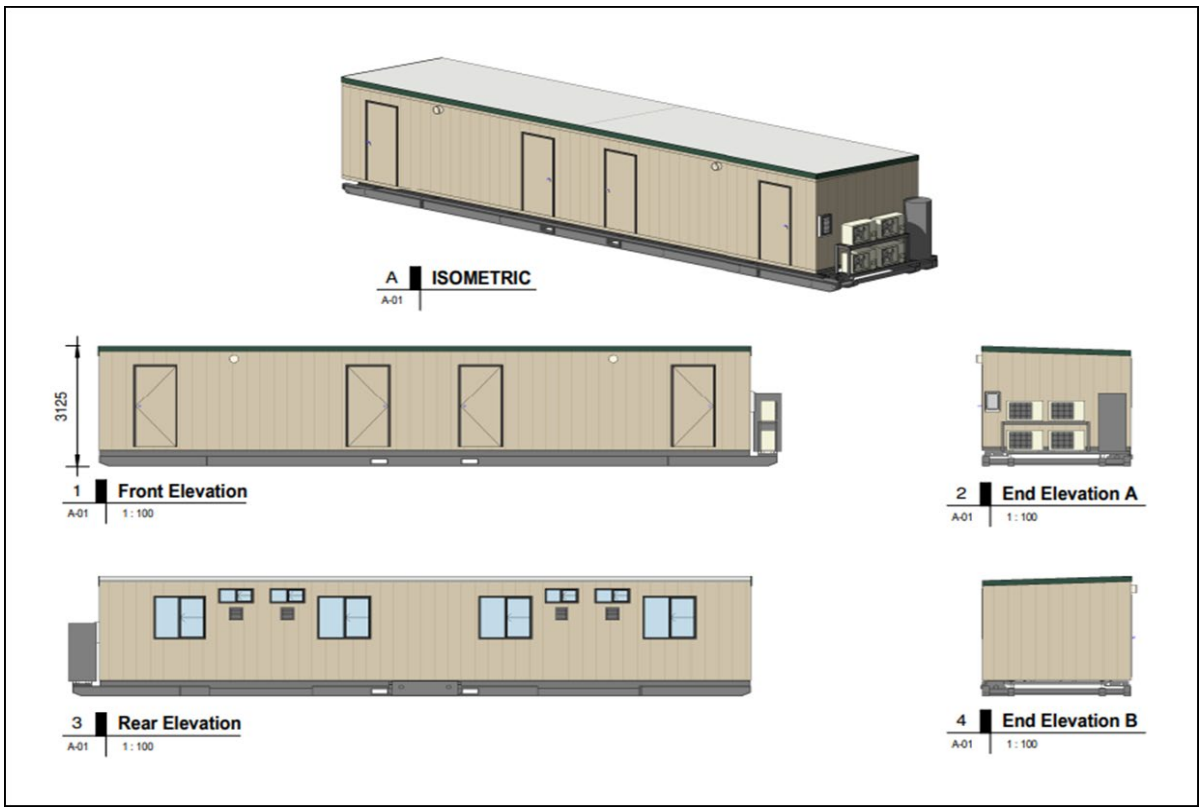

Figure 1.5 **Example of workforce accommodation units – external view**

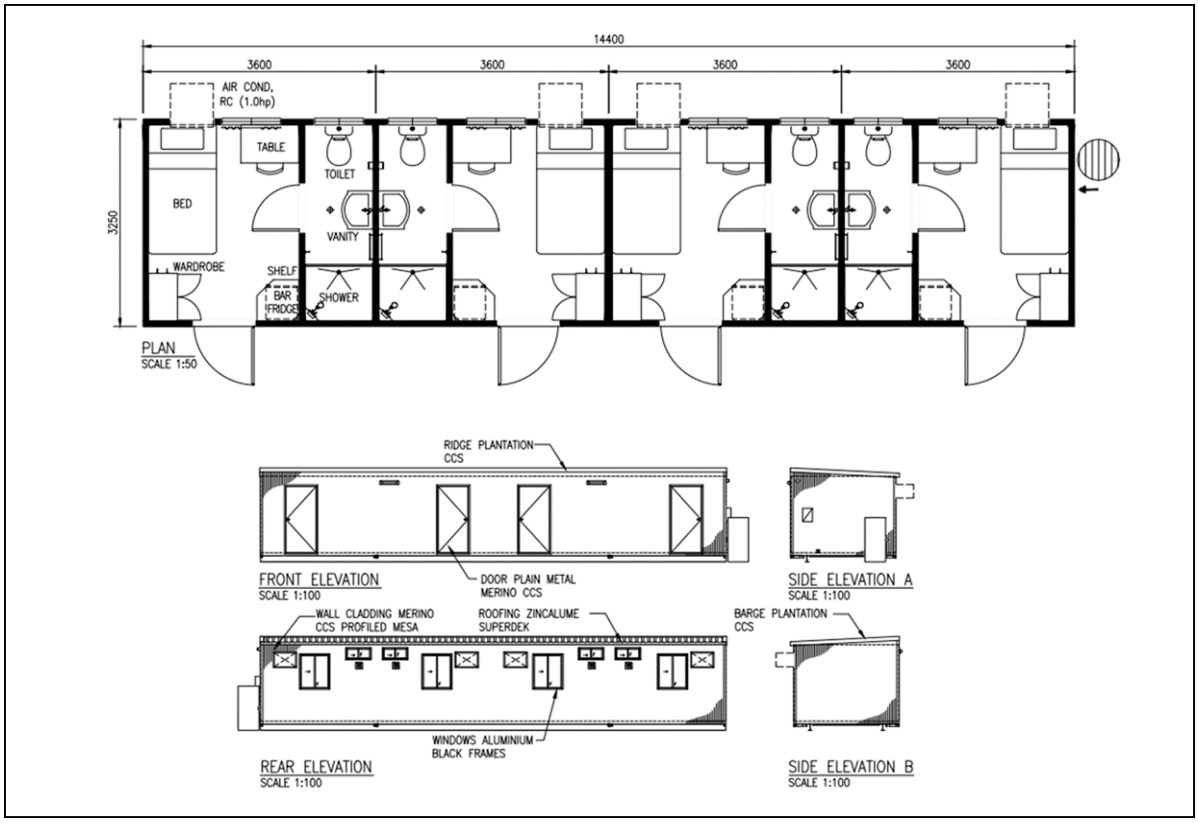

Figure 1.6 **Example of workforce accommodation units – typical layout**

The demountable units may be constructed in stages of up to the 500-person capacity as construction of the project progresses. Communal infrastructure that can accommodate up to 500 people, readily upgradable to 1,000 people if required for future projects and subject to future approvals, will be installed alongside 125 four-bed units.

Communal facilities will include:

- kitchen and dining hall
- recreational facilities such as a gymnasium
- BBQ facilities
- licensed social area
- laundry and linen store facilities
- medical centre.

Figure 1.7 and Figure 1.8 provide examples of a 500-person capacity accommodation facility layout. The exact layout to be adopted will be confirmed as part of future detailed design and will be based on the specific requirements of the site.

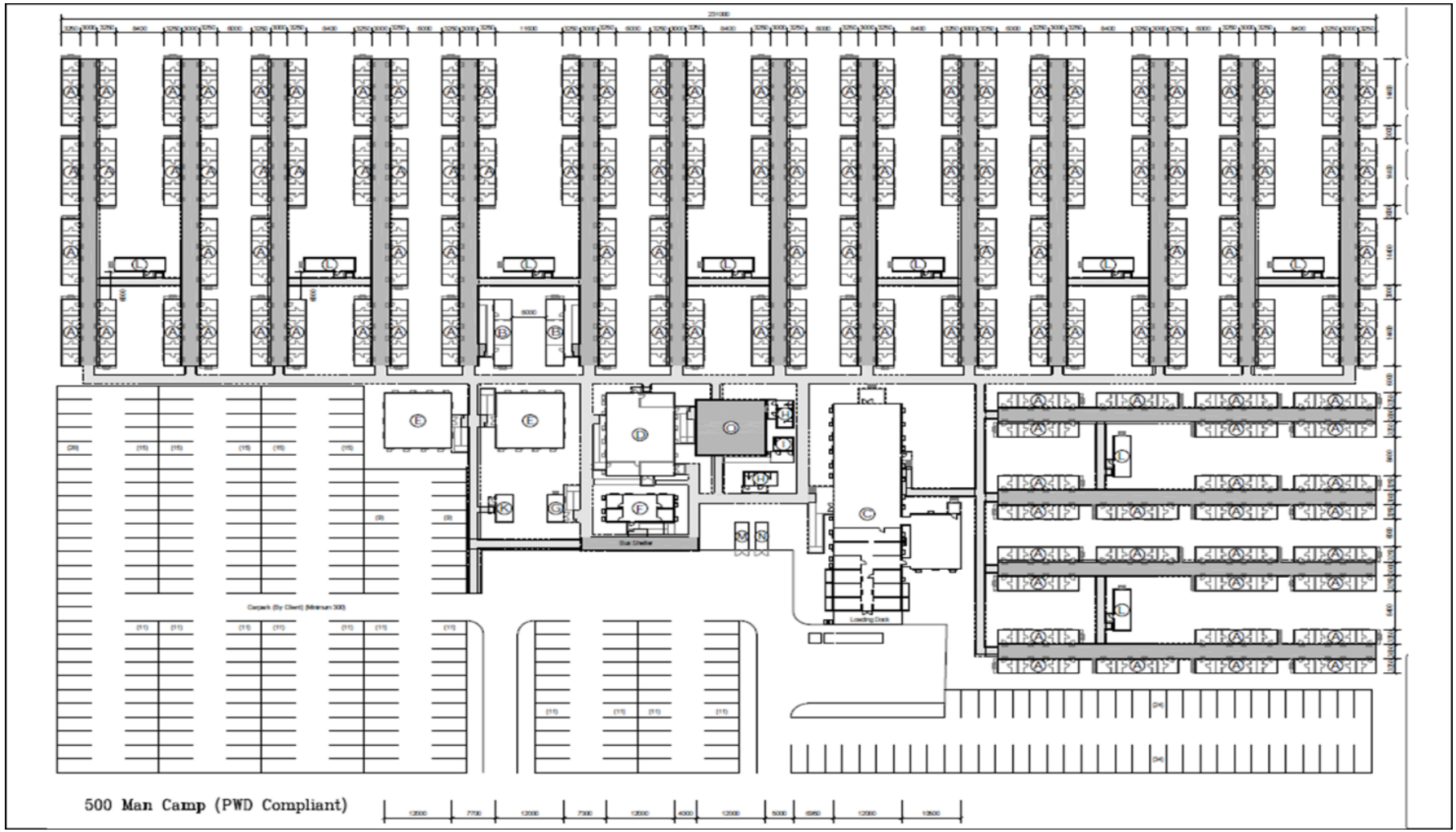

Figure 1.7 Example 1 – layout of a 500-person accommodation facility

Note: Figure not to scale.

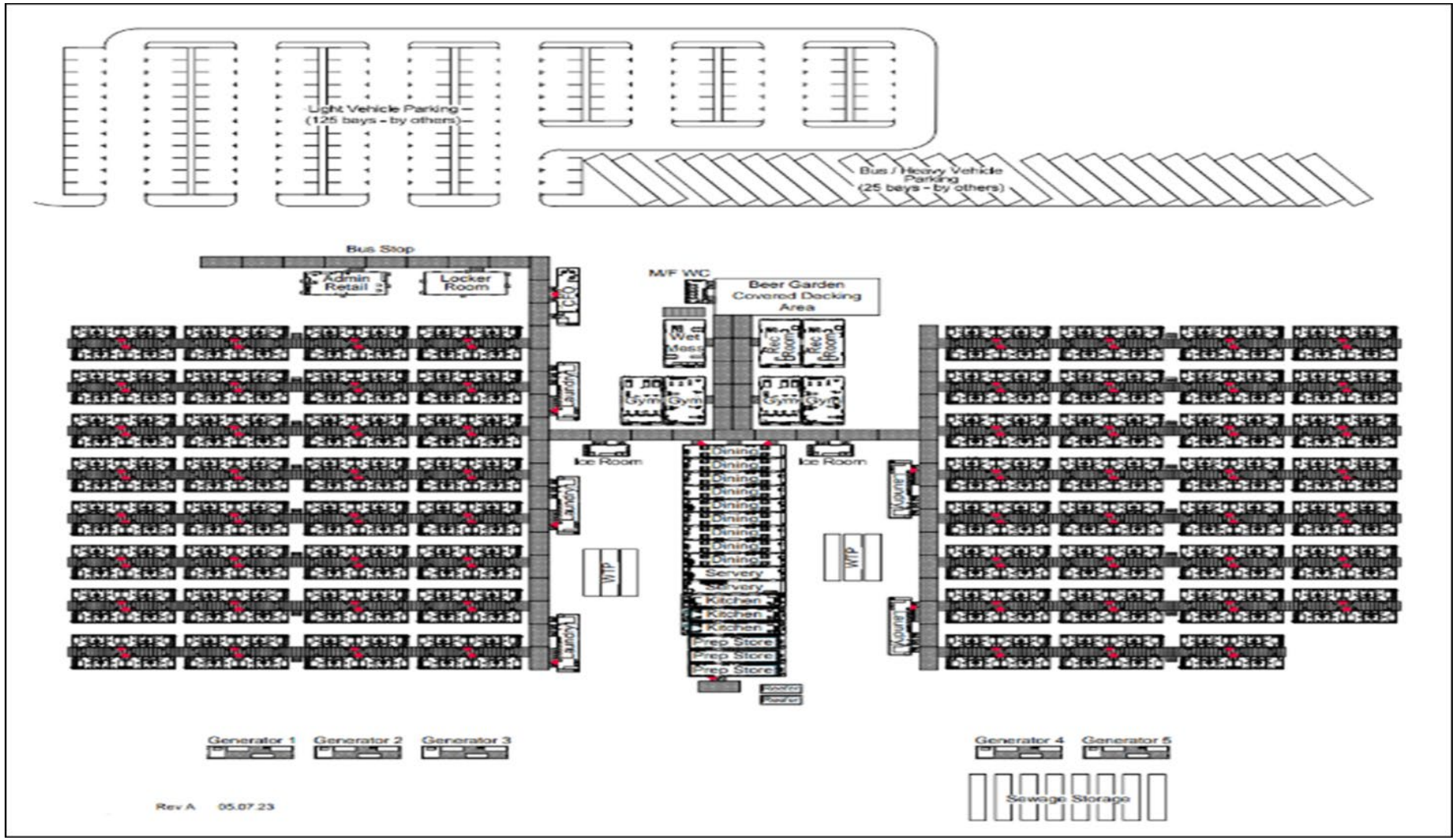

Figure 1.8 Example 2 – layout of a 500-person accommodation facility

Note: Figure not to scale.

1.3.3 Accommodation facility access

No change will occur to the project's primary vehicle access route as described and assessed in the EIS (EMM 2022b), which will be via the Castlereagh Highway, Barneys Reef Road and Birriwa Bus Route South. The primary vehicle access point on Barneys Reef Road will provide access to the development footprint of the project.

The accommodation facility will be accessed from the primary vehicle access route of the project through to a new internal access track between the solar and battery project and the accommodation facility (Figure 1.4).

An internal emergency access track will be constructed south of the accommodation facility infrastructure area, suitable for emergency vehicles (Figure 1.4). This will enable an alternative emergency access to the public road network, directed towards the south-eastern corner of the property. This emergency access track is not intended for general access.

1.4 Terminology

The following key terms are used throughout this amendment report:

- **The project:** The project comprises of the solar and battery project assessed in the Birriwa Solar and Battery Project Environmental Impact Statement (EIS), and the accommodation facility assessed in this amendment report, as shown in Figure 1.3.
- **The solar and battery project:** The project assessed in the Birriwa Solar and Battery Project EIS.
- **The project area**: The solar and BESS study area (1,330 ha) and the accommodation facility study area (205 ha), in which the DA will apply. The total project area considered for the project is approximately 1,535 ha.
- **Accommodation facility study area**: The area of assessment (approximately 205 ha) for baseline surveys and studies conducted for the amendment report. The study area comprises the maximum area considered for the Birriwa accommodation facility (refer to Figure 1.3), as part of the site selection process for the accommodation facility infrastructure and access. Note, this area is not the development footprint and hence is not the maximum extent of ground disturbing work (impact footprint).
- **Solar and BESS study area:** The area of assessment (approximately 1,330 ha) for baseline surveys and studies conducted for the EIS. This study area comprises the maximum area considered in the EIS, based on the extent of land where ACEN holds landholder agreements and the area of potential impact for road upgrades.
- **Project development footprint:** The maximum extent of ground disturbing work (impact footprint) associated with the amended project, comprising approximately 1,197 ha of land, associated with construction and operation of the project including the solar, BESS, road upgrades, re-inclusion of south-eastern corner, and accommodation facility components (refer to Figure 1.3), including:
    - **Accommodation facility development footprint (approximately 33 ha):** Comprises all operational components of the accommodation facility (approximately 23 ha, which includes the accommodation infrastructure area), the access track from the solar and BESS study area to the accommodation facility (approximately 6 ha), and an emergency access track which provides a secondary access from the accommodation facility infrastructure area to the south-east (approximately 4 ha).

The solar and BESS development footprint and road upgrade corridor (approximately 1,164 ha): This is the impact footprint of the original project as assessed in the EIS (approximately 1,159 ha) *and the re-inclusion of the grassland area south-east of the solar and BESS study area (approximately 5 ha)*. It comprises the area to be developed within land where ACEN holds landholder agreements, including all operational components of the project, areas of direct impact for construction of the public road crossings, and the area of direct impact for public road upgrade works along the access route (i.e. part of Barneys Reef Road and its intersection with the Castlereagh Highway and Birriwa Bus Route South, connecting the access point to the project with the Castlereagh Highway). A refinement to the development footprint is included in the amended project, associated with the solar component of the project, to include the south-eastern corner (approximately 5 ha) of the solar and BESS study area into the development footprint. This area was conservatively mapped as derived native grassland and previously excluded from the solar and BESS development footprint.

- **Associated residence:** A dwelling whose owners have entered into a land agreement with ACEN for the project. Residences identified with an 'A' are associated residences.
- **Non-associated residence**: A dwelling whose owners do not have an agreement with ACEN for the project. Residences identified with an 'R' are non-associated.
- **Viewpoints**: Are representative public and private viewpoints of the study area, which are selected for assessment of the project's level of exposure to them. They provide a representative sample of the likely visual landscape changes on the different users of the surrounding areas and their visual exposure to various project elements. Viewpoints can be representative of views from residential dwellings, public roadways or other local features (e.g. villages, other public recreation areas or scenic vistas of value to the community).
- **Viewshed**: Is a theoretical assessment of visible elements from a particular viewpoint. It is created using GIS data (digital elevation model and digital surface model) to simulate the project's visibility from the selected viewpoints.

1.5 The applicant

The applicant details are outlined in Table 1.1.

Table 1.1 Applicant details

Name	ACEN Australia Pty Ltd (ACEN)
Postal address	Suite 2, Level 2, 15 Castray Esplanade, Battery Point, Tasmania 7004
Contact	Cédric Bergé
ABN	27 616 856 672

1.6 Purpose and scope of this report

This landscape and visual impact assessment addendum (ALVIA) is an addendum to the Birriwa solar and battery project EIS LVIA. This ALVIA is appended to the amendment report (Appendix F.2 of the amendment report) and should be read in conjunction with the amendment report. This ALVIA provides a comprehensive assessment of the amended project's potential impacts on the character of the landscape and the impacts on the local visual amenity.

1.7 Assessment approach and requirements

This ALVIA has been prepared in accordance with the relevant Secretary's environmental assessment requirements (SEARs), guidelines and policies, and in consultation with the relevant government agencies.

The ALVIA was prepared with reference to the methods outlined in:

- *Guidelines for Landscape and Visual Impact Assessment Third Edition* (2013) (the GLVIA), prepared by the Landscape Institute and Institute of Environmental Management and Assessment
- *Guideline for landscape character and visual impact assessment* (2020) Centre for Urban Design Transport for NSW
- *Wind Energy: Visual Assessment Bulletin AB 01 For State significant wind energy development* (2016) (VA Bulletin) NSW Department of Planning and Environment.

DPE published the *Large-Scale Solar Guideline* (Solar Guideline) in 2022, after the Birriwa Solar and Battery project scoping report was submitted and SEARs issued. Therefore, the Solar Guideline was not applied to the Birriwa Solar and Battery project, and therefore the Solar Guideline is not applicable to this ALVIA. Notwithstanding, this ALVIA assesses visual impacts from the accommodation facility only, and therefore does not fall under the Solar Guideline requirements.

2 Assessment methodology

2.1 Overview

The assessment method used in this report is adapted from the GLVIA and VA Bulletin, which involve information review, consultation, field observations and photography, computer-based data processing and analysis, and application of subjective professional judgement.

2.2 Stages in the assessment methodology

2.2.1 Stage 1 – visual baseline study

This stage involves recording and analysing the existing landscape features, characteristics, the way in which the landscape is experienced, and the value or importance placed on the landscape and visual resource of the accommodation facility development footprint.

The landscape character is determined by the number, size, type and contrast of elements present. Typically, the key elements are topography, vegetation, water features and built elements. Other important factors are the consistency of these elements and whether they have developed progressively over time and become well integrated into a harmonious landscape. In addition, consideration must be given to the prevalence of change, including whether the landscape is experiencing large-scale development.

The impact of a project on the landscape character is based on the combination of the sensitivity of the existing landscape and the magnitude of the proposal on the landscape. According to the *Guideline for landscape character and visual impact assessment* (2020), sensitivity refers to the quality of an area, and how sensitive the existing character is to change. The context is a primary factor in the visual sensitivity of the view. Generally, sites within higher contrasting landscapes have greater ability to absorb change, whereas sites within a uniform or highly ordered landscape have higher sensitivity and less potential for absorption.

Magnitude refers to the physical scale of the project in the landscape. This takes into account the size of the project, distance from any viewing areas and the contrast it has to the surrounding landscape. Table 2.1 has been developed to provide a rating for the impact of a project on landscape character.

Table 2.1 Landscape character impact

Sensitivity	Magnitude			
	High	Moderate	Low	Negligible
High	High	High	Moderate	Negligible
Moderate	High	Moderate	Low	Negligible
Low	Moderate	Low	Low	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

2.2.2 Stage 2 – visual catchment definition

The studies for visual catchment area establish the area in which the project may be visible, who will see the project infrastructure, and the nature of the views at those points. A Zone of Visual Influence (ZVI) is generated using geographic information system (GIS) analysis and is used to simulate the project's visibility from the surrounding landscape.

The ZVI is a tool to help determine the extent of visibility, and the locations that may be impacted. It is used as a guide for fieldwork, viewpoint selection and early detection of potential visual impacts.

2.2.3 Stage 3 – viewpoint selection

Viewpoints provide a representation of the likely changes a project will have on the landscape from a specific location. The effect a project has on the landscape can be illustrated photographically and evaluated consistently across the project.

Viewpoints are selected to provide representative samples of the likely changes and the exposure to project elements. The viewpoints presented as part of this assessment are considered representative of potential visual impacts from a number of the locations identified as areas of concern by the local community and include local roads and private viewpoints from residential properties.

This ALVIA has identified four potential viewpoints. These are made up of dwellings and roadways near the proposed accommodation facility development footprint.

2.2.4 Stage 4 – viewpoint assessment

i Visual magnitude

The magnitude of change on the visual landscape is one factor in determining the significance of visual impacts of the project (refer to Table 2.2 and Table 2.3). In accordance with the GLVIA, this visual assessment considered the following criteria in determining the magnitude of change on a receptor:

- Whether the impact is temporary or permanent – impacts that are for a limited duration are considered less significant than those that occur for an extended period or are permanent.
- Distance of the viewer from the altered elements in the landscape – close proximity to an altered landscape will increase the significance for private dwellings. In the case of motorists, mid ground changes can be greater than foreground elements as they can result in longer viewing times.
- Length of viewing time – views from a dwelling are constant, whereas some views from roadways as experienced by motorists may be brief depending upon speed and viewing direction.
- 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.
- Scale of change – the loss or addition of features in the view and changes in the proportion of the view affected by the project.

Table 2.2 Magnitude of change – viewing experience

Duration of view	Distance from site (km)				
	0–0.5	0.5–1.0	1.0–2.5	2.5–4.0	>4.0
Long (>20 minutes)	High	High	Moderate	Moderate	Low
Moderate (2–20 minutes)	High	Moderate	Moderate	Low	Low
Short (<2 minutes)	Moderate	Low	Low	Low	Low

Table 2.3 Magnitude of change – scale

Scale of change	Extent of view affected		
	High	Moderate	Low
High	High	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Low

The two sensitivity ratings from Table 2.2 and Table 2.3 are combined to form the visual sensitivity rating as indicated in Table 2.4. This magnitude of change rating is applied to the visual impact rating shown in Table 2.8.

Table 2.4 Magnitude of change

Scale of change	Viewing experience		
	High	Moderate	Low
High	High	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Low

ii Visual sensitivity

Visual sensitivity is a measure of the landscape's ability to visually 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.

The VA Bulletin identifies the type of view as *viewer sensitivity* and the view context as *scenic quality*. Viewer sensitivity relates to the location of the viewer and the relative importance placed on the landscape viewed from that viewpoint by the community or visitors. These viewpoints include public use areas, public travel ways, and private homes.

Visual sensitivity has been assessed based on the viewer sensitivity level classification given in the VA Bulletin, presented in Table 2.5.

Table 2.5 Viewer sensitivity level classification

Viewer sensitivity	Description
High	Residential areas and rural villages (defined as land zoned R1, R2, R3, R4, R5 and RU5 in the *Standard Instrument Local Environmental Plan* [Standard Instrument LEP]). Recreation, cultural or scenic sites and viewpoints of National or State significance such as National Parks, National reserves, and World Heritage areas. Any buildings, historic rural homesteads/dwellings on the State or local Government Heritage List.
Moderate	Rural dwelling(s). Tourist and visitor accommodation (definition in Standard Instrument 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. Other low use and low concern viewpoints and travel routes.

Source: Table 5 from VA Bulletin (DPE 2016).

Scenic quality refers to the relative scenic or aesthetic value placed on the landscape by the community. This is based on the presence of key landscape features known to be associated with community perceptions of high, moderate or low scenic quality. The scenic quality classifications used in this assessment are identified in Table 2.6.

Table 2.6 Scenic quality classification

Scenic quality	Landforms	Vegetation	Waterbodies
High	Isolated peaks, steep rocky ridges, cones or escarpments with distinctive form and/or colour contrast that become focal points. Larger areas of distinctive rock outcrops or boulders. Well defined, steep sided valley gorges.	Strongly defined patterns with combinations of eucalypt forest, naturally appearing openings, streamside vegetation and/or scattered exotics. Distinctive stands of vegetation that may create unusual forms, colours or textures in comparison to surrounding vegetation.	Visually prominent lakes, reservoirs, rivers, streams and swamps.
Moderate	Steep, hilly and undulating ranges that are not visually dominant. Broad shallow valleys. Moderately deep gorges or moderately steep valley walls. Minor rock outcrops.	Predominantly open forest or woodland combined with some natural openings in patterns that offer some visual relief. Vegetative stands that exhibit a range of size, form, colour, texture and spacing.	Intermittent streams, lakes, rivers, swamps and reservoirs.
Low	Large expanses of flat or gently undulating terrain. Indistinct, dissected or unbroken landforms that provide little illusion of spatial definition or landmarks.	Extensively cleared and cropped areas with very limited variation in colour and texture.	Natural waterbody absent.

Source: Table 3 from VA Bulletin (DPE 2016).

The two visual sensitivity ratings above are combined to form the visual sensitivity rating as indicated in Table 2.7. This combined rating is applied to the visual impact rating shown in Table 2.8.

Table 2.7 Visual sensitivity rating

Viewer sensitivity	Scenic quality		
	High	Moderate	Low
High	High	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Low

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 highly significant, whereas a change in an already heavily modified landscape would be considered of low or moderate significance.

Visual impact refers to the change in the appearance of the landscape because of development. This report addresses a number of factors that contribute to the visual impacts and has presented them in a measurable way.

Table 2.8 combines the visual sensitivity rating with the magnitude of change rating to determine the visual impact rating. This rating is applied to each viewpoint to measure the impacts of a development from that specific location.

Table 2.8 Evaluation of significance – visual impact rating

Visual sensitivity	Magnitude of change		
	High	Moderate	Low
High	High	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Low

The primary assessment tools for determining the significance of impact of the project are the site inspections and photographs of the views from the selected viewpoints. This enables 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.

2.2.5 Stage 5 – mitigation

The final step in the assessment process is to determine additional measures that could be incorporated into the design of the project to reduce, or where possible, eliminate the visual impact of the project.

Mitigation measures can be in several forms including:

- design of project infrastructure to reduce the contrast with the surrounding environment by:
  - moving project elements to less visible locations

  - removing some project elements
  - re-sizing the project elements
  - use finishes and products that minimise or eliminate surface glare
  - select finishes and colours that are appropriate to the location and context to blend the development into surroundings. Neutral colours that blend in with the surrounding landscape will be used where possible, such as khaki, green, beige, or similar

- use of visual buffers and screening by planting vegetation
- designing infrastructure to screen operations and lighting.

Mitigation measures that have been incorporated into the design of the project are discussed in Chapter 5 of this report.

3 Visual baseline study

3.1 Constraints analysis

Two locations were initially considered within the same lot do develop the accommodation facility; a northern and southern location. Using wireframe modelling and photomontages, it was apparent that the southern location had the potential to be visible from Merotherie Road and a nearby dwelling (R37).

This visual constraint analysis aided in the selection of the current location, as the northern option provided screening from dwellings and the nearby roadways.

3.2 Land use

The accommodation facility study area is located in a rural setting. Key land uses in the local and broader region include agriculture, consisting primarily of sheep and cattle grazing and dry land cropping, with areas of mining, viticulture and production forestry within the broader region (in the vicinity of Gulgong and Mudgee). There are 11 dwellings scattered within 4 km of the accommodation facility development footprint (refer Table 4.2). There are no existing buildings within the accommodation facility development footprint.

The majority of the land surrounding the accommodation facility study area is zoned RU1 primary production under the *Mid-Western Regional LEP 2012*.

3.2.1 Historic heritage

An historic heritage assessment (HHA) for the Birriwa solar and battery project was completed in 2022 (OzArk 2022 B). An addendum HHA (Ozark 2023) was completed addressing the accommodation facility study area in 2023. Regarding the accommodation facility development footprint these reports found:

- No listed historic heritage items within or near the project area (p. 45).
- No historic sites were recorded during the survey within the accommodation facility study area (p. 45).
- The visual amenity of local heritage sites will not be impacted by the proposed accommodation facility, and no significant historic items will be impacted (p. 47).

3.2.2 Aboriginal heritage

A search of the Aboriginal Heritage Information Management System (AHIMS) register identified no previously recorded sites within the study area. There are no sites in the study area currently or previously listed on the Commonwealth Heritage List or the National Heritage List.

One Native Title Claim covers the study area, Warrabinga-Wiradjuri #7 (NC2018/002, NSD857/2017), which covers an area from Dunedoo to Lithgow.

An Aboriginal heritage assessment (ACHA) for this project was completed in 2022 (OzArk 2022 A). An addendum ACHA (Ozark 2023) was completed addressing the accommodation facility study area in 2023). The addendum report completed desktop and field searches of the project site and found:

- One Aboriginal site located in the accommodation facility development footprint (36-2-0518 (Mangarlowe IF-2)). This site is recommended for salvage (p. 49).
- No other aboriginal heritage sites were identified as potentially impacted by the proposed accommodation facility.

3.3 Residences

A number of non-associated and associated residences have been identified in the vicinity of the accommodation facility study area. Associated residences whose owners have a landholder agreement with ACEN for the project are identified with an 'A'. Non-associated residences that are not associated with the project and do not hold landholder agreements with ACEN and are identified with an 'R'.

There are a total of 11 residences within 4 km of the accommodation facility development footprint. Nine non-associated residences are located between 2 km and 4 km from the accommodation facility development footprint (Figure 1.3). One associated residence (A4) is approximately 940 m from the accommodation development footprint (closest point to the access track), and one non-associated residence (R37) is approximately 1.8 km from the accommodation facility development footprint (closest point to the emergency access track). The non-associated residence (R37) is approximately 2.5 km from the accommodation facility infrastructure area and the associated residence (A4) is approximately 2.1 km from the accommodation facility infrastructure area.

The locations of the receptors and representative viewpoints considered as part of this assessment are shown on Figure 4.2.

3.4 Roads

No change will occur to the project's primary vehicle access route as described and assessed in the (EMM 2022), which will be via the Castlereagh Highway, Barneys Reef Road and Birriwa Bus Route. The primary vehicle access point on Barneys Reef Road will provide access to the development footprint of the project.

The accommodation facility will be accessed from the primary vehicle access route of the project through to a new internal access track between the solar and battery project and the accommodation facility (Figure 1.4).

An internal emergency access track will be constructed south of the accommodation facility, suitable for emergency vehicles (Figure 1.4). This will enable an alternative emergency access to the public road network, directed towards the south-eastern corner of the property. This emergency access track is not intended for general access.

3.5 Towns

Townships in the region of the accommodation facility development footprint are characterised by scattered small villages and small rural centres.

The closest township to the accommodation facility development footprint is Birriwa – a small village of less than 50 people (according to 2021 census data) located near the northern border of the Mid-Western LGA. Birriwa lies just over 9 km to the west of the accommodation facility development footprint, and will have no view of the accommodation facility infrastructure.

The nearest towns are Dunedoo (population approximately 700 in 2021 census), located 22 km north-west of the accommodation facility development footprint, and Gulgong (population 2,600 in 2021 census), located 22 km south of the accommodation facility development footprint.

3.6 Vegetation

Much of the accommodation facility study area has been extensively cleared of trees and has been highly modified by historic farming practices.

The landscape typical of the region is predominantly cleared, open grazing land with scattered groupings of remnant native trees. Existing vegetation is generally found along drainage lines, roadsides and along the perimeter of paddocks and property boundaries.

The remnant vegetation in or near the accommodation facility study area is derived from the following vegetation communities:

- Yellow Box grassy woodland on lower slopes and valley flats within/around the study area
- Rough-Barked Apple – Red Gum – Yellow Box woodland along the lower northern slopes of Barneys Reef
- Queensland Bluegrass – Redleg Grass – Rats Tail Grass – Spear Grass – Panic Grass derived grassland along the lower slopes of Barneys Reef.

3.7 Topography

The accommodation facility footprint lies on the south-east facing lower slopes of Barneys Reef, which runs east to west within the project area. The elevation of the accommodation facility study area is at 450–500 m AHD (Australian Height Datum). There is an un-named third order stream flowing north-easterly, located south of the accommodation facility.

3.8 Landscape values

Mid-Western Regional Council has identified enhancing and protecting the region's biodiversity and natural heritage as a key planning priority in their *Strategic Planning Statement* (2020). This would indicate there is a high value placed on the natural landscape. Elements like waterways that support vegetation and wildlife would have a high community value. This would be true of wooded areas like Barneys Reef as well. No significant scenic vistas have been identified as having potential to be impacted by the project.

3.9 Night lighting

The project sits within the Dark Sky Region surrounding the Siding Spring Observatory. Developments within this area are required to apply good lighting design principles that eliminate light spill. These principles are illustrated in the *Dark Sky Planning Guideline* (2016), and include:

- eliminating upward spill light
- directing light downwards, not upwards
- use of shielded fittings
- avoiding 'over' lighting
- switching lights off when not required
- use of energy efficient bulbs
- use of asymmetric beams, where floodlights are used
- ensuring lights are not directed towards reflective surfaces
- use of warm white colours.

3.10 Other developments

The following developments have been identified in various stages of planning, which are in close proximity to the accommodation facility:

- RES is seeking approval to develop the Barneys Reef Wind Farm along the southern slopes of Barneys Reef. The project includes 63 wind turbines with supporting BESS and electrical infrastructure. The turbine locations begin along the Castlereagh Highway at Gingers Lane and stretch to Merotherie and Bungaba in the east. The closest proposed turbine location is 750 m south of the accommodation facility development footprint. There are two turbines that would be located in this area, with a third located 2.2 km south-east of the accommodation facility development footprint. Based on the visual impact assessment of the wind farm, 10-19 turbines would be visible from the accommodation facility infrastructure area. The dwelling R37 has been identified as a dwelling associated with the Barneys Reef Wind Farm.

- ACEN is seeking approval to develop the Valley of the Winds project, which is located north of the Golden Highway. The closest turbine is 12 km north of the accommodation facility development footprint, between Leadville and Uarbry. The project stretches northward to Coolah. This project is not expected to be visible from the accommodation facility infrastructure area.

- Narragamba Solar project is in the EIS preparation stage of the approvals process. It is located approximately 2 km south-east of the accommodation facility development footprint. There is a very low chance of any cumulative impact anticipated due to low visibility of the accommodation facility infrastructure area from Merotherie Road. The temporary nature of the proposed accommodation facility means it would be decommissioned once it is no longer required.

3.11 Key landscape features

Key features in the landscape add to the character and uniqueness of a place. The features may include dramatic natural features like a mountain peak, cliff or waterfall. A feature can also be much smaller in scale like a distinctive tree or cluster of trees that stands out visually in the landscape.

The features identified below help define the project area and its surrounds and thus are key elements in the landscape.

3.11.1 Barneys Reef

The reef is a distinct feature characterised by steep rocky slopes that define the valleys around it. The upper slopes are covered with remnant vegetation that contrasts with the agricultural land along the valleys.

3.11.2 Agricultural valleys

The valleys are defined as alluvial plains along waterways. They have flat or gently undulating land that rises from a river or creek. The land has been cleared to make way for agricultural uses, including cropping and grazing.

4 Visual assessment

4.1 Zone of visual influence

A zone of visual influence (ZVI) diagram has been prepared for the project to illustrate the theoretical visibility of the proposed project infrastructure. The ZVI represents the area over which a development can be seen. Refer to Figure 4.1 for the ZVI.

The ZVI was generated using a digital elevation model (DEM) and a digital surface model (DSM), both of which cover the accommodation facility development footprint, the selected viewpoints and their immediate surrounds. The DEM and DSM were built using publicly available ELVIS spatial data from the Foundation Spatial Data Framework.

The DEM is representative of the bare earth surface and only takes into account the topography of the landscape. The DSM is representative of the actual surface of the earth and takes into account a variety of different features in the landscape, including vegetation and built structures (e.g. rural dwellings, farm sheds and agricultural infrastructure).

It is important to note that the ZVI does not take into account the diminishing size of the project elements as the viewer moves further away. It only indicates where the project elements will be visible, with no obstructions. To account for the diminishing effect of distance on the project elements, distance bands are marked on the ZVI. These provide a general indication of relative size based on the characteristics of the human eye.

4.1.1 Summary of ZVI

The topography of the region limits the distance from which the accommodation facility can be seen. Higher ground to the north and south will prevent views from beyond a short distance. Complete views of the accommodation facility development footprint from beyond 2 km are limited to a narrow easterly band extending out to about 3.5 km.

Partial views of the accommodation facility development footprint from up to 4 km away will be possible in an arc from east to south-east, however, given the scale of the proposed structures and the varied landscape, these views will be relatively unaffected.

KEY

- Solar and BESS study area
- Accommodation facility study area
- Viewshed buffer
- Access track
- Emergency access track

Existing environment

- Dwelling not associated with the project
- Dwelling associated with the project
- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed assessment location

- Accommodation camp

Area visible to assessment locations

100%

>0%

Source: EMM (2023); DPIE (2022); DFSI (2017, 2022); GA (2011); ACEN (2022)

0 1 2 km

GDA 1994 MGA Zone 55

N

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Zone of visual influence

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure 4.1

EMM creating opportunities

4.2 Assessed viewpoints

To assess these impacts, specific viewpoints are used to represent what people can see from that location and its immediate surrounds. A viewpoint might be selected at a dwelling, or near a cluster of dwellings to illustrate the visibility of a project from those dwellings. Viewpoints can also be along roadways and at public locations to capture the visual experience people have while in those places.

Four representative viewpoints were selected from locations near dwellings and main roadways near the accommodation facility study area. The locations of the viewpoints considered as part of this assessment are illustrated on Figure 4.2.

Table 4.1 provides the rationale for selecting each photograph location. The representative viewpoints were selected based on the following criteria:

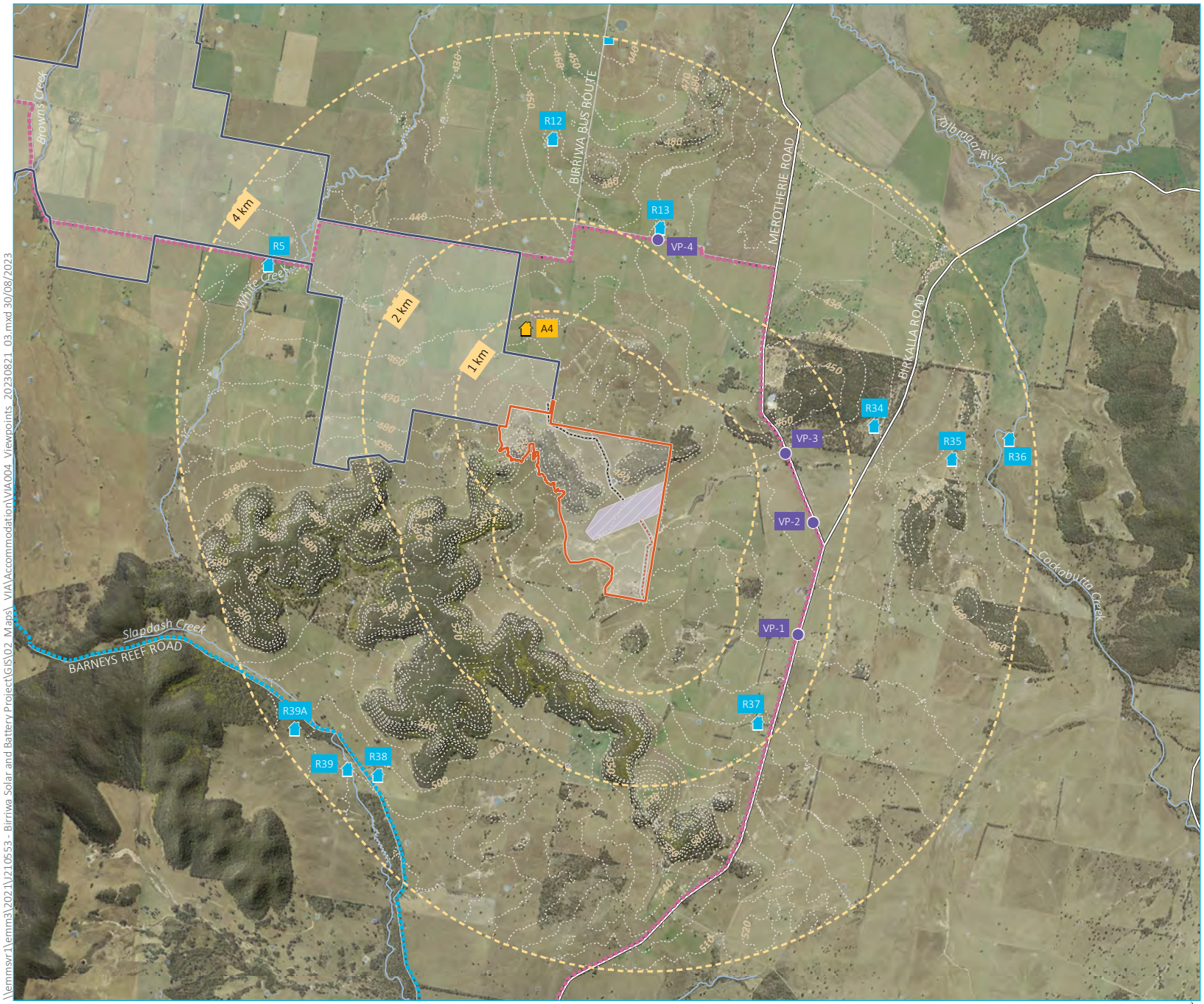
- proximity to project elements
- the location of dwellings and other local features and important sites
- the positioning of regional and local roads and potential impacts on passing motorists
- local topography
- presence of remnant vegetation and wind breaks with potential to provide screening.

Photographs from these representative viewpoints were captured and a selection of these photographs has been provided in the following sections as part of the viewpoint analysis. The photographs are used to represent and assess the visual changes that may occur from the development of the accommodation facility.

As part of the preparation of this ALVIA, site inspections were carried out during early 2022 and most recently during the month of June 2023. The purpose of the site inspections was to ground-truth the representative viewpoints identified during the initial desktop analysis and photograph the accommodation facility footprint from representative viewpoints.

Table 4.1 Assessed viewpoints, receptors and rational for selection

Assessment location	Viewpoint type(s)	Representative receptors	Distance to accommodation facility development footprint*	Rationale for selection
Viewpoint 1	Dwellings, cyclists and motorists	R37, motorists and cyclists along Merotherie Road	1.8 km	This view is from Merotherie Road, south-east of the accommodation facility development footprint. The view is also representative of views from one dwelling south of the project. This viewpoint is also representative of views experienced by cyclists on the Central West Cycle Trail, which runs along Merotherie Road.
Viewpoint 2	Cyclists and motorists	R35, R36, motorists and cyclists along Merotherie Road	1.5 km	This view is from east of the proposed accommodation facility infrastructure, on Merotherie Rd just north of the intersection with Birkalla Rd.
Viewpoint 3	Dwellings, cyclists and motorists	R34, R35, R36, motorists and cyclists along Merotherie Road	1.3 km	This view is from Merotherie Road, east of the accommodation facility. This viewpoint is also representative of views experienced by cyclists on the Central West Cycle Trail, which runs along Merotherie Road.
Viewpoint 4	Dwelling and cyclists	R12, R13, Motorists and cyclists along Birriwa Bus Route North	2.4 km to access road	This viewpoint is located north of the accommodation facility along Birriwa Bus Route North. It represents views from roads and dwellings and illustrates the visibility of the accommodation facility development footprint and associated access tracks.



KEY

- Viewpoint location
- Solar and BESS study area
- Accommodation facility study area
- Viewshed buffer
- Accommodation facility development footprint
- Accommodation facility infrastructure area
- Access track
- Emergency access track

Central West Cycle (CWC) trail

- CWC main route - Gulgong to Dunedoo
- CWC alternate route - Slap Dash Creek side trail

Existing environment

- Dwelling not associated with the project
- Dwelling associated with the project
- Major road
- Minor road
- Topographic contour (10 m interval)
- Named watercourse
- Waterbody

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Source: EMM (2023); DPIE (2022); DFSI (2017, 2022); GA (2011); ACEN (2022)

0 1 2 km

GDA 1994 MGA Zone 55

N

Viewpoint locations and receptors

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure 4.2

EMM creating opportunities

Figure 4.3 — Viewpoint 1

Viewpoint 1	Merotherie Road
Distance of view	2.3 km
Duration of view	Short (travellers) Long (nearby residence)
Scale of change	Nil
Magnitude of change	Nil
Viewer sensitivity	Low
Scenic quality	Low
Visual sensitivity	Low
Visual impact rating	**Low**

Description:

View from Merotherie Road toward the accommodation facility development footprint. This view is facing north west from the road.

Comments:

There is a ridge line (central to photo) that hides the proposed accommodation facility infrastructure from view.

Figure 4.4 — Viewpoint 2

Viewpoint 2	Merotherie Road
Distance of view	1.5 km
Duration of view	Short (travellers)
Scale of change	Nil
Magnitude of change	Nil
Viewer sensitivity	Low
Scenic quality	Low
Visual sensitivity	Low
Visual impact rating	**Low**

Description:

View from Merotherie Road toward the accommodation facility development footprint. This view is facing toward the west from the road.

Comments:

The visible line of trees screens most views of the accommodation facility development footprint from view. A small portion of the camp can be seen through the line of trees (refer to photomontage on next page).

Views from Merotherie Road are intermittent as the road is lined by trees that offer small windows of opportunities to see the landscape.

Figure 4.5 — Viewpoint 2 photomontage

Figure 4.6 — Viewpoint 3

Viewpoint 3	Merotherie Road
Distance of view	1.3 km
Duration of view	Short (travellers)
Scale of change	Nil
Magnitude of change	Nil
Viewer sensitivity	Low
Scenic quality	Low
Visual sensitivity	Low
Visual impact rating	**Low**

Description:

View from Merotherie Road toward the accommodation facility development footprint. This view is facing toward the west from the road.

Comments:

The visible line of trees screens most views of the proposed accommodation facility infrastructure. A portion of the camp can be seen along the lower slopes of the hillside (refer to photomontage on next page).

Figure 4.7 — Viewpoint 3 photomontage

Figure 4.8 — Viewpoint 4

Viewpoint 4	Birriwa Bus Route
Distance of view	2.4km
Duration of view	Short (travellers)
Scale of change	Nil
Magnitude of change	Nil
Viewer sensitivity	Low
Scenic quality	Low
Visual sensitivity	Low
Visual impact rating	**Low**

Description:

View from Birriwa Bus Route toward the accommodation facility development footprint. This view is facing toward the south from the road.

Comments:

The visible line of trees and high ground screens the proposed accommodation facility infrastructure from this viewpoint.

4.3 Visual impacts on residences

There are a total of 11 dwellings within 4 km of the accommodation facility development footprint. Nine non-associated residences are located between 2 km and 4 km from the accommodation facility development footprint. One associated residence (A4) is located within approximately 940 m and one non-associated residence (R37) is within approximately 1.8 km of the accommodation facility development footprint.

All but two of the dwellings within 4 km of the accommodation facility development footprint will have no view of the accommodation facility development footprint. The following dwellings may experience some visual impact:

- One dwelling (R35) may have partial views of the accommodation facility infrastructure filtered by existing vegetation from a distance of just over 3 km.
- One dwelling (R37) may have partial views of a small section of the accommodation facility access track at a distance of over 2.4 km. Existing topography will prevent any view of the accommodation facility infrastructure from this location.

The visual impact for both of these dwellings is low.

The proposed accommodation facility does not require any change to the visual impact assessment already undertaken for the solar and battery project for any dwelling.

Attachment A includes viewshed analyses for all the dwellings within 4 km of the accommodation facility footprint.

Table 4.2 Dwellings within 4 km of the accommodation facility development footprint

Dwelling	Location	Distance to accommodation facility infrastructure area	Visual assessment	Recommended mitigation measures	Combined impact of solar and battery project/ accommodation facility infrastructure area
A4	908 Birriwa Bus Route South	2.1 km	Topography and existing vegetation along slopes of Barneys Reef will screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No additional impact – the accommodation facility infrastructure will not be visible from this dwelling.
R5	591A Birriwa Bus Route South	4.4 km	Topography and existing vegetation along slopes of Barneys Reef will most likely screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No additional impact – the accommodation facility infrastructure will not be visible from this dwelling.

Table 4.2 Dwellings within 4 km of the accommodation facility development footprint

Dwelling	Location	Distance to accommodation facility infrastructure area	Visual assessment	Recommended mitigation measures	Combined impact of solar and battery project/ accommodation facility infrastructure area
R12	678 Birriwa Bus Route North	3.8 km	Topography and existing vegetation along slopes of Barneys Reef will most likely screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No additional impact – the accommodation facility infrastructure will not be visible from this dwelling.
R13	1085 Birriwa Bus Route South	2.7 km	Topography and existing vegetation along slopes of Barneys Reef will screen the accommodation facility. There is potential to see the access road for a distance of approximately 300 m. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the accommodation facility infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.
R34	135 Birkalla Road	2.3 km	Topography and existing vegetation will most likely screen the accommodation facility and access road. Based on the ZVI, there is low visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and battery project will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.

Table 4.2 Dwellings within 4 km of the accommodation facility development footprint

Dwelling	Location	Distance to accommodation facility infrastructure area	Visual assessment	Recommended mitigation measures	Combined impact of solar and battery project/ accommodation facility infrastructure area
R35	82 Birkalla Road	3.1 km	This dwelling may have partial views of the proposed accommodation facility through existing vegetation. At a distance of over 3 km the impact of partial views of small-scale structures will be minor. Based on the ZVI, there is low visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and battery infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.
R36	110 Coppers Lane	3.7 km	Topography and existing vegetation will most likely screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and BESS infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.
R37	677 Merotherie Road	2.5 km	Topography and existing vegetation will most likely screen the accommodation facility and access road. Based on the residential viewshed analysis for this property (Figure A.4), the accommodation facility infrastructure will not be visible from this location. Without existing vegetation a small portion of the accommodation facility access road may be visible at a distance of over 2.4 km.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and battery infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.

Table 4.2 Dwellings within 4 km of the accommodation facility development footprint

Dwelling	Location	Distance to accommodation facility infrastructure area	Visual assessment	Recommended mitigation measures	Combined impact of solar and battery project/ accommodation facility infrastructure area
R38	1920 Barneys Reef Road	3.4 km	Topography and existing vegetation along slopes of Barneys Reef will most likely screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and battery infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.
R39	1921 Barneys Reef Road	3.6 km	Topography and existing vegetation along slopes of Barneys Reef will most likely screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and BESS infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.
R39a	1995 Barneys Reef Road	3.8 km	Topography and existing vegetation along slopes of Barneys Reef will most likely screen the accommodation facility and access road. Based on the ZVI, there is no visual impact expected at this dwelling.	Not required. Refer Attachment A for viewshed analysis.	No **combined** impact – the solar and battery infrastructure will not be visible from this dwelling. It is not possible to see both the solar and battery project and the accommodation facility development footprint from this location.

4.4 Night lighting assessment

Lights have the potential to alter the night time landscape character of the region.

Potential sources of light sources include:

- lighting for safety and security within the accommodation facility
- vehicles along the access road to the Birriwa solar and battery project.

The accommodation facility has been sited to minimise visibility from existing dwellings, homesteads, and public viewpoints. It is unlikely that the proposed lighting will create a noticeable impact on the existing night lighting.

4.4.1 Overview of potential impacts from night lighting

Visual impact assessments are not required to, and do not attempt to, assess the amount or brightness of light reaching any location. It is possible to predict that a dwelling or viewpoint with possible views of the accommodation facility development footprint may also see light emitted by the accommodation facility infrastructure or by vehicles using the accommodation facility access track.

Night lighting impacts are possible at:

- Two dwellings that have possible views (R35 and R37).
- Two viewpoints that have filtered views of the accommodation facility development footprint (viewpoints 2 and 3).

Although the amount, brightness or quality of light are not assessed as part of this report, the distances involved and existing vegetation indicate the impact of night lighting will be minor.

New light sources related to the accommodation facility have the potential to extend visual impacts into the night. Due to the relatively isolated location of the accommodation facility, there is a very small number of existing light sources to illuminate the night sky. The existing light sources are associated with dwellings and motor vehicles travelling along Merotherie Road and Birkalla Road.

The highest visual impact of night lighting is expected to be on people who enjoy the outdoors at night, specifically night-sky enthusiasts, photographers, star gazers and campers. The impact of night lighting is unlikely to be experienced from inside dwellings since internal lights reflect off windows and limit views of the exterior at night.

4.4.2 Lighting design principles

Minimising light pollution of the night sky will be considered within the design phases of the accommodation facility. Siting project elements can play a large role in reducing the visibility of any required lighting. Good use of the landscape to reduce lighting impacts include:

- use of landform to shield the project from view
- use of landscape elements (trees, mounding, walls) to shield effects of lighting from view.

Good lighting design can also minimise, and in some cases eliminate light pollution of the night sky. Design standards like AS 4282 *Control of obtrusive effects of outdoor lighting*, *National Light Pollution Guidelines for Wildlife* (2020), and the *Dark Sky Planning Guideline* (2016) should be applied during the design of project elements.

The *Dark Sky Planning Guideline* (2016) was developed by DPE to provide design guidelines that maintain the dark sky, and to improve lighting practices. The guidelines are directed at projects within the Warrumbungle International Dark Sky Park which includes Siding Spring Observatory, and covers a radius of 200 km from the observatory. The accommodation facility is within the International Dark Sky Park, and the applicable Dark Sky Planning Guideline provides measures to help reduce light pollution that can be applied to the lighting design. Design guidelines adapted from the guidelines include:

- eliminating upward spill light
- directing light downwards, not upwards
- use of shielded fittings
- avoiding 'over' lighting
- switching lights off when not required
- use of energy efficient bulbs
- use of asymmetric beams, where floodlights are used
- ensuring lights are not directed towards reflective surfaces
- use of warm white colours.

5 Mitigation measures

A range of visual impact mitigation measures are available to screen development. As a general rule, mitigation should aim first at reducing the visible changes to the landscape. Secondly, mitigation should screen new infrastructure introduced by the project to present a landscape that is as similar to the existing landscape as possible.

Based on analysis of the visual impact of the proposed amendments from selected viewpoints and nearby dwellings, the following mitigation measures are recommended for the proposed accommodation infrastructure.

This recommendation does not change the recommendations of the original LVIA for the Birriwa solar and battery project.

5.1 Design considerations

The location of the accommodation facility development footprint has been carefully selected to minimise visual impacts, as described in Section 3.1.

5.2 Construction mitigation

The potential for the greatest visual impact occurs during the construction stages of a project. This is when the changes to the landscape occur, and there is a lot of movement of vehicles and equipment. Even though construction is viewed as temporary, practical steps should be taken to reduce the impacts during this stage. These practices include:

- locate laydown areas in areas with limited visibility from dwellings and public roads
- minimise creation of dust from vehicles and wind
- restore or remediate any earthworks undertaken during construction
- keep clearing and trimming of vegetation to a minimum.

5.3 Lighting

Lighting design principles outlined in Section 4.4 should be followed to minimise any light spill from the project.

5.4 Vegetation retention

The landscape character of the area consists of remnant bushland along the hilltops and upper slopes of Barneys Reef. There are trees along roadways and waterways as well. The accommodation facility development footprint and the access road do not require the removal of any existing trees. It is assumed that the existing level of screening will be maintained for the duration of the accommodation facility's operation.

5.5 Landscaping

Due to the temporary nature of the accommodation facility, no vegetative visual screening is recommended.

5.6 Impact and mitigation summary

Table 5.1 Summary of results of visual impacts at each viewpoint

Viewpoint	Distance to accommodation facility infrastructure area	Representative receptors	Residential or public	Project visible	Magnitude of change	Visual sensitivity	Visual impact rating	Significant impact	Mitigation proposed	Visual impact rating after mitigation	Potential for cumulative impacts
Viewpoint 1	2.0 km	R37, cyclists and Motorists	Residential and public	No	Low	Low	**Low**	No	None	**low**	No
Viewpoint 2	1.6 km	R34, R35, R36 cyclists and motorists	Residential	Yes	Low	Low	**Low**	No	None	**Low**	No
Viewpoint 3	1.3 km	R35, R36 cyclists and motorists	Public	Yes	Low	Low	**Low**	No	None	**Low**	No
Viewpoint 4	2.6km	R13, cyclists and motorists	Residential and public	Yes	Low	Low	**Low**	No	None	**Low**	No

6 Conclusion

6.1 Visual impact summary

The objective of a visual impact assessment is to determine how the proposed accommodation facility will impact on the existing visual amenity and landscape character. Any potential negative impacts must be investigated to determine how it can be mitigated and reduced to an acceptable level.

The accommodation facility design, accommodation facility development footprint and placement of the infrastructure has evolved to minimise or avoid visual impacts where possible.

Nonetheless, the development of the accommodation facility will result in some changes to the landscape. Visual impacts will occur during the construction and operational stages of the accommodation facility, and the visual landscape will be altered from its current state for the duration of the temporary operation of the accommodation facility.

Visual assessments have been conducted from a number of representative viewpoints surrounding the accommodation facility development footprint. The representative viewpoints were selected based on the following criteria:

- proximity to the accommodation facility development footprint
- the location of receptors (i.e. dwellings) and other local features
- the positioning of regional and local roads and potential impacts on passing motorists
- local topography
- presence of vegetation with potential to provide screening.

The representative viewpoints have been assessed to demonstrate the potential visual impacts of the project. The visual assessment determined that, of the viewpoints assessed, accommodation facility may be visible to varying degrees from two of the four viewpoints. Based on variable elevation and undulation in the landscape and the presence of vegetation, and the small scale of the proposed accommodation facility, the impact assessment predicts:

- no visibility from viewpoints 1 and 4
- a low visual impact from viewpoints 2 and 3
- no viewpoint locations with a moderate visual impact rating
- no viewpoint locations with a high impact rating.

In addition to the viewpoint assessments, each resident within 4 km of the accommodation facility development has been assessed for potential visual impacts. Only one dwelling within 4 km of the accommodation facility development footprint will have the potential to see the accommodation facility infrastructure (R35), and in that case the impact will be low due to views being filtered by existing vegetation from a distance of just over 3 km.

One dwelling (R37) may see a small portion of the accommodation facility access track. The assessment for dwellings predicts:

- no visibility from R5, R12, R13, R34, R36, R38, R39, R39a and A4
- a low visual impact from R35 and R37

- no dwelling with moderate visual impact
- no dwellings with a high impact rating.

6.1.1 Night lighting

The only lighting proposed are for security and maintenance purposes. This will primarily occur around the buildings.

The night lighting would be inwardly focused and shielded so it does not result in light spill impacts to neighbouring properties or the night sky.

6.1.2 Cumulative impacts

Cumulative visual impacts have also been considered, which can arise from the presence of similar projects and can have a significant visual impact on the landscape when viewed together. There are several state significant development projects approved or proposed in the local area, as identified through DPE's Major Projects Planning Portal at the time of writing the amendment report. A radius of approximately 25 km from the project was used to identify future projects for consideration of potential cumulative impacts. Of the SSD projects:

- the majority are located in the LGAs of Mid-Western Regional and Warrumbungle
- two are approved (Stubbo Solar and Battery project construction has commenced and Dunedoo Solar Farm construction yet to commence)
- six are in various stages of the SSD assessment process
- one is approved and operational (Beryl Solar Farm).

Anticipated cumulative impacts to the closest identified projects are summarised below:

- Barneys Reef Wind Farm:
    - All but two residences within 4 km of the accommodation facility development footprint will have no view of the of accommodation facility development footprint. For these dwellings there will be no cumulative impact.
    - For the two dwellings (R35 and R37) that may have some view of the accommodation facility development footprint the visual impact of the accommodation facility has been assessed as low. For this reason, and given the small relative scale of the accommodation facility, the potential cumulative impact is minimal.
    - For viewpoint 1 to 4, and for travellers along the Central West Cycle Trail (Merotherie Road and Birriwa Bus Route South) the visual impact of the accommodation facility has been assessed as low. For this reason, and given the small relative scale of the accommodation facility, the potential cumulative impact is minimal.
- Narragamba Solar project:
    - Very low chance of any cumulative impact due to low visibility of the accommodation facility from Merotherie Rd.

- Valley of the Winds:
    - The Valley of the Winds project is not expected to be visible from the accommodation facility location.
- Stubbo Solar project:
    - Located approximately 11 km south of the accommodation facility development footprint, this project is not expected to be visible from the accommodation facility infrastructure.

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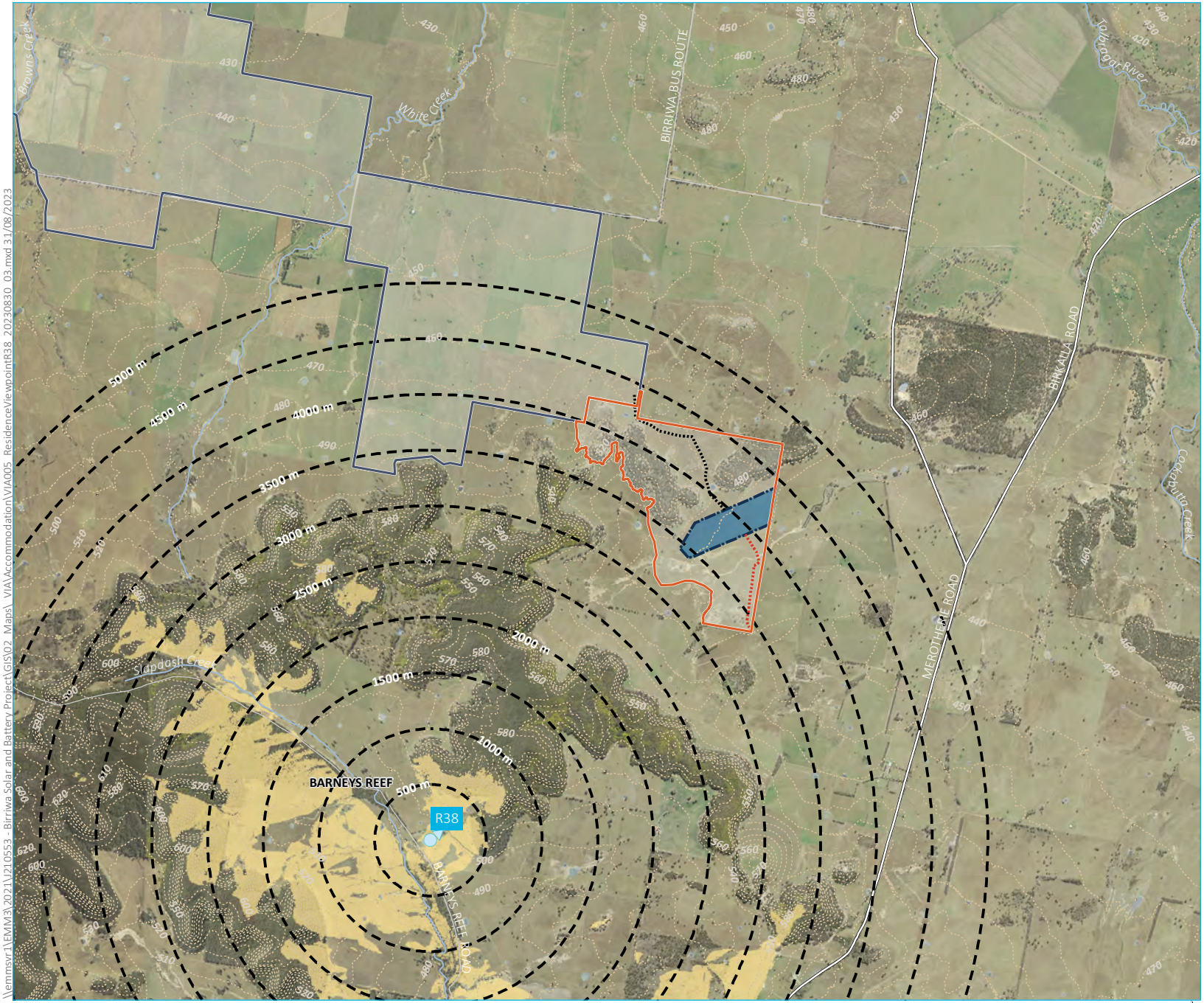
Attachment A
Viewshed analyses

EMM
creating opportunities



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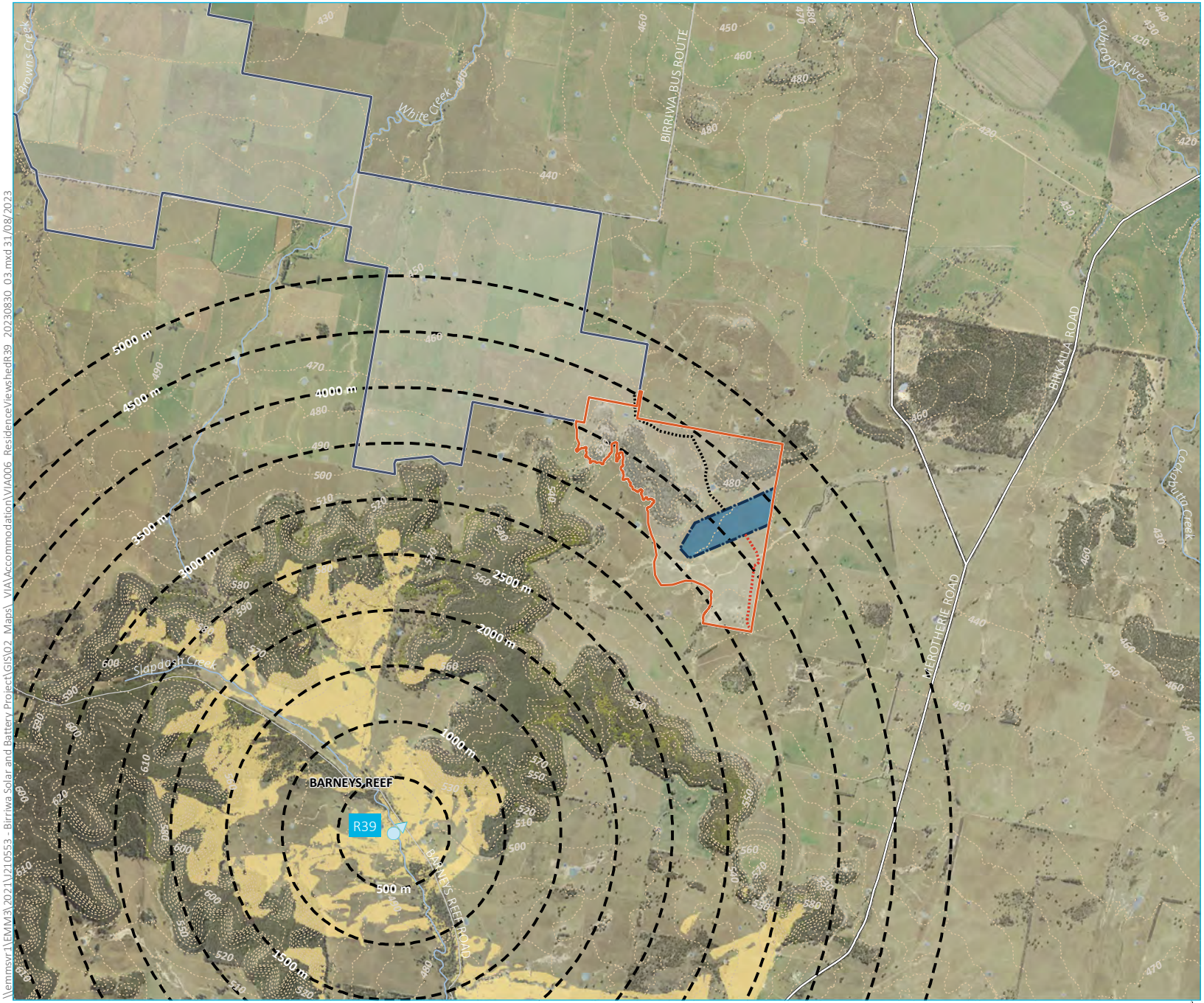
Source: EMM (2023); DCSSS (2023)

Residential viewshed analysis - R38

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.1

EMM
creating opportunities



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Residential viewshed analysis - R39

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.2

EMM
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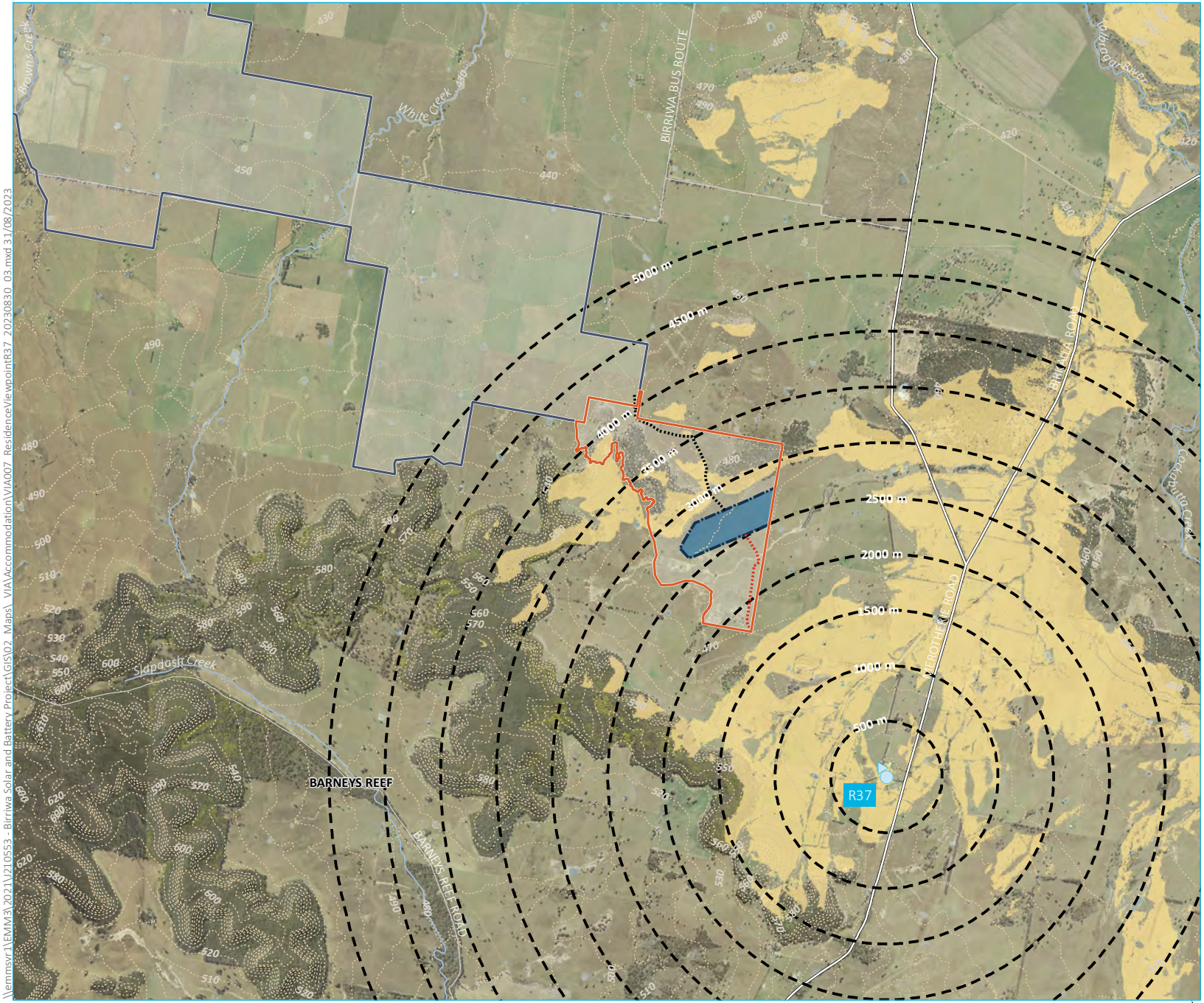

KEY

- Solar and BESS study area
- Accommodation facility study area
- Workers accommodation camp
- Access track
- Emergency access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed analysis

- R37
- Viewpoint buffer
- Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

GDA 1994 MGA Zone 55

N

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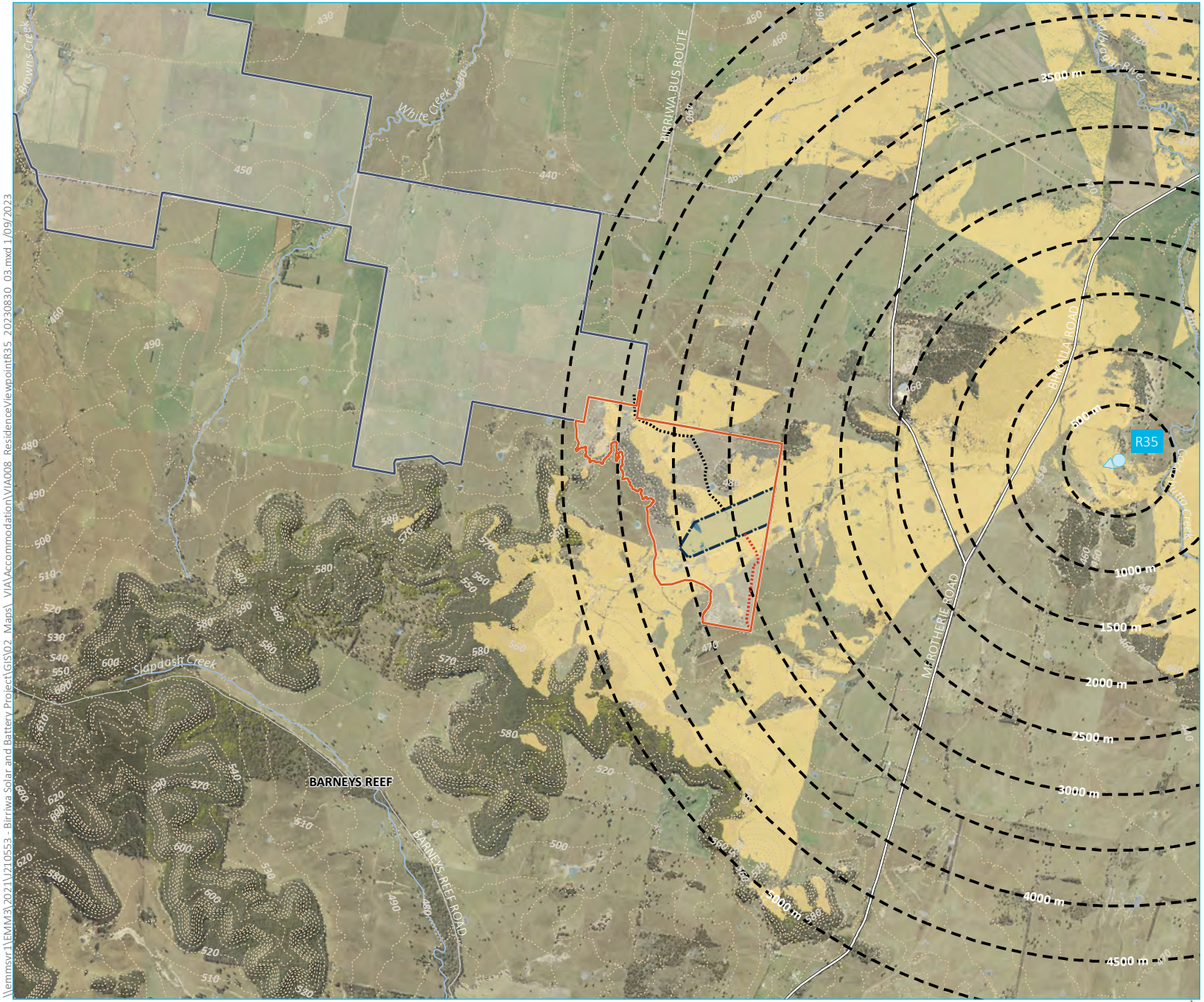
Residential viewshed analysis - R37

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.3

EMM creating opportunities



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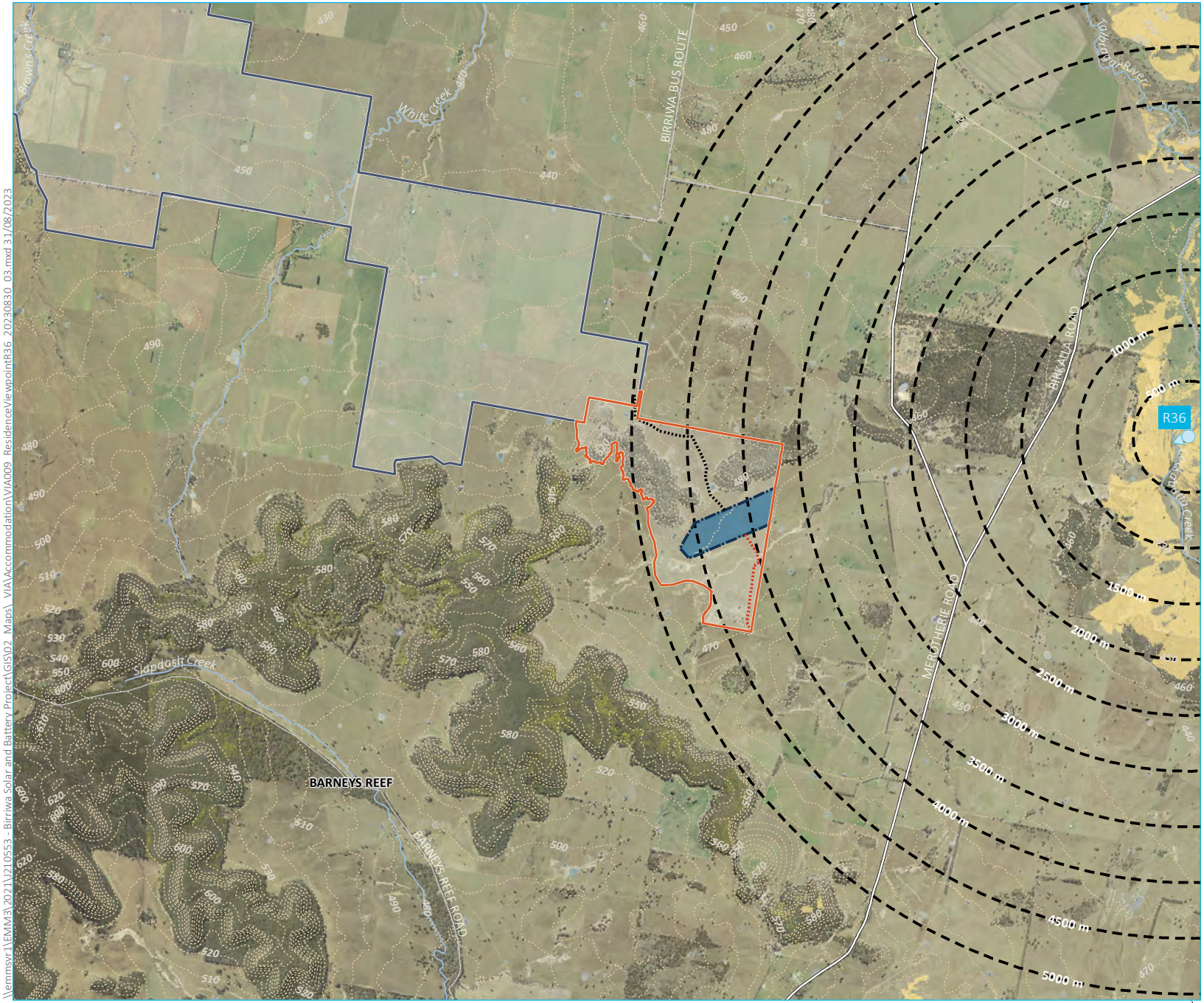
Residential viewshed analysis - R35

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.4

EMM
creating opportunities



KEY

- Solar and BESS study area
- Accommodation facility study area
- Workers accommodation camp
- Access track
- Emergency access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed analysis

- R36
- Viewpoint buffer
- Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

\\emmsvr1\EMM3\2021\P210553 - Birriwa Solar and Battery Project\GIS\02 Maps\ VIA\Accommodation\VIA009 ResidenceViewpointR36 20230830 03.mxd 31/08/2023

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

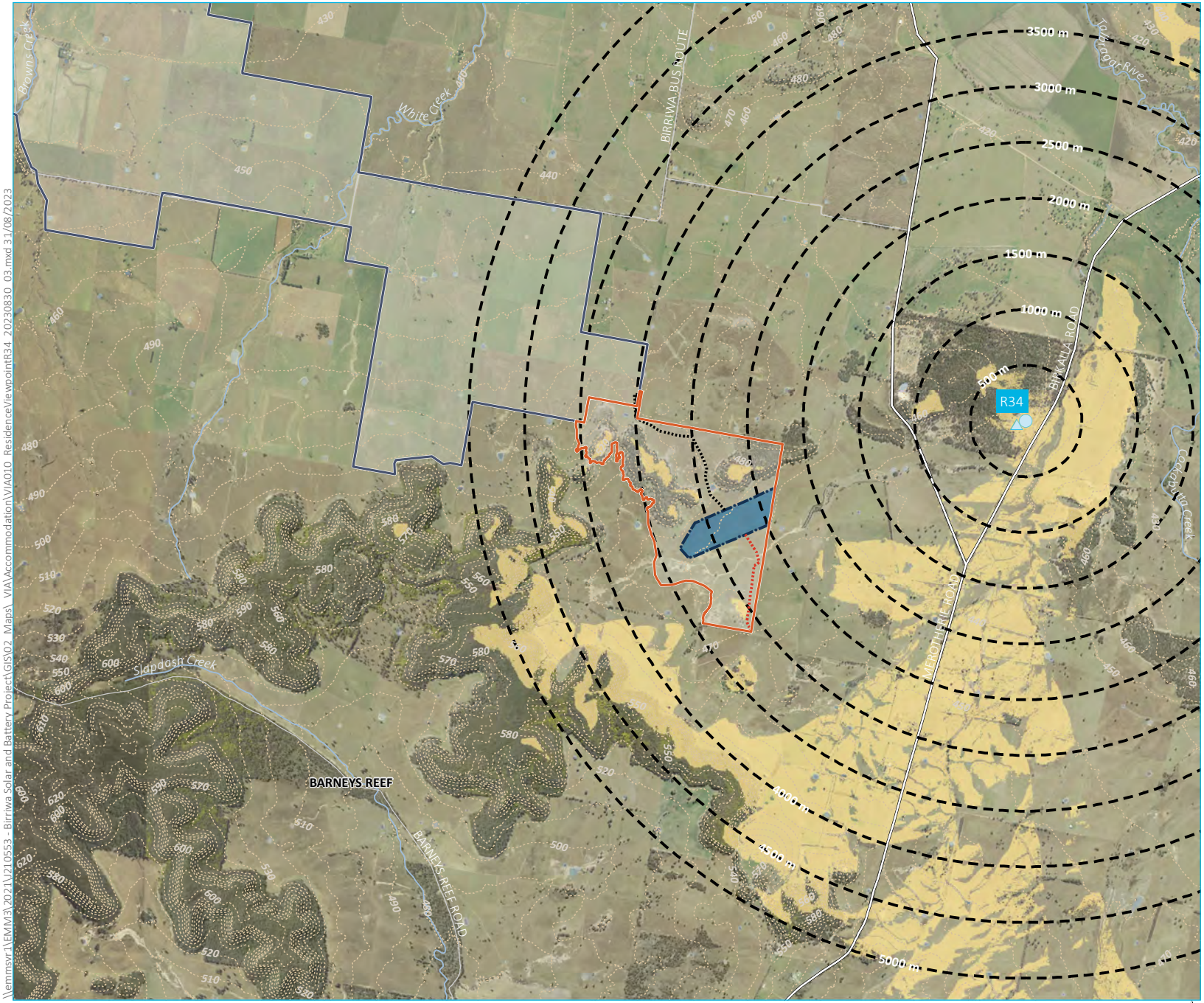
GDA 1994 MGA Zone 55

N

Residential viewshed analysis - R36

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.5

EMM creating opportunities



KEY

- Solar and BESS study area
- Accommodation facility study area
- Workers accommodation camp
- Access track
- Emergency access track

Existing envireonment

- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed analysis

- R34
- Viewpoint buffer
- Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

GDA 1994 MGA Zone 55

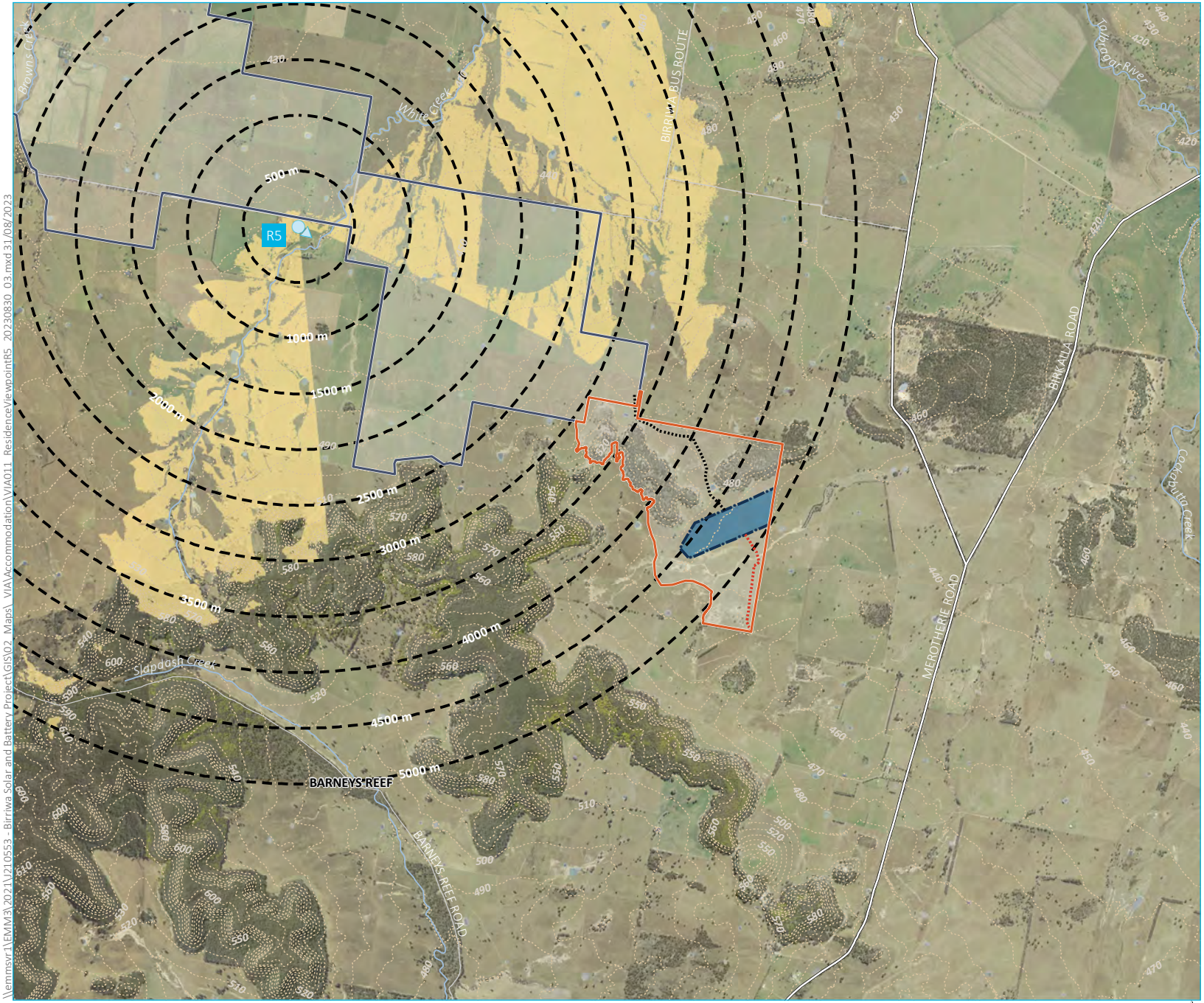
N

\\emmsvr1\EMM3\2021\P210553 - Birriwa Solar and Battery Project\GIS\02 Maps\ VIA\Accommodation\VIA010 ResidenceViewpointR34 20230830 03.mxd 31/08/2023

Residential viewshed analysis - R34

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.6

EMM creating opportunities



KEY

- Solar and BESS study area
- Accommodation facility study area
- Workers accommodation camp
- Access track
- Emergency access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed analysis

- R5
- Viewpoint buffer
- Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

\\emmsvr1\EMM3\2021\210553 - Birriwa Solar and Battery Project\GIS\02_Maps_VIA\Accommodation\VIA011_ResidenceViewpointR5_20230830_03.mxd 31/08/2023

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

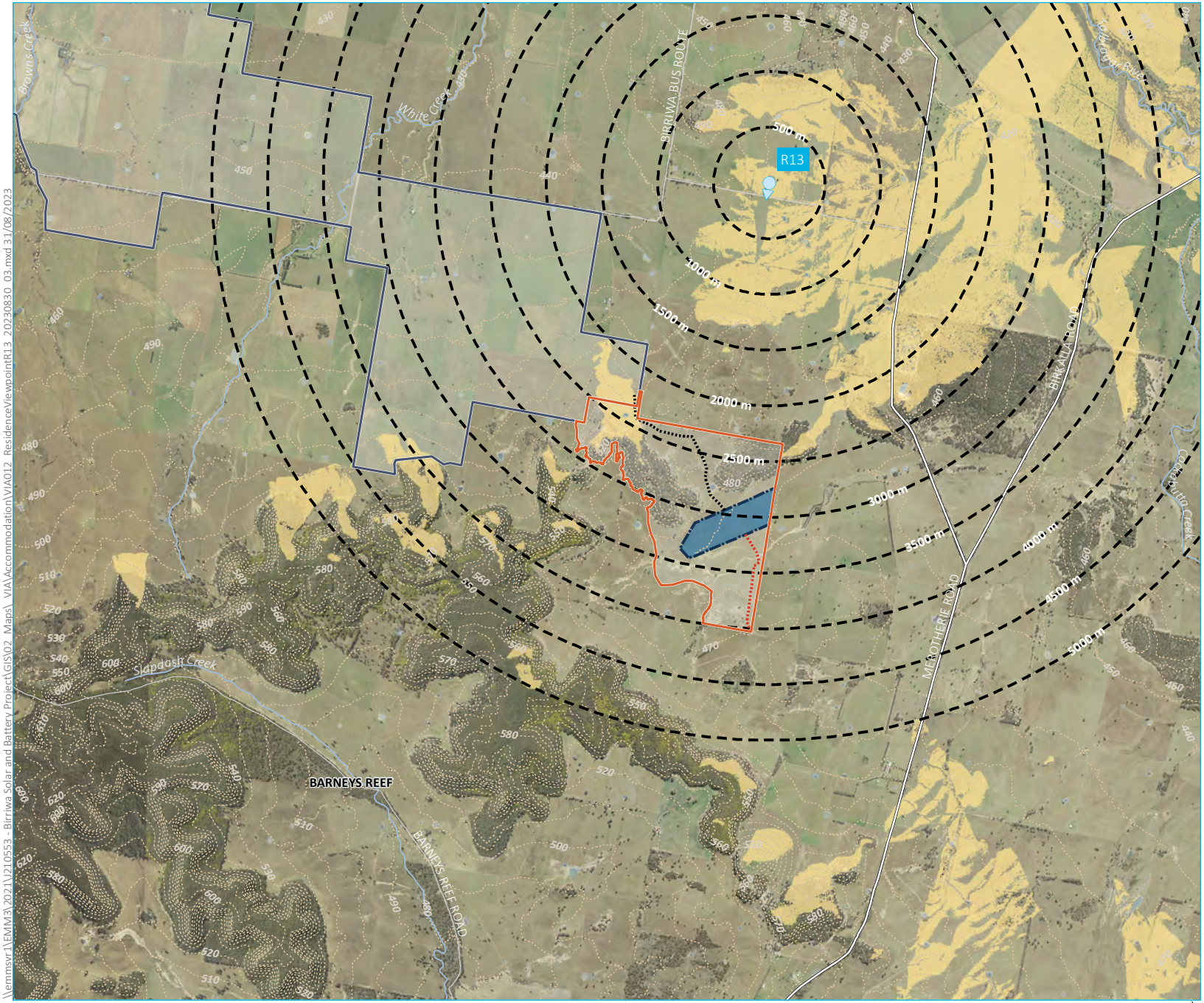
GDA 1994 MGA Zone 55

N

Residential viewshed analysis - R5

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.7

EMM creating opportunities



KEY

- Solar and BESS study area
- Accommodation facility study area
- Workers accommodation camp
- Access track
- Emergency access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed analysis

- R13
- Viewpoint buffer
- Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

GDA 1994 MGA Zone 55

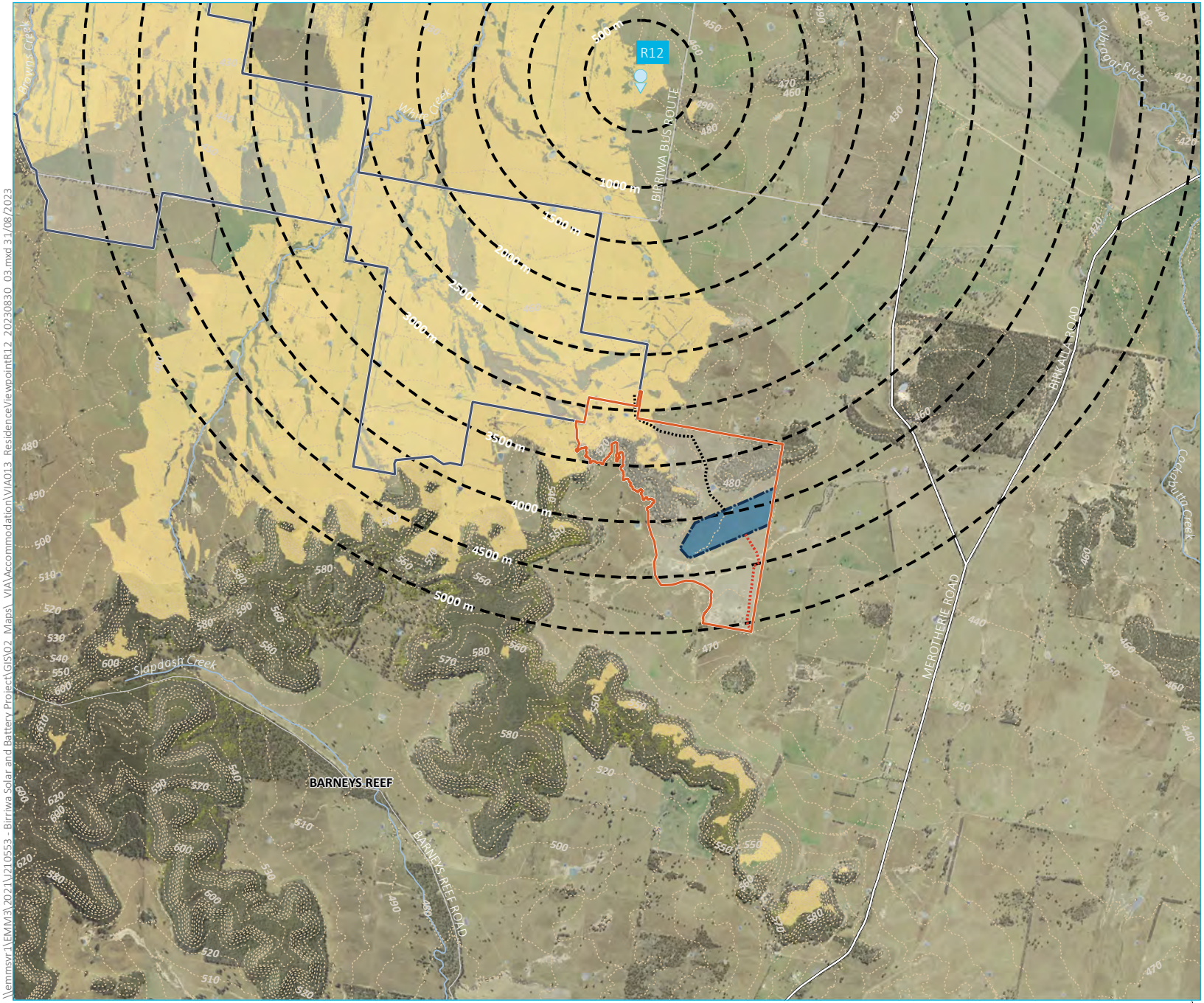
N

\\emmsvr1\EMM3\2021\P210553 - Birriwa Solar and Battery Project\GIS\02 Maps\ VIA\Accommodation\VIA012 ResidenceViewpointR13 20230830 03.mxd 31/08/2023

Residential viewshed analysis - R13

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.8

EMM creating opportunities



KEY

- Solar and BESS study area
- Accommodation facility study area
- Workers accommodation camp
- Access track
- Emergency access track

Existing environment

- Major road
- Minor road
- Named watercourse
- Topographic contour (10 m interval)

Viewshed analysis

- R12
- Viewpoint buffer
- Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

GDA 1994 MGA Zone 55

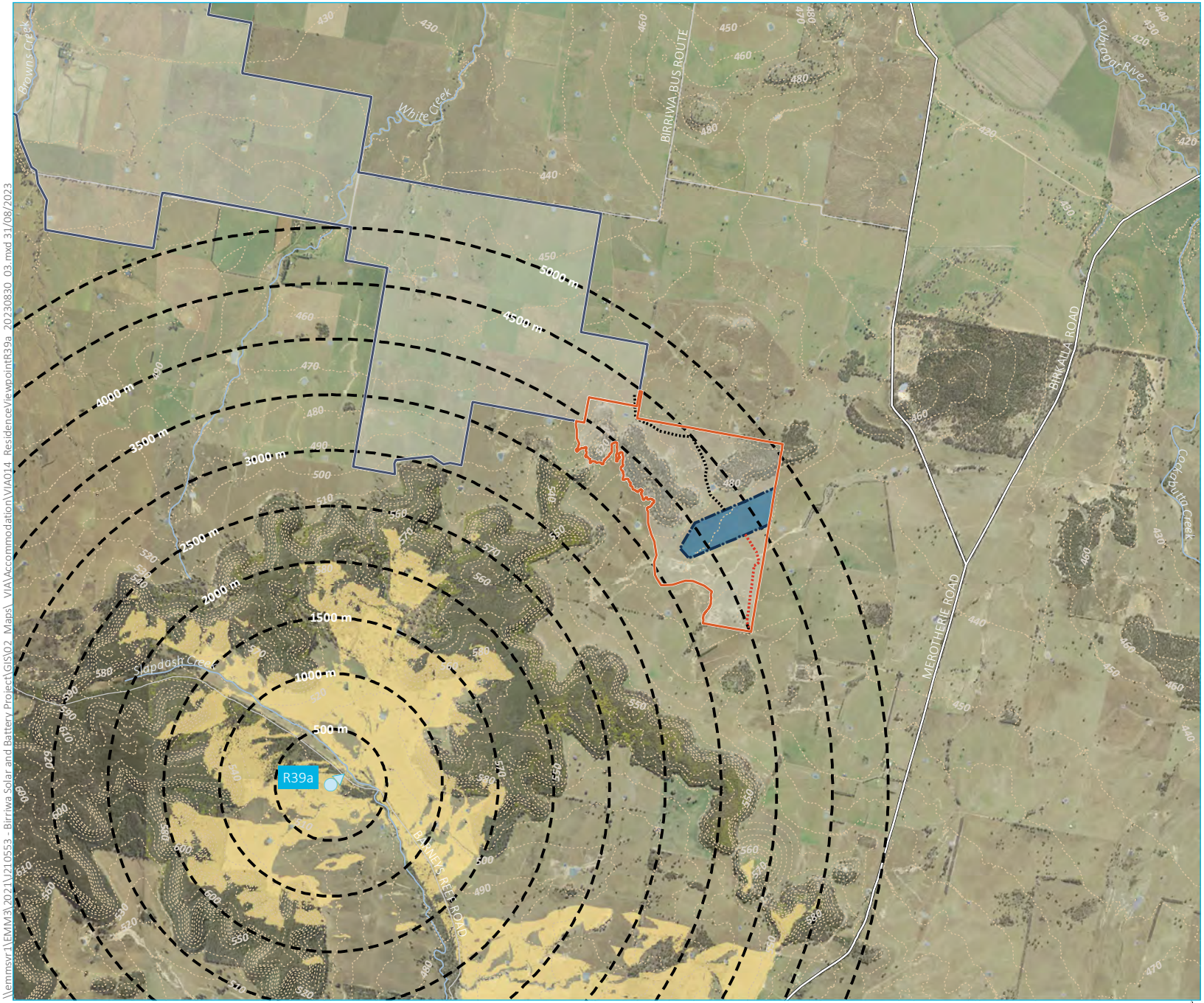
N

\\emmsvr1\EMM3\2021\P210553 - Birriwa Solar and Battery Project\GIS\02 Maps\ VIA\Accommodation\VIA013 ResidenceViewpointR12 20230830 03.mxd 31/08/2023

Residential viewshed analysis - R12

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.9

EMM creating opportunities



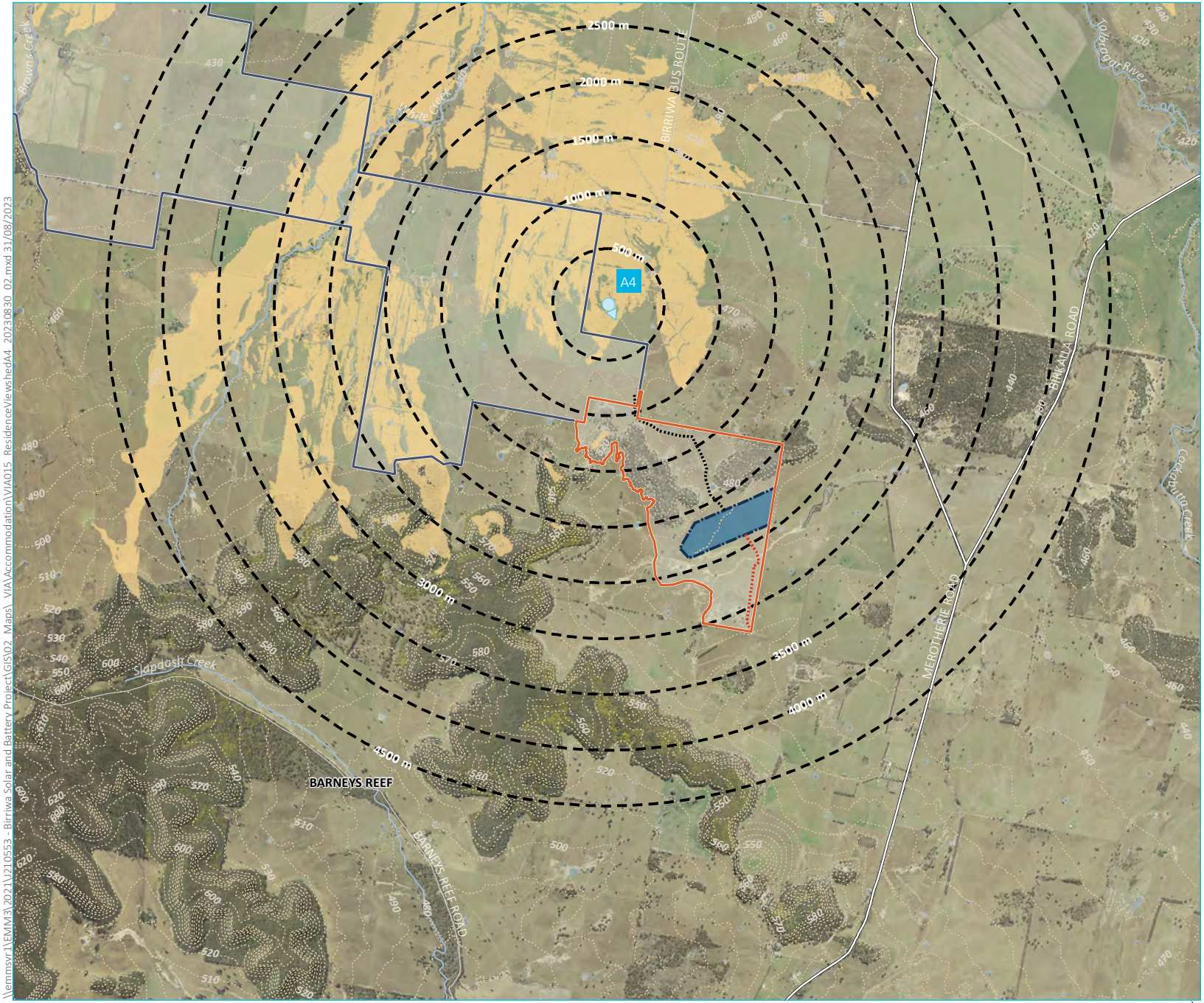
Source: EMM (2023); ABS (2021); DCSSS (2023)

\\emmsvr1\EMM3\2021\210553 - Birriwa Solar and Battery Project\GIS\02 Maps\ VIA\Accommodation\VIA014 ResidenceViewpointR39a 20230830 03.mxd 31/08/2023

Residential viewshed analysis - R39a

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.10

EMM creating opportunities



KEY

Solar and BESS study area

Accommodation facility study area

Workers accommodation camp

Access track

Emergency access track

Existing environment

Major road

Minor road

Named watercourse

Topographic contour (10 m interval)

Viewshed analysis

A4

Viewpoint buffer

Visible project infrastructure (assumed 4.4 m height) - bare earth surface

NOTE: No views of project infrastructure predicted based on viewshed analysis

\\emmsvr1\EMM3\2021\P210553 - Birriwa Solar and Battery Project\GIS\02 Maps\ VIA\Accommodation\VIA015 ResidenceViewshedA4 20230830 02.mxd 31/08/2023

Source: EMM (2023); ABS (2021); DCSSS (2023)

0 1 2 km

GDA 1994 MGA Zone 55

N

Residential viewshed analysis - A4

Birriwa Solar and BESS Project
Visual Impact Assessment Addendum
Figure A.11

EMM creating opportunities

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