



Puggoon Solar Farm and Battery Energy Storage System

Appendices

PREPARED FOR

X-ELIO⁺

X-Elio Aus2 Pty Ltd

DATE

7 February 2025

REFERENCE

0717476





APPENDIX A SCOPING SUMMARY TABLE

SCOPING REPORT SUMMARY TABLE

Level of Assessment	Matter	Scale of Impact ¹	Nature of Impact ²	Sensitivity of receiving environment ³	Mitigation Measures Required	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping Report Reference
Detailed	Amenity – Landscape and Visual	Low	Direct Cumulative Perceived	Sensitive (receptors, townships, communities)	Likely	Yes	Specific	<ul style="list-style-type: none"> Landscape Institute and Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment Third Edition (2013) 	Section 6.2
Detailed	Biodiversity	Moderate	Direct Indirect	Sensitive (ecological values of species / biodiversity present)	Likely	No	General	<ul style="list-style-type: none"> Biodiversity Assessment Methodology (DPE 2020) Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013) Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various) 	Section 6.4
Standard	Amenity – Noise and Vibration	Low	Direct Cumulative Perceived	Sensitive (receptors)	Likely	No	General	<ul style="list-style-type: none"> Noise Policy for Industry (2017) (NSW Environment Protection Authority) Interim Construction Noise Guidelines 2009 (Department of Environment, Climate Change) NSW Road Noise Policy 2011 (Department of Environment, Climate Change and Water) Assessing Vibration: A Technical Guideline 2006 	Section 6.3
Detailed	First Nations Cultural Heritage	Low	Direct Indirect Perceived	Sensitive (cultural values)	Likely	No	Specific	<ul style="list-style-type: none"> Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011) Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010) Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW, 2010c) Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010b) 	Section 6.5
Detailed	Access – Traffic and Transport	Low	Direct Indirect Cumulative	Sensitive (disturbance to other road users)	Likely	Yes	Specific	<ul style="list-style-type: none"> Guide to Traffic Generating Developments (RTA, 2002) Austrroads Guide to Road Design Austrroads Guide to Traffic Management 	Section 6.9
Standard	Historic Heritage	Low	Direct Indirect	Sensitive (heritage values)	Likely	No	General	<ul style="list-style-type: none"> Historical Archaeology Code of Practice (Heritage Council, 2006) 	Section 6.6
Standard	Hazards and Risks – SEPP 33 / Preliminary Hazard Analysis (BESS)	Low	Direct Indirect Perceived	Sensitive (safety)	Likely	No	General	<ul style="list-style-type: none"> Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011) Assessment Guideline: Multi-level Risk Assessment (Department of Planning and Infrastructure, 2011) Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis (Department of Planning, 2011) 	Section 6.7.1
Standard	Hazards and Risks – Bushfire	Low	Direct Indirect	Sensitive (safety)	Likely	No	General	<ul style="list-style-type: none"> Planning for Bushfire Protection 2019 – NSW Rural Fire Service (RFS, 2019) 	Section 6.7.2
Standard	Hazards and Risks – Health – Electromagnetic Field	Low	Direct Perceived	Sensitive (safety)	Likely	No	General	<ul style="list-style-type: none"> National Health and Medical Research Council advice 	Section 6.7.3

¹ Scale of Impacts – based on the severity of the impact, the geographical location and the duration of the impact as detailed in Appendix C of State Significant Development Guidelines – Preparing a Scoping Report (DPE, 2021a).

² Nature of Impact - type of impact, i.e. direct, indirect, cumulative, perceived, as detailed in Appendix C of State Significant Development Guidelines – Preparing a Scoping Report (DPE, 2021a).

³ Sensitivity of the receiving environment – expressed in legislation, societal values, or vulnerability to change, as detailed in Appendix C of State Significant Development Guidelines – Preparing a Scoping Report (DPE, 2021a).

Level of Assessment	Matter	Scale of Impact ¹	Nature of Impact ²	Sensitivity of receiving environment ³	Mitigation Measures Required	Cumulative Impact Assessment	Engagement	Relevant government plans, policies and guidelines	Scoping Report Reference
Standard	Mining and Exploration Titles	Low	Indirect	Sensitive (disturbance to mining and exploration operations)	Likely	No	General	<ul style="list-style-type: none"> State significant development guidelines – preparing an environmental impact statement (DPE, 2022) 	Section 6.8
Standard	Social	Low	Direct Indirect Cumulative Perceived	Sensitive (social, environmental and economic values)	Likely	Yes	General	<ul style="list-style-type: none"> Social Impact Assessment Guideline for State Significant Projects (DPE, 2021b) Technical Supplement: Social Impact Assessment Guideline for State Significant Projects (Technical Supplement) (DPE, 2021d) 	Section 6.10
Standard	Water Resources (flooding and hydrology)	Low	Direct Indirect	Sensitive (local hydrology and water quality)	Likely	No	General	<ul style="list-style-type: none"> Managing Urban Stormwater; Soils & Construction (Landcom, 2004); Guidelines for Controlled Activities on Waterfront Land (DPI Water, 2018); Relevant Water Sharing Plans (DPI Water); and Guidelines for Watercourse Crossings on Waterfront Land (DPI Water, 2012) Floodplain Risk Management Guidelines (Department of Environment and Climate Change, 2016) Floodplain Development Manual: The management of flood liable land (NSW Government, 2005) 	Section 6.11
Standard	Land Resources (agriculture and soils)	Low	Direct Indirect	Sensitive (agricultural land use)	Likely	No	General	<ul style="list-style-type: none"> Soil and Landscape Issues in Environmental Impact Assessment (OEH, 2000); Landslide Risk Management Guidelines (AGS, No Date); and Site Investigations for Urban Salinity (OEH, 2002). Revised Large Scale Solar Guidelines (DPE, 2022a) 	Section 6.12
Standard	Air Quality	Low	Direct Indirect	Sensitive (local air quality)	Likely	No	General	<ul style="list-style-type: none"> National Greenhouse Accounts Factors (Australian Government, 2021); and NSW Climate Change Policy Framework (Office of Environment and Heritage, 2016). 	Section 6.13
Standard	Waste Management	Low	Direct Indirect	Sensitive (environmental values, safety)	Likely	No	General	<ul style="list-style-type: none"> Waste Classification Guidelines (DECCW, 2009) 	Section 6.14



ERM

APPENDIX B

PRELIMINARY VISUAL IMPACT
ASSESSMENT



Puggoon Solar Farm and BESS

Preliminary Visual Impact Assessment



moir
STUDIO

Puggoon Solar Farm and BESS

Preliminary Visual Impact Assessment

Prepared for

Environmental Resources Management Australia Pty Ltd

Issue

E

Date

15.01.2024

Project Number

2469

Revision	Date	Author	Checked	Comment
A	27.06.2024	NL	SW	Draft Issue for Review
B	05.12.2024	CC	AR	Final Draft
C	19.12.2024	CC	AR	Final Draft for Submission
D	20.12.2024	AR	-	Final for Submission
E	15.01.2024	AR	-	Revised Project name for Submission

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1.0

Introduction

1.0 Introduction

1.1 Background

X-Elio Aus2 Pty Ltd (the Applicant) proposes to develop the Puggoon Solar Farm and BESS and associated Battery Energy Storage System (BESS). Moir Studio have been commissioned by Environmental Resources Management Australia Pty Ltd (ERM) on behalf of the Applicant to prepare a Preliminary Visual Impact Assessment (PVIA) for the proposed Puggoon Solar Farm and BESS. The purpose of this PVIA is to provide a preliminary assessment of the potential visual impacts associated with the Puggoon Solar Farm and BESS which is referred to hereafter as 'the Project'.

The PVIA for the Project has been prepared in accordance with the following documents:

- *Large-Scale Solar Energy Guideline August 2022* (referred to hereafter as 'the Guideline') developed by the Department of Planning, Housing and Infrastructure (DPHI).
- *Technical Supplement - Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline August 2022* (referred to hereafter as 'the Technical Supplement') developed by the Department of Planning, Housing and Infrastructure (DPHI).
- *State Significant Development Guidelines - Preparing a Scoping Report (Appendix A)* (referred to hereafter as 'the SSD Guidelines')

This PVIA will form part of the Scoping Report seeking the Secretary's Environmental Assessment Requirements (SEARs) that will inform the preparation of a Landscape and Visual Impact Assessment (LVIA) to prepare an Environmental Impact Statement (EIS).

1.2 Relevant Experience

The Technical Supplement states: *"The applicant is expected to engage relevant professionals (for example: landscape architects, architects, environmental planners, geographers, or other visual assessment specialists) with demonstrated experience and capabilities."* (DPHI, 2022b).

Moir Studio is a professional design practice and consultancy specialising in the areas of Landscape Architecture, Urban Design and Landscape and Visual Impact Assessment. Our team has extensive experience in undertaking Landscape and Visual Impact Assessments for large-scale infrastructure and renewable energy projects.

Recent experience includes the preparation of Landscape and Visual Impact Assessments for the following Solar Energy Projects:

- Blind Creek Solar Farm Project LVIA (Bungendore, NSW)
- Glenellen Solar Farm LVIA (Glenellen, NSW)
- Oxley Solar Farm LVIA (Castledoyle, NSW)
- Stubbo Solar Farm LVIA (Stubbo, NSW)
- Tilbuster Solar Farm LVIA (Tamworth, NSW)
- Dunedoo Solar Farm LVIA (Dunedoo, NSW)

1.3 Overview of Preliminary Visual Impact Assessment for Solar Farms

The Technical Supplement states: “A *Preliminary Visual Assessment must be included in an applicant’s scoping report as part of their request for the Secretary’s environmental assessment requirements (SEARs).*” (DPHI, 2022b). The visual assessment process is broken into two key stages:

- Stage 1 - Preliminary Assessment (Scoping Phase)
- Stage 2 - Detailed Assessment (EIS Phase)

This PVIA forms part of **Stage 1** - Preliminary Assessment and will be submitted to DPHI together with the Scoping Report for the request for SEARs. This stage is used to identify viewpoints or receptor locations that will require detailed assessment in Stage 2 as a part of the EIS phase.

Stage 1 - Preliminary Assessment comprises the application of the Preliminary Assessment Tools.

The Preliminary Assessment Tools assist in the identification of viewpoint locations where a solar farm may have impacts and warrant further consideration. This also provides the opportunity to identify potential visual impacts to inform and refine the proposed development footprint layout. The tools assist in identifying locations and viewpoints that are likely to experience little to no impacts which is useful in early consultation and ensures that field work and assessments are concentrated in areas with potential visual impacts only.

The Guideline states that *effective and early stakeholder engagement is critical for large-scale solar energy projects* (DPHI, 2022a). Along with the application of Preliminary Assessment Tools in Stage 1 - Preliminary Assessment, the Guideline recommends proponents engage with the local community in the Project’s preliminary stages. Findings from preliminary stakeholder engagement help identify existing community values related to specific viewpoints or key landscape features, and assist in identifying opportunities and constraints related to the design, management, visual impact and mitigation measures.

2.0

Study Method

2.0 Study Method

2.1 Study Method

The following has been undertaken to develop the PVIA in accordance with the Guideline and the Technical Supplement:

Preliminary Visual Impact Assessment:

Preliminary assessment tools have been applied to identify locations or viewpoints with potential views to the solar array. The results of preliminary visual impact assessment identify viewpoint locations that require further detailed assessment. The findings of the preliminary assessment have been included in this PVIA and will form the basis for discussion with the community in the EIS phase of the Project.

2.2 Report Structure

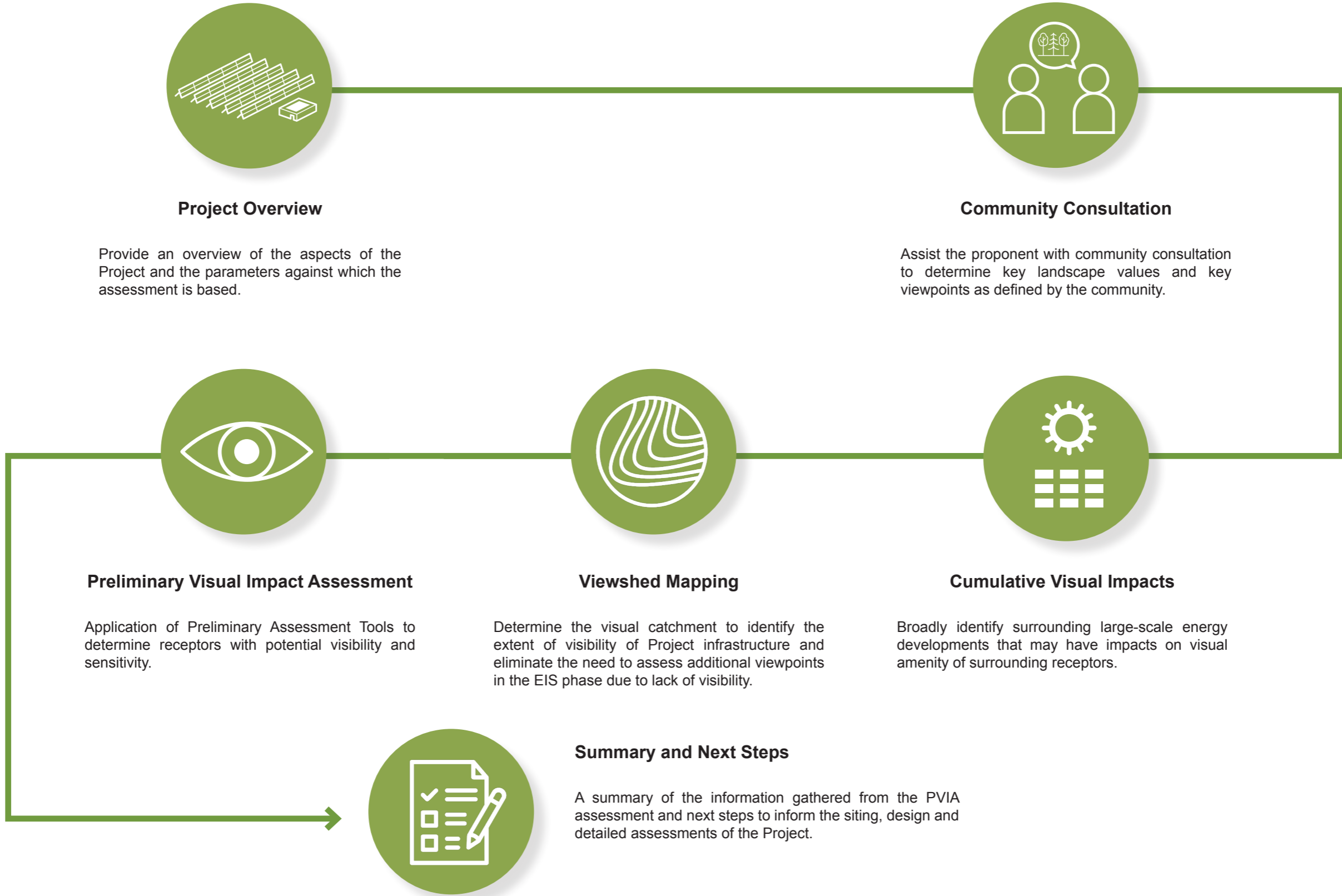
Table 01 provides an overview of the requirements of the Guideline and the Technical Supplement, and where these have been addressed in the PVIA:

Preliminary Visual Impact Assessment Report Structure:	
PVIA Report:	Guideline and Technical Supplement Requirements:
Section 3.0: Project Overview	<i>The assessment must include a full description of the proposed solar energy project design and use maps to show the location of the project in relation to viewpoints and surrounding landscapes identified for analysis.</i>
Section 4.0: Preliminary Visual Impact Assessment and Viewshed Mapping	<i>A Preliminary Visual Assessment must be included in an applicant's scoping report as part of their request for the Secretary's environmental assessment requirements (SEARs). The applicant can use viewshed mapping to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint. The applicant should also consider undertaking a reverse viewshed analysis.</i>
Section 5.0: Cumulative Visual Impacts	<i>The baseline analysis should identify and describe (...) the location of any existing operational or approved large-scale energy developments within a regional and local context, including projects which may have the potential to create direct or indirect cumulative impacts with the project.</i>
Section 6.0: Summary and Next Steps	

Table 01 – Overview of Report Structure

2.3 Steps Undertaken for PVIA

The following process has been undertaken to develop this PVIA:



3.0

Project Overview

3.0 Project Overview

3.1 The Project

The Project comprises of a large-scale solar photovoltaic (PV) generation facility with a generation capacity of approximately up to 264 megawatts (MW) and an associated 110 MW / 440 MWh BESS.

The Project covers an area of approximately 504 hectares (ha). **Figure 01** shows the existing site context and **Figure 02** provides an indicative layout of the Project. The final layout and capacity of the Project will be investigated during the preparation of the EIS and will be selected on the basis of environmental constraints identification, outcomes of stakeholder engagement, engineering assessments and design of project infrastructure.

The height of the solar tracker will be 1.52 m, with rotation angle of +/- 55 degrees. Therefore, the maximum height considering the solar panel will be 2.7 meters above ground level with a pitch of 7 meters. The solar arrays will be mounted to galvanised steel racking frames onto horizontal tracker tubes and will utilise single axis tracking systems, with relatively little soil disturbance required.

3.2 Key Project Components

It is anticipated that the physical layout and design of the Project will comprise the following key infrastructure elements:

- PV modules
- BESS
- Power Conversion Units
- Substation

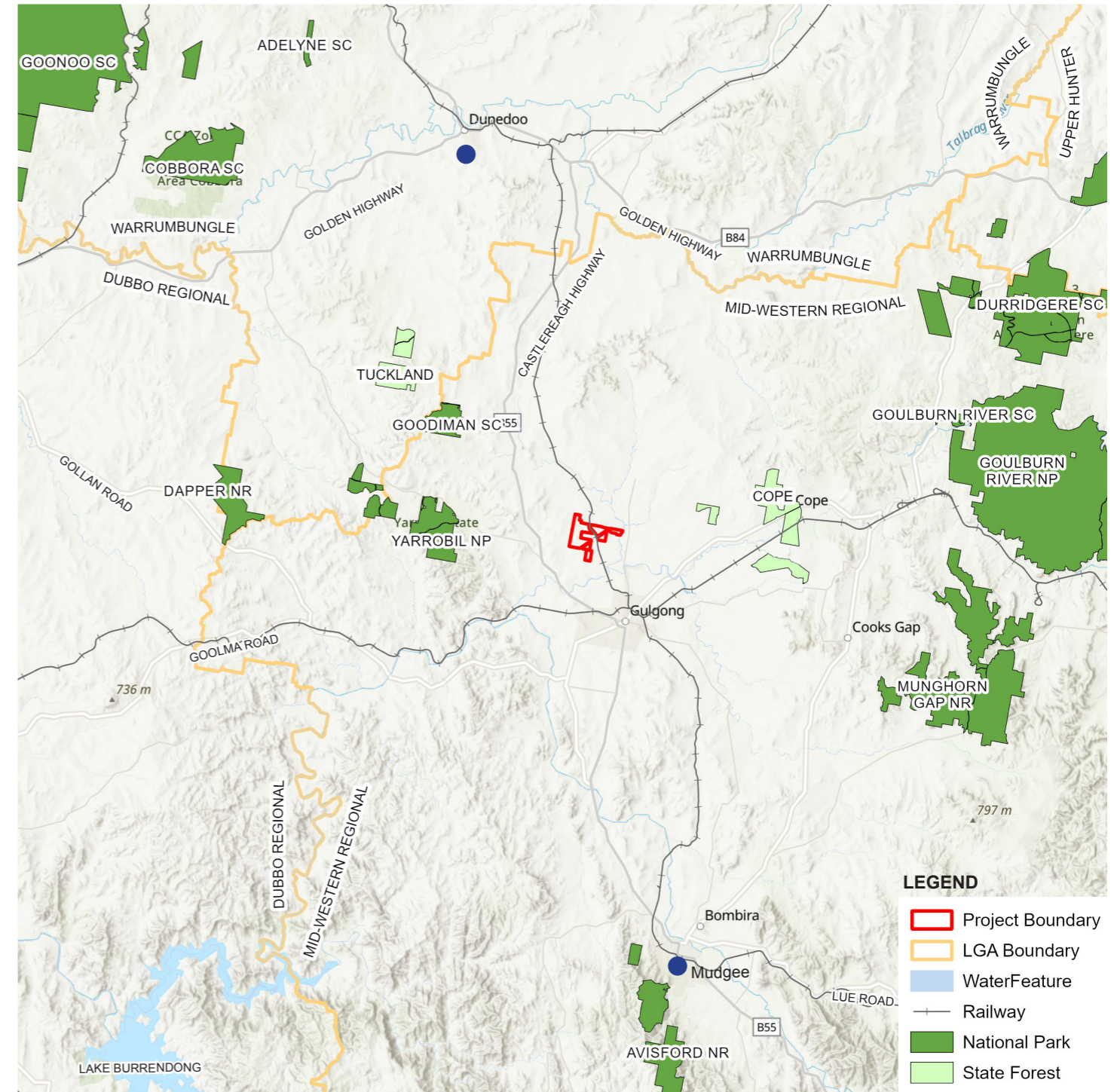
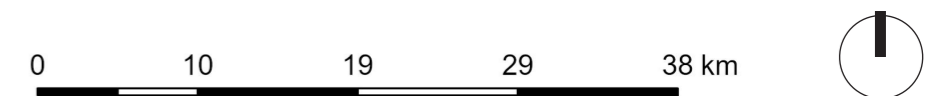
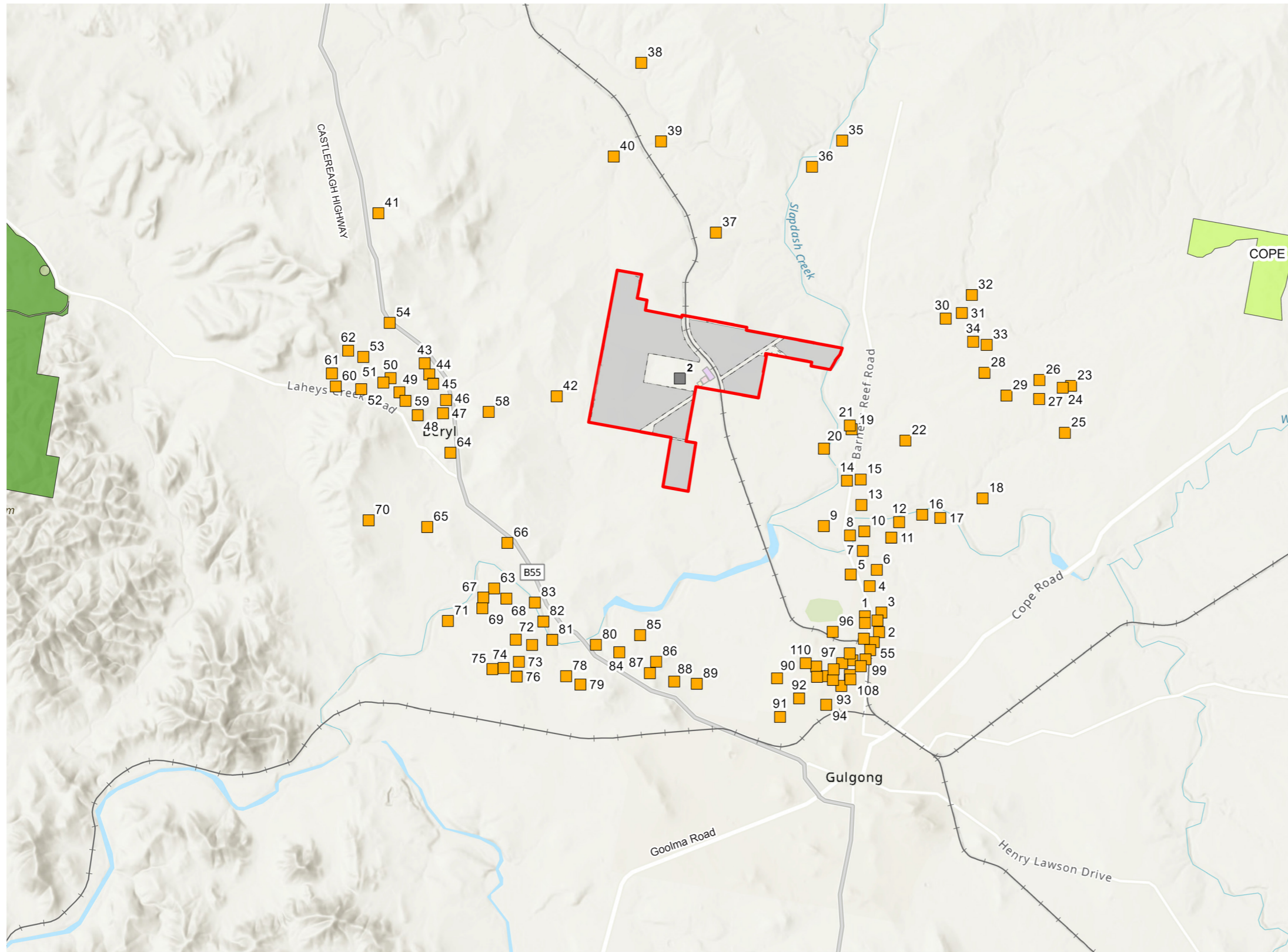


Figure 01 – Project Context
Map Source: ArcGIS, 2024



Project Layout

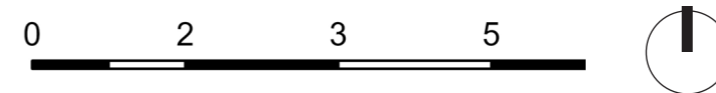
Puggoon Solar Farm and BESS



LEGEND

- Project Boundary
- BESS
- Substation
- Switch Station
- PV Array
- Non-Associated Dwellings
- Associated Dwellings
- Railway
- National Park
- State Forest

Figure 02 – Project Layout
Imagery Source: ArcGIS, 2024



4.0

Preliminary Visual Impact Assessment

4.0 Preliminary Visual Impact Assessment

4.1 Preliminary Visual Impact Assessment Overview

The Technical Supplement states: ‘a preliminary visual assessment must be included in an applicant’s scoping report as part of their request for the Secretary’s environmental assessment requirements (SEARs)’ (DPHI, 2022b). Further, it states: ‘to use the preliminary assessment tools; identify all viewpoints from public roads and rail lines within 2.5 km of the proposed development; identify other public and private viewpoints within 4 km of the proposed development.’ (DPHI, 2022b)

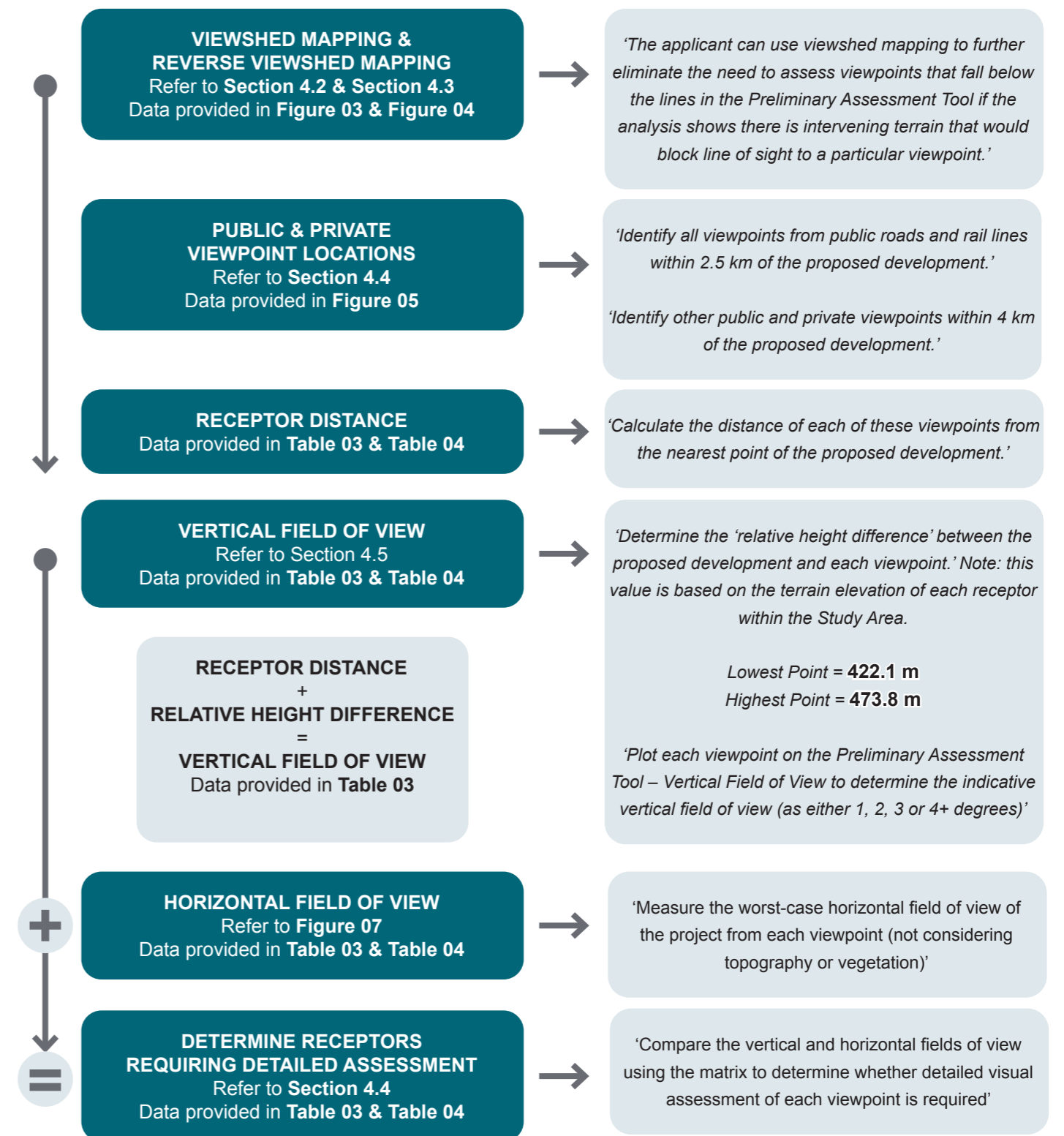
The preliminary assessment tools must be used to identify viewpoints that require detailed assessment in the EIS. The tools can be used to eliminate the need to assess viewpoints that are likely to experience very low impacts. This is assessed using on the vertical and horizontal field of view that a development is likely to occupy when viewed from each viewpoint and is influenced by distance, height elevation changes, and width of a project (DPHI, 2022).

Simple Assessment:

The adjacent flowchart provides an overview of the requirements of the Simple Assessment (in accordance with the Section 3.1.1 of the Technical Supplement) and the relevant sections of the report where these have been addressed.

Intermediate Assessment:

Although not a requirement of the Scoping Phase, an intermediate assessment has been undertaken for the Project from representative viewpoints to indicate receptors requiring further detailed assessment in the EIS Phase of the Project. Refer to **Section 4.9**.



4.2 Viewshed Mapping

A viewshed map identifies all areas from which a Project may be viewed. Viewshed mapping can be achieved by using geographic information systems (GIS) that account for topography and line of sight between viewpoints and the Project.

The purpose of the viewshed map is to further eliminate the need to assess viewpoints that fall below the lines in the Preliminary Assessment Tool if the analysis shows there is intervening terrain that would block line of sight to a particular viewpoint.

Viewshed mapping was undertaken for the Project to eliminate viewpoint locations that will not have a line of sight to the Project (refer to **Figure 03**). It is important to note that the viewshed map provides an assessment based on topography alone and does not take into account intervening elements such as vegetation and structures. The viewshed map, therefore, represents a theoretical worst case scenario.

Viewshed mapping has been undertaken based on a maximum panel height of 2.7 m.

Summary of Viewshed Map:

The following provides a summary of the viewshed map prepared for the Study Area:

- Due to the undulating terrain within and around the Project, the viewshed map indicates that majority of the Project will theoretically be visible to the immediate south and east of the Project.
- Majority of non-associated dwellings to the north, west and southwest of the Project theoretically have low visibility of the Project (Up to 20% visibility).
- Majority of non-associated dwellings to the east and southeast of the Project theoretically have a high visibility of the Project (Up to 90% visibility in some areas).
- Elevated areas to the southeast will theoretically have the most visibility of the Project. These areas are located approximately between 3.5 and 5.0km from the Project.
- Castlereagh Highway and Barneys Reef Road are major road corridors located within 2.5 km of the Project. Views are limited along Castlereagh Highway due to topography. Visibility of the Project along Barneys Reef Road is limited to areas in proximity to the Project, only a small portion of the road would have visibility greater than 30% (see **Figure 03**).

4.3 Reverse Viewshed Mapping

The Technical Supplement states: *'The applicant should also consider undertaking a reverse viewshed analysis. This can be a useful tool to refine the project design process to reduce any significant impacts. It can also be used to communicate the visibility of certain parts of the project and aid consultation with the community. This analysis should be used to highlight parts of the project that can be seen from the greatest number of viewpoints'* (DPHI, 2022b).

Figure 04 represents a reverse viewshed map that takes into account a total of 110 non-associated dwellings identified within 4 km of the Project. This figure shows parts of the Project that are likely to be visible from these non-associated dwellings. This assessment also represents a bare ground scenario, i.e., a landscape without intervening elements such as vegetation and structures.

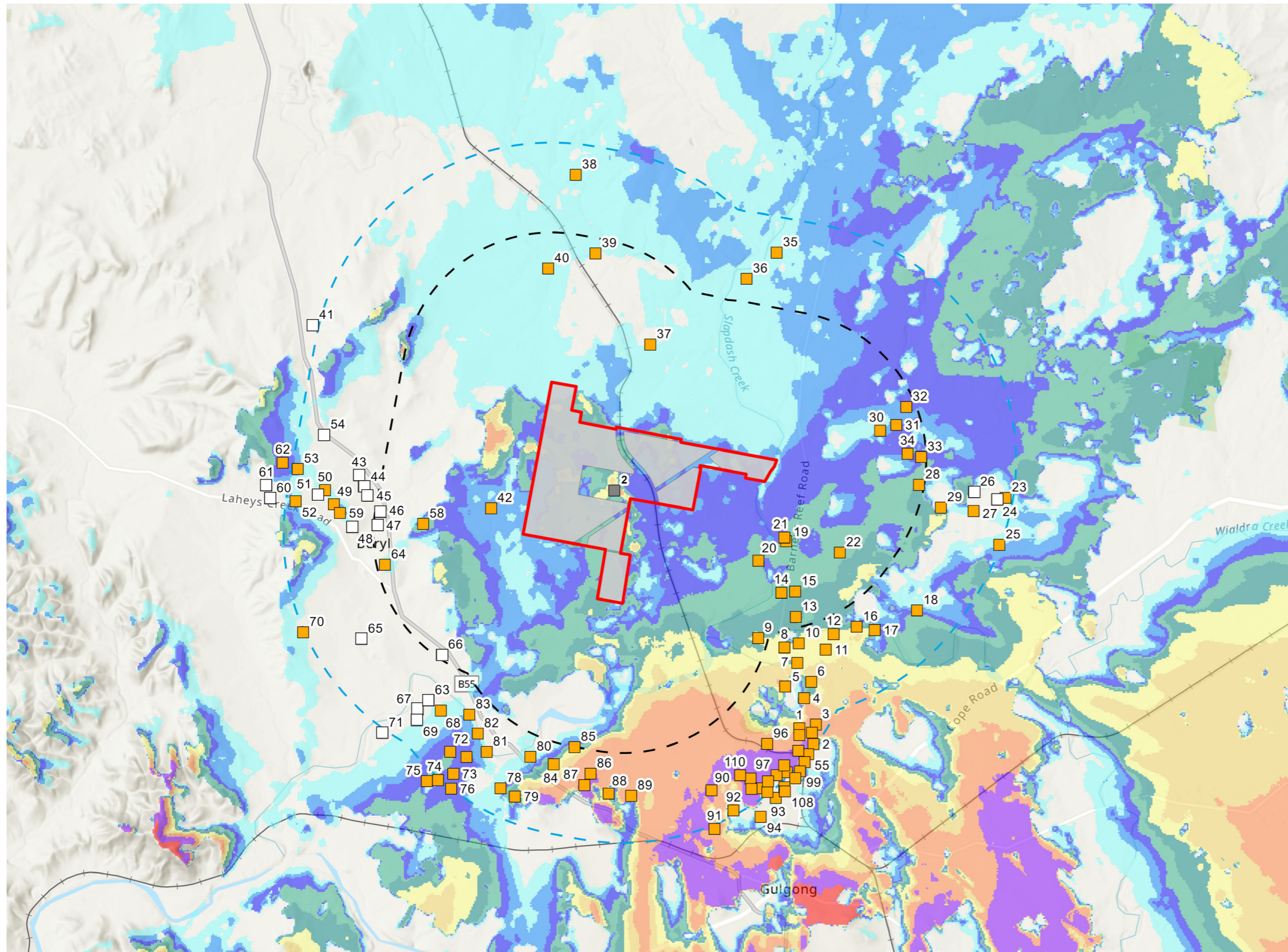
Summary of Reverse Viewshed Map:

The following provides a summary of the reverse viewshed map prepared for the Project Area:

- There are no areas identified in the Project Area with visibility from all 110 non-associated dwellings in the Study Area.
- Up to 55 non-associated dwellings will theoretically view the majority of the western portions of the Project, located west of the railway tracks (see **Figure 04**).
- Up to 66 non-associated dwellings will theoretically view the eastern portions of the Project due to the undulating topography of the area.

Viewshed Map

Puggoon Solar Farm and BESS

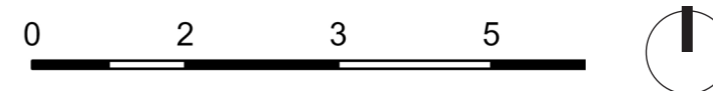


LEGEND

- Project Boundary
 - PV Array
 - Non-Associated Dwellings
 - Non-associated dwelling with no line of sight.
No further assessment required.
 - Associated Dwellings
 - 4.0 km from the nearest Solar Array
 - 2.5 km from the nearest Solar Array
 - Railway
- ZVI (Based on 2.7m Panel Height)
- No Visibility
 - 1%-10% Visibility
 - 10%-20% Visibility
 - 20%-30% Visibility
 - 30%-40% Visibility
 - 40%-50% Visibility
 - 50%-60% Visibility
 - 60%-70% Visibility
 - 70%-80% Visibility
 - 80%-90% Visibility
 - 90%-100% Visibility

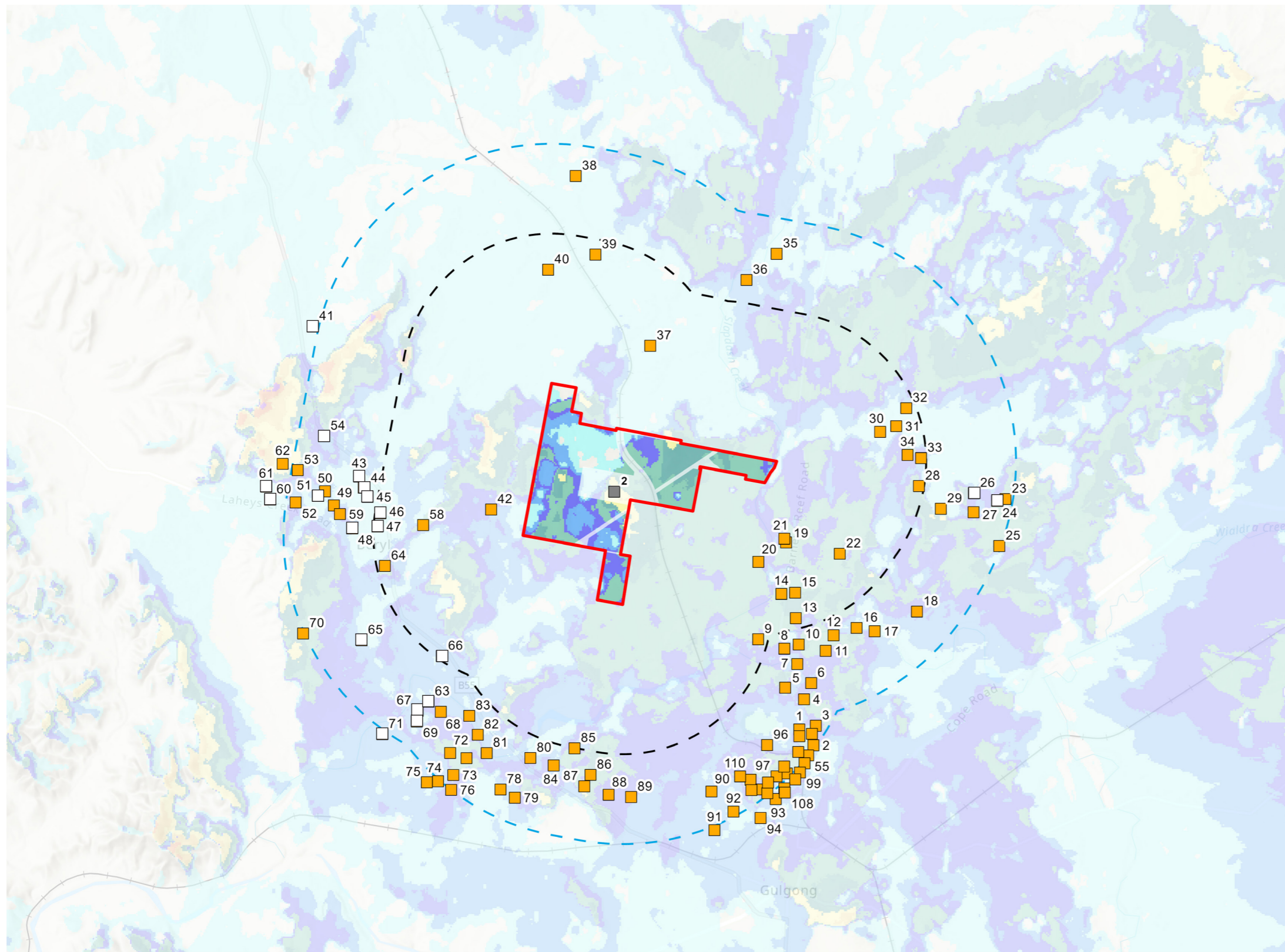
Note: Viewshed Map is a preliminary assessment tool that represents a bare ground scenario - i.e. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst-case scenario.

Figure 03 – Viewshed Map
Imagery Source: ArcGIS, 2024



Reverse Viewshed Map

Puggoon Solar Farm and BESS



LEGEND

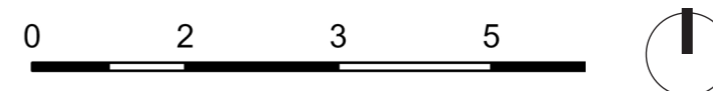
- Project Boundary
- Non-Associated Dwellings
- Non-associated dwelling with no line of sight.
No further assessment required.
- Associated Dwellings
- 4.0 km from the nearest Solar Array
- 2.5 km from the nearest Solar Array
- Railway

Reverse ZVI (Based on 1.5m Receptor Height)

- No Visibility
- 1-<11 dwellings
- 11-<22 dwellings
- 22-<33 dwellings
- 33-<44 dwellings
- 44-<55 dwellings
- 55-<66 dwellings
- 66-<77 dwellings
- 77-<88 dwellings
- 88-<99 dwellings
- 99-110 dwellings

Note: Viewshed Map is a preliminary assessment tool that represents a bare ground scenario - i.e. a landscape without screening, structures or vegetation. As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the map is based solely on topographic information. Therefore this form of mapping should be acknowledged as representing the worst-case scenario.

Figure 04 – Reverse Viewshed Map
Imagery Source: ArcGIS, 2024



4.4 Viewpoint Selection and Preliminary Assessment Tool

4.4.1 Assessment Parameters

The Technical Supplement states: “*The calculations can be based on either the project area, or the development footprint depending on the level of information available at the time. A more refined approach that uses the development footprint, may result in less viewpoints requiring assessment.*” (DPHI, 2022b).

As stated in the Technical Supplement, Private receptors (non-associated dwellings) were assessed to within 4 km of the Project, and road and rail receptors (Public Receptors) were assessed within 2.5 km of the Project (DPHI 2022b, p.12).

The following provides an overview of the viewpoint selection process. Viewpoints have been illustrated in **Figure 05**. Further refinement of the viewpoints will be undertaken in the preparation of the LVIA.

4.4.2 Public Receptors

From a total of 15 public receptor locations selected within the Study Area, 13 public receptor locations have been selected to represent roads and rail receptors within 2.5 km of the Project. Two (2) additional key public receptors have been selected between 4 km and 5 km of the Project to represent a preliminary visual impact from the Project at The People’s Park (VPA15), and Gulgong Turf Club (VPA14) (see **Table 04**).

4.4.3 Other Public and Private Receptors

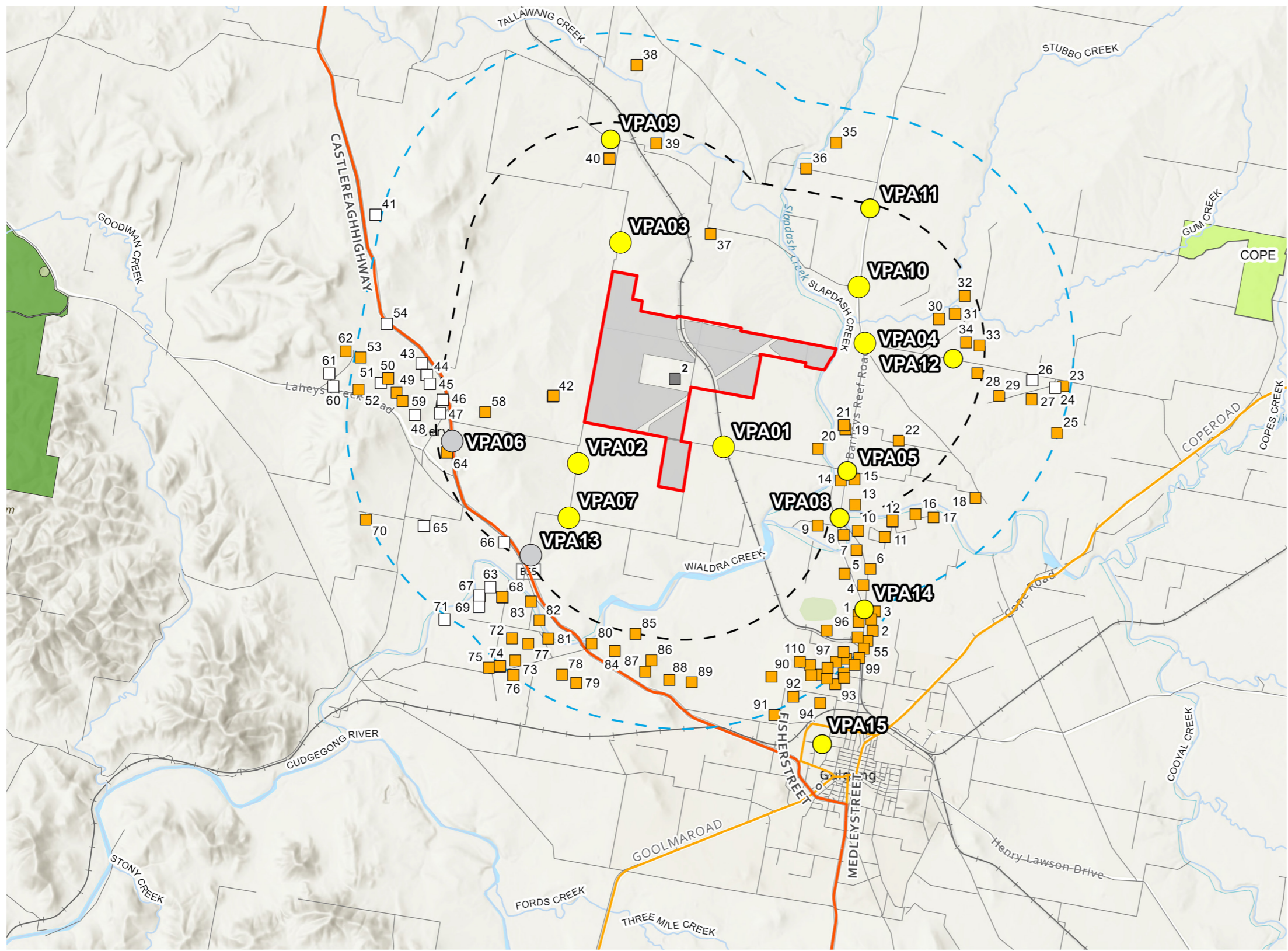
In accordance with the Technical Supplement, other public and private receptors within 4 km of the Project Area must be identified and assessed. 110 non-associated dwellings were identified within 4 km of the Project.

4.4.4 Additional Viewpoints

The Technical Supplement states: “*Additional viewpoints should be considered if ancillary infrastructure, such as substations, have the potential to cause impacts beyond the distances prescribed in the tool.*” (DPHI, 2022b). This will be assessed once ancillary infrastructure layout has been confirmed. Detailed assessment from the two (2) locations outside 4km from the Project will be carried out in the EIS stage if deemed necessary. These include The People’s Park (VPA15) and Gulgong Turf Club (VPA14).

Public and Private Receptor Locations

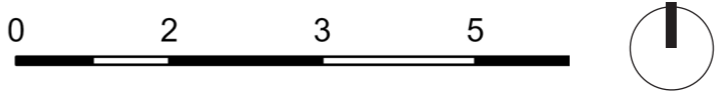
Puggoon Solar Farm and BESS



LEGEND

- Project Boundary
- PV Array
- Public Viewpoints
- Non-Associated Dwellings
- Associated Dwellings
- 4.0 km from the nearest Solar Array
- 2.5 km from the nearest Solar Array
- Primary_Road
- Arterial_Road
- Sub Arterial Road
- Watercourse
- Railway
- National Park
- State Forest
- Non-associated dwelling with no line of sight (based on ZVI). No further assessment required.
- Public Viewpoint with no line of sight (based on ZVI). No further assessment required.

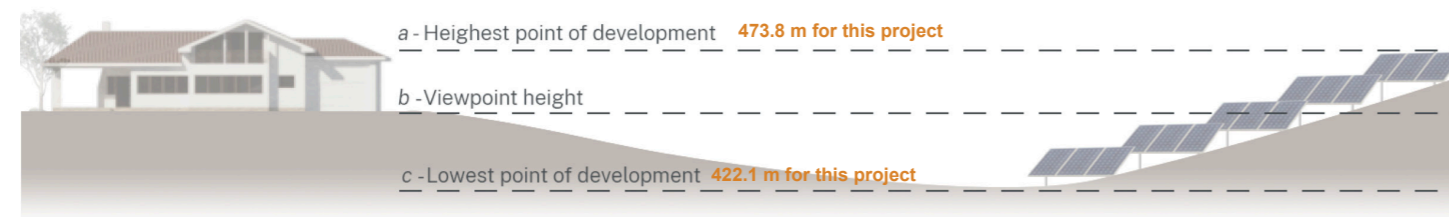
Figure 05 – Public and Private Receptor Locations
Imagery Source: ArcGIS, 2024



4.5 Vertical Field of View Calculation

As per the Technical Supplement, the image below illustrates the method of calculation for the relative height difference for each receptor location. The vertical field of view sector (1, 2, 3 or 4 degrees) is determined by combining the receptor distance and the relative height difference (see **Figure 06**).

Project located above and below viewpoint (a - c)



Project located above viewpoint (a - b)



Project located below viewpoint (b - c)



Figure 06 – Relative Height Calculations
Imagery Source: DPHI, 2022

4.6 Horizontal Field of View Calculation

As per the Technical Supplement, **Figure 07** below illustrates how the horizontal field of view is calculated for each receptor location. For the purpose of this report, the horizontal field of view has been calculated based on the project boundary to provide a worst-case scenario assessment. This will be refined in the EIS phase.

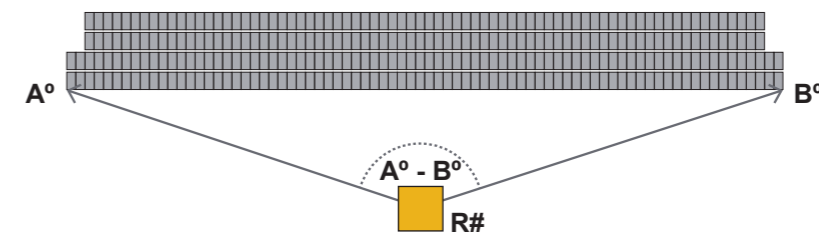


Figure 07 – Horizontal Field of View Calculations
Imagery Source: DPHI, 2022

4.7 Assessment Requirements

As stated in the Technical Supplement, **Table 02** is used to determine whether a detailed visual assessment of each receptor location is required by comparing the vertical and horizontal fields of view for each receptor location. This will be refined in the EIS phase.

Horizontal FOV	1° Vertical FOV	2° Vertical FOV	3° Vertical FOV	4° + Vertical FOV
1 - 10 °	No assessment required	No assessment required	No assessment required	No assessment required
11 - 20 °	No assessment required	No assessment required	No assessment required	Assessment required
21 - 30 °	No assessment required	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required
31 - 40 °	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required for all viewpoints except road / rail	Assessment required
41 - 50 °	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required	Assessment required
51 - 60 °	No assessment required	Assessment required for all viewpoints except road / rail	Assessment required	Assessment required
61 - 70 °	No assessment required	Assessment required	Assessment required	Assessment required
71 - 130 °	Assessment required for all viewpoints except road / rail	Assessment required	Assessment required	Assessment required
130 ° +	Assessment required	Assessment required	Assessment required	Assessment required

Table 02 – Preliminary Visual Assessment Tool - Assessment Requirements
Source: DPHI, 2022

4.8 Results of Simple Assessment Tools

The simple assessment tool was applied to a total of 110 non-associated dwellings within 4 km of the Project. **Appendix A** provide a summary of these results. The assessment identified a total of 13 non-associated dwellings will require an intermediate assessment.

4.9 Results of Intermediate Assessment Tools

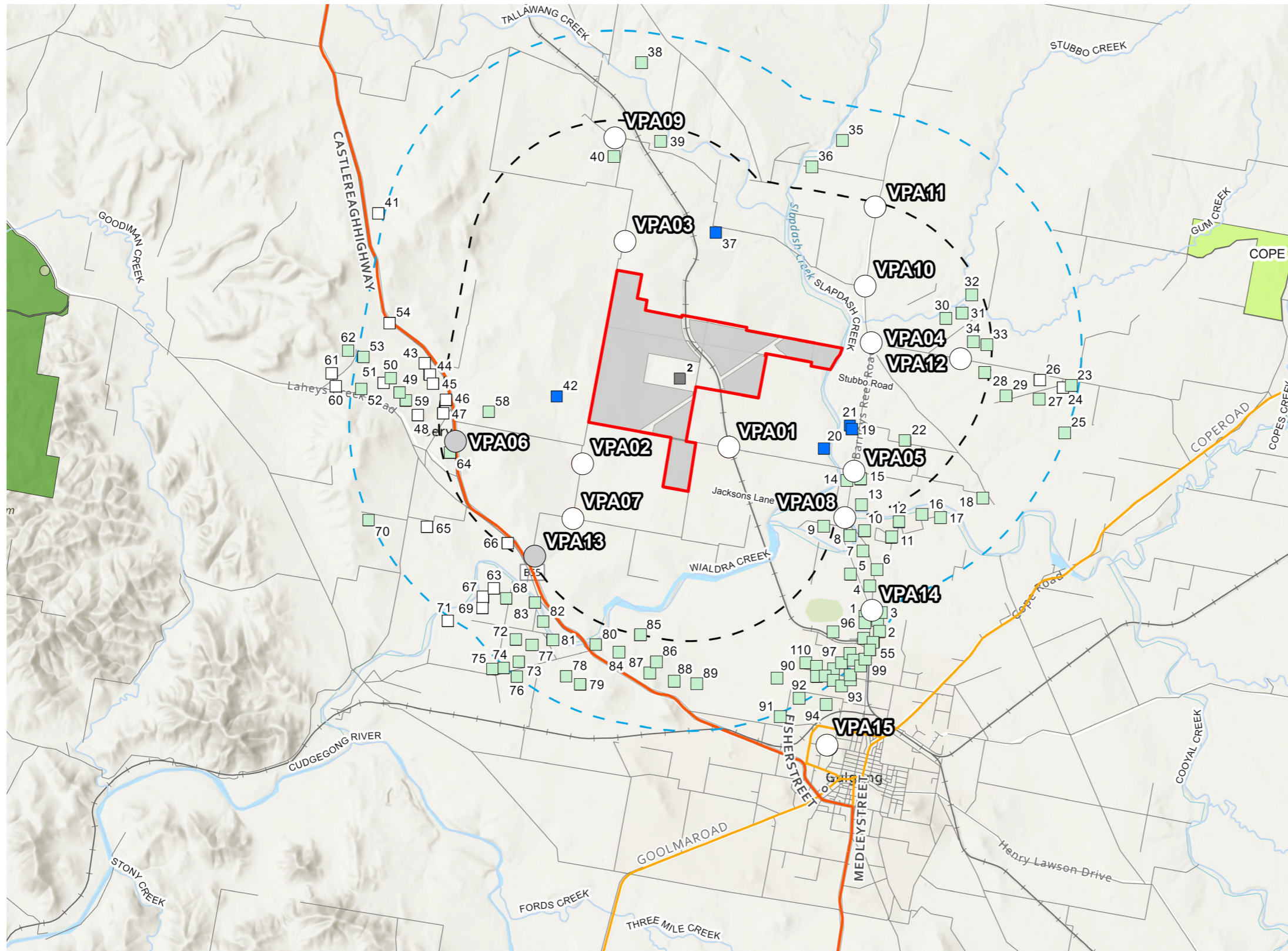
Representative intermediate assessments were prepared in accordance with the requirements of the Technical Supplement from 15 public receptors. The intermediate assessments concluded no further assessment would be required in the EIS from the public receptors. Where located close to the public receptor, assumptions have been made that dwellings would return a similar result. **Table 3** below and **Figure 08** summarises the results of the representative assessment which determined 8 of the 13 non-associated dwellings would not require any further assessment in the EIS. Five (5) dwellings will require assessment in the EIS. Refer to **Appendix B**.

Non-associated Dwellings	Representative Intermediate Assessment (Public VP)	Visual Impact Rating based on Intermediate Assessment:	Assessment required in EIS?
8, 9, 10	VPA10	Very Low	No
13, 14, 15	VPA05	Very Low	No
36	VPA11	Very Low	No
58	VPA06	Very Low	No
19, 20, 21	N/A	TBC	Yes
37	N/A	TBC	Yes
42	N.A	TBC	Yes

Table 03 – Overview of results of intermediate assessment on non-associated dwellings

Results of Preliminary Assessment

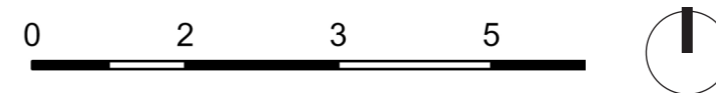
Puggoon Solar Farm and BESS



LEGEND

- Project Boundary
- PV Array
- Associated Dwellings
- 4.0 km from the nearest Solar Array
- 2.5 km from the nearest Solar Array
- Primary_Road
- Arterial_Road
- Sub Arterial Road
- Watercourse
- Railway
- National Park
- State Forest
- Non-associated dwelling identified for further assessment in EIS.
- Non-associated dwelling with no line of sight (based on ZVI). No further assessment required.
- Non-associated dwelling with no further assessment required based on simple assessment / representative intermediate assessment.
- Public Viewpoint with no line of sight (based on ZVI). No further assessment required.
- Public Viewpoint with no further assessment required based on intermediate assessment.

Figure 08 – Results of Preliminary Assessment
Imagery Source: ArcGIS, 2024



5.0

Cumulative Visual Impact

5.0 Cumulative Visual Impact

5.1 Overview of Potential Cumulative Impacts

The Project is located within the Mid-Western Regional LGA and the Central-West Orana REZ. In accordance with the *Cumulative Impact Assessment Guidelines* (DPHI, 2022d), the area selected to assess relevant cumulative impacts from other developments should not be unnecessarily large or include areas where the cumulative impacts are likely to be negligible, relative to the baseline condition of the relevant Project. Visibility research suggests turbines and objects recede into the background in terms of visibility at 8 km (DPHI 2021).

The occurrence of large-scale renewable energy projects within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed as these projects could become part of the existing landscape. It is important to determine whether the effect of multiple projects and other major infrastructure within the region would combine to become the dominant visual element, altering the perception of the general landscape character. **Figure 9** shows other renewable energy projects that are currently proposed, operating and under construction over a broader regional context.

5.2 Nearby Large-Scale Renewable Energy Projects

Currently, 26 other renewable energy projects have been identified in the area (see **Table 05**). Nine (9) of these projects are located within 10 km of the Project. Barneys Reef Wind Farm (BRWF), Bellambi BESS (BLBS), Beryl BESS (BRBS), Beryl Solar Farm (BSF), Mayfair Solar Farm (MSF), Mavis Solar Farm, Narragamba Solar farm, Stubbo Solar Farm (SSF) and Tallawang Solar Farm (TSF) are located in close proximity to the Project (see **Table 04**).

Given the distance, intervening elements such as existing vegetation, built form and weather conditions would obscure visibility. As all the other large-scale renewable projects are located in excess of 10 km it unlikely that all the other projects located beyond 10 km would be visible simultaneously.

Cumulative visual impacts of all the nine (9) large-scale renewable projects in relation to the Project will be assessed in detail during the EIS stage.

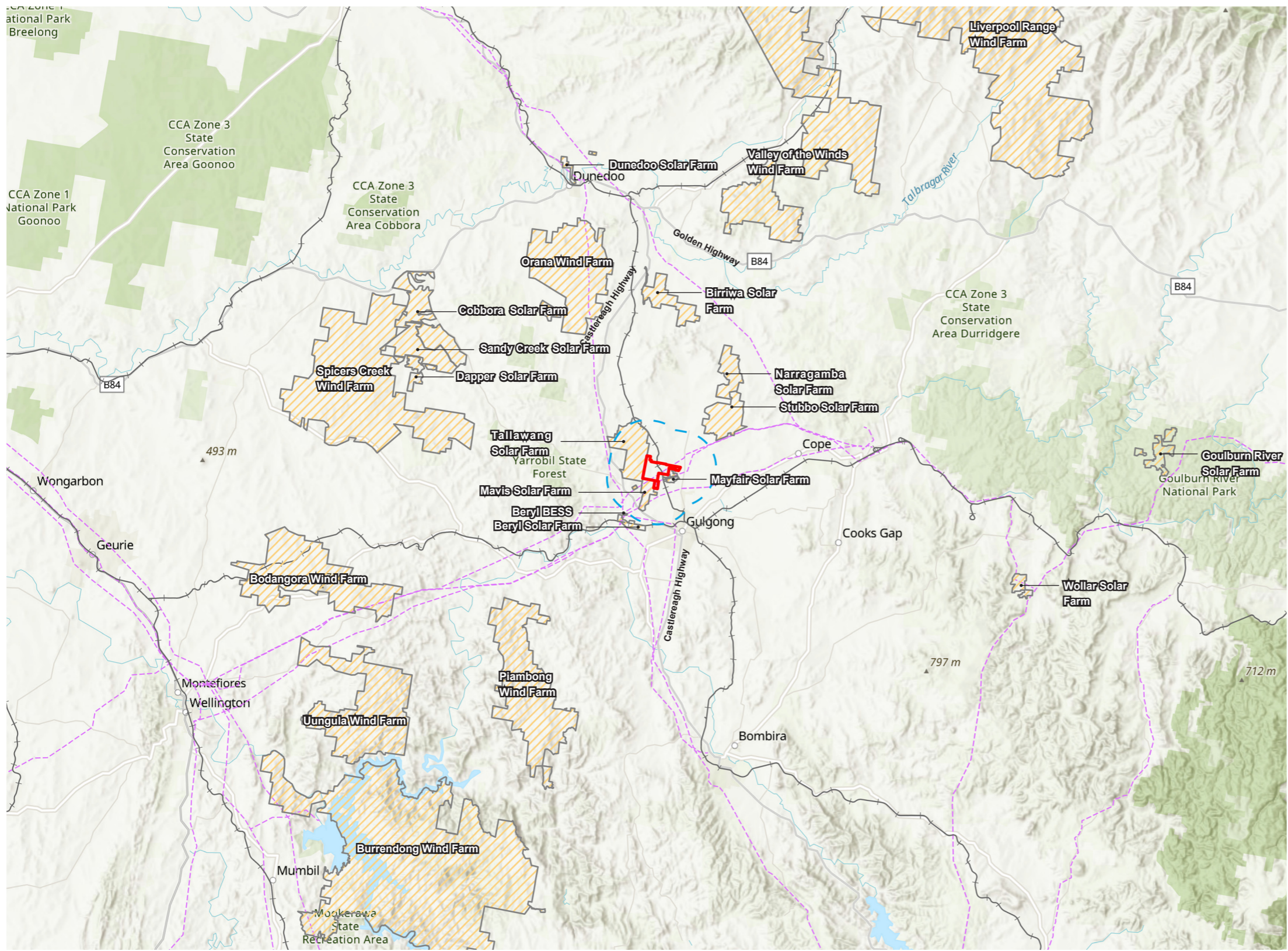
5.3 Cumulative Impact on Broader Landscape Character

The re-occurrence of renewable energy projects has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. It is important to determine whether the effect of major infrastructure projects within the region would combine to become the dominant visual element, altering the perception of the general landscape character (DPHI 2021).

With respect to the Project, it is likely that several projects would be visible simultaneously because of the proximity to each other. Further assessment of the cumulative visual impact will be detailed in the EIS, along with potential mitigation and management measures that can be employed to reduce cumulative impacts.

<i>Name of Project</i>	<i>Developer</i>	<i>Project Type</i>	<i>Indicative Scale</i>	<i>Proximity to Project</i>	<i>Status</i>
Tallawang Solar Farm	RES	Solar	500 MW of solar farm capacity with 500 MW / 1,000 MWh BESS	Adjacent to the	More Information Required
Mayfair Solar Farm & BESS	Elgin Energy	Solar	60 MW of solar capacity with a 60 MWh BESS	Adjacent to the	Prepare EIS
Mavis Solar Farm & BESS	Metka-EGN Australia	Solar	250 MW of solar capacity with a 100 MW / 200 MWh BESS	Adjacent to the	Prepare EIS
Stubbo Solar Farm & BESS	UPC Renewables Australia	Solar	400 MW of solar capacity with a 200 MWh BESS	4.6 km	Under Construction
Sandy Creek Solar Farm	Lightsource bp	Solar	750 MW of solar farm and BESS capacity	4.6 km	Response to Submissions
Beryl Solar Farm	First Solar Pty Ltd	Solar	95 MW of solar capacity	5.0 km	Operational
Narragamba Solar Farm	Acen Australia	Solar	320 MW of solar capacity with a potential BESS with capacity of 200	9.0 km	Prepare EIS
Birriwa Solar Farm & BESS	Acen Australia	Solar	600 MW of solar capacity with a coupled BESS of up to 600 MW /	15.0 km	Approved
Avonside Solar Farm	EEW Eco Energy World Pty Ltd	Solar	180 MW of solar capacity with a 400MW BESS	18.0 km	Prepare EIS
Dapper Solar Farm	Origin Energy Power Limited	Solar	300 MW of solar capacity	30.0 km	Prepare EIS
Cobbora Solar Farm	Marble Energy	Solar	700 MW of Solar Energy with 200 MW of BESS	31.0 km	Prepare EIS
Dunedoo Solar Farm	Sun Spot 4 Pty Ltd	Solar	55 MW of solar capacity	32.0 km	Approved
Wollar Solar Farm & BESS	Wollar Solar Development	Solar	280 MW of solar capacity with a 30 MWh BESS	40.0 km	Under Construction
Goulburn River Solar Farm & BESS	Lightsource Development Services Australia Pty Ltd	Solar	450 MW of solar capacity with 1,030 MW / 2,060 MWh	50.0 km	Approved
Orana Wind Farm & BESS	ACIONA Energy Australia Global	Wind	524 MW of wind capacity with a 200 MWh BESS	15.0 km	Prepare EIS
Piambong Wind Farm & BESS	Piambong Wind Farm	Wind	551 MW of wind capacity with a 200 MWh BESS	18.0 km	Prepare EIS
Spicers Creek Wind Farm	Spicers Creek Wind Farm Pty Ltd	Wind	700 MW of wind capacity, two battery storage of 400 MW capacity	19.0 km	Recommendation
Valley of the Winds Wind Farm	UPC Renewables Australia Pty Ltd	Wind	800 MW of capacity	26.0 km	Assessment
Bodangora Wind Farm	Inflgen Energy Development Pty Ltd	Wind	120 MW of capacity	29.0 km	Operational
Uungula Wind Farm	Uungula Wind Farm Pty Ltd	Wind	414 MW capacity	34.0 km	Under Construction
Burrendong Wind Farm	Burrendong Wind Farm	Wind	400-500 MW of wind capacity	41.0 km	Response to Submissions
Liverpool Wind Farm	Epuron / Tilt Renewables	Wind	960 MW of wind capacity	49.0 km	Approved
Bellambi Heights BESS	Vena Energy Australia	Battery Energy Storage	Generation capacity of 408 MW (two 204 MW BESS generating units)	1.2 km	Approved
Beryl BESS	Ratch-Australia Corporation	Battery Energy Storage	100 MW / 200 MWh BESS	3.9 km	Response to Submissions

Table 04 – Nearby State Significant Developments
Source: ERM



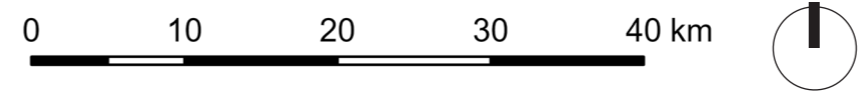
Nearby Renewable Energy Projects

Puggoon Solar Farm and BESS

LEGEND

- Project Boundary
- 4.0 km from the nearest Solar Array
- Nearby State Significant Developments
- Railway
- Existing Transmission Lines

Figure 09 – Nearby Renewable Energy Projects
Imagery Source: ArcGIS, 2024



6.0 Summary and Next Steps

6.1 Summary of Findings

Due to the relatively undulating topography that is typical of the surrounding landscape, the majority of the Project is likely to be visible only from areas close to the Project, especially to the east, south and southeast. Undulations within the existing landscape will potentially limit visibility from receptors that are to the north and west of the Project. Preliminary desktop analysis identifies that intervening vegetation surrounding nearby dwellings and roadsides will likely fragment views of the Project.

The Preliminary Visual Assessment considered a 4 km buffer from the Project in order to identify preliminary visual impacts on surrounding receptors. 110 non-associated receptors were identified within 4 km of the Project. Application of the Preliminary Assessment Tools indicates that a detailed assessment is required for five (5) non-associated receptors within 4 km. No public receptors will require additional assessment in the EIS Phase.

6.2 Next Steps

An LVIA will be prepared in accordance with the Guideline and the Technical Supplement. During the preparation of the LVIA, detailed site investigations will be undertaken from areas identified in the preliminary assessment as having potential visibility towards the Project, including receptors identified for a detailed assessment. This process will be undertaken using the procedures outlined in the following guidelines:

- *Large-Scale Solar Energy Guideline* (August 2022)
- *Technical Supplement Landscape and Visual Impact Assessment - Large-Scale Solar Energy Guideline* (August 2022)
- Environmental Planning and Assessment Regulation 2021
- Mid-Western Regional Local Environmental Plan (LEP) 2012
- State Environmental Planning Policy (Transport and Infrastructure) 2021 (Transport and Infrastructure SEPP).
- Cumulative Impact Assessment Guidelines for State Significant Development (October 2022).

Specialised modelling tools and visualisations (including photomontages) will be developed to illustrate

potential views of the Project from key public and private viewpoints identified through this report. In addition site inspections will be undertaken from key public viewpoints identified as requiring further assessment.

The LVIA will include an assessment of the landscape and visual impact resulting from all associated infrastructure and ancillary structures, and consideration of cumulative impacts of nearby infrastructure. Further assessment will be undertaken to assess potential impacts of glint and glare using industry standard methodology.

Cumulative impacts of surrounding renewable energy projects will also be assessed in the LVIA in order to identify impacts on the broader landscape character of the region. Currently, nine (9) large-scale project were identified close to the Project. Detailed assessment of the impacts of these projects will be undertaken in the EIS phase.

On-site and off-site visual landscape mitigation strategies will be developed in response to the assessment and community consultation. The purpose of the mitigation strategies will be to ensure the Project is integrated into the existing landscape and to mitigate identified visual impacts to an acceptable level.

7.0 References

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A

Simple Assessment Results

Vertical Field of View Private Receptors

Puggoon Solar Farm and BESS

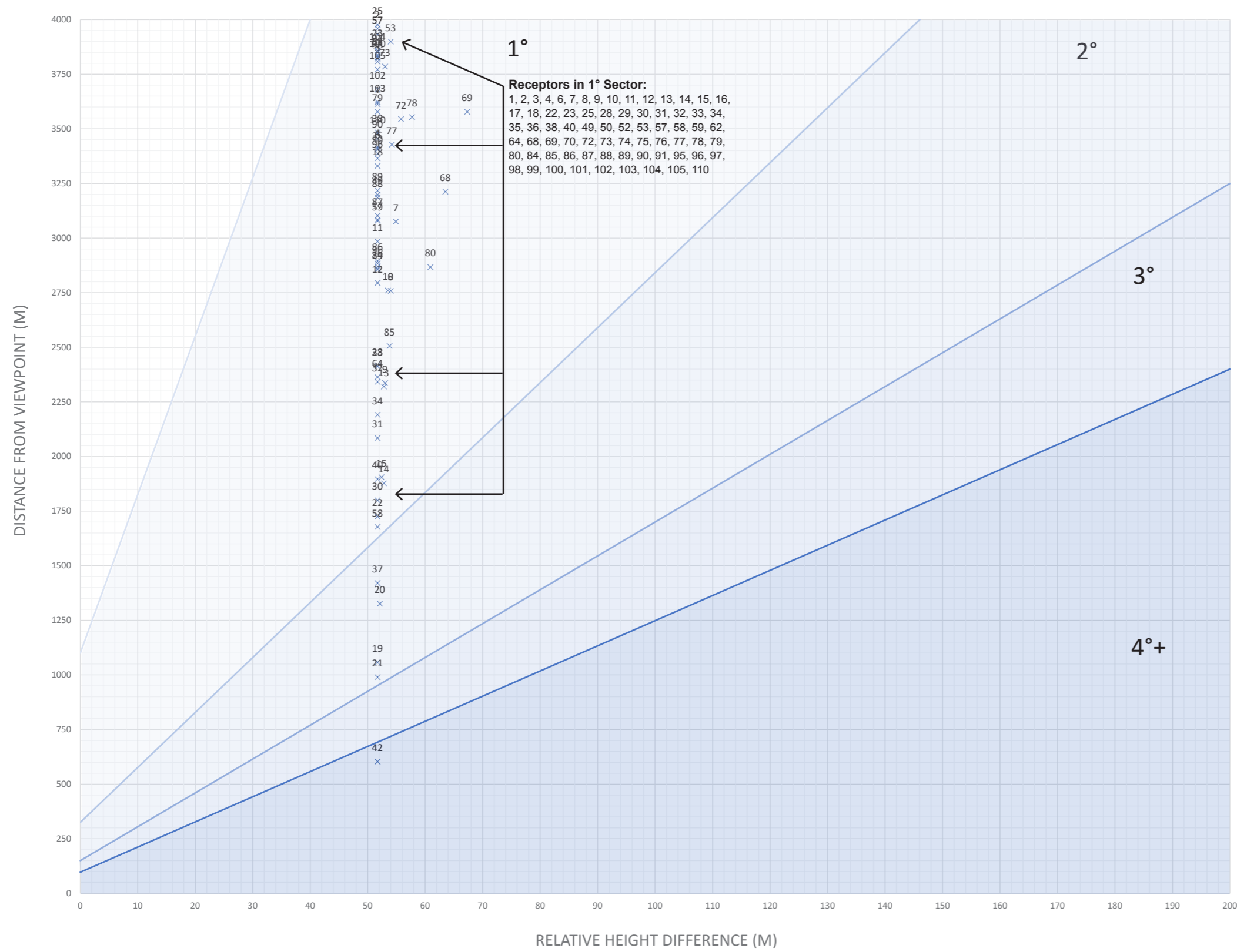


Figure 10 – Vertical Field of View - Private Receptors

Private Viewpoints/Receptors							
RECEPTOR ID	Receptor Elevation (m)	Relative Height Difference (m)	Distance to the Solar Panel (m)	Vertical Field of View (FOV) X°	Horizontal Field of View (FOV) X°	Visibility (based on viewshed mapping)	Detailed Assessment Required?:
1	430.3	51.7	3,613	1	52	70-80%	NO
2	437	51.7	3,959	1	48	1-10%	NO
3	432.2	51.7	3,808	1	51	70-80%	NO
4	429.1	51.7	3,418	1	57	50-60%	NO
6	425.6	51.7	3,411	1	60	50-60%	NO
7	418.9	54.9	3,076	1	66	50-60%	NO
8	419.8	54	2,758	1	73	50-60%	YES
9	420.8	53	2,337	1	81	50-60%	YES
10	420.3	53.5	2,760	1	71	50-60%	YES
11	425.7	51.7	2,985	1	63	50-60%	NO
12	424.2	51.7	2,794	1	64	50-60%	NO
13	421	52.8	2,320	1	79	40-50%	YES
14	421	52.8	1,877	1	92	30-40%	YES
15	421.4	52.4	1,905	1	86	40-50%	YES
16	424.8	51.7	2,869	1	59	20-30%	NO
17	426.3	51.7	3,085	1	54	10-20%	NO
18	427.1	51.7	3,330	1	46	10-20%	NO
19	424.5	51.7	1,058	2	104	30-40%	YES
20	421.7	52.1	1,326	2	117	20-30%	YES
21	423.2	51.7	990	2	106	30-40%	YES
22	429.3	51.7	1,725	1	69	30-40%	NO
23	446.9	51.7	3,874	1	48	1-10%	NO
25	439.2	51.7	3,977	1	30	1-10%	NO
28	447.4	51.7	2,413	1	38	20-30%	NO
29	444.7	51.7	2,856	1	35	1-10%	NO
30	432	51.7	1,800	1	42	10-20%	NO
31	435.7	51.7	2,085	1	39	10-20%	NO
32	435.3	51.7	2,342	1	38	20-30%	NO
33	440.5	51.7	2,415	1	38	20-30%	NO
34	439.7	51.7	2,191	1	39	20-30%	NO
35	436.7	51.7	3,405	1	60	1-10%	NO

Table 05 – Preliminary Visual Assessment Tool - Private Receptors

Private Viewpoints/Receptors

36	434.4	51.7	2,885	1	72	1-10%	YES
37	445.2	51.7	1,421	2	117	1-10%	YES
38	453.5	51.7	3,484	1	41	1-10%	NO
40	443.5	51.7	1,897	1	55	1-10%	NO
42	444.1	51.7	604	4	105	10-20%	YES
49	465.3	51.7	3,198	1	49	10-20%	NO
50	463.5	51.7	3,386	1	48	1-10%	NO
52	469	51.7	3,838	1	43	1-10%	NO
53	476.1	54	3,900	1	42	1-10%	NO
57	450	51.7	3,934	1	46	80-90%	NO
58	461.9	51.7	1,678	1	71	30-40%	YES
59	465.1	51.7	3,079	1	50	10-20%	NO
62	486.9	64.8	4,166	1	40	10-20%	NO
64	455.4	51.7	2,364	1	57	1-10%	NO
68	410.3	63.5	3,213	1	41	1-10%	NO
69	406.5	67.3	3,578	1	39	1-10%	NO
70	438.8	51.7	4,022	1	40	1-10%	NO
72	418	55.8	3,545	1	34	20-30%	NO
73	420.8	53	3,785	1	30	20-30%	NO
74	417.5	56.3	4,030	1	32	20-30%	NO
75	415.8	58	4,169	1	31	30-40%	NO
76	419.6	54.2	4,002	1	31	20-30%	NO
77	419.6	54.2	3,428	1	35	10-20%	NO
78	416.1	57.7	3,554	1	35	10-20%	NO
79	422.9	51.7	3,578	1	36	30-40%	NO
80	412.9	60.9	2,867	1	42	10-20%	NO
84	421.4	51.7	2,859	1	44	50-60%	NO
85	420	53.8	2,507	1	49	40-50%	NO
86	437.7	51.7	2,895	1	46	80-90%	NO
87	440.2	51.7	3,102	1	44	80-90%	NO
88	426.8	51.7	3,186	1	45	20-30%	NO
89	421.3	51.7	3,217	1	46	70-80%	NO
90	427.6	51.7	3,457	1	48	70-80%	NO
91	428.4	51.7	4,068	1	42	70-80%	NO

Private Viewpoints/Receptors

95	438.1	51.7	3,828	1	48	80-90%	NO
96	428.2	51.7	3,365	1	52	70-80%	NO
97	453.1	51.7	3,851	1	47	80-90%	NO
98	444.4	51.7	3,821	1	47	80-90%	NO
99	442.5	51.7	4,078	1	45	20-30%	NO
100	435.3	51.7	3,827	1	50	70-80%	NO
101	443.4	51.7	4,103	1	44	40-50%	NO
102	435.1	51.7	3,680	1	51	70-80%	NO
103	446.8	51.7	3,623	1	47	80-90%	NO
104	455.8	51.7	3,858	1	45	80-90%	NO
105	450.6	51.7	3,772	1	46	80-90%	NO
110	445	51.7	3,476	1	48	80-90%	NO

Vertical Field of View Public Receptors

Puggoon Solar Farm and BESS

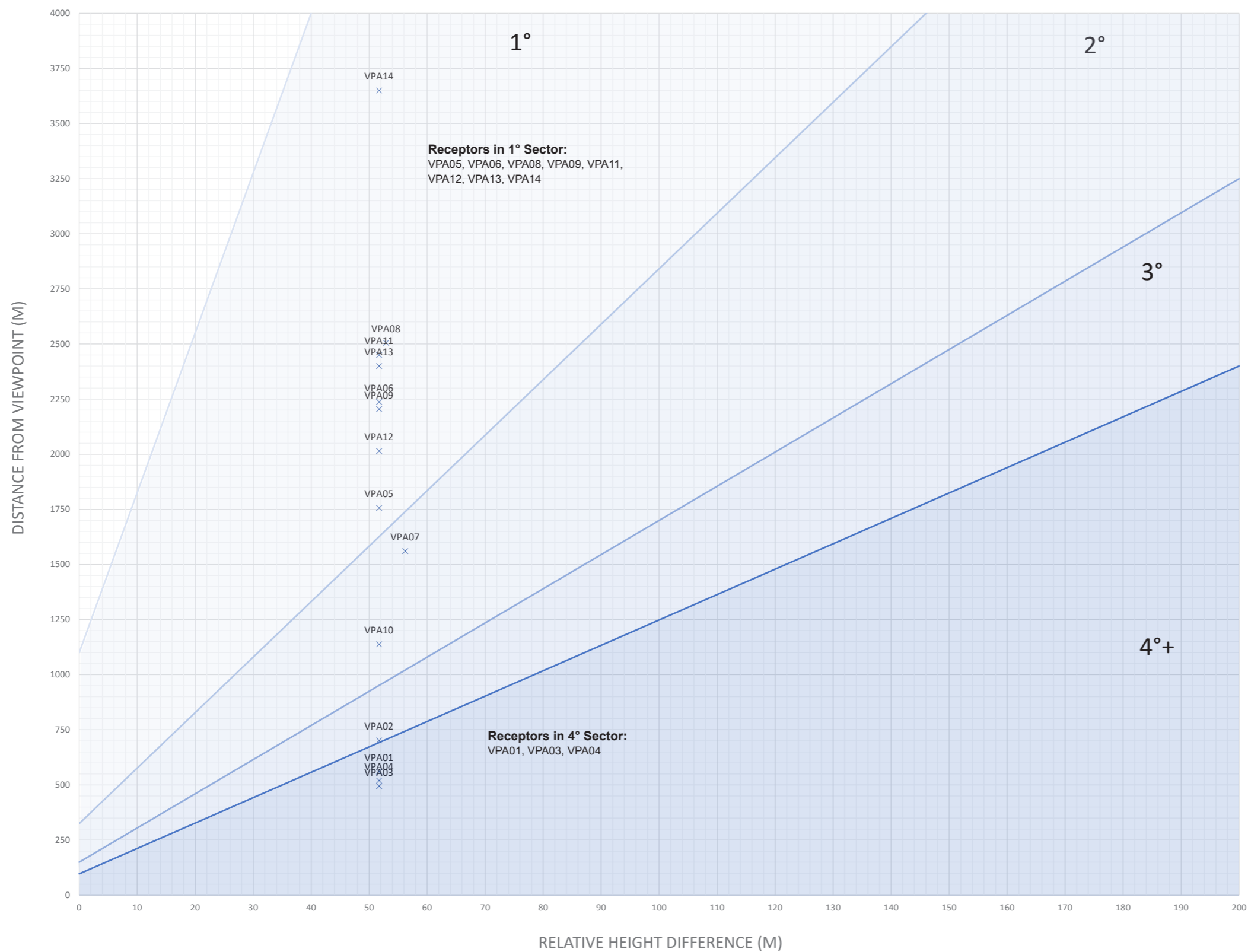


Figure 11 – Vertical Field of View - Public Receptors

Public Viewpoints/Receptors										
8.0	Receptor ID:	Receptor Elevation: (m)	Relative Height Difference: (m)	Distance to nearest Panel: (m)	Vertical Field of View (FOV) X°	Horizontal extent of View:	Column2	Horizontal Field of View (FOV) X°	Visibility (based on Viewshed mapping)	Detailed Assessment Required?
	VPA01	431.7	51.7	560.65	4	221-	51	190	10-20%	YES
	VPA02	427.4	51.7	701.91	3	7-	105	98	1-10%	YES
	VPA03	458	51.7	494.21	4	115-	190	75	1-10%	YES
	VPA04	432.8	51.7	519.96	4	230-	285	55	20-30%	YES
	VPA05	422.2	51.7	1756.64	1	262-	353	91	30-40%	NO
	VPA06	453.7	51.7	2237.71	1	42-	101	59	1-10%	NO
	VPA07	417.6	56.2	1560.37	2	7-	75	68	20-30%	YES
	VPA08	420.9	52.9	2505.17	1	278-	357	79	40-50%	NO
	VPA09	445	51.7	2205.09	1	132-	184	52	1-10%	NO
	VPA10	432.7	51.7	1138.13	2	198-	272	74	10-20%	YES
	VPA11	445.1	51.7	2450.34	1	192-	255	63	10-20%	NO
	VPA12	437.2	51.7	2014.49	1	242-	283	41	20-30%	NO
	VPA13	423.1	51.7	2400.06	1	15-	66	51	1-10%	NO
	VPA14	429.7	51.7	3650.27	1	299-	352	53	70-80%	NO
	VPA15	455.3	51.7	4835.74	1	322-	1	39	80-90%	NO

Table 06 – Preliminary Visual Assessment Tool - Public Receptors

B

Intermediate Assessments

Intermediate Assessment Methodology

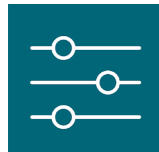
Purpose of the Intermediate Assessment (Wireframes)

The purpose of preparing wireframes is to determine the visual magnitude of a Project more accurately. This involves using 3D modelling, which can account for many factors that influence magnitude, including intervening topography, the different distances at which the PV Array will be visible, and spacing between panels. If the result of the wireframe assessment indicates that a moderate or high impact continues to be likely, then the applicant must proceed in undertaking a site inspection and photomontage from these locations.



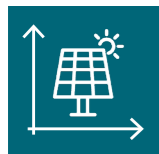
Step 1 - Determine Visual Sensitivity

The visual sensitivity is determined by identifying the sensitivity of each viewpoint and receiver and categorising the scenic quality of the area in view. For the purpose of the intermediate assessment, conservative 'moderate' visual sensitivity has been applied to all viewpoints.



Step 2 - Determine Visual Magnitude

Visual magnitude is determined by analysing the volume of the field of view that a project would occupy. This can be determined by splitting the wire frame diagram into a grid comprising cells 1 degree high and 10 degrees wide and counting the number of cells that would be occupied by a Project. The number of cells occupied determines the visual magnitude.



Step 3 - Determine Visual Impact Rating

The overall visual impact rating of each viewpoint is determined for each viewpoint by combining the visual magnitude and visual sensitivity using the matrix as shown.

Visual Impact Rating Matrix:

Visual Magnitude (Number of Occupied Cells)	Visual Sensitivity			
	High	Moderate	Low	Very Low
Very High 37+	High	High	Moderate	Moderate
High 26 - 36	High	Moderate	Moderate	Low
Moderate 15 - 25	Moderate	Moderate	Low	Low
Low 8 - 14	Moderate	Low	Low	Very Low
Very Low 1 - 7	Low	Low	Very Low	Very Low

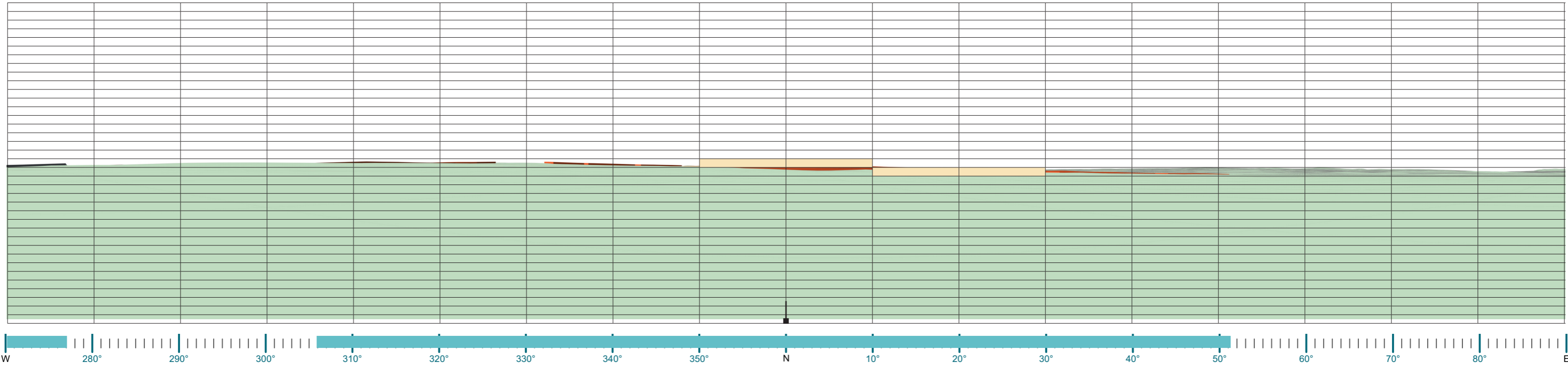
Any dwellings with a moderate or high visual impact will require a detailed assessment.
(including a site inspection and photomontage)

Detailed Assessment Required:

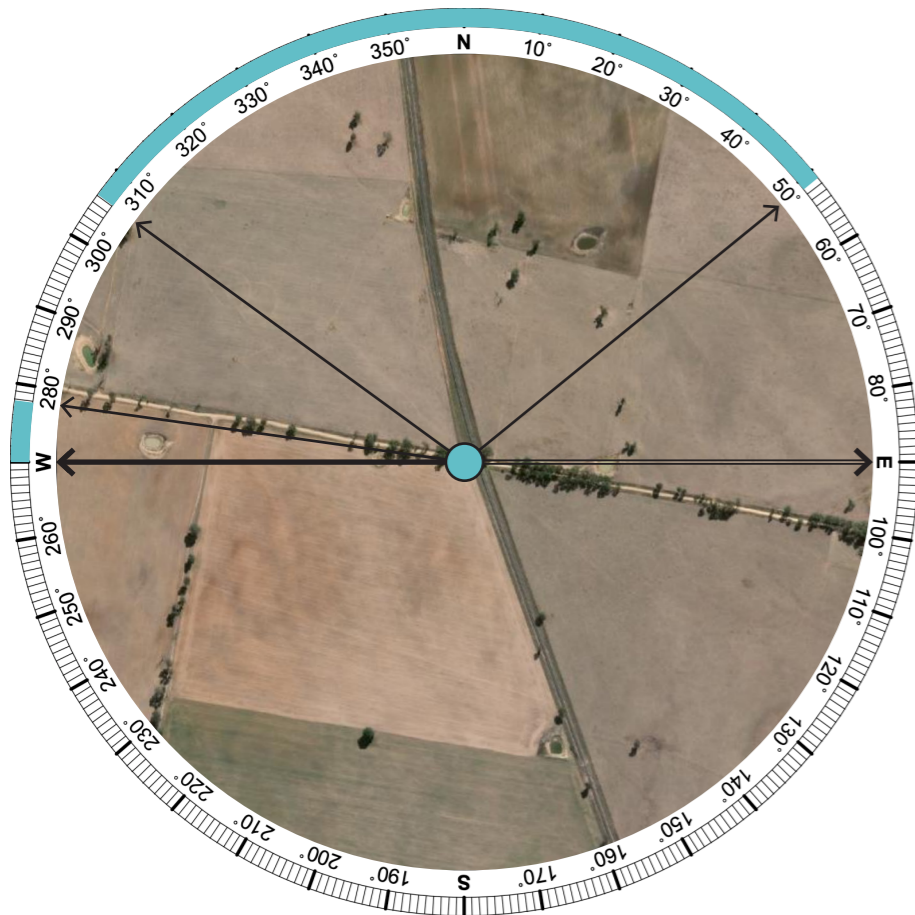
YES/NO

VPA01 (North)

180° Wireframe Diagram Assessment



Viewpoint Location



Sensitivity:



Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**

Overall Potential Sensitivity: **Very Low**

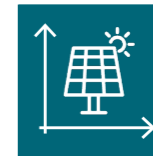
Magnitude:



Number of Occupied Cells: **4**

Magnitude Rating: **Very Low**

Visual Impact Rating:



Impact Rating: **Very Low**

 Extent of Potential Visibility

Elevation: **434 m**

Distance to Project: **0.55 km**

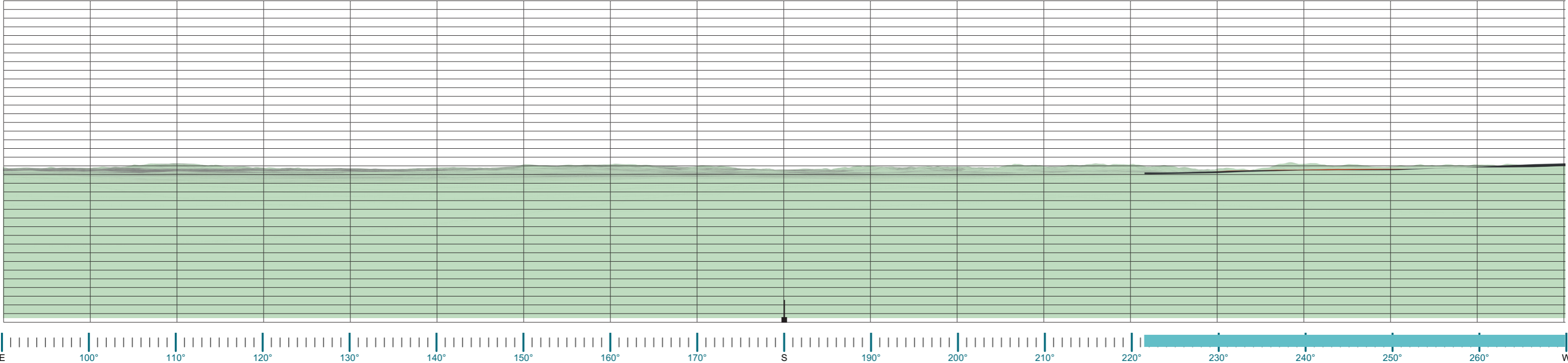
Aerial Source: ESRI, 2024

Detailed Assessment Required:

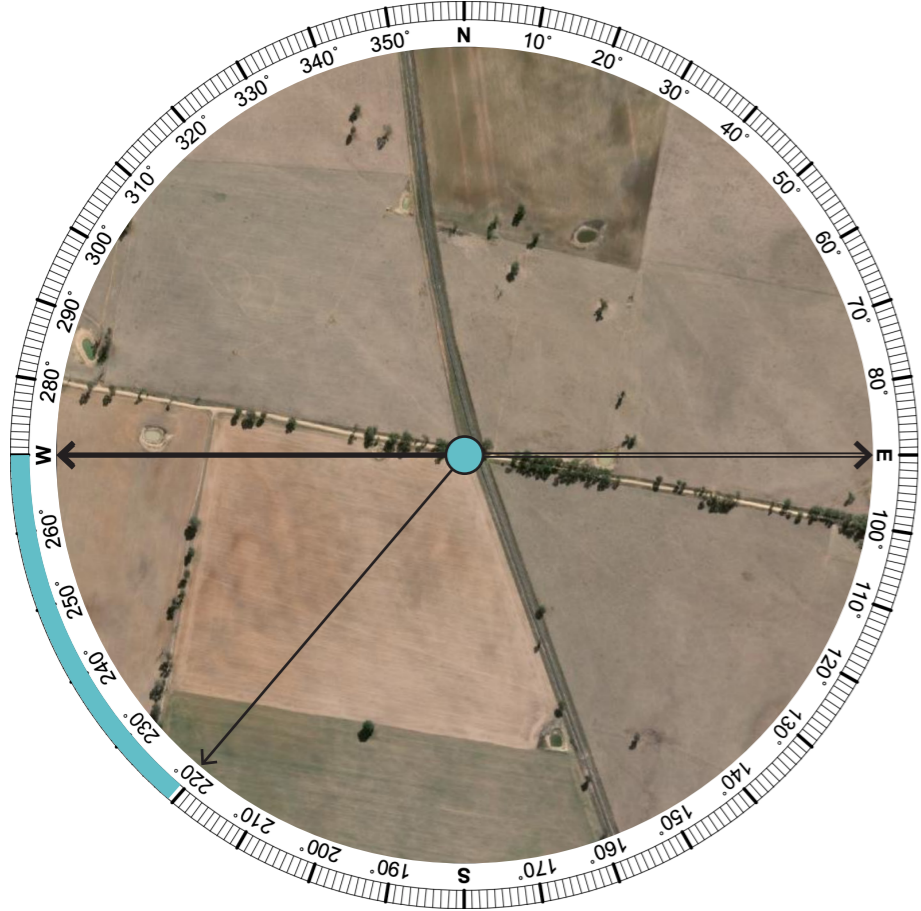
NO

VPA01 (South)

180° Wireframe Diagram Assessment



Viewpoint Location



Extent of Potential Visibility

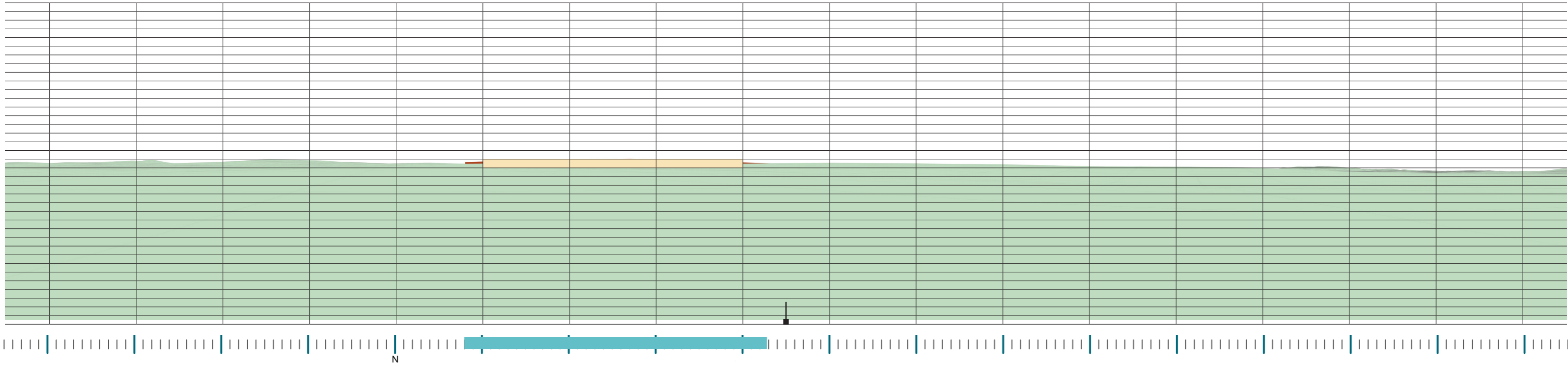
Elevation: **434 m**

Distance to Project: **0.55 km**

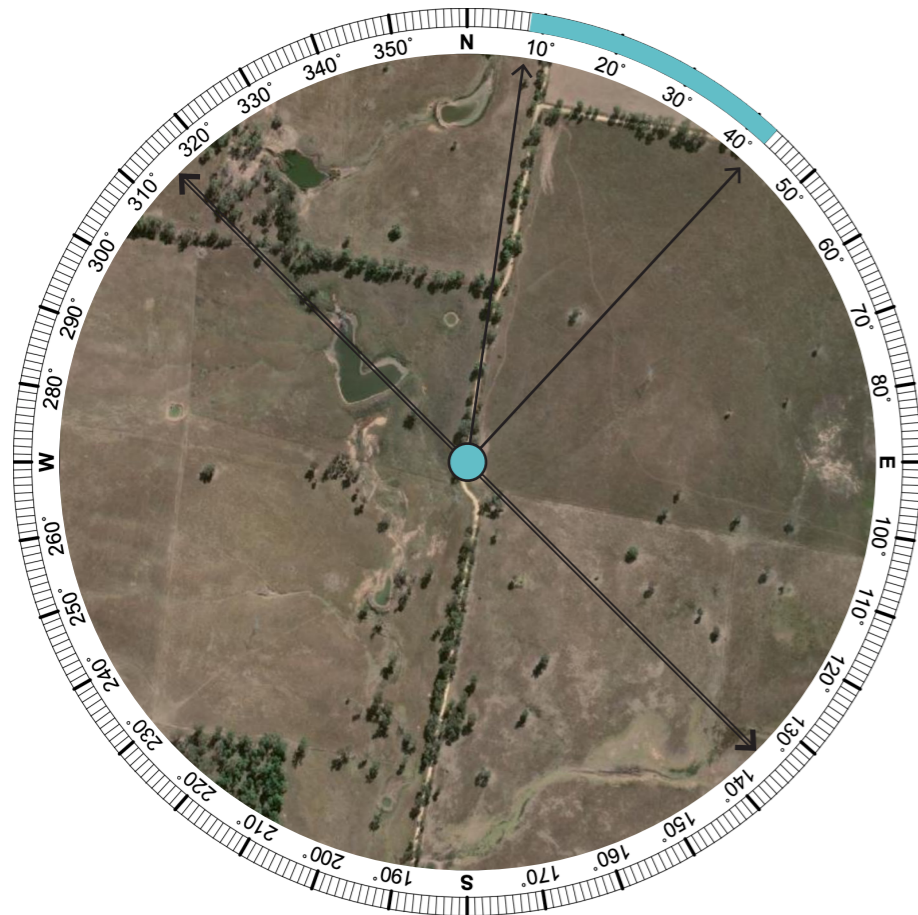
Aerial Source: ESRI, 2024

VPA02


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **3**

Magnitude Rating: **Very Low**

Visual Impact Rating:

 Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **429 m**

Distance to Project: **0.70 km**

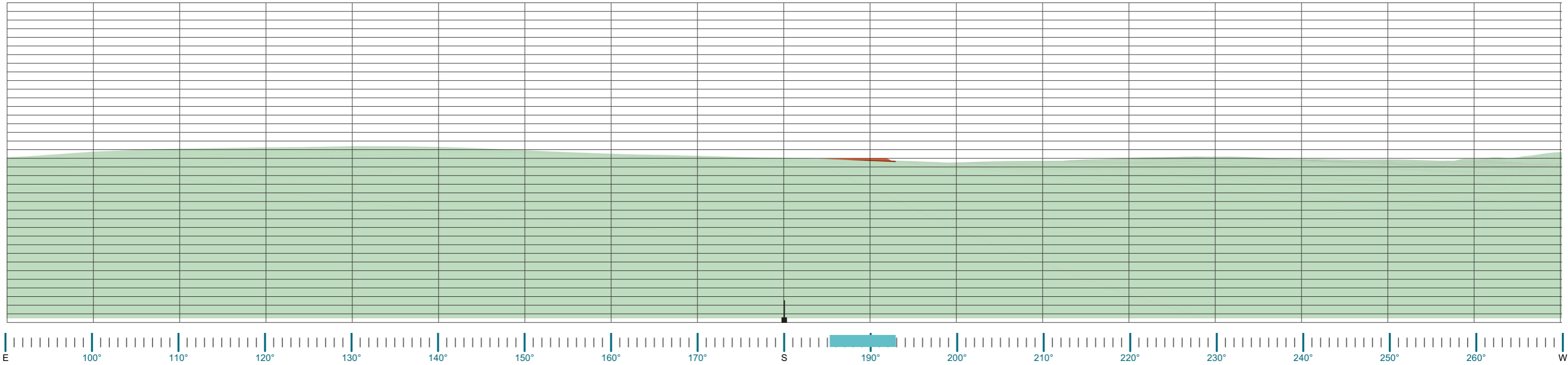
Aerial Source: ESRI, 2024

Detailed Assessment Required:

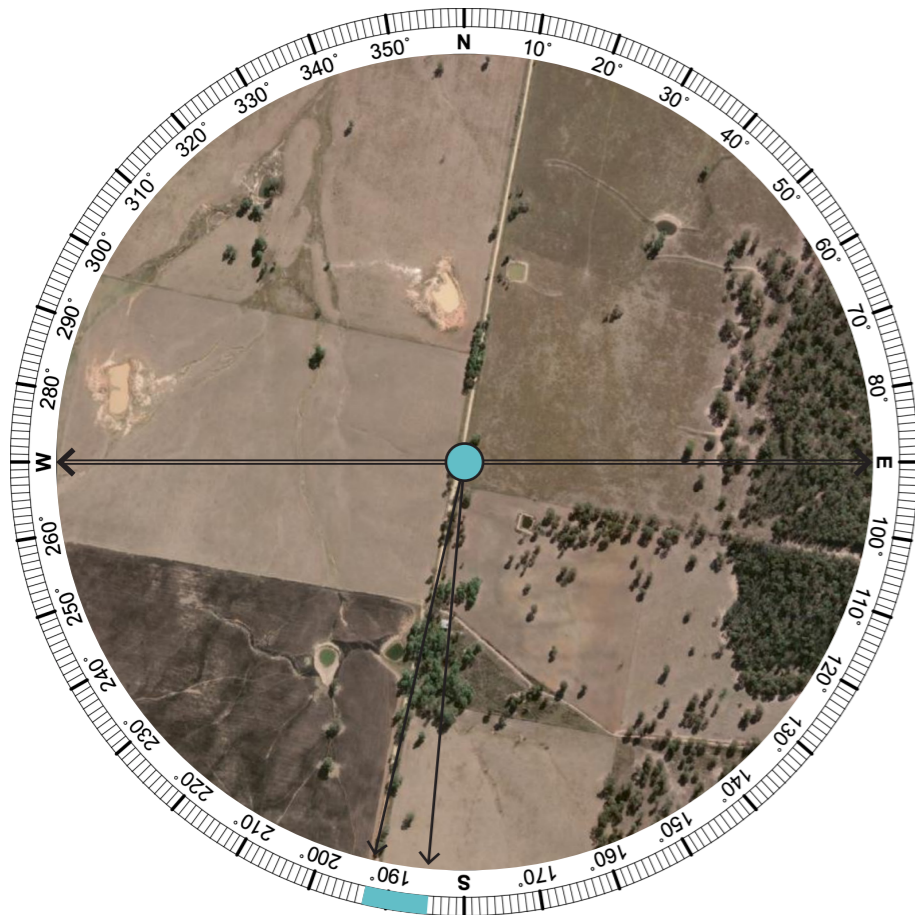
NO

VPA03


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Moderate**

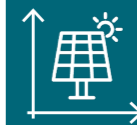
Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **0**

Magnitude Rating: **Nil**

Visual Impact Rating:

 Impact Rating: **Nil**

Extent of Potential Visibility

Elevation: **464 m**

Distance to Project: **0.50 km**

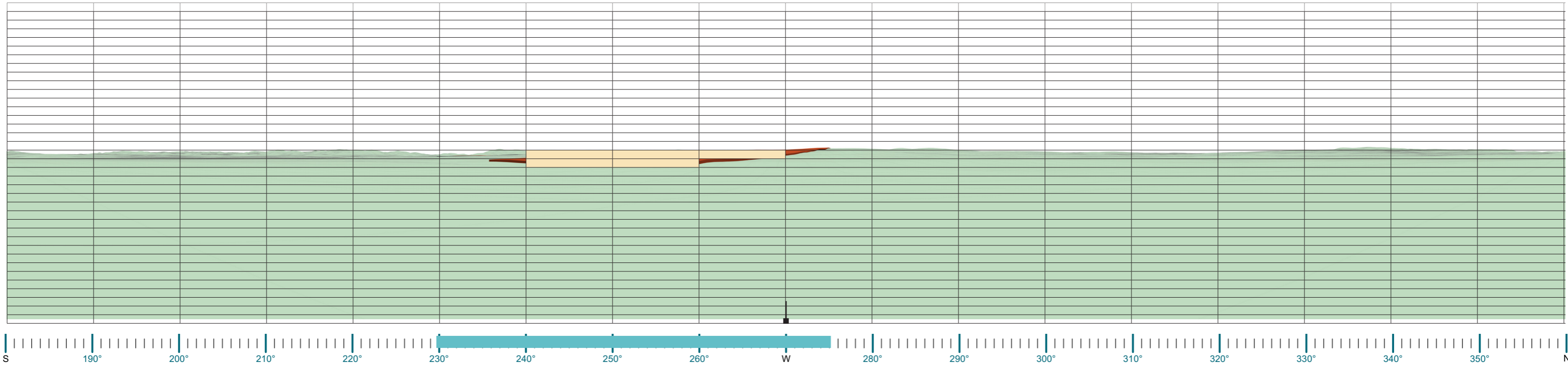
Aerial Source: ESRI, 2024

Detailed Assessment Required:

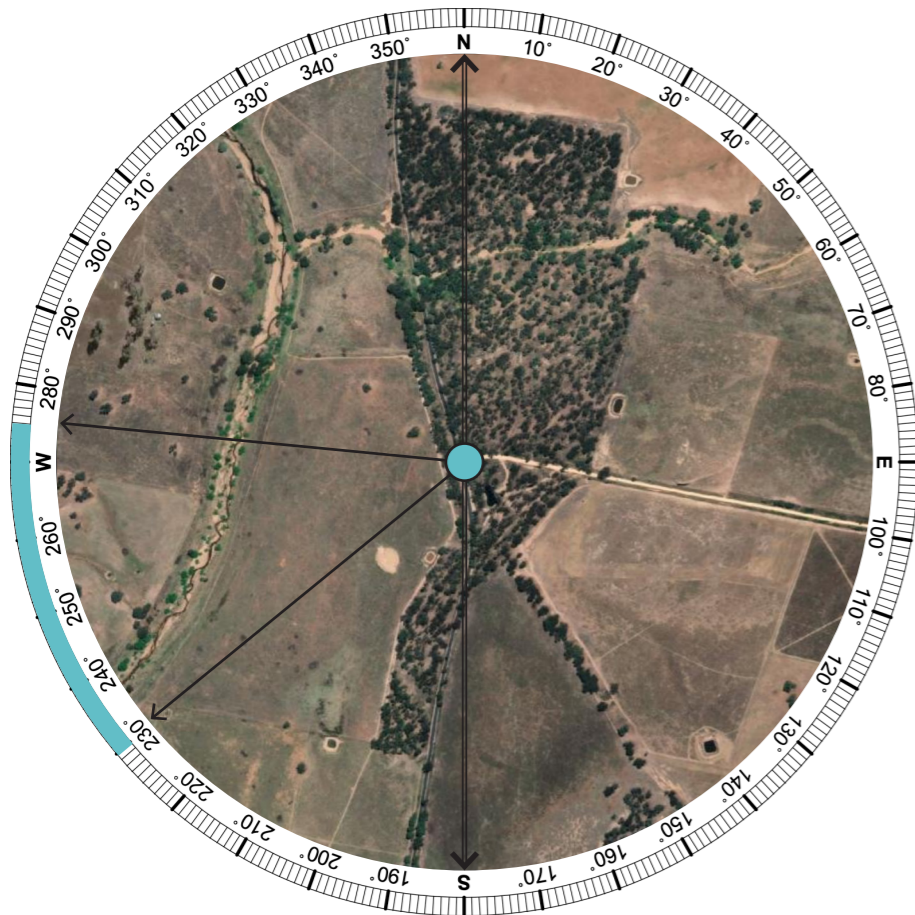
NO

VPA04


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**

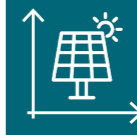
Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **5**

Magnitude Rating: **Very Low**

Visual Impact Rating:

 Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **429 m**

Distance to Project: **0.50 km**

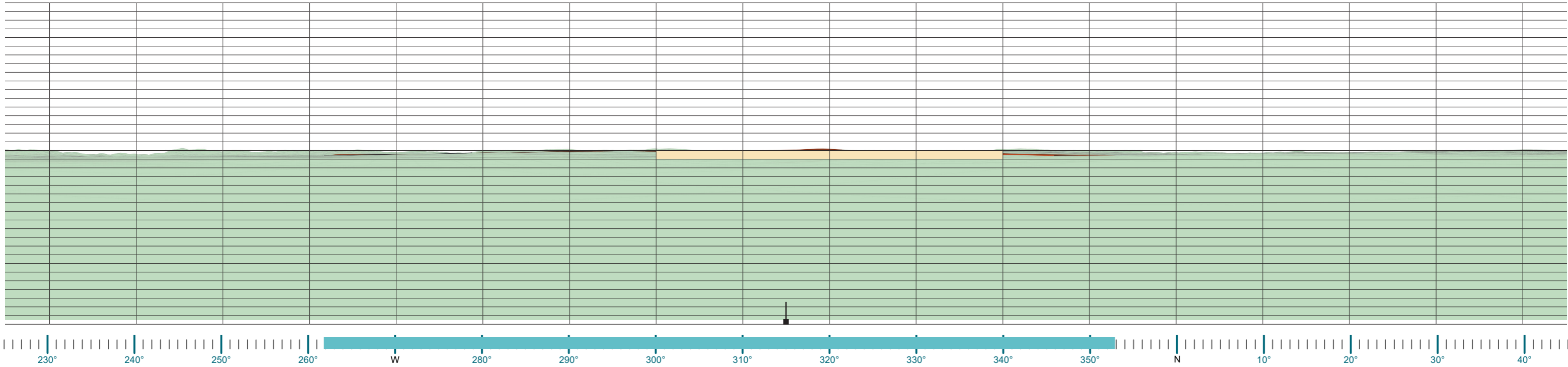
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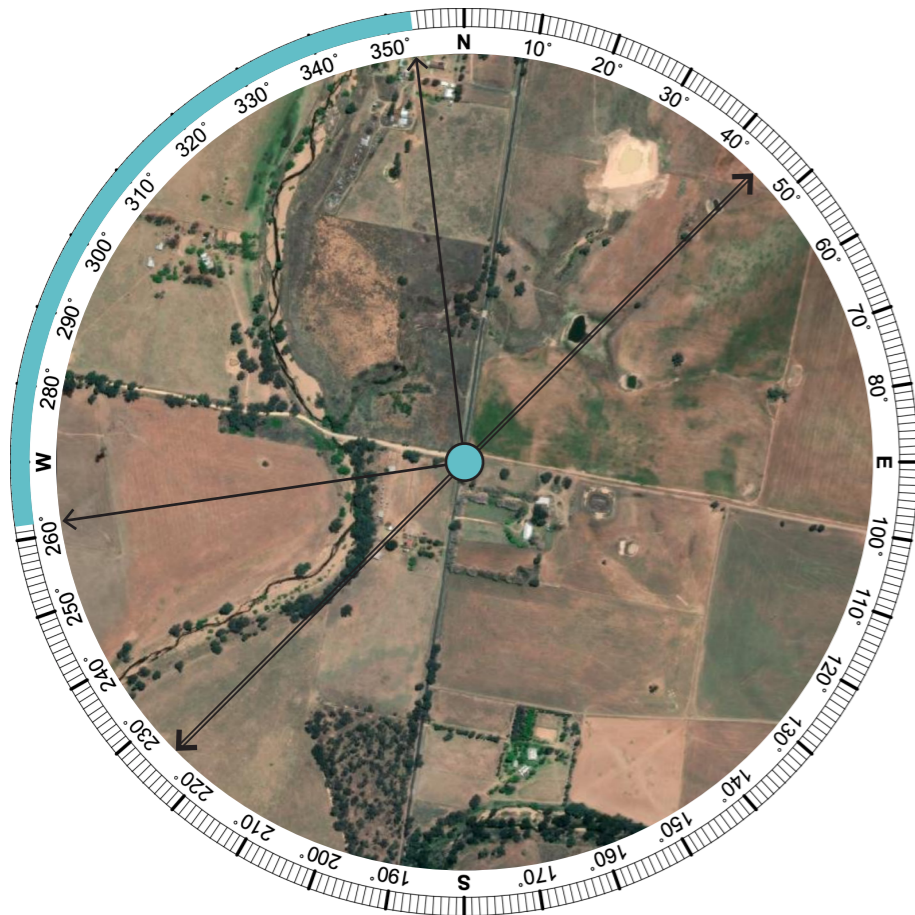
NO

VPA05


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **4**

Magnitude Rating: **Very Low**

Visual Impact Rating:

 Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **424 m**
Distance to Project: **1.74 km**

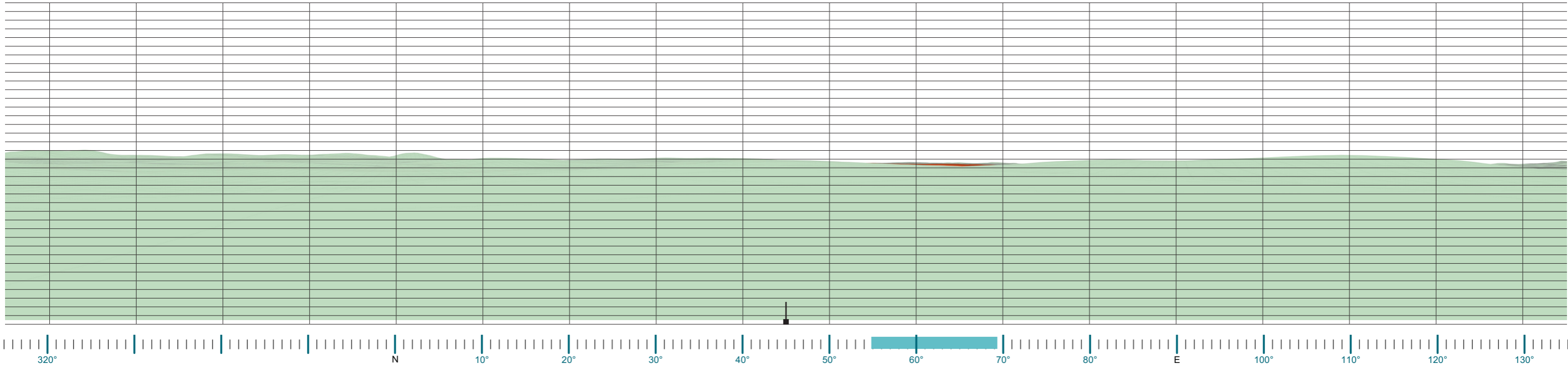
Aerial Source: ESRI, 2024

Detailed Assessment Required:

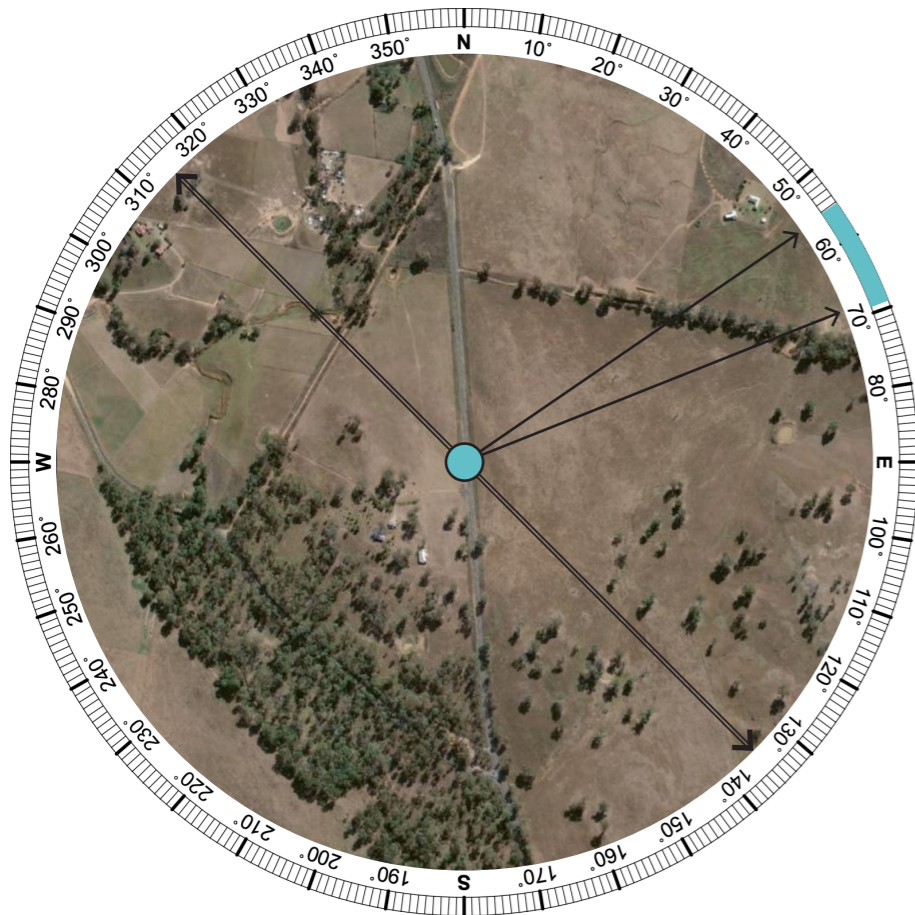
NO

VPA06


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Moderate**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **0**

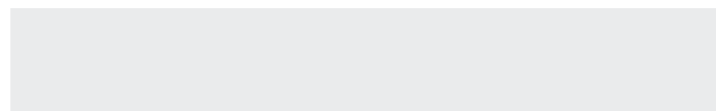
Magnitude Rating: **Nil**

Visual Impact Rating:

 Impact Rating: **Nil**

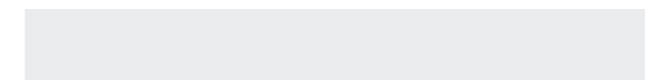
Impact Rating: **Nil**

Extent of Potential Visibility



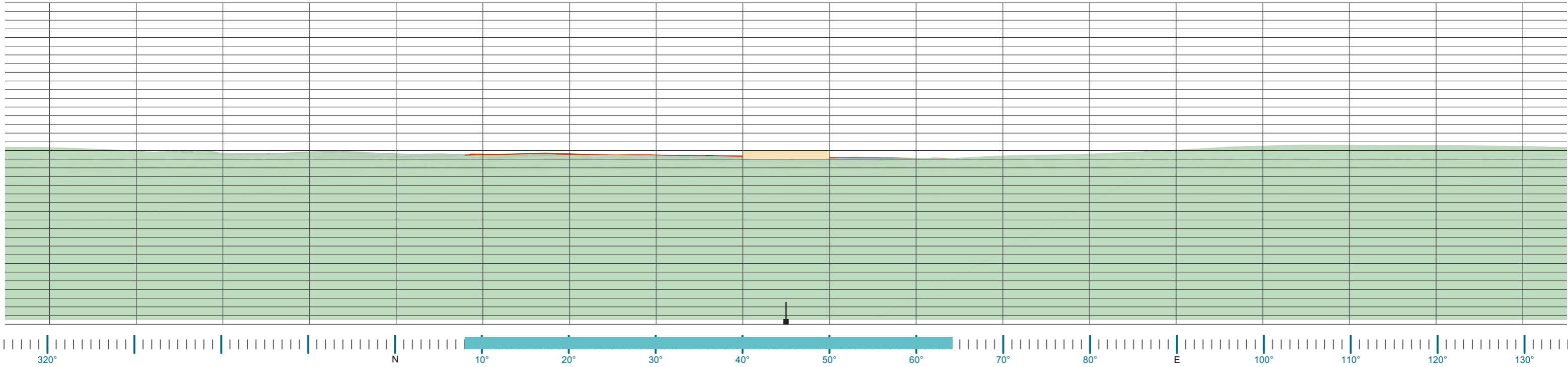
Aerial Source: ESRI, 2024

Detailed Assessment Required:

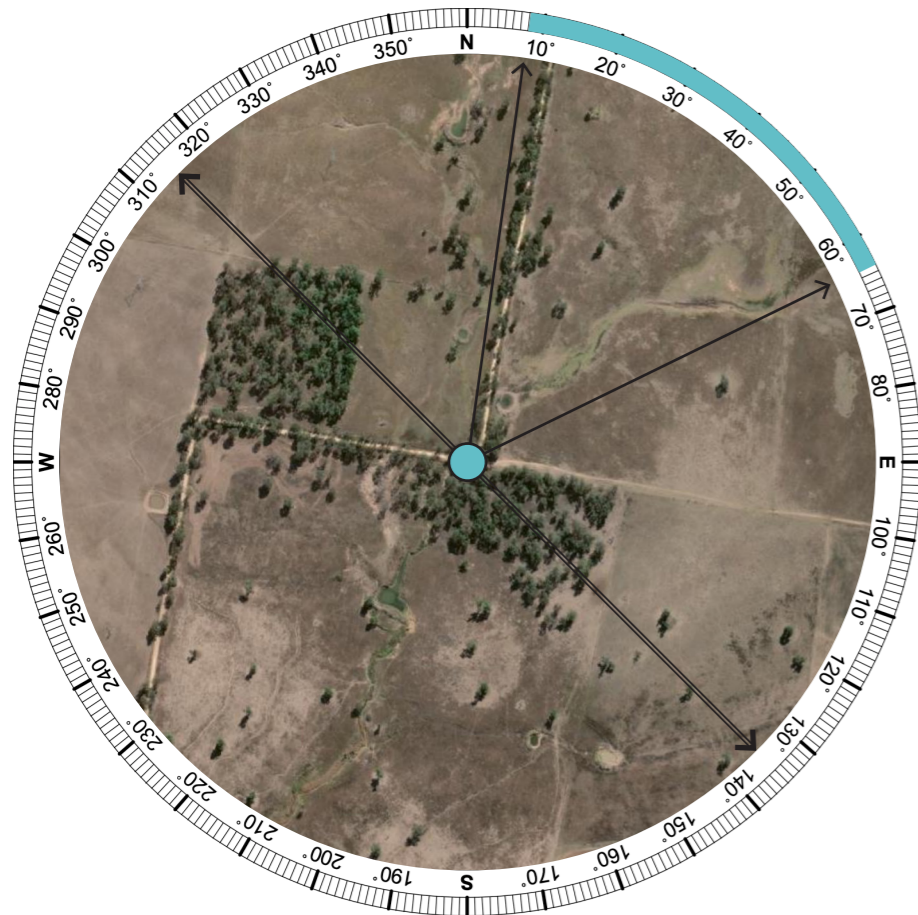


VPA07


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**


Overall Potential Sensitivity: **Very Low**

Magnitude:

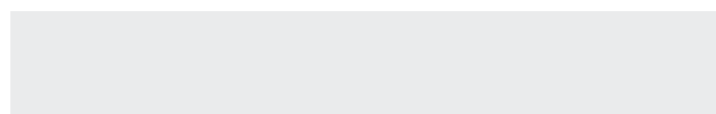
 Number of Occupied Cells: **1**

Magnitude Rating: **Very Low**

Visual Impact Rating:

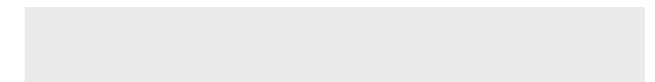
 Impact Rating: **Very Low**

Extent of Potential Visibility



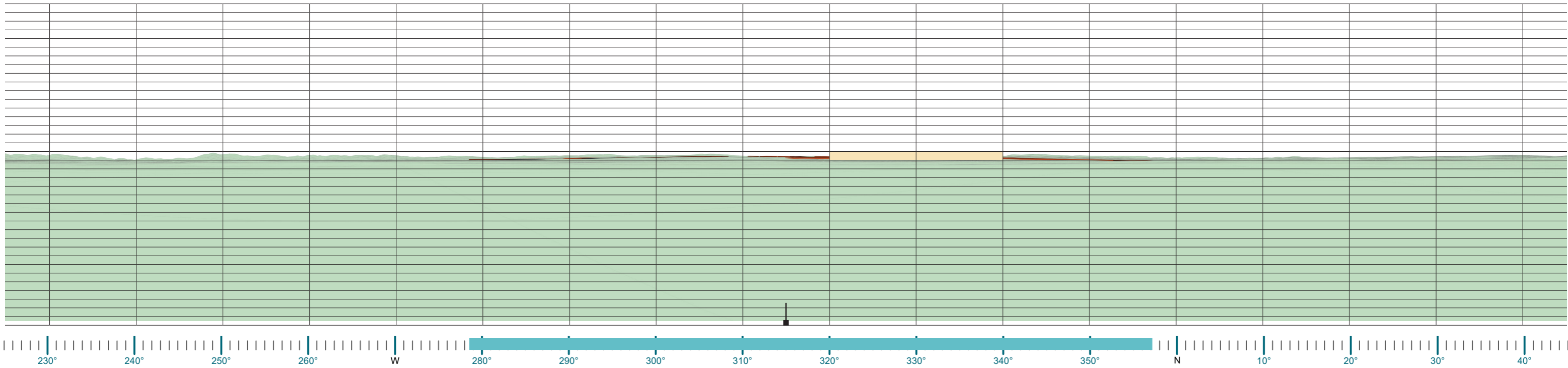
Aerial Source: ESRI, 2024

Detailed Assessment Required:

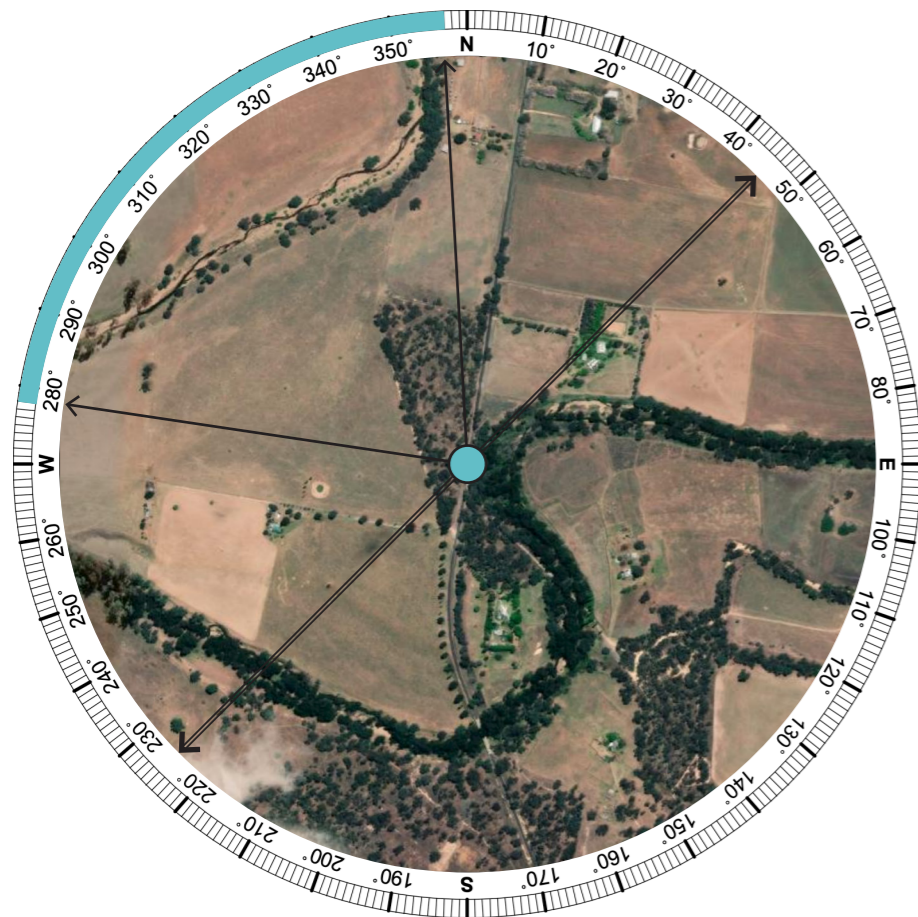


VPA08


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Moderate**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **2**

Magnitude Rating: **Very Low**

Visual Impact Rating:

 Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **425 m**

Distance to Project: **2.49 km**

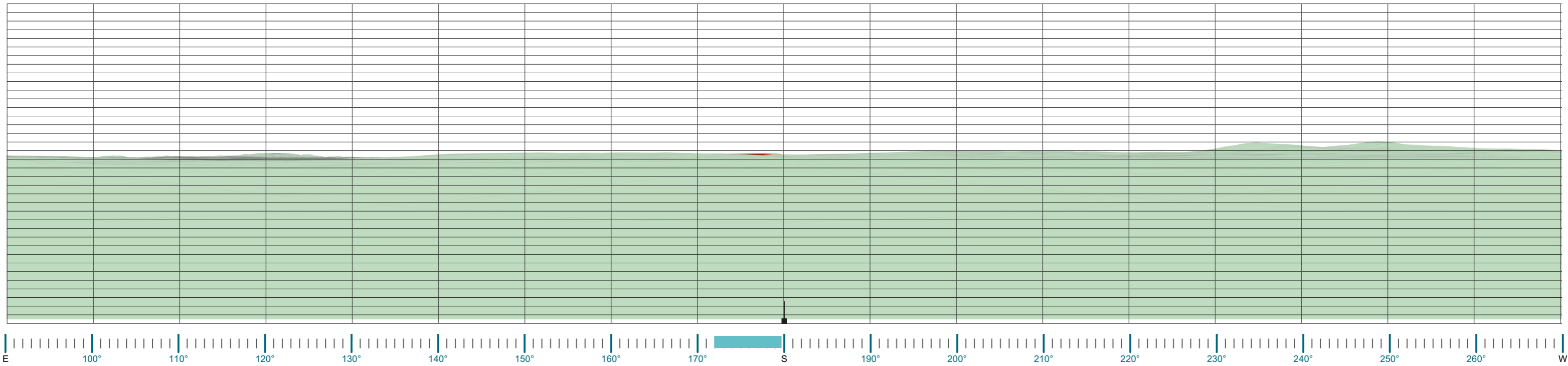
Aerial Source: ESRI, 2024

Detailed Assessment Required:

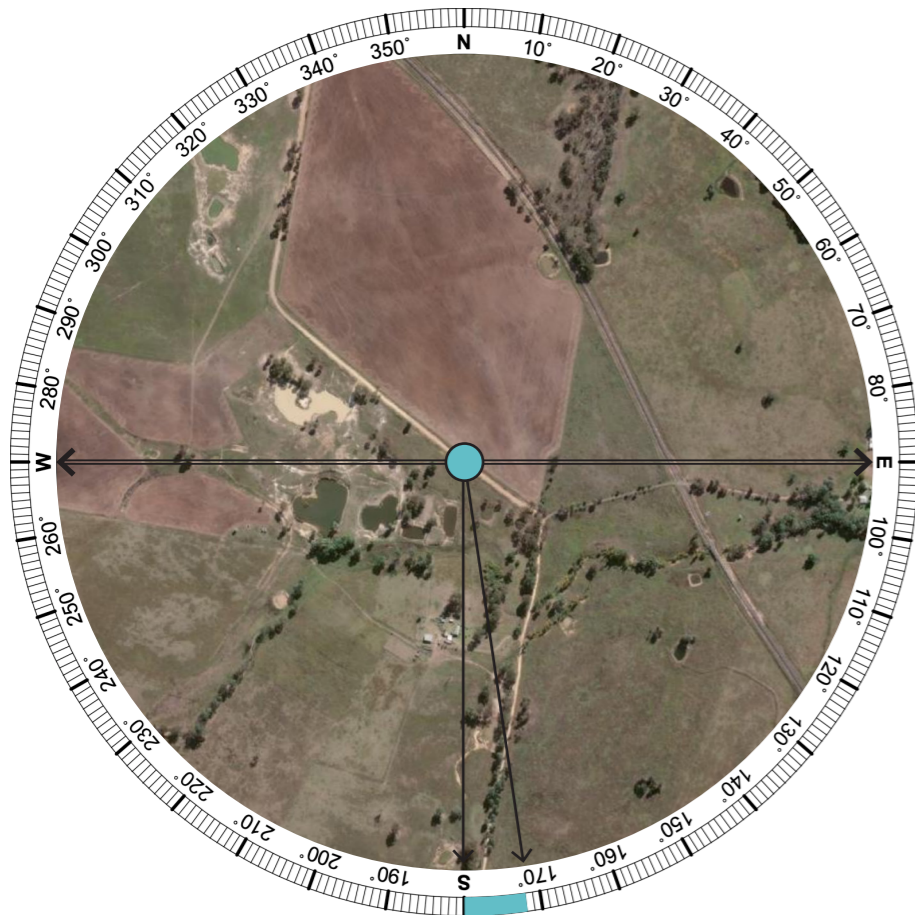
NO

VPA09


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **0**

Magnitude Rating: **Very Low**

Visual Impact Rating:

 Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **445 m**
Distance to Project: **2.22 km**

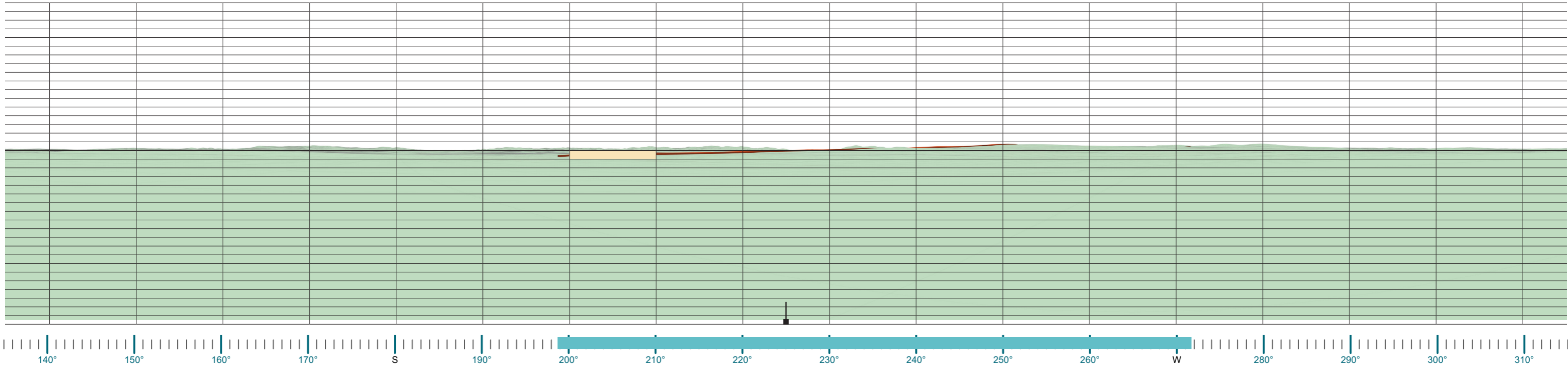
Aerial Source: ESRI, 2024

Detailed Assessment Required:

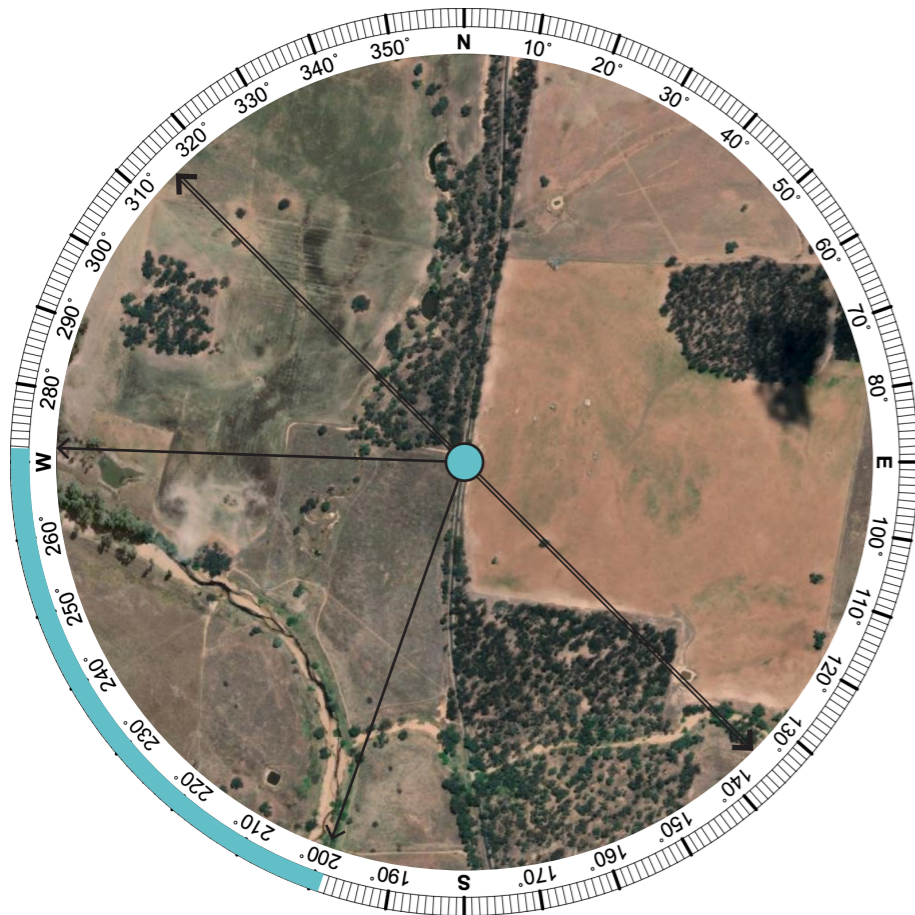
NO

VPA10

180° Wireframe Diagram Assessment



Viewpoint Location



Sensitivity:



Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**

Overall Potential Sensitivity: **Very Low**

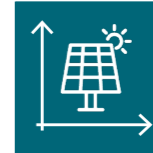
Magnitude:



Number of Occupied Cells: **1**

Magnitude Rating: **Very Low**

Visual Impact Rating:



Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **434 m**

Distance to Project: **1.11 km**

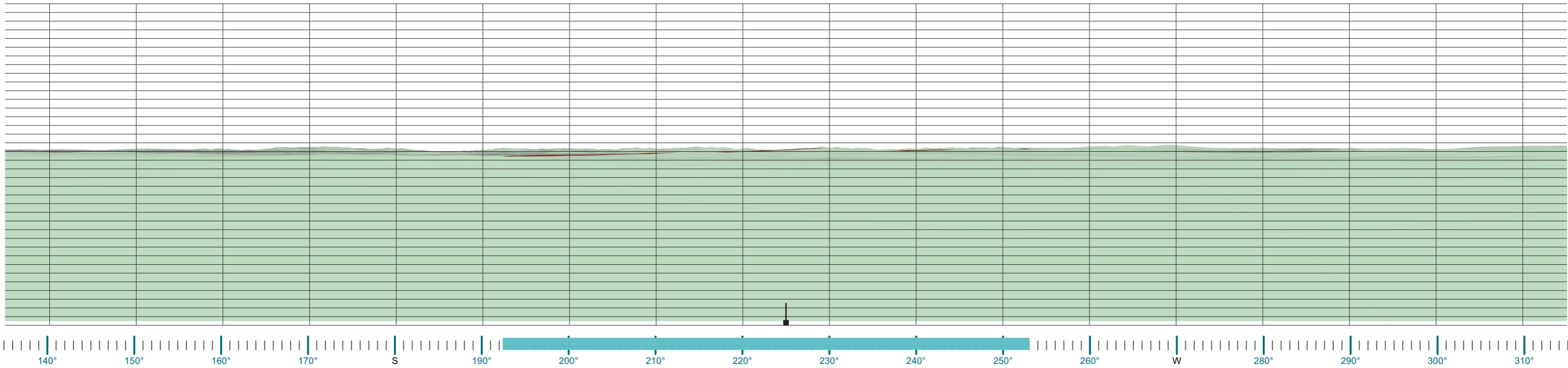
Aerial Source: ESRI, 2024

Detailed Assessment Required:

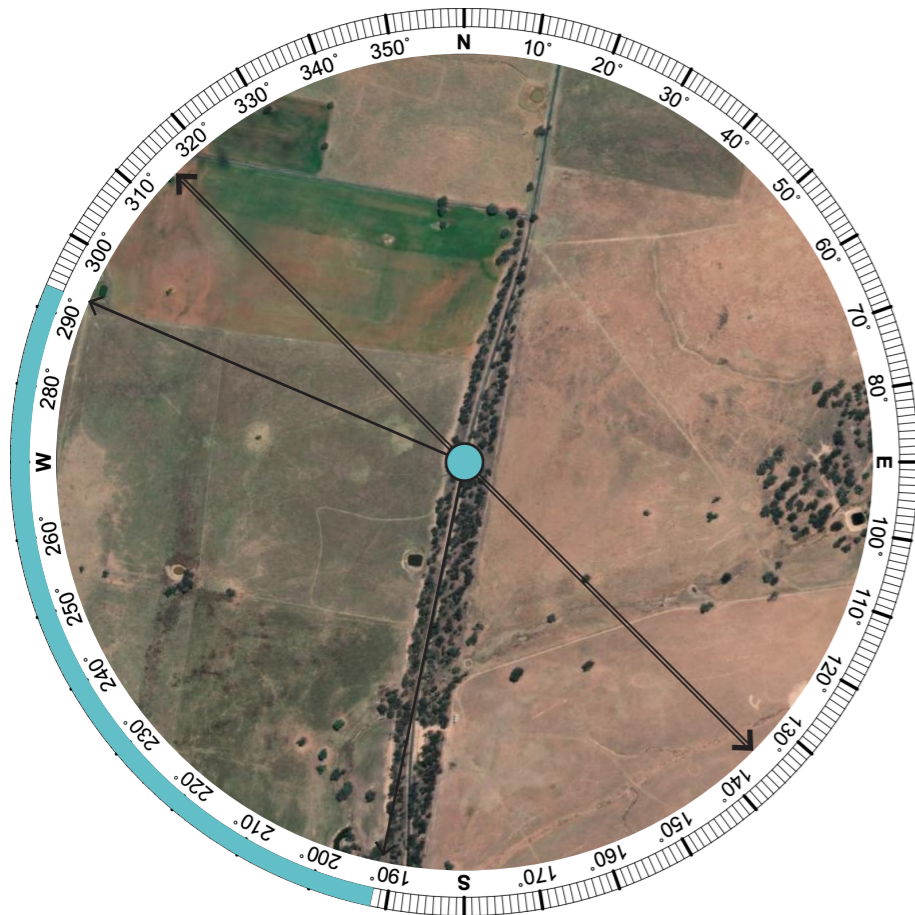
NO

VPA11


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**

Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **0**

Magnitude Rating: **Nil**

Visual Impact Rating:

 Impact Rating: **Nil**

Extent of Potential Visibility

Elevation: **446 m**

Distance to Project: **2.43 km**

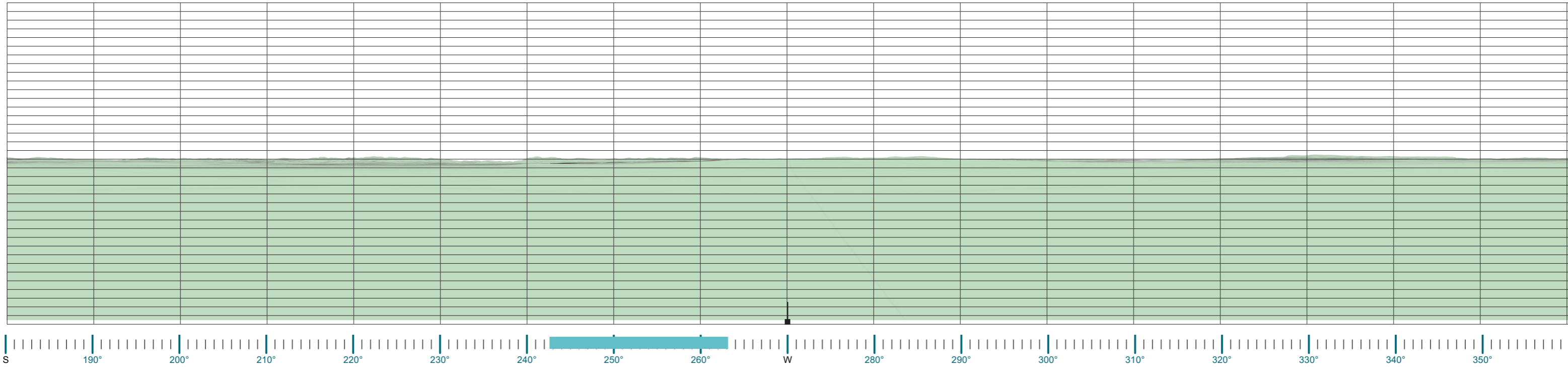
Aerial Source: ESRI, 2024

Detailed Assessment Required:

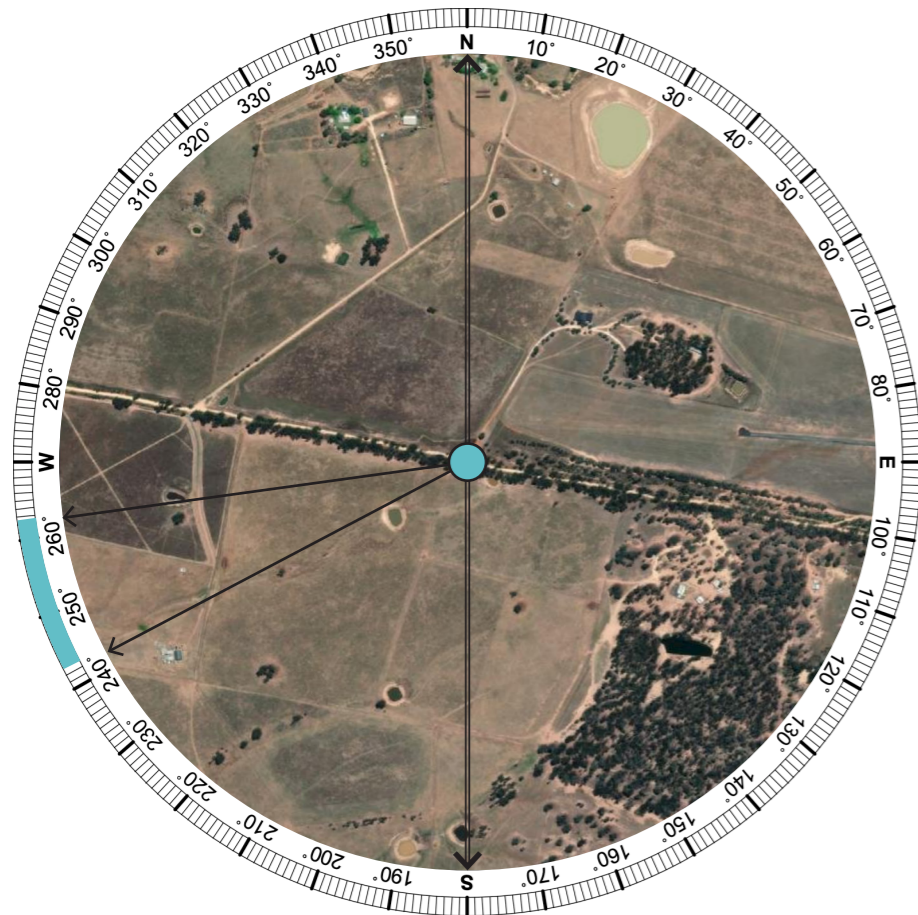
NO

VPA12


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **0**

Magnitude Rating: **Nil**

Visual Impact Rating:

 Impact Rating: **Nil**

Extent of Potential Visibility

Elevation: **441 m**

Distance to Project: **1.98 km**

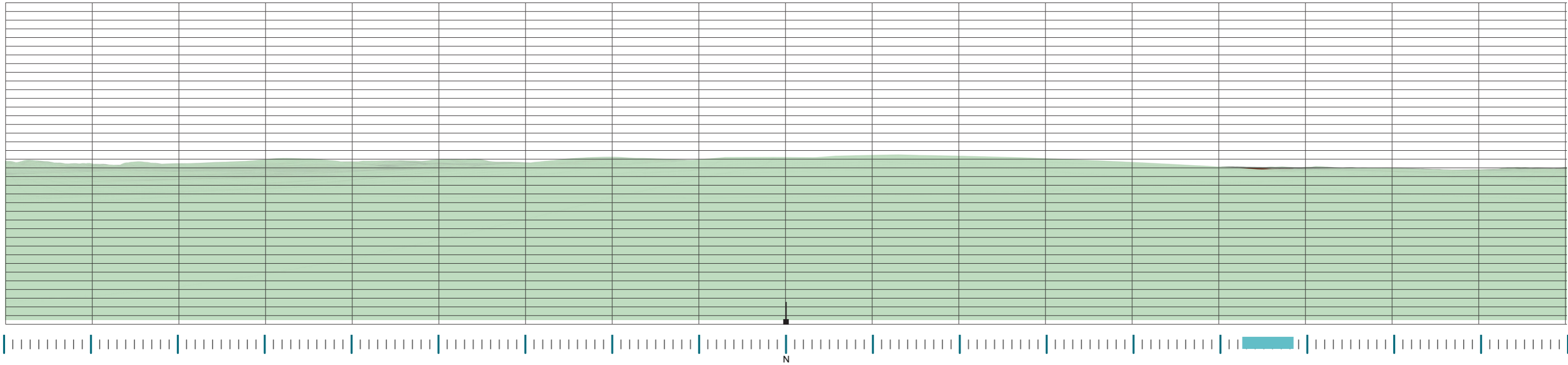
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Detailed Assessment Required:

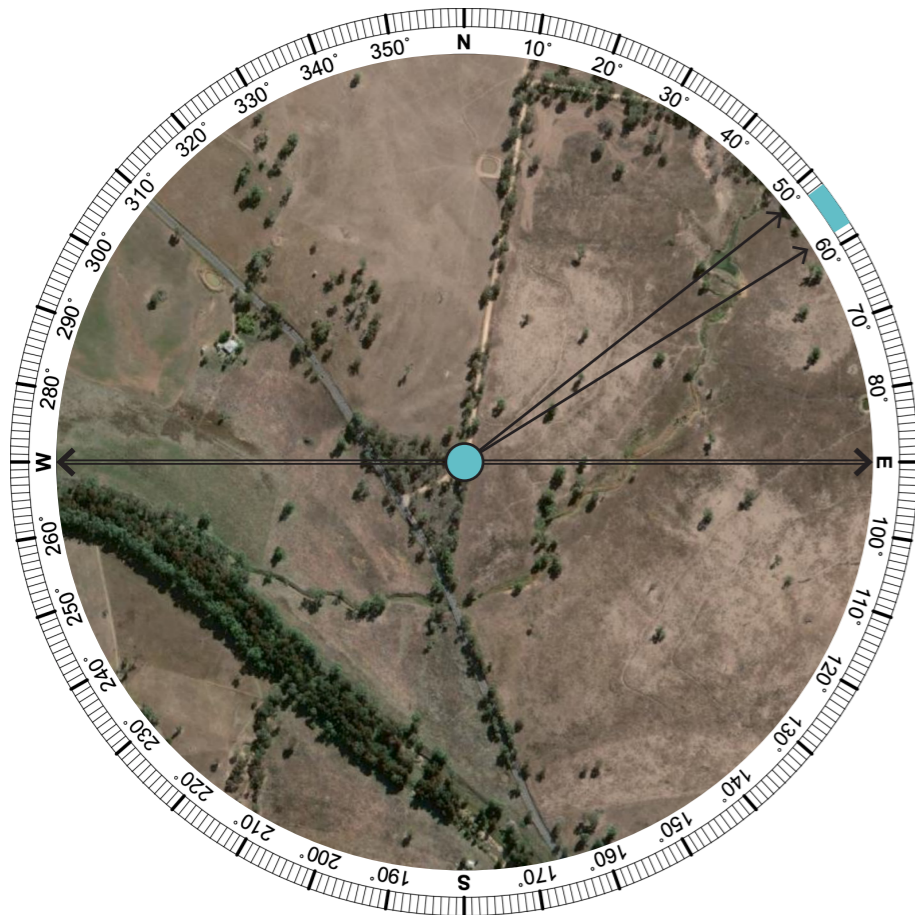
NO

VPA13


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Moderate**


Overall Potential Sensitivity: **Very Low**

Magnitude:

 Number of Occupied Cells: **0**

Magnitude Rating: **Nil**

Visual Impact Rating:

 Impact Rating: **Nil**

Extent of Potential Visibility

Elevation: **423 m**

Distance to Project: **2.42 km**

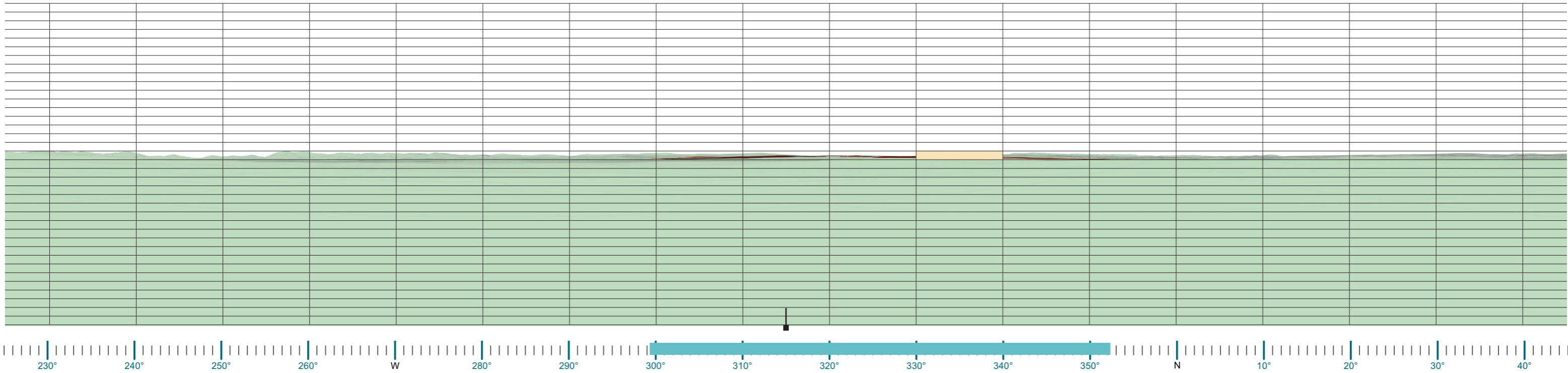
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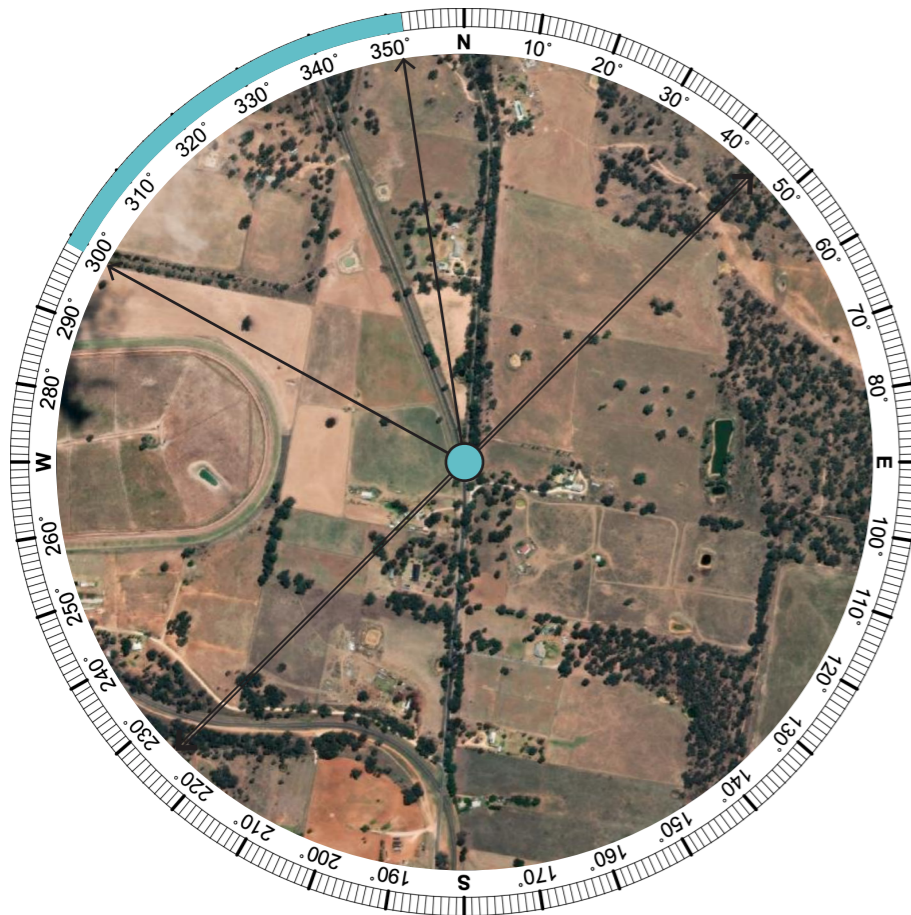
NO

VPA14

180° Wireframe Diagram Assessment



Viewpoint Location



Sensitivity:



Viewpoint Type: Public (**Very Low**)

Scenic Quality: **Low**

Overall Potential Sensitivity: **Very Low**

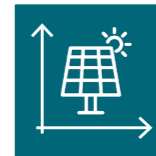
Magnitude:



Number of Occupied Cells: **1**

Magnitude Rating: **Very Low**

Visual Impact Rating:



Impact Rating: **Very Low**

Extent of Potential Visibility

Elevation: **431 m**

Distance to Project: **3.64 km**

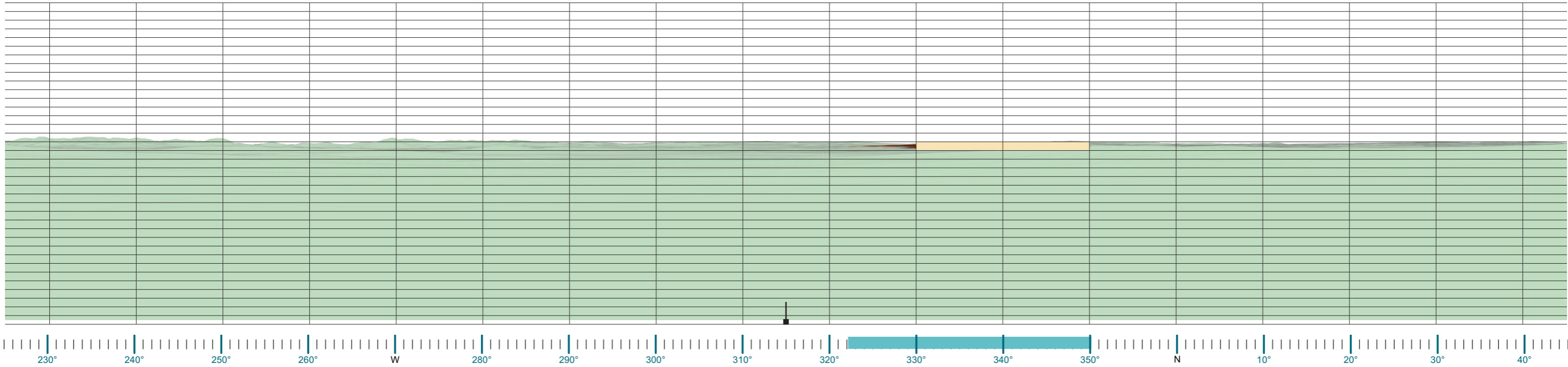
Aerial Source: ESRI, 2024

Detailed Assessment Required:

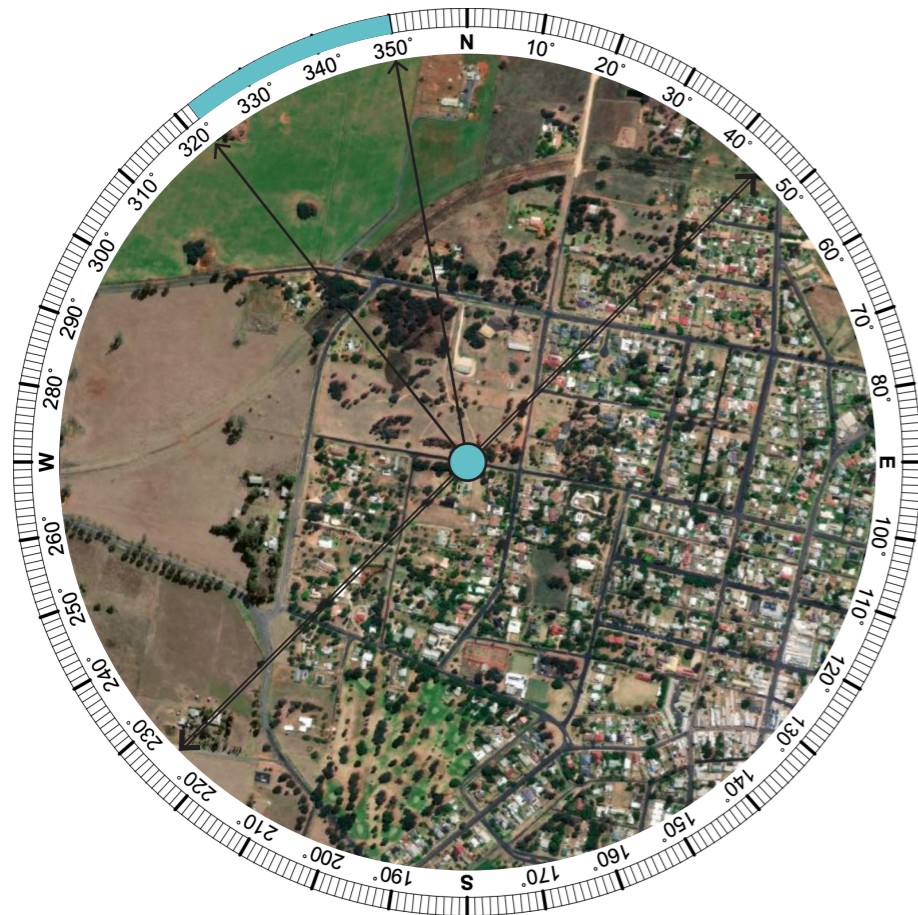
NO

VPA15


180° Wireframe Diagram Assessment



Viewpoint Location




Sensitivity:

 Viewpoint Type: Public (**Moderate**)

Scenic Quality: **Low**


Overall Potential Sensitivity: **Moderate**

Magnitude:

 Number of Occupied Cells: **2**

Magnitude Rating: **Very Low**

Visual Impact Rating:

 Impact Rating: **Low**

Extent of Potential Visibility

Elevation: **459 m**

Distance to Project: **4.86 km**

Aerial Source: ESRI, 2024

Detailed Assessment Required:

NO



APPENDIX C

PRELIMINARY BIODIVERSITY REPORT



Puggoon Solar Farm and Battery Energy Storage System

Preliminary Biodiversity Report

PREPARED FOR

X-ELI⁺

DATE

07 February 2025

REFERENCE

0717476



DOCUMENT DETAILS

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DOCUMENT SUBTITLE	Preliminary Biodiversity Report
PROJECT NUMBER	0717476
Date	07 February 2025
Version	01
Author	Freya Robinson
Client name	X-Elio Aus2 Pty Ltd

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
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Final	01	F. Robinson	M. Aitkens	L. Baker	07.02.2025	Final for lodgement

SIGNATURE PAGE

Puggoon Solar Farm and Battery Energy Storage System

Preliminary Biodiversity Report



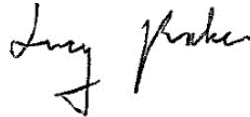
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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
ALA	Atlas of Living Australia
ASC	Australian Soil Classification
BAM	Biodiversity Assessment Methodology 2020
BAM-C	Biodiversity Assessment Methodology Calculator
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offset Scheme
CE	Critically Endangered
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEC	Department of Environment and Conservation
DP	Deposited Plans
DPE	Department of Planning & Environment
DPHI	Department of Planning, Housing and Infrastructure, previously known as DPE
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
DSWPC	Department of Sustainability, Environment, Water, Population & Communities
E	Endangered
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERM	Environmental Resources Management Australia Pty Ltd
GIS	Geographic Information System
ha	Hectare
HBT	Hollow Bearing Trees
IBRA	Interim Biogeographic Regionalisation for Australia
LCA	Land Category Assessment
LGA	Local Government Area
LLS Act	<i>Local Land Services Act 2013</i>
Mi	Migratory
MNES	Matters of National Environmental Significance
MW	Megawatt
MWn	Megawatt nominal
MWp	Megawatt peak
NPWS	NSW National Parks and Wildlife Service

Acronyms	Description
NSW	New South Wales
NVR	Native Vegetation Regulatory
OEH	Office of Environment and Heritage
PBR	Preliminary Biodiversity Report
PCT	Plant Community Type
PMST	Protected Matter Search Tool
PV	Photovoltaic
SAII	Serious and Irreversible Impacts
SEARS	Secretary's Environmental Assessment Requirements
SEED	The Central Resource for Sharing and Enabling Environmental Data in NSW
SF	Solar Farm
SSD	State Significant Development
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
V	Vulnerable
VIS	Vegetation Information System
VZ	Vegetation Zones

1. ASSESSMENT OVERVIEW

X-Elio Aus2 Pty Ltd (X-Elio, or 'the Proponent') proposes to construct and operate the Puggoon Solar Farm and Battery Energy Storage System (BESS) (the Project), a renewable energy development. The Project is anticipated to have an installed capacity of up to 264 megawatts (MW), and a BESS facility with 110 MW / 220 MWh storage capacity.

The Project is located at 40 Jacksons Lane Beryl NSW 2852, which is 4 km northwest of Gulgong and 302 km (by road) north-west of Sydney, in the in the Mid-Western Regional local government area (LGA) in the Central West and Orana region of New South Wales (NSW) (**Figure 2-1**). Yarrobil National Park is located east of the Project area.

The Wallerawang – Gwabegar Railway intersects the centre of the Project Area, running northwest to southeast. An existing Wellington to Wollar 330 kilovolt (kV) overhead transmission line also intersects the Project Area, running southwest to northeast.

1.1 APPLICABLE LEGISLATION AND POLICIES

The Proponent is seeking State Significant Development (SSD) Consent under Division 4.7, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Project. The Proponent has engaged ERM to prepare a Scoping Report for the Project, as a first step in the SSD consent process. The Scoping Report supports an application to the Secretary of the NSW Department of Planning, Housing and Infrastructure (DPHI) for Secretary's Environmental Assessment Requirements (SEARs).

The SEARs will guide the preparation of an Environmental Impact Statement (EIS) for the Project. If the Project is determined as a SSD, Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) will apply to the Project which identifies the mandatory preparation of a BDAR, unless a successful Biodiversity Development Assessment Report (BDAR) Waiver is obtained (s7.14 of the BC Act). A BDAR Waiver is not being requested for this Project. Thus, a BDAR completed in accordance with the Department of Planning, Industry and Environment's (DPIE) *Biodiversity Assessment Method 2020* (BAM) will be prepared to accompany the Project EIS.

1.1.1 BIODIVERSITY OFFSETS SCHEME

Biodiversity Credits are used in the Biodiversity Offsets Scheme (BOS) to resolve residual impacts that a project has on biodiversity values. Biodiversity credits are calculated through the application of the BAM for:

- Unavoidable impacts on biodiversity through the clearing of native vegetation and habitat for the development site; and
- Predicted gain in biodiversity values at a biodiversity stewardship site also known as a conservation area.

This Preliminary Biodiversity Report (PBR) is not a BDAR. The focus of the PBR is the broad characterisation of relevant biodiversity values likely to occur within the Project Area. A BDAR will be prepared as part of the EIS. The BDAR will be used to determine the number of biodiversity credits required to offset the Project's residual and unavoidable impacts. A biodiversity stewardship site does not form part of this PBR.

1.1.2 THE BIODIVERSITY ASSESSMENT METHOD

1.1.2.1 THE ASSESSMENT FRAMEWORK

The BAM comprises of three stages of assessment. This PBR only considers those relevant to the Project being Stages 1 and 2 of the BAM. The elements of the Stage 1 assessment are outlined in **Table 1-1**.

TABLE 1-1 STAGE 1 OF THE BAM

Aspect	Description
Establishing the Site Context	<ul style="list-style-type: none"> • Identification of the Project Area. • Identification of landscape features including Interim Biogeographic Regionalisation for Australia (IBRA) bioregions and subregions, bodies of water, habitat connectivity, geographical features of significance, areas of outstanding biodiversity values, and NSW (Mitchell) landscapes. • Assessment of native vegetation cover on the Project Area. • Identification of Category 1 – Exempt Land.
Assessing Native Vegetation, Threatened Ecological Communities and Vegetation Integrity	<ul style="list-style-type: none"> • Review of existing databases for information on native vegetation communities. • Mapping of the native vegetation in the Project Area, including ground cover and tree canopy cover. • Identification of plant community types (PCTs). • Completing accepted methods of plot-based vegetation surveys (BAM Plots). • Identification of threatened ecological communities (TECs) that are associated with identified PCTs. • Mapping of native vegetation zones and assessment of vegetation integrity.
Assessing Habitat Suitability for Threatened Species	<ul style="list-style-type: none"> • Identification of Ecosystem Credit Species, Species Credit Species and Dual Credit Species. • Scoping of proposed field surveys to address relevant candidate species.
Identifying Prescribed Additional Biodiversity Impacts	<ul style="list-style-type: none"> • Identification of prescribed direct, and indirect impacts on the habitat of threatened species, including geographical features of significance, human-made structures, and non-native vegetation, habitat connectivity, waterbodies, and potential vehicle strike.

Stage 2 of the BAM outlines the requirements for assessing impacts on biodiversity values as identified in Stage 1. It follows the mitigation hierarchy principles of avoid, minimise, and offset. This stage is also used to determine the number and class of biodiversity credits required to offset any remaining impacts to biodiversity that are unavoidable.

1.1.2.2 CHANGES TO THE BAM

Clause 6.31 of the *Biodiversity Conservation Regulation 2017* outlines how an Accredited Assessor can address changes to the BAM that occur whilst preparing a BDAR for a Project. This Clause is reproduced below for clarity:

6.31 Changes in biodiversity assessment method

(1) *If the biodiversity method is changed, a biodiversity assessment report may, during the designated period after the method is changed, be prepared on the basis of the method in force before the change, but only if the report states that it has been prepared on that basis.*

(2) *For the purposes of this clause, the designated period is—*

- (a) *except as provided by this subclause—6 months, or*
- (b) *in the case of a biodiversity development assessment report in respect of State significant development or State significant infrastructure—12 months, or*
- (c) *in the case of a biodiversity certification assessment report for an application that is not a strategic biodiversity certification application—12 months, or*
- (d) *in the case of a biodiversity certification assessment report for a strategic biodiversity certification application—12 months or such longer period as the Minister approves in a particular case.*

The BAM refers to the Threatened Biodiversity Data Collection (TBDC) and NSW BioNet Atlas as resources that **must** be used in preparing a BDAR. A change in the content of these resources has the effect of changing the BAM when preparing a BDAR. Thus, such changes during the preparation of a BDAR for this Project after the date of this PBR may be interpreted as a change to the BAM. On this basis, and with reference to the specified designated periods above, the Accredited Assessor may prepare the BDAR on the basis of the methods in force before the change and in so doing will state this as the case in the BDAR.

This PBR contains site-based information capable of determining the plant community types (PCTs) present within the Project Area, thus provides a sound basis for the generation of the Candidate Species applicable to the Project. Changes in the Candidate Species list after the publishing of this PBR may represent a change in the BAM for a BDAR in preparation and, for this reason, these additional species may be excluded from the assessment. The BDAR will state this if the circumstance arises.

A change to survey methods for Candidate Species specified in the TBDC during the preparation of the BDAR is also interpreted as a change to the BAM. The Accredited Assessor may choose to apply the survey methods in force before the change and, if so, the decision to do so will be stated in the BDAR.

1.1.3 BIODIVERSITY VALUES NOT ASSESSED

The BAM does not assess the following biodiversity values; therefore, these have been excluded from the PBR:

- Marine mammals;
- Wandering seabirds;
- Biodiversity that is endemic to Lord Howe Island; and
- Native vegetation and loss of habitat on category 1-exempt land (within the meaning of Part 5A of the *Local Land Services Act 2013* (LLS Act)), other than the additional biodiversity impacts under clause 6.1 of the BC Regulation (referred to as prescribed impacts in the BAM).

A statewide draft Native Vegetation Regulatory (NVR) is available for review as of March 2024. The NVR map identifies both Category 1 and 2 Land occurring within the Project Area. Site surveys completed aimed to verify/amend this map in preparation for the BDAR.

2. INTRODUCTION

The Proponent is seeking consent for the Project, which is classed as State Significant Development (SSD) under Division 4.7, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). A Biodiversity Development Assessment report (BDAR) prepared in accordance with the BAM is mandatory for such projects unless otherwise waived.

This PBR provides details of initial works associated with the preparation of a BAM compliant BDAR. Initial works have included desktop research, field survey (May 2024) and analysis involving use of the Biodiversity Assessment Method Calculator (BAM-C) (app updated 13/04/2023 10:00 (Version: 1.4.0.00), BAM data updated 14/03/2024 (Version: 67)).

This PBR focuses on the mapping of PCTs and the identification of associated threatened species and ecological community constraints. Additionally, this PBR outlines future survey and assessment requirements, with an approach to addressing residual impacts.

2.1 SUBJECT LAND

X-Elio proposes to develop the Puggoon Solar Farm and BESS in Beryl NSW. The project would include a BESS of 110 MW / 440 MWh and up to 264 MWp of solar power that could be stored for up to 4 hours.

The Project Area is approximately 553 ha and is located north of the Castlereagh Highway. The Project Area is intersected by a railway in the centre and an existing electricity transmission line in the eastern portion of the site.

The allotments within which the Project Area is located are outlined in **Table 2-1**. Lots within the Project Area are zoned RU1 Primary Production or SP2 Infrastructure. The Project boundary is displayed in the location map, **Figure 2-1**.

TABLE 2-1 SUBJECT LAND DESCRIPTION

Feature	Description	
Locality	40 Jacksons Lane Beryl NSW 2852	
Local Government Area	Mid-Western Regional Council	
Lot/DP	Lot 1 DP433484	Lot 217DP750762
	1 433484	Lot 218DP750762
	2 433484	Lot 219DP750762
	2 528667	Lot 222DP750762
	61 750762	Lot 3 DP1078822
	65 750762	Lot 4 DP1078822
	73 750762	Lot 1 DP1145586
	103 750762	Lot 4329 DP 216544
	215 750762	Lot 4330 DP1216545
Zoning	RU1 – Primary Production	
Current land use	The existing land uses surrounding the Project Area are predominantly agricultural and primarily used for irrigated cropping and grazing.	

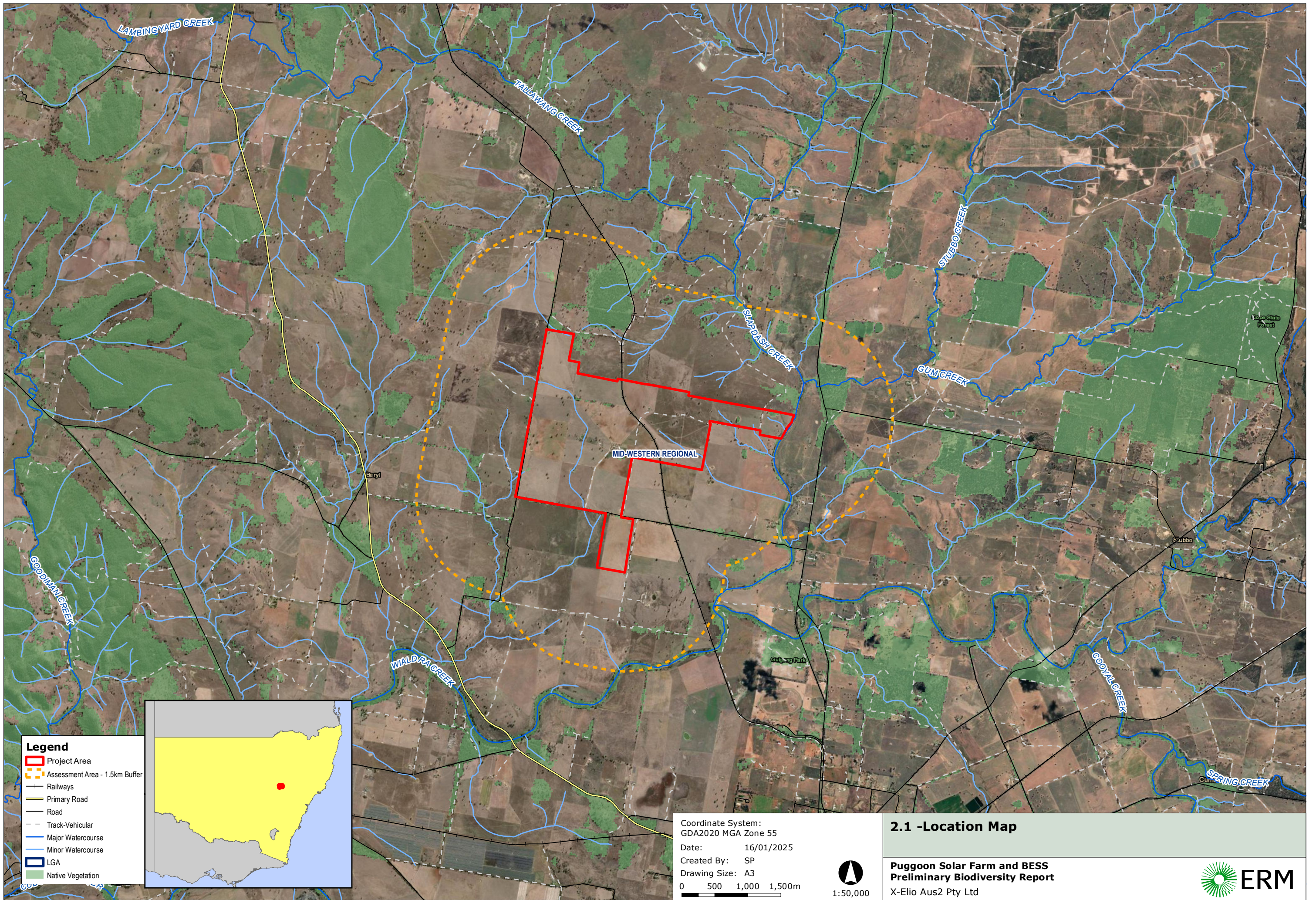
2.1.1 DEVELOPMENT OVERVIEW

The Project involves the construction, operation and decommissioning of a solar farm, a BESS and associated infrastructure. **Table 2-2** summarises the key indicative Project components and specifications. The solar arrays occupy a space of approximately 429 ha. Further details of the project layout including ancillary infrastructure, transmission corridor and access roads will be prepared during the EIS phase.

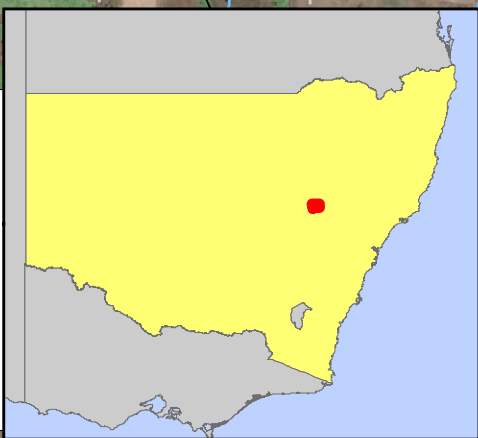
The indicative preliminary Project layout is displayed in **Figure 2-2**, which shows the proposed development footprint for the solar farm, including solar panels, associated ancillary and infrastructure. The indicative layout is subject to further design development during the EIS phase.

TABLE 2-2 PROJECT SPECIFICATIONS

Component	Feature	Specification
Energy generation	Solar Arrays	Approximately 452.8 ha.
Electrical Reticulation Network	On-site substation	New high voltage substation proposed near the intersection of the existing 330 kV transmission line with the existing train line.
	Internal electrical reticulation network (Medium Voltage)	<p>Electrical reticulation will generally follow rows of panels and internal access routes to reach the step-up substation (33 / 330 kV) for the Project.</p> <p>The Project will connect into the substation (33 / 330 kV) on-site directly via underground MV cables (33 kV, internal reticulation voltage).</p> <p>The Project will be connected to the Grid by Switching Station (330 kV) located on-site boundary.</p>
	Switchyard / BESS	Battery energy storage system with a capacity of 110 MW / 220 MWh. Switch and other electrical equipment providing connection to the existing 330 kV transmission network.
Access Roads	Access to site	Access to the Project Area will be from Castlereagh Highway and Puggoon Road and/or via Barneys Reef Road and Jacksons Lane. This will be subject to assessment in the EIS phase.



- Legend**
- Project Area
 - Assessment Area - 1.5km Buffer
 - Railways
 - Primary Road
 - Road
 - Track-Vehicular
 - Major Watercourse
 - Minor Watercourse
 - LGA
 - Native Vegetation




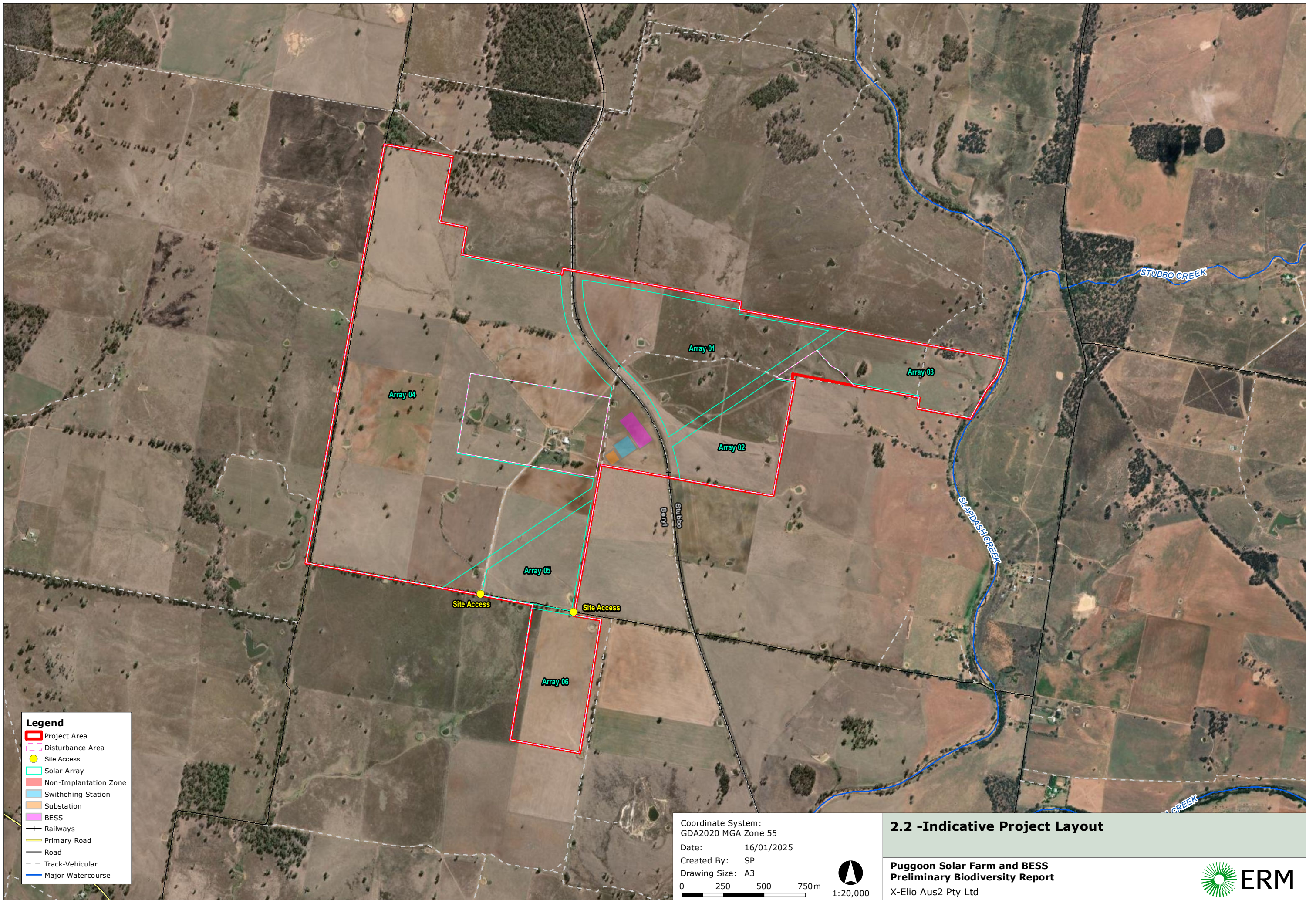
Coordinate System:
GDA2020 MGA Zone 55
Date: 16/01/2025
Created By: SP
Drawing Size: A3
0 500 1,000 1,500m
1:50,000

2.1 -Location Map

**Puggoon Solar Farm and BESS
Preliminary Biodiversity Report**

X-Elio Aus2 Pty Ltd





Legend

- Project Area
- Disturbance Area
- Site Access
- Solar Array
- Non-Implantation Zone
- Switching Station
- Substation
- BESS
- Railways
- Primary Road
- Road
- Track-Vehicular
- Major Watercourse


Coordinate System:
GDA2020 MGA Zone 55
Date: 16/01/2025
Created By: SP
Drawing Size: A3

0 250 500 750m 1:20,000

2.2 - Indicative Project Layout

**Puggoon Solar Farm and BESS
Preliminary Biodiversity Report**

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2.2 METHODS

The following databases and resources were reviewed in preparing this PBR:

- Online Threatened Biodiversity Data Collection (TBDC), including NSW BioNet Atlas and threatened biodiversity profiles;
- Online BioNet Vegetation Classification Database;
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) identifying MNES with potential to occur within the locality (10 km buffer around the Project Area) (Accessed 14 June 2024, provided in **Appendix A**);
- NSW SEED Portal to identify Mitchell Landscapes, hydrology mapping, map of Interim Biographic Regionalisation of Australia (IBRA) version 7;
- NSW eSPADE Soils and Land Mapping;
- Department of Planning, Industry and Environment (DPIE) Australian Soil Classification (ASC) soil type map of NSW, version 4.5;
- NSW DPI Fisheries key fish habitat mapping;
- NSW State Vegetation Type Map (SVTM) C2.0M2.0 (December 2023); and
- Atlas of Living Australia (ALA) Database.

Observations made during the initial site visits were used to verify desktop review findings where applicable, with future surveys to be completed in accordance with the BAM.

2.2.1 SITE CONTEXT

2.2.1.1 LANDSCAPE FEATURES

The following landscape features were identified through desktop review:

- IBRA regions and subregions;
- Native vegetation extent and cleared areas within the Project Area (ha);
- Rivers, streams, estuaries, and wetlands;
- Connectivity features; and
- Areas of geological significance and soil hazard.

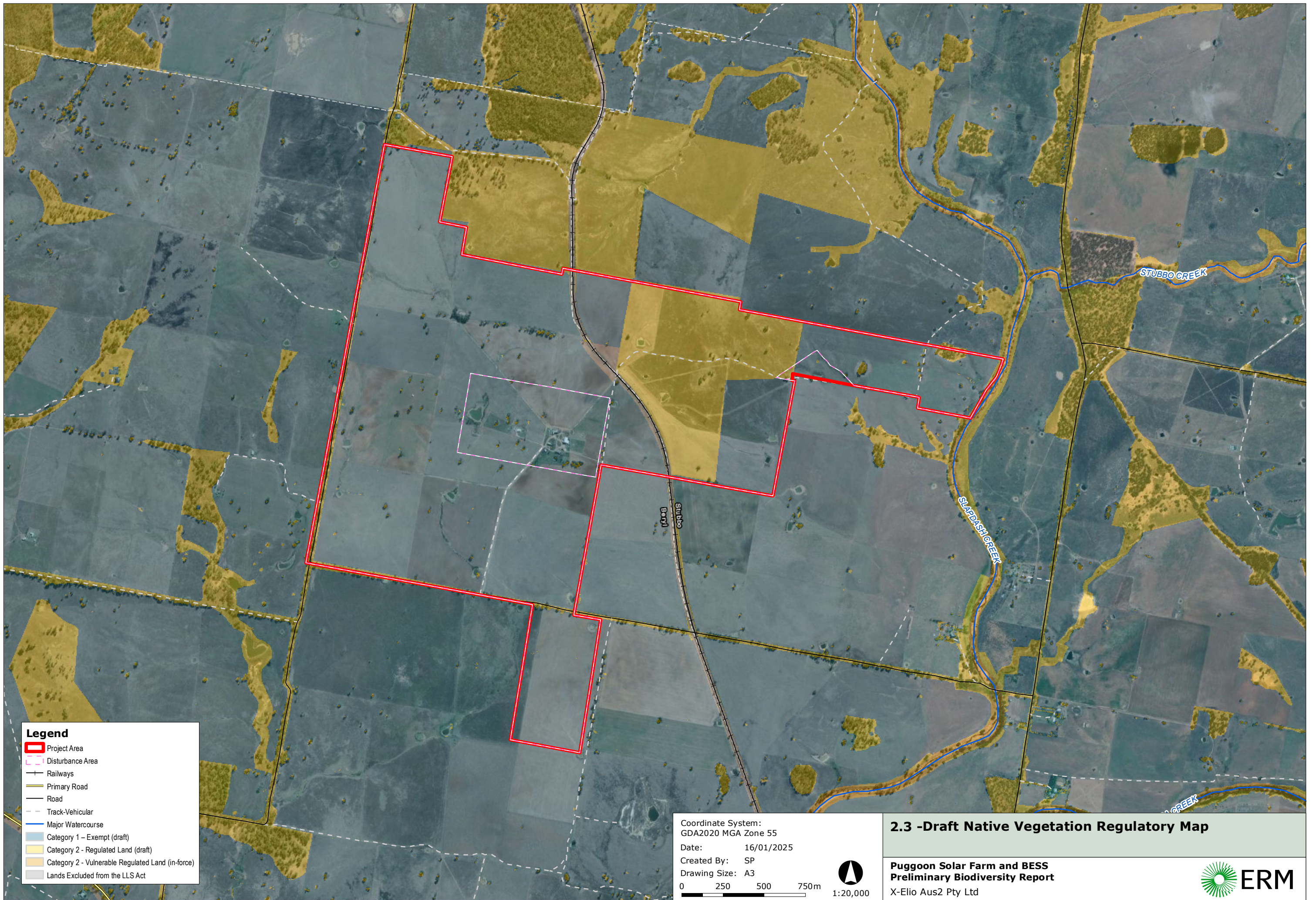
2.2.1.2 LAND CATEGORISATION

Under s60I the *Local Land Services Act 2013*, land is categorised as either:

- Category 1 – Exempt Land; or
- Category 2 – Regulated Land.

Land categorisation for the Project Area was reviewed using the Draft Native Vegetation Regulatory Map (Draft NVR Map), which is shown in **Figure 2-3**.

When preparing the BDAR, the draft NVR map will be reviewed using guidance provided in *Determining native vegetation land categorisation for application in the Biodiversity Offsets Scheme* (DPIE 2023). Any proposed variations to the draft NVR map will be evidence-based and determined through consultation with the Biodiversity, Conservation and Science (BCS) Directorate.



Legend

- Project Area
- Disturbance Area
- Railways
- Primary Road
- Road
- Track-Vehicular
- Major Watercourse
- Category 1 - Exempt (draft)
- Category 2 - Regulated Land (draft)
- Category 2 - Vulnerable Regulated Land (in-force)
- Lands Excluded from the LLS Act

Coordinate System:
GDA2020 MGA Zone 55
Date: 16/01/2025
Created By: SP
Drawing Size: A3
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2.3 -Draft Native Vegetation Regulatory Map

**Puggoon Solar Farm and BESS
Preliminary Biodiversity Report**
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2.2.2 NATIVE VEGETATION TYPES, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY

2.2.2.1 MAPPING NATIVE VEGETATION EXTENT

Initial field surveys were conducted across the Project area between 13 and 16 May 2024. Site evaluation was conducted through rapid vegetation assessments, Land Category Assessment (LCA) transects and BAM plots to determine likely PCTs present.

Further BAM plot sampling and refinement of PCT mapping will be required to be completed in accordance with the BAM to inform an EIS submission.

2.2.2.2 PLOT-BASED VEGETATION SURVEY

BAM plots are required in accordance with section 4.2.1 of the BAM. These plots are used to calculate the vegetation integrity score (VIS) of a plant community. During the initial field surveys, five (5) BAM Plots were completed. These plots consisted of a central 50 m transect and a 20 m by 20 m plot. Data collection within each plot included:

- Identification of all flora species present within the plot area;
- Stratum and layers in which all species occur;
- Growth form of species;
- Abundance rating for each species;
- One 1000 m² (20m by 50 m) plot to assess the function attributes (Number of hollow bearing trees, stem size class, tree regeneration and length of logs); and
- Five 1 m² plots to assess average leaf litter cover, bare earth, cryptogram, and rock cover.

All BAM plots are to be recorded using GIS software and given unique identification for ease of assessment. The location of BAM plots completed to date are shown in **Figure 2-4** .

2.2.2.3 SCATTERED TREE ASSESSMENTS

Scattered trees across the Project Area were assessed in accordance with section B.1 of the BAM. Under the BAM, scattered trees are defined as species listed in the tree growth form group that:

- a. have a percent foliage cover that is less than 25% of the benchmark for tree cover for the most likely plant community type and are on category 2-regulated land and surrounded by category 1-exempt land on the Native Vegetation Regulatory Map under the LLS Act, or
- b. have a DBH of greater than or equal to 5 cm and are located more than 50 m away from any living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or human-made surfaces or bare ground, or
- c. are three or fewer trees that have a DBH of greater than or equal to 5 cm and are within a distance of 50 m of each other, that in turn, are greater than 50 m away from the nearest living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or human-made surfaces or bare ground.

A survey for Candidate Species utilisation of the scattered trees was not made during the initial field survey.

2.2.3 THREATENED FLORA AND FAUNA

2.2.3.1 ASSESSMENT FOCUS

The Project BDAR will identify the habitat suitability for threatened species within the Project area. Species that meet all the relevant criteria will be automatically populated in the BAM-C to be assessed either for ecosystem credits or species credits, being:

- Ecosystem credit species are considered likely to have suitable habitat on the Project Area (currently mapped as the Project Area for the Project) and must be assessed for impacts, including measures taken to avoid, minimise and mitigate impacts. These species are referred to as 'predicted species' in the BAM-C and the assessor must calculate ecosystem credits to offset any residual impact; or
- Candidate species are likely to have suitable habitat on the Project Area (currently mapped as the Project Area for the Project). They are referred to as 'candidate species' in the BAM-C and will require further assessment.

In some circumstances the TBDC may identify a threatened species that requires assessment for ecosystem credits and species credits (referred to as dual credit species). For dual credit species, part of the habitat is assessed as a species credit (e.g., breeding habitat or land mapped on an important habitat map for a species). The remaining habitat components for the species are assessed as an ecosystem credit (e.g., foraging habitat).

Review of the BioNet Atlas and the BAM-C, as informed by site-based survey, was conducted to produce a Candidate Species list relevant to the Project. This has formed the basis for defining the field survey methods, timing and effort for the Project BDAR.

2.2.3.2 LIKELIHOOD OF OCCURRENCE ASSESSMENT

Consistent with the accepted approach for biodiversity assessment, a likelihood of occurrence assessment was undertaken for the Project Area, informed by desktop sources and the initial field survey results. Desktop sources identified several fauna and flora species listed under the EPBC Act and BC Act that have been recorded previously or are predicted to occur within a 10 km buffer of the project boundary (the locality). The likelihood of occurrence approach refines the desktop generated list using site-specific and specific-species habitat information.

The assessment ranks the likelihood of the species occurring within the project boundary through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field survey. The criteria applied are outlined in **Table 2-3**.

TABLE 2-3 LIKELIHOOD OF OCCURRENCE CRITERIA

	Preferred habitat exists	Suitable habitat exists ²	Habitat does not exist ³
Recent ¹ records within the Project Area	Known	Known	Known
Recent records in the Locality ⁴	Likely	Potential	Unlikely
No records within the Locality, but the Project Area is within known distribution	Potential	Unlikely	Unlikely
No records in the Locality, and the Project Area is outside of distribution	Unlikely	Unlikely	Unlikely

1. Recent records are those that have been recorded in the last 20 years.
2. Habitat may be considered suitable, but not preferred because: some desired habitat features may be present, but not all; habitat may have poor connectivity; or habitat may be known to be disturbed.
3. Based on sources reviewed and/or field survey results.
4. 'Locality' refers to a 10 km² buffer around the Project Area and is inclusive of the Project Area.

2.2.3.3 FIELD SURVEYS

ERM ecologists undertook field surveys across the Project Area between Monday 13th May and Thursday 16th May 2024. Field survey methods included vegetation integrity plots (BAM Plots), rapid vegetation assessments, habitat feature mapping and assessments, LCA transects, scattered tree assessments, bird censuses and opportunistic fauna observations. Field survey methods, effort and results are provided in **Table 2-4**, with survey locations presented in **Figure 2-4**.

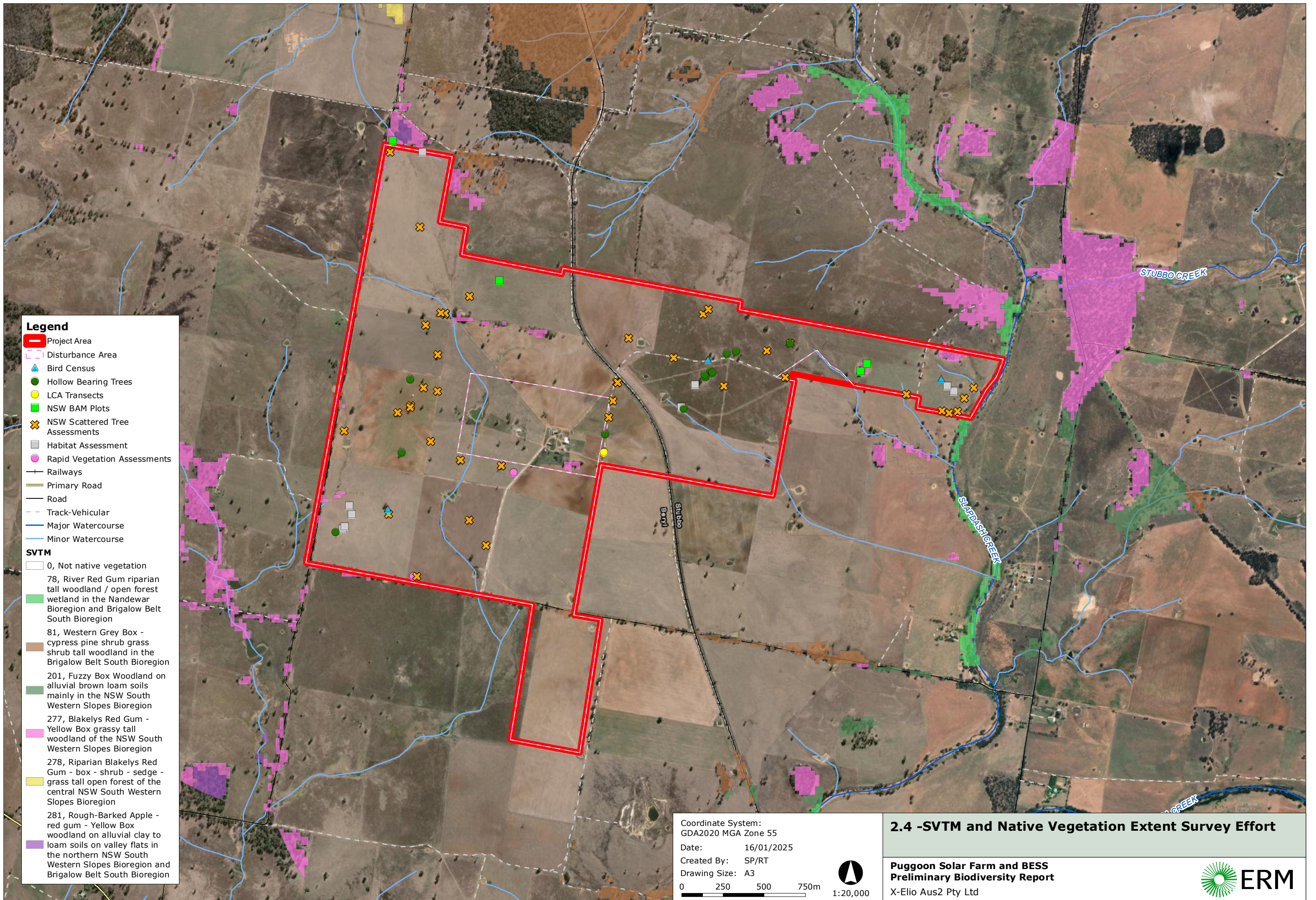
Where possible presence or absence of the following fauna habitat features were noted during the survey:

- Water sources with emergent vegetation;
- Large stick nests;
- Fallen/standing dead timber and logs;
- Mistletoe presence and abundance; and
- Hollow-bearing trees (HBT) with hollows greater than 20cm diameter.

The BAM requires targeted surveys for candidate species where suitable habitat is identified. Targeted flora and fauna surveys will be required in accordance with the requirements of the BAM, as part of the EIS phase. The initial survey of the Project Area is sufficient for defining the foundational elements of the Project BDAR and EPBC Act referral; however, it is acknowledged that additional surveys performed in accordance with the BAM, associated databases and applicable guidelines will be required in finalising the BDAR.

TABLE 2-4 FIELD SURVEY METHODS, EFFORT AND RESULTS

Method	Target species	Applicable Guidelines	Effort	Comment
LCA Transect	<ul style="list-style-type: none"> Groundcover species 	<ul style="list-style-type: none"> NSW OEH (2017) Interim Grasslands and other Groundcover Assessment Method 	<ul style="list-style-type: none"> 15 LCA Transects completed An additional 5 transects were aborted due to areas of homogeneous cropping 	<ul style="list-style-type: none"> LCA transects were conducted to inform whether grassland areas subject to cropping and grazing were to be classified as native or non-native. The findings of the LCA transects will be used to support the Land Category Assessment Report.
BAM plots	<ul style="list-style-type: none"> All flora species 	<ul style="list-style-type: none"> BAM 2020 	<ul style="list-style-type: none"> 5 BAM plots conducted across 3 vegetation zones 	<ul style="list-style-type: none"> To support the submission of a BDAR, additional BAM plots will be required to generate the Vegetation Integrity (VI) score of all vegetation zones present within the Project Area.
Rapid Vegetation Assessments	<ul style="list-style-type: none"> All flora species 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> 14 rapid vegetation assessments 16 vegetation polygons created 	<ul style="list-style-type: none"> Rapid vegetation assessments conducted focused on areas of cropping where no additional assessment is required. Vegetation polygons were created to map areas of native vegetation where further assessment is required.
Habitat Quality Assessments	<ul style="list-style-type: none"> Amphibians Reptiles Birds (inc. owls) Mammals 	<ul style="list-style-type: none"> TBDC species specific habitat descriptions 	<ul style="list-style-type: none"> 31 habitat features mapped as polygons or points 20 hollow bearing trees (HBTs) were recorded 	<ul style="list-style-type: none"> Habitat quality assessments/HBTs were completed at a high-level to identify areas of potential habitat for threatened and protected fauna species. Hollow bearing trees only includes those within patches of vegetation, scattered trees containing hollows was noted under the scattered tree assessment.
Scattered Tree Assessments	<ul style="list-style-type: none"> All native tree species 	<ul style="list-style-type: none"> Appendix B of BAM 2020 	<ul style="list-style-type: none"> 70 trees assessed against the BAM 2020 guidelines for definition as a 'scattered tree' 	<ul style="list-style-type: none"> Trees were assessed for their height, diameter at breast height (DBH), species, presence of hollows, distance from nearest tree and nativity of understorey for assessment against the scattered tree guidelines. Not all trees assessed under the scattered tree assessment meet the definition of a scattered tree.
Bird Census Surveys	<ul style="list-style-type: none"> All avian species 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> A total of seven 20-minute bird census surveys were conducted across 4 sites. 	<ul style="list-style-type: none"> Bird census surveys were conducted in order to detect any threatened or protected bird species and create an understanding of habitat use across the Project Area.



Legend

- ▬ Project Area
- Disturbance Area
- ▲ Bird Census
- Hollow Bearing Trees
- LCA Transects
- NSW BAM Plots
- ✕ NSW Scattered Tree Assessments
- Habitat Assessment
- Rapid Vegetation Assessments
- + Railways
- Primary Road
- Road
- - - Track-Vehicular
- Major Watercourse
- Minor Watercourse

SVTM


- 0, Not native vegetation
- 78, River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
- 81, Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion
- 201, Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- 277, Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
- 278, Riparian Blakelys Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
- 281, Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion

Coordinate System:
GDA2020 MGA Zone 55
Date: 16/01/2025
Created By: SP/RT
Drawing Size: A3
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2.4 -SVTM and Native Vegetation Extent Survey Effort

Puggoon Solar Farm and BESS Preliminary Biodiversity Report

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2.2.4 WEATHER CONDITIONS

The weather conditions during the survey event were appropriate for the survey of a variety of flora and fauna species. 10 mm of rain had fallen on Monday 13th May, prior to commencement of surveys and an additional ~30 mm of rain had fallen earlier in the month, despite this rain dams contained low to moderate levels of water. Daily weather observations from nearby Gulgong weather station (Station No. 062013) are presented in in **Table 2-5**.

TABLE 2-5 WEATHER CONDITIONS DURING SITE SURVEYS

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)	Wind Speed at 3pm (km/h)
13/05/2024	6.7	21.4	10.4	11
14/05/2024	6.0	22.1	0	11
15/05/2024	5.7	21.9	0	11
16/05/2024	6.5	20.6	0	6

Retrieved from Bureau of Meteorology [Gulgong, NSW - Daily Weather Observations \(bom.gov.au\)](https://www.bom.gov.au)

2.3 AUTHORS AND CONTRIBUTORS

This report was prepared by:

- Freya Robinson, ERM Ecologist, Bachelor of Biological Science (Botany and Ecology); and
- Jessica Gardner, ERM Senior Ecologist, Master of Science (Biosciences).

This report was reviewed by BAM Accredited Assessor Mark Aitkens (BAAS 17034), ERM Principal Ecologist, Bachelor of Science (Environmental Biology).

Field work was completed by:

- Freya Robinson;
- Jessica Gardner; and
- Mark Aitkens.

2.4 LICENSING

The flora and fauna surveys undertaken for the PBR were conducted under the NSW Scientific Licence SL100196 held by ERM.

3. SITE CONTEXT

3.1 LANDSCAPE FEATURES

The Assessment Area for a non-linear development is defined as a 1,500 m buffer applied to the Project Area. The Assessment Area is used to assess the landscape features and extent of native vegetation beyond the Project Area. The Assessment Area and landscape features contained within it, as defined in Sections 4.2 and Section 4.3 of the BAM, are presented in **Table 3-1**.

TABLE 3-1 LANDSCAPE FEATURES

Landscape Feature	Description
IBRA Bioregion and Subregion	The Project Area and Assessment Area occur within the Inland Slopes subregion of the NSW South Western Slopes IBRA bioregion (Figure 2-1).
NSW (Mitchell) Landscape Regions	<p>The Project Area is situated in the Cope Hills Granite Landscape Region. A small section of the eastern most boundary falls into the Talbragar-Upper Macquarie Terrace Sands and Gravels Landscape Region which occurs along Slapdash Creek to the east and Wialdra Creek to the south that occur within the Assessment Area. Just beyond the west of the Assessment Area is the Gulgong Ranges Landscape Region.</p> <p>The Cope Hills Granite Landscape Region is described as "Undulating and rolling hills on Carboniferous granite and granodiorite, general elevation 500 to 740m, local relief 150m. Gritty gradational red earth and red texture-contrast soils. Forest of yellow box (<i>Eucalyptus melliodora</i>), Blakely's red gum (<i>Eucalyptus blakelyii</i>), red stringybark (<i>Eucalyptus macrorhyncha</i>), apple box (<i>Eucalyptus bridgesiana</i>), mountain gum (<i>Eucalyptus dalrympleana</i>) and black cypress pine (<i>Callitris endlicheri</i>)." (Mitchell, 2002).</p>
Rivers, Streams, Estuaries, and Wetlands	<p>The Project Area is located north of the Cudgegong River and Wialdra Creek. Slapdash Dreek occurs along the eastern boundary of the Project Area. NSW Hydrography mapping (Figure 2-1) shows that three unnamed ephemeral watercourses intersect the Project Area. Farm dams occur throughout the Project Area. These artificial features possess low vegetation quality with minimal or no floating, fringing, emerged and submerged vegetation present. The development footprint of the Project has avoided these features.</p> <p>There are no Ramsar Wetlands or Important Wetlands as listed in the Directory of Important Wetlands of Australia located within the Project Area.</p>
Habitat Connectivity	<p>Habitat connectivity throughout the Project Area is considered as low. Small patches of woodland occur as isolated patches and are disjunct from other vegetated areas. Local habitat connectivity is mostly restricted to vegetation along fence lines, roadsides and riparian areas. Riparian vegetation present on the eastern boundary along Slapdash Creek continues north and south and connects with other patches of creek line vegetation in the broader landscape. Larger patches of wooded vegetation occur to the north-west of the Project Area of which some connectivity is present. Connectivity to the Yarrobil State Forest, Tuckland State Forest and the State Conservation Area, all west of the Project Area, is considered negligible.</p> <p>The habitat connectivity present will be of greatest value to fauna species that utilise the canopy for dispersal (e.g. avian species).</p>

Landscape Feature	Description
Geological Features of Significance	There are no karsts, caves, crevices, cliffs or other geological features of significance present within the Project Area.
Areas of Outstanding Biodiversity	No areas of outstanding biodiversity values occur within the Project Area.
Soil Hazard Features	<p>A search of the eSPADE database found that the overall hazard of the land and soil capability of the Project Area is ranked as 5 meaning there are severe limitations.</p> <p>A search of the ASC Soil Type Map reveals that the Sodosols soil type occurs across the entirety of the Project Area. Sodosols are categorised as soils with strong texture contrast between A horizons and sodic B horizons which are not strongly acid.</p> <p>A search of the NSW Environment Protection Authority Contaminated Sites Register returned 1 current results for the Mid-Western Regional Council LGA:</p> <ul style="list-style-type: none"> • Mobil Depot, Mudgee <p>None of these results are in proximity to the Project Area and expected to impact the Project.</p>

3.2 NATIVE VEGETATION COVER

The native vegetation cover of the Assessment Area was determined in accordance with Section 3.2 of the BAM. Native vegetation cover within the Assessment Area is used to inform the BAM-C in predicting Candidate Species relevant to the assessment. Native vegetation occurring within the Project area was calculated using field-based survey results, in combination with data extracted from the recently published draft NVR Map. Broad assumptions have been made in determining the extent of native vegetation cover as outlined below:

- Category 1 – Exempt lands (draft): These lands are likely to have been cleared in the past for cropping and other high intensity agricultural activities. While native vegetation may occur across lands in this category, it is likely to be substantially disturbed and may be cleared without any requirement for regulatory approvals;
- Category 2 – Vulnerable Regulated Land (In-Force): These lands, which include riparian zones, steep lands and specially mapped areas are assumed to be 100% covered by native vegetation; and
- Category 2 – Regulated land (Draft): These lands are likely to comprise native vegetation cover as the predominant land use of the area (excluding cropping lands) is livestock grazing with limited pasture improvement. It has been assumed that the conservation value of the groundcover is at least medium.

The extent of native vegetation across the Assessment Area is summarised in **Table 3-2**, which includes the parameters used in the BAM-C for percentage of native vegetation cover and the cover class which was found to be 0 - 10%. The extent of native vegetation within the Assessment Area is shown in **Figure 2-1**.

TABLE 3-2 NATIVE VEGETATION COVER IN THE ASSESSMENT AREA

Description	Value
Assessment Area	3,308.72 ha
Total area of native vegetation cover	299.12 ha
Percentage of native vegetation cover	9.04%
Class (0-10, >10-30, >30-70 or >70%)	0-10%

3.2.1 PATCH SIZE

Patch size of each Vegetation Zone within the Project Area was determined in accordance with Section 4.3.2 of the BAM. Patch size is defined in the BAM as an area of intact native vegetation that occurs on the development site and includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or 30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site.

Three patch sizes have been determined to occur within the Project Area:

- <5 ha (Vegetation Zones 1 and 2);
- 5-<25 ha (Vegetation Zones 4 and 5); and
- 100 ha (Vegetation Zone 7).

3.3 LAND CATEGORY ASSESSMENT

The development of the solar farm and BESS will require assessment using the BAM and the preparation of a BDAR to support the submission of the Environmental Impact Statement (EIS). Part 6 Division 2 section 6.8 (3) of the NSW *Biodiversity Conservation Act 2016* (BC Act) determines that the BAM is to exclude the assessment of the impacts of clearing of native vegetation on Category 1 - exempt land (within the meaning of Part 5A of the NSW *Local Land Services Act 2013* (LLS Act)), other than prescribed impacts (e.g., impacts on the habitat of threatened species). This determination is repeated in section 1.5 (1)(d) of the BAM.

BAM accredited assessors may establish a reasonable approximation of land categorisation for the Environment Agency Head to consider. An outline of an evidence-based approach to identifying NVR map land categorisation, and the biodiversity assessment requirements in relation to Category 1 – exempt land, is provided in the guide *Determining native vegetation land categorisation for application in the Biodiversity Offsets Scheme* (State Government of NSW and DPE, 2023).

An LCA Report will be prepared separately to this PBR, and will include the full details for the reasonable approximation of land categorisation for the Subject Land of the Project. Initial surveys, including LCA transects, have informed the proposed field verified PCT mapping, with proposed Category 1 – exempt land mapped as PCT 0, Non-native (**Figure 4-1**).

3.4 OPPORTUNISTIC OBSERVATIONS

Opportunistic sightings of species were recorded during the surveys conducted in May 2024. Additionally, bird census surveys were conducted in three locations for 20 minutes, repeated over two days. Despite historic clearing, pasture improvement activities and supporting livestock, the Project Area was observed to be utilised by several native and introduced fauna species, including several common woodland bird species.

A running list of fauna species observed opportunistically and through bird census surveys during the May 2024 surveys was recorded, presented in **Appendix B**.

4. NATIVE VEGETATION, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY

This section describes the PCTs present across the Project area, as identified during field survey events, in accordance with the requirements of Section 4 of the BAM as listed below:

- Vegetation formation and class;
- Species relied upon for identification of vegetation type and relative abundance;
- Justification of evidence used to identify a PCT (as outlined in paragraph 5.2.1.12 of the BAM);
- TEC status (as outlined in paragraph 5.2.1.14-15 of the BAM); and
- Estimate percentage cleared value of PCT (as outlined in paragraph 5.2.1.16 of the BAM).

In this assessment, lands classified as Category 1-exempt vegetation on the Draft NVR Map have been interpreted as lands not comprising native vegetation.

4.1 MAPPING PCTS AND ECOLOGICAL COMMUNITIES

4.1.1 PCTS WITHIN THE PROJECT AREA

The SVTM has identified three candidate PCTs as occurring in the Project Area:

- PCT 78 – River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion;
- PCT 81 – Western Grey Box - cypress pine shrub grass shrub tall woodland in the Brigalow Belt South Bioregion; and
- PCT 277 – Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion.

An additional four PCTs are mapped within the Assessment Area (a 1.5 km buffer applied to the Project Area) under the SVTM:

- PCT 201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion;
- PCT 278 - Riparian Blakelys Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion;
- PCT 281 - Rough-Barked Apple - red gum - Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South Western Slopes Bioregion and Brigalow Belt South Bioregion; and
- PCT 478 - Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion.

Five BAM plots, 15 LCA Transects, 14 rapid vegetation assessments and 16 vegetation polygons were completed within the Project Area in order to verify the PCTs present. The initial field survey has aided the identification of nine (9) vegetation zones as listed below:

- VZ1: PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions – Woodland;
- VZ2: PCT 201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion – Woodland;

- VZ3: PCT 201 – Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion – Scattered Trees;
- VZ4: PCT 277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion – Woodland;
- VZ5: PCT 277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion – Grassland;
- VZ6: PCT 277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion – Scattered Trees;
- VZ7: PCT 278 – Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion – Woodland;
- VZ8: PCT 0 – Non-native – Low Conservation Value; and
- VZ9: PCT 0 – Non-native – Modified.

Vegetation Zones 5, 8 and 9 are further assessed to establish a reasonable approximation of land categorisation in the LCA report (prepared separately to this document). A description of the four PCTs confirmed to occur within the Project Area (PCTs 76, 201, 277 and 278) are provided in **Table 4-1** through **Table 4-4** and the proposed field verified PCT mapping is displayed in **Figure 4-1**.

TABLE 4-1 PCT 76 DESCRIPTION

PCT 76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	
PCT ID	76
PCT name	Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
Vegetation formation	Grassy Woodlands
Vegetation class	Floodplain Transition Woodlands
TEC Status	PCT 76 is associated with: <ul style="list-style-type: none"> • Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions listed as Endangered under the BC Act • Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia listed as Endangered under the EPBC Act
Percent cleared value	92.00%
BioNet VIS PCT Description	Tall woodland to 25 m high dominated by Western Grey Box (<i>Eucalyptus microcarpa</i>) often as the only tree species often occupying 90% of the canopy cover but other trees may include Yellow Box (<i>Eucalyptus melliodora</i>), White Cypress Pine (<i>Callitris glaucophylla</i>) and minor Buloke. The shrub layer is absent or sparse and includes <i>Dodonaea viscosa</i> subsp. <i>cuneata</i> , <i>Acacia buxifolia</i> , <i>Acacia acinacea</i> , <i>Acacia hakeoides</i> , <i>Bursaria spinosa</i> . Grazing has eliminated these shrubs in many places. A mid-dense or dense grass ground cover is present composed of <i>Austrodanthonia caespitosa</i> , <i>Austrodanthonia setacea</i> , <i>Austrostipa scabra</i> subsp. <i>falcata</i> , <i>Paspalidium constrictum</i> , <i>Themeda australis</i> , <i>Austrostipa aristiglumis</i> , <i>Aristida behriana</i> and <i>Elymus scaber</i> var. <i>scaber</i> along with introduced grass species such as <i>Bromus</i> spp., <i>Vulpia</i> spp. and <i>Hordeum leporinum</i> . The small scrambler <i>Einadia nutans</i> subsp. <i>nutans</i> is usually present. Native forbs include <i>Sida corrugata</i> , <i>Wahlenbergia gracilis</i> , <i>Vittadinia gracilis</i> , <i>Dianella porracea</i> , <i>Oxalis perennans</i> and <i>Chamaesyce drummondii</i> .

PCT 76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions

Description within Project Area	PCT 76 was observed as a single patch of woodland in the north-east of the Project Area in proximity to an ephemeral creek line in a lower elevation area. Further to the east where elevation is further decreased and in proximity to the perennial Slapdash Creek the vegetation transitions into PCT 201 and to the west where elevation increases the vegetation transitions into PCT 277. The patch of PCT 76 within the Project Area is solely comprised of <i>Eucalyptus microcarpa</i> in the canopy and an understorey dominated by <i>Lolium perenne</i> .
Associated species present	<i>Eucalyptus microcarpa</i> , <i>Enchylaena tomentosa</i>
Vegetation Zones	One vegetation zone was observed for PCT 76: <ul style="list-style-type: none"> • Vegetation Zone 1: PCT 76 Woodland (0.40 ha)
BAM Plots	1 BAM Plot was completed within Vegetation Zone 1: <ul style="list-style-type: none"> • BAM02



PHOTOGRAPH 1 PCT 76, VEGETATION ZONE 1

TABLE 4-2 PCT 201 DESCRIPTION

PCT 201 Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	
PCT ID	201
PCT name	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
TEC Status	PCT 201 is associated with: <ul style="list-style-type: none"> Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions listed as Endangered under the BC Act.
Percent cleared value	94.00%
BioNet VIS PCT Description	Tall woodland or open forest dominated by Fuzzy Box (<i>Eucalyptus conica</i>) often growing with Western Grey Box (<i>Eucalyptus microcarpa</i>), Yellow Box (<i>Eucalyptus melliodora</i>) or Kurrajong (<i>Brachychiton populneus</i> subsp. <i>populneus</i>). Buloke (<i>Allocasuarina luehmannii</i>) is common in places. Shrubs are generally sparse and include <i>Acacia deanei</i> subsp. <i>deanei</i> , <i>Dodonaea viscosa</i> subsp. <i>cuneata</i> , <i>Geijera parviflora</i> , <i>Acacia implexa</i> , <i>Senna artemisioides</i> sens lat., <i>Myoporum montanum</i> and <i>Cassinia aculeata</i> . Small shrubs include <i>Maireana enchylaenoides</i> , <i>Maireana microphylla</i> and <i>Sclerolaena muricata</i> var. <i>muricata</i> . The ground cover may be dense after rain but is usually mid-dense and may be dominated by weed species. Native forbs include <i>Calotis cuneifolia</i> , <i>Eremophila debilis</i> , <i>Sida corrugata</i> , <i>Einadia hastata</i> , <i>Dianella revoluta</i> var. <i>revoluta</i> and <i>Xerochrysum viscosa</i> . Native grasses include <i>Austrostipa scabra</i> subsp. <i>scabra</i> , <i>Chloris truncata</i> , <i>Elymus scaber</i> var. <i>scaber</i> , <i>Themeda australis</i> and <i>Austrodanthonia setacea</i> . Weeds may be very common. They include the pepper Tree <i>Schinus areica</i> and forb species such as <i>Plantago lanceolata</i> , <i>Lepidium africanum</i> , <i>Verbena bonariensis</i> and <i>Marrubium vulgare</i> and the grass species <i>Bromus diandrus</i> , <i>Vulpia myuros</i> , <i>Lolium perenne</i> and <i>Paspalum dilatatum</i> .
Description within Project Area	PCT 201 was observed in the far north-east of the Project Area, as two woodland patches and encompassing all the scattered trees within the far eastern paddock in proximity to Slapdash Creek. The canopy species within these patches include <i>Eucalyptus conica</i> , <i>E. melliodora</i> , <i>E. blakelyi</i> and <i>Brachychiton populneus</i> subsp. <i>populneus</i> and the understorey is predominately comprised of <i>Austrostipa ramosissima</i> .
Associated species present	<i>Eucalyptus conica</i> , <i>Eucalyptus melliodora</i> , <i>Eucalyptus blakelyi</i> , <i>Brachychiton populneus</i> subsp. <i>populneus</i> , <i>Einadia hastata</i> , <i>Calotis cuneifolia</i> , <i>Cheilanthes sieberi</i> , <i>Rumex brownii</i>
Vegetation Zones	Two vegetation zones were observed for PCT 201: <ul style="list-style-type: none"> Vegetation Zone 2: PCT 201 Woodland (1.55 ha) Vegetation Zone 3: PCT 201 Scattered Trees (0.07 ha)
BAM Plots	One BAM Plots was completed within Vegetation Zone 2: <ul style="list-style-type: none"> BAM03

PCT 201 Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion



PHOTOGRAPH 2 PCT 201, VEGETATION ZONE 2



PHOTOGRAPH 3 PCT 201, VEGETATION ZONE 3

TABLE 4-3 PCT 277 DESCRIPTION

PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	
PCT ID	277
PCT name	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
TEC Status	<p>PCT 277 is associated with:</p> <ul style="list-style-type: none"> White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions listed as Critically Endangered under the BC Act. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland listed as Critically Endangered under the EPBC Act.
Percent cleared value	94.00%
BioNet VIS PCT Description	Tall woodland to about 20 m high dominated by Blakely's Red Gum (<i>Eucalyptus blakelyi</i>) and Yellow Box (<i>Eucalyptus melliodora</i>). Blakely's Red Gum or Yellow Box vary in their dominance and either can be absent in some places grading into areas with more Apple Box (<i>Eucalyptus bridgesiana</i>), Long-leaved Box (<i>Eucalyptus goniocalyx</i>) and rarely <i>Eucalyptus microcarpa</i> . Shrubs are sparse or absent and may include <i>Acacia dealbata</i> . The ground cover may be dense to sparse depending on rainfall and is dominated by grass species including <i>Poa sieberiana</i> , <i>Bothriochloa macra</i> , <i>Aristida ramosa</i> , <i>Themeda australis</i> , <i>Austrodanthonia</i> spp. and <i>Austrostipa</i> spp. Forbs include <i>Vittadinia cuneata</i> , <i>Chrysocephalum apiculatum</i> and <i>Sida corrugata</i> .
Description within Project Area	PCT 277 was observed throughout the majority of the Project Area mostly presenting as scattered trees in combination with areas of native grassland and woodland matrices. The characteristic canopy species present includes
Associated species present	<i>Eucalyptus blakelyi</i> , <i>Eucalyptus melliodora</i> , <i>Eucalyptus albens</i> , <i>Eucalyptus microcarpa</i> , <i>Eucalyptus conica</i> , <i>Eucalyptus goniocalyx</i> , <i>Bothriochloa macra</i> , <i>Aristida ramosa</i> , <i>Chloris truncata</i> , <i>Sida corrugata</i>
Vegetation Zones	<p>Three vegetation zones were observed for PCT 277:</p> <ul style="list-style-type: none"> Vegetation Zone 4: PCT 277 Woodland (2.77 ha) Vegetation Zone 5: PCT 277 Grassland (5.39 ha) Vegetation Zone 6: PCT 277 Scattered Trees (1.33 ha)
BAM Plots	<p>1 BAM Plot was completed within Vegetation Zone 5:</p> <ul style="list-style-type: none"> BAM01

PCT 277 Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion



PHOTOGRAPH 4 PCT 277, VEGETATION ZONES 4 AND 5



PHOTOGRAPH 5 PCT 277, VEGETATION ZONE 6

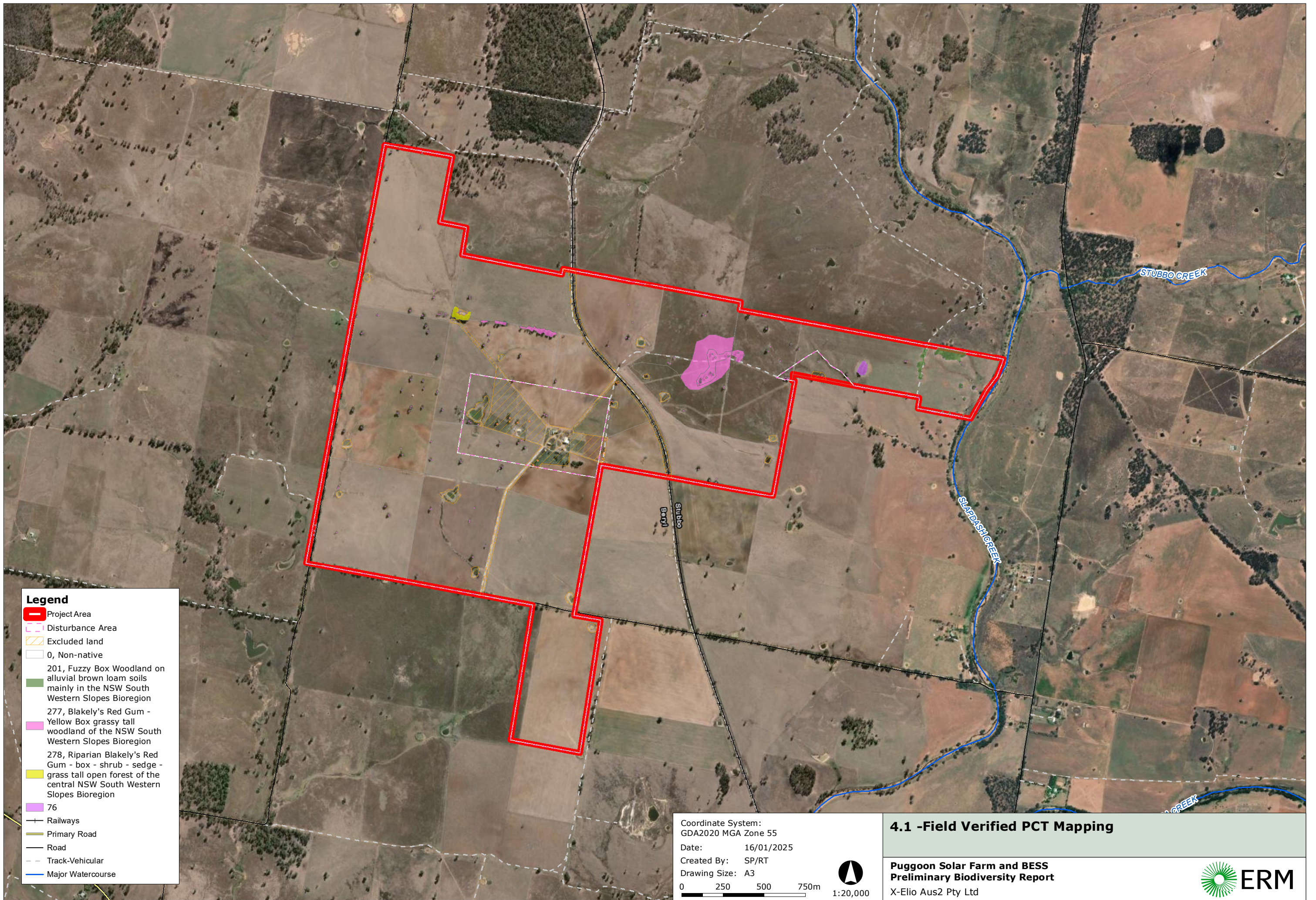
TABLE 4-4 PCT 278 DESCRIPTION

PCT 278 Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion	
PCT ID	278
PCT name	Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Vegetation formation	Grassy Woodlands
Vegetation class	Western Slopes Grassy Woodlands
TEC Status	<p>PCT 278 is associated with:</p> <ul style="list-style-type: none"> White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions listed as Critically Endangered under the BC Act; and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland listed as Critically Endangered under the EPBC Act
Percent cleared value	80.00%
BioNet VIS PCT Description	<p>Tall open forest or woodland dominated by Blakely's Red Gum (<i>Eucalyptus blakelyi</i>) often with Yellow Box (<i>Eucalyptus melliodora</i>), Apple Box (<i>Eucalyptus bridgesiana</i>) or Long-leaved Box (<i>Eucalyptus goniocalyx</i>). Shrubs are sparse and usually contain a number of wattles (<i>Acacia</i> spp.) with tea tree (<i>Leptospermum</i> spp.) or hopbush (<i>Dodonaea viscosa</i> var. <i>cuneata</i>). The ground cover is often dense containing sedges such as <i>Carex appressa</i> and other <i>Carex</i> species. Rushes (<i>Juncus</i> spp.) may be common in wet sites. Grasses include <i>Poa labillardierei</i> var. <i>labillardierei</i> and <i>Microlaena stipoides</i> var. <i>stipoides</i>. Forbs include <i>Rumex brownii</i>, <i>Ranunculus</i> spp., <i>Hydrocotyle laxiflora</i>, <i>Dichondra repens</i>, <i>Dianella revoluta</i> var. <i>revoluta</i>, <i>Geranium retrorsum</i>, <i>Acaena ovina</i>, <i>Persicaria lapathifolia</i> and <i>Ranunculus sessiliflorus</i> var. <i>sessiliflorus</i>. Occurs on deep alluvial silty clay-loam soils in gullies and on creek flats in hill landscapes or along creeks mainly in the Upper Slopes sub-region of the NSW South-western Slopes Bioregion.</p>
Description within Project Area	<p>PCT 278 was observed along an ephemeral watercourse in the north-west corner of the Project Area and beside a dam approximately 1km south-east of the corner. Diagnostic canopy species were observed (<i>Eucalyptus melliodora</i>, <i>Eucalyptus blakelyi</i>), a shrub layer was absent and groundcover species, while having a high level of weeds, were consistent with the characteristic species of the PCT.</p>
Associated species present	<i>Eucalyptus melliodora</i> , <i>Eucalyptus blakelyi</i> , <i>Hydrocotyle laxiflora</i> , <i>Rumex brownii</i> , <i>Microlaena stipoides</i>
Vegetation Zones	<p>One vegetation zone was observed for PCT 278:</p> <ul style="list-style-type: none"> Vegetation Zone 7: PCT 278 Woodland (0.51 ha)
BAM Plots	<p>1 BAM Plot was completed within Vegetation Zone 7:</p> <ul style="list-style-type: none"> BAM04

PCT 278 Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion



PHOTOGRAPH 6 PCT 278, VEGETATION ZONE 7



Legend

- Project Area
- Disturbance Area
- Excluded land
- 0, Non-native
- 201, Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- 277, Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
- 278, Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
- 76
- Railways
- Primary Road
- Road
- Track-Vehicular
- Major Watercourse

Coordinate System:
GDA2020 MGA Zone 55

Date: 16/01/2025

Created By: SP/RT


Drawing Size: A3

0 250 500 750m 1:20,000

4.1 -Field Verified PCT Mapping

Puggoon Solar Farm and BESS Preliminary Biodiversity Report

X-Elio Aus2 Pty Ltd



4.2 THREATENED ECOLOGICAL COMMUNITIES

PCTs mapped across the Project area were reviewed to identify any potential TEC associations, in addition to those provided via the PMST results. The potential TECs considered are provided in **Table 4-5**.

TABLE 4-5 POTENTIAL TECs ACROSS THE PROJECT AREA

TEC	EPBC Act	BC Act	Likelihood to occur within Project Area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland/White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	CE	CE	Likely This community is being assessed against Vegetation Zones 4, 5 and 7. Refer to Section 4.2.1 for further discussion. Additional BAM plots and vegetation assessments required to determine presence.
Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	-	E	Known This community is being assessed against Vegetation Zone 2 and was found to confirm. Refer to Section 4.2.2 for further discussion.
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia/Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penepplain, Nandewar and Brigalow Belt South Bioregions	E	E	Known This community is being assessed against Vegetation Zone 1 and was found to conform to both listed communities. Refer to Section 4.2.3 for further discussion.
Coolibah – Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions/Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain and Mulga Lands Bioregions	E	E	Unlikely Diagnostic canopy species (<i>Eucalyptus coolabah</i> subsp. <i>coolabah</i> and/or <i>Eucalyptus largiflorens</i>) are not present in the Project Area.
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	CE	-	Unlikely Project Area is not within the IBRA bioregions where the community occurs.
Weeping Myall Woodlands/Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Penepplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	E	E	Unlikely Diagnostic canopy species (<i>Acacia pendula</i>) is not present in the Project Area.

4.2.1 WHITE BOX – YELLOW BOX – BLAKELY’S RED GUM GRASSY WOODLAND

The White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC is listed as Critically Endangered under the EPBC Act and part of the national community is listed in NSW as the White Box – Yellow Box – Blakely’s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions which is listed as Critically Endangered under the BC Act. The key criteria of the TEC have been assessed against areas of PCTs 277 and 278 to determine presence within the Project Area. The term ‘Box-Gum Woodlands’ is used here onward to describe both the EPBC Act and BC Act listed communities.

The community generally presents as an open woodland with a canopy foliage cover of less than 30% consisting of *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) and/or *Eucalyptus blakelyi* (Blakely’s Red Gum) and in some cases the grey boxes *Eucalyptus microcarpa* and *E. moluccana* can occur as co-dominants. A shrub layer is generally absent but can include *Acacia*, *Bursaria*, *Cassinia*, *Hibbertia*, *Lissanthe* and *Templetonia* species (DCCEEW 2023; NSW TSSC, 2020).

The ground cover is dominated by tussock grasses, especially *Themeda triandra* (Kangaroo Grass) and *Poa sieberiana* (Snow Grass), along with species of *Austrostipa*, *Aristida*, *Chloris*, *Cymbopogon*, *Dichanthium*, *Microlaena* and *Rytidosperma*. Between the tussocks there may be bare ground or a range of forbs from genera such as *Bulbine*, *Chrysocephalum*, *Dianella*, *Geranium*, *Goodenia*, *Lomandra*, *Pimelea* and *Stackhousia* (DCCEEW 2023; NSW TSSC, 2020).

The EPBC Act and BC Act listed communities have been assessed against the 8.67 ha of PCT 277 and PCT 278 Woodland and Grassland Vegetation Zones (VZ4, VZ5, VZ7) within the Project Area.

To be considered part of the EPBC Act listed TEC, patches must be assessed against the questions presented in **Table 4-6**, as per the field identification guidelines published by DEH, 2006. To be considered part of the BC Act listed TEC, patches must be assessed against the key characteristics present in **Table 4-7**, as per the field identification guidelines published by DECC NSW, 2007.

TABLE 4-6 BOX-GUM WOODLAND EPBC ACT TEC ASSESSMENT

Question	Response
Is, or was previously, at least one of the most common overstorey species White Box, Yellow Box or Blakely’s Red Gum?	VZ4 – Yes, <i>Eucalyptus melliodora</i> and <i>E. blakelyi</i> common in the canopy VZ5 – Further assessment required VZ7 – Yes, <i>Eucalyptus melliodora</i> and <i>E. blakelyi</i> common in the canopy
Does the patch have a predominately native understorey?	VZ4 – Further assessment required VZ5 – Yes, there is 25% native groundcover and 20% exotic groundcover VZ7 – Yes, there is 90% native groundcover
Is the patch 0.1 ha or greater in size?	Yes – all VZs are greater than 0.1 ha in size

Question	Response
There are 12 or more native understorey species present (excluding grasses) from the provided list, with at least one important species (Species list attained from: https://www.dcceew.gov.au/sites/default/files/documents/box-gum-species.pdf)	All VZs will require further assessment to determine
Determination of Presence	Likely – further assessment required

TABLE 4-7 BOX-GUM WOODLAND BC ACT TEC ASSESSMENT

Question	Response
Is the site on the tablelands or western slopes of NSW?	Yes – the site is on the South Western Slopes of NSW.
Does the site contain, or would the site have recently been likely to contain, White Box, Yellow Box or Blakely's Red Gum?	VZ4 – Yes, <i>Eucalyptus melliodora</i> and <i>E. blakelyi</i> common in the canopy VZ5 – Further assessment required VZ7 – Yes, <i>Eucalyptus melliodora</i> and <i>E. blakelyi</i> common in the canopy
Is the ground layer mainly grassy?	VZ4 – Further assessment required VZ5 – Yes, there is 25% native grass cover and 20% exotic grass cover VZ7 – Yes, there is 90% native groundcover
If the site has been degraded, is there potential for assisted natural regeneration of the tree layer or the understorey (e.g. by removing grazing, weeds, etc)?	Yes – the site is subject to grazing and weed incursion and would have potential for regeneration if land use practices changed.
Determination of Presence	Likely – further assessment required

Based on a preliminary assessment of the key criteria of the BC Act and EPBC Act communities against the patches of VZ4, VZ5 and VZ7 within the Project Area, both listed communities are considered likely to occur. Additional BAM Plots and vegetation assessments within these Vegetation Zones will be required to make the final determination of presence.

4.2.2 FUZZY BOX WOODLAND ON ALLUVIAL SOILS OF THE SOUTH WESTERN SLOPES, DARLING RIVERINE PLAINS AND BRIGALOW BELT SOUTH BIOREGIONS

The Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions TEC is listed as Endangered under the BC Act. The key indicators of the TEC have been assessed against woodland patches of PCT 201 to determine presence within the Project Area. The term 'Fuzzy Box Woodland' is used here onward to describe the BC Act listed community.

The community generally presents as a woodland or open forest dominated by *Eucalyptus conica* (Fuzzy Box) often occurring with *Eucalyptus microcarpa* (Grey Box), *E. melliodora* (Yellow Box), *Brachychiton populneus* subsp. *populneus* (Kurrajong) and *Allocasuarina luehmannii* (Buloke). Shrubs are sparse and include *Acacia deanei*, *Dodonaea viscosa*, *Geijera parviflora*, *Acacia implexa*, *Senna artemisioides* sens. lat., *Myoporum montanum*, *Cassinia aculeata*, *Maireana microphylla* and *Sclerolaena muricata*. The ground cover is moderately dense and includes *Calotis cuneifolia*, *Sida corrugata*, *Einadia hastata*, *Dianella revoluta*, *Bracteantha viscosa*, *Eremophila debilis*, *Maireana enchylaenoides*, *Austrostipa scabra*, *Chloris truncata*, *Elymus scaber*, *Themeda triandra* and *Rytidosperma caespitosum*.

The community occurs on brown loam or clay soils on the western slopes of the Great Dividing Range, often located upslope from River Red Gum communities and at higher elevations slightly above inundated areas on the floodplain. It is expected that weeds are common under suitable conditions in disturbed areas (NSW TSSC, 2021a).

The BC Act listed community has been assessed against the 1.55 ha of PCT 201 - Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion Woodland Vegetation Zone (VZ2) within the Project Area.

To be considered part of the BC Act listed TEC, patches must be assessed against the questions presented in **Table 4-8**, as per the field identification guidelines published by DECCW, 2010.

TABLE 4-8 FUZZY BOX WOODLAND BC ACT TEC ASSESSMENT

Question	Response
Is the site on the western slopes of the NSW and in the South Western Slopes, Darling Riverine Plains or Brigalow Belt South Bioregion?	Yes – the Project Area is within the South Western Slopes bioregion and on the western slope of the Great Dividing Range.
Is the site on a prior stream, abandoned channel, slight depression, undulating plain or flat with alluvial or colluvial soils?	Yes – the Project Area is on undulating plains and the subregion typically comprises of alluvial sands, loams and clays (NPWS, 2003).
Is the site a woodland dominated by fuzzy box with a sparse shrubby understorey and/or open forb and grassy groundcover?	Yes – the VZ presents as a woodland with <i>Eucalyptus conica</i> as the dominant canopy species, with an absent shrub layer and a grassy groundcover.
Does the site contain a combination of the diagnostic tree species from Table 1? (refer DECCW, 2010)	Yes – diagnostic tree species present include <i>Eucalyptus conica</i> , <i>Eucalyptus blakelyi</i> and <i>Eucalyptus melliodora</i> .
Is the site situated on an upper floodplain above the level of frequent inundation and upslope from a River Red Gum community, or on a lower slope or valley flat with other tree species, such as inland grey box, yellow box, white box or Blakely's red gum?	Yes – the VZ occurs in areas of approximately 430 to 440 m elevation. Flood studies in the broader region show that flood levels in areas of proximity to Cudgong River are approximately 450 m (WMA Water, 2021), therefore 440 m further from Cudgong River could be considered above the level of frequent inundation. The SVTM shows vegetation along the nearby Slapdash Creek (250 m east) comprises of PCT 78 (Forested Wetlands) River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Question	Response
Are there any plant species present at the site from those listed as characteristic in Table 1? (refer DECCW, 2010)	Yes - In addition to the tree species previously mentioned, characteristic species present within the VZ include <i>Austrostipa ramosissima</i> , <i>Wahlenbergia fluminalis</i> , <i>Calotis lappulacea</i> , <i>Calotis cuneifolia</i> , <i>Einadia hastata</i> , <i>Dichondra repens</i> , <i>Glycine latifolia</i> , <i>Glycine clandestina</i> , <i>Microlaena stipoides</i> , <i>Cheilanthes sieberi</i> , <i>Rumex brownii</i> , <i>Sisymbrium irio</i> and <i>Marrubium vulgare</i>
Determination of Presence	Present – Patches of VZ2 conform with the TEC

Assessment against the key indicators of the TEC found all 1.55 ha of VZ2: PCT 201 conforms with the BC Act listed Fuzzy Box Woodland on alluvial soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South bioregions Endangered Ecological Community.

4.2.3 GREY BOX GRASSY WOODLANDS AND DERIVED NATIVE GRASSLANDS OF SOUTH-EASTERN AUSTRALIA

The Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia TEC is listed as Endangered under the EPBC Act and part of the national community is listed in NSW as the Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions which is listed as Endangered under the BC Act. The key criteria of the TEC have been assessed against areas of PCT 76 to determine presence within the Project Area. The term 'Grey Box Grassy Woodlands' is used here onward to describe both the EPBC Act and BC Act listed communities.

The community generally presents as a temperate eucalypt woodland to open forest with a canopy dominated by *Eucalyptus microcarpa* generally with a cover of 20-50%, a shrub layer varying between moderately dense to sparse and a grassy understorey dominated by tussock grasses and consisting of perennial and annual native forbs and graminoids. Other canopy species that may be present or co-dominant include *Allocasuarina luehmannii* (Buloke), *Brachychiton populneus* (Kurrajong), *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus albens* (White Box), *E. camaldulensis* (River Red Gum), *E. conica* (Fuzzy Box), *E. leucoxylon* (Yellow Gum), *E. melliodora* (Yellow Box) and *E. populnea* (Bimble Box). Commonly occurring shrub genera include *Acacia*, *Bursaria*, *Cassinia*, *Dodonaea*, *Eremophila* and *Maireana*. Groundcover frequently consists of species from the *Rytidosperma*, *Austrostipa*, *Elymus*, *Enteropogon*, *Dianella* and *Lomandra* genera and chenopods are more prominent in comparison to other temperate grassy woodland communities (TSSC, 2010; NSW TSSC, 2021b).

The Grey Box Grassy Woodlands community generally occurs in areas of low slopes, flats, undulating plains and occasionally in drainage depressions on alluvial or colluvial soils on red or brown sands, clays or loams. The derived native grasslands occurs when the canopy and mid stratum are reduced to less than 10% cover, but evidence persists that this once comprised of characteristic species of the community, and the groundcover is predominately native and remains consistent with the ground stratum species of the community (TSSC, 2010).

The EPBC Act and BC Act listed communities have been assessed against the 0.40 ha of VZ1: PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions – Woodland within the Project Area.

To be considered part of the EPBC Act listed TEC, patches must be assessed against the questions presented in **Table 4-9**, as per the field identification guidelines published by TSSC, 2010. There are no guidelines for assessment of the presence of the BC Act listed community available. Presence is therefore assumed as the patch of PCT 76 within the Project Area is associated with the TEC and aligns with the description provided by NSW TSSC(2021b).

TABLE 4-9 GREY BOX GRASSY WOODLANDS EPBC ACT TEC ASSESSMENT

Key Diagnostic Characteristic	Response
The ecological community occurs on low slopes and plains from central NSW, through northern and central Victoria into South Australia.	The Project Area is situated on the South Western Slopes of NSW.
The vegetation structure of the ecological community is typically a woodland to open forest.	The community present in the Project Area is a patch of woodland.
The tree canopy is dominated (50% canopy crown cover) by <i>Eucalyptus microcarpa</i> (Grey Box).	The canopy of the community within the Project Area consists entirely of <i>Eucalyptus microcarpa</i> .
The mid layer comprises shrubs of variable composition and cover, from absent to moderately dense. The mid layer usually has a crown cover of less than 30% with local patches up to 40% crown cover.	The shrub layer of the community present in the Project Area is absent.
The ground layer also is highly variable in development and composition, ranging from almost absent to mostly grassy to forb-rich. Ground layer flora commonly present include one or more of the graminoid genera: <i>Austrodanthonia</i> , <i>Austrostipa</i> , <i>Elymus</i> , <i>Enteropogon</i> , <i>Dianella</i> and <i>Lomandra</i> ; and one or more of the chenopod genera: <i>Atriplex</i> , <i>Chenopodium</i> , <i>Einadia</i> , <i>Enchylaena</i> , <i>Maireana</i> , <i>Salsola</i> and <i>Sclerolaena</i>	The ground layer of the community present in the Project Area is predominately exotic grasses however <i>Austrostipa</i> , <i>Einadia</i> and <i>Enchylaena</i> species are present.
Derived grasslands are a special state of the ecological community, whereby the canopy and mid layers have been mostly removed to <10% crown cover but the native ground layer remains largely intact, with 50% of more of the total vegetation cover being native.	The community is only present in the Project Area as a woodland, derived native grasslands are not present.
Determination of Presence	Present – Patches of VZ1 conform with the TEC

Assessment against the key indicators of the TEC found all 0.40 ha of VZ1: PCT 76 conforms with the EPBC Act listed Grey Box Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia TEC and the BC Act listed Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions Endangered Ecological Community.

5. THREATENED AND MIGRATORY SPECIES

The following sections identify the ecosystem credit species, species credit species and dual credit species as well as species listed under the EPBC Act and additional species relevant to the Project Area as identified through threatened species records.

No threatened and/or migratory flora or fauna species were detected during the field survey. A desktop assessment of the likelihood of occurrence of preliminary candidate species, MNES species and listed species recorded within the locality of the Project Area was conducted.

5.1 CANDIDATE SPECIES

'Species credit species', also referred to as 'candidate species', are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence. These species are identified in the TBDC. A targeted survey or an expert report is required to confirm the presence or absence of these species on the Project Area. Alternatively, for a development, activity, clearing or biodiversity certification proposal only, the Applicant may elect to assume the species is present.

Review of the BAM-C provided a list of candidate species applicable to the Project area and are listed in **Table 5-1**. Where the Project area does not meet the TBDC listed geographic or habitat requirement for a species, the species has been excluded from the candidate species list.

This Candidate Species list will form the basis for the preparation of the Project BDAR. In preparing the BDAR, surveys as required under the BAM will be completed for all candidate species using 'in force' guidance available at the time of preparing this PBR. The candidate species list generated by the BAM-C is attached as **Appendix C**.

5.1.1 HABITAT SUITABILITY

Habitat features were mapped across the Project Area, with 31 features mapped as polygons or points, including several farm dams. Only 4 mapped dams had a water level above 50%, with 4 at low/<25% capacity and 3 with no standing water observed. Frogs were heard calling at 2 dams, both at low capacity, suggesting that there is sufficient moisture present at these dams to support frog habitat, despite lower water levels and a lack of fringing, floating and emergent vegetation.

Several hollows were observed across the Project Area, suitable for use by hollow-dependent fauna species including parrots, cockatoos, owls and gliders, while rocky outcrops observed have suitable loose rocks to support the Pink-tailed Legless Lizard (*Aprasia parapulchella*).

One candidate species, the Large Bent-winged Bat (*Miniopterus orianae oceanensis*), has been assumed unlikely to occur due to lack of suitable habitat present within the Project Area. This species relies on the presence cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding.

5.1.2 BAM IMPORTANT AREAS (IMPORTANT HABITAT MAPS)

For a small number of threatened species, a habitat constraint may refer to a mapped location (Important Habitat Maps) that identifies areas that are considered important for those species. Maps currently available relevant to the Project Area include BAM important areas for the Regent Honeyeater (*Anthochaera phrygia*) and the Swift Parrot (*Lathamus discolor*). These maps have been reviewed and it has been determined that the Project Area does not form part of the important habitat mapping for these species. The BAM Important Areas map is attached in **Appendix D**.

TABLE 5-1 BAM-C CANDIDATE SPECIES LIST

Common Name	Scientific Name	BC Act	EPBC Act	Recommended Survey period	Likelihood to occur within Project Area
Flora					
Ausfeld's Wattle	<i>Acacia ausfeldii</i>	V	-	August – October	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present. No <i>Acacia</i> specimens were observed during the initial survey.
Yass Daisy	<i>Ammobium craspedioides</i>	V	V	September – November	Unlikely Geographic limitations apply as the Project Area is not south of Cowra.
A Spear-grass	<i>Austrostipa wakoolica</i>	E	E	October – December	Unlikely Geographic limitations apply as the Project Area is not west of Cowra.
Sand-hill Spider Orchid	<i>Caladenia arenaria</i>	E	E	September	Unlikely Project Area is outside of species distribution and preferred habitat is not present.
Small Scurf-pea	<i>Cullen parvum</i>	E	-	December – January	Unlikely Project Area is outside of species distribution and preferred habitat is not present.
Bluegrass	<i>Dichanthium setosum</i>	V	V	November – May	Potential There are no recent records within the locality, but habitat surrogate (i.e., associated PCT) is present.
Pine Donkey Orchid	<i>Diuris tricolor</i>	V	-	September – October	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
-	<i>Euphrasia arguta</i>	CE	CE	November – March	Unlikely There are no recent records in the locality and preferred habitat is not present.
Tumut Grevillea	<i>Grevillea wilkinsonii</i>	CE	CE	October	Unlikely Project Area is outside of species distribution and preferred habitat is not present.

Common Name	Scientific Name	BC Act	EPBC Act	Recommended Survey period	Likelihood to occur within Project Area
Leafless Indigo	<i>Indigofera efoliata</i>	E	E	September – October	Unlikely Project Area is outside of species distribution and preferred habitat is not present.
Tarengo Leek Orchid	<i>Prasophyllum petilum</i>	E	E	September – December	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
-	<i>Prasophyllum sp. Wybong</i>	-	CE	September - October	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Small Purple-pea	<i>Swainsona recta</i>	E	E	September - November	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Silky Swainson-pea	<i>Swainsona sericea</i>	V	-	September - November	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Fauna					
Regent Honeyeater (Breeding)	<i>Anthochaera phrygia</i>	CE	CE	N/A	Unlikely Project Area does not occur within the Important Habitat Map for the species
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	V	V	September - November	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
South-eastern Glossy Black-Cockatoo (Breeding)	<i>Calyptorhynchus lathami lathami</i>	V	V	January - September	Potential There are recent records within the locality and habitat surrogate (i.e., associated PCT) is present. No <i>Allocasuarina</i> spp. were observed.
Sloane's Froglet	<i>Crinia sloanei</i>	E	E	July – August	Unlikely There are no recent records in the locality and preferred habitat is not present.

Common Name	Scientific Name	BC Act	EPBC Act	Recommended Survey period	Likelihood to occur within Project Area
Striped Legless Lizard	<i>Delma impar</i>	V	V	September - December	Unlikely Geographic limitations apply as the Project Area is not south of the Mid-Western Highway
White-bellied Sea-Eagle (Breeding)	<i>Haliaeetus leucogaster</i>	V	-	July - December	Likely There are recent records in the locality and habitat surrogate (i.e., creeklines) is present.
Key's Matchstick Grasshopper	<i>Keyacris scurra</i>	E	E	March – May and August - December	Unlikely There are no recent records in the locality and preferred habitat is not present.
Swift Parrot (Breeding)	<i>Lathamus discolor</i>	E	CE	N/A	Unlikely Project Area does not occur within the Important Habitat Map for the species
Booroolong Frog	<i>Litoria booroolongensis</i>	E	E	October – December	Unlikely There are no recent records in the locality and preferred habitat is not present.
Pink Cockatoo	<i>Lophochroa leadbeateri</i>	V	-	September – December	Unlikely There are no recent records in the locality and preferred habitat is not present.
Large Bent-winged Bat (Breeding)	<i>Miniopterus orianae oceanensis</i>	V	-	December - February	Unlikely Habitat constraints apply as there are no caves, tunnels, mines, culverts or other structures known or suspected to be used for breeding present in the Project Area.
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-	All year	Unlikely There are no recent records in the locality and preferred habitat is not present.
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V	-	December - June	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Koala	<i>Phascolarctos cinereus</i>	E	E	All year	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.

Common Name	Scientific Name	BC Act	EPBC Act	Recommended Survey period	Likelihood to occur within Project Area
Superb Parrot (Breeding)	<i>Polytelis swainsonii</i>	V	V	September – November	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Grey-headed Flying-fox (Breeding)	<i>Pteropus poliocephalus</i>	V	V	October - December	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Golden Sun Moth	<i>Synemon plana</i>	V	V	November – December	Unlikely Geographic limitations apply as the Project Area is not south of the Mid-Western Highway

Locality refers to a 10 km buffer around the Project Area

V = Vulnerable, E = Endangered, CE = Critically Endangered

5.2 ECOSYSTEM CREDIT SPECIES

Ecosystem credit species, also referred to as 'predicted species' are threatened species whose occurrence can generally be predicted by vegetation surrogates and/or landscape features, or that have a low probability of detection using targeted surveys. The TBDC identifies the threatened species assessed for ecosystem credits. A targeted survey is not required to identify or confirm the presence of ecosystem credit species.

The ecosystem credit species predicted to occur on or use the Project Area as advised by the BAM-C are listed in **Table 5-2**. The preliminary candidate species list generated by the BAM-C is attached as **Appendix E**.

TABLE 5-2 BAM-C PREDICTED SPECIES LIST

Common name	Scientific name	Listing status		Species retained for further assessment	Sensitivity to gain class
		BC Act	EPBC Act		
Regent Honeyeater (Foraging)	<i>Anthochaera phrygia</i>	CE	CE	Yes	High
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	Yes	Moderate
South-eastern Glossy Black-Cockatoo (Foraging)	<i>Calyptorhynchus lathami lathami</i>	V	V	No – no presence of <i>Allocasuarina</i> or <i>Casuarina</i> species	High
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-	Yes	High
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	V	Yes	High
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	Yes	High
Black Falcon	<i>Falco subniger</i>	V	-	Yes	Moderate
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	Yes	High
White-bellied Sea-Eagle (Foraging)	<i>Haliaeetus leucogaster</i>	V	-	Yes	High
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	V	Yes	High
Swift Parrot (Foraging)	<i>Lathamus discolor</i>	E	CE	Yes	Moderate
Pink Cockatoo (Foraging)	<i>Lophochroa leadbeateri</i>	V	-	Yes	Moderate
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	E	E	Yes	Moderate
Large Bent-winged Bat (Foraging)	<i>Miniopterus orianae oceanensis</i>	V	-	Yes	High
Scarlet Robin	<i>Petroica boodang</i>	V	-	Yes	Moderate
Flame Robin	<i>Petroica phoenica</i>	V	-	Yes	Moderate

Common name	Scientific name	Listing status		Species retained for further assessment	Sensitivity to gain class
		BC Act	EPBC Act		
Superb Parrot (Foraging)	<i>Polytelis swainsonii</i>	V	V	Yes	Moderate
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-	Yes	Moderate
Grey-headed Flying-fox (Foraging)	<i>Pteropus poliocephalus</i>	V	V	Yes	High
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V	Yes	Moderate

One ecosystem credit species has been excluded from further assessment because of habitat constraints, the South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*). With the Assessment Area found to have a vegetation cover of <10%, and no specimens of *Allocasuarina* sp. observed within the Project Area, habitat for this species is unlikely to be present.

5.3 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

5.3.1 THREATENED SPECIES

The PMST search identified 46 EPBC Act listed threatened species with potential to occur within the Project Area, these species are assessed in **Table 5-3**. Of these, none of the species were found known to occur within the Project Area, and five have been assessed as likely to occur within the Project Area, additional survey effort will be required to determine presence of these species. The location of the records of these species are shown in **Figure 5-1** and **Figure 5-2**. The PMST report is attached as **Appendix A**.

TABLE 5-3 PMST THREATENED SPECIES

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project area
<i>Fish</i>				
Flathead Galaxias	<i>Galaxias rostratus</i>	CE	CE	Unlikely Project Area is not within the known distribution of the species, there are no records in the locality and suitable habitat is not present.
Trout Cod	<i>Maccullochella macquariensis</i>	E	E	Unlikely Project Area is not within the known distribution of the species, there are no records in the locality and suitable habitat is not present.
Murray Cod	<i>Maccullochella peelii</i>	-	V	Unlikely Project Area is not within the known distribution of the species, there are no records in the locality and suitable habitat is not present.

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project area
Macquarie Perch	<i>Macquaria australasica</i>	E	E	Unlikely Project Area is not within the known distribution of the species, there are no records in the locality and suitable habitat is not present.
<i>Bird</i>				
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Southern Whiteface	<i>Aphelocephala leucopsis</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
Australasian Bittern	<i>Botaurus poiciloptilus</i>	E	E	Unlikely There are no recent records in the locality and preferred habitat is not present.
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	-	V, Mi	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Curlew Sandpiper	<i>Calidris ferruginea</i>	E	CE, Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	E	Unlikely There are no recent records in the locality and preferred habitat is not present.
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	V	V	Potential There are recent records within the locality and habitat surrogate (i.e., associated PCT) is present.
Brown Treecreeper (south-eastern)	<i>Climacteris picumnus victoriae</i>	V	V	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Grey Falcon	<i>Falco hypoleucos</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
Latham's Snipe	<i>Gallinago hardwickii</i>	-	V, Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.
Painted Honeyeater	<i>Grantiella picta</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	V	V, Mi	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project area
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Malleefowl	<i>Leipoa ocellata</i>	E	V	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	E	E	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Blue-winged Parrot	<i>Neophema chrysostoma</i>	V	V	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Plains-wanderer	<i>Pedionomus torquatus</i>	CE	CE	Unlikely There are no recent records in the locality and preferred habitat is not present.
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Pilotbird	<i>Pycnoptilus floccosus</i>	-	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
Australian Painted Snipe	<i>Rostratula australis</i>	E	E	Unlikely There are no recent records in the locality and preferred habitat is not present.
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Amphibians				
Sloane's Froglet	<i>Crinia sloanei</i>	E	E	Unlikely There are no recent records in the locality and preferred habitat is not present.
Mammals				
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	E	Potential There are recent records in the locality and suitable foraging habitat is present.
Spot-tailed Quoll	<i>Dasyurus maculatus maculatus</i> (SE mainland population)	V	E	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
Corben's Long-eared Bat	<i>Nyctophilus corbeni</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project area
Koala (combined populations of QLD, NSW and the ACT)	<i>Phascolarctos cinereus</i>	E	E	Potential There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	-	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Likely There are recent records in the locality and habitat surrogate (i.e., associated PCT) is present.
<i>Reptile</i>				
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	V	V	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Striped Legless Lizard	<i>Delma impar</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
<i>Flora</i>				
-	<i>Androcalva procumbens</i>	V	V	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Bluegrass	<i>Dichanthium setosum</i>	V	V	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
-	<i>Euphrasia arguta</i>	CE	CE	Unlikely There are no recent records in the locality and preferred habitat is not present.
-	<i>Homoranthus darwinioides</i>	V	V	Potential There are no recent records in the locality, but preferred habitat is present.
Spiny Peppercress	<i>Lepidium aschersonii</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
-	<i>Ozothamnus tessellatus</i>	V	V	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Tarengo Leek Orchid	<i>Prasophyllum petilum</i>	E	E	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
A Leek-orchid	<i>Prasophyllum sp. Wybong</i> (C.Phelps ORG 5269)	-	CE	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project area
Slender Darling Pea	<i>Swainsona murrayana</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
Small Purple-pea	<i>Swainsona recta</i>	E	E	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Austral Toadflax	<i>Thesium australe</i>	V	V	Unlikely There are no recent records in the locality and preferred habitat is not present.
-	<i>Vincetoxicum forsteri</i> listed as <i>Tylophora linearis</i>	V	E	Unlikely There are no recent records in the locality and preferred habitat is not present.

5.3.2 MIGRATORY SPECIES

The PMST search identified 10 EPBC Act listed migratory species with potential to occur within the Project area, these species are assessed in **Table 5-4**. Four of these species have been assessed above as they are also listed threatened species. No migratory species are found to be likely to occur within the Project area.

TABLE 5-4 PMST MIGRATORY SPECIES

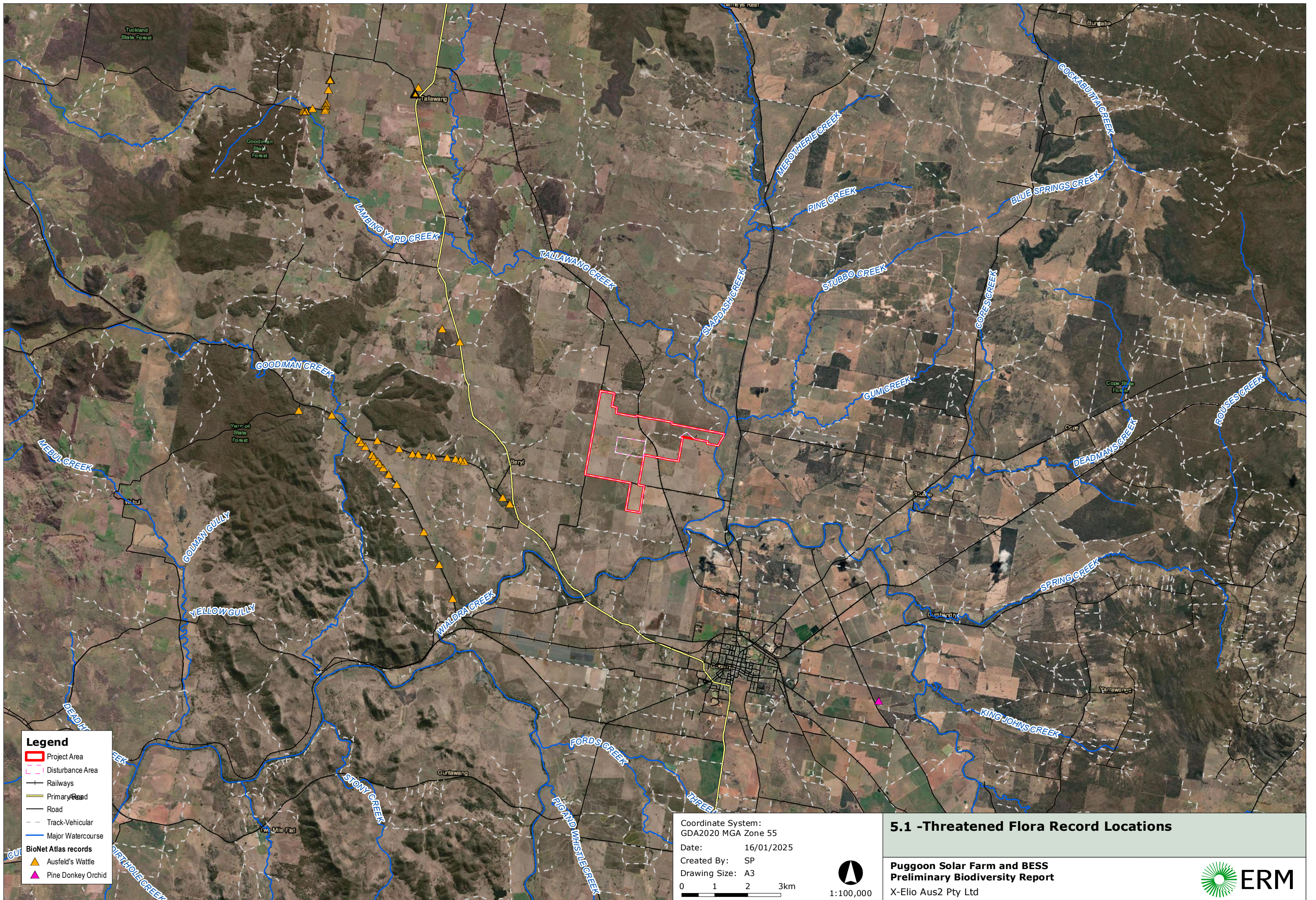
Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project area
Common Sandpiper	<i>Actitis hypoleucos</i>	-	Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.
Fork-tailed Swift	<i>Apus pacificus</i>	-	Mi	Potential There are no recent records in the locality, but habitat surrogate (i.e., associated PCT) is present.
Pectoral Sandpiper	<i>Calidris melanotos</i>	-	Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.
Yellow Wagtail	<i>Motacilla flava</i>	-	Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	-	Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.
Rufous Fantail	<i>Rhipidura rufifrons</i>	-	Mi	Unlikely There are no recent records in the locality and preferred habitat is not present.

5.4 BIONET ATLAS SPECIES RECORDS

17 species have been recorded within the locality (10 km buffer to the Project area) as per the BioNet Atlas species sightings search results. Eight of these have been previously assessed as MNES species, six of the remaining species are assessed as predicted species under the BAM-C, generating ecosystem credits and requiring no further assessment, while three of the remaining species will require targeted surveys. The location of the records of these species are shown in **Figure 5-1** and **Figure 5-2**. The preliminary predicted species list generated by the BAM-C is attached as **Appendix E**.

TABLE 5-5 BIONET ATLAS SPECIES RECORDS

Common Name	Scientific Name	BC Act	EPBC Act	Likelihood to occur within Project Area
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Breeding habitat for the species will require further assessment as a candidate species.
Black Falcon	<i>Falco subniger</i>	V	-	Assessed as a predicted species in the BAM-C, no further assessment required.
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	Assessed as a predicted species in the BAM-C, no further assessment required.
Grey-crowned Babbler (eastern subspecies)	<i>Poatostomus temporalis temporalis</i>	V	-	Assessed as a predicted species in the BAM-C, no further assessment required.
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	Assessed as a predicted species in the BAM-C, no further assessment required.
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V	-	Additional species assessed as a predicted species in the BAM-C, no further assessment required.
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Breeding habitat does not occur within the Project Area, therefore this species is only assessed as a predicted species in the BAM-C, no further assessment required.
Ausfeld's Wattle	<i>Acacia ausfeldii</i>	V	-	Species presence will require further assessment as a candidate species.
Pine Donkey Orchid	<i>Diuris tricolor</i>	V	-	Species presence will require further assessment as a candidate species.



Legend

- Project Area
- Disturbance Area
- Railways
- Primary Road
- Road
- Track-Vehicular
- Major Watercourse
- BioNet Atlas records**
- ▲ Ausfeld's Wattle
- ▲ Pine Donkey Orchid

Coordinate System:
GDA2020 MGA Zone 55

Date: 16/01/2025

Created By: SP

Drawing Size: A3

0 1 2 3km

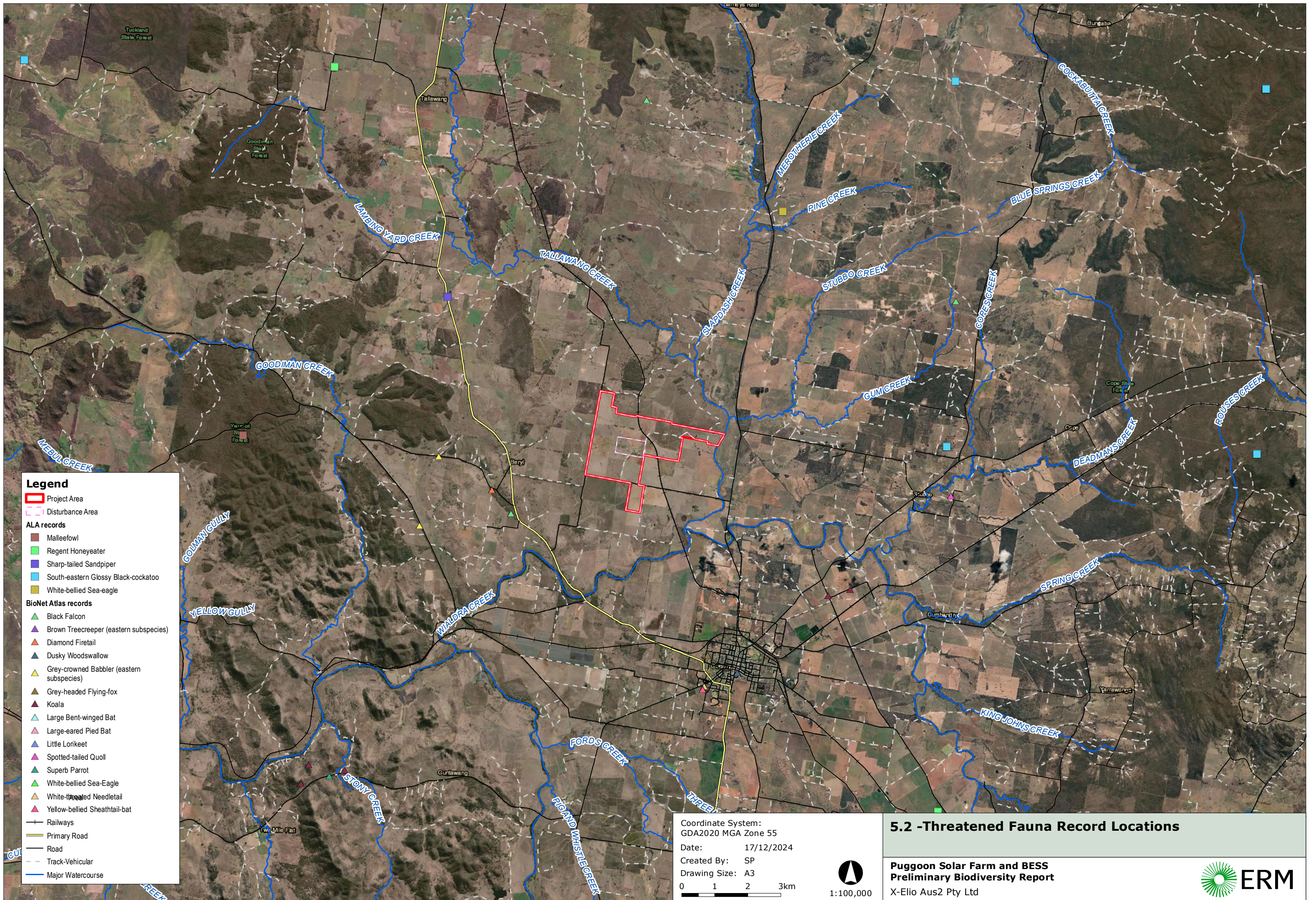
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5.1 -Threatened Flora Record Locations

**Puggoon Solar Farm and BESS
Preliminary Biodiversity Report**

X-Elio Aus2 Pty Ltd





Legend

- Project Area
- Disturbance Area

ALA records

- Malleefowl
- Regent Honeyeater
- Sharp-tailed Sandpiper
- South-eastern Glossy Black-cockatoo
- White-bellied Sea-eagle

BioNet Atlas records

- Black Falcon
- Brown Treecreeper (eastern subspecies)
- Diamond Firetail
- Dusky Woodswallow
- Grey-crowned Babbler (eastern subspecies)
- Grey-headed Flying-fox
- Koala
- Large Bent-winged Bat
- Large-eared Pied Bat
- Little Lorikeet
- Spotted-tailed Quoll
- Superb Parrot
- White-bellied Sea-Eagle
- White-tailed Needletail
- Yellow-bellied Sheath-tail-bat

Infrastructure

- Railways
- Primary Road
- Road
- Track-Vehicular
- Major Watercourse

Coordinate System:
GDA2020 MGA Zone 55

Date: 17/12/2024

Created By: SP

Drawing Size: A3

0 1 2 3km



5.2 -Threatened Fauna Record Locations

**Puggoon Solar Farm and BESS
Preliminary Biodiversity Report**
X-Elio Aus2 Pty Ltd



6. IDENTIFYING PRESCRIBED IMPACTS

Prescribed impacts are identified in Clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Management of the habitat of threatened species or ecological communities associated with:
 - Karst, caves, crevices, cliffs, rock outcrops and other geological features of significance;
 - Human made structures; and
 - Non-native vegetation.
- Management of areas connecting threatened species habitat, such as movement corridors;
- Management of water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or subsidence from underground mining); and
- Vehicle strikes on threatened species or on animals that are part of a TEC.

The BAM does not provide an approach to determine the number and class of biodiversity credits that are required for a prescribed impact. However, prescribed impacts on biodiversity may be considered by a consent authority when they determine biodiversity credits generated on a Biodiversity Stewardship Site.

An assessment of the relevance of these prescribed impacts to the Project is provided in **Table 6-1**. The prescribed impacts will be further assessed through the preparation of a BDAR.

TABLE 6-1 PRESCRIBED IMPACTS

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature
Karst, caves, crevices, cliffs, rocks, or other geological features of significance	<input type="checkbox"/> Yes/ <input checked="" type="checkbox"/> No	N/A (there are no karst, caves, crevices, cliffs, or other geological features of significance to threatened species or threatened communities within the Project Area)	N/A
Human-made structures	<input checked="" type="checkbox"/> Yes/ <input type="checkbox"/> No	A transmission line occurs through the centre of the Project Area and fencing, gates and other agricultural infrastructure occurs throughout the Project Area.	Raptor species (e.g. White-bellied Sea-Eagle, Spotted Harrier) as well as other avian species (e.g. Scarlet Robin, Flame Robin) are known to frequently use human-made structures for foraging, perching and nesting.
Non-native vegetation	<input checked="" type="checkbox"/> Yes/ <input type="checkbox"/> No	Areas of non-native vegetation are present within the Project Area (Cat-1 land subject to historic clearing)	Foraging habitat for raptor species (e.g. Black Falcon, Spotted Harrier) and avian species that forage on exotic grasses (e.g. Scarlet Robin, Flame Robin).
Habitat connectivity	<input checked="" type="checkbox"/> Yes/ <input type="checkbox"/> No	Small patches of treed vegetation occur within the Project Area in proximity to larger areas of remnant woodland. This feature may aid in local and regional wildlife movement.	Species that forage within or use the canopy for dispersal (e.g. Koala, Grey-headed Flying-fox and avian species).
Waterbodies, water quality and hydrological processes	<input checked="" type="checkbox"/> Yes/ <input type="checkbox"/> No	Creek lines and dams occur across the Project Area.	Permanent water bodies with sufficient vegetation may provide habitat for amphibian species.
Vehicle strikes	<input checked="" type="checkbox"/> Yes/ <input type="checkbox"/> No	An increase in vehicle activity during construction and operation has the potential to result in an increase in vehicle strikes to threatened fauna.	Species that forage or disperse along the ground (e.g. Koala, avian species).

7. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

MNES relevant to the Project area are provided in Table 7-1. Under the EPBC Act, projects that are expected to have a significant impact on MNES are required to refer the proposed action (the Project) to the Commonwealth Minister for Climate Change, Energy, Environment and Water (DCCEEW). This process involves a formal assessment and determination by the Minister. If the Minister determines the proposed action is likely to have a significant impact on MNES then the action is deemed to be controlled action under the EPBC Act.

NSW maintains a bilateral agreement with the Australian Government with regards to biodiversity. This agreement aims to establish a consistent framework for environmental assessment and approvals. This agreement allows accredited assessors in NSW to conduct assessments and approvals for state significant development projects in line with state and federal standards. The PMST report is attached as **Appendix A**.

TABLE 7-1 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

MNES	Relevance to the Project Area
World Heritage Properties	No World Heritage Properties are mapped within or are adjacent to the Project Area.
National Heritage Places	No National Heritage Places are mapped within or are adjacent to the Project Area.
Wetlands of International Importance (Ramsar Wetlands)	Ramsar wetlands identified by the PMST are more than 200 km from the Project Area.
Listed Threatened Ecological Communities (TECs)	<p>The PMST identified five TECs with the potential to occur within the Project area. One EPBC Act TEC is confirmed to occur within the Project Area:</p> <ul style="list-style-type: none"> Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (0.40 ha) <p>One EPBC Act TEC is considered likely to occur within the Project Area:</p> <ul style="list-style-type: none"> White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland <p>Additional survey effort is required to determine the presence of this community.</p>
Listed Threatened Species	<p>The PMST identified 46 threatened species listed under the EPBC Act that have the potential to occur within the Project area.</p> <p>No EPBC Act listed threatened species are known to occur within the Project area.</p> <p>Five EPBC Act listed threatened species are considered likely to occur within the Project area, including:</p> <ul style="list-style-type: none"> Regent Honeyeater (<i>Anthochaera phrygia</i>) – Critically Endangered Brown Treecreeper (eastern subspecies) (<i>Climacteris picumnus victoriae</i>) – Vulnerable Superb Parrot (<i>Polytelis swainsonii</i>) – Vulnerable Diamond Firetail (<i>Stagonopleura guttata</i>) – Vulnerable Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) – Vulnerable
Listed Migratory Species	The PMST identified 10 migratory species with the potential to occur within the Project Area. None of these species are considered known or likely to occur within the Project Area.
Great Barrier Reef Marine Park	Not applicable

8. NEXT STEPS

The Project SEARs are likely to require the preparation of a BDAR. This will require completion of Stage 1 and Stage 2 of the BAM. The following sections generally outline the future scope of these works.

8.1 STAGE 1 OF THE BAM

Stage 1 of the BAM requires that additional survey periods be completed to inform the Project BDAR. At this stage of the project, ERM has completed initial surveys, to be followed by seasonal surveys to meet the anticipated survey requirements in accordance with the BAM. The project BDAR will document the methods and results of these survey efforts and how they adhere to the relevant survey guidelines. Relevant survey guidelines in force at the time of this PBR include:

- Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (DPE 2022);
- 'Species credit' threatened bats and their habitats, NSW survey guide for the Biodiversity Assessment Method (OEH, 2018);
- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft) (Department of Environment and Conservation (DEC), 2004);
- Survey Guidelines for Australia's Threatened Mammals (Department of Sustainability, Environment, Water, Population & Communities (DSWP&C), 2011);
- NSW Survey Guide for Threatened Frogs: A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (DPIE, 2020b);
- Surveying Threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method (DPIE, 2020c); and
- Threatened reptiles Biodiversity Assessment Method survey guide (DPE, 2022).

Remaining investigations include the following:

- Obtaining of additional BAM plot data for delineated vegetation zones;
- Review of Candidate Species list following confirmation of PCT mapping; and
- Conduct targeted surveys for updated Candidate Species list and MNES species likely to occur.
- Consult with BCS to confirm the assessment of native vegetation cover within the Project Area (299.12 ha) prior to January 2025. Current assessment of native vegetation cover is <10% (9.04%), which is below the threshold of cover required for targeted threatened Owl surveys. As such these surveys are not scheduled for Winter 2024. If, however, following consultation the BCS advise that surveys must be completed, these can be done from January through to August, while conducting required seasonal surveys for the BDAR.

8.2 STAGE 2 OF THE BAM

Application of Stage 2 of the BAM aims to determine how the Project will meet the "No Net Loss" standard required by the NSW BC Act. This calculation depends on the extent of biodiversity values being impacted, whether the impact is direct, indirect or prescribed. These impacts are to be assessed following application of the mitigation hierarchy (avoid, minimise, mitigate). Therefore, allowing for the quantification of residual impacts.

The BAM is then used to calculate the offset liability of the Project in units referred to as biodiversity credits. A biodiversity offset strategy will be defined to demonstrate how this offset is to be delivered, this defines the “No Net Loss” for the proposed Project.

8.2.1 APPLICATION OF THE MITIGATION HIERARCHY

This Preliminary Biodiversity Report has identified the biodiversity constraints on the proposed Puggoon BESS and Solar Farm that will require consideration and application of the mitigation hierarchy. Impacts to native vegetation and threatened species should be avoided as a priority. The following principles are to be considered in the application of the mitigation hierarchy:

Avoid:

- Areas of mapped TECs;
- Areas that contain identified biodiversity values such as habitat features; and
- Areas of mapped native vegetation.

Minimise:

- The risk for weed and pest incursion on the Project Area; and
- The risk of injury to fauna.

Mitigate:

- Any residual impacts to biodiversity. This should be achieved through conservation and improvement of existing native vegetation on the Project Area.

8.2.2 OFFSET STRATEGY

If deemed to be required, an offset strategy would need to demonstrate a ‘no net loss’ outcome and may comprise one or more of the following:

- Retirement of suitable ecosystem and species credits registered in the BOS including payment into the Biodiversity Conservation Trust fund;
- Contribution to a conservation initiative; and/or
- Implementation of a voluntary planning agreement (s7.18 of the BC Act).

The Minister may also consider Ancillary Rules in lieu of retiring biodiversity credits as well as any additional and appropriate measures that will minimize those impacts if consent or approval is to be granted for impacts on entities at risk of serious and irreversible impacts (s7.16(3) of the BC Act).

8.3 PREPARATION OF A BDAR

A BDAR prepared in accordance with the BAM is expected to be provided as a part of the EIS and will have regard for the PCTs and BAM-C generated Candidate species identified in this PBR. This is to be used to assess the impacts of the Project on assessable biodiversity values. The Project BDAR will comprise the survey methods and results and an assessment of impacts associated with the Project. It will also outline the offset strategy for any residual impacts as a result of the Project.

9. REFERENCES

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APPENDIX A

PROTECTED MATTERS SEARCH TOOL
(PMST) RESULTS



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 14-Jun-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	46
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	9
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [[Resource Information](#)]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	800 - 900km upstream from Ramsar site	In feature area
Riverland	800 - 900km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream from Ramsar site	In feature area
The macquarie marshes	200 - 300km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [[Resource Information](#)]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In buffer area only
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occur within area	In buffer area only
Weeping Myall Woodlands	Endangered	Community may occur within area	In buffer area only
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species

[[Resource Information](#)]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area

FISH

Scientific Name	Threatened Category	Presence Text	Buffer Status
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In feature area
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			
Androcalva procumbens [87153]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Homoranthus darwinioides [12974]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Lepidium aschersonii Spiny Peppercross [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Ozothamnus tessellatus [56203]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In feature area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area

REPTILE

Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species

[[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area

Migratory Terrestrial Species

Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area	In feature area

Migratory Wetlands Species

Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
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Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [\[Resource Information \]](#)

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [13274]	NSW	In buffer area only

Communications, Information Technology and the Arts - Telstra Corporation Limited	State	Buffer Status
Commonwealth Land - Australian Telecommunications Commission [13275]	NSW	In buffer area only

Listed Marine Species [\[Resource Information \]](#)

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]	
Protected Area Name	Reserve Type	State	Buffer Status	
Yarrobil	CCA Zone 1 National Park	NSW	In buffer area only	

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Barneys Reef Wind Farm	2022/09358		Assessment	In buffer area only	
Central-West Orana Renewable Energy Zone Transmission Project	2022/09353		Assessment	In feature area	

Controlled action					
Title of referral	Reference	Controlled Action	Post-Approval	Buffer Status	
Open cut coal mine & associated infrastructure	2011/6158	Controlled Action	Post-Approval	In buffer area only	
Valley of the Winds wind farm	2020/8668	Controlled Action	Assessment Approach	In buffer area only	

Wollar to Wellington 330kV Transmission Line Project	2005/2202	Controlled Action	Post-Approval	In feature area
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Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
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Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
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Proposed large-scale solar farm project	2022/9171	Referral Decision	Referral Publication	In feature area
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Stubbo Solar Farm	2022/9180	Referral Decision	Referral Publication	In buffer area only
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Bioregional Assessments			[Resource Information]
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SubRegion	BioRegion	Website	Buffer Status
Central West	Northern Inland Catchments	BA website	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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APPENDIX B

OBSERVED FAUNA SPECIES LIST



ERM

Common Name	Species Name	Common Name	Species Name
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	Magpie-lark	<i>Grallina cyanoleuca</i>
Australasian Pipit	<i>Anthus novaeseelandiae</i>	Masked Lapwing	<i>Vanellus miles</i>
Australian Hobby	<i>Falco longipennis</i>	Peregrine Falcon	<i>Falco peregrinus</i>
Australian Kind Parrot	<i>Alisterus scapularis</i>	Nankeen Kestrel	<i>Falco cenchroides</i>
Australian Magpie	<i>Gymnorhina tibicen</i>	Noisy Friarbird	<i>Philemon corniculatus</i>
Australian Raven	<i>Corvus coronoides</i>	Noisy Miner	<i>Manorina melanocephala</i>
Australian Wood Duck	<i>Chenonetta jubata</i>	Pied Butcherbird	<i>Cracticus nigrogularis</i>
Black-faced Cuckooshrike	<i>Coracina novaehollandiae</i>	Pied Cormorant	<i>Phalacrocorax varius</i>
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>	Pied Currawong	<i>Strepera graculina</i>
Brown Falcon	<i>Falco berigora</i>	Red-rumped Parrot	<i>Psephotus haematonotus</i>
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	Red Wattlebird	<i>Anthochaera carunculata</i>
Cat	<i>Felis catus</i>	Rufous Whistler	<i>Pachycephala rufiventris</i>
Common Starling	<i>Sturnus vulgaris</i>	Striated Pardalote	<i>Pardalotus striatus</i>
Crested Pigeon	<i>Ocyphaps lophotes</i>	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Double-barred Finch	<i>Taeniopygia bichenovii</i>	Welcome Swallow	<i>Hirundo neoxena</i>
Eastern Rosella	<i>Platycercus eximius</i>	White-necked Heron	<i>Ardea pacifica</i>
Galah	<i>Eolophus roseicapilla</i>	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>
Grey Butcherbird	<i>Cracticus torquatus</i>	Yellow-billed Spoonbill	<i>Platalea flavipes</i>
Grey Teal	<i>Anas gracilis</i>	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	Willie Wagtail	<i>Rhipidura leucophrys</i>
Little Corella	<i>Cacatua sanguinea</i>		



APPENDIX C BAM-C CANDIDATE SPECIES

Proposal Details

Assessment Id 00049263/BAAS17034/24/00049264	Proposal Name Rollsville Solar Farm and BESS	BAM data last updated * 14/03/2024
Assessor Name Mark Aitkens	Report Created 26/06/2024	BAM Data version * 67
Assessor Number BAAS17034	Assessment Type Major Projects	BAM Case Status Open
Assessment Revision 0	Date Finalised To be finalised	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
<i>Austrostipa wakoolica</i> A spear-grass		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Acacia ausfeldii</i> Ausfeld's Wattle		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Dichanthium setosum</i> Bluegrass		<input checked="" type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input checked="" type="checkbox"/> Apr <input checked="" type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

BAM Candidate Species Report

<p><i>Litoria booroolongensis</i> Booroolong Frog</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Phascogale tapoatafa</i> Brush-tailed Phascogale</p>		<input checked="" type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input checked="" type="checkbox"/> May <input checked="" type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Euphrasia arguta</i> Euphrasia arguta</p>		<input checked="" type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Synemon plana</i> Golden Sun Moth</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Pteropus poliocephalus</i> Grey-headed Flying-fox</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Keyacris scurra</i> Key's Matchstick Grasshopper</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input checked="" type="checkbox"/> Apr <input checked="" type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

BAM Candidate Species Report

<p><i>Phascolarctos cinereus</i> Koala</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Miniopterus orianae oceanensis</i> Large Bent-winged Bat</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input checked="" type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input checked="" type="checkbox"/> Dec
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<p><i>Indigofera efoliata</i> Leafless Indigo</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Diuris tricolor</i> Pine Donkey Orchid</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Lophochroa leadbeateri</i> Pink Cockatoo</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input checked="" type="checkbox"/> Nov</td> <td><input checked="" type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input checked="" type="checkbox"/> Dec
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<p><i>Aprasia parapulchella</i> Pink-tailed Legless Lizard</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input checked="" type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input type="checkbox"/> Dec
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BAM Candidate Species Report

<p><i>Prasophyllum sp. Wybong</i> Prasophyllum sp. Wybong</p>		<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Anthochaera phrygia</i> Regent Honeyeater</p>		<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Caladenia arenaria</i> Sand-hill Spider Orchid</p>		<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Swainsona sericea</i> Silky Swainson-pea</p>		<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Crinia sloanei</i> Sloane's Froglet</p>		<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input checked="" type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Swainsona recta</i> Small Purple-pea</p>		<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>

BAM Candidate Species Report

<p><i>Cullen parvum</i> Small Scurf-pea</p>		<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input checked="" type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input checked="" type="checkbox"/> Dec
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<p><i>Calyptorhynchus lathami lathami</i> South-eastern Glossy Black-Cockatoo</p>		<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input checked="" type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input checked="" type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Petaurus norfolcensis</i> Squirrel Glider</p>		<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input checked="" type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input checked="" type="checkbox"/> Apr</td> </tr> <tr> <td><input checked="" type="checkbox"/> May</td> <td><input checked="" type="checkbox"/> Jun</td> <td><input checked="" type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input checked="" type="checkbox"/> Nov</td> <td><input checked="" type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input checked="" type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input checked="" type="checkbox"/> Apr	<input checked="" type="checkbox"/> May	<input checked="" type="checkbox"/> Jun	<input checked="" type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input checked="" type="checkbox"/> Dec
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<p><i>Petaurus norfolcensis - endangered population</i> Squirrel Glider in the Wagga Wagga Local Government Area</p>		<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input checked="" type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input checked="" type="checkbox"/> Apr</td> </tr> <tr> <td><input checked="" type="checkbox"/> May</td> <td><input checked="" type="checkbox"/> Jun</td> <td><input checked="" type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input checked="" type="checkbox"/> Nov</td> <td><input checked="" type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input checked="" type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input checked="" type="checkbox"/> Apr	<input checked="" type="checkbox"/> May	<input checked="" type="checkbox"/> Jun	<input checked="" type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input checked="" type="checkbox"/> Dec
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<p><i>Delma impar</i> Striped Legless Lizard</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input checked="" type="checkbox"/> Nov</td> <td><input checked="" type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input checked="" type="checkbox"/> Dec
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<p><i>Polytelis swainsonii</i> Superb Parrot</p>		<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input checked="" type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input checked="" type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input type="checkbox"/> Dec
<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr											
<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug											
<input checked="" type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input checked="" type="checkbox"/> Nov	<input type="checkbox"/> Dec											

BAM Candidate Species Report

<p><i>Lathamus discolor</i> Swift Parrot</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Prasophyllum petilum</i> Tarengo Leek Orchid</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Grevillea wilkinsonii</i> Tumut Grevillea</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input checked="" type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input checked="" type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<p><i>Ammobium craspedioides</i> Yass Daisy</p>		<input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input checked="" type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input checked="" type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

Threatened species Manually Added

None added



APPENDIX D BAM IMPORTANT AREAS

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00049263/BAAS17034/24/00049264	Rollsville Solar Farm and BESS	14/03/2024
Assessor Name	Report Created	BAM Data version *
Mark Aitkens	26/06/2024	67
Assessor Number	Assessment Type	BAM Case Status
BAAS17034	Major Projects	Open
Assessment Revision		Date Finalised
0		To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Diamond Firetail	Stagonopleura guttata	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions

BAM Predicted Species Report

Diamond Firetail	Stagonopleura guttata	201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Flame Robin	Petroica phoenicea	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

BAM Predicted Species Report

Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Little Lorikeet	<i>Glossopsitta pusilla</i>	201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Pink Cockatoo	<i>Lophochroa leadbeateri</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
Regent Honeyeater	<i>Anthochaera phrygia</i>	201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
Scarlet Robin	<i>Petroica boodang</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
		277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion
		278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions
		201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion

BAM Predicted Species Report

South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Speckled Warbler	<i>Chthonicola sagittata</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions 201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Superb Parrot	<i>Polytelis swainsonii</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions 201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Swift Parrot	<i>Lathamus discolor</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions 201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

BAM Predicted Species Report

Swift Parrot	<i>Lathamus discolor</i>	278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions 201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
White-throated Needletail	<i>Hirundapus caudacutus</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions 201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	76-Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions 201-Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion 277-Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion 278-Riparian Blakely's Red Gum - box - shrub - sedge - grass tall open forest of the central NSW South Western Slopes Bioregion

Threatened species Manually Added

Common Name	Scientific Name
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
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BAM Predicted Species Report







APPENDIX E BAM-C PREDICTED SPECIES



BAM Important Areas

Legend

-  Swift Parrot Important Areas
-  Migratory Shorebird Important Areas
-  Regent Honeyeater Important Areas
-  Plains-wanderer Important Areas



0 2.8 5.5 11.0



Kilometres



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Sydney NSW 2000

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APPENDIX D

AHIMS RESULTS



AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Rollsville

Client Service ID : 902768

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
36-2-0040	DM/OC1 - "Puggoon"	AGD	55	731150	6423350	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Stephanie Garling					Permits		
36-3-0047	Stubbo Creek 3;	AGD	55	739276	6424042	Open site	Valid	Artefact : -	Open Camp Site	234
	Contact	Recorders	L Cubis					Permits		
36-3-0048	Slapdash Creek 1;	AGD	55	737542	6421727	Open site	Valid	Artefact : -	Open Camp Site	234
	Contact	Recorders	L Cubis					Permits		
36-2-0015	Puggoon;	AGD	55	731367	6425435	Open site	Valid	Artefact : -	Open Camp Site	1299
	Contact	Recorders	R Hawkins,Hawkins					Permits		
36-2-0101	Wialdra Creek 1. WC1	AGD	55	731990	6419720	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr.David Maynard					Permits		
36-2-0140	WC IF 1	AGD	55	730960	6419061	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.David Maynard,Murong Gialinga Aboriginal and Torres Strait Islander Corporat					Permits		
36-3-3091	Old Barneys AFT 1	GDA	55	738486	6420460	Open site	Valid	Artefact : -		
	Contact	Recorders	Niche Environment and Heritage,Ms.Clare Anderson					Permits		
36-2-0469	Beryl Solar Farm AS1	GDA	55	731174	6418420	Open site	Destroyed	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr.Matthew Barber,NGH					Permits		
36-2-0470	Beryl Solar Farm IF 4	GDA	55	731214	6418411	Open site	Destroyed	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr.Matthew Barber,NGH					Permits		
36-2-0471	Beryl Solar Farm IF 3	GDA	55	731385	6418330	Open site	Destroyed	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr.Matthew Barber,NGH					Permits		
36-2-0501	Bellambi IF 1	GDA	55	731941	6420363	Open site	Valid	Artefact : 1		
	Contact	Recorders	EMM Consulting - St Leonards - Individual users,Ms.Morgan (emm consulting) Wik					Permits		
36-2-0502	Bellambi PAD 1	GDA	55	732443	6420072	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	EMM Consulting - St Leonards - Individual users,Ms.Morgan (emm consulting) Wik					Permits		
36-2-0503	Bellambi PAD 2	GDA	55	732682	6419854	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	EMM Consulting - St Leonards - Individual users,Ms.Morgan (emm consulting) Wik					Permits		
36-2-0504	Bellambi Height ST 1 with PAD	GDA	55	731792	6421773	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : 1, Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	AHIMS APP Users,EMM Consulting - St Leonards - Individual users,EMM Consulting					Permits		

Report generated by AHIMS Web Service on 20/06/2024 for Charles Barnett for the following area at Lat, Long From : -32.3482, 149.44 - Lat, Long To : -32.2757, 149.5636. Number of Aboriginal sites and Aboriginal objects found is 36

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
36-2-0505	Bellambi ST 1 with PAD	GDA	55	731086	6418740	Open site	Valid	Potential Archaeological Deposit (PAD) : 1, Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	EMM Consulting - St Leonards - Individual users,Ms.Morgan (emm consulting) Wilc Permits							
36-2-0506	Bellambi OS 1 with PAD	GDA	55	731340	6419416	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	EMM Consulting - St Leonards - Individual users,Ms.Morgan (emm consulting) Wilc Permits							
36-2-0507	Bellambi Heights PAD 1	GDA	55	732359	6421870	Open site	Valid	Artefact : -, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	EMM Consulting - St Leonards - Individual users,EMM Consulting - St Leonards - In Permits							
36-2-0608	Tallowang IF4	GDA	55	733581	6423101	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0609	Tallowang PAD 1 with AS	GDA	55	731734	6422984	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0610	Tallowang PAD 2 with AS	GDA	55	732833	6425892	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0618	Tallowang AS 1	GDA	55	733242	6426164	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0620	Tallowang AS 3	GDA	55	732266	6423350	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0621	Tallowang AS 4	GDA	55	732339	6424389	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0622	Tallowang AS 5	GDA	55	732513	6424657	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0623	Tallowang AS 6	GDA	55	732772	6425015	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0624	Tallowang AS 7	GDA	55	733062	6424816	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0631	Tallowang IF1	GDA	55	732084	6422990	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0632	Tallowang IF2	GDA	55	732467	6422381	Open site	Valid	Artefact : -		
	Contact	Recorders	Umwelt (Australia) Pty Limited - Individual users,Mr.Andrew Crisp Permits							
36-2-0633	Tallowang IF3	GDA	55	733116	6422268	Open site	Valid	Artefact : -		

Report generated by AHIMS Web Service on 20/06/2024 for Charles Barnett for the following area at Lat, Long From : -32.3482, 149.44 - Lat, Long To : -32.2757, 149.5636. Number of Aboriginal sites and Aboriginal objects found is 36

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Rollsville

Client Service ID : 902768

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>
36-2-0634	Tallawang IF5	GDA	55	732632	6423384	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>
36-2-0635	Tallawang IF6	GDA	55	732521	6423624	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>
36-2-0636	Tallawang IF7	GDA	55	732905	6424041	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>
36-2-0638	Bellambi Heights AS 2	GDA	55	733492	6421742	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>
36-3-4073	SNI-CMT10	GDA	55	739439	6419028	Open site	Valid	Modified Tree (Carved or Scarred) :		
	<u>Contact</u>	<u>Recorders</u>						-		<u>Permits</u>
36-3-4120	SNI-B01	GDA	55	739527	6419089	Open site	Valid	Burial : -		
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>
36-2-0732	SNI-IF55	GDA	55	733179	6425876	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>								<u>Permits</u>

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 20/06/2024 for Charles Barnett for the following area at Lat, Long From : -32.3482, 149.44 - Lat, Long To : -32.2757, 149.5636. Number of Aboriginal sites and Aboriginal objects found is 36

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APPENDIX E

PRELIMINARY TRAFFIC AND TRANSPORT
IMPACT ASSESSMENT

Lucy Baker
Partner
ERM
Level 14, 207 Kent Street
Sydney NSW 2000

Ref: 963
21 January 2025

Issued via email: lucy.baker@erm.com

Dear Lucy

Puggoon Solar Farm and BESS – Preliminary Traffic Assessment

Amber Organisation has been engaged to provide a preliminary review of the traffic matters associated with the proposed Puggoon Solar Farm and Battery Energy Storage System (BESS). The Project Area is located between Puggoon Road and Jacksons Lane, approximately 8 kilometres northwest of Gulgong.

The Project would include a 264MWp solar farm and a BESS with an anticipated capacity of up to 110MW / 440MWh. Figure 1 shows the location of the Project Area in relation to the surrounding transport network, with access to the site expected via Puggoon Road and/or Jacksons Lane. All vehicles associated with the site are expected to travel to/from the south via Puggoon Road or Barneys Reef Road to access the broader road network.

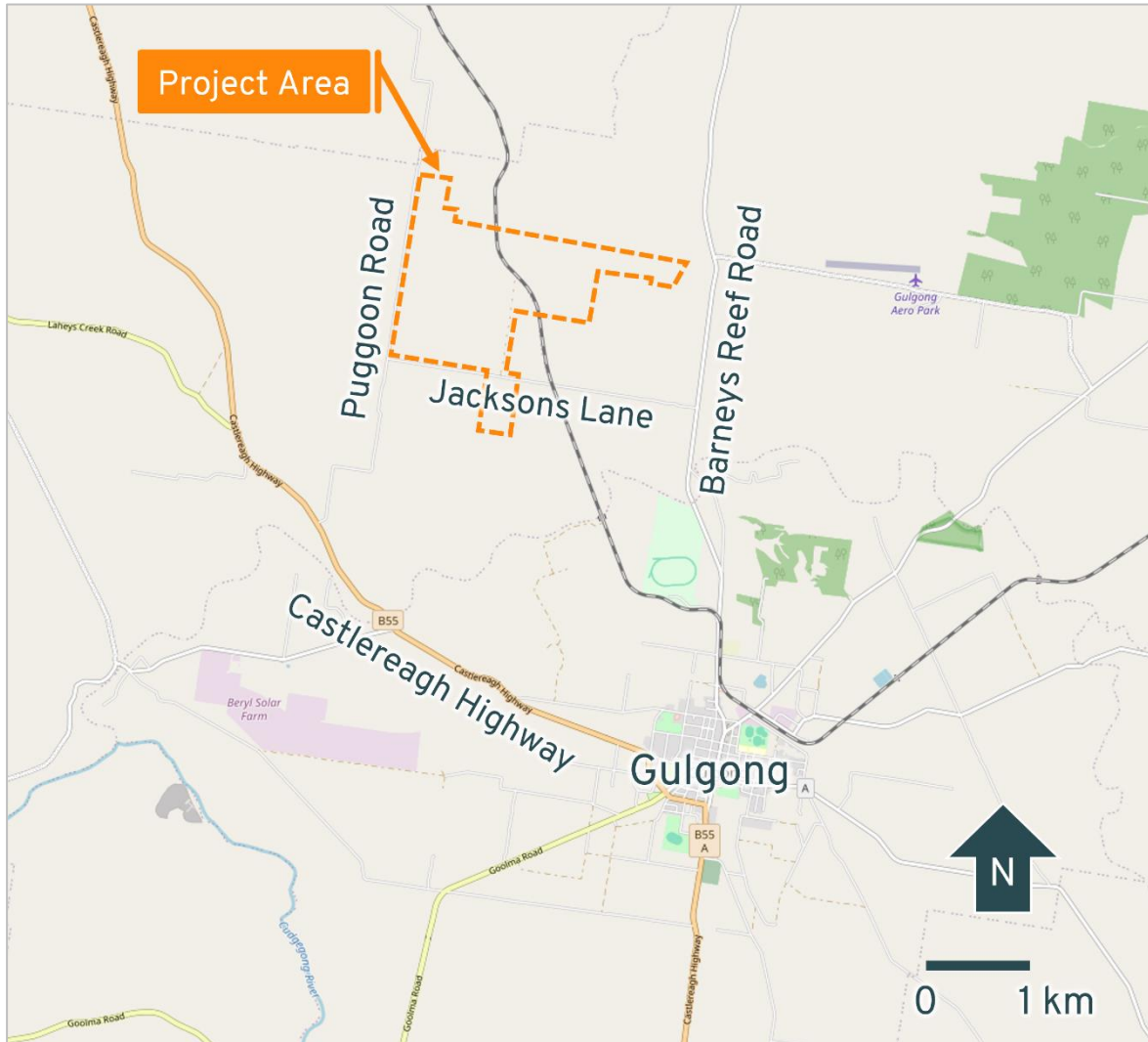
Traffic generated by the project can be separated into three distinct stages: construction, operation and decommissioning. The peak traffic generating potential is expected to be during construction which generates vehicle trips associated with the workforce accessing the Project Area and the delivery of raw materials and plant.

The construction workforce is expected to primarily be housed within the nearby towns which may include Gulgong and Mudgee, with materials and equipment generally sourced from the surrounding area where practicable. Port of Newcastle has been identified as the likely location where the solar farm and BESS plant will likely be imported, however additional transport routes may be considered during the EIS.

The following provides a review of the traffic engineering matters relevant to the proposal. It includes a preliminary review of the potential access route for construction traffic and oversize/overmass (OSOM) vehicles, as well as a review of the access arrangements for the site to determine the likely extent of any potential road upgrades required by the increase in traffic generated by construction personnel and heavy vehicles accessing the site.

The assessment has used available traffic survey data, aerial and road network imagery and has been undertaken with consideration to the Restricted Access Vehicle network maps provided by TfNSW.

Figure 1: Site Location



Source: OpenStreetMap

1. Transport Network

1.1 Road Environment

Puggoon Road is a municipal local road which runs in a general north-south alignment between Castlereagh Highway and its termination near Tallawang Creek approximately 5.0 kilometres north of the site. **Jacksons Lane** is a municipal local road which runs in an east-west alignment between Puggoon Road and Barneys Reef Road. Both roads have an unsealed carriageway with a typical width in the order of 4.5 metres which accommodates low volumes of two-way vehicle movement. The default regional speed limit of 100km/h applies along each road.

Barneys Reef Road is a municipal local road which runs in a north-south alignment between its continuations as Merotherie Road near Merotherie and Medley Street in Gulgong. It has a sealed carriageway width of approximately 5.0 metres in the vicinity of the site which accommodates low volumes of two-way vehicle movement. Further south near Gulgong, the carriageway widens to 6.0 metres which provides one travel lane in each direction. A speed limit of 100km/h applies along the road.

1.2 Traffic Volumes

No traffic volume data is available for Barneys Reef Road, Puggoon Road, Jacksons Lane or Castlereagh Highway however all roads would be expected to carry a low level of traffic based on the surrounding land use which is predominantly agricultural. It is recommended that traffic surveys are undertaken to establish the existing road environment.

1.3 Public Transport Services

No public transport services are provided in the vicinity of the site. Ogden's Coaches operates the following school bus routes along Barneys Reef Road:

- MA27A/MP27A travels southbound and passes the Jacksons Lane intersection at approximately 8:32am and 4:50pm on school days.
- MA27B/MP27B travels northbound and passes the Jacksons Lane intersection at approximately 7:32am and 3:52pm on school days.

It is expected that heavy vehicle movements associated with the site would be required to avoid travel along the road during school bus operating times, which would be specified within the future Traffic Management Plan (TMP).

1.4 Restricted Vehicle Access

The TfNSW Restricted Vehicle Access Map for the surrounding area is provided within Figure 2 with green lines indicating approved B-Double routes and black lines indicating approved routes with travel conditions. The figure shows that Castlereagh Road is an approved route for 25/26m B-Double vehicles, and Barneys Reef Road is approved between Rouse Street in Gulgong and Jacksons Lane however travel conditions apply along the road as follows:

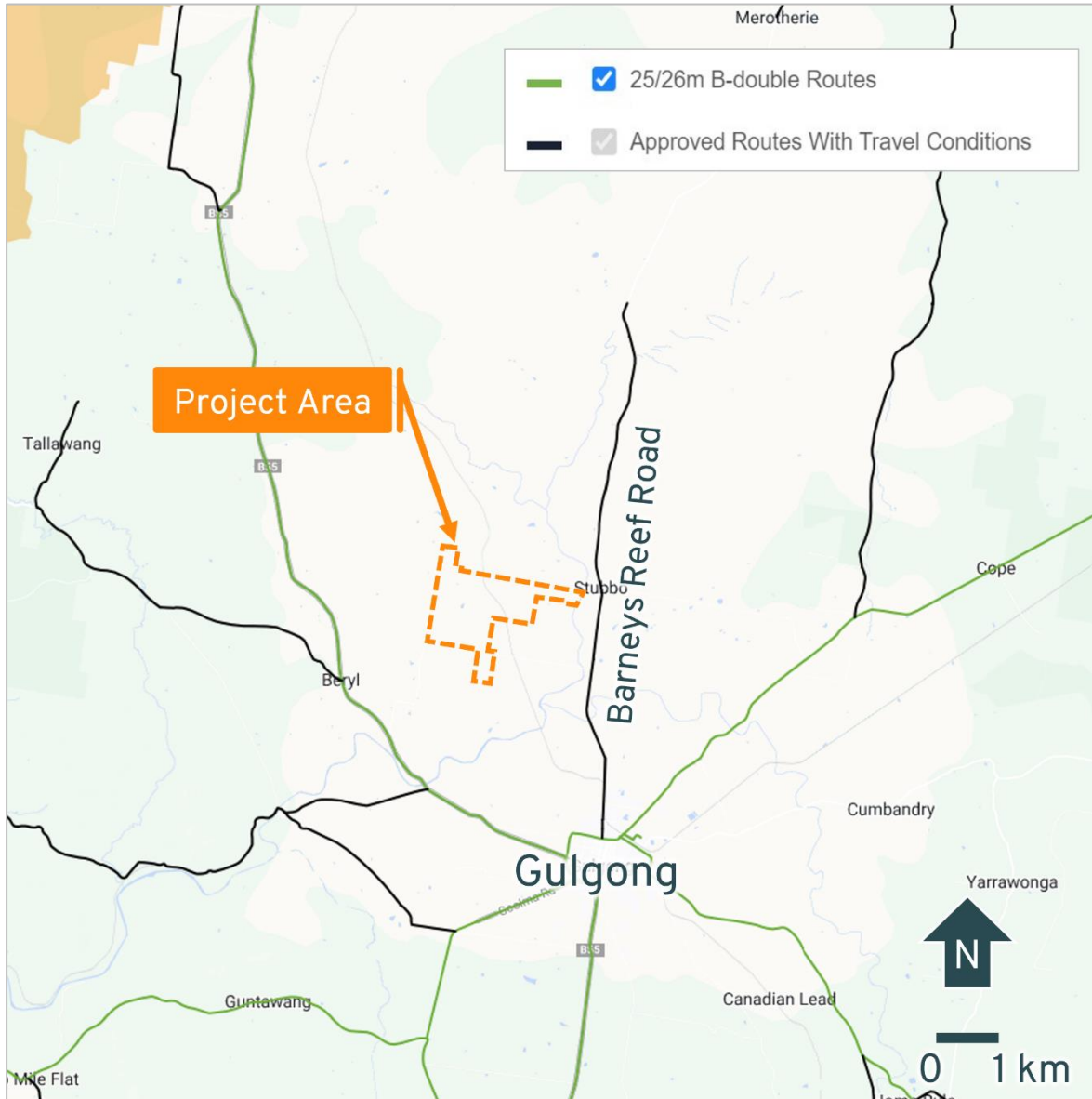
80km/hr B-Double speed limit. Outside school bus operation times.

It is noted that Jacksons Lane and Puggoon Road are both unrated for B-Double access and approval would be required from Council/NHVR for B-Double vehicles to utilise the road.

A review of the TfNSW Oversize Overmass (OSOM) Load Carrying Vehicles Network map has also been undertaken. The map shows approved routes for eligible vehicles operating under the Multi-State Class 1 Load Carrying Vehicles Mass and Mass Exemption Notices. The review indicates that all local roads between Gulgong and the site (including Barneys Reef Road, Jacksons Lane and Puggoon Road) are unrated for Class 1 OSOM vehicles and approval would be required from Council/NHVR for Class 1 OSOM vehicles to access the site.

Vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig are defined as Special Purpose Vehicles (SPVs). The NSW Special Purpose Vehicle Network map provides details of the approved roads as well as conditions of access and travel restrictions for eligible SPVs. The network map indicates that all local roads between Gulgong and the site (including Barneys Reef Road, Jacksons Lane and Puggoon Road) are unrated for SPVs and approval would be required from Council/NHVR for SPVs to access the site.

Figure 2: TfNSW 26m B-Double Network of Approved Roads



Source: TfNSW Restricted Vehicle Access Map

1.5 Crash History

Amber has conducted a review of the TfNSW Road Safety database for all casualty crashes along Puggoon Road, Jacksons Lane and Barneys Reef Road. The crash database provides the location and severity of all injury and fatal crashes for the five-year period from 2018 to 2022. The search revealed one serious injury 'off road to the left, hitting object' crash along Barneys Reef Road approximately 3 kilometres south of the Jacksons Lane intersection.

Given the search area, the associated traffic volumes on the roads, and the rural high-speed road environment, it is concluded that the road network is currently operating in a relatively safe manner.

2. Preliminary Traffic Assessment

Traffic impacts resulting from the Project will be largely limited to the construction phase and can broadly be separated into the following categories:

- Light vehicles associated with transporting the workforce to/from the site.
- Shuttle buses may be considered to transport the majority of the workforce between the site and nearby regional centres.
- Medium and Heavy Rigid Trucks (MRV and HRV) used to deliver raw materials and smaller plant.
- Truck and Dog vehicles used to transport earthwork material to/from the site.
- 19 metre long semitrailers and 26 metre long B-Doubles used to transport larger plant.

It is recommended that traffic surveys are undertaken to assess the capacity of the road to cater for the additional traffic movements generated during the construction phase. A mid-block assessment of the roads should be undertaken against the requirements set out in the *Austrroads Guide to Traffic Management*, and intersection modelling may be carried out for major intersections.

It is expected that the traffic generated by the Project would be unlikely to result in any significant adverse impacts to the operation of the road network given the surrounding land use and area serviced by the road network. However, any future assessment should also consider the cumulative impacts of other nearby major projects.

During operation the project would generate a negligible level of traffic on the road network.

3. Preliminary Route Assessment

3.1 Transformer Transport Vehicle (Oversize/Overmass)

Port of Newcastle has been identified as the likely location where the solar farm and BESS plant will likely be imported, however additional transport routes may be considered during the EIS.

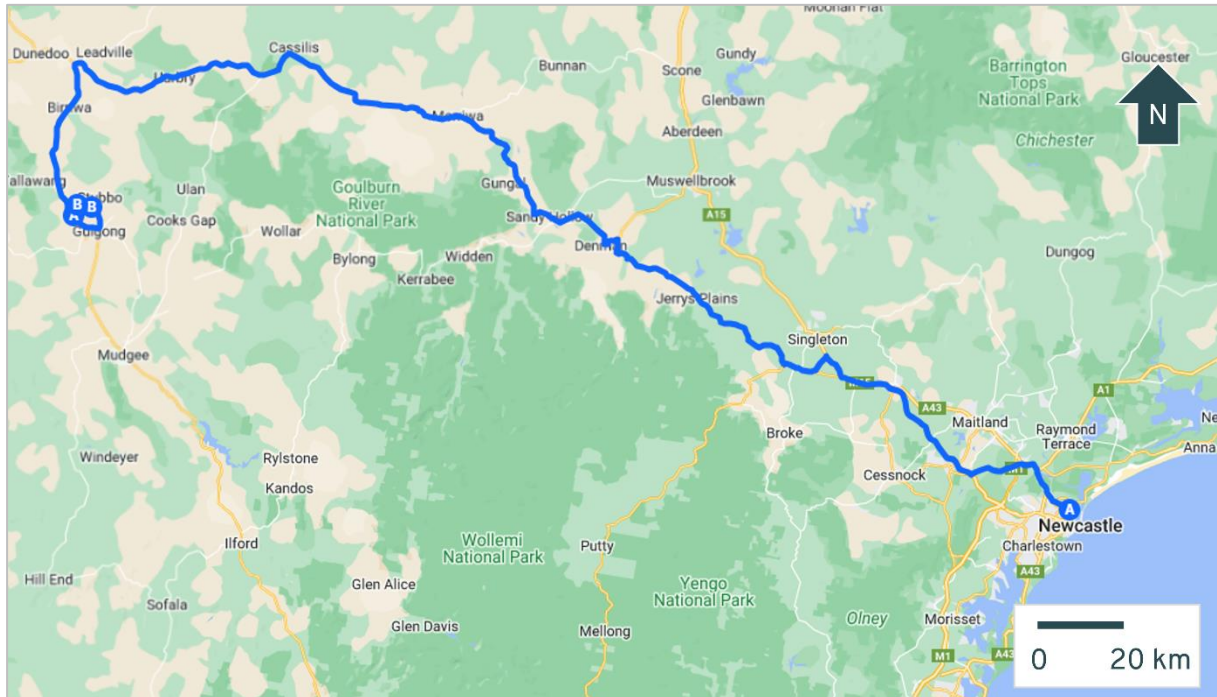
The preliminary route assessment has focused on the transformer transport vehicle which typically represents the worst-case scenario due to the length of the vehicle and the associated load. The chosen route would aim to reduce the number of turn manoeuvres at intersections as these may require road upgrades to accommodate the vehicle. It would also seek to avoid built-up areas to limit conflicts between the OSOM vehicles and vulnerable road users.

A potential route for the transformer transport vehicle travelling from the Port of Newcastle to the site is shown within Figure 3 and summarised as follows:

- Vehicles would depart Newcastle utilising Industrial Drive, Pacific Highway, New England Highway, and John Renshaw Drive to access the Hunter Expressway. The route would ensure the towns of Maitland and Rutherford are avoided and is typically adopted for oversize vehicles departing Newcastle.
- Vehicles would then utilise Golden Highway to reach Castlereagh Highway and head towards the town of Gulgong.
- Vehicles may access the site via Puggoon Road or via Old Mill Road, Rouse Street, Medley Street, Barneys Reef Road and Jacksons Lane.

The final route option would be subject to detailed assessment during the EIS.

Figure 3: OSOM Transformer Transport Vehicle – Potential Access Route Options from Port of Newcastle to Site



Source: Google Maps - [Link](#)

It is noted that the route is currently approved within the NSW Oversize Overmass Load Carrying Vehicles Network Map between Port of Newcastle and Castlereagh Highway in Gulgong. All roads between Castlereagh Highway and the site are currently unrated and would require further assessment and approval for OSOM access.

Travel conditions are applicable on sections of the route as follows:

- **Pacific Highway and New England Highway**
 - *Prior to travel on the Pacific Highway at Hexham, the operator must contact the Hexham Straight Widening Project on 1800 515 141 a minimum of five (5) days prior to your proposed commencement date. Failure to provide notice may result in delays to travel. Prior to travel on the Pacific Highway, New England Highway and Pacific Motorway between Tomago, Tarro and Lenaghan, the operator must contact the Black Hill to Tomago Project on 1800 094 895 a minimum of five (5) days prior to your proposed commencement date. Failure to provide notice may result in delays to travel.*
- **Hunter Expressway**
 - *Vehicles or combinations exceeding 3.2 metres wide are not permitted to travel from Monday to Friday from 5:00am to 9:00am and from Monday to Friday from 4:00pm to 6:00pm (except on state-wide public holidays).*
- **Golden Highway – Level Crossing in Denman**
 - *Vehicle must approach and traverse the designated level crossings at a speed not less than 35km/h. If the vehicle cannot comply with this condition, the operator must contact Rail Infrastructure Manager. Active control - primary flashing lights.*
- **Castlereagh Highway – Level Crossing in Birriwa**
 - *Vehicle must approach and traverse the designated level crossings at a speed not less than 35km/h. If the vehicle cannot comply with this condition, the operator must contact Rail Infrastructure Manager. Active control - primary flashing lights.*

Oversize vehicle movements to and from the site will be required to adhere to the relevant travel conditions. The vehicles would also be subject to specific road permits that would be applied for once the dimensions of the load and the specific delivery vehicle are known.

The route for the transformer transport vehicle would be reviewed as part of a Route Assessment which would be prepared as part of the preparation of the Environmental Impact Statement. The Route Assessment should provide an assessment and commentary on the following matters:

- Confirm the dimensions and loading of the OSOM vehicle.
- Contact TfNSW, relevant Council(s), and rail authorities to undertake an assessment of any bridge structures based on the loading of the vehicle.
- Provide a review of the height clearances along the access route and confirm the vehicle is able to suitably access the site.
- Provide a horizontal alignment review utilising swept paths to confirm if any road upgrades are required at key pinch points and provide concept designs for any road improvements.
- Identify suitable pullover bay locations.

Overall, the vehicle is expected to be able to be accommodated within the existing road reserve with no major road upgrades required. It is noted that the route generally utilises State Roads which are typically designed to accommodate the associated loads.

3.2 General Construction Traffic (up to B-Doubles)

General construction traffic up to B-Doubles travelling from the Port of Newcastle are anticipated to utilise the same potential route options identified above between Port of Newcastle and Ulan Road in Cassilis. Vehicles may use Puggoon Road to access the project area from Castlereagh Highway, or an alternative approved B-Double network consisting of Ulan Road, Main Street, Cope Road, Rouse Street and Barneys Reef Road to reach Jacksons Lane and subsequently the Project Area.

It is noted that Puggoon Road and Jacksons Lane are currently unrated for B-Double access and would require further assessment and approval for B-Doubles to utilise the roads. Travel conditions are also applicable along Barneys Reef Road as outlined in Section 1.4 which would restrict B-Doubles to an 80 km/hr speed limit and travel outside school bus operating times. It is noted that road upgrades or traffic management measures may also be required to safely accommodate an increase in traffic given the existing road width which ranges from 5.0-6.0 metres.

A potential connection between the Project Area and the State/Regional Road network is Rouse Street in the town of Gulgong which forms a cross intersection with Medley Street (continuation of Barneys Reef Road). Vehicles may also utilise the Castlereagh Highway / Puggoon Road intersection. No formal turn treatments are currently provided at either intersection.

Further assessment of the intersections including turn treatment warrants and sight distance should be undertaken as part of the Traffic Impact Assessment. It is recommended that a turning movement count survey is undertaken at the relevant intersections to establish the existing road environment.

3.3 Bridges and Railway Crossings

Further assessment of bridges and railway crossings along the route should be undertaken as part of the Traffic Impact Assessment.

3.4 Unsealed Roads

The access routes may utilise Jacksons Lane and Puggoon Road, both of which are unsealed local roads. Further assessment should be undertaken as part of the Traffic Impact Statement to confirm the traffic volumes along each road and confirm the extent of any road upgrades or traffic management measures required.

4. Access Arrangements

4.1 Design

The primary traffic impact during construction is generated by staff accessing the site in the morning peak hour and exiting the site in the evening peak hour, and by heavy vehicles accessing the site during the day. Staff are expected to primarily be located within Gulgong or Mudgee and would travel to/from the south.

The site access is expected to be provided on Puggoon Road and/or Jacksons Lane, both of which are local roads. Further assessment and concept design of the access location/s should be undertaken as part of the Traffic Impact Assessment to confirm suitable access for all vehicles travelling to and from the Project Area.

4.2 Sight Distance

Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance to be provided along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds.

The precise location of the proposed site access location/s is yet to be determined however it is expected that any access will be located to achieve compliance with the required sight distance. Further assessment will be undertaken upon confirmation of the proposed access arrangements and as part of the future Traffic Impact Assessment.

5. Conclusion

Based on the above assessment, it has been determined that:

- No traffic volume data is available for the roads in the vicinity of the site. It is recommended that traffic surveys are undertaken to establish the existing road environment as part of the future Traffic Impact Assessment.
- School bus services operate along Barneys Reef Road in the vicinity of the Project Area. It is expected that heavy vehicle movements associated with the site would be required to avoid travel along the road during school bus operating times.
- A review of the recorded casualty crash history indicates the road network in the vicinity of the Project Area is currently operating in a relatively safe manner.
- Port of Newcastle is likely to be the preferred delivery port for the solar farm and BESS plant, however additional transport routes may be considered during the EIS. The assessment identified potential travel routes for the transformer transport vehicle (OSOM) and general construction traffic (B-Doubles), which are subject to further assessment as part of the Traffic Impact Assessment.
- Further assessment of the State/Regional Road intersections including turn treatments and sight distance should be undertaken as part of the Traffic Impact Assessment. It is recommended that turning movement count surveys are undertaken to establish the existing road environment.
- Further assessment and concept design of the access location/s on Puggoon Road and/or Jacksons Lane should be undertaken as part of the Traffic Impact Assessment to confirm suitable access for all vehicles travelling to and from the Project Area and compliance with Austrroads sight distance requirements.

If you have any questions please feel free to contact the undersigned.

Yours sincerely
Amber Organisation



Michael Willson
Director



Oliver Mihaila
Associate



ERM

APPENDIX F

PRELIMINARY SOCIAL IMPACT
ASSESSMENT



Puggoon Solar Farm and Battery Energy Storage System

Appendix F - Preliminary Social
Assessment

PREPARED FOR

X-ELI⁺

DATE

07 February 2025

REFERENCE

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Puggoon Solar Farm and Battery Energy Storage

Appendix F - Preliminary Social Assessment

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
ABS	Australian Bureau of Statistics
EIS	Environmental Impact Assessment
LGA	Local Government Area
NSW	New South Wales
SAL	Suburbs and Localities
SUA	Significant Urban Areas
SEIFA	ABS Socio-Economic Indexes for Areas
SIA	Social Impact Assessment
UCL	Urban Centres and Localities

APPENDIX F PRELIMINARY SOCIAL IMPACT ASSESSMENT

F.1 EXISTING ENVIRONMENT

The Project Area is situated in Beryl, New South Wales (NSW), approximately 4 km northwest of the town of Gulgong in the Mid-Western Regional Local Government Area (LGA). The Project Area is approximately 302 km (by road) northwest from Sydney, NSW.

Gulgong is the closest community to the Project Area that has the potential to provide goods and services (including accommodation) to support the construction and operation (e.g. ongoing maintenance) phases of the Project, along with the smaller town of Dunedoo and the larger communities of Mudgee, Wellington. The closest major regional city is Dubbo. As a result of Dubbo's proximity to the Project Area (refer to **Table F-1**) as well as its ability to provide an array of goods, services and possible accommodation options for the Project, the Urban Centre and Localities of Dubbo has been included in this scope.

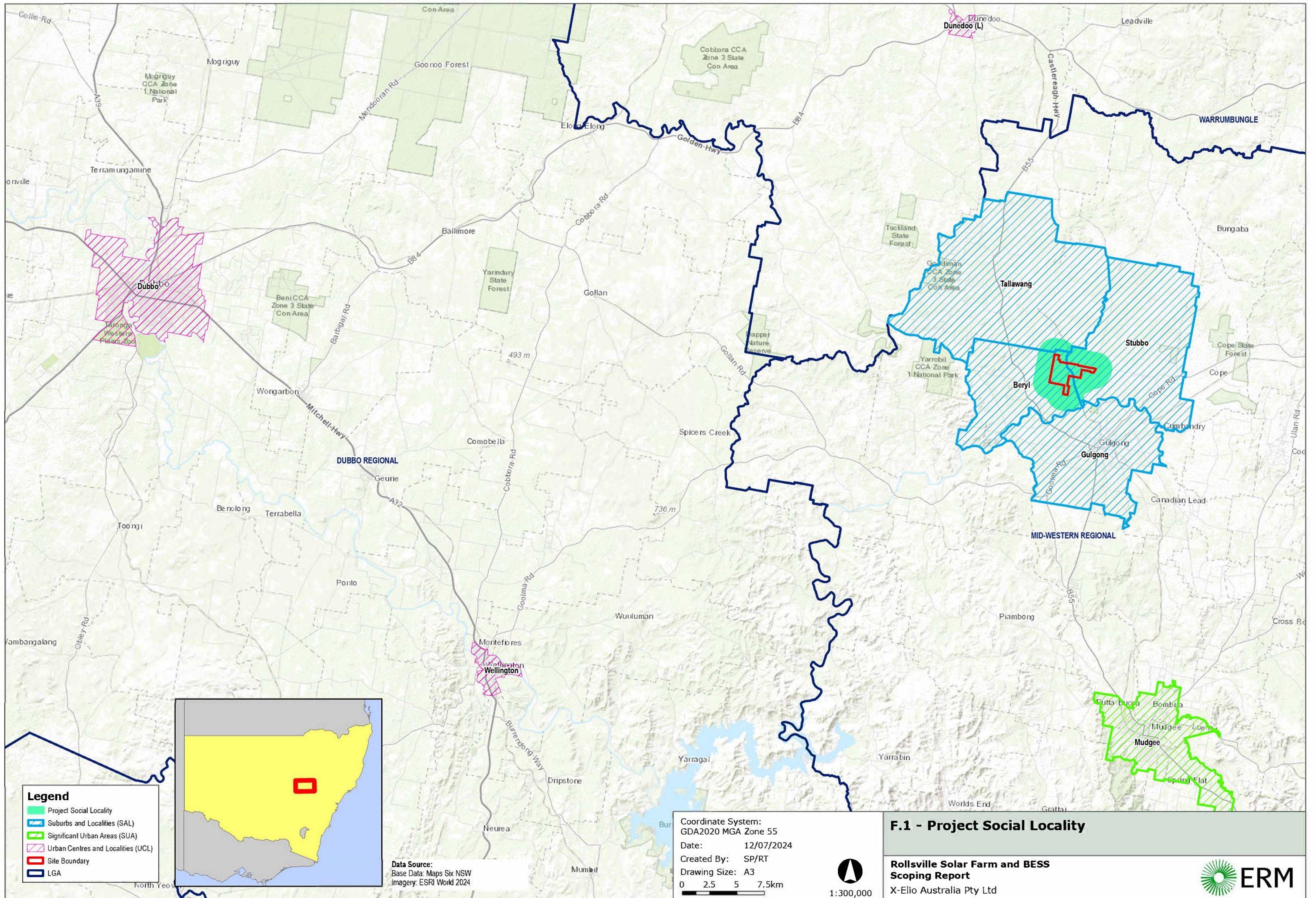
Based on the above, the Project's Social Locality, as defined for the purposes of the SIA, was determined to comprise of the following three components:

- The **Project Area and immediate surrounding areas**, located within the Australian Bureau of Statistics (ABS) Suburbs and Localities (SAL) Beryl, Nos. SAL10326 (containing the Project), SAL Stubbo, Nos. SAL13697 (containing the Project) and SAL Tallawang, Nos. SAL13746 (north of the Project Area). SAL data has been used to identify key baseline indicators for the Social Locality, where applicable. Additionally, LGA data for the Mid-Western Regional LGA (LGA15270) and state level data for NSW have been used to provide an understanding of the broader and comparative social context within which the Project is located;
- The **possible transportation and haulage routes** to the Project Area. Primary access to the Project Area during construction and operation is via Castlereagh Highway on the western boundary of the Project Area – this route requires vehicles to traverse Puggoon Road and Jacksons Lane; and
- The **surrounding towns and regional centres** of Gulgong, Dunedoo, Mudgee, Wellington and Dubbo which may provide goods and services to support the construction phase of the Project. ABS Urban Centres and Localities (UCLs), Suburbs and Localities (SAL), and Significant Urban Areas (SUA), provide baseline data for these towns and regional centres.

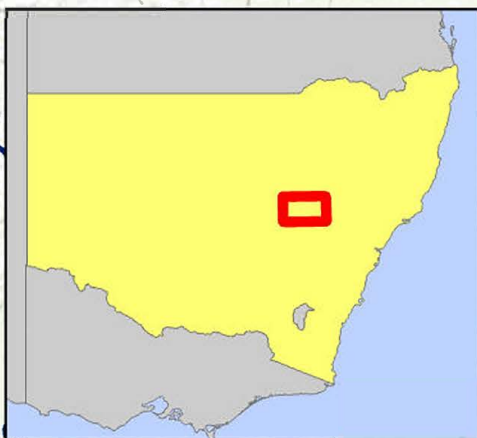
The Project Area and immediate surrounding areas, SALs, UCLs, Mid-Western Regional LGA and transportation and haulage routes form the Social Locality, as depicted in **Figure F-1**.

TABLE F-1 APPROXIMATE DISTANCES TO THE PROJECT AREA

Town/Regional Centre	Approximate Travel Distance
Gulgong	10 km south
Dunedoo	44 km north
Mudgee	41 km south
Wellington	83 km southwest
Dubbo	112 km west



- Legend**
- Project Social Locality
 - Suburbs and Localities (SAL)
 - Significant Urban Areas (SUA)
 - Urban Centres and Localities (UCL)
 - Site Boundary
 - LGA



Data Source:
 Base Data: Maps Six NSW
 Imagery: ESRI World 2024

Coordinate System:
 GDA2020 MGA Zone 55
Date: 12/07/2024
Created By: SP/RT
Drawing Size: A3
 0 2.5 5 7.5km



1:300,000

F.1 - Project Social Locality

Rollsville Solar Farm and BESS
Scoping Report
 X-Elio Australia Pty Ltd



F.2 COMMUNITY PROFILE

The community profile presented in this section will inform the social baseline in the second phase SIA (part of the EIS) and is primarily based on ABS 2021 Census data.

Table F-2 outlines the ABS datasets used to provide key demographic data across the Project Social Locality. For the purposes of the first phase SIA, only 2021 ABS datasets (i.e. latest available) were considered. However, in the second phase SIA, relevant 2016 ABS data will also be used for the purposes of trend analysis.

TABLE F-2 SUMMARY OF RELEVANT ABS DATASETS

Location	2021 ABS Data Reference (Census)
Beryl SAL (within Project Area)	SAL10326
Stubbo SAL (within Project Area)	SAL13697
Tallawang SAL (adjacent to Project Area to the north)	SAL13746
Gulgong SAL	SAL11800
Dunedoo UCL	UCL121032
Mudgee SUA	SUA1022
Wellington UCL	UCL115155
Dubbo UCL	UCL112006
Mid-Western Regional LGA	LGA15270
NSW	Code 1 (STE)

In addition to the above listed ABS datasets, the second phase SIA social baseline will be informed by a desktop review of sources including from public health advisory bodies, principally NSW Health, local hospitals (i.e. regarding physical and mental health issues prevalent in the local community), and educational institutions, principally the NSW Department of Education and local schools. Information relating to the economic profile of the Project will be provided by ABS 2021 Census data, while information on developmental priorities and challenges in the region will be provided by local and State government planning documents, such as Mid-Western Regional Council Local Strategic Planning Statements.

Table F-3 draws on the ABS datasets listed in **Table F-2** to provide a demographic overview of the Project's Social Locality. As outlined above, the Project Area is located within the Beryl SAL (SAL10326) and the Stubbo SAL (SAL13697). These SALs are the primary source of information about the potentially impacted communities, which defines the characteristics and is used to provide an understanding of potentially vulnerable groups within the Project's immediate Social Locality.

Table F-3 also includes the ABS' Socio-Economic Indexes for Areas (SEIFA)¹ based on 2021 census to provide an indication of comparative socio-economic advantage and disadvantage. The ABS broadly defines socio-economic advantage and disadvantage in the SEIFA as, "...people's access to material and social resources, and their ability to participate in society" at

¹ SEIFA is a product developed by the ABS that ranks areas in Australia according to relative socio-economic advantage and disadvantage. The indexes are based on information from the five-yearly Census, available at: <https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/latest-release>.

an area rather than individual level (ABS, 2018). SEIFA combines Census data such as income, education, employment, occupation, housing, and family structure to summarise the socio-economic characteristics of an area. Each area receives a SEIFA score, referred to as the 'socio-economic advantage and disadvantage score', indicating how relatively advantaged or disadvantaged that area is compared with other areas. A lower score indicates that an area is relatively disadvantaged compared to an area with a higher score.

The SEIFA scores in **Table F-3** are a percentile score which divide a distribution into 100 equal groups. The lowest scoring 1% of areas are given a percentile number of 1 and the highest 1% of areas are given a percentile number of 100. **Table F-3** indicates the Gulgong SAL has a much lower SEIFA index of 12, compared to the surrounding SALs of Beryl and Tallawang (both with a score of 46) and the Stubbo SAL with a score of 37. The Mid-Western Regional LGA has a SEIFA score of 41. Based on this data, the Gulgong SAL has a lower SEIFA score compared to its neighbouring SALs and the LGA.

Table F-3 also denotes that there is a 0% unemployment rate in both the Beryl and Stubbo SALs² whilst the Tallawang SAL has a 4.9% unemployment rate (the same unemployment rate as NSW) and the Gulgong SAL, 4.5%. The highest rate of unemployment in the Social Locality is the Wellington UCL, which has a 7.7% unemployment rate in 2021, followed by the Dunedoo UCL with 6.9%.

² It should be noted that, whilst the rating of 0% may reflect that all persons eligible are employed within the workforce, it may also be an outcome of data randomisation by the ABS to preserve respondent anonymity.

TABLE F-3 KEY INDICATORS FOR ALL ABS DATASETS (2021) ACROSS THE PROJECT SOCIAL LOCALITY

Population	Median Age	Indigenous Pop. (%)	Pop. Over 65 Years of Age	Median Weekly Household Income	Unemployment (%)	SEIFA (Percentile in NSW)	Dwelling Count (Occupied / Unoccupied (%))	Dwelling Tenure (Owned Outright + Mortgaged / Rented, %)	Household Composition (Families / Singles / Groups, %)
<i>Beryl SAL (within Project Area)</i>									
117	48	0.0%	26.9%	\$1,583	0.0%	46	41 / 3 (7.1%)	82.9% / 7.3%	91.9% / 8.1% / 0.0%
<i>Stubbo SAL (within Project Area)</i>									
270	46	6.7%	22.0%	\$1,305	0.0%	37	94 / 15 (13.9%)	93.6% / 8.5%	70.4% / 25.5% / 4.1%
<i>Tallawang SAL (adjacent to Project Area to the north)</i>									
165	38	1.8%	13.7%	\$1,449	4.9%	46	59 / 15 (20.3%)	84.8% / 10.2%	83.0% / 17.0% / 0.0%
<i>Gulgong SAL</i>									
2,680	41	8.1%	21.8%	\$1,371	4.5%	12	1,012 / 105 (9.5%)	72.1% / 24.0%	67.5% / 30.4% / 2.1%
<i>Dunedoo UCL</i>									
725	54	10.1%	33.9%	\$840	6.9%	*	310 / 43 (12.1%)	66.8% / 26.5%	57.3% / 40.1% / 2.5%
<i>Mudgee SUA</i>									
12,563	37	7.1%	18.6%	\$1,742	3.5%	*	4,727 / 655 (12.2%)	63.4% / 33.6%	69.0% / 27.6% / 3.4%
<i>Wellington UCL</i>									
4,581	41	27.4%	22.7%	\$1,060	7.7%	*	1,700 / 287 (14.4%)	62.5% / 33.4%	60.7% / 35.8% / 3.6%

Population	Median Age	Indigenous Pop. (%)	Pop. Over 65 Years of Age	Median Weekly Household Income	Unemployment (%)	SEIFA (Percentile in NSW)	Dwelling Count (Occupied / Unoccupied (%))	Dwelling Tenure (Owned Outright + Mortgaged / Rented, %)	Household Composition (Families / Singles / Groups, %)
<i>Dubbo UCL</i>									
38,783	35	16.7%	16.5%	\$1,632	3.6%	*	19,279 / 994 / (6.6%)	59.4% / 36.6%	67.9% / 28.3% / 3.7%
<i>Mid-Western Regional LGA</i>									
25,713	42	6.8%	18.4%	\$1,486	4.0%	41	9,638 / 1,704 (15.0%)	71.1% / 24.4%	68.9% / 28.3% / 2.8%
<i>NSW Code 1 (STE)</i>									
8,072,163	39	3.4%	17.7%	\$1,829	4.9%	*	2,900,468 / 299,524 (9.4%)	64% / 32.6%	71.1% / 25.0% / 3.8%

*Note: SEIFA is not provided for ABS UCL and STE Statistical Areas.

Table F-4 outlines the key industries and areas of employment for SALs, UCLs, SUA, LGA and NSW in the Project Social Locality. The most prominent occupations across the SALs in 2021 were Technicians and Trades Workers, Managers and Professionals. The most prominent occupation for the Mid-Western Regional LGA was Technicians and Trades Workers.

TABLE F-4 KEY INDUSTRIES FOR SELECT ABS STATISTICAL AREAS (2021 CENSUS DATA)

Location	Key Occupation and Industries
Beryl SAL (within Project Area)	<ul style="list-style-type: none"> Of the 117 residents in this SAL, there were 42 people who were reported as being in the workforce in the 2021 Census, with 26 people working full-time, nine working part-time and five away from work. The most common occupations in the SAL included Technicians and Trades Workers (19.0%), Labourers (19.0%), Managers (14.3%), Clerical and Administrative Workers (14.3%), Machinery Operators and Drivers (11.9%) and Sales Workers (9.5%). Of the employed people in this SAL, 16.7% were working in Coal Mining.
Stubbo SAL (within Project Area)	<ul style="list-style-type: none"> Of the 270 residents in this SAL, there were 111 people who were reported as being in the workforce in the 2021 Census, with 68 working full-time, 32 working part-time and 10 away from work. The most common occupations in the SAL include Managers (22.1%), Machinery Operators and Drivers (17.7%), Technicians and Trades Workers (16.8%), Professionals (7.1%), Community and Personal Service Workers (7.1%), Clerical and Administrative Workers (7.1%), Labourers (7.1%) and Sales Workers (6.2%). Of the employed people in this SAL, 20.4% were working in Coal Mining. Other industries of employed residents include Sheep-Beef Cattle Farming (8.0%), Sheep Farming (Specialised) (7.1%), Bread Manufacturing (Factory based) (4.4%) and Supermarket and Grocery Stores (4.4%).
Tallawang SAL (adjacent to the Project Area to the north)	<ul style="list-style-type: none"> Of the 165 residents in this SAL, there were 81 people who were reported as being in the workforce in the 2021 Census, with 45 working full-time, 20 working part-time and 13 away from work. The most common occupations in the SAL include Professionals (25.0%), Managers (22.4%), Labourers (17.1%), Technicians and Trades Workers (14.5%), Machinery Operators and Drivers (11.8%), Sales Workers (6.6%), Community and Personal Service Workers (5.3%) and Clerical and Administrative Workers (3.9%). Of the employed people in this SAL, 11.8% were working in Coal Mining. Other industries of employed residents include Sheep-Beef Cattle Farming (9.2%), Supermarket and Grocery Stores (7.9%), Sheep Farming (Specialised) (5.3%) and Beef Cattle Farming (Specialised) (5.3%).
Gulgong SAL	<ul style="list-style-type: none"> 55.4% of the SAL's residents reported being in the workforce. The top occupations reported in the SAL were Technicians and Trades Workers (19.2%), Machinery Operators and Drivers (18.0%), Labourers (13.4%), Community and Personal Service Workers (11.0%), Managers (10.6%), Professionals (9.5%), Clerical and Administrative Workers (9.3%) and Sales Workers (7.9%). The top industries of employment for those in the SAL were Coal Mining (18.2%), Supermarket and Grocery Stores (4.1%), Accommodation (3.6%), Aged Care Residential Services (3.5%) and Primary Education (2.8%).
Dunedoo UCL	<ul style="list-style-type: none"> 42.1% of the UCL's residents reported being in the workforce. The top occupation reported in the UCL were Labourers (16.6%), Managers (14.9%), Professionals (14.1%), Community and Personal Service Workers (14.1%), Technicians and Trades Workers (11.6%), Clerical and Administrative Workers (11.6%), Machinery Operators and Drivers (10.0%) and Sales Workers (7.1%).

Location	Key Occupation and Industries
	<ul style="list-style-type: none"> Of the employed people in the UCL, the top industries of employment were Combined Primary and Secondary Education (11.6%), Hospitals (except Psychiatric Hospitals) (5.4%), Sheep Farming (Specialised) (3.7%), Coal Mining (3.7%) and Fuel Retailing (3.7%).
Mudgee SUA	<ul style="list-style-type: none"> 62.4% of the SUA's residents reported being in the workforce. The top occupation reported in the SUA were Technicians and Trades Workers (18.0%), Professionals (15.8%), Machinery Operators and Drivers (12.7%), Community and Personal Service Workers (12.4%), Labours (10.8%), Managers (10.6%), Clerical and Administrative Workers (9.7%). Of the employed people in the SUA, the top industries of employment were Coal Mining (16.6%), Primary Education (3.0%), Other Social Assistance Services (2.9%), Supermarket and Grocery Stores (2.6%), Hospitals (except Psychiatric Hospitals) (2.4%).
Wellington UCL	<ul style="list-style-type: none"> 45.9% of the UCL's residents reported being in the workforce. The top occupations reported in the UCL were Community and Personal Service Workers (20.2%), Labourers (16.3%), Technicians and Trades Workers (12.9%), Professionals (12.3%), Clerical and Administrative Workers (10.4%), Sales Workers (9.1%), Machinery Operators and Drivers (8.5%) and Managers (8.0%). Of the employed people in the UCL, the top industries of employment were Correctional and Detention Services (6.6%), Aged Care Residential Services (5.7%), Takeaway Food Services (4.7%) Supermarket and Grocery Stores (4.5%) and Primary Education (3.9%).
Dubbo UCL	<ul style="list-style-type: none"> 62.8% of the UCL's residents reported being in the workforce. The top occupations reported in the UCL were Professionals (19.4%), Community and Personal Service Workers (16.0%), Technicians and Trades Workers (13.9%), Clerical and Administrative Workers (12.5%), Labourers (10.4%), Managers (10.3%), Sales Workers (9.8%), and Machinery Operators and Drivers (5.9%). Of the employed people in the UCL, the top industries of employment were Hospitals (5.9%), Other Social Assistance Services (4.4%), Aged Care Residential Services (3.1%), Primary Education (2.8%), and State Government Administration (2.5%).
Mid-Western Regional LGA	<ul style="list-style-type: none"> 57.8% of the LGA's residents reported being in the workforce. The most common occupations in Mid-Western Regional LGA were Technicians and Trades Workers (17.5%), Professionals (14.1%), Managers (13.9%), Machinery Operators and Drivers (12.9%), Labourers (11.4%), Community and Personal Service Workers (11.0%), Clerical and Administrative Workers (9.7%) and Sales Workers (7.8%). Of the employed people in the LGA, 14.7% worked in Coal Mining. Other major industries of employment included Primary Education (2.8%) Supermarket and Grocery Stores (2.6%) Aged Care Residential Services (2.5%) and Other Social Assistance Services (2.5%).
NSW Code 1 (STE)	<ul style="list-style-type: none"> The most common occupations in NSW included Professionals (25.8%), Managers (14.6%), Clerical and Administrative Workers (13.0%), Technicians and Trades Workers (11.9%), and Community and Personal Service Workers (10.6%). Of the employed people in NSW, 4.2% worked in Hospitals (except Psychiatric Hospitals). Other major industries of employment included Supermarket and Grocery Stores (2.5%), Other Social Assistance Services (2.4%), Computer System Design and Related Services (2.3%) and Aged Care Residential Services (2.2%).

F.3 SOCIAL INFRASTRUCTURE OVERVIEW

Social infrastructure comprises schools and other education institutions, medical services, emergency services, recreational facilities, and community organisations. Some commercial services are also listed under social infrastructure, such as childcare facilities.

Gulgong is a small historic town with a range of social infrastructure that supports its community. Healthcare services are provided at the Gulgong Multi-Purpose Service (provides both a hospital and aged care services) and Gulgong Medical Centre. The towns educational needs are met by institutions including the Gulgong Public School and Gulgong High School, along with early childhood education centres. Emergency services for the town include Gulgong Police Station and Gulgong Fire Station. Community engagement is fostered through various organisations, including a Rotary Club, Lions Club and Country Women's Association (CWA) which offer social, recreational and support activities. Public amenities include the library, Youth and Community Centre, swimming pool and various parks and playgrounds. Additionally, Gulgong's historic and heritage buildings include the Pioneers Museum and Prince of Wales Opera House.

Dunedoo is a small rural town which boasts a well-rounded social infrastructure that supports the community's well-being and daily life. Healthcare needs are met by the Dunedoo Multi-Purpose Service (MPS), which offers emergency care, aged care and outpatient services. The educational needs are catered to by Dunedoo Central School, which provided education from primary through to secondary levels, along with early childhood reduction services. Community engagement is fostered through various groups and services such as the CWA, Lions Club and local sporting clubs. Public amenities include a library, community hall, and parks that host community events. Essential emergency services are provided by the Rural Fire Service and NSW Police.

Mudgee features educational facilities, including primary and secondary schools and a campus of TAFE NSW. The Mudgee District Hospital provides comprehensive medical care. There are numerous recreational facilities such as sports grounds, parks, a public swimming pool and library. Cultural activities include local arts and music events such as Mudgee Wine and Food Festival, Mudgee Field Days, Flavours of Mudgee, Sculptures in the Garden, and Mudgee Running Festivals. These events, among others, draw visitors from across the region.

Wellington also hosts several educational institutions, including primary, secondary school and TAFE NSW campus. Healthcare is anchored by the Wellington Health Service while cultural and community activities are supported by the Wellington Civic Centre and the local library. Emergency services for Wellington include Wellington Police, Fire and Rescue NSW, NSW Ambulance, State Emergency Service (SES), and Rural Fire Service (RFS). Wellington hosts various social events throughout the year including, Wellington Boot Racing Carnival, Wellington Show, Wellington Arts and Sculpture Festival, Cameron Park Markets and Wellington Vintage Fair and Swap Meet.

Dubbo is a major regional city in NSW and has a well-developed social infrastructure. Dubbo hosts comprehensive educational facilities and healthcare including TAFE Western, Charles Sturt University and Dubbo Base Hospital. Attractions such as festivals, museums and galleries has allowed tourism to act as an economic driver. Outdoor pursuits throughout the region include gardens, parks, and camping sites which are popular for locals and tourists. **Table F-5** documents Dubbo's emergency services and educational institutions in more detail.

TABLE F-5 DUBBO EMERGENCY SERVICES AND EDUCATIONAL INSTITUTIONS

Emergency Services	Educational Institutions
<ul style="list-style-type: none"> • Dubbo Base Hospital • Western NSW Oral Health Service • Lourdes Hospital • Dubbo Private Hospital • Bawrunga Aboriginal Medical Service • Family Planning NSW • Dubbo Medical and Allied Health Group – Specialists • Macquarie Health Collective • headspace Dubbo • South Dubbo Family Medical Practice • Dubbo Family Doctors 	<ul style="list-style-type: none"> • Dubbo and District Preschool • Dubbo West Preschool • Goodstart Early Learning Dubbo - Baird Drive • Regand Park Early Childhood Education Centre • Insight Early Learning Southlakes, Dubbo • Dubbo Early Learning Centre • Imagine Childcare & Preschool Blueridge Park • Dubbo College Senior Campus • Dubbo College South Campus • Dubbo College Delroy Campus • Macquarie Anglican Grammar School • Yawarra Community School • Dubbo West Public School • Dubbo South Public School • Dubbo North Public School • Saint Laurence's Primary School • Saint Johns Primary • Saint Pius X Primary School • Mian School • St Johns College • Dubbo Christian School • Buninyong Public School • St Marys Primary School • Dubbo School of Distance Education • School of Rural Health • TAFE NSW - Dubbo • TAFE NSW - Dubbo, Narromine Road • Charles Sturt University • VERTO Western College Dubbo

F.4 POTENTIAL SOCIAL IMPACTS

The first phase SIA provides a preliminary desktop assessment of the potential impacts while the second phase SIA, that will be incorporated into the EIS, develops this preliminary assessment into a full assessment report. The full assessment report provides a detailed analysis of the potential impacts and incorporates key stakeholder feedback.

The scoping of potential social impacts was initially facilitated through consideration of the SIA Scoping Tool (DPE, 2023c) that complements the SIA Guideline. The SIA Scoping Tool identifies the potential social impacts that are considered likely to occur, and the corresponding level of assessment for each potential social impact.

Use of the updated SIA Scoping Tool allows for the level of assessment to be identified, which in this case was determined to be 'detailed assessment'.

The methodology that will be followed in the second phase SIA is provided in **Section F.3**. The second phase SIA will also take into account potential cumulative impacts in view of recent and proposed renewable energy projects, and other large-scale projects in the Project Social Locality.

As this is a first phase SIA, this impact assessment is preliminary in nature and makes assumptions about community perceptions and potential impacts from the Project, based on the desktop review, prior solar farm SIA experience, and the outcomes of the engagement activities carried out to-date. The identified potential impacts listed in **Table F-6** will be ground-truthed, supplemented by stakeholder feedback, and reviewed against any changes associated with further design development subsequent to issuing the SEARs.

It should be noted that the Project is continuously evolving and improving, and as such the outcomes of this preliminary assessment will be used to inform future refinements as part of the ongoing design development. Furthermore, given the operational timeframe for the Project (in excess of 30 years), components of the Project may be upgraded to prolong the life of operation, or decommissioned and the land returned to the original land use. For the purposes of this first phase SIA and the second phase SIA, therefore, a future decommissioning phase are not to be assessed. The potential social impacts associated with the decommissioning of the Project will be considered as part of a Decommissioning Plan (or similar).

TABLE F-6 PRELIMINARY SOCIAL IMPACT ASSESSMENT

Description of Impact	Impact Categories	Impact Influence	Project Phase	Level of Assessment
<i>Employment and Procurement</i>				
Increased demand for labour in the Social Locality (generates direct and indirect employment opportunities)	Livelihoods	Positive	Construction	Detailed Assessment
Increased demand for labour in the Social Locality leading to a skill shortages/ reduced labour availability for local services and/or businesses	Livelihoods	Negative	Construction	Detailed Assessment
Increased demand for goods and services in the Social Locality (stimulates local economies)	Livelihoods	Positive	Construction	Detailed Assessment
Increased demand for goods and services in the Social Locality (creates shortages)	Livelihoods	Negative	Construction	Detailed Assessment
Diversification of income streams for host landowners	Livelihoods	Positive	Life of the Project	Detailed Assessment
<i>Local Disruptions</i>				
Disruptions to agricultural activities / farming practices (e.g. activities may limit access and cause temporary inconveniences for the operation of rural properties, such as stock movements, paddock access, etc.)	Livelihoods Health and Wellbeing	Negative	Life of the Project	Detailed Assessment

Description of Impact	Impact Categories	Impact Influence	Project Phase	Level of Assessment
Increased vehicular movement from workers employed by the Project, and the transportation of materials and equipment to site, increasing the potential for accidents and wear and tear on road infrastructure	Health and Wellbeing	Negative	Construction	Detailed Assessment
Interruptions to daily life, such as changes in traffic conditions (e.g. diversions for school buses, road closures, changes to public vehicular access), utility disruptions, etc.	Way of Life Accessibility	Negative	Construction	Detailed Assessment
Impacts associated with noise, vibration, and dust, which may cause impacts or disruptions to community health.	Health and Wellbeing Surroundings	Negative	Construction	Detailed Assessment
Changes to public vehicular access in the vicinity of the Project Area has the potential to impact community access	Accessibility	Negative	Life of the Project	Detailed Assessment
<i>Land Use and Landscape</i>				
Perceived impacts on land and/or property values (i.e. a decrease in land values)	Livelihoods	Negative	Operation	Detailed Assessment
Visual impact through altered rural character/changes to rural amenity (i.e. loss of scenic views and negative changes to visual amenity, glare from solar panels)	Way of Life Surroundings	Negative	Life of the Project	Detailed assessment
Altered landscape has the potential to impact tangible and intangible Aboriginal heritage	Culture	Negative	Life of the Project	Detailed Assessment
<i>Accommodation and Worker Influx</i>				
Increased demand / pressures on housing and accommodation potentially resulting in a shortage and/or increased cost of living	Way of life	Negative	Construction	Detailed Assessment
Increased demand and pressure on social, emergency, community, and recreational services and/or facilities including health care	Accessibility Way of Life	Negative	Construction	Detailed Assessment
<i>Stakeholder and Community</i>				
Development of a Community Benefit Fund (or similar Project-specific community benefit sharing scheme), which may generate positive outcomes for the local community (e.g. support of local community groups, scholarships, etc.)	Livelihoods Culture	Positive	Life of the Project	Detailed Assessment

Description of Impact	Impact Categories	Impact Influence	Project Phase	Level of Assessment
Reduced community cohesion and increased social tensions if appropriate management and/or mitigations are not implemented.	Health and Wellbeing	Negative	Construction	Detailed Assessment
Perceived adverse potential health impacts associated with the Project, including noise emissions, exposure to low level EMF, and bushfire risk.	Health and Wellbeing	Negative	Operation	Detailed Assessment

F.5 ASSESSMENT APPROACH

This section outlines the plan for developing the second phase SIA, in accordance with the requirements of the Social Impact Assessment Guideline and Technical Supplement (DPE 2023a, 2023b). Accordingly, the second phase SIA will be structured according to the following sections:

1. Introduction, Project Description, Regulatory Context

This section will provide a detailed overview of the Project locale, components, stages, and history. It will also provide a detailed review of the legislative and regulatory framework applicable to the SIA, taking into account relevant company policies.

2. Methodology

The impact assessment methodology to be applied to the second phase SIA follows DPHI's Social Impact Significance matrix (DPE, 2023b, pp 12-13), as depicted in **Table G-2**. In this matrix, the likelihood level refers to the probability of a social impact's occurrence as a result of the Project while the magnitude is considered in terms of the following elements:

- **Extent:** Who specifically is expected to be affected (directly, indirectly, and/or cumulatively), including any potential vulnerable people? Which location(s) and people are affected? (e.g. near neighbours, local, regional);
- **Duration:** When is the social impact expected to occur? Will it be time-limited (e.g. over particular Project phases) or permanent?
- **Severity:** What is the likely scale or degree of change? (e.g. mild, moderate, severe);
- **Intensity:** How sensitive/vulnerable (or how adaptable/resilient) are affected people to the impact, or (for positive impacts) how important is it to them? This might depend on the value they attach to the matter; whether it is rare/unique or replaceable; the extent to which it is tied to their identity; and their capacity to cope with or adapt to change; and
- **Level of Concern/Interest:** How concerned/interested are people? Sometimes, concerns may be disproportionate to findings from technical assessments of likelihood, duration and/or severity. Concern itself can lead to negative impacts, while interest can lead to expectations of positive impacts.

The characteristics of the magnitude of impact combine with their likelihood of occurrence to yield a rating of social impact significance, as indicated in **Table F-2**. The social impact significance matrix depicted in **Table F-2** will be applied to yield the initial evaluation of social impacts that are likely to be experienced by different groups within the Project Social Locality.

TABLE F-7 ADAPTED SOCIAL IMPACT SIGNIFICANCE MATRIX

		Magnitude level				
		1 Minimal	2 Minor	3 Moderate	4 Major	5 Transformational
Likelihood level	A Almost certain	Medium	Medium	High	Very High	Very High
	B Likely	Low	Medium	High	High	Very High
	C Possible	Low	Medium	Medium	High	High
	D Unlikely	Low	Low	Medium	Medium	High
	E Very unlikely	Low	Low	Low	Medium	Medium

*Where impacts are positive the following colour scale is used:

Positive		Low	Medium	High	Very High
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3. Social Locality and Stakeholder Identification

This section will elaborate on the preliminary outline of the Project Social Locality. The update will incorporate regulator and client feedback on the preliminary identification and provide an updated stakeholder list as the SIA moves into the second phase and more information becomes available.

4. Stakeholder Engagement relevant to the SIA

This section summarises the community and stakeholder engagement activities and outcomes relevant to the SIA that have been undertaken during ongoing stakeholder engagement for the Project, and during targeted engagement for the SIA.

5. Social Baseline

This section will update and expand on the community profile. The preliminary desktop assessment will be supplemented and ground-truthed with data obtained during fieldwork, including stakeholder engagement activities outlined above.

6. Impact Assessment and Management

This section will update and expand on the preliminary social impact assessment, providing an impact assessment informed by the stakeholder engagement. Two ratings will be provided in the impact assessment table covering pre- and post-mitigation levels of impact significance. The section will also elaborate on the mitigation measures which may be applied to reduce the negative social impact significance levels, or enhance the social benefits, for the various social impacts identified. The level of residual impacts will also be noted.

7. Monitoring Framework

This section will provide an overview of the recommended monitoring framework for the social impact management and mitigation measures put in place during the construction and operation phases of the Project. The framework provided will help to form the basis for developing a SIMP as part of Project post-approval requirements.

8. References

List of all documents and other resources cited in the SIA.

9. Appendices

Appendices will include community profiles and other supporting information such as summaries of stakeholder engagement and primary research, where considered necessary.



APPENDIX F REFERENCES

ABS 2021, QuickStats: Search Census data | Australian Bureau of Statistics (abs.gov.au), accessed 12 June 2024.

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DPE, 2023c, 'Scoping Worksheet', Department of Planning, Industry and Environment, Sydney, Social Impact Assessment | Planning (nsw.gov.au), accessed 12 June 2024.



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APPENDIX G

CUMULATIVE IMPACT ASSESSMENT
SCOPING SUMMARY

CUMULATIVE IMPACT ASSESSMENT SCOPING SUMMARY

TABLE 1 NEARBY STATE SIGNIFICANT DEVELOPMENTS AND POTENTIAL OVERLAP WITH THE PROJECT

Project	Key Features	Project Status	Indicative timeframe	Overlap with the Puggoon PV & BESS	Distance to Project (Approx)
<i>Solar Energy Developments</i>					
Tallawang Solar Farm	<ul style="list-style-type: none"> 500 MW capacity solar farm Area across 1,370 ha 	<ul style="list-style-type: none"> Under Assessment More Information Required 	<ul style="list-style-type: none"> Proposed construction in late 2026 for 34 months Proposed operational life of 35 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	Adjacent to the Project.
Mayfair Solar Farm & BESS	<ul style="list-style-type: none"> 60 MW capacity solar farm 60 MWh BESS Area across 217 ha 	<ul style="list-style-type: none"> Project proposed, SEARS issued 7 August 2023; and Prepare EIS Phase 	<ul style="list-style-type: none"> Proposed construction in Q3 2026 for 12 months Proposed operational life of 40 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	Adjacent to the Project.
Mavis Solar Farm & BESS	<ul style="list-style-type: none"> 250 MW capacity solar farm 100 MW / 200 MWh capacity BESS Area across 488 ha 	<ul style="list-style-type: none"> Project proposed, SEARs issued 12 February 2024 Prepare EIS Phase 	<ul style="list-style-type: none"> Proposed construction for 18 months Proposed operational life in 2026 for 25-30 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap. 	Adjacent to the Project.
Stubbo Solar Farm & BESS	<ul style="list-style-type: none"> 400 MW capacity solar farm 200 MWh capacity BESS Area across 1,250 ha 	<ul style="list-style-type: none"> Under Construction 	<ul style="list-style-type: none"> Proposed construction for 24-26 months Proposed operational life in 2025 for 25-30 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap. 	4.6 km
Sandy Creek Solar Farm	<ul style="list-style-type: none"> 750 MW of solar farm and BESS capacity 	<ul style="list-style-type: none"> Response to Submissions 	<ul style="list-style-type: none"> Proposed construction in Q2 2026 for 22-28 months Proposed operational life in 2025 for 25-40 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap. 	4.6 km

Project	Key Features	Project Status	Indicative timeframe	Overlap with the Puggoon PV & BESS	Distance to Project (Approx)
Beryl Solar Farm	<ul style="list-style-type: none"> • 109 MW capacity solar farm • Area across 332 ha 	<ul style="list-style-type: none"> • Operational 	<ul style="list-style-type: none"> • Operational 	<ul style="list-style-type: none"> • No construction overlap • Operations overlap 	5.0 km
Narragamba Solar Farm	<ul style="list-style-type: none"> • 320 MW capacity solar farm • BESS with capacity of 200 MWh • Area across 1,034 ha 	<ul style="list-style-type: none"> • Project proposed, SEARs issued 23 August 2023 • Prepare EIS Phase 	<ul style="list-style-type: none"> • Proposed construction in Q4 2025 for 20-24 months • Proposed operational life of 25 years 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	9.0 km
Birriwa Solar Farm & BESS	<ul style="list-style-type: none"> • 600 MW capacity solar farm • 600 MW / 1,200 MWh capacity BESS • Area across 1,330 ha 	<ul style="list-style-type: none"> • Approved 	<ul style="list-style-type: none"> • Proposed construction in late 2026 or early 2027 for 28 months • Proposed operational life of 30 years 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	15.0 km
Avonside Solar Farm	<ul style="list-style-type: none"> • 180 MW capacity solar farm • 400 MW capacity BESS • Area across 323 ha 	<ul style="list-style-type: none"> • Project proposed, SEARs issued 21 January 2024 • Prepare EIS Phase 	<ul style="list-style-type: none"> • Proposed construction for 12-24 months within 12 months of approval • Proposed operational life of 25-30 years 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	18.0 km
Dapper Solar Farm	<ul style="list-style-type: none"> • 300 MW capacity solar farm • Area across 730 ha 	<ul style="list-style-type: none"> • Project proposed, SEARs issued 24 February 2023 • Prepare EIS Phase 	<ul style="list-style-type: none"> • Proposed construction early 2025 for 18-24 months • Proposed operational life in 2026-2027 for 30 years 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	30.0 km
Cobborra Solar Farm	<ul style="list-style-type: none"> • 700 MW capacity solar farm • Area across 2,700 ha 	<ul style="list-style-type: none"> • Project proposed, SEARs issued 16 October 2023 • Prepare EIS Phase 	<ul style="list-style-type: none"> • Proposed construction late 2023 for 36 months • Proposed operational life in 2026 for 30 years 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	31.0 km

Project	Key Features	Project Status	Indicative timeframe	Overlap with the Puggoon PV & BESS	Distance to Project (Approx)
Dunedoo Solar Farm	<ul style="list-style-type: none"> 55 MW of solar capacity 	<ul style="list-style-type: none"> Approved 	<ul style="list-style-type: none"> Proposed construction late 2024 for 12 months Proposed operational life in 2026 for 30 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	32.0 km
Wollar Solar Farm & BESS	<ul style="list-style-type: none"> 280 MW of solar capacity with a 30 MWh BESS 	<ul style="list-style-type: none"> Under Construction 	<ul style="list-style-type: none"> Construction estimated to be complete mid 2024 Proposed operational life of 30 years 	<ul style="list-style-type: none"> No construction overlap Operations overlap 	40.0 km
Goulburn River Solar Farm & BESS	<ul style="list-style-type: none"> 450 MW of solar capacity with 1,030 MW / 2,060 MWh BESS 	<ul style="list-style-type: none"> Approved 	<ul style="list-style-type: none"> Proposed construction in 2025 for 27 months Proposed operational life of 40 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	50.0 km
<i>Wind Energy Developments</i>					
Orana Wind Farm & BESS	<ul style="list-style-type: none"> 92 WTGs 524 MW capacity wind farm Area across 16,770 ha 	<ul style="list-style-type: none"> Project proposed, SEARs issued 8 June 2023 Prepare EIS Phase 	<ul style="list-style-type: none"> Proposed construction in 2025 for 24-36 months Proposed operational for 30 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	15.0 km
Piambong Wind Farm & BESS	<ul style="list-style-type: none"> 81 WTGs 551 MW capacity wind farm 200 MWh BESS Area across 10,000 ha 	<ul style="list-style-type: none"> Project proposed, SEARs issued 12 December 2023 Prepare EIS Phase 	<ul style="list-style-type: none"> Proposed construction in 2026 for up to 36 months Proposed operational for 30 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	18.0 km
Spicers Creek Wind Farm	<ul style="list-style-type: none"> 700 MW of wind capacity, two battery storage of 400 MW capacity 	<ul style="list-style-type: none"> Recommendation 	<ul style="list-style-type: none"> Proposed construction of 40 months to commence within one to five year's of approval Proposed operational for 30 years 	<ul style="list-style-type: none"> Potential construction overlap Operations overlap 	19.0 km

Project	Key Features	Project Status	Indicative timeframe	Overlap with the Puggoon PV & BESS	Distance to Project (Approx)
Valley of the Winds Wind Farm	<ul style="list-style-type: none"> • 131 WTGs • Over 800 MW capacity wind farm • 320 MW / 640 MWh capacity BESS • Area across 695 ha 	<ul style="list-style-type: none"> • Assessment 	<ul style="list-style-type: none"> • Proposed construction for 40 months to commence within one to five years of approval • Proposed operational for 30 years • 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	26.0 km
Bodangora Wind Farm	<ul style="list-style-type: none"> • 120 MW capacity wind farm • 	<ul style="list-style-type: none"> • Operational 	<ul style="list-style-type: none"> • Operational 	<ul style="list-style-type: none"> • No construction overlap • Operations overlap 	29.0 km
Uungula Wind Farm	<ul style="list-style-type: none"> • 97 WTGs • 400 MW capacity wind farm 	<ul style="list-style-type: none"> • Under Construction 	<ul style="list-style-type: none"> • Proposed 30 months construction • Proposed operational for 30 years 	<ul style="list-style-type: none"> • No construction overlap • Operations overlap 	34.0 km
Burrendong Wind Farm	<ul style="list-style-type: none"> • 70 WTGs • 400-500 MW capacity wind farm • Area across 3,058 ha 	<ul style="list-style-type: none"> • Response to Submissions 	<ul style="list-style-type: none"> • Proposed construction of 18-24 months to commence within one to five years of approval • Proposed operational for 30 years 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	41.0 km
Liverpool Range Wind Farm	<ul style="list-style-type: none"> • 962 MW of wind capacity 	<ul style="list-style-type: none"> • Modification 	<ul style="list-style-type: none"> • Proposed construction of 24-36 months • Proposed operation for 20-30 years • 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	49.0 km

Project	Key Features	Project Status	Indicative timeframe	Overlap with the Puggoon PV & BESS	Distance to Project (Approx)
<i>Battery Energy Storage Developments</i>					
Bellambi Heights BESS	<ul style="list-style-type: none"> • Generation capacity of 408 MW (two 204 MW BESS generating units) and energy storage capacity of 816 MWh 	<ul style="list-style-type: none"> • Approved 	<ul style="list-style-type: none"> • Proposed construction to commence in Q2 2025 • Construction: one stage (13-20 months) or two stages (up to 18 months each) • Proposed operational for 25 years commencing 2026 • 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	1.2 km
Beryl BESS	<ul style="list-style-type: none"> • 100 MW / 200 MWh capacity BESS • Area across 38 ha 	<ul style="list-style-type: none"> • Response to Submissions 	<ul style="list-style-type: none"> • Proposed construction of 12 months to commence early 2025 • Proposed operational for 30 years commencing 2026 	<ul style="list-style-type: none"> • Potential construction overlap • Operations overlap 	3.9 km

TABLE 2 CUMULATIVE IMPACT ASSESSMENT APPROACH

Level of Assessment	Description
Detailed Assessment	<p>The Project may result in significant impacts on the matter, including cumulative impacts. Detailed assessment is characterised by:</p> <ul style="list-style-type: none"> • Potential overlap in impacts between a future project (e.g. Project A) and the proposed project; • Potential for significant cumulative impacts as a result of the overlap, requiring detailed technical studies to assess the impacts; • Sufficient data is available on the future project to allow a detailed assessment of cumulative impacts with the proposed project for the relevant matter; and • Uncertainties exist with respect to data, mitigation, assessment methods and criteria.
Standard Assessment	<p>The Project is unlikely to result in significant impacts on the matter, including cumulative impacts. Standard assessments are characterised by:</p> <ul style="list-style-type: none"> • Impacts are well understood; • Impacts are relatively easy to predict using standard methods; • Impacts are capable of being mitigated to comply with relevant standards or performance measures; and • the assessment is unlikely to involve any significant uncertainties or require any detailed cumulative impact assessment.
N/A	<p>No potential overlap in impacts between a future project and the proposed project that would warrant any consideration in the cumulative impact assessment.</p>

TABLE 3 CUMULATIVE IMPACT ASSESSMENT SCOPING SUMMARY TABLE

Project	Potential overlap between impacts of Project and impact of other projects			
	Access (Traffic)	Amenity – Noise and Visual	Social Impacts	Other
<i>Solar Energy Developments</i>				
Tallawang Solar Farm	Likely to be overlap in access, traffic and transport impacts between this project and the proposed Project. Further assessment required.	Likely to be overlap in visual and noise impacts between this project and the proposed Project. Further assessment required.	Likely to be risk of cumulative social impacts, given the close proximity of this project from the proposed Project. Further assessment required.	The Project and this development are adjacent to each other. The cumulative impacts of both projects on biodiversity and Aboriginal heritage will be considered in the EIS.
Mayfair Solar Farm & BESS	Likely to be overlap in access, traffic and transport impacts between this project and the proposed Project. Further assessment required.	Likely to be overlap in visual and noise impacts between this project and the proposed Project. Further assessment required.	Likely to be risk of cumulative social impacts, given the close proximity of this project from the proposed Project. Further assessment required.	The Project and this development are adjacent to each other. The cumulative impacts of both projects on biodiversity and Aboriginal heritage will be considered in the EIS.
Mavis Solar Farm & BESS	Likely to be overlap in access, traffic and transport impacts between this project and the proposed Project. Further assessment required.	Likely to be overlap in visual and noise impacts between this project and the proposed Project. Further assessment required.	Likely to be risk of cumulative social impacts, given the close proximity of this project from the proposed Project. Further assessment required.	The Project and this development are adjacent to each other. The cumulative impacts of both projects on biodiversity and Aboriginal heritage will be considered in the EIS.
Stubbo Solar Farm & BESS	Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project, however potential impacts in visual impact. Further assessment required.	Potential risk of cumulative social impacts, given the proximity of this project from the proposed Project. Further assessment required.	N/A

Project	Potential overlap between impacts of Project and impact of other projects			
	Access (Traffic)	Amenity – Noise and Visual	Social Impacts	Other
Sandy Creek Solar Farm				
	Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project, however potential impacts in visual impact. Further assessment required.	Potential risk of cumulative social impacts, given the proximity of this project from the proposed Project. Further assessment required.	N/A
Beryl Solar Farm				
	Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project, however potential impacts in visual impact. Further assessment required.	Potential risk of cumulative social impacts, given the proximity of this project from the proposed Project. Further assessment required.	N/A
Narragamba Solar Farm				
	Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project, however potential impacts in visual impact. Further assessment required.	Potential risk of cumulative social impacts, given the proximity of this project from the proposed Project. Further assessment required.	N/A
Birriwa Solar Farm & BESS				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A

Project	Potential overlap between impacts of Project and impact of other projects			
	Access (Traffic)	Amenity – Noise and Visual	Social Impacts	Other
Avonside Solar Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Dapper Solar Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Cobbora Solar Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Dunedoo Solar Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Wollar Solar Farm & BESS				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A

Project	Potential overlap between impacts of Project and impact of other projects			
	Access (Traffic)	Amenity – Noise and Visual	Social Impacts	Other
Goulburn River Solar Farm & BESS	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
<i>Wind Energy Developments</i>				
Orana Wind Farm & BESS	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Piambong Wind Farm & BESS	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Spicers Creek Wind Farm	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Valley of the Winds Wind Farm	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A

Project	Potential overlap between impacts of Project and impact of other projects			
	Access (Traffic)	Amenity – Noise and Visual	Social Impacts	Other
Bodangora Wind Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Ungula Wind Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Burrendong Wind Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	N/A
Liverpool Range Wind Farm				
	No potential overlap in access, traffic and transport impacts between this project and the proposed Project.	No potential overlap in visual and noise impacts between this project and the proposed Project.	Low risk of cumulative social impacts, given the distance of this project from the proposed Project. Further assessment required.	
<i>Battery Energy Storage Developments</i>				
Bellambi Heights BESS				
	Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	Potential overlap in visual and noise impacts between this project and the proposed Project. Further assessment required.	Potential risk of cumulative social impacts, given the proximity of this project from the proposed Project. Further assessment required.	N/A

Project	Potential overlap between impacts of Project and impact of other projects			
	Access (Traffic)	Amenity – Noise and Visual	Social Impacts	Other
Beryl BESS	Low risk of cumulative impacts relating to traffic and transport, subject to the transport route. Further assessment required.	No potential overlap in noise impacts between this project and the proposed Project, however potential impacts in visual impact. Further assessment required.	Potential risk of cumulative social impacts, given the proximity of this project from the proposed Project. Further assessment required.	N/A



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