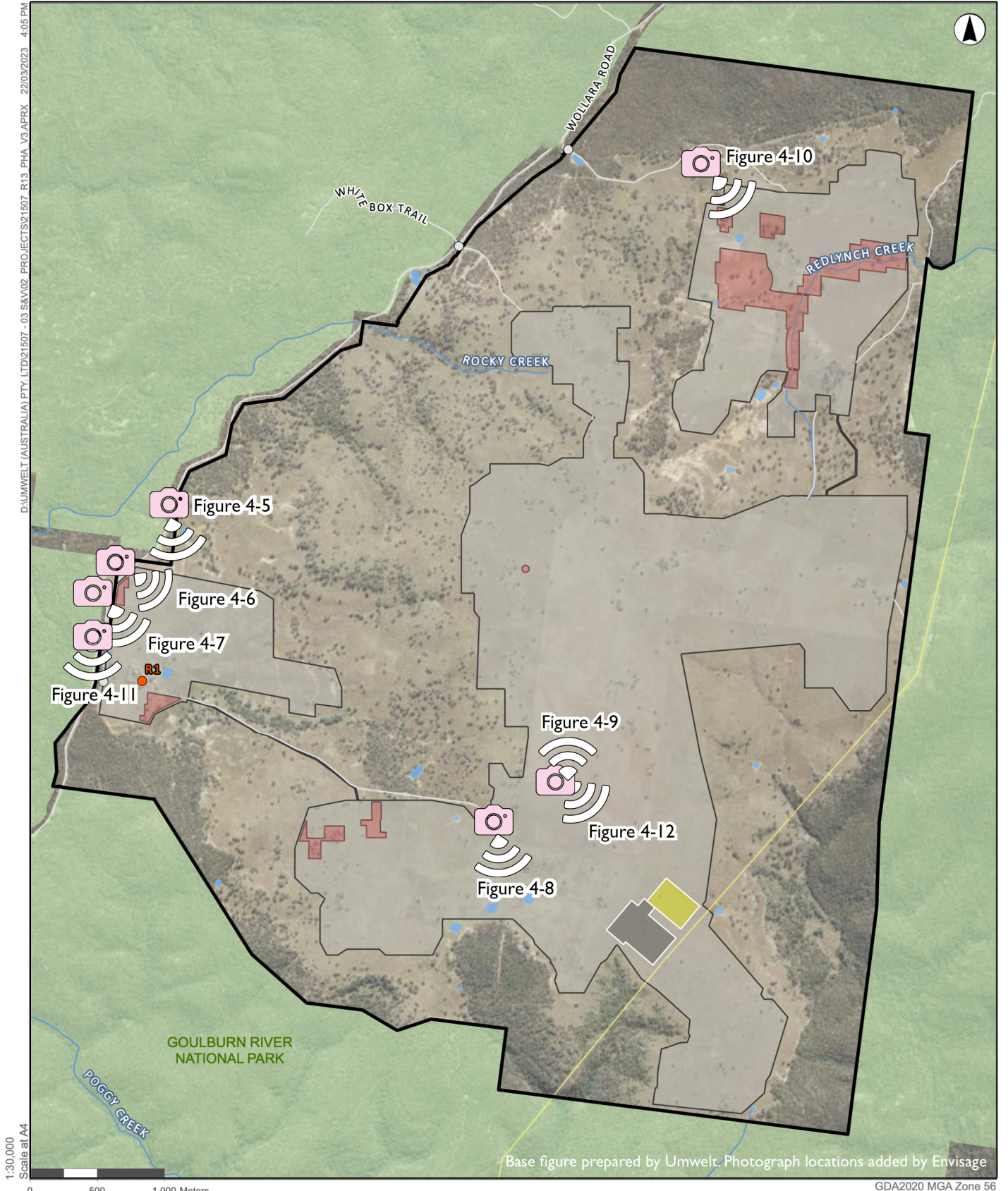


Figure 4-4  
**Location of Project Area images**

GOULBURN RIVER SOLAR FARM  
 LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT



- Legend
- Involved Dwelling
  - Access Points
  - Electricity Transmission Line
  - Watercourse
  - Roads and Tracks
  - Railway
  - Local Government Boundary
  - Project Area
  - Exclusion Zones - Environmentally Sensitive Areas
  - Battery Energy Storage System
  - Battery Substation
  - NSW National Parks
  - NSW State Forests
  - Waterbodies
  - 📷 Location Photo Was Taken (Approximate)
  - 📶 Approximate Direction Of View

#### 4.1.3 Physical landscape characteristics of the Project Area

The Project Area (comprising the solar farm, BESS and substation) has been mostly cleared of tall vegetation. Its cleared undulating slopes are used for agricultural purposes (grazing or cropping). Built elements within the Project Area include two homesteads (one referred to as the 1900s house in the north of the Project Area in the vicinity of Redlynch Creek, and one referred to as Post-War House in the southwest of the Project Area), a former homestead (a timber slab hut used until 1900), farm sheds, dams, post-and-wire fencing, a 500 kV TransGrid transmission line which passes through the south-eastern corner of the Project Area, and unsealed, internal access roads.

The terrain includes hills as well as low lying areas, and ranges in elevation from approximately 325 m to 450 m above sea level. The cleared, elevated hills provide 360-degree distant views. Stands of native trees occupy some of the rocky, higher slopes as well as creek/drainage lines. Isolated, individual trees are scattered across open paddocks.

Photographs are provided to illustrate the landscape character of the Project Area at the locations where various components of the Project would be located. Photograph locations are shown in [Figure 4-4](#).

#### Solar farm

The proposed solar farm development footprint occupies around 799.5 ha and is located within three distinct, flatter, cleared areas within the Project Area, including:

- A cleared area adjacent to Wollara Road (shown in [Figure 4-5](#), [Figure 4-6](#) and [Figure 4-7](#))
- A large, cleared, centrally located area, of mostly elevated land (shown in [Figure 4-8](#) and [Figure 4-9](#)) and
- An area in the north-east of the Project Area (shown in [Figure 4-10](#)).



Figure 4-5: Proposed solar farm area viewed from Wollara Road, looking south-east



Figure 4-6: Proposed solar farm area viewed from Wollara Road, looking east



Figure 4-7: Proposed solar farm area and existing Post-War House, viewed from Wollara Road, looking south



Figure 4-8: Proposed solar farm area on elevated, centrally located land within Project Area, looking south-east.  
The view includes the transmission line in the background



Figure 4-9: Proposed solar farm area on elevated, centrally located land within Project Area, looking north



Figure 4-10: Proposed solar farm area in north-east of Project Area, looking south-east. The view includes the 1900s house and transmission line in background.

#### Solar farm entrance

The main proposed entrance to the solar farm is from Wollara Road at an existing, unsealed driveway leading to the Post-War House. The existing driveway is partially screened by native trees within Wollara Road reserve and is shown in Figure 4-11.



Figure 4-11: Location of existing main driveway off Wollara Road, looking south along Wollara Road

### Onsite substation

The proposed solar farm substation would be in the south-east of the Project Area near the existing transmission line. A view toward the existing transmission line passing through the south-east of the Project Area is shown [Figure 4-12](#).



Figure 4-12: Existing transmission line passing through the Project Area, looking south-east

#### 4.1.4 Heritage significance of the landscape

An Aboriginal Heritage study has been undertaken by OzArk (*Aboriginal Cultural Heritage Assessment Report, Goulburn River Solar Farm, 2023*) and a historic heritage study has been undertaken by Umwelt (*Goulburn River Solar Farm Historical Heritage Assessment, 2023*). The assessments found:

- The Project Area is within an active registered Native Title Claim (NC2011/006) held by the Gomeroi People. No determined claims or Indigenous Land Use Agreements are in place for the Project Area.
- The surrounding Goulburn River National Park contains several hundred recorded Aboriginal archaeological sites that demonstrate the way in which Aboriginal people lived and moved through this landscape over many thousands of years. It is recognised as a significant cultural landscape.
- Twelve Aboriginal artefact sites were identified (one previously recorded and 11 previously unidentified) consisting of a grinding groove site, four artefact scatters, and six isolated finds. Eight are within the development footprint and are recommended to be salvaged with a surface collection of visible artefacts.
- Seven trees with scars were identified. The trees were of cultural importance to the aboriginal community and the scarring may be Aboriginal in origin. Aesthetic values within the development footprint are related to the association of recorded Aboriginal objects with the landscape, both in their physical association to features such as Redlynch Creek, Rocky Creek, and Ringwood Gully, but also the object's association with the smells and sounds of the current agricultural landscape. Killoe Creek grinding groove site also has aesthetic values as the visible grooves maintain their association with Killoe Creek.
- A management plan is to be prepared for the management of Aboriginal sites.
- The development footprint contains the ruins of the O'Brien homestead (the original timber slab hut) which may have historic and cultural values. The location of the hut is near the centre of the Project Area, and not visible from outside the Project Area. An exclusion zone has been established around O'Brien homestead including a 20 m buffer to protect for any impacts.

#### 4.1.5 Ecological significance of the landscape

A Biodiversity Development Assessment Report has been prepared by Umwelt (April 2023<sup>10</sup>) to assess the potential biodiversity impacts of the Project. The assessment found:

- The Project Area is not within a world heritage property or a national heritage place; it is not near any wetlands of international importance; is not within either a Commonwealth marine area or the Great Barrier Reef Marine Park.
- The Project Area, however, provides habitat for listed threatened species, and supports ecological communities, including critically endangered communities, and entities at risk of Serious and Irreversible Impacts (SAIL).
- The surrounding Goulburn River National Park contains high conservation values. It is unique in its topography and geology, which support a diverse number of plant communities and animal species. It also supports extensive geological and geomorphological diversity.

#### 4.1.6 Community amenity value of the landscape

Umwelt engaged with the community during preparation of the Project social impact assessment. Those engaged include nearby communities, employees and suppliers, local business and service providers, local government, State government, Federal government, traditional custodians and Aboriginal stakeholders, community and special interest groups, broader community, and local media. The engagement process, in part, was undertaken to identify the views of people, their values, interests, priorities and impacts.

During consultation, the visual amenity value of the landscape and its value to the community, was raised as an issue. Community visual amenity concerns are summarised as:

- Community 'sense of place'
- Impact to current scenic landscape/character of the locality
- Aboriginal cultural values and attachment to Country
- Changes to the landscape's visual character causing amenity disturbance
- Potential night lighting
- Impact to surrounding Goulburn River National Park through increased activity in the Project Area
- Cumulative visual impacts.

The surrounding Goulburn River National Park provides local amenity including recreational opportunities. The Goulburn River, which flows through much of the Goulburn River National Park, has a varied landscape of wide, open floodplain and rugged gorge walls, and provides opportunity for recreational activities such as walking and photography (NPWS, 2021).

The Park, however, attracts relatively few visitors compared to other national parks that are located closer to major metropolitan centres. The main recreational feature of the park is the Goulburn River, with facilities including the Spring Gully camping and picnic area, Big River campground, and Lees Pinch Lookout Walking Track (which is currently closed). Milan Dhiyaan, a local Aboriginal company, also provides guided Aboriginal cultural tours<sup>11</sup>.

#### 4.1.7 Planning matters relevant to landscape character

The Project Area is located within land zoned RU1 Primary Production under the *Upper Hunter Local Environmental Plan* (LEP) 2013. The relevant visual objective for the RU1 zone is:

- To maintain the rural landscape character of the land in the long term.

<sup>10</sup> Umwelt, *Goulburn River Solar Farm Biodiversity Development Assessment Report*, April 2023

<sup>11</sup> p27, Umwelt, *Social Impact Scoping Report*, December 2021

The *Upper Hunter Development Control Plan (DCP) 2015*, specifies design guidelines to achieve rural character objectives (which include not detracting from the rural setting, respecting the scenic quality of the site, and not dominating the surrounding landscape). Design guidelines include:

- Development should be sited in areas with the least topographical constraints (that is, not on steep slopes).
- Development should minimise cut and fill.
- All external finishes shall be of tones similar to those inherent in the landscape. Generally, all buildings, ancillary structures, including sheds, garages and water tanks are to be of natural earthy colours in the mid tonal range or darker and are to be of a non-reflective finish.
- Buildings are set back 100 m to unsealed roads (as per DCP Table 13: Minimum Structure Setbacks - Rural and Environmental Management Zones).
- Use natural colours, muted and earth tones for large surfaces including walls and roof.
- Avoid use of highly reflective glass, metal cladding (such as Zinalume) and plastics on the exterior of buildings to prevent glare nuisance to surrounding properties. Use factory pre-coloured materials with low reflective properties.

#### 4.2 Scenic quality

The scenic quality of the landscape is assessed as '**moderate**' when seen from northern and southern parts of the study area, where there are long views of undulating, cleared, agricultural landscape bordered by steep, densely vegetated ranges.

Scenic quality of the landscape is assessed as '**low**' where viewed from within the forested landscape of Goulburn River National Park along the Wollara Road corridor. In that location there is indistinct, shrubby vegetation along the road that limits views to the unsealed road corridor, and the roadside vegetation is not scenic of itself. The open, grassed pastures of the Project Area contrast with the surrounding forested landscape zone.

#### 4.3 Landscape character impact

The project would be located wholly within the open, agricultural landscape zone. The likely impact to the zone's landscape character, and to the character of the adjoining forested landscape, is assessed in Table 4-1. The table describes and rates:

- the sensitivity of the two existing landscape character zones to the proposed development, and
- the predicted magnitude of the change to landscape character from the proposed development.

The two aspects (sensitivity and magnitude) are combined (as shown in Table 2-4) to achieve an overall impact level to landscape character.

Table 4-1: Assessment of landscape character impacts

Landscape character zone	Sensitivity of existing landscape character to the proposed development	Magnitude of change the Project would have to the landscape character	Landscape Character Impact
Open, agricultural landscape	<p><b>Low</b></p> <p><i>Landscape designations</i></p> <ul style="list-style-type: none"> <li>▪ The Project Area is not within a designated scenic landscape and does not have recognised national or regional landscape value.</li> <li>▪ However, rural landscape character generally, is locally valued (rural character being recognised within the LEP).</li> </ul> <p><i>Landscape quality/characteristics</i></p>	<p><b>Low</b></p> <ul style="list-style-type: none"> <li>▪ The Project would change some visual characteristics of the agricultural landscape by:               <ul style="list-style-type: none"> <li>- introducing rows of solar modules (uncharacteristic built structures) across an area of open, grassed pasture.</li> <li>- introducing dark colours and repetitive linear patterning, contrasting the existing green/golden colours and informal patterning of the grazing paddocks.</li> </ul> </li> </ul>	<b>Low</b>

Landscape character zone	Sensitivity of existing landscape character to the proposed development	Magnitude of change the Project would have to the landscape character	Landscape Character Impact
	<ul style="list-style-type: none"> <li>▪ The landscape has been modified from its natural state – extensively cleared of trees and used for grazing.</li> <li>▪ The assessed scenic quality of the landscape is 'moderate'.</li> <li>▪ The Project Area is typical of the local agricultural landscape character, however, is visually isolated by the adjoining forested landscape of the Goulburn River National Park.</li> <li>▪ Potential impact to scenic character was raised as an issue by the community during engagement.</li> </ul> <p><i>Cultural heritage interests</i></p> <ul style="list-style-type: none"> <li>▪ The landscape, including the Project Area, is of cultural heritage importance to the Gomeroi People<sup>12</sup> and contains a site of local importance.</li> </ul>	<ul style="list-style-type: none"> <li>▪ However, there would be minimal physical change to the landscape through earth shaping or tree removal.</li> <li>▪ Most existing vegetation surrounding the development footprint would be retained, particularly on higher, rocky slopes and along drainage lines, maintaining 'natural' landscape features which are characteristic of the Project Area.</li> <li>▪ Sheep grazing may continue, retaining the site's agricultural land use characteristics.</li> <li>▪ Changes to the Project Area would not affect the broader agricultural landscape zone, as the site is visually isolated and physically separated from the more accessible local agricultural areas.</li> <li>▪ The Project is reversible (that is, the structural components could be removed and there would be little residual impact to the landscape).</li> </ul>	
<b>Dense forested landscape</b>	<p><b>Low</b></p> <ul style="list-style-type: none"> <li>▪ The project would be located wholly within the open, agricultural landscape zone, adjacent to the forested landscape.</li> <li>▪ The assessed scenic quality of the visible forested landscape adjacent to the Project Area is 'low' (although, the forested landscape of the area has higher scenic quality).</li> <li>▪ When experiencing the scenic quality of Goulburn River National Park from Wollara Road, the appearance of the Project Area's agricultural landscape is unexpected and uncharacteristic of the surrounding forested landscape.</li> </ul>	<p><b>Very low</b></p> <ul style="list-style-type: none"> <li>▪ The Project would not physically change the visual characteristics of the forested landscape.</li> <li>▪ The presence of the Project would, however, change the scenic quality of the Wollara Road corridor.</li> <li>▪ Scenery would include solar panels, however, the dark colours and linear patterning of the modules would have less contrast with the dense forested vegetation, than the existing grassed paddocks.</li> </ul>	<b>Very low</b>

<sup>12</sup> OzArk (Aboriginal Cultural Heritage Assessment Report, Goulburn River Solar Farm, 2022)



As outlined in [SECTION 2](#), the assessment of visual impact has two parts. The preliminary assessment firstly investigates the extent of the proposal seen from potential viewpoints and on that basis which viewpoints should proceed to the second phase, being the detailed assessment. The methodology to undertake the preliminary assessment is presented in [SECTION 2.4.1](#).

## 5.1 Viewpoints

Potential private viewpoints (i.e., residences) within 4 km of the Project's development footprint, and public viewpoints from roads or rail within 2.5 km were initially identified. The locations are shown in Figure 5-1 and include nineteen residences and one public road (Wollara Road).

A viewshed of the proposed project based on 3 m height for the solar panels (the average height of the solar modules being between 2.6 - 2.98 m above ground level), was produced to determine whether the identified residences had a 'theoretical' line of sight to the Project. The Project's viewshed is shown in yellow in Figure 5-1. The viewshed was produced via geographic information systems (GIS) which account for topography and line of sight, but does not account for intervening elements such as vegetation or buildings which could obstruct views. Therefore, the projected direct line of sight is 'theoretical'.

Figure 5-1 shows that three potential viewpoints (receiver R2, R47 and R51) would not have 'theoretical' visibility to the Project. These receivers were eliminated from further analysis.

During field investigations (including discussions with residents), it was further determined that there was no habitable dwelling located at R4 and R50. Therefore, these receivers were also eliminated from further analysis.

## 5.2 Preliminary analysis

For each of the remaining potential viewpoints (14 private and one public), measurements were taken using the preliminary assessment tools in the *Technical Supplement*<sup>13</sup>. The measurements for each potential viewpoint are provided in [Table 5-1](#).

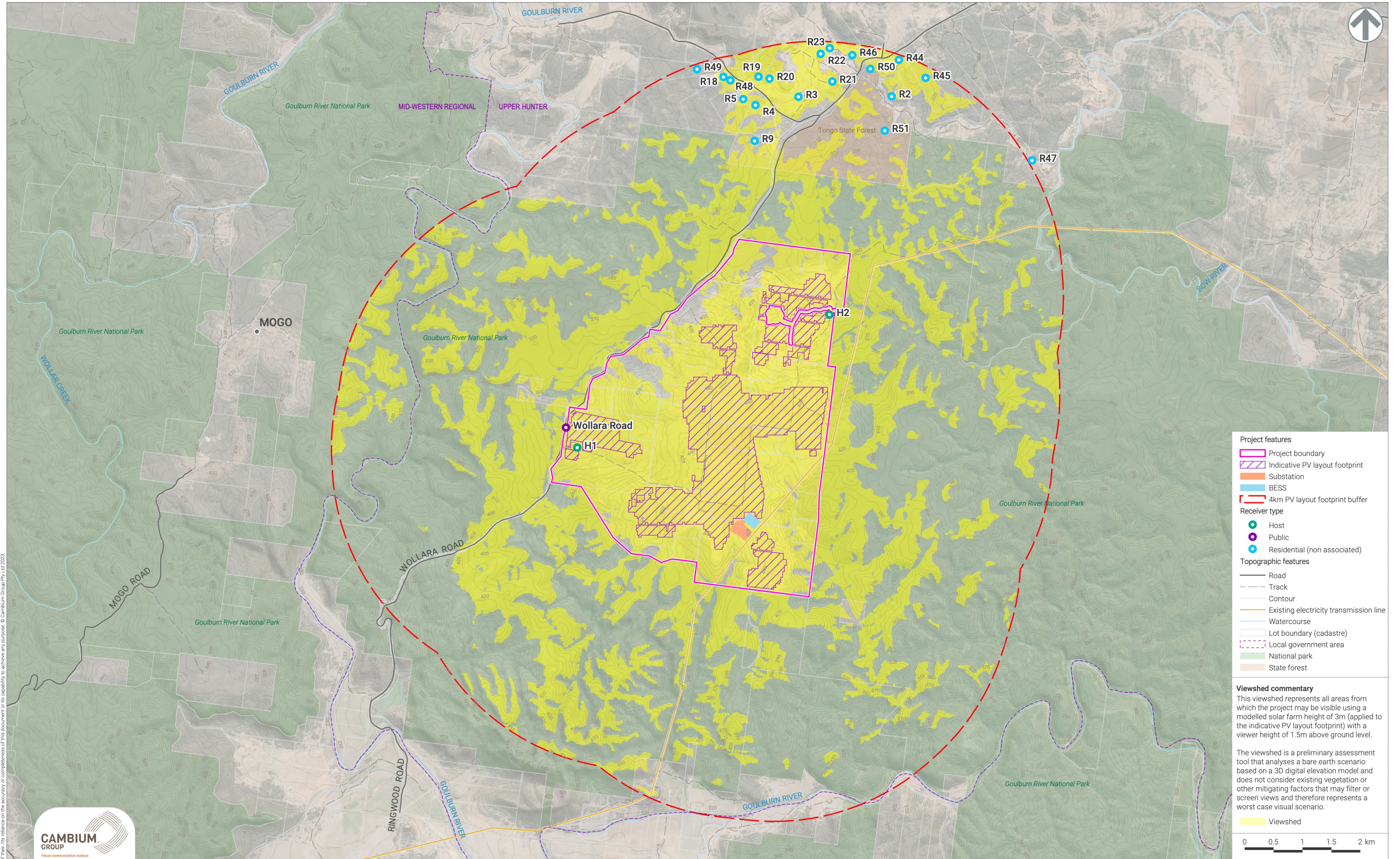
The results of the preliminary assessment determined that six viewpoints would require detailed assessment – comprising five private viewpoints (R3, R5, R9, R21, R46) and the single public viewpoint (Wollara Road).

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<sup>13</sup> Measurements were: distance to the development footprint, relative height compared to the Project, vertical field of view, and horizontal field of view. Definitions are provided in [SECTION 2.4.1](#) of this LCVA.

Figure 5-1  
Receivers and viewshed

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Source: NSW Government Department of Planning and Environment, Technical Supplement - Landscape and Visual Impact Assessment (2022), Esri, Maxar, Geoeye (2022), Commonwealth of Australia (Geoscience Australia) (2022), Elvis Elevation and Depth - Foundation Spatial Data (2022), Lightsource BP (2023), Uimwelt (2023), Envisage Consulting (2023), Cambium Group (2023)

031250\_GRSF\_IVIA\_F5-1\_Receivers\_and\_viewshed\_230321\_v01

Table 5-1: Preliminary assessment tool results

				(a)	442.98 m (Highest point of development footprint (440 m) + panel height (2.98 m))				
				(c)	320 m (Lowest point of development)				
Receiver No. (locations shown in Figure 5-1)	Type of viewpoint	Distance from Project development footprint - approximate (m)	Viewpoint ground height (m)	(b) Final height of viewpoint (ground height + 1.5 m standard viewer height)	Relative Height Difference (m) (refer to note 2)	Vertical field of view (sector) (the vertical field of view graph is provided at Appendix B)	Horizontal field of view (degrees) (refer to note 3)	Is detailed visual assessment required? (based on Table 1 of the <i>Technical Supplement</i> provided at Appendix A)	
Wollara Road	Public road	32	330.5	332	122.98	4	170	Assessment required	
R03	Private	3060	324	325.5	122.98	2	46	Assessment required	
R05	Private	3240	337	338.5	122.98	2	55	Assessment required	
R09	Private	2485	333	334.5	122.98	2	63	Assessment required	
R18	Private	3660	336	337.5	122.98	1	54	No assessment required	
R19	Private	3530	334	335.5	122.98	1	51	No assessment required	
R20	Private	3450	330	331.5	122.98	1	50	No assessment required	
R21	Private	3280	315	316.5	126.48	2	41	Assessment required	
R22	Private	3775	305	306.5	136.48	1	39	No assessment required	
R23	Private	3900	300	301.5	141.48	1	42	No assessment required	
R44	Private	3915	310	311.5	131.48	1	31	No assessment required	
R45	Private	3795	312	313.5	129.48	1	31	No assessment required	
R46	Private	3820	302	303.5	139.48	2	36	Assessment required	
R48	Private	3565	340	341.5	122.98	1	54	No assessment required	
R49	Private	3915	328	329.5	122.98	1	53	No assessment required	

TABLE NOTES:

- 1) Elevations derived from NSW Spatial Data elevation and depth
- 2) Relative height is obtained by calculating:  
 if (b) is equal to, or between, (a) and (c), then (a) minus (c)  
 if (b) is less than (c), then (a) minus (c)  
 if (b) is greater than (a), then (b) minus (c)
- 3) Horizontal field of view is calculated on the development footprint

The methodology to undertake the detailed assessment is presented in [SECTION 2.4.2](#).

### 6.1 Stage 1 – Refine and classify viewpoints

The preliminary assessment determined there were six viewpoints requiring detailed assessment - five private viewpoints (R3, R5, R9, R21, R46) and the single public viewpoint (Wollara Road).

Attempts were made<sup>14</sup> to visit each of the viewpoints identified, to assess visibility to the Project Area. Only two of the private viewpoints (R9 and R21), and the public viewpoint, were able to be accessed.

At both R9 and R21, existing site features obstructed views toward the Project Area. Photographs were taken from the primary external living area of each of property<sup>15</sup>, as evidence that there was no line of sight to the Project Area (and that further assessment was therefore not required). The view from R9 is shown in [Figure 6-1](#). The view from R21 is shown in [Figure 6-2](#).

Following these Stage 1 investigations, there remained three private viewpoints (R3, R5, R46), and one public viewpoint (Wollara Road), requiring detailed assessment.

### 6.2 Stage 2 – Determine magnitude (of change to view)

For the public viewpoint (Wollara Road), magnitude of the Project was measured by:

1. Producing a 180-degree panoramic photograph of the view,
2. Producing a photomontage by overlaying a 3D model of the Project on the photo
3. Overlaying the *Technical Supplement's* Visual Magnitude Grid Tool on the photomontage
4. Counting the number of grid cells that the project would occupy, and
5. Determining the magnitude rating based on the number of cells and the thresholds (refer to [Table 2-2](#)).

The panoramic photograph from the public viewpoint (Wollara Road) and 3D model overlay of the project is shown in [Figure 6-3](#). A full-size 50 mm image from within the photomontage area (that more appropriately represents the view of the Project from the human eye) is shown in [Figure 6-4](#).

Access was not available to take photographs from the remaining three private viewpoints (R3, R5 and R46). Therefore, a simulated image of the view was generated (modelled) based on topography, and a wireframe (outline) of the Project was overlain on the image. The modelled view simulates the 180-degree view from the viewpoint, however, does not include trees, buildings or other possible features that could obstruct the view, and therefore the simulated image represents a 'worst-case scenario' of the magnitude of the Project in view.

The modelled view and wireframe overlay for each private viewpoint is shown in [Figure 6-5](#), [Figure 6-6](#) and [Figure 6-7](#).

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<sup>14</sup> In accordance with the *Technical Supplement*, all reasonable efforts were made to access each private viewpoint identified, and to take panoramic photographs. Efforts included: making multiple phone calls to the property owner (where contact details were available), visiting the property, and contacting neighbours.

<sup>15</sup> Primary viewpoints as per [Table 2-1](#)