Bellambi Heights Renewable Project

Scoping Report

March 2022

VENA ENERGY AUSTRALIA

Bellambi Heights Renewable Project

Scoping Report

Prepared for Vena Energy Australia
March 2022

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Scoping Report

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Executive Summary

Vena Energy Services (Australia) Pty Ltd (VEA) proposes to develop the Bellambi Heights Renewable Project (the project), a large scale solar photovoltaic generation facility along with battery storage and associated infrastructure. The proposed solar farm will have a generation capacity of approximately 200 megawatts (MW) which will generate the equivalent of approximately 400 gigawatt hours (GWh) of energy annually, enough to power approximately 92,000 homes. The proposed battery energy storage system (BESS) will also have a capacity of approximately 200 MW and up to two hours of storage, which is approximately 146 GWh or the equivalent of 161,000 homes.

The project is within the Mid-Western Regional Council local government area and is within the Central-West Orana Renewable Energy Zone. The project is in the locality of Beryl, approximately 6.5 km north-west of the township of Gulgong, in the Central West of New South Wales (NSW). The project incorporates a switchyard which will be built and operated by TransGrid and will connect to the existing Wellington-to-Wollar 330 kV transmission line. The project will play an important role in achieving the objectives of the Central-West Orana Renewable Energy Zone. It will also provide significant economic stimulus to the region through construction jobs and associated flow-on benefits.

The project will be developed within a project area of approximately 304 hectares (the project area). The exact land area to be covered by the project components (the development footprint) will be refined as the project design develops and will be informed by the outcomes of community and stakeholder engagement and the findings of the environmental, social, and economic assessments.

The project area has been selected with consideration of several alternatives to ensure the project is viable as a solar and storage development and that it will result in maximum benefits for the locality and region in the long term, while minimising impacts to the environment. Key factors in selection of the project area include its position adjacent to existing and planned transmission infrastructure and its high solar exposure and physical conditions for large-scale solar energy generation. The project area has been refined and optimised following initial investigations of biodiversity, heritage, and visual amenity considerations.

The project is State significant development pursuant to Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021. Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*.

This Scoping Report has been prepared to support a request for the Secretary's Environmental Assessment Requirements for the project. A preliminary environmental assessment has been carried out and is documented in this report to assist in the identification of matters that will require further assessment in the Environmental Impact Statement (EIS), and the level of assessment that should be carried out for each matter.

This Scoping Report has been prepared in accordance with the recently released guidelines: *State significant development guidelines - preparing a scoping report: Appendix A to the State significant development guidelines* (DPIE 2021a). The aspects identified as requiring detailed assessment in the EIS include visual, biodiversity, traffic, and Aboriginal heritage. Aspects requiring standard assessment include hazards, social, water, land, noise and vibration, and air quality.

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1 Introduction

1.1 Project overview

Vena Energy Services (Australia) Pty Ltd (VEA) proposes to develop the Bellambi Heights Renewable Project (the project), a large scale solar photovoltaic (PV) generation facility along with battery storage and associated infrastructure . The project will have a generation capacity of approximately 200 megawatts (MW), which will generate the equivalent of approximately 400 gigawatt hours (GWh) of energy annually. The proposed battery energy storage system (BESS) will have a capacity of approximately 200 MW and up to two hours of storage. The project is State significant development (SSD) pursuant to Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The project is within the Mid-Western Regional Council local government area and the Central-West Orana (CWO) Renewable Energy Zone (REZ). The project is in the locality of Beryl across two parcels of land at 696 Castlereagh Highway and 79 Puggoon Road, Beryl, on Lot 101 and 102 of Deposited Plan 1203462, approximately 6.5 km north-west of the township of Gulgong, in the Central West of New South Wales (NSW). The project comprises the key components outlined in Table 1.1 below.

Table 1.1 Project components

Component	Location
Development of a large-scale solar farm with a generation capacity of approximately 200 MW	Lot 102 / DP 1203462 - 696 Castlereagh Highway
Development of a utility scale battery energy storage system (BESS) with a capacity of approximately 200 MW	Lot 102 / DP 1203462 - 696 Castlereagh Highway
Switchyard connecting the solar farm and BESS to an existing 330 kV transmission line, which will be operated by TransGrid	Lot 101 / DP 1203462 - 79 Puggoon Road

The project will be connected to the National Electricity Market (NEM) via the proposed switchyard to be developed as part of the project, within the project area at 79 Puggoon Road, Beryl on Lot 101 of Deposited Plan 1203462. The switchyard forms part of the project and will be built and operated by TransGrid. Initial consultation has been undertaken with TransGrid, who already owns the land for the proposed switchyard. The proposed switchyard is adjacent to the existing Wellington-to-Wollar 330 kV transmission line and no additional transmission lines are expected to be required. Grid connection investigations will be facilitated with regulatory and infrastructure bodies such as AEMO and TransGrid to determine the most appropriate connection to the NEM. The final layout and composition of the TransGrid switchyard and the project will be investigated and refined during the Environmental Impact Statement (EIS) and detailed design process.

The project will be developed within a project area of approximately 304 hectares inclusive of the solar farm, BESS and TransGrid switchyard as shown in Figure 1.1. The exact land area to be covered by the project components (the development footprint) will be refined as the project design progresses and will be informed by the outcomes of community and stakeholder engagement and the findings of the environmental, social, and economic assessments.

The project is consistent with NSW government policy for development of electricity infrastructure. It will contribute to the development of the CWO REZ and assist in meeting NSW's energy generation and storage requirements, as well as the NSW and Australian Government emissions reduction targets.

KEY

- Project area
- Rail line
- Major road
- Minor road
- Electricity transmission line - 330 kV
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Local government area
- Central West Orana Renewable Energy Zone

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

Regional setting

Bellambi Heights Renewables Project
Scoping Report
Figure 1.1

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1.2 The applicant

Vena Energy Services (Australia) Pty Ltd (VEA) is part of Vena Energy, one of the largest independent power producers of renewable energy, which develops, constructs, owns, and operates solar photovoltaic power generation, wind power generation and energy storage projects in the Asia-Pacific region. Vena Energy is a portfolio company of Global Infrastructure Partners, a leading global independent infrastructure fund manager in the energy, transport, water, and waste sectors. Vena Energy's business is to build, own, and operate renewable energy generation assets and associated infrastructure.

Headquartered in Singapore, and with presence in Australia, Japan, India, Indonesia, Philippines, South Korea, Taiwan, and Thailand Vena Energy's portfolio consists of solar, wind and battery energy storage system assets producing over 16 gigawatts (GW) in operation, construction, shovel-ready, and development stages.

Vena Energy operates from 48 offices throughout the Asia-Pacific region, with an extensive local presence of more than 600 professional experts across several fields: with local-market and technical expertise for all aspects of development, construction, and operations. In each country Vena Energy employs local professionals who specialise in land, development, grid assessment, construction management, operations, and monitoring.

VEA was established in January 2016 by leading experts in the development, construction, and operation fields of renewable energy assets in the Australian market. The company is actively developing a diversified pipeline in Australia of over 2.5 GW of renewable energy assets, with development approvals successfully secured for solar projects totalling 1,250 megawatts (MW) (Figure 1.2), across the key NEM regions of New South Wales (NSW), Queensland, and South Australia.

VEA has successfully completed construction of the 95 MW first stage of the Tailem Bend Solar Project in South Australia, which was bought online in February 2019. The Project was the first utility scale solar project in Australia constructed without the need for Australian Renewable Energy Agency (ARENA) funding. The second stage of the Tailem Bend Solar Project includes an 87 MW solar farm and a 41.5 MW BESS and began construction in February 2022.

In Queensland VEA has constructed the Wandoan South BESS, a 100 MW BESS (150 MWh) and is currently constructing the first stage (125 MW) of the Wandoan South Solar Farm. The Wandoan South BESS was the first large-scale BESS in Australian to be built without ARENA or other Government funding. The entire Wandoan South Project (WSP) is approved for up to 650 MW (single-axis tracking) and up to 1 GW (fixed tilt racks) of solar and up to 450 MW of battery storage. VEA has also received approval for the Collinsville North Solar Project with capacity of up to 150 MW of solar, plus battery storage.

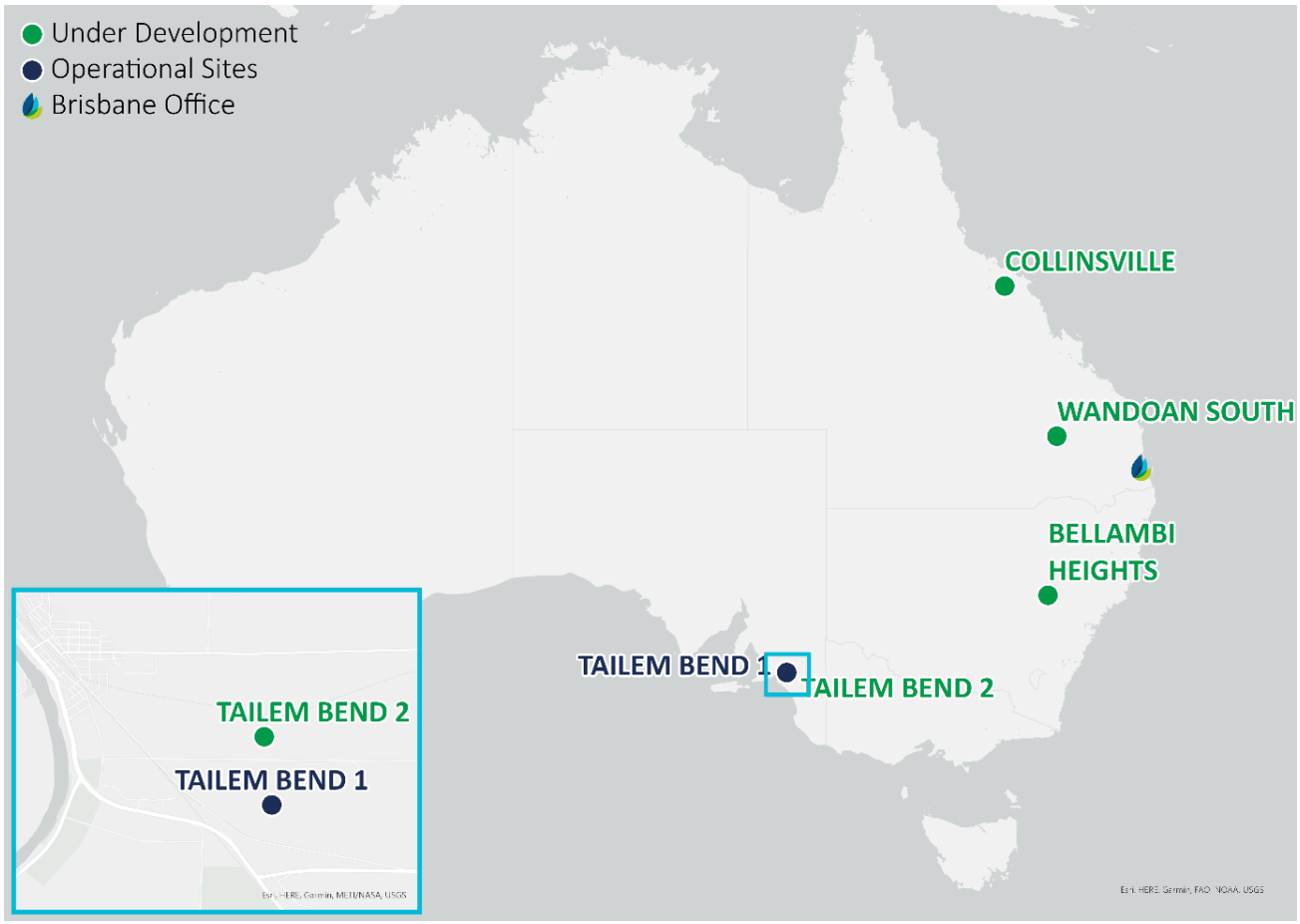


Figure 1.2 - Vena Energy Australia Project Portfolio

1.3 Purpose of this report

The project is State significant development (SSD) pursuant to Schedule 1 of the Planning Systems SEPP. Accordingly, approval for the project is required under Part 4 of the NSW EP&A Act.

This Scoping Report has been prepared to support a request for the Secretary's Environmental Assessment Requirements (SEARs) for the project. The SEARs will identify the level of environmental assessment required to be carried out as part of the Environmental Impact Statement (EIS) for submission to the Department of Planning and Environment (DPE) as part of a development application under Division 4.1 Part 4 of the EP&A Act. This Scoping Report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of VEA in accordance with the recently released guidelines: *State significant development guidelines - preparing a scoping report: Appendix A to the state significant development guidelines* (DPIE 2021a) (Scoping Report Guidelines).

2 Strategic context

2.1 Site and surrounds

2.1.1 Regional context

The project is within the locality of Beryl in the Mid-Western Regional LGA, in the Central West Region of NSW. The nearest population centre to the project is the township of Gulgong, approximately 6.5 km south-east of the project. Gulgong has a population of 2,521 (ABS 2016). Other nearby population centres in the vicinity of the project include Mudgee (population 10,923), approximately 30 km south, Dunedoo (population 1,221), approximately 34 km north, Wellington (population 4,077), approximately 54 km south-west, and Dubbo (population 38,943), approximately 80 km north-west of the project (ABS 2016).

Key land uses in the local and broader region include agriculture, consisting primarily of sheep and cattle grazing and dry land cropping, with areas of mining, viticulture and production forestry located within the broader region. Renewable energy development is a growing land use in the area, with multiple renewable energy projects located in the vicinity as illustrated in Figure 2.1.

The nearest national parks to the project area are the Yarrobil National Park, approximately 8 km west, and the Goulburn River National Park, approximately 32 km east. Other areas of environmental conservation are located to the west of the Castlereagh Highway including the Goodiman State Conservation area approximately 12 km north-west of the project area. The project area is situated on land zoned 'RU1 Primary Production' under the Mid-Western Regional Local Environmental Plan (Mid-Western Regional LEP).

2.1.2 Local context

The locality of Beryl has a population of 132 (ABS 2016) and is situated along the Castlereagh Highway between Gulgong and Dunedoo. Land surrounding the project area is primarily cleared land used for grazing or dry land cropping with scattered rural residences and agricultural buildings and infrastructure. The project area is within a broad valley, with an undulating landform and a rural character. This landscape includes dense vegetation along Wialdra Creek in the south, trees intermittently along the Castlereagh Highway, corridors of trees along field boundaries and scattered individual trees across the open paddocks. There are several patches of vegetation along riparian corridors with more substantial stands of vegetation at Puggoon Road as well as a Travelling Stock Reserves at the junction of the Castlereagh Highway and Laheys Creek Road.

There are several high voltage electricity transmission lines within and near the project area. They include the Wellington-to-Wollar 330 kV transmission lines that cross through the project area, and the Beryl 132kV substation and the Wellington-to-Beryl and Mudgee-to-Beryl 132kV transmission lines to the south-west of the project area. An unformed crown road directly adjoins the project's northern boundary. There are multiple renewable energy generation projects (proposed and approved) in the vicinity of the project area with the proposed Tallawang Solar Farm adjoining the project's northern boundary, and the operational Beryl Solar Farm approximately 2.5 km to the south (see Figure 2.2).

All land within and immediately adjoining the project area is zoned RU1 – Primary Production and supports agricultural land uses consistent with the rural character of the area. Beyond that, RU1 - Primary Production zonings and land use continue, except for two groupings of land to the northwest and southeast zoned RU5 – Large Lot Residential. These areas are associated with a number of local residences around Beryl Road to the south and Laheys Creek Road to the north of the project area. There are 45 residences within 3 km of the development site. Of these residences, 14 are within 1 km, 20 are between 1–2 km and 11 are between 2–3 km from the project area.

Of the nearby residences, three are currently associated with the proposed Tallawang Solar Farm (SSD-23700028) which adjoins the northern boundary of the project area.

The project area and surrounds are subject to a mineral exploration licence (EL) 8160 held by Bowdens Silver Pty Ltd which covers a broader area in the local region. Other key features in the local surrounds include 'The Lagoon' homestead approximately 2 km south-east of the project.

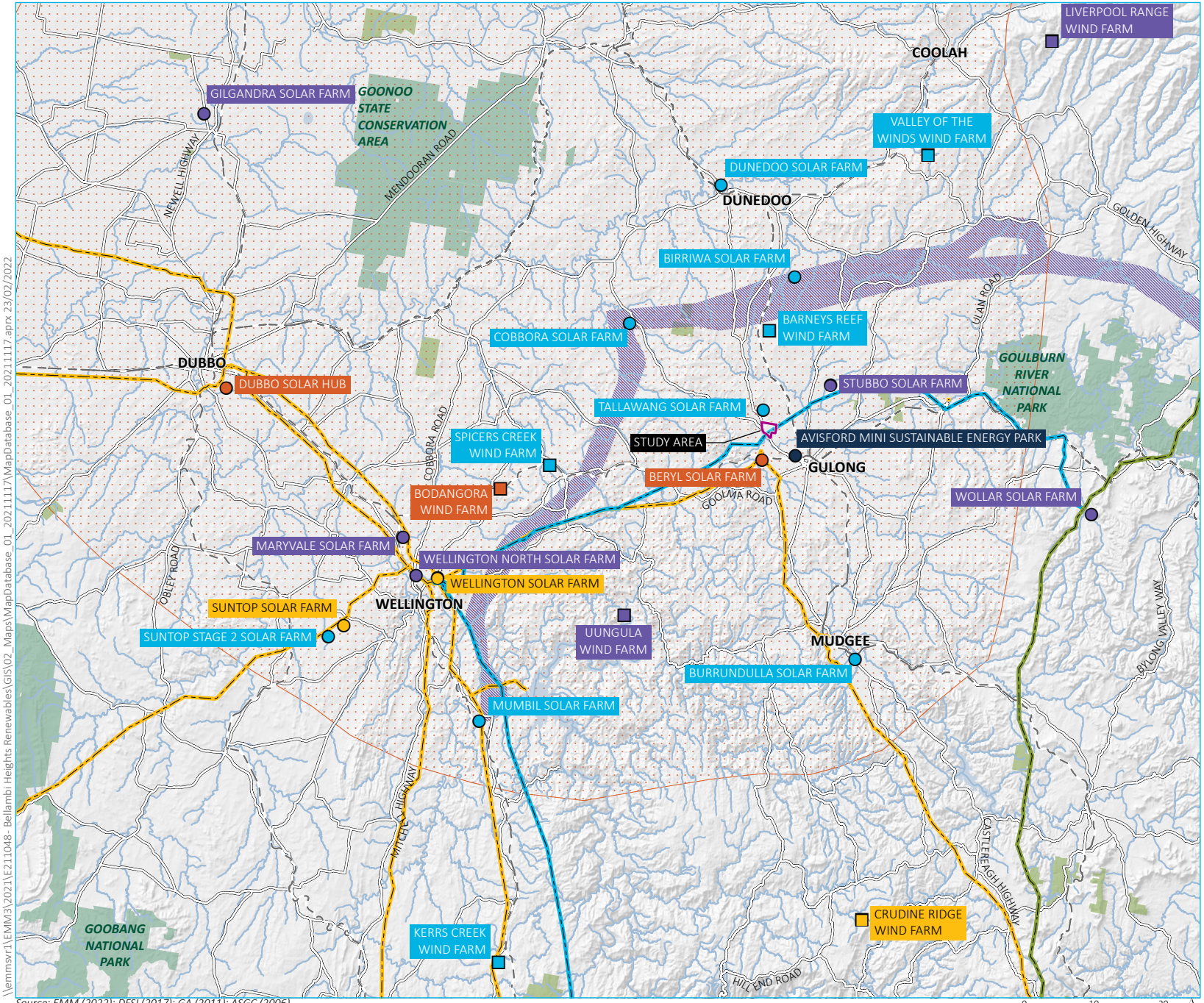
2.1.3 The project area

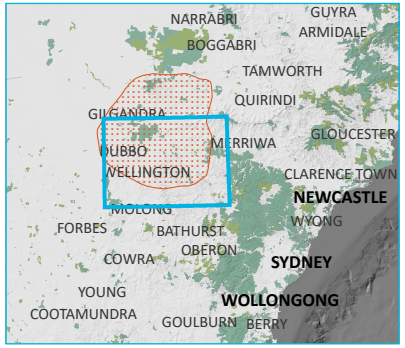
The project area is around 304 ha and covers two properties, being Lots 101 and 102 of Deposited Plan 1203462. Lot 101 is owned by TransGrid and was acquired in 2017 based on its identification as a potential site for a substation to augment the transmission network and support renewable energy connections in the area. Lot 102 is freehold land and contains easements for existing 60 m wide and future 45 m wide electricity transmission corridors. The project area is zoned RU1 Primary production in its entirety under the Mid-Western Regional LEP.

An overview of the project area is provided in Figure 2.3 showing the project area boundaries, legal description, surrounding road network and potential access points. During the preparation of the EIS, the development footprint within the project area will be refined based on further stakeholder engagement, environmental assessment, and constraints identification.

The project area is bounded by the Castlereagh Highway (SH18) along its western perimeter for approximately 2.5 km, and Puggoon Road along the eastern boundary. Primary access to the project will be via Puggoon Road as shown in Figure 2.3. Options for site access are described further in Section 3.3.5.

The elevation of the project area is between 420 m at the southern boundary and 460 m at the northern boundary. The project area includes some perennial watercourses identified as strahler stream order of 1st, 2nd, and 3rd, predominantly situated near the allotment boundaries. Several paddock trees, small waterbodies and stock dams are present across the project area. The project area has been affected by past land use and agricultural activities for grazing and dryland cropping. The existing infrastructure onsite includes typical agricultural infrastructure such as a shed, internal tracks, and stock fencing. As previously stated, the existing 330 kV TransGrid transmission lines bisect the project area in a north-easterly direction with 4 transmission towers within the project area. Photographs showing the existing project area conditions are provided in Photograph 2.1 to Photograph 2.6 below.





KEY

- Project area
- Central West Orana Renewable Energy Zone
- Central West Orana Renewable Energy Zone transmission corridor

Operating system voltage

- 132 kV
- 330 kV
- 500 kV

Surrounding renewable development

Solar development	Wind development
Approved	Approved
In planning	In planning
Operational	Operational
Under construction	Under construction
Rejected	

Existing environment

- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

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

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Surrounding renewable energy development

Bellambi Heights Renewables Project
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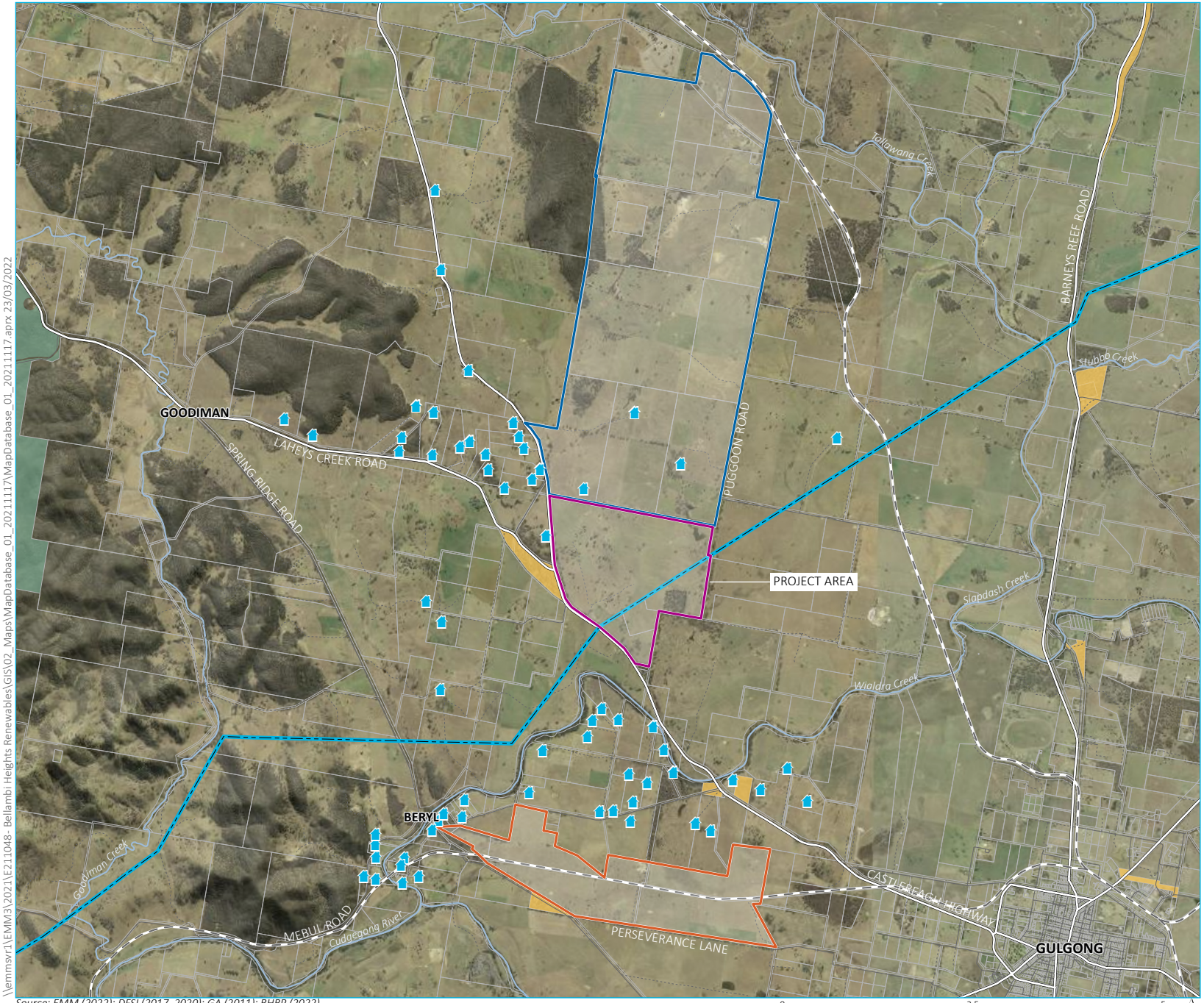

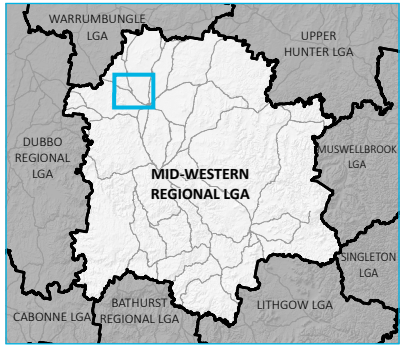

KEY

- Project area
- Beryl Solar Farm
- Tallawang Solar Farm
- Dwellings not associated with the project
- Electricity transmission line- 330 kV
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Named waterbody
- Cadastral boundary
- Local government area
- NPWS reserve
- Travelling Stock Reserves

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Source: EMM (2022); DFSI (2017, 2020); GA (2011); BHRP (2022)

0 2.5 5 km

GDA2020 MGA Zone 55

N

Local context

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Figure 2.2

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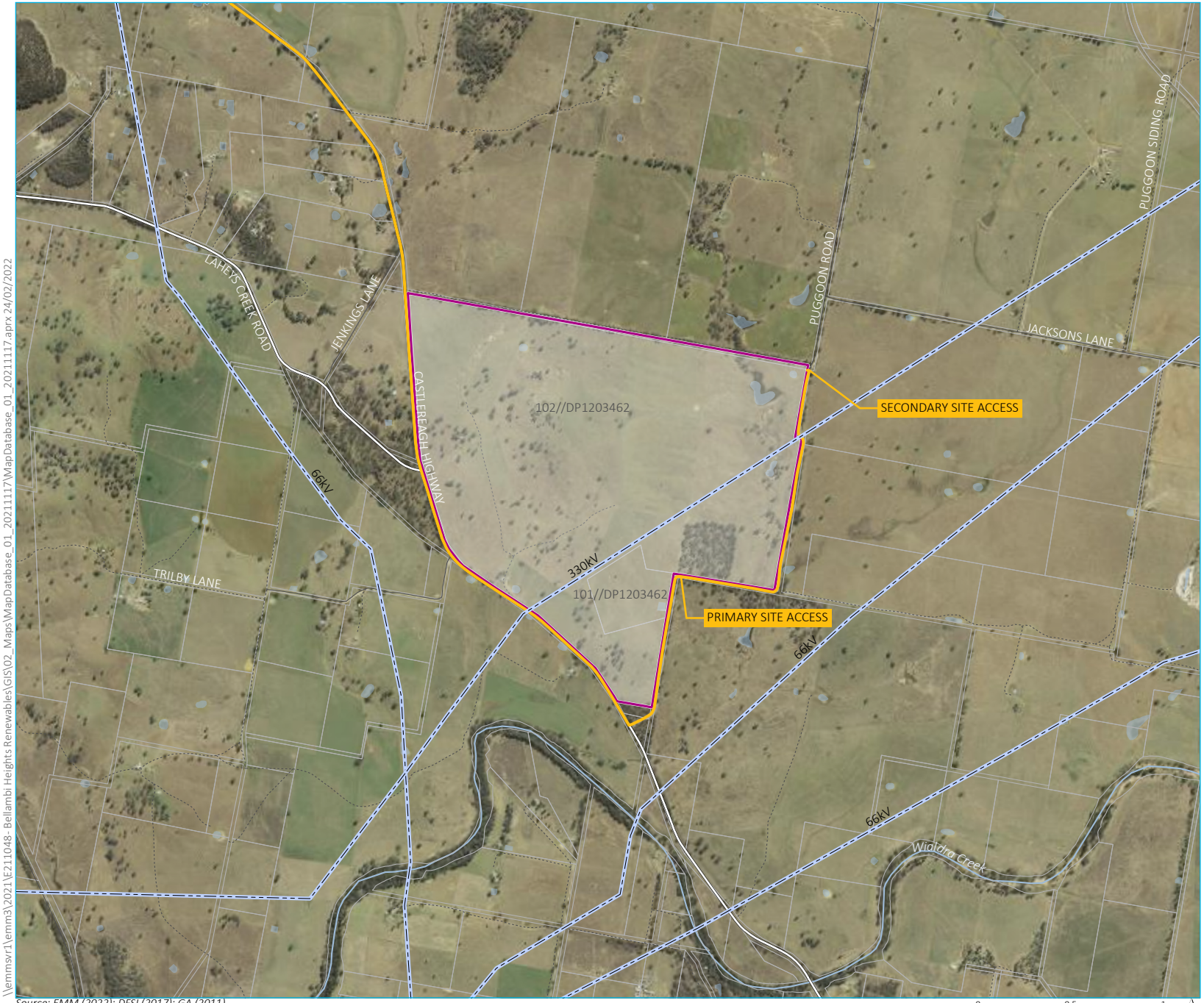

KEY

- Project area
- Rail line
- Major road
- Minor road
- Vehicular track
- Indicative site access
- Existing transmission line
- Named watercourse
- Waterbody
- Cadastral boundary

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Source: EMM (2022); DFSI (2017); GA (2011)

0 0.5 1 km

GDA2020 MGA Zone 55

N

Site overview

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Figure 2.3

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Photograph 2.1 – Existing views of project area from Castlereagh Highway.

Photograph 2.2 – Existing views from the project area looking north.

Photograph 2.3 – Existing views from west of project area.

Photograph 2.4 – Existing 330 kV transmission line within project area looking north-east.

Photograph 2.5 – Views of existing 330 kV transmission line within project area looking east.

Photograph 2.6 – View of existing 330kV transmission line within project area looking south.

2.2 Strategic planning framework

An overview of relevant key policies, plans and strategies, and how the project aligns with these, is provided in Table 2.1.

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
International context		
The Paris Agreement	The Paris Agreement is a legally binding international treaty on climate change adopted by 196 parties in 2015. As a signatory to the agreement, the Australian Government has committed to reduce greenhouse gas emissions by 26-28 percent on 2005 levels by 2030.	The project will contribute to meeting Australia's commitments under the Paris Agreement by reducing the NEM's annual greenhouse gas emissions.
National context		
Large-scale Renewable Energy Target	The Australian Government Clean Energy Regulator administers the Large-scale Renewable Energy Target which incentivises investment in renewable energy power stations such as wind and solar farms. The Large-scale Renewable Energy Target of 33,000 GW hours of additional renewable electricity generation was met at the end of January 2021 (Clean Energy Regulator 2021). The annual target will remain at 33,000 GW hours until the scheme ends in 2030.	Once operational, the solar project will generate up to approximately 400 GW hours of electricity annually, which will contribute towards meeting the Large-scale Renewable Energy Target in future years. In addition, the BESS project will be able to store renewable energy to increase market efficiency and enable greater penetration of renewables in the electricity grid.
Integrated System Plan 2020	The Integrated Systems Plan 2020 (ISP 2020) prepared by the Australia Energy Market Operator is an: "actionable roadmap for eastern Australia's power system to optimise consumer benefits through a transition period of great complexity and uncertainty." REZ's are identified in the ISP 2020 as areas where "clusters of large-scale renewable energy can be developed to promote economies of scale in high quality areas and capture geographical and technological diversity in renewable resources" (Australia Energy Market Operator 2020)	The CWO REZ is identified within the ISP 2020 with the CWO REZ transmission link identified as an "actionable ISP project", critical to addressing cost, security, and reliability issues.
State context		
NSW Electricity Strategy 2019	The NSW Electricity Strategy is the NSW Government's plan for a reliable, affordable, and sustainable electricity future that supports a growing economy. With four of NSW's five remaining coal-fired generators scheduled to close by 2035, the strategy outlines a reliable energy system which meets NSW's energy requirements and emission reduction targets. The strategy and its enabling legislation the *Electricity Infrastructure Investment Act 2020* supports the rolling out of REZs, commencing with the CWO REZ and the setting of a Renewable Energy Zone body, (Energy Corporation of NSW) that will bring together investors and carry out early planning so benefits to local communities are maximised.	The project will contribute to the development of the CWO REZ and assist in meeting NSW's energy generation and storage requirements, as well as the NSW Government's emissions reduction targets.

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy or strategy	Description	Alignment with strategic framework
Net Zero Plan Stage 1: 2020-2030	The Net Zero Plan Stage 1 2020-2030 (DPIE 2020) outlines the NSW Government's plan to grow the economy and create jobs while helping the state to deliver a 35% cut in emissions compared to 2005 levels.	The project contributes to Priority 1 of the Plan: "Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living." The CWO REZ is also identified in the plan as critical in replacing retiring coal fired generators in NSW.
NSW Electricity Infrastructure Investment Roadmap 2020	The Electricity Infrastructure Roadmap coordinates investment in transmission, generation, storage and firming infrastructure as ageing coal-fired generation plants retire. The roadmap includes actions that will deliver "whole-of system" benefits. The roadmap sets out a plan to deliver the state's first 5 Renewable Energy Zones (REZs) in the Central-West Orana, New England, South-West, Hunter-Central Coast, and Illawarra regions.	The project is within the CWO REZ and is ideally placed to contribute to the success of the roadmap.
Large-Scale Solar Energy Guideline 2018	Large-Scale Solar Energy Guideline (Solar Guideline) (DPIE 2018) provides the community, industry, applicants, and regulators with guidance on the planning framework for the assessment of large-scale solar projects and identify the key planning considerations relevant to solar energy development in NSW.	Site selection and impact assessment considerations detailed in the guideline have been and will continue to be used to inform the project as described in Section 2.3.2 below.
Draft Large-Scale Solar Energy Guideline 2021	It is noted that a draft guideline was publicly exhibited in February 2022 and is currently under review by NSW Government.	The project will consider the guideline in the EIS.
Local and regional context		
Central West and Orana Regional Plan 2036	Central West and Orana Regional Plan 2036 (the Regional Plan) was released by the DPIE in 2017 to guide land use planning priorities and decision making in the CWO region for the next two decades.	The project directly contributes to Goal 1 of the Regional Plan (ie "to become the most diverse regional economy of NSW"). It also contributes to Direction 9 (ie "increase renewable energy generation").
Our Place 2040 Mid-Western Regional Local Strategic Planning Statement	The Mid-Western Regional Local Strategic Planning Statement sets out the 20 year vision for land use planning in the Mid-Western Council LGA. Planning Priority 7 of the Local Strategic Planning Statement is to "support the attraction of a diverse range of business and industries". To support this planning priority the Local Strategic Planning Statement contains a land use action to "consider renewable energy development in appropriate areas that avoids impacts on the scenic rural landscape and preserves valuable agricultural land."	The project will contribute to Planning Priority 7 of the Local Strategic Planning Statement and has been sited to minimise impacts on productive agricultural land and visual amenity.

2.3 Project justification

2.3.1 Project benefits

The project aligns with the NSW and Commonwealth Government's objectives for energy security and reliability and emissions reductions and will contribute to the continued growth of renewable energy generation and storage capacity in the CWO REZ. The CWO REZ was announced as the "pilot REZ" by the NSW Government in late 2019 and was formally declared by the Minister for Energy and Environment under section 19(1) of the *Electricity Infrastructure Investment Act 2020* on 5 November 2021.

The project is therefore highly aligned with the NSW Government's strategic policy direction for the electricity sector. In addition, it will result in a number of benefits including:

- support and contribution to Commonwealth and State climate change commitments such as the Paris Agreement, Renewable Energy Target (RET) Scheme, 2020 ISP and NSW Net Zero Plan Stage 1: 2020-2030;
- development of the CWO REZ, supplying approximately 200 MW of electricity generating capacity to the NEM, and significantly contributing to the targeted 3,000 MW for the CWO REZ as identified in the NSW Electricity Strategy;
- contribute to capacity gaps in the electricity market following the closure of 7,000 – 8,000 MW worth of coal-fired power generators within NSW by 2035 (NES 2019). The project will provide a total generation capacity equivalent to powering the needs of up to 253,000 homes, thereby enhancing reliability and security of electricity supply in NSW; and
- support the realisation of the CWO Regional Plan's goal to diversify the local economy through direct and indirect economic benefits to local communities in the region, including employment opportunities, increased spending in local communities, community benefit programs and benefits to landholders.

2.3.2 Site suitability

The project area is ideally located adjacent to existing and planned transmission infrastructure. The project area is traversed by the existing Wellington-to-Wollar 330 kV transmission lines and contains property previously acquired by TransGrid for future transmission development. The project area provides a strong point of connection to the transmission network, making it an ideal site for increasing generation capacity on the NSW electricity grid with minimal requirements for additional transmission infrastructure.

The solar resource available in the Central West Region of NSW, particularly Beryl, is relatively high and suited to efficient and high-output generation. The site location within the Central West Region is ideally placed to contribute to the development of the CWO REZ and assist in meeting NSW's energy generation and storage requirements. The project area presents optimal conditions for utility scale solar as it is relatively flat, undulating and predominantly cleared.

Biodiversity, heritage, and amenity values of the project area and surrounds have also been considered through the project scoping and the project area selection has been amended to avoid and minimise potential impacts. Key changes made following preliminary environmental assessments involved reducing the development footprint, avoidance of land containing high value vegetation and incorporation of visual screening into the site layout. Further description of design refinements completed through the scoping phase is provided in Section 3.6.

In summary the project area is considered highly suitable due to:

- the location of the project being within the CWO REZ and the availability of high solar resources and physical conditions for large-scale solar energy generation;

- its proximity to existing transmission infrastructure and future planned transmission infrastructure;
- the existing agricultural land use within and surrounding the project area, which is compatible with large-scale solar energy generation; and
- the project area selection and layout has been amended to retain biodiversity and amenity values and no significant adverse biophysical, cultural, social, or economic impacts are anticipated.

3 Project description

3.1 Overview

The project comprises a large-scale solar PV generation facility and a battery energy storage system (BESS), which is supported by associated infrastructure. The solar project will have a generation capacity of approximately 200 MW, which will generate the equivalent of approximately 400 GWh of energy annually. The BESS will have a capacity of approximately 200 MW and have provision for up to two hours of storage. Details on the project area, physical layout and design, activities and uses, timing and alternatives considered are provided in the following sections.

3.2 Project area

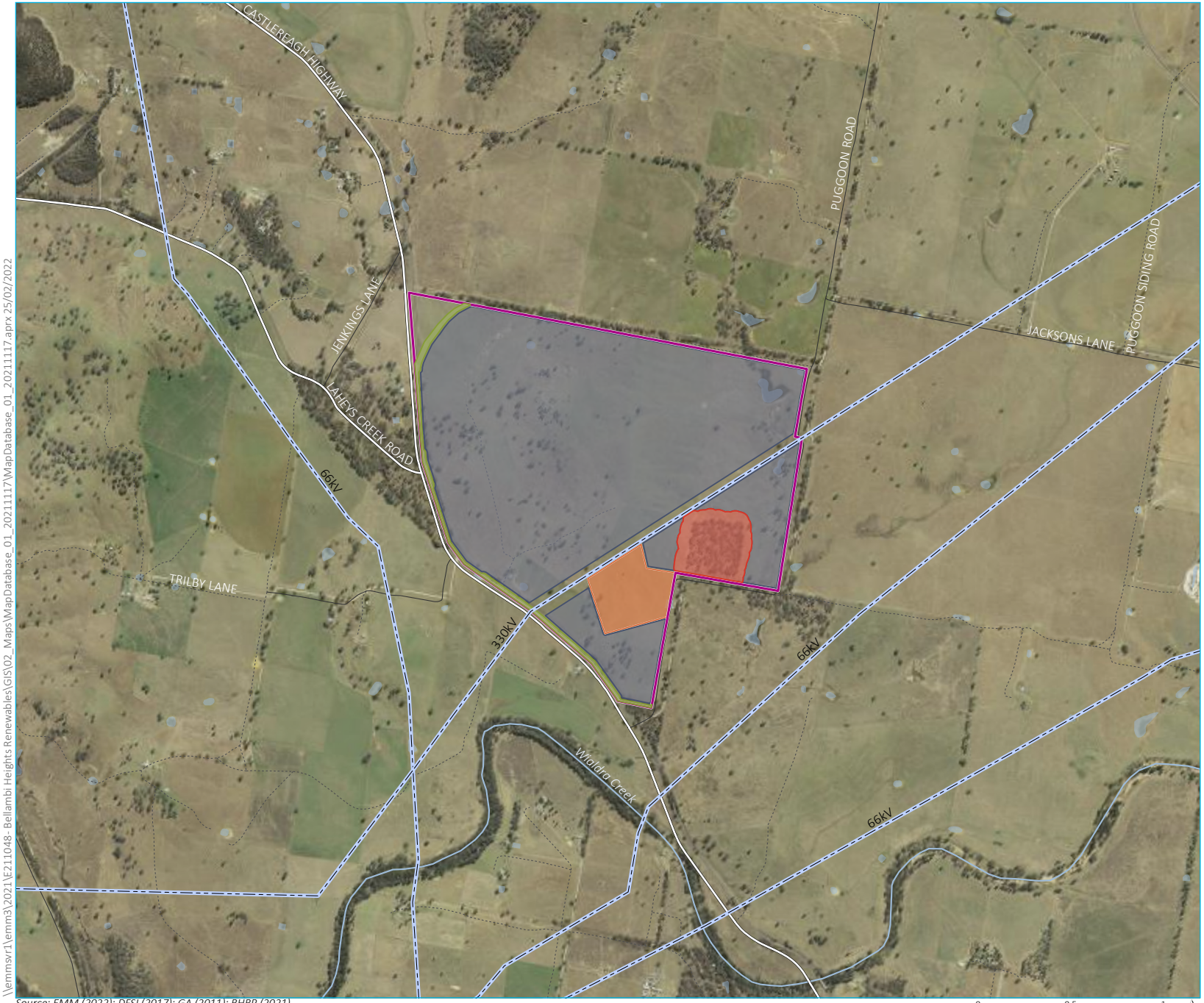
The project area is around 304 ha and covers two properties, being Lots 101 and 102 of Deposited Plan 1203462. Within the project area an indicative developable area (the development footprint) of approximately 260 ha has been identified which will minimise impacts to biodiversity and visual amenity. The project will be designed and established within the indicative developable area to avoid and minimise potential impacts. Further refinement of the project will occur during development of the design and preparation of the EIS. An area for investigation of landscape treatment and avoidance of high value native vegetation has also been identified through analysis of biodiversity values and visual amenity as discussed in Section 6.1 and 6.2. The project area, indicative developable area and areas for avoidance are shown in Figure 3.1.

3.3 Physical layout and design

The physical layout and design of the project will comprise the following key infrastructure elements:

- **Solar farm** – to absorb and convert sunlight into electricity. The solar farm will comprise solar modules, mounting structures, inverter stations, weather stations, internal access tracks and associated cabling.
- **Battery energy storage system** (BESS) – to store and discharge electricity when required.
- **Facility substation and grid connection** – a facility substation connected to the solar farm and BESS inverter stations as well as a switchyard will be established to connect the project to the transmission network. The proposed switchyard is adjacent to the existing 330 kV transmission line network and will be constructed and operated by TransGrid. No new transmission lines are expected for the project.
- **Administration and control area** – including the facility substation and control rooms, BESS, administration buildings with amenities, O&M workshops, and car parking sufficient for employees and contractors.
- **Site access –** including primary and secondary access points on Puggoon Road.

An indicative layout of the project is provided in Figure 3.1. The project area layout and design will be refined further through the preparation of an EIS for the project. The following sections describe the project design and layout considerations for the key infrastructure elements.



KEY

- Project area
- Existing transmission line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Waterbody
- Site investigation area
- Landscape treatment investigation area
- Avoidance footprint
- TransGrid switchyard
- Indicative developable area

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Source: EMM (2022); DFSI (2017); GA (2011); BHRP (2021)

0 0.5 1 km

GDA2020 MGA Zone 55

N

Project area indicative layout

Bellambi Heights Renewables Project
Scoping Report
Figure 3.1

EMM
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3.3.1 Solar farm

A solar farm is proposed with a generation capacity of approximately 200 MW and is expected to generate approximately 400 GWh of energy annually. The solar farm will comprise rows of PV solar modules (solar panels) mounted on single axis tracking structures. An example of the type of solar modules, mounted on a single axis tracking system is provided in Photograph 3.1. The modules will be installed in parallel rows, with an indicative spacing of 5–10 m between each row and a height of approximately 5 m. The rows of PV modules will be aligned in a north-south direction, allowing the panels to rotate from east to west during the day, tracking the sun's movement. The exact number, dimensions and configuration of solar modules will be optimised through the project detailed design.

Groups of solar modules will be connected to inverter stations and the inverters linked together to collect the total energy being produced. The inverter stations are designed to convert the DC electricity generated by the modules into AC form that is compatible with the national electricity grid. Step-up transformers, that increase the voltage to 33 kV, will be housed alongside the inverters. Underground or above ground cables will then run from each inverter station to the project substation. A typical inverter station is expected to be approximately 2.5 m in height, 11.5 m in length and 1.5 m wide. The quantity and exact dimensions of the inverter stations will be determined during detailed design. Example photographs of solar PV modules and inverter stations are provided in Photograph 3.1 and Photograph 3.2. Power, earthing, and communications cables will also be installed across the project area between electrical devices. Cabling may be underground or above ground depending on geotechnical conditions.

Photograph 3.1 Example of solar PV modules mounted to single axis tracking structures

Photograph 3.2 Example of solar PV modules and inverter station at Tailem Bend, South Australia

3.3.2 Battery energy storage system

The project includes a BESS which will serve a number of functions including potential storage of electricity produced by the solar farm and provision of services to the National Electricity Market. Renewable energy generation is intermittent in nature and subject to fluctuations in solar and wind availability. Batteries mitigate these natural fluctuations through their ability to store and discharge electricity when required. The proposed BESS will have a capacity of approximately 200 MW and up to two hours of storage, equivalent to powering the needs of 161,000 average homes annually. The proposed BESS will provide both storage as well as firming capacity to the NEM and assist in grid stability by providing frequency control ancillary services. The BESS will allow for the storage and export of renewable energy within the network so that it can be used during times of peak demand. The major components of the BESS will comprise:

- **batteries** – most likely a lithium-ion technology;
- **inverters** – bi-directional inverters to convert DC current to AC current (when exporting electricity) and vice versa (when importing electricity); and
- **transformers** – skid-mounted transformers will be installed adjacent to each inverter to step up the voltage to the internal reticulation voltage of the plant.

The batteries could be containerised in self-contained steel enclosures resembling shipping containers or alternatively within a building resembling a large industrial shed. Examples of the likely configuration and appearance of a BESS from a comparable VEA site are provided in Figure 3.2 and Figure 3.3. Due to rapidly evolving technology, the final technology choice and battery storage capacity for the project is yet to be confirmed and is subject to final selection and detailed design. The location and type of the BESS within the project area will be assessed in the EIS.

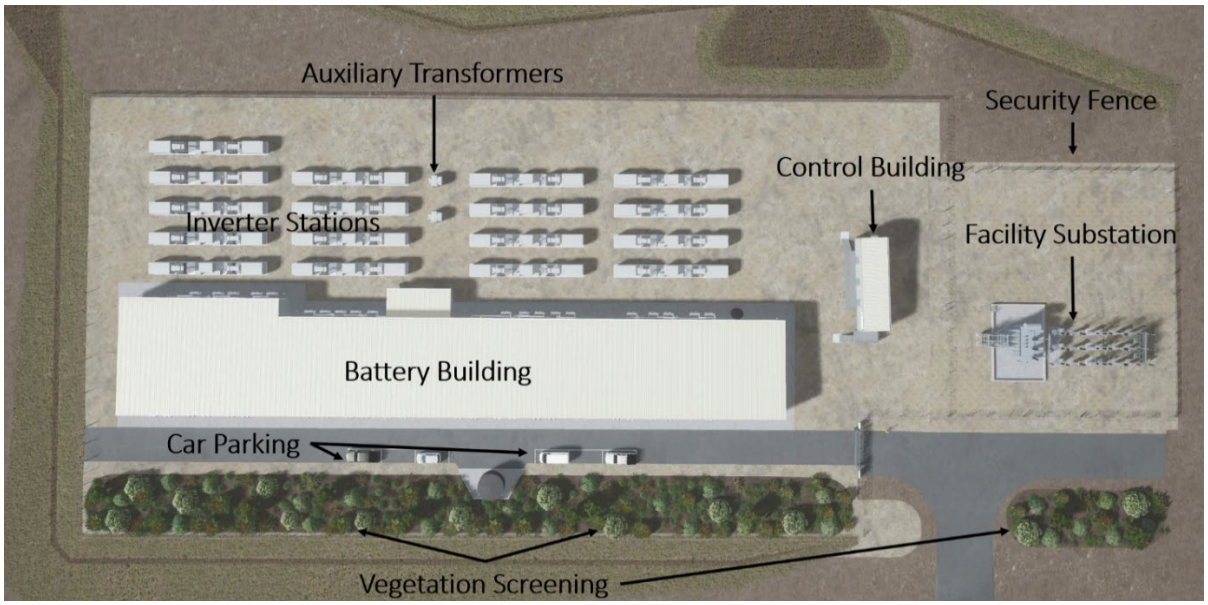

Figure 3.2 –BESS configuration at VEA's Wandoan South BESS

Figure 3.3 – Example view of VEA's Wandoan South BESS site

Battery modules are the key building block in a utility-scale BESS and are capable of both storing and discharging energy at a rapid rate. Battery modules are installed in racks, then the racks are wired together in strings, and strings of batteries are connected to the inverter stations. A group of battery racks is similar in appearance to a large server room or a data centre, as shown in Photograph 3.3 below.

Photograph 3.3 Example of individual battery modules installed in racks and connected via cabling.

Although adjacent to each other, the solar farm and the BESS will be registered as separate generating units in the NEM and will be developed and operated independently. The solar energy generated from the solar farm will be exported to the NEM or used to charge the BESS. When discharging, the BESS will export its electricity to the NEM. As such, they are independent and distinct, but related, uses of the project area.

3.3.3 Facility substation and grid connection

Infrastructure to connect the solar farm and BESS to the external transmission network will comprise:

- a substation connected to the solar farm and BESS inverter stations (facility substation); and
- a switchyard that will connect to the 330 kV transmission line.

The facility substation will be established within the project administration and control area and will connect to the solar farm and BESS inverter stations. Voltage will be stepped up at the facility substation via one or more transformers to match the voltage of the transmission network. The facility substation will connect to the proposed TransGrid switchyard.

The TransGrid switchyard will be located adjacent to the facility substation, and adjacent to the existing Wellington-to-Wollar 330 kV transmission line. The switchyard is expected to cover an area of approximately 100 x 100 m, and is likely to contain termination structures, busbars, circuit breakers, disconnectors, buildings and other electrical and communications equipment. The switchyard will likely be built and operated by TransGrid, but forms part of the project.

3.3.4 Supporting infrastructure

An administration and control area will be established, approximately 3 hectares (ha) in area. This area will include:

- BESS facilities;

- facility substation;
- control rooms;
- administration buildings with amenities;
- operation and maintenance workshops; and
- car parking.

Security fencing will also be installed around the perimeter of the solar farm and high voltage electrical equipment such as the BESS facilities, facility substation and switchyard. Signage will be clearly displayed identifying hazards present within the project. Lighting will be installed where necessary for safety, maintenance, and security purposes. Lightning protection is likely to be provided for in key locations of the administration and control area, BESS equipment, substation and building entrances, switchyard, and inverter stations.

3.3.5 Site access

Primary access to the project area will be via Puggoon Road, as shown in Figure 3.1. A secondary access/egress will also be provided point to the north-west boundary on Puggoon Road. The transport route to the project area will be confirmed through the EIS but is expected to primarily comprise vehicle movements originating north of the project area and travelling south along the Castlereagh Highway before making a left turn onto Puggoon Road.

Subject to detailed design, internal access tracks will also be established including:

- a perimeter track up to 6 m wide; and
- internal access tracks for manoeuvring between the module sections between 2–5 m wide.

All internal access tracks will be unsealed. The internal tracks will serve both as access for servicing and maintaining the facility as well as fire trails and buffers. Internal access track

3.4 Activities and uses

Project activities and uses of the project area will vary across the project lifecycle. Activities to be carried out during the construction, operation, and decommissioning of the project area are described in the following sections.

3.4.1 Construction

Construction of each of the solar and BESS components is expected to be completed over a period of 12-18 months, which could be concurrent or sequential. Construction activities will be undertaken during standard day time construction hours. Temporary infrastructure required during the construction phase of the project will include laydown and storage areas and a site compound. Typical construction activities will include installation and maintenance of environmental controls, upgrading construction access tracks, demolition of existing structures, establishment of construction facilities and laydown area, civil works, electrical works, testing and commissioning activities.

Where required, additional or improved drainage channels, sediment control ponds and dust control measures will be implemented. Further, laydown areas and waste handling, fuel and chemical storage areas will be strategically placed to minimise potential environmental impacts during the construction phase of the project.

i Workforce

If the solar and BESS were built concurrently, the peak construction workforce could be up to 400 employees and contractors. Local councils and business owners will be consulted through the development and assessment of the project regarding managing potential impacts and opportunities for accommodation of the construction workforce.

The construction workforce will be sourced from the local area as far as practicable. Accommodation for non-local construction staff is expected to be sourced through the use of available rental and motel accommodation in surrounding townships and regional centres. Potential cumulative impacts on accommodation, infrastructure, and services will be considered in the EIS as part of the social impact assessment.

3.4.2 Operation

The key activities during operation of the project will be energy generation and energy storage. The project is expected to employ 5-8 full-time staff throughout operations. Regular maintenance will be required throughout the operational life of the project. Site maintenance activities will include management of internal roads, drainage, fencing, and vegetation. Additional maintenance of the key infrastructure will also be required which could include service, repair or replacement of PV modules, inverters, transformers or components of the BESS, substation, or switchyard. Light vehicle access will be required across the project area throughout operations and occasional heavy vehicles may also be required.

3.4.3 Decommissioning

If decommissioning were to occur, all above-ground infrastructure associated with the various project elements would be removed for sale, recycling, or disposal. Access tracks and hardstand areas would be remediated to prepare a suitable soil profile for subsequent sowing with an appropriate ground cover mix. As each element is decommissioned the project area would be made suitable for returning to its pre-development agricultural land use.

3.5 Timing

The project timing will be determined through detailed design and will be influenced by market demand for the energy generation and storage aspects of the project. The key phases of the project will involve construction, operation, and decommissioning, the timing of which is described in the following sections.

The construction staging and timing will be dependent on market demand with the solar farm and BESS having potential to be developed either concurrently or sequentially. Accordingly, the construction phase of the project could take between 12-36 months from site establishment to commissioning. It is likely that construction of the switchyard will be completed concurrent with the construction of either the solar farm or BESS.

The expected operating life for the solar farm is 30 years before any major replacements or refurbishments would be required. For the BESS, the expected operating life is 20 years before the battery cells would require replacement or refurbishment.

At a point in time relevant to the project's life span and according to equipment performance, condition, and project viability, VEA will consider whether to either repower or decommission each key project component. Repowering of the project beyond the initial life span will encompass the continuation of the operations and upgrading, replacing, or repairing various components of the project as necessary. The potential of the project to operate past the original life span will depend on the market conditions and technological availability. Should the repowering of the solar farm and/or BESS not be a viable option, the infrastructure associated with the respective project component would be decommissioned.

The sequencing of the project will be determined through detailed design, and subject to market response, and is likely to involve overlap between activities but indicatively will involve the following steps:

- construction of supporting infrastructure and grid connection (including switchyard);
- construction of solar farm;
- construction of BESS;
- operation of facility; and
- decommissioning.

3.6 Alternatives considered

The project has been in development since 2018, during which time VEA has reviewed several options for the development and consulted with key stakeholders and the community to identify the optimal project configuration. The project area was investigated for the development of renewable energy projects as it is adjacent to existing and planned transmission infrastructure and in a locality with high solar resource.

Solar power generation and battery energy storage systems were identified as the preferred technology options for the site. While Australia has an abundance of renewable energy sources, solar and wind power generation are the cheapest forms of new build electricity generating capacity globally, including in Australia.

A preliminary concept for the project was presented to the local community and stakeholders as the 'Gulgong Solar Farm'. The concept consisted of three stages, across non-contiguous properties with up to 500 MW of solar and 600 MW of BESS with six hours of storage capacity. The three stages considered for the initial project concept are shown in Figure 3.4.

After consultation with the local community, the project has been changed to respond to a range of concerns and feedback provided by the community. These changes include:

- changing the name from Gulgong Solar Farm to Bellambi Heights Renewable Project;
- reducing the number of stages from three to one due to concerns about traffic, visual impacts, local identity, and site significance, as well as flood risk on a portion adjacent to Wialdra Creek. The reduction in the number of stages resulted in:
  - decreasing the number of impacted residences within 500 m of the project from 24 to 4, a reduction of 83%;
  - a 63% decrease in project area from 820 ha to 304 ha;
  - reducing the number of land parcels required for the project from 12 allotments to 2;
  - reducing the project's highway frontages by 74%;
  - a 60% reduction of the project's solar generation capacity from 500 MW to 200 MW;
  - nominating a single main site access point from the local Puggoon Road and removing direct access points from the Castlereagh Highway;

- inclusion of solar panel setbacks of up to 30 m from the project's Castlereagh Highway frontage, and 10m from other project area boundaries;
- provision of native vegetation screening which varies in width between 10-20 m to the project's Castlereagh Highway frontage, established inside the site, beyond the existing vegetated road reserve;
- excluding 5 ha in the northwest corner of the site from the development footprint, mitigating views from the Highway; and
- relocation of the project administration and control area to a less prominent location to reduce visual impact of the project.

The project will be refined further through preparation of an EIS and detailed design. Further consultation is planned with the community and stakeholders as described in Section 5.

KEY

- Preliminary site options study area
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Waterbody
- Cadastral boundary

Source: EMM (2022); DFSI (2017); GA (2011)

0 1 2 km

GDA2020 MGA Zone 55

N

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Preliminary site options considered

Bellambi Heights Renewables Project
Scoping Report
Figure 3.4

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4 Statutory context

The key relevant statutory requirements for the project having regard to the EP&A Act, other NSW and Commonwealth legislation, and environmental planning instruments are summarised in Table 4.1. This table has been set out in accordance with the Scoping Report Guidelines and *State Significant development - preparing an environmental impact statement Appendix B to the state significant development guidelines* (DPIE 2021d) (EIS Guidelines), to cover the following:

- power to grant approval (ie, approval pathway);
- permissibility;
- consistent approvals;
- Commonwealth approvals;
- approvals not required (pursuant to Section 4.41 of the EP&A Act); and
- mandatory matters for consideration.

Detailed consideration of relevant statutory requirements will be provided in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Power to grant approval	
EP&A Act and Planning Systems S SEPP	Part 4 of the EP&A Act relates to development assessment and consent; Part 4, Division 4.7 relates to the assessment of development deemed to be significant to the State (or SSD). Section 4.36(2) of the EP&A Act states that a: *...State environmental planning policy may declare any development, or any class or description of development, to be State significant development.* The Planning Systems SEPP identifies development that is SSD. Section 2.6(1) of the Planning Systems SEPP states: *(1) Development is declared to be State significant development for the purposes of the Act if:* *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and* *(b) the development is specified in Schedule 1 and 2.* The project meets both these requirements; it requires development consent, and is a development specified in Schedule 1 of the Planning Systems SEPP. Schedule 1 of the Planning Systems SEPP defines the following as SSD: *Electricity generating works and heat or co-generation* *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, waste, hydro, wave, solar or wind power) that:* *(a) has a capital investment value of more than $30 million.* The project is development for the purpose of electricity generation and will have a capital investment value of more than $30 million. Consequently, the project is SSD.

Table 4.1 Statutory context

Approval	Requirement
Permissibility	
State Environmental Planning Policy (Transport and Infrastructure) 2021	Section 2.36(9) of *State Environmental Planning Policy (Transport and Infrastructure) 2021* states that: *...development for the purpose of a solar energy system may be carried out by any person with consent on any land.* Therefore, development for the purpose of a solar energy system may be carried out within the project area with development consent.
Electricity Infrastructure Investment Act (2020)	The project area is within a declared REZ under Section 23 of the *Electricity Infrastructure Investment Act (2020).* The CWO REZ has an intended network capacity of 3 gigawatts.
Consistent approvals	
Overview	Section 4.42 of the EP&A Act outlines that the approvals listed below cannot be refused if necessary for carrying out an approved SSD and are to be consistent with the terms of the development consent for the SSD.
An approval under Section 138 of the NSW *Roads Act 1993*	Under Section 138 or Part 9, Division 3 of the *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either Transport for NSW or local council, depending upon the classification of the road. The interaction of the project with the local and regional road network will be addressed in the EIS.
Commonwealth approvals	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect matters of national environmental significance (MNES). If an action will, or is likely to, have a significant impact on any MNES, it is deemed to be a 'controlled action' and requires approval from the Commonwealth Environment Minister or the Minister's delegate. A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties or National heritage places within the vicinity of the project area (refer Appendix F). The preliminary biodiversity assessment included comprehensive targeted flora and fauna surveys which identified no listed threatened species or listed migratory species within the project area. Field surveys also found that no PCTs representative of threatened ecological communities (TECs) listed under the EPBC Act are within the proposed developable area. Further biodiversity assessment will be carried out through the preparation of the EIS and will inform whether a referral to the Commonwealth Department of Agriculture, Water and the Environment is required.
Native Title Act 1993	The Commonwealth *Native Title Act 1993* recognises and protects native title rights in Australia. It allows a native title determination application (native title claim) to be made for land or waters where native title has not been validly extinguished, for example, extinguished by the grant of freehold title to land. Claimants whose native title claims have been registered have the right to negotiate about some future acts, including mining and granting of a mining lease over the land covered by their native title claim. Where a native title claim is not registered, a development can proceed through mediation and determination processes, though claimants will not be able to participate in future act negotiations. A native title claim relevant to the project area was registered on 22 November 2018 titled Warrabinga-Wiradjuri #7 (NC2018/002).
Approvals not required	
Overview	Section 4.41 of the EP&A outlines the following approvals, permits etc are not required for an approved SSD.

Table 4.1 Statutory context

Approval	Requirement
Fisheries Management Act 1994	A permit under the *Fisheries Management Act 1994* to block fish passage or dredge or carry out reclamation work on water land will not be required pursuant to Section 4.41 of the EP&A Act. The project may require work in water land to facilitate the upgrade of road crossings or establish new crossings of mapped watercourses within the project area. These works will be undertaken in accordance with NSW DPI *Policies and Guidelines on Fish-Friendly Waterway Crossings* (undated), *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013), and NSW *Guidelines for Controlled Activities*.
Heritage Act 1977	An approval under Part 4, or an excavation permit under Section 139, of *the Heritage Act 1977* will not be required pursuant to Section 4.41 of the EP&A Act. Notwithstanding, there are no listed heritage items within the project area.
National Parks and Wildlife Act 1979	An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974* will not be required pursuant to Section 4.41 of the EP&A Act. There is potential for Aboriginal sites to occur within the project area. Any Aboriginal heritage sites identified within the project area will be avoided as far as practicable during the design process.
Rural Fires Act 1997	A bushfire safety authority under Section 100B of the *Rural Fires Act 1997* will not be required pursuant to Section 4.41 of the EP&A Act. A bushfire assessment in accordance with NSW Rural Fire Service *Planning for Bushfire Protection 2019* will be carried out to inform the EIS.
Water Management Act 2000	A water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000* will not be required pursuant to Section 4.41 of the EP&A Act. Construction work near or within watercourses within the project area may be required. These works will be carried out in accordance with DPIE's various guidelines for controlled activities.
Other NSW approvals	
Conveyancing Act 1919	An easement established under Section 88B of the *Conveyancing Act 1919* is likely to be required for the connection to the TransGrid switchyard.
Crown Land Management Act 2016	Subject to investigations to be completed with regards to any upgrade of Puggoon Road, a Section 5.21 licence may be required to authorise the use or occupation of Crown Land.

Table 4.1 Statutory context

Approval	Requirement
Mandatory considerations - Considerations under EP&A Act and EP&A Regulation	
Section 1.3 of the EP&A Act	Relevant objectives of the EP&A Act are: *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *(c) to promote the orderly and economic use and development of land,* *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *(g) to promote good design and amenity of the built environment,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.* The above will all be considered in the EIS.
Section 4.15 of the EP&A Act	Pursuant to Section 4.15 of the EP&A Act the consent authority must consider the following relevant matters for consideration: • Relevant environmental planning instruments for the project including: – *State Environmental Planning Policy (Biodiversity and Conservation) 2021*; – *State Environmental Planning Policy (Resilience and Hazards) 2021*; – *State Environmental Planning Policy (Transport and Infrastructure) 2021*; and – *Mid-Western Regional Local Environmental Plan 2012* (Mid-Western Region LEP). • Relevant development control plans. • the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; • the suitability of the site for the development; and • the public interest. The above will all be considered in the EIS.
Mandatory considerations - Considerations under other legislation	
Biodiversity Conservation Act 2016	The likely impact of the project on biodiversity values is assessed in the biodiversity development assessment report. The Minister for Planning and Public Spaces may (but is not required to) further consider under that Act the likely impact of the project on biodiversity values.
Mandatory considerations - Environmental planning instruments	
State Environmental Planning Policy (Resilience and Hazards) – Section 3.7	The EIS will consider the following relevant departmental guidelines: • Applying *State Environmental Planning Policy No. 33 Hazardous and Offensive Development*; • HIPAP No. 3 – Risk Assessment; and HIPAP No. 12 – Hazards.
State Environmental Planning Policy (Resilience and Hazards) – Section 4.6	As the development will involve a change of use on land for development with a purpose referred to in Table 1 of the contaminated land planning guidelines (agriculture) is being, or is known to have been, carried out, a report specifying the findings of a preliminary investigation of the land concerned is required to be carried out in accordance with the Managing Land Contamination Planning Guidelines (DUAP 1998).

Table 4.1 Statutory context

Approval	Requirement
Mid-Western Regional LEP	The EIS will consider: • the relevant objectives and land uses for RU1 zone; • Clause 4.1E Subdivision of land in Zone RU1 for non-agricultural land uses; • Clause 6.3 Earthworks; and • Clause 6.4 Groundwater vulnerability.
Mandatory considerations Development control plans	
In accordance with Section 2.10 of the NSW State Environmental Planning Policy (Planning Systems) 2021, Development Control Plans do not apply to State significant development and are not a relevant consideration for the project.	

5 Engagement

5.1 Community and stakeholder engagement strategy

Vena Energy Australia's approach to the engagement undertaken to date, and the engagement principles to be followed during the preparation of the environmental impact statement will be undertaken in accordance with the following guidelines:

- Undertaking Engagement Guidelines for State Significant Project (DPIE, July 2021);
- Social Impact Assessment Guideline for State Significant Projects (DPIE, July, 2021); and
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (Department of Environment, Climate Change and Water, 2010).

5.2 Scoping phase consultation

5.2.1 Community engagement

Vena Energy Australia has been engaging with the community since early 2019 including meetings and discussions with local landholders as part of early investigations to assess the potential for a solar farm in the area.

In 2019, a preliminary concept for the project was presented to the local community and stakeholders as the 'Gulgong Solar Farm'. The concept consisted of three stages, across non-contiguous properties with up to 500 MW of solar and 600 MW of BESS with six hours of storage capacity.

After hearing the early community feedback on this concept, VEA undertook additional investigations and refined the design. Specifically, VEA refined the design to reduce the development footprint and generation capacity, incorporate visual impact mitigation and reduce the project's Castlereagh Highway frontage. The name of the project was also changed to Bellambi Heights Renewable Project, in recognition of the feedback received regarding community association and identity.

The project was scaled down from three stages to one, with a reduction in the development footprint from 820 ha to 304 ha. Dropping stage two and three from the original development has resulted in an 80% decrease in the number of sensitive receivers within 500 m of the site, and over 70% reduction in the project's highway frontage.

With regards to visual mitigation the administrative and control facilities have been relocated to a less prominent location within the site and 5 ha in the north west corner of the site has been excluded from the potential buildable footprint to mitigate views from the highway. Provision has also been made for native vegetation screening varying in width between 10–20 m, established within the site, beyond the existing vegetated road reserve.

Following the project refinements, VEA commenced reengagement activities with the community in early 2022 with a focus on neighbouring landowners and original community members from the 2019 engagement activities to re-introduce the proposed project and highlight the refinement undertaken in response to the feedback received during the early engagement process.

A summary of the engagement tools used during the re-engagement phase are outlined in Table 5.1

Table 5.1 Engagement tools (re-engagement phase, 2021/2022)

Engagement Tool	Description	Targeted Stakeholder Groups
Community information package	A Community Information Package (CIP) was letterbox dropped, personally by the VEA project team, to neighbours within 3 km of the development site on 25 February 2022, as well as those beyond whom VEA had consulted with previously. The CIP provided an overview of the project, its history and design refinement, and included options for providing feedback and participation, including links to a community survey, website, e-mail and 1800 line.	Adjacent neighbours (4 properties) Surrounding residents Wider community (website)
Face to face meetings	Individual meetings held with neighbours and residents within 3km of the proposal regarding the project refinements and to ascertain feedback on individual concerns, interests, and issues.	Adjacent neighbours (4 properties) Surrounding residents
Survey	Survey to scope and assess potential issues, impacts and opportunities of the Project.	Adjacent neighbours (4 properties) Surrounding residents Provided on the Project webpage
Phone calls / discussions	Phone calls were used as a tool to reengage with stakeholders previously involved in the project, and to try and contact those who had not been involved in earlier engagement and for whom a publicly available phone number was available	Adjacent neighbours (4 properties) Surrounding residents
Webpage, email, and community information line	Platforms and tools that provide the opportunity for the wider community and public to engage with the Project. They allow the proponent to provide information about the Project and the community to provide feedback outside of dedicated consultation periods. The project webpage also included links to the survey and opportunity to register your contact information for future engagement opportunities.	Adjacent neighbours (4 properties) Surrounding residents Wider community
Project briefings	Targeted meetings and briefings with key Local, State agencies as required	Mid-Western Regional Council and other regulatory bodies.

5.2.2 Engagement outcomes

i Adjacent neighbours and surrounding residents

As a result of re-engagement activities, face to face meetings were held with nine (9) landholders and discussions held with another twelve (12). Voice messages were left with another twelve (12) landholders. Table 5.2 below provides a breakdown of the engagement reach.

Table 5.2 Summary of scoping phase local community engagement activities

Stakeholder	Reach	Engagement
Adjacent Neighbours	4	CIP (all) Face to face meetings (2) Phone discussions (1) Attempted contacts with no response (1)
Landowners/residents located between 1 km and 2 km of the development site with potential moderate to high site visibility.	9	CIP (all) Face to face meetings (3) (Phone discussions (1) Attempted contacts with no response (2)
Landowners/residents located between 500 m and 1 km of the development site	10	CIP (all) Face to face meetings (2) Phone discussions (3) Attempted contacts with no response (3) Initial Community Survey Response (1)
Landowners/residents between 2 km and 3 km of the development site with potential moderate to high visibility	2	CIP (all)
Re-engagement with prior contacts	7	CIP (all) Face to face meetings (1) Phone discussions (4) Attempted contacts with no response (2) Initial Community Survey Response (1)
Landowners/residents located between 1 to 3 km from the development site with either low or no visual impact	14	CIP (all) Face to face meetings (1) Phone discussions (3) Attempted contacts with no response (4)

In addition to the above, 4 responses have been received for the community survey, interested parties have visited the website, emailed the project team, and rang the 1800 line.

Feedback received from the local community during the reengagement phase was mixed. There were local landholders supportive of the project (and in particular noted the scaling back of the project footprint as a good outcome), while others were indifferent, and several opposed.

Considerable feedback was not specific to the proposed BHRP, but related to peoples' lived experience with the existing as-built utility scale solar farm in the district and the lack of enforcement of consent conditions, as well as an expressed frustration with the manner in which the Central West Orana REZ is being 'imposed' on the community without meaningful consultation. A recurrent theme was concern about the increasing number of known and potential renewable projects in the district, a sense of consultation fatigue, and scepticism that 'decision makers in Sydney' are not listening to regional communities.

A summary of the issues of concern raised during the above consultation is provided in Table 5.3 below.

Table 5.3 Summary of issues raised by community

Issue	Comments
Cumulative impact	Concern that the number of renewable developments and other State Significant Projects proposed in the Mid-Western Regional Council LGA would trigger unacceptable cumulative impacts in terms of accommodating a workforce, social implications of drifting or temporary community members, demand on local services and traffic impacts.
Visual impact	Parties experiencing any visual impact should be financially compensated and that this should commence on construction, extend through to the life of the project, and be registered on the land title as a means to neutralise adverse impacts on land values. Several landholders were of the opinion that setback standards in Council's Development Control Plan should be mandatory. Others maintained that the effectiveness of screen plantings in mitigating visual impact was the more important outcome or supported the proposed refined outcome provided by VEA (i.e. reduction in footprint as a strategy response). One landholder noted that because of proximity to the site and topography, it would not be possible to screen parts of the BHRP from the curtilage of their residence. Existing panoramic views from Flirtation Hill in Gulgong will be degraded as a result of the number of renewable energy projects being imposed on Gulgong as a result of the Central West-Orana REZ. For most, opportunities do exist for landscaping to help mitigate visual impacts if strategically located, are established early and well maintained during the establishment phase.
Land values	Concern that land values would be adversely impacted. One local was concerned land values would increase because of an inevitable change to land use zoning that would trigger a rate increase that would, in turn, be a financial imposition for neighbours and the immediate community.
Tourism impact	Accommodating an itinerant workforce during construction, with limited local accommodation, has the potential to adversely impact on tourism.
Fire risk	Renewable energy projects introduce a fire risk to the community and first responders (both Fire and Rescue NSW and the Rural Fire Service brigades) will not enter an electricity generating facility. Being located on the western side of Gulgong this creates a risk for the town and community. One landholder maintains that solar farms attract lightning which increases the fire risk for others in the locality.
Insurance	One landowner was concerned they would be unable to afford insurance premiums to provide the required Public Liability coverage to continue farming and undertaking their preferred agricultural practices as a result of renewable energy projects.
Grid connection	One landowner doubted the capacity to connect to TransGrid's existing Wellington-Wollar 330kV line without that line being upgraded, which they are of the opinion it would not be in light of the proposed new 500kV transmission infrastructure associated with the Central West Orana REZ.
Viability	One landholder questioned the need for more solar when existing solar farms are not generating at their potential because of grid capacity issues.
Health impact	One landholder is concerned that solar panels, during their operational life, leach toxic materials into the soil. One landholder wants the environmental impact statement to clearly explain the health risks associated with living near a solar farm and overhead transmission lines.
Site suitability	Two landholders queried the suitability of the site and construction limitations given the hard granite bedrock across the site.
Enforcement of conditions	Several landholders expressed frustration with the lack of enforcement of consent conditions. These comments related to landscaping obligations for the existing as-built utility scale solar farm within the district and a reported inability to have these acted upon by the asset owner or DPE.

ii Mid Western Regional Council

Initial consultation with the Mid Western Regional Council (MWRC) was undertaken in February 2019 with VEA meeting with Council representatives to discuss the project. In March 2019 VEA was requested to provide a briefing to Councillors. The key issue raised was visual impact.

Following consultation with the local community and the introduction of *Development Control Plan (Amendment No 5)* VEA then undertook additional studies relating to visual sensitivities and mitigation treatment options. The design was subsequently modified to reduce the size and location of the proposed development.

Consultation recommenced with MWRC in February 2022. A copy of the Community Information Package was forwarded to Council and VEA's plans for re-engagement with the local community outlined.

A Teams meeting was held with Council on the 9th March to provide an overview of the revised project and to understand how Council wanted to be consulted during the assessment and planning approvals process.

Key issues raised during this meeting are listed below.

- MWRC is dealing with a number of State Significant Projects (not just renewable energy developments) and it is the responsibility of developers and the industry to recognise the problems this can create in terms of managing cumulative impact and, in particular, the challenges of accommodating large construction workforces without causing adverse impacts on the community and Council resources.

- The cumulative impact of the simultaneous construction of significant infrastructure projects has the potential to cause adverse impacts. It was noted that accommodation options are limited and if not managed appropriately have the potential to adversely impact on tourism; an industry of key importance and value to the region.

- The reduction in scale of the proposed BHRP in response to initial community feedback was noted.

- It would be appropriate, on receipt of SEARs, for VEA to make a presentation to Councillors that focusses on explaining how cumulative construction impacts will be managed in a manner that provides local benefit, with an informed program identifying the likely construction start date.

- Council asked that VEA confirm the advice it has received from TransGrid with regards to the ability to connect to the existing Wellington – Wollar 330kV line that bisects the development site. If the BHRP triggers the need for an upgrade to this line, then this needs to be known and assessed as part of the BHRP development.

- While Council is supportive of renewable energy developments, these need to be located in areas that are suitable and do not result in the degradation of important landscape values.

- Parts of the community are anxious about the number of renewable energy projects and associated transmission infrastructure that could be proposed in the LGA as a result of the Central West Orana REZ. Apart from justified concerns about the potential cumulative impact on the landscape, Council and the community is yet to experience any substantive, ongoing positives from construction of utility scale renewable energy developments.

- Notwithstanding the *Environmental Planning and Assessment Amendment (Infrastructure Contributions) Regulation 2021* that caps a levy on solar and wind electricity generation facilities to $450,000, Council would be requesting 1% of the cost of development, consistent with its existing Contributions Plan.

- Council would also expect that VEA would enter into an Voluntary Planning Agreement as the preferred mechanism for providing community benefit.

- Any Council support of the project would be contingent on VEA demonstrating the suitability of the site and a willingness to adequately address issues of concern to Council and the community.

i Government agencies and interested groups

Table 5.4 provides a summary of the consultation undertaken to date with State agencies.

Table 5.4 Summary of scoping phase agency engagement activities

Stakeholder	Engagement activities	Purpose and Key outcomes
Department of Planning and Environment	1. Meeting 2. Teams meeting 3. Teams meeting	1. 11 December 2018 initial pre-lodgement meeting with presentation of the then proposed project (ie. the Gulgong Solar Farm). 2. 14 December 2021 introduce the project to the Department's Social Impact Assessment team and outline the targeted approach to be taken for community engagement during the scoping phase, including presentation and discussion on the engagement tools to be used. 3. 16 December 2021 pre-lodgement meeting with a presentation and discussion on the revised Bellambi Heights Renewable Project
EnergyCo	Team meeting	21 November 2021 introducing the BHRP to the EnergyCo Case Management Team.
Biodiversity Conservation and Science Directorate	Meeting	February 2019 met to discuss results of initial ecological surveys and discuss expectations relating to additional targeted flora survey and candidate species assessment.
Transport for New South Wales	On-site meeting	February 2019 met with Roads and Maritime Services representative to look at and discuss Castlereagh Highway access considerations.
Natural Resource Access Regulator	Meeting	March 2019 meeting to discuss the project. Matters discussed included mapped watercourse categorisations, soil and water management, and water supply for construction and operation.
Sidings Springs Observatory	Meeting	April 2019 met to discuss the Dark Sky planning guideline and implications for lighting design.
Crown Lands	Phone call/emails	January 2022 to validate status of Lot 137 DP 750762 as Crown land and discuss the potential for road improvement works to impact on this Lot.
State Member (Dubbo)	Phone call/email	Called to establish preferred means of communication about the BHRP. An introductory letter on the BHRP and a copy of the Community Information Package was subsequently emailed on 9 March 2022 with the offer to meet as required.
Federal Member (Calare)	Phone call/email	Called to establish preferred means of communication about the BHRP. An introductory letter on the BHRP and a copy of the Community Information Package was subsequently emailed on 9 March 2022 with the offer to meet as required.
NSW Farmers	Phone call/email	Called to establish preferred means of communication and consultation about the BHRP. A copy of the Community Information Package was subsequently emailed on 9 March 2022 with the offer to meet with the Mudgee Branch as required.
TransGrid	Ongoing discussions	TransGrid has advised that there is a lot of generation connected, or proposed to be connected, to the 330kV line that bisects the BHRP site. While there is currently no restriction on any additional generator connecting to the line, the more generation is connected the more often that all the generators will be constrained as the line only has a certain capacity.

5.3 EIS phase consultation

VEA is committed to genuine and consistent engagement with the local community and stakeholders to support the building of strong relationships with stakeholders, foster existing connections, and establish a socially sustainable project. Therefore, VEA will continue to engage with the local community and stakeholders throughout the EIS and will be targeted as more detailed information becomes available as assessments and investigations are completed or undertaken in collaboration with stakeholders.

Consultation during the development of the EIS will aim to:

- consult proactively with stakeholders using clear and consistent key messages;
- continue to engage with key stakeholders to identify potential issues and opportunities;
- communicate the progress of the project and key findings or outcomes of assessments;
- enable stakeholders to have input into the preparation of the EIS, project planning, investigate opportunities for visual treatment and identify opportunities for benefit sharing; and
- implement response and feedback strategies to address stakeholder concerns and use these to inform the evolution of the project.

It is noted that Covid circumstances and associated health orders could preclude the ability for face to face engagement on the project. If this scenario eventuates, alternative forms of engagement, such as project fact sheets and online meetings on request or virtual community drop in sessions would be used to account for any inability for face to face engagement.

Engagement undertaken during the preparation of the environmental impact statement will be in consideration of the principals and objectives contained in the following guidelines:

- Undertaking Engagement Guidelines for State Significant Project (DPIE, July 2021);
- Social Impact Assessment Guideline for State Significant Projects (DPIE, July, 2021); and
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (Department of Environment, Climate Change and Water, 2010).

The proposed preliminary approach to stakeholder engagement during the EIS phase is detailed in Table 5.5.

Table 5.5 Proposed EIS phase stakeholder engagement

Stakeholder	Purpose	Method
Adjacent Neighbours	Community benefit sharing models Regular project updates Identification of key environmental and social concerns Communication regarding how environmental and social concerns will be mitigated or managed	Face-to-face briefings, interviews and phone calls Newsletters and fact sheets Community drop-in sessions Website feedback forms and project information line
Aboriginal stakeholders	Regular project updates Identify Aboriginal cultural heritage values of the study area and connection to place	Consultation in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010) Newsletters and fact sheets Community drop-in sessions Website feedback forms and project information line
Mid Western Regional Council	Informing Council of project progress Discuss access options for the project and confirm Council requirements for road upgrades Consultation to inform the social impact assessment Communicate outcomes of assessments	Face to face/videoconference meetings; Email and phone correspondence Briefing letters
Wider community	Regular project updates	Newsletters and fact sheets Community drop-in sessions or opportune participation in local community events (i.e., local shows or events) Website feedback forms and project information line
Local service suppliers	Regular project updates Identify key environmental, social, and economic concerns Gain an understanding of the local economy and resource availability (ie availability of accommodation for the construction phase)	Face-to-face briefings, interviews and phone calls Newsletters and fact sheets Community drop-in sessions Website feedback forms and project information line Register for interested parties
DPE	Informing DPE of project progress Resolving of issues during EIS preparation Applying DPIE guidelines to engagement activities	Face to face/videoconference meetings; Email and phone correspondence Briefing letters
EnergyCo	Informing DPE of project progress	Face to face/videoconference meetings
Members of Parliament	Informing Members of project progress, as required.	Face to face/videoconference meetings
Special Interest Groups	Regular project updates Identify key environmental, social, and economic concerns	Face-to-face briefings, interviews, and phone calls. Newsletters and fact sheets Community drop-in sessions Website feedback forms and project information line
Agencies.	Informing agencies of project progress Resolving of issues during EIS preparation	Face to face/videoconference meetings; Email and phone correspondence

Table 5.5 Proposed EIS phase stakeholder engagement

Stakeholder	Purpose	Method
TransGrid, AEMO	Progression of Grid Connection Application	Face to face/video conference meetings; Email and phone correspondence
NSW Farmers	Informing agencies of project progress Resolving of issues during EIS preparation	Face to face/video conference meetings; Email and phone correspondence
Fire and Rescue NSW Rural Fire Service	Fire risk mitigation	Workshop; Information Session
Other development proponents	Understand and address potential cumulative impacts, and manage expectations and equity in community benefit sharing	Regular briefings

6 Proposed assessment of impacts

A preliminary environmental assessment has been carried out to identify matters requiring further assessment in the EIS and the level of assessment that should be carried out. In accordance with the Scoping Report Guidelines (DPIE 2021a), the following factors have been considered in the identification of matters needing further assessment for the project:

- the scale and nature of the likely impact of the project and the sensitivity of the receiving environment;
- whether the project is likely to generate cumulative impacts with other relevant future projects in the area; and
- the ability to avoid, minimise and/or offset the impacts of the project, to the extent known at the scoping phase.

The following sections of this chapter present the identified matters requiring further assessment and the proposed approach to the respective assessments. In addition to the preliminary environmental assessment presented herein preliminary technical studies have been carried out for the key issues of visual amenity, biodiversity, and Aboriginal heritage. These preliminary technical studies have been commenced to ensure that the values of the project area and surrounds are taken into consideration early in the planning and design of the project. Measures implemented through the scoping phase to avoid and minimise impacts are also described in the following sections for visual amenity, biodiversity, and Aboriginal heritage.

Matters have been categorised as per the categories identified in the Scoping Report Guidelines (DPIE 2021a). A scoping summary table in accordance with the Scoping Report Guideline is included in Appendix A. Also, in accordance with the Scoping Report Guideline, the level of assessment identified for each matter is as follows:

- Detailed:
  - Visual;
  - Biodiversity;
  - Aboriginal heritage; and
  - Traffic.
- Standard:
  - Historical heritage;
  - Social and economic;
  - Hazards;
  - Land;
  - Water;
  - Noise and vibration; and

- Air quality.

6.1 Visual

6.1.1 Existing environment

A review of landscape and visual amenity was completed to inform the planning and design of the project. The review was prepared by Iris Visual Planning and Design and considered the various site options described in Section 3.6. This section provides a summary of the findings with the complete visual scoping study provided in Appendix E.

The landform of the project area rises to a local highpoint in the central north of the project area, with some local undulations including a small spur located generally parallel to the highway and extending south-east from this highpoint. This spur divides views into smaller visual catchments, containing views from the east and west somewhat. Overall, the project area has a relatively small visual catchment with only small areas where there will be greater than 30% of the proposed developable area visible. The existing mature vegetation surrounding the project area will reduce the visual prominence of the project, by screening and filtering views, and providing a vegetated backdrop to views particularly from the east, south-east and south. The vegetation and undulating local landform increase the visual absorption of the proposed development into the surrounding landscape.

An indicative visual catchment for the project has been established based on 3D viewshed modelling and visibility analysis undertaken using LIDAR point cloud data and is shown in Figure 6.1. The following describes the potential visual catchment of the project area:

- There are short and mid- range views from the rural areas to the north of the project area. These are filtered and screened by the existing mature trees and vegetation along the unformed Crown road that adjoins the northern project area boundary. As the land rises, there would be views from the paddocks about 1-2 km to the north of the site.

- There would be some views to the east of the project area from the paddocks to the east and south-east, between Jacksons Lane and Wialdra Creek extending about 2 km from the project area.

- To the south, the vegetation within the project area, along Puggoon Road, the Castlereagh Highway and Wialdra Creek, combine to filter and enclose views from the south, including locally elevated properties in the locality of 'The Lagoon'.

- There may be views from areas to the south-east of the project area, viewed at a distance of over 4 km. However, at this distance the solar farm infrastructure would not be discernible and would appear as a block of colour amongst distant paddocks.

- To the south of the project area, vegetation along Wialdra Creek screens areas to the south of the creek. There may be some views from high points along Beryl Road at a distance of about 2 km.

- In views from the west, south of Laheys Creek Road, the project would be visible from some areas within 1 km of the project area and then again as the landform rises to a small ridgeline about 2 km west of the project area.

- Areas to the north-west of the project area are mostly screened by vegetation within the Travelling Stock Reserve and local landform, with some distant views possible from paddocks about 3 km away.

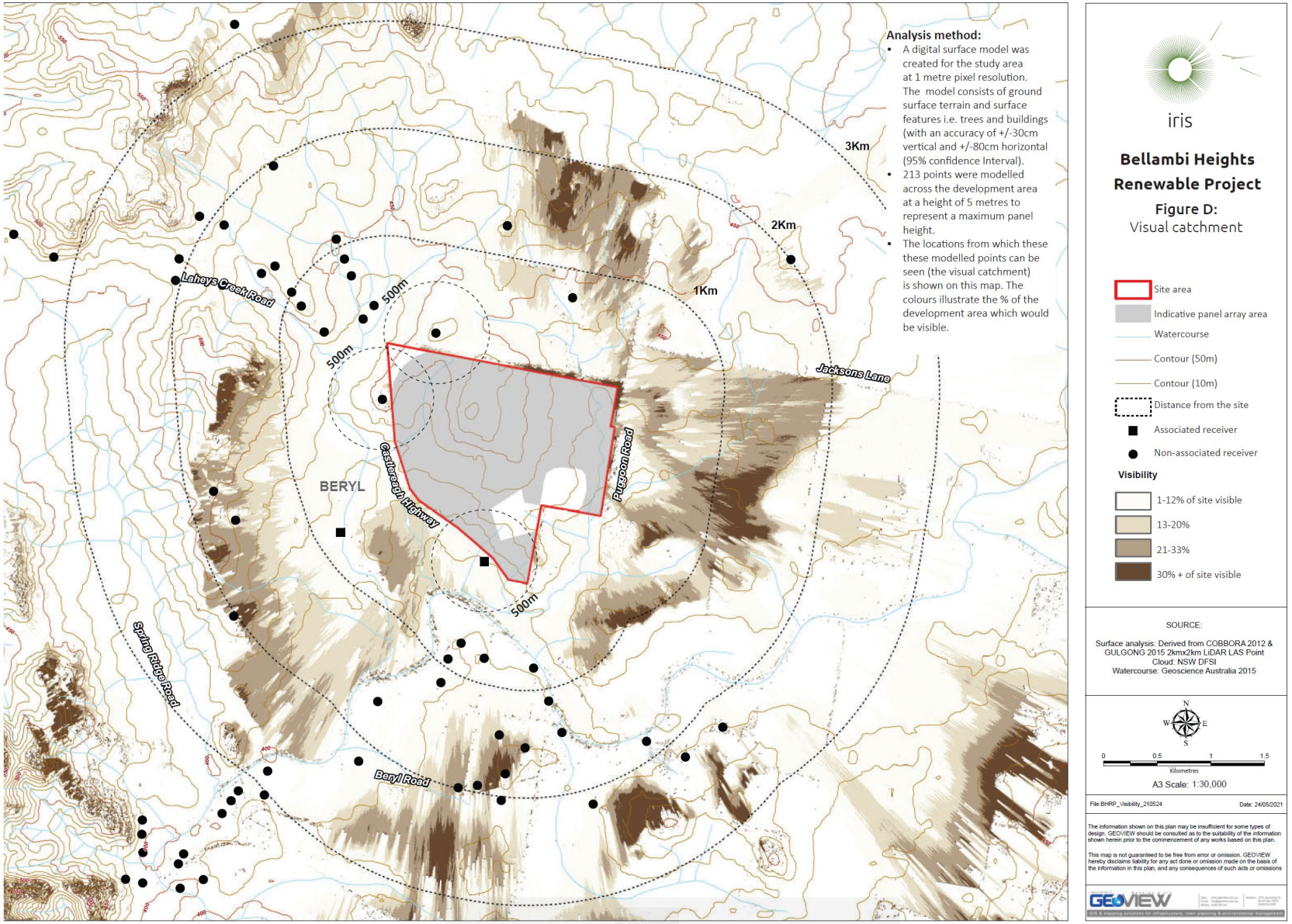


Figure 6.1 Indicative visual catchment

i Views from residential properties

While the project is mainly visible from rural areas which contain few residences, there are some locations where views to the project from residences are likely. There would be views from two properties within 200 m of the project area where views to the project are likely. One dwelling is located to the west of the Castlereagh Highway on a rise, and the other on a paddock to the north of the project area. The latter is associated with the proposed Tallawang Solar Farm.

Further to the north of the project area, at a distance of 1-2 km, there are two dwellings associated with the proposed Tallawang Solar Farm with potential views to the project viewed over the vegetation along the northern unformed Crown road. There would also be views from several dwellings west of the project area and east of Spring Ridge Road where there may be distant views to the west facing slopes of the project. Views from properties on the lower lying areas, to the south of Wialdra Creek, would be largely screened by creekside vegetation. There are locally elevated areas on Beryl Road, where there may be distant views to the project.

Many of these dwellings include existing views to the highway and transmission line infrastructure crossing the valley. These locations would be of lower sensitivity as these receptors are located within a working rural landscape which includes existing high voltage power infrastructure.

There is a heritage listed residence (The Lagoon Homestead) to the south of Wialdra Creek, which would have higher visual sensitivity, however, this property is unlikely to have views of the project due to intervening vegetation and the landform of the project area.

ii Views from the Castlereagh Highway

When travelling from north to south along the Castlereagh Highway, approaching Gulgong, there is a long view directed along the Spring Valley, as the highway passes over a small rise, north of the project area. The journey includes a series of small visual catchments of rural landscape as the highway meanders south. Vegetation within the Travelling Stock Reserve, at the intersection with Laheys Creek Road, encloses views for a short section. To the south of Laheys Creek Road, views open-up to the west to include distant views of the vegetated hills of Spring Ridge and Yarrobil National Park to the west of the valley. The vegetation along Wialdra Creek creates a strong visual element, identifying the crossing of the creek.

Views from the Castlereagh Highway are of higher sensitivity due to the number of people who use the Highway, and its role in the experience of approaching the township of Gulgong from the north as referred to in the Mid-Western Regional Council Local Environmental Plan (LEP). While this section of the highway is on the north westerly approach to Gulgong and identified as one of the 'Main Entrance Corridors' to Gulgong in the Mid-Western Regional Local Strategic Planning Statement (LSPS) 2020, this section of the highway has a visual character consistent with the experience of passing through the broader rural landscape. The outskirts of the township of Gulgong begins to the south of Wialdra Creek, where the density of rural residences begins to increase and the approach to town becomes apparent with an avenue of trees and signage marking the approach to the township itself.

There would be views from the highway to the project as it forms the western boundary of the project area for about 2.5 km. On this part of the journey, groups of trees along the Highway partly obstruct and filter views towards the project area intermittently from the Highway. In some locations, the project area is viewed in the context of existing overhead transmission lines and with existing blocks of vegetation.

The views from the highway to the vegetated hills of Spring Ridge and Yarrobil National Park, to the west of the project area, would continue to be viewed from the highway without interruption from the project. The vegetation at Laheys Creek Road in the Travelling Stock Reserve, and the Wialdra Creek crossing would also remain unchanged as visual features along this journey.

Opportunities for landscape and visual mitigation have been identified for viewpoints along the Castlereagh Highway. A solution will be designed for the proposal, building upon the landscape character of the project area, and valued landscape elements of the project area, determined in consultation with the community.

Specifically, a landscape strategy will address views from the highway and the experience of passing through this section of the landscape. This is likely to include providing areas of dense screening interspersed with areas where screening is combined with scattered trees to provide a site responsive roadside landscape that further reduces views to the project. Long view lines from the highway, such as the approach from the north, will also be prioritised with adjustments to the development footprint combined with plantings maximising the screening effect of the local landform.

6.1.2 Avoidance and minimisation of impacts

In determining the preferred project area location and development footprint a process of 3D viewshed modelling and visibility analysis was undertaken using LIDAR point cloud data. This process was carried out to maximise the potential for natural screening of the project by the existing landform and vegetation of the project area and surrounding areas to minimise the potential visual impact of the project. The selection of a preferred project area also considered the local landscape features, important view corridors, public viewing locations and the number and proximity of sensitive receivers. An indicative visual catchment for the project is shown in Figure 6.1 based on this analysis. Based on the viewshed modelling the project area selection was refined to minimise visual impacts. This included:

- removing an area of land located to the east and west of the Castlereagh Highway, about 1 km to the north of Jenkins Lane so that the proposal will only be viewed from the perimeter of the project area, rather than viewers on the Highway passing through the development footprint;
- removing development from the foreground of views to the Spring Ridge and Yarrobil National Park (south of the Castlereagh Highway), retaining views to this important local visual feature; and
- consolidating the project area to one contiguous footprint rather than one that is spread over several separate paddocks so that it will be viewed from a smaller number of vantage points, can be more effectively screened by vegetation, and appear as a single visual element within a broader patchwork of paddocks.

Based on the refinements made through the scoping phase the proposed development footprint substantially reduces the number of potential visual receptors to the project, reduces the number of viewers with a higher visual sensitivity (including rural residential properties), reduces the number of potential receptors (both associated and non-associated dwellings) within 500 m of the project area, and reduces the duration of views to the project from the Highway.

6.1.3 Assessment approach

The visual impact assessment will include an assessment of the likely visual and landscape impacts of the project (including any glare, reflectivity, and night lighting) on surrounding residences, scenic or significant vistas, air traffic and road corridors in the public domain. A comprehensive viewshed analysis utilising light detection and ranging (LIDAR) data, aerial imagery, and results from site inspections and stakeholder engagement will be performed to identify locations within a local setting (including public viewpoints) that may experience views of project infrastructure.

Where relevant, the visual impact assessment and EIS will include mitigation measures to help reduce the project's impacts on visual amenity. The potential for any visual or landscape impacts to accumulate from other proposed,

approved, under construction, and operational renewable energy developments will also be considered. Cumulative impact assessment is described further in Section 6.12.

6.2 Biodiversity

A biodiversity scoping assessment was prepared for the project by EMM and is provided in Appendix C. The assessment included a desktop review of relevant databases, a preliminary field assessment and targeted flora and fauna surveys of the project area.

6.2.1 Existing environment

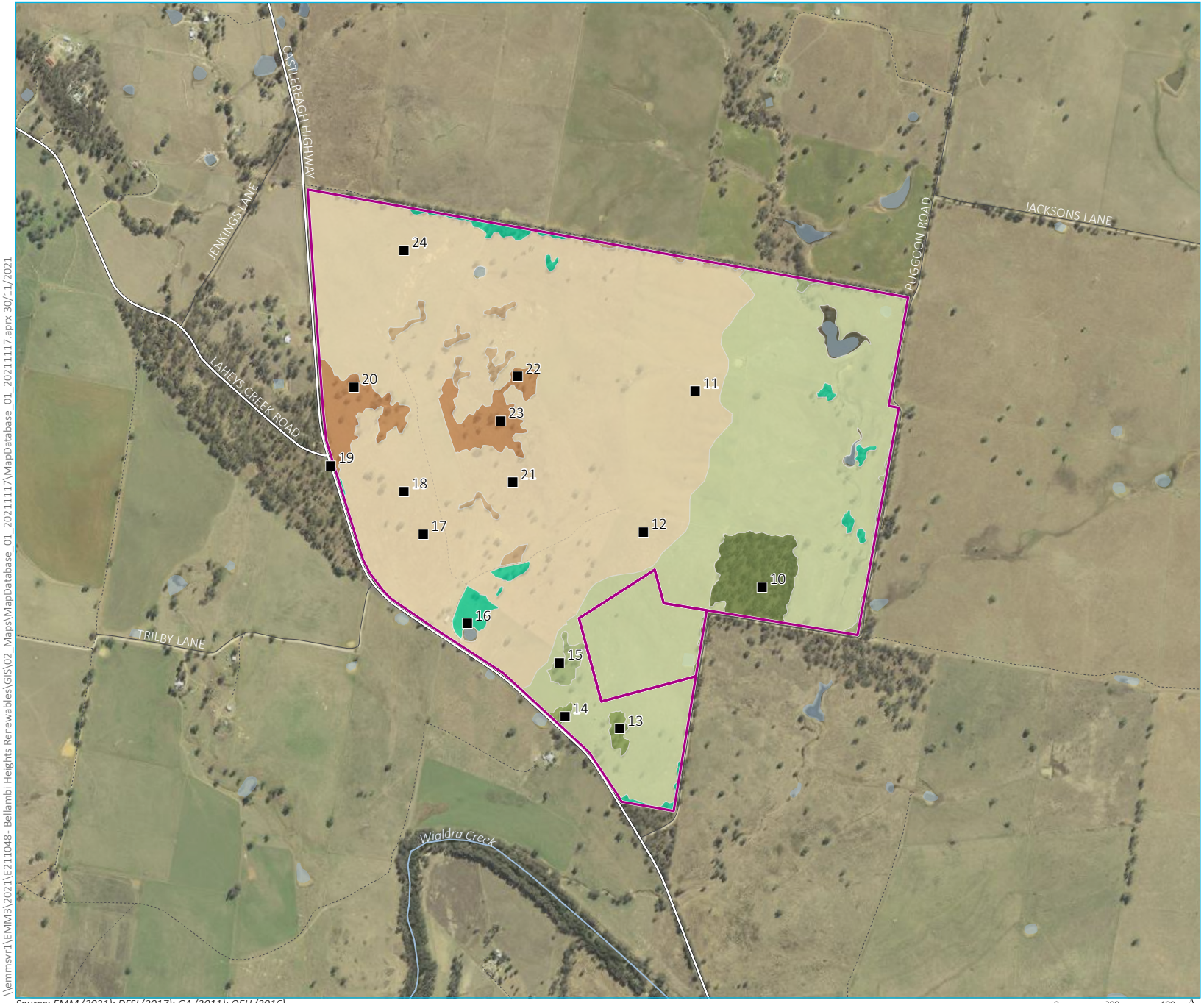
The project area has been impacted by past land use, including agricultural activity, with remnant vegetation ranging from good to poor condition. Vegetation condition varies across the project area and includes a range of moderate condition woodlands to high degraded pastures and derived grasslands. Areas devoid of tree cover are heavily impacted by grazing activities and show little native cover or diversity. These areas are considered to be of minimal biodiversity value. Woodland areas are generally in poor to moderate condition and show impacts from grazing. However, these areas show some native cover and diversity. High condition vegetation is restricted to a small area in the east of the project area. Comprehensive targeted surveys undertaken across the project area have not recorded any threatened species to date.

i Native vegetation

Three plant community types (PCTs) were mapped across the project area. These PCTs were stratified into eight vegetation zones based on broad condition. Table 6.1 provides a summary of the PCTs identified on site and details of their condition.

PCTs 266 and 277 are considered representative of White Box Yellow Box Blakely's Red Gum Woodland critically endangered ecological community (CEEC) listed under the BC Act. PCT 277 in good condition is considered representative of White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands CEEC listed under the EPBC Act.

The PCT mapping and plot locations are shown in Figure 6.2.



KEY

- Project area
- Plot location
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Waterbody

Plant community types

266- White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion

- Moderate
- Poor
- DNG

277- Blakelys Red Gum- Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion

- Good
- Moderate
- Poor
- DNG

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

- Poor

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Source: EMM (2021); DFSI (2017); GA (2011); OEH (2016)

0 200 400 m

GDA2020 MGA Zone 55

N

Plant Community Type (PCT) mapping and plot locations

Bellambi Heights Renewables Project
Scoping Report
Figure 6.2

EMM
creating opportunities

Table 6.1 Plant community types and condition in the project area

PCT	Description	Condition	Area (ha)	Threatened Ecological Community (TEC)
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Moderate	11.09	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). Does not meet condition thresholds under the EPBC Act.
		Poor	3.29	Not a TEC. Vegetation is too degraded, and unlikely to be able to be rehabilitated.
		Derived Native Grassland (DNG)	172.46	Not a TEC. Vegetation is too degraded, and unlikely to be able to be rehabilitated.
277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Good	8.21	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands CEEC (EPBC Act).
		Moderate	1.38	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). Does not meet thresholds under the EPBC Act.
		Poor	2.25	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). Does not meet thresholds under the EPBC Act.
		DNG	99.29	Not a TEC. Vegetation is too degraded, and unlikely to be able to be rehabilitated.
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	Poor	5.03	Not a TEC.

ii Threatened species

Desktop database searches identified a significant number of potential threatened species that could occur within the project area, including 20 flora and 48 fauna species. A candidate species assessment was undertaken in accordance with the BAM (OEH 2017) based on the PCTs present within the project area. The results of this assessment are presented in Table 6.2.

Table 6.2 Candidate species assessment

Scientific name	Common name	Survey required and timing
Flora		
Acacia ausfeldii	Ausfield's Wattle	Yes– woodland areas. All year
Ammobium craspedioides	Yass Daisy	No – geographic limitations not present.
Cullen parvum	Small Scurf-pea	No – outside range.

Table 6.2 Candidate species assessment

Scientific name	Common name	Survey required and timing
Dichanthium setosum	Bluegrass	Yes – all areas. Dec – May
Euphrasia arguta	-	No – suitable habitat not present.
Grevillea wilkinsonii	Tumut Grevillea	No – geographic limitations not present.
Pomaderris queenslandica	Scant Pomaderris	No – suitable habitat not present.
Prasophyllum petilum	Tarengo Leek Orchid	No – geographic limitations not present.
Swainsona recta	Small Purple-pea	Yes – woodland areas. Sep - Nov
Swainsona sericea	Silky Swainson-pea	Yes – areas not subject to cultivation. Sept - Feb
Tylophora linearis	-	Yes – woodland areas. All year
Zieria obcordata	Obcordate-leafed Zieria	No – suitable habitat not present.
Fauna		
Anthrochaera phrygia	Regent Honeyeater (breeding)	No – site not located within mapped important areas.
Aprasia parapulchella	Pink-tailed Legless Lizard	No – habitat constraints (rocky areas) not present.
Burhinus grallarius	Bush Stone-curlew	Yes – woodland patches. All year
Callocephalon fimbriatum	Gang-gang Cockatoo (breeding)	No – outside species breeding range.
Calyptorhynchus lathami	Glossy Black-Cockatoo (breeding)	No – geographic limitation not present and no suitable breeding habitat present.
Cercartetus nanus	Eastern Pygmy-possum	Yes – woodland patches. Oct - Mar
Chalinolobus dwyeri	Large-eared Pied Bat	No – no suitable roosting habitat.
Delma impar	Striped Legless Lizard	No – outside species distribution.
Haliaeetus leucogaster	White-bellied Sea-Eagle (breeding)	No – suitable nesting habitat not present.
Hamirostra melanosternon	Black-breasted Buzzard (breeding)	No – suitable breeding habitat limited to riparian vegetation along Wialdra Creek which will be avoided.
Hieraaetus morphnoides	Little Eagle (breeding)	No – nests observed during survey.
Hoplocephalus bitorquatus	Pale-headed Snake	No – suitable habitat not present.
Lathamus discolor	Swift Parrot (breeding)	Mapped important areas to be obtained from OEH.
Litoria booroolongensis	Booroolong Frog	No – no suitable habitat present.

Table 6.2 Candidate species assessment

Scientific name	Common name	Survey required and timing
Lophoictinia isura	Square-tailed Kite (breeding)	No – suitable breeding habitat limited to riparian vegetation along Wialdra Creek.
Miniopterus schereibersii oceanensis	Eastern Bentwing-bat (breeding)	No – suitable breeding habitat not present in or near the site.
Myotis macropus	Southern Myotis	No – medium to large permanent creeks, rivers, lakes or other waterways supporting pools 3m or wider not present.
Ninox connivens	Barking Owl (breeding)	No – site does not support suitable breeding habitat.
Ninox strenua	Powerful Owl (breeding)	No – site does not support suitable breeding habitat.
Petaurus norfolcensis	Squirrel Glider	Yes – woodland patches. All year
Petrogale penicillata	Brush-tailed Rock-Wallaby	No – habitat constraint (rocky outcrops and cliffs) not present.
Phascogale tapoatafa	Brush-tailed Phascogale	No – outside species range.
Phascolarctos cinereus	Koala (breeding)	Yes – woodland patches and paddock trees. All year
Polytelis swainsonii	Superb Parrot (breeding)	Yes – woodland patches. However, suitable breeding sites limited, and outside breeding range.
Pteropus poliocephalus	Grey-headed Flying-fox	No – no camps in project area.
Synemon plana	Golden Sun Moth	No – geographic limitations not present.

Targeted flora surveys were undertaken in February 2019 in accordance with *Surveying threatened plants and their habitats* (EES 2020). Transect surveys were undertaken across all woodland areas at 10 m spacing, while 10% of remaining areas of low-quality derived grassland (62.1 ha) were sampled using transect surveys spaced at 100 m following consultation with the Biodiversity and Conservation Division (BCD) of the Department of Planning and Environment in March 2019. In total, over 77 km of transect survey were undertaken across the project area.

Targeted fauna surveys were undertaken in February 2020. Surveys included:

- bird surveys targeting the Superb Parrot and Bush-stone Curlew;
- terrestrial trapping surveys targeting the Eastern Pygmy-possum;
- arboreal trapping surveys targeting the Squirrel Glider;
- camera surveys targeting the Eastern Pygmy-possum and Squirrel Glider;
- spot assessment technique surveys targeting the Koala; and
- spotlight surveys targeting the Bush Stone-curlew, Eastern Pygmy-possum, Squirrel Glider and Koala.

Targeted flora and fauna surveys did not record any threatened species within the project area.

6.2.2 Avoidance and minimisation of impacts

The project will avoid and minimise impacts to biodiversity through the avoidance of high condition native vegetation (PCT 277 – Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion) to the east of the project area. This patch of vegetation will be avoided and has been excluded from the indicative developable area as shown in Figure 3.1.

6.2.3 Assessment approach

The potential biodiversity impacts of the project will be assessed in accordance with the Biodiversity Assessment Method (DPIE, 2020). This assessment will include preparation of a Biodiversity Development Assessment Report in accordance with the Biodiversity Assessment Method. The Biodiversity Development Assessment Report will include assessment of biodiversity values, consideration of prescribed impacts (those not quantified by ecosystem or species credits), presentation of mitigation and avoidance measures, quantification of the offsetting requirements, and will present a strategy for offset delivery if required.

6.3 Aboriginal heritage

An Aboriginal Heritage Preliminary Constraints Assessment (AHPCA) was prepared by EMM and is provided in Appendix D. The assessment was completed in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) and provides preliminary advice based upon desktop level assessment and visual inspection of the project area.

6.3.1 Existing environment

An initial search of the Aboriginal Heritage Information Management System (AHIMS) database conducted on 14 January 2019 identified 36 recorded Aboriginal sites within a 15 km by 11 km area, centred on the project area. An updated search of the AHIMS database was conducted on 8 April 2021. The updated search results included the 36 previously noted sites, and additional seven Aboriginal sites identified by EMM visual inspection as described further in the sections below. A breakdown of AHIMS sites by type is provided in Table 6.3 and shown on Figure 6.3.

Table 6.3 AHIMS extensive search results

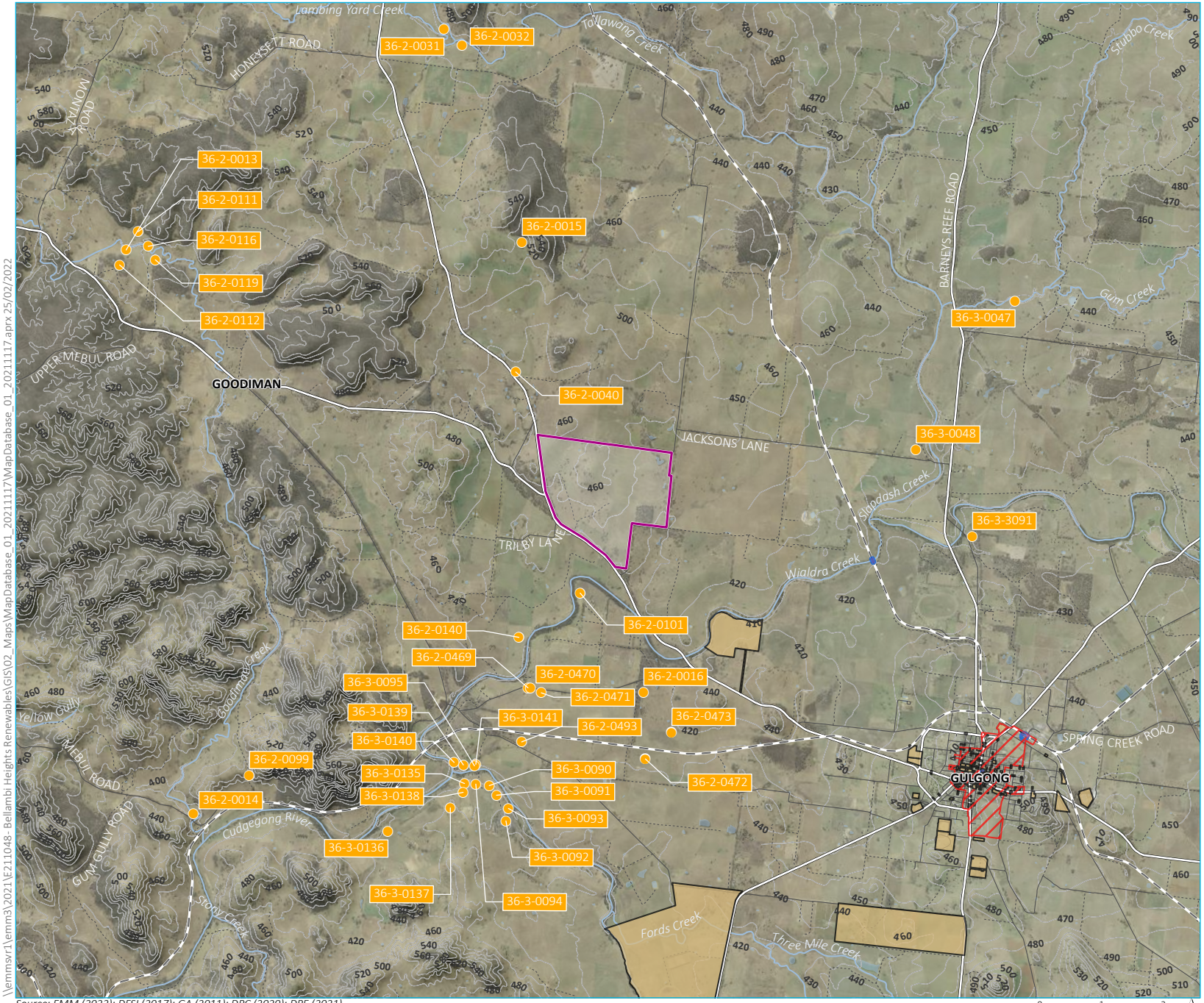
Site type	Number of sites	Representation (%)
Open camp sites	35	97%
Artefact scatter	*4*	*11%*
Isolated artefact	*1*	*3%*
Artefact site (number of artefacts not specified)	*30*	*83%*
Quarry site	1	3%
TOTAL	36	100%
Open camp sites	35	97%

Open camp sites (artefact scatters and isolated finds) represent the dominant site type for the area (n=35, 97%). The only other site type identified is a stone quarry with associated artefact scatter. Five of the sites are registered as destroyed, whilst the remainder are listed as valid.

A predictive model of Aboriginal heritage values within the project area was devised based on desktop analysis of:

- landscape features and disturbance in the project area and its surrounds;
- pre-colonial period ecological conditions;
- ethno-historical information about Aboriginal life and material culture; and
- the type and distribution of Aboriginal sites described in previous reports and AHIMS data.

The project area contains a number of landscape features which are often associated with Aboriginal objects and archaeological sensitivity as a result of Aboriginal people's use of those features in their everyday lives and for traditional cultural activities. Proximity to Wialdra Creek and other ephemeral waterways and the subsequent availability of animal and plant resources in addition to natural materials suitable for artefact manufacture indicate that the project area would have been a locale highly likely to have attracted Aboriginal occupation.



KEY

- Project area
- AHIMS site
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Contour (20 m)
- State Heritage Register- Curtilage

LEP- heritage items and conservation areas

- State Heritage Act
- Conservation area- general
- LEP heritage item- general

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Source: EMM (2022); DFSI (2017); GA (2011); DPC (2020); DPE (2021)

0 1 2 km

GDA2020 MGA Zone 55

N

AHIMS and historic heritage listed sites

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Figure 6.3

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Based on the predictive model, the following areas were identified from desktop level as having potential archaeological sensitivity:

- within 30 m of ephemeral waterways;
- within 200 m of permanent waterways;
- level areas associated with ridge lines and hill crests; and
- areas of stone outcropping.

Over two days in January 2019, archaeologists from EMM completed a visual inspection of the project area. The objective of the visual inspection was to complete targeted inspection of archaeologically sensitive areas identified by the predictive model and complete broader inspection of the project area.

Visual inspection of the project area confirmed that a significant level of anthropogenic disturbance is present across the project area including land clearance, damming of watercourses, cultivation, and livestock grazing. The visual inspection confirmed the assumptions of the predictive model, with two Aboriginal sites located within the project area in proximity to waterways and/or in association with crest landforms. Areas of PAD have been identified where topographical features can be clearly delineated and are anticipated to contain sub-surface archaeological deposits. Within the project area, these PADs have been defined by benched crests clearly discernible from surrounding undulating hills. Any proposed impacts within areas delineated as PAD would need to be preceded by test excavation to confirm the presence of sub-surface deposit, its nature and extent, and its assessed significance for the purposes of future management.

In addition to the two Aboriginal sites described above, there is as an area of archaeological sensitivity which has been defined as any lands within 30 m of the ephemeral waterway which traverses the eastern portion of the project area in a north-south alignment (see Figure 6.4). Table 6.4 provides a summary of the Aboriginal sites recorded as a result of the visual inspection. Figure 6.4 shows the location of the Aboriginal heritage features identified through the visual inspection.

Table 6.4 Aboriginal sites recorded as a result of the visual inspection

Site Name	Description
Bellambi Heights PAD 1	Potential archaeological deposit delineated as the hill crest central to the Bellambi Heights property approximately 150 m by 125 m.
Bellambi Heights ST 1 with PAD	Possible culturally scarred grey box with potential archaeological deposit approximately 200 m by 200 m. Dimensions of the scar: length 68 cm, width 29cm, regrowth 35 cm, height above ground to base of scar 118 cm.

KEY

- Project area
- Aboriginal site
- Contour (10 m)
- Major road
- Cadastral boundary
- Waterbody
- Potential archaeological deposit
- Areas of archaeological sensitivity

Strahler stream order

- 1st order
- 2nd order
- 3rd order
- 7th order

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Source: EMM (2022); DFSI (2017); GA (2011); DPI (2015)

0 200 400 m

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N

Aboriginal heritage items and areas of sensitivity

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Figure 6.4

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Photograph 6.1 **Bellambi Heights PAD 1**

Photograph 6.2 **Bellambi Heights ST 1 with PAD**

6.3.2 Avoidance and minimisation of impacts

Areas of archaeological sensitivity have been identified as a broader characterisation of the landscape on the basis of known archaeological values, predictive modelling, and visual inspection. Areas of archaeological sensitivity acknowledge that archaeological material has a higher likelihood of occurring within these areas in contrast to the surrounding landscape. Any proposed impacts within areas of archaeological sensitivity would need to be subject to further assessment (ie survey) to establish if archaeological values are present which may include isolated artefacts, artefact scatters and/or PAD. Areas of archaeological sensitivity will be considered through the detailed design of the project and impacts will be avoided and minimised where practical.

6.3.3 Assessment approach

The presence of Aboriginal heritage values and their assessed significance will be considered through the EIS and detailed design. Any proposed impacts to identified Aboriginal objects, areas identified as PAD or archaeologically

sensitive areas would need to be the subject of additional assessment, which may include test excavation during the EIS phase of the project and possibly salvage excavation as a management strategy subsequent to project approach.

The proposed approach to assessment of Aboriginal heritage impacts would involve the following steps:

- An Aboriginal Cultural Heritage Assessment (ACHA) report would be prepared in accordance with *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011);
- The ACHA would be supported by an archaeological investigation that complies with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b); and
- Members of the local Aboriginal community who register for the project as part of the ACHA process must be consulted. Consultation would be undertaken in accordance with *Aboriginal Consultation Requirements for Proponents 2010* (DECCW 2010c).

6.4 Traffic

6.4.1 Existing environment

The project transport route is expected to primarily comprise vehicle movements originating north of the project area and travelling south along the Castlereagh Highway before making a left turn onto Puggoon Road. The Castlereagh Highway is an approved B-double transport route.

Primary access to the project area will be via Puggoon Road, along the eastern boundary of the project area as shown in Figure 2.3. Secondary access will also be via Puggoon Road at a point on the north-west boundary of the project area. Puggoon Road is a local unsealed road with minimal through traffic used primarily to access agricultural landholdings and scattered rural residences. In the vicinity of the project area, only the Castlereagh Highway and Puggoon Road are expected to require access by project-related traffic.

Site access will be investigated further through detailed design and any road upgrade requirements will be identified and outlined in the EIS.

6.4.2 Assessment approach

A traffic impact assessment will be carried out to investigate potential impacts associated with the project. The traffic impact assessment will include the following key elements:

- projections of traffic volumes (both light and heavy vehicles) and transport routes during construction and operation;
- assessment of the potential traffic impacts of the project on road network function, including intersection performance, site access arrangements, and road safety, including school bus routes and cyclist safety;
- assessment of the capacity and condition of the existing road network to accommodate the type and volume of traffic generated by the project (including over size vehicles, cover mass vehicles and escorted deliveries) during construction and operation, with any potential cumulative impacts from other projects in the area being taken into account; and
- provide details of measures to manage potential impacts, including a schedule of required road upgrades, road maintenance contributions, and other traffic control measures, developed in consultation with the relevant road authority.

6.5 Historic heritage

6.5.1 Existing environment

A search of the available historical heritage inventories was carried out including:

- Mid-Western Regional LEP;
- Australian Heritage Database; and
- NSW State Heritage Register.

There are no National, State, or Local listed heritage items identified within the project area. The closest heritage item to the project area is The Lagoon Homestead adjacent to Wialdra Creek under the Mid-Western Regional Local Environmental Plan (LEP), approximately 2.4 km south-east of the project area. The nearest heritage item from the NSW State Heritage Register is the Gulgong railway bridge over Wialdra Creek which is approximately 4 km east of the project area. The project will have no direct impacts to listed heritage items. However, the potential for indirect impacts to listed heritage items will be assessed in the EIS. There is potential for previously unreported heritage items to be located within the project area associated with historical agricultural land use.

6.5.2 Assessment approach

A Historical Heritage Impact Assessment will be carried out to assess potential impacts on historical heritage associated with the project. The assessment will involve the following key tasks:

- a review of the NSW State Heritage Inventory, the relevant LEPs and the Australian Heritage Database to determine if there is any additional information on place of heritage significance in or near to the project;
- a site survey will be carried out to assess the potential impact of the project upon any previously unidentified heritage values and assessing the significance of any potential historical heritage items identified; and
- mapping of identified registered historical heritage items and additional historical heritage items (if found during site assessment) identified from these reviews.

6.6 Social and economic

A comprehensive Social Impact Assessment Scoping study has been prepared to support this Scoping Report. This report documents the process and outcomes of the scoping phase of the social impact assessment and been prepared in consideration of the DPE Social Impact Assessment Guideline (2021) (refer to Appendix B). The below summarises the key outcomes of findings of the scoping study.

6.6.1 Existing environment

The project sits in the Central Tablelands in the Mid-Western Regional LGA, about 6.5 km south-east of Gulgong. The Mid-Western Regional LGA includes the larger township of Mudgee, and smaller townships and villages of Gulgong, Rylestone, Kandos, Bylong and Ulan

The Mid-Western Region is home to 25,367 people (Estimated Resident Population, Remplan, 2021), This represents an increase from the 2016 ERP of 821 persons. The annualised growth rate from 2016-2020 was 0.83%, compared to 1.38% for New South Wales.

Specifically, the project sits within the state suburb of Beryl, a small rural suburb of 132 people (ABS 2016). It is situated along the Castlereagh Highway between Gulgong and Dunedoo and land is primarily used for grazing or dry land cropping, with specialised beef cattle farming being a dominant industry of employment for the rural locality (15.8%).

The region is home to the Wiradjuri people - the largest Aboriginal group in central New South Wales, by area and population. The people of the Wiradjuri country are known as "people of three rivers" being the Macquarie River (Wambool), Lachlan River (Kalari) and the Murrumbidgee River (Murrumbidjeri) which border their lands. Aboriginal residents account for approximately 5.4% of the Mid-Western Regional LGA (ABS, 2016).

A brief overview of the characteristics of the community is provided below, with more context provided in Appendix B of this scoping report. Key characteristics include:

- rural community with an ageing population;
- notable economic growth in coal mining industry and steady reliance on rural based industries;
- strong social ties with higher-than-average volunteer rates;
- substantial difference in digital inclusion and access to mobile networks when compared to urban areas;
- strong connection to country, with Aboriginal persons accounting for a higher proportion of the Mid-Western Region's population when compared to NSW; and
- strained access to reliable nearby health services.

6.6.2 Assessment approach

The scoping phase has identified both positive and negative social impacts occurring during the project planning, construction and operational phases of the project – both project specific and cumulative. These likely social impacts have been categorised into key social impact themes that require further assessment as part of the EIS. These include social impacts relating to:

- access to and use of infrastructure and services;
- culture and heritage;
- economic contributions and sustainability;
- ecosystem services;
- environmental assessment and approvals (processes);
- health and wellbeing;
- land use change and conflict;
- social amenity; and
- visual amenity.

The EIS will include an assessment of social impacts in accordance with Social Impact Assessment Guideline (DPE, July 2021). As part of the EIS, future stages of SIA for this Project will analyse and predict the unmitigated and mitigated social impacts and develop strategies to avoid or mitigate negative impacts and enhance positive impacts.

The scoped issues will be further explored and validated during the EIS preparation phase using several research methodologies, including a participatory and impartial engagement approach to inform the SIA. This engagement will build upon the engagement carried out by the proponent as part of the development of the EIS.

Subsequent phases of the SIA program will include:

- a detailed update of the baseline social profile to ensure that any further baseline data relevant to the impacts identified is obtained;
- further validation of the area of social influence and identification of affected communities and vulnerable groups;
- participatory engagement methodologies to understand the perceptions of the identified stakeholders within the social locality and those indirectly affected by the project;
- a comprehensive assessment and evaluation of social impacts against existing baseline conditions; and
- the SIA will seek broader involvement across the stakeholder groupings identified, over the subsequent phases of the EIS.

6.7 Hazards and risk

Potential hazardous scenarios and risks associated with the project include bushfires, dangerous goods and hazardous substances, and exposure to electromagnetic fields. Accordingly, the EIS will include the following:

- an assessment of potential hazards and risks, including but not limited to bushfires and electromagnetic fields from proposed electrical infrastructure . The project will be assessed against the International Commission on Non-Ionizing Radiation Protection *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields*; and
- a Preliminary Hazard Analysis prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (Department of Planning 2011a) and *Multi-Level Risk Assessment* (Department of Planning 2011b).

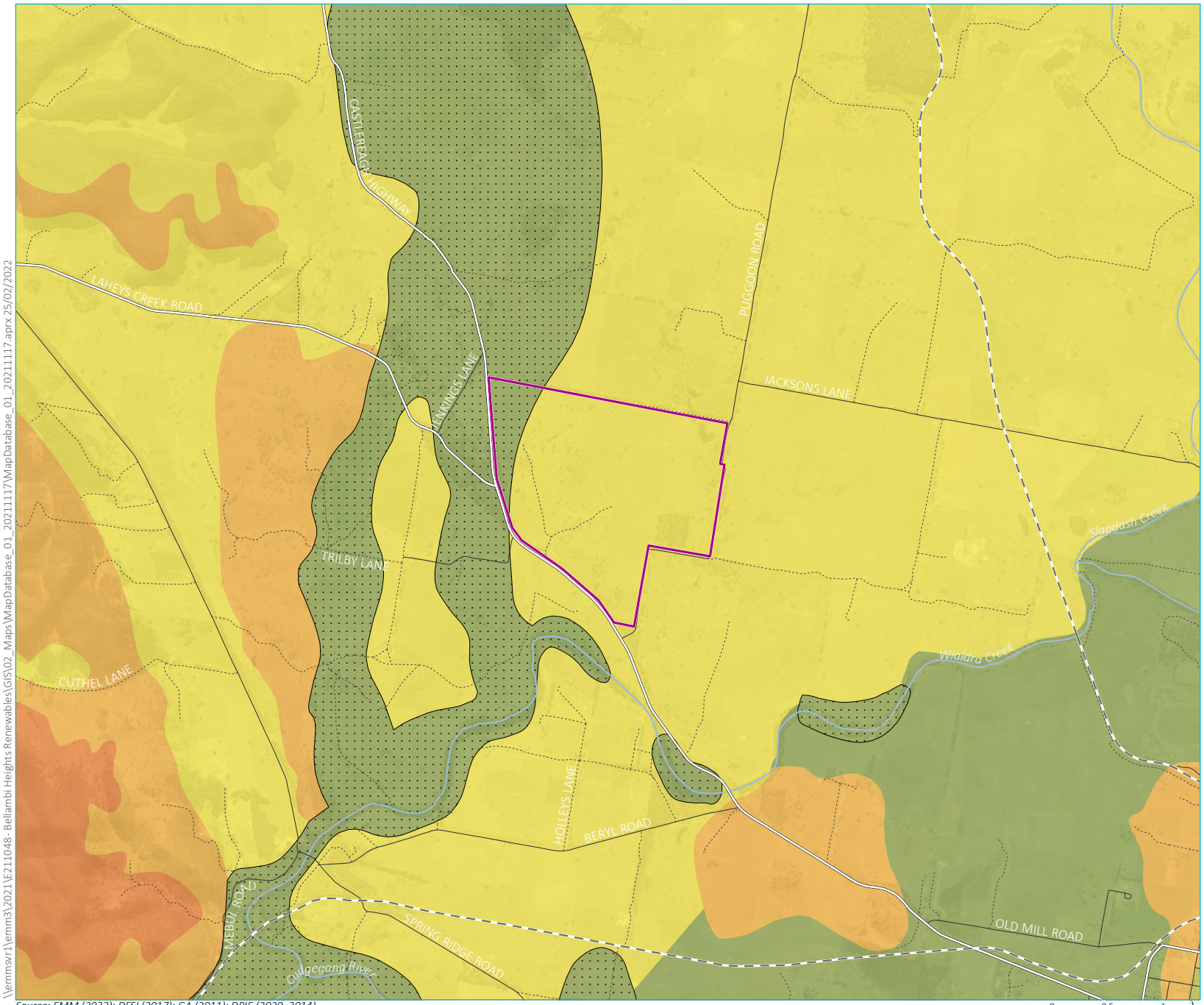
There is no evidence that exposure to electromagnetic fields generated by powerlines, substations, and other electrical sources can cause adverse health effects (ARPANSA 2018). Generally, distances beyond 50 m from a high voltage powerline are not expected to have higher than typical magnetic fields and for substations, magnetic field levels at distances of 5-10 m away are no higher than background levels in a typical home. Electromagnetic fields that are anticipated to be generated by the project are not expected to exceed guidelines for public exposure and will not cause adverse impacts for human health. The electromagnetic field levels of the project including solar farm, BESS, facility substation, and grid connection will be assessed as part of the EIS but are not anticipated to increase electromagnetic field levels above existing background environmental levels.

6.8 Land

6.8.1 Existing environment

Soils across the project area are predominantly mapped as sodosols, with a small portion of the north-west of the project area classified as ferrosols under the Australian Soil Classification system. Sodosols have a strong texture contrast between surface horizons and subsoil horizons. Generally, sodosols have low agricultural potential, high erodibility, poor structure, and low permeability (Grey and Murphy 2002). Ferrosols do not have a strong texture contrast. Mostly, they are well structured and found in well-drained sites. Generally, ferrosols have high agricultural potential because of their good structure and moderate to high chemical fertility and water-holding capacity.

The project area has previously been used for grazing and dryland cropping. The project area is predominantly mapped as land soil capability Class 5, with a small section of Class 3 on the north-west corner of the project area. Mapping of land soil capability under the land and soil capability assessment scheme is shown in Figure 6.5. Class 5 is characterised as moderate to low capability land. Class 5 land has high limitations for high-impact land uses. The limitations will largely restrict land use to grazing, some horticulture, forestry, and nature conservation (OEH 2012). The portion of the project area mapped as Class 3 land and soil capability is considered to have moderate limitations only. This section of the project area is mapped as Biophysical Strategic Agricultural Land (BSAL) and makes up approximately 23 ha of the project area. The land and soil resources of the project area will be carefully managed to prevent long-term degradation.



KEY

- Project area
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse
- Biophysical strategic agricultural land

Land soil capability class

- 3
- 4
- 5
- 6
- 7

Source: EMM (2022); DFSI (2017); GA (2011); DPIE (2020, 2014)

0 0.5 1 km

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Land and soil capability

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Figure 6.5

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6.8.2 Assessment approach

The project will be designed to minimise impacts on agricultural land, where practical. As part of the EIS, a land use conflict risk assessment (LUCRA) will be undertaken in accordance with DPI's (2011) Land Use Conflict Risk Assessment Guideline and in consultation with neighbouring landholders. The LUCRA will assess the project's potential impacts on neighbouring agricultural operations. Should they be required, land management practices will be implemented to avoid or minimise potential impacts on neighbouring agricultural operations.

Consideration of impacts to soils and the potential for erosion and sedimentation issues will be included in the EIS. More detailed assessment of soils will be required once the final position of project components has been determined. The soil assessment will focus on soil disturbance during construction, including erosion from construction work and rehabilitation where required.

6.9 Water

6.9.1 Existing environment

The project is within the Macquarie-Bogan River Catchment. The catchment covers an area of more than 74,000 km^2 within the Murray-Darling Basin. The project area contains five ephemeral watercourses as shown in Figure 6.6. Of the watercourses within the project area, four are first order streams whilst one third order stream crosses the eastern section of the project area. The nearest perennial watercourse is Wialdra Creek, a seventh order watercourse approximately 500 m south of the project area (Figure 6.6). A review of LEP flood planning maps did not identify any flood planning areas in or in the vicinity of the project area. There are also multiple farm dams within the project area.

A section of the project area is identified as 'groundwater vulnerable' on the Mid-Western Region LEP Groundwater vulnerability map. Clause 6.4 of the Mid-Western LEP requires the consent authority to consider the likelihood of groundwater contamination from a development and potential impacts on groundwater dependent ecosystems prior to determining a development application.

6.9.2 Assessment approach

The ephemeral watercourses within the project area will be considered further through the project detailed design. Specific design considerations and mitigation measures may be carried out to minimise potential impacts. In addition, roads and services that require watercourse crossings will be designed and constructed in accordance with relevant regulations and best practice design and construction methods.

Potential impacts to water resources from the project are expected to include demand for water during the construction of the project, as well as for land management during operations. The project is not likely to impact groundwater during construction, operation, or decommissioning due to the limited amount of subsurface disturbance activities required during the installation and decommissioning of project infrastructure. Water used by the project during construction and operation is expected to be sourced off-site and delivered by truck. If surface water or groundwater extraction is required to meet the project's demand for water, an assessment of impacts for these water sources will be included in the EIS. Impacts of the traffic associated with water trucks will be assessed in the EIS in accordance with Section 6.4.

Source: EMM (2022); DFSI (2017); GA (2011)

Watercourses

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Figure 6.6

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The surface water assessment will include a review of the existing surface water environment, an assessment of the surface water impacts and a description of any proposed mitigation and management measures. Key surface water issues to be explored will include:

- flood risk assessment to identify flood extents and potential flooding characteristics;
- water management during construction and operation; and
- impacts to receiving waters.

6.10 Noise and vibration

6.10.1 Existing environment

Land use in the project area and surrounds is predominantly agricultural. Given the project's rural setting, background noise at nearby sensitive receptors is likely to be low and characterised by agricultural equipment and machinery associated with agricultural production activities and vehicle movements along the local and regional road network.

6.10.2 Assessment approach

The construction of the project and its access roads have potential to create noise and vibration impacts for surrounding landholders adjacent to the project area. Noise generated by the project will include construction noise and noise generated by increased traffic along the local road network.

During the operational phase of the project, noise generated is anticipated to be minimal, consisting of noise associated with vehicle movements within the project area and electrical infrastructure such as the inverter stations, the BESS, facility substation and grid connection. It is unlikely that the operation of the project will produce any vibration impacts.

Noise and vibration will be assessed in the EIS in accordance with the:

- NSW Interim Construction Noise Guideline (DECC 2009);
- NSW Noise Policy for Industry (EPA 2017);
- NSW Road Noise Policy (DECCW 2011); and
- Assessing Vibration: A Technical Guideline (DECC 2006).

A road traffic noise assessment will also be included in the EIS to assess noise impacts associated with project related vehicle movements along the local road network during the construction phase of the project.

6.11 Air quality

6.11.1 Existing environment

Land use within the project area and surrounds is primarily agricultural, which is likely to influence local and regional air quality. Existing sources of air pollution within a local setting are limited and consist primarily of dust and vehicle and machinery exhaust emissions associated with agricultural production and freight transport along the

Castlereagh Highway. There are a number of mining operations near Ulan, which is approximately 25 km east of the project area.

6.11.2 Assessment approach

The project is not anticipated to generate significant air quality impacts during construction or operations. Project related traffic on unsealed roads within the project area may contribute to localised dust generation primarily during the construction phase. Mitigation measures will be implemented to address these impacts. These measures will be discussed with Council and surrounding landholders as part of ongoing stakeholder engagement.

The implementation of mitigation measures will ensure that the project will not generate significant air quality impacts during construction, operation, or decommissioning. A detailed air quality assessment is not considered to be required as part of the EIS as potential impacts will be temporary in nature and will not extend beyond the construction or decommissioning phase of the project.

6.12 Cumulative impacts

The project will contribute to the overall development of the CWO REZ. Other proposed, approved, under construction and operational renewable energy developments within and in the vicinity of the CWO REZ are identified in Figure 2.1. As shown in this figure, there are multiple renewable energy generation projects (proposed and approved) in the vicinity of the project area with the proposed Tallawang Solar Farm adjoining the project's northern boundary, and the operational Beryl Solar Farm approximately 2.5 km to the south.

The project may generate cumulative impacts in conjunction with surrounding projects during both construction and operation. These impacts may include cumulative traffic, construction noise, visual, social (including workforce and accommodation capacity), and biodiversity impacts. However, there may also be a cumulative benefit to local communities from the project and other developments in the region through the generation of jobs during construction and ongoing operation, particularly under the CWO REZ, and contribution to local economies associated with the purchase of local goods and services.

The EIS will carry out a cumulative assessment in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPIE 2021c).

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NSW Government 2021b, *Draft Large-Scale Solar Energy Guideline*

NSW DECCW 2010a, *Aboriginal Cultural Heritage Consultation Requirements for Proponents*

NSW DECCW 2010b, *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*

OEH 2011, *Guide to investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*

OEH 2012, *The land and soil capability assessment scheme*. Second approximation.

Appendix A

Scoping summary table

A.1 Scoping summary table

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
Detailed	Amenity – Visual	Yes	Specific	• *Guidelines for Landscape and Visual Impact Assessment* (United Kingdom Landscape Institute of Environmental Management and Assessment 2013); • *Wind Energy: Visual Assessment Bulletin AB 01 For State Significant Wind Energy Development* (DPE 2016); and • *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects 2018).	Section 6.1
	Biodiversity	Yes	General	• Biodiversity Assessment Method (DPIE 2020) • Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013); • Commonwealth EPBC 1.2 Significant Impact Guidelines – Actions on, or Impacting upon Commonwealth Land and Actions by Commonwealth Agencies (Commonwealth of Australia, 2013); • Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various);	Section 6.2
	Heritage – Aboriginal	Yes	Specific	• Guide to investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011); • Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010); • Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010);	Section 6.3
	Traffic	Yes	Specific	• Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013)	Section 6.4
Standard	Hazards and risks	No	Specific	• Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011a); • Multi-Level Risk Assessment (DoP, 2011b); • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DoP 2011);	Section 6.7

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
	Heritage – Historical	Yes	General	• Historical Archaeology Code of Practice (Heritage Council 2006)	Section 6.4
	Social and economic	Yes	Specific	• Social Impact Assessment Guideline for State Significant Projects 2021 (DPIE 2021)	Section 6.6
	Land	No	General	• Land Use Conflict Risk Assessment Guideline (DPI 2011) • Managing Land Contamination: Planning Guidelines *State Environmental Planning Policy No 55 Remediation of land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)	Section 6.8
	Water	No	General	• Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) • Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008); • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000); • Guidelines for instream works on waterfront land (NOW 2012) • Guidelines for riparian corridors on waterfront land (NOW 2012) • Guidelines for watercourse crossings on waterfront land (NOW 2012)	Section 6.9
	Amenity – Noise and vibration	Yes	General	• NSW Interim Construction Noise Guideline (DECC 2009); • NSW Noise Policy for Industry (EPA 2017); • NSW Road Noise Policy (DECCW 2011); and • Assessing Vibration: A Technical Guideline (DECC 2006).	Section 6.10
	Air quality	No	General	• N/A	Section 6.11

Appendix B

Social Impact Scoping Report

Social Impact Scoping Report

Bellambi Heights Renewable Project, NSW

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Table of Contents

1. Introduction

1.1 Background

Vena Energy Australia (VEA) proposes to develop the Bellambi Heights Renewable Project (the project), a large scale solar photovoltaic (PV) generation facility along with battery storage and associated infrastructure. The proposed solar farm will have a generation capacity of approximately 200 megawatts (MW), which will generate the equivalent of approximately 400 gigawatt hours (GWh) of energy annually. The proposed battery energy storage system (BESS) will have a capacity of 200 MW and up to two hours of storage.

The project is within the Mid-Western Regional Council local government area and the Central West Orana (CWO) Renewable Energy Zone (REZ). The project is in the locality of Beryl across two parcels of land at 696 Castlereagh Highway and 79 Puggoon Road, Beryl, on Lot 101 and 102 of DP 1203462, approximately 6.5 km north-west of the township of Gulgong, in the Central West of NSW.

The project will aid in the delivery of cheaper, more reliable, and cleaner electricity and assist NSW in meeting the Energy Security Target established by the NSW Electricity Strategy (2019) and enacted in the *Electricity Infrastructure Investment Act 2020* (EII Act).

The project is State Significant Development (SSD) pursuant to Schedule 1 of the State Environmental Planning Policy (Planning Systems) 2021. Accordingly, approval for the project is required under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act).

This Social Impact Scoping Report has been prepared by AAP Consulting Pty Ltd on behalf of VEA, the proponent of the project. It documents the process and outcomes of the scoping phase of the social impact assessment and been prepared in consideration of the DPE Social Impact Assessment Guideline (2021) (2021 Guideline).

It forms part of the project's Request for Secretary's Environmental Assessment Requirements (SEARs) lodged with the NSW Department of Planning and Environment (DPE) by VEA as part of the project's State Significant Development (SSD) application under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 Project overview

The project comprises of:

- Development of a large scale solar farm with a generation capacity of up to 200 MW
- Development of a utility scale battery energy storage system (BESS) with a capacity of up to 200MW
- A switchyard connecting the solar farm and BESS to an existing 300 kV transmission line, which will be operated by TransGrid.

The project will be connected to the National Electricity Market (NEM) via the proposed switchyard to be developed as part of the project. The switchyard will be built and operated by TransGrid and is adjacent to the existing Wellington-to-Wollar 330 kV transmission line. TransGrid has advised that there is a lot of generation connected, or proposed to be connected, to the 330kV line that bisects

the BHRP site. While there is currently no restriction on any additional generator connecting to the line, the more generation is connected the more often all the generators will be constrained as the line only has a certain capacity. No additional transmission lines are expected to be required.

Construction of each of the solar and BESS components is expected to be completed over a period of 12-18 months. The construction staging and timing will be dependent on market demand with the solar farm and BESS having potential to be developed either concurrently or sequentially. Accordingly, the construction phase of the project could take between 12-36 months from site establishment to commissioning. It is likely that construction of the switchyard will be completed concurrent with the construction of either the solar farm or BESS.

The peak construction workforce could be up to 400 workers, if the solar farm and BESS are built concurrently, whilst the operations of the project will support 5 to 8 full time workers (or equivalent) over the lifetime of the project.

The transport route for the project workforce and materials is expected to primarily comprise vehicle movements originating north of the project area and travelling south along Castlereagh Highway before making a left turn onto Puggoon Road. Primary access to the project area will be via Puggoon Road, along the eastern boundary of the project area.

1.3 The applicant

The applicant for the project is VEA, part of Vena Energy, a leading renewable energy company in the Asia-Pacific region, that owns, develops, constructs, operates, manages and commercialises a renewable energy portfolio totalling 16 GW. Vena Energy is committed to engaging with local communities throughout the lifecycle of its portfolio projects, as well as incorporating recognised Environment, Social and Governance (ESG) standards into its strategy and business practices.

VEA was established in January 2016 by leading experts in the development, construction, and operation fields of renewable energy across the Australian market. The company is actively developing a diversified pipeline in Australia of over 2.5 GW of renewable energy assets, with development approvals successfully secured or in various stages of development for solar projects totalling 1,250 megawatts (MW), across the key NEM regions of New South Wales (NSW), Queensland, and South Australia.

1.4 Structure of this report

The structure of this report is influenced by the 2021 Guideline requirements and is outlined below.

Table 1.1 Structure of this report

Chapter	Description
Chapter 1	Introduces the project and structure of this report
Chapter 2	Describes the social locality
Chapter 3	Establishes the social baseline
Chapter 4	Initial evaluation of the likely social impacts for different groups in the social locality
Chapter 5	Provides a framework for approach to SIA in the assessment phase

2 Social locality

2.1 Preliminary identification of social locality

This report considers social impacts in the 'social locality'. There is no prescribed meaning or fixed, predefined geographic boundary to a project's social locality; rather, the social locality should be construed depending on the project's nature and its impacts.

Defining the social locality begins with understanding the nature of the project, the characteristics of affected communities and how positive and negative impacts may be reasonably perceived or experienced by different people. Social impacts in and beyond the project's site boundary, both positive and negative, may also be considered during approval processes in terms of public interest and the suitability of the site for the project.

The following factors have been considered in determining the social locality for the project:

- The nature and scale of the project and its associated activities
- The characteristics of surrounding communities and how positive and negative impacts may be reasonably perceived or experienced by different people, including those that may be vulnerable or marginalised
- The potentially affected built or natural features located near the project that have social value or importance
- Cumulative impacts that may impact affected communities because of other projects or operations near the project site
- Any relevant social, cultural, demographic trends or social change processes occurring now or in the past near the project site
- The history of the proposed project site and the area, and any similar experiences people near the project have had
- The broader (indirect) area of social influence of communities that will be impacted by future incoming workforces, business opportunities, construction access and supply chain routes.

The following features of the project's social context have been considered in understanding the project's social locality:

- Residents and occupants of associated dwellings and properties to be used for the project
- Residents and occupants of adjacent dwellings and properties of the project
- Townships where property owners and residents of associated dwellings frequent for routine personal or economic activities, community activities and to access infrastructure and services
- Residents, service providers and business owners of townships as per point above
- Transportation routes along the Castlereagh Highway, including the access to the site via local roads (Puggoon Road)
- Locations of council administrations and government services

- Places and areas of social or cultural importance to residents, including Aboriginal communities
- Places of residence of future construction and operational workforce and their primary dependents.

This geographical representation that outlines the scoped social locality of the project includes:

- The ABS state suburb of Beryl (the geographic location of the project) and surrounding suburbs of Tallawang, Mebul, Gulgong and Stubbo
- The Mid-Western Regional LGA (the regional area in which the project sits).

The social locality will be further refined as required during the assessment phase.

2.2 Stakeholder identification

Social impact assessment involves the participation and collaboration of people who have an interest in, or those that are affected by, a project. As Burdge (2004) outlines, stakeholders may be affected groups or individuals that:

- Live, work, or recreate near the project
- Have an interest in the proposed action or change
- Use or value a resource associated with the project
- Are affected by the project e.g., may be required to relocate because of the project.

A stakeholder identification process was undertaken during the scoping phase for the project to support the planning and delivery of community and stakeholder consultation to inform the broader EIS, including the SIA. This process involved identifying stakeholders with an interest in the project, or those directly and indirectly affected. This included identifying any potentially vulnerable or marginalised groups within the community.

Key stakeholder groups identified during the scoping phase are outlined in Figure 2.1.

2.3 Stakeholder engagement

VEA has been engaging with the community since early 2019 including meetings and discussions with local landholders as part of early investigations to assess the potential for a solar farm in the area.

In 2019, a preliminary concept for the project was presented to the local community and stakeholders as the 'Gulgong Solar Farm'. The concept consisted of three stages, across non-contiguous properties with up to 500 MW of solar and 600 MW of BESS with six hours of storage capacity.

After hearing the early community feedback on this concept, VEA undertook additional investigations and revised the design. Specifically, VEA revised the design to reduce the development footprint and generation capacity, incorporate visual impact mitigation and reduce the project's Castlereagh Highway frontage. The name of the project was also changed to Bellambi Heights Renewable Project. Section 4.3 provides an overview of project refinements that have occurred during the planning and scoping phase of the project.

VEA commenced reengagement activities with the community in early 2022 with a focus on neighbouring landowners. This reengagement utilised a range of tools including face to face meetings,

phone calls and discussions, project briefings and an online survey. An overview of engagement activities and outcomes is provided in in Chapter 5 of the EIS Scoping Report (EMM, 2022). The outcomes of engagement have been used to further inform the scoping of likely social impacts with key issues of concern primarily relating to:

- Cumulative impact
- Visual impact
- Land values
- Impact on tourism
- Fire risk and health impacts
- Insurance
- Grid connection, project viability and site suitability
- Enforcement of conditions of approval

The stakeholder engagement action plan specific to the SIA for the EIS phase is further discussed in Chapter 5. This action plan outlines a participatory approach to SIA and identifies how the SIA will seek broader involvement across the stakeholder groupings over the subsequent phases of the EIS.

Figure 2.1 Key stakeholder groups

3 Social baseline

This chapter presents the social baseline for the project and describes the social context without the project. It documents the existing social environment, conditions and trends relevant to the project and defines characteristics of the communities within the project's social locality, including any vulnerable groups.

It considers any built or natural features on or near the project that could be affected and the intangible values that people may associate with these features. Examples may include a sense of place or belonging and the relevant social, cultural, demographic trends or social change processes occurring now or in the past near the project and in the broader region.

Relevant to this discussion are changing employment patterns, shifting land uses or population and demographic changes, and how people have felt or experienced these changes.

The social baseline provides a point of comparison – it can be used as reference against which to measure the impacts of the project as it develops, and/or to determine the adequacy or otherwise of existing facilities (Vanclay, 2015).

For this assessment, a summary of the social baseline is provided in the body of this report to provide an overview of the existing environment. Additional supplementary data that supports the assessment such as the community profile dataset is included in Appendix 1. **Development context**

3.1.1 Renewable energy in NSW

Australia's vast natural landscape means that it has one of the best solar and wind resources on the planet, setting viable foundations for a strong renewable sector, particularly in rural environments.

In 2021, the Clean Energy Council announced that Australia's renewable energy industry passed a significant milestone in 2020, with more than a quarter of the country's total electricity generation coming from renewable sources for the first time. Renewables were responsible for 27.7% of total generation in 2020, an increase of 3.7 percentage points compared to 2019 (Clean Energy Council, 2021). This is despite the challenges of the COVID-19 pandemic.

In 2020 New South Wales became a leader on renewable energy policy after releasing Australia's most ambitious renewable energy plan – The Electricity Infrastructure Roadmap.

This Roadmap will deliver 12 GW of new transmission capacity in NSW through the Central West Orana, New England and Southwest Renewable Energy Zones, attracting up to $32 billion in private investment and supporting 3 GW of long-duration storage and firming projects, including pumped hydro, by 2030.

According to the Clean Energy Council, the roadmap will also create 6300 construction, and 2800 ongoing jobs in regional Australia, reduce electricity prices in the state by $130 per year for households and $430 for small businesses, and reduce NSW's carbon emissions by an estimated 90 million tonnes. (Clean Energy Council, 2021).

The first pilot zone is the Central West Orana. Once complete, it is expected that this REZ would power approximately 1.4 million homes (Energy NSW, 2021). The Central West Orana REZ was formally declared on 5 November 2021 which represents the first step in formalising the REZ under the Electricity Infrastructure Investment Act 2020.

Broadly, the REZ would provide more reliable power to regions, reduce wholesale costs, contribute to emissions reduction and engaging communities by helping them to actively participate in the development of energy infrastructure in the region (Energy NSW, 2019).

The Bellambi Heights Renewable Project is located within the Central West Orana REZ.

3.1.2 Central West and Orana Regional Plan 2036

The NSW Department of Planning, Infrastructure and Environment (DPE) Central West and Orana Regional Plan 2036 is a 20-year blueprint for the future of the Central West and Orana region and the overarching strategic planning framework.

The existing Central West and Orana Regional Plan 2036 is undergoing its first 5-year review to reset its priorities and extend its reach to 2041. Public exhibition of the updated draft Central West and Orana Regional Plan 2041 is now complete.

The exhibition of the draft plan is a key part of the review process. The draft plan was exhibited from 22 November 2021 to 18 February 2022. DPE is now considering submissions and feedback received during the exhibition period and aims to release the final plan later in 2022.

The vision outlined in the existing plan is to create a leading diverse regional economy in NSW, with a vibrant network of centres leveraging the opportunities of being at the heart of NSW and outlines the delivery of vision through four goals:

- The most diverse regional economy in NSW
- A stronger, healthier environment and diverse heritage
- Quality freight, transport and infrastructure networks
- Dynamic, vibrant and healthy communities.

The draft draft Central West and Orana Regional Plan 2041 also highlights the region's role in supporting the State's transition to net zero carbon emissions by 2050 through a broad range of actions, including through enabling the establishment of the Central West Orana Renewable Energy Zone.

The elements of the existing Regional Plan that are addressed by the project are summarised in Table 3.1.

Table 3.1 Relationship of the project to Central West and Orana Regional Plan

Plan Reference	Regional Plan element	Relevance of the project to element
Direction 9	Increase renewable energy generation. The region has significant potential for renewable energy industries with vast open spaces and higher altitude tablelands with potential for	The project has the potential to directly contribute to the

Plan Reference	Regional Plan element	Relevance of the project to element
	wind power generation, large scale solar energy and bioenergy generation.	achievement of this direction.
Goal 2	A stronger, healthier environment and diverse heritage. The Central West and Orana's ecosystems and communities are subject to natural hazards that will be exacerbated by climate change. Innovative ways to manage water, harness renewable energy and prepare for natural hazards will build regional resilience and improve adaptation. Land use and infrastructure planning must respond to these risks.	The project has the potential to directly contribute to the achievement of this direction.

3.2 The social baseline

A brief overview of the characteristics of the community is provided below, with more context provided in the proceeding sections. Key characteristics include:

- Rural community with an ageing population
- Notable economic growth in coal mining industry and steady reliance on rural based industries
- Strong social ties with higher-than-average volunteer rates
- Substantial difference in digital inclusion and access to mobile networks when compared to urban areas
- Strong connection to country, with Aboriginal persons accounting for a higher proportion of the Mid-Western Region's population when compared to NSW
- Strained access to reliable nearby health services.

3.2.1 Regional context

The project sits in the Central Tablelands in the Mid-Western Regional LGA, about 6.5 km south-east of Gulgong. The Mid-Western Regional LGA includes the larger township of Mudgee, and smaller townships and villages of Gulgong, Rylestone, Kandos, Bylong and Ulan.

The Mid-Western Region is home to 25,367 people (Estimated Resident Population, Remplan, 2021), This represents an increase from the 2016 ERP of 821 persons. The annualised growth rate from 2016-2020 was 0.83%, compared to 1.38% for New South Wales.

The region is home to the Wiradjuri people - the largest Aboriginal group in central New South Wales, by area and population. The people of the Wiradjuri country are known as "people of three rivers" being the Macquarie River (Wambool), Lachlan River (Kalari) and the Murrumbidgee River (Murrumbidjeri) which border their lands. Aboriginal residents account for approximately 5.4% of the Mid-Western Regional LGA (ABS, 2016).

Analysis of the age groups of the LGA in 2016 compared to Regional NSW shows that there was a higher proportion of people under the age of 14 and over the age of 65, when compared to NSW. Overall, 20.4% of the population was aged between 0 and 14, and 19.7% were aged 65 years and

over, compared with 18.5% and 13.2% respectively for NSW. The 50-59 years cohort recorded the largest change in Mid-Western Regional between 2016 and 2011, showing a 18.1% increase from 2011 (Remplan, 2021).

Key land uses in the local and broader region include agriculture, consisting primarily of sheep and cattle grazing and dry land cropping, with areas of mining, viticulture and production forestry located within the broader region. Renewable energy development is a growing land use in the area, with multiple renewable energy projects located in the vicinity. This is reflective of the labour force, with dominant industries of employment including coal mining (18.1%), agriculture, forestry and fishing and construction (8.2%) (Remplan, 2022). Other dominant industries include retail trade (10.6%) and health care and social assistance (9.8%). Analysis of the employment status (as a percentage of the labour force) in the region compared to NSW shows that unemployment levels are relatively low. In the September 2021 quarter, unemployment in the Mid-Western Region LGA was 2.5%, compared to 4.6% in NSW (Australian Government, Labour Market Information Portal 2021).

In terms of employment opportunities, NSW Farmers is concerned about the impact of COVID-19 and other cumulative effects on the available labour force. They claim that the last two years had "emptied out the supply line" of workers who were already under stress in regional NSW because of the prolonged years of drought (Townsend, S, 2022). It is suggested that causes to this shortfall including COVID-19 and the breaking of the drought. Particularly when the casual workforce evacuated with seasonal workers with the border closures and competing with trade sector, mining and transport.

Notwithstanding the above, the region has a diverse economic base. Business and investment in the Region are driven by the major industry sectors of agriculture, tourism, real-estate, construction, manufacturing and mining. The region attracts more than 650,000 visitors each year to experience the local wine, food, sporting, and cultural events (Remplan, 2022). The mining industry sector makes the greatest contribution to economic output in the region, which at $2.9 B accounts for 52.69% of total output. This industry sector is also the largest employer with 1,831 jobs which represents 18.14% of total employment within the region.

There are substantial differences in digital inclusion between Australians living in rural and urban areas which is evident through connectivity to internet. In the LGA, 74.3% of households have access to the internet, compared to 82.5% of households across NSW. The take up of the NBN continues to close the gap in access for rural Australia, however connections to the internet have become evidently important during the past 18 months with the COVID-19 pandemic, particularly during the state-wide lockdowns, where households have had to rely on internet connectivity to access tele-health services and stay in touch not only with workplaces, but family and social groups.

Across the LGA volunteerism is higher than the state average which is reflective of other regional areas in NSW. 21.7% of the population take part in voluntary work through a community or organisation, compared to 18% in NSW. Mobility rates are also stable – with over half of the population having lived in the area for at least five years (ABS, 2016).

Regarding the provision of social infrastructure and services, there has been controversy in recent years relating to the under supply of health care in the region with some townships, such as Gulgong, relying on tele-health services for periods of time. The Mid-Western Regional LGA has a below average rate of transport (3.9 ASR per 100) and cost (2.1 ASR per 100) affecting access to healthcare in comparison to NSW (4.3 ASR per 100 and 2.5 ASR per 100 respectively). The transient workers for

mining and agribusiness and potential strains on community services is relevant when considering growth in other sectors such as renewable energy.

The Mid-Western Regional Council considers one of its distinct competitive advantages to be its central location to Sydney and Newcastle, and strong transport links (Mid-Western Council, 2022). Daily air and coach services access the region, and is a 45-minute flight or 3.5 hour drive north-west from Sydney. The Castlereagh Highway traverses the region and is a main route of travel for inland residents, connecting Lithgow in the south to south-east Queensland in the north. The Castlereagh Highway meets the Golden Highway at Dunedoo which is a key route of travel from Dubbo to Newcastle, giving the region access to the Hunter region and the major metropolitan centre of Newcastle, including the Port of Newcastle. Railway lines at Binnaway and Mendooran provide opportunities to expand the freight network and support the local industry. As a result of the proximity to major national highways, the Central-West and Orana Regional Plan 2036 outlines a vision to capitalise on the location to grow the freight industry which may result in opportunities for new intermodal facilities and support rail infrastructure (NSW Government, 2016). This theme is consistent with the draft Central-West and Orana Regional Plan 2041 and further supported by the draft Central West and Orana Regional Transport Plan which is on exhibition until 31 March 2022 (NSW Government, 2021).

In terms of vulnerability, this assessment has reviewed the Socio-Economic Indexes for Areas (SEIFA). This is a suite of indexes that have been created by the Australian Bureau of Statistics from social and economic Census information. Specifically, this assessment looks at the Index of Relative Socio-economic Disadvantage (IRSD), a general socio-economic index that summarises a range of information about the economic and social conditions of people and households within an area. The SEIFA score for Mid-Western Regional Council in 2016 was 960. Across Australia's local government areas SEIFA scores range from 188 (most disadvantaged) to 1186 (least disadvantaged). This score is reflective of several indicators, including the lower incomes when compared to the NSW average, lower level of educational attainment, age of population and health statistics, as socio-economic status is a significant determinant of physical and mental health (Wang & Geng 2019).

3.2.2 Local context

Beryl is a small rural suburb of 132 people (ABS 2016), predominately with family households (91%). It is situated along the Castlereagh Highway between Gulgong and Dunedoo and land is primarily used for grazing or dry land cropping, with specialised beef cattle farming being a dominant industry of employment for the rural locality (15.8%).

Reflective of the rural communities, volunteer rates are above the state average (22.5% compared to 18%) with the community supported by several community meeting hubs including within the nearby township of Gulgong.

In the surrounding areas there are several educational facilities that services the rural community including Gulgong Public School, Gulgong High School, Goolma Public School and Fromes Creek Public School. The Mudgee and Wellington TAFE colleges are 30 km and 52 km in distance respectively.

Beryl is close to the major centres of Mudgee (38 km by road to the South) and Dubbo (105 km by road to the north-west).

There are multiple renewable energy generation projects (proposed and approved) in the vicinity of Beryl with the proposed Tallawang Solar Farm adjoining the project's northern boundary, and the operational Beryl Solar Farm approximately 2.5 km to the south. Nearby comparative projects are further outlined in Table 3.2.

There are 45 residences within 3 km of the development site. Of these residences, 14 are within 1 km, 20 are between 1–2 km and 11 are between 2–3 km from the project area. Of the nearby residences, three are currently associated with the proposed Tallawang Solar Farm (SSD-23700028) which adjoins the northern boundary of the project area.

The project area and surrounds are subject to a mineral exploration licence (EL) 8160 held by Bowdens Silver Pty Ltd which covers a broader area in the local region. Other key features in the local surrounds include 'The Lagoon' homestead approximately 2 km south-east of the project.

3.3 Other renewable projects in or near the locality

In this SIA, cumulative impacts refer to the combined effect of impacts from several activities on a particular value or receiver. According to the 2021 Guideline, cumulative impacts can take three forms. They can be:

- Spatial impacts: occurring over the same area, such as trucks from multiple operations which may produce a cumulative noise impact along a common haulage route
- Temporal: vary over time, such as the construction of multiple large projects over the same timeframe which may produce a spike in temporary work in an area, creating a cumulative shortage of accommodation
- Linked impact: involve more complex interactions – one impact may trigger another.

To build an understanding of potential community perceptions of the project and to inform the assessment approach for the SIA, a select number of comparable projects in the region have been reviewed to identify how communities have responded to these proposed developments.

The project is in proximity to several other renewable energy major projects as outlined in Table 3.2 and shown in Figure 3.1. Specially, this review has incorporated the Beryl Solar Farm, Stubbo Solar Farm, Wellington Solar Farm, and the Tallawang Solar Farm. A review of scoping reports, response to submissions and media has been undertaken and highlighted that key community sentiments towards these projects included:

- Concerns around the cumulative visual impacts of renewable developments in the region
- Concerns over the cumulative impacts of multiple renewable projects on property values and conflicting land use
- Potential for economic stimulus to regional NSW, but wary of the opportunities for local people and concern that benefits are being overstated.

The outcome of this review has been used to help inform the scoping of likely social impacts (refer to Chapter 4).

Table 3.2 Renewable energy projects in the region

Project	Undergoing Approval Process	Approved	Under Construction / Operational	Rejected
Beryl Solar Farm			✓	
Tallawang Solar Farm	✓			
Stubbo Solar Farm		✓		
Avisford Mini Sustainable Energy Park				✓
Barneys Reef Wind Farm	✓			
Wollar Solar Farm		✓		
Uungula Wind Farm		✓		
Wellington North Solar Farm		✓		
Wellington Solar Farm			✓	
Spicers Creek Wind Farm	✓			
Bodangora Wind Farm			✓	
Cobbora Solar Farm	✓			

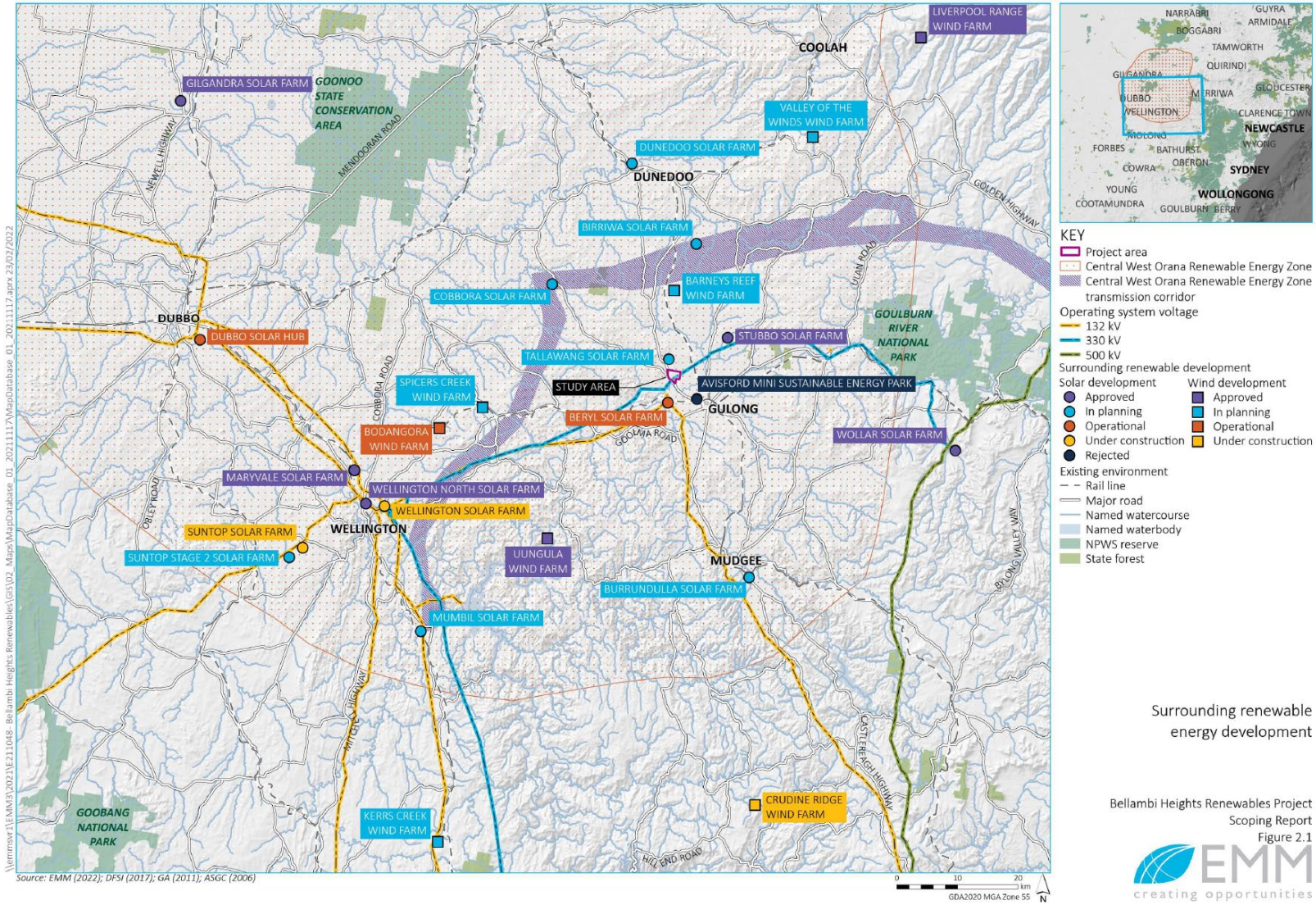

Figure 3.1 Major renewable energy projects in the locality (source: EMM, 2022)

3.4 Social baseline summary

This baseline presents some of the strengths and challenges facing communities in the locality and it has been used as a basis, where possible, to assess the social impacts of the project. From a review of the baseline, it is possible to identify several key issues and opportunities for the Mid-Western Regional LGA, as listed below:

- Protecting key community values including local communities; rural lifestyle; social/community and recreation facilities and events; traditional community and family values
- Developing more and diverse employment and training services/opportunities for local people
- Improved access to education, community services, and quality health services
- Conservation of heritage and environment.

Inherent within the SIA process is the need to identify and empower vulnerable groups. "Although vulnerability is context dependent and can include a very wide range of groups, typically the concept includes Indigenous peoples, ethnic minorities, migrants, disabled people, the homeless, the poor, those struggling with substance abuse, and isolated elderly people" (Vanclay, 2015).

From the social profile analysis undertaken for the project, it is possible to assess key areas of community resilience and risk in the LGA. The key findings are summarised in Table 3.3 and identifies several population groups as potentially having vulnerability to the social or economic changes that the project, and the cumulative effects of other developments across the region, may bring. These include:

- Low-income earners
- The elderly and youth
- Property owners within the social locality
- First Nations, Aboriginal and Torres Strait Islanders
- Those with a disability, or of ill-health, requiring medical attention

Table 3.3 Social baseline summary

Strengths	Vulnerabilities	Potential implications for vulnerable groups
Stable population mobility and higher than average volunteer rates, showing strong ties to community, leading to community strength and cohesion.	New production technologies and changing skill requirements. Technology gap between regional and metropolitan NSW – including access to internet.	Those with low education qualifications have reduced resilience to changes in employment due to unforeseen circumstances. Reduced access to support networks.
Growing renewable energy services to the area.	Temporary reduction in social amenity during construction. Impact on livelihoods and existing industry due to changes in land use.	Potential further restrictions to access to services for vulnerable groups due to influx of workers for major works.

Strengths	Vulnerabilities	Potential implications for vulnerable groups
	Reduced community cohesion due to differing perceptions on renewable energy and distributive equity.	
Diverse and growing economic base.	Decrease in usual local procurement and economic activity associated with large tourism events and accommodation due to COVID-19 and additional uncertainty surrounding a resurgence of these activities and events.	Employment and training opportunities, and opportunities to strengthen community resilience to natural disasters such as drought and floods.
Centrally located to Sydney and Newcastle, as well as other regional centres in NSW.	Public transport opportunities and linkages to centres for those without access to a private vehicle or are unable to drive.	Those without access to a vehicle or a license, particularly First Nations, Aboriginal and Torres Strait Islander and early school leavers have restricted access and limited provisions for assistance.
Diverse natural capital, including diversity of natural resources, heritage items, agricultural lands, and national parks and reserves.	Competing land uses in the region and managing community perceptions.	Ongoing potential for conflict between different and similar industries utilising the natural capital of the area.

4 Scoping of likely social impacts

4.1 Scoping methodology

State significant projects can impact people in many ways, both positively and negatively. The SIA process assesses a project from the perspective of people – meaning a development is more likely to be socially sustainable if the expected and perceived impacts on people are understood, managed and/or mitigated.

The scoping approach has been guided by the 2021 Guideline and included:

- Gaining an understanding of the project's social locality
- Considering the characteristic of the communities within the social locality (the social baseline)
- Identifying likely social impacts for different groups in the social locality.

The scoping tool contained in the 2021 Guideline was used to help inform this scoping process. The tool is used to demonstrate how scoping has informed the level of assessment to be undertaken.

The process of applying the scoping tool involved:

- Identifying project activities
- Using available technical assessments, review of submissions from comparative projects and review of social commentary as inputs to the scoping tool and considering each of the categories of social impact (see Table 4.1), before determining how likely it is that project activities will cause an impact to it
- Considering and assessing the material characteristics of any likely impact
- Considering stakeholder/community opinions and sentiment towards the project activities through desktop research and review of other comparative projects
- Determining whether a social impact may potentially arise from the project activities, and then developing a rationale for the decision
- Determining the level of assessment (and engagement) required in the EIS preparation phase.

Table 4.1 Social impact categories (2021 Guideline)

Categories	Definition
Way of life	How people live, how they get around, how they work, how they play, and how they interact each day.
Community	Community composition, cohesion, character, how the community functions, and people's sense of place.
Accessibility	How people access and use infrastructure, services and facilities, whether provided by a public, private or not-for-profit organisation.
Culture	Aboriginal and non-Aboriginal, including shared beliefs, customs, values and stories, and connections to Country, land, waterways, places and buildings.

Categories	Definition
Health and wellbeing	Physical and mental health especially for people vulnerable to social exclusion or substantial change, psychological stress resulting from financial or other pressures, access to open space and effects on public health.
Surroundings	Ecosystem services such as shade, pollution control, and erosion control, public safety and security, access to and use of the natural and built environment, and aesthetic value and amenity.
Livelihoods	People's capacity to sustain themselves through employment or business.
Decision-making systems	Including the extent to which people can have a say in decisions that affect their lives, and have access to complaint, remedy and grievance mechanisms.

4.2 Level of impact assessment

The definition of the level of impact assessment is outlined in the 2021 Guideline and is common to other EIS disciplines. The levels of assessment are as follows:

- Detailed: The project may result in significant social impacts, including cumulative impacts
- Standard: The project is unlikely to result in significant social impacts, including cumulative impacts
- Minor: The project may result in minor social impacts
- Not relevant: The project will have no social impact, or the social impacts of the project will be so small that they do not warrant consideration.

4.3 Scoped likely social impacts

The scoping phase determined a number of social impacts that required further investigation. These impacts have been linked to key impact themes. Table 4.2 summarises these themes and demonstrates the interrelationships that exist between the social impact themes and social impact categories. The key impact themes requiring further assessment include:

- Access to and use of infrastructure and services
- Economic contributions and sustainability
- Social amenity
- Land use change and conflict
- Visual amenity
- Culture and heritage
- Ecosystem services
- Health and wellbeing
- Social amenity
- Environmental assessment and approvals (processes)

Table 4.2 Scoped likely social impacts

Project activity	Social impact category	Impact to people	Impact type	Affected stakeholder group	Level of assessment
Access to and use of infrastructure and services					
Construction	Access	Influx of workers placing additional pressure on social services, transport, and infrastructure (i.e., health)	Negative	Wider community	Detailed
Construction	Access	Strain on local accommodation and housing (both affordability and availability) during construction and negative impact on tourism sector	Negative	Wider community, Tourism industry, Local business, services, and suppliers	Detailed
Culture and heritage					
Construction	Culture	Potential loss of Aboriginal cultural heritage, impacting on values relating to physical and symbolic linkages to landscape and ancestry	Negative	First Nations, Aboriginal and Torres Strait Islanders	Detailed
Economic contributions and sustainability					
Establishment of project site, construction, and operations	Livelihoods	Distributive equity and the desire of nearby landholders to receive 'fair' compensation for the impacts they experience by living near the project, including compensation of perceived flow on affects to personal insurances, compounded by expectations created by nearby projects	Negative	Nearby neighbours	Detailed
Public announcement of project, establishment of project site, construction, and operations	Livelihoods	Devaluation of adjacent and nearby properties	Negative	Nearby neighbours	Detailed
Construction	Livelihoods	New employment opportunities and income stimulus from direct and indirect jobs and supply chain opportunities	Positive	Wider community, Youth and unskilled workers, First Nations, Aboriginal and Torres Strait Islanders, Local business, services, and suppliers	Detailed

Project activity	Social impact category	Impact to people	Impact type	Affected stakeholder group	Level of assessment
Construction	Livelihoods	Opportunities for community investment	Positive	Wider community, Mid-Western Regional Council, Community groups	Detailed
Construction	Livelihoods	Difficulties sourcing qualified, skilled staff within the locality or taking away skilled workforces from existing industries	Negative	Wider community Local business, services, and suppliers	Detailed
Ecosystem services					
Construction	Surroundings	Perceived risk of environmental damage affected how people experience their surroundings	Negative	Wider community	Standard
Environmental assessment and approvals process (processes)					
Project planning and public announcement of project	Decision-making systems	Exacerbation of low levels of trust in state planning systems and speculation around viability of renewable energy. Potential for multiple concurrent and nearby projects causing reduced level of community cohesion	Negative	Nearby neighbours, Industry groups and committees, State and Federal Regulatory bodies	Detailed
Construction and operation	Decision-making systems	Continued inclusive engagement to support project and increased likelihood of legacy project	Positive	Wider community	Detailed
Construction and operation	Decision-making systems	Hope for a more secure, renewable energy market leading to greater intergenerational equity	Positive	Wider community, Industry groups and committees	Detailed
Cumulative impacts	Decision-making systems	Compounding effects on population relating to consultation fatigue and distrust in the sector due to experiences on a nearby project and enforcement of conditions of approval	Negative	Nearby neighbours, Wider community, Mid-Western Regional Council, State and Federal Regulatory bodies Industry groups and committees	Detailed
Health and wellbeing					
Construction and operation	Health and Wellbeing	Public safety risks because of infrastructure, and perceived increased risk of bushfires	Negative	Nearby neighbours, Workforce,	Detailed

Project activity	Social impact category	Impact to people	Impact type	Affected stakeholder group	Level of assessment
				Wider community, Emergency Services	
Construction and operation	Health and Wellbeing	Health impacts resulting from infrastructure including solar panels and transmission lines and anxiety related to the potential for permanent change to surroundings	Negative	Nearby neighbours	Minor
Construction	Health and Wellbeing	Public safety risks because of increased traffic and road conditions	Negative	Nearby neighbours, Road users, Construction workforce	Minor
Land use change and conflict					
Project planning and public announcement of project	Surroundings	Low levels of trust in the viability of the project relating to the site location and ability to connect to the existing grid	Negative	Nearby neighbours	Detailed
Establishment of facility	Livelihoods	Infrastructure causing disruption to existing agricultural or livestock operations	Negative	Nearby neighbours	Minor
Social amenity					
Construction	Surroundings	Changes to amenity resulting from construction, affecting how people live (i.e., because of construction dust and noise)	Negative	Nearby neighbours	Minor
Visual amenity					
Construction and operation	Surroundings	Changes to the visual landscape affecting how people experience their rural surroundings and lifestyles	Negative	Nearby neighbours, Wider community	Detailed
Construction and operation	Surroundings	Multiple renewable energy projects changing the regional visual character, including the rural outlook from Flirtation Hill in Gulgong	Negative	Wider community, Mid-Western Regional Council	Detailed

4.4 Project refinement and potential mitigation measures

The project has been in development since 2018 and through the early phase of project development, several refinements have been made by VEA.

In 2019, a preliminary concept for the project was presented to the local community and stakeholders as the 'Gulgong Solar Farm'. The concept consisted of three stages, across non-contiguous properties with up to 500 MW of solar and 600 MW of BESS with six hours of storage capacity. After hearing the early community feedback on this concept VEA revised the project design to mitigate impacts to the community by significantly reducing the development footprint. These refinements are listed in the table below.

A second round of engagement was carried out during early 2022, presenting the revised concept design to the nearby neighbours and key stakeholder groups. Additional refinements made during the scoping phase are also presented in Table 4.3.

Table 4.3 project refinement following consultation in 2019 and 2021/2022

Project aspect	Refinement
Project refinements following consultation in 2019	
Project Identity	• Revision of project name to Bellambi Heights Renewable Project
Development Footprint	• Scaling down from three stages to one • Reduction in development footprint from 820ha to 304ha • Over an 80% decrease in the number of sensitive receivers within 500m of the site
Generation Capacity	• Revised solar generation capacity from 500MW to 200MW, which can generate approximately 400 gigawatt-hours (GWh) of energy annually which is enough to power approximately 92,000 homes • Revised BESS from 600MW to 200MW. The BESS will have two hours of storage capacity, the equivalent of powering approximately 161,000 homes annually
Visual Mitigation	• Relocation of administrative and control facilities to a less prominent location on site • Provision of native vegetation screening which varies in width between 10-20m, established inside the site, beyond the existing vegetated road reserve
Transportation and Access	• Over 70% reduction in the project's highway frontage • Relocation of the main access point from Castlereagh Highway to Puggoon Road
Additional refinements made through the scoping phase since project engagement in 2021/2022	
Visual Amenity	• Excluding 5ha in the northwest corner of the site from the potential buildable footprint, mitigating views from the Highway • Removing an area of land located to the east and west of the Castlereagh Highway, about 1 km to the north of Jenkins Lane so that the proposal will only be viewed from the perimeter of the project area, rather than viewers on the Highway passing through the development footprint • Removing development from the foreground of views to the Spring Ridge and Yarrobil National Park (south of the Castlereagh Highway), retaining views to this important local visual feature • Consolidating the project area to one contiguous footprint rather than one that is spread over several separate paddocks so that it will be viewed from a smaller number of vantage points, can be more effectively screened by vegetation, and appear as a single visual element within a broader patchwork of paddocks • The outcome of the above three refinements resulting in the reduction of the number of potential visual receptors to the project, the number of viewers with a higher visual sensitivity (including rural residential properties), the number of potential receptors (both associated and non-associated dwellings) within 500 m of the project area, and the duration of views to the project from the Highway.

The project will be further refined through the EIS and detailed design process. Additional potential project refinements and mitigation measures that will be investigated during the next phase of assessment to help avoid or mitigate likely social impacts are summarised in Table 4.4.

Table 4.4 Investigation of further project refinement and management measures

Impact theme	Project refinement and potential mitigation measures
Access to and use of infrastructure and services	• As per EIS Scoping report, a Traffic Impact Assessment will be carried out and site access will be investigated further through detailed design and any road upgrade requirements will be identified and outlined in the EIS • Consulting with and notifying stakeholders, considering any vulnerable or sensitive road users • Provide open and transparent, access to the community regarding project information • Workplace strategies that encourage the integration of incoming populations with local communities and promote positive workforce behaviours • Early investment in partnerships that build local business development and capacity • Prioritising opportunities for Indigenous economic participation in the project • Coordinated efforts to collaborate with local business and tourism groups to both anticipate and minimise impacts on access to community services
Culture and heritage	• As per EIS Scoping report, any proposed impacts within areas of archaeological sensitivity would need to be subject to further assessment to establish if archaeological values are present which may include isolated artefacts, artefact scatters and/or Potential Archaeological Deposits (PAD). An Aboriginal Cultural Heritage Assessment will be carried out • An Aboriginal Participation Plan to be considered to highlight employment and training opportunities as part of the project • Consultation with key stakeholder groups to help identify the likelihood for the project to cause intangible harm though cultural or spiritual loss
Economic contributions and sustainability	• Aboriginal Participation Plan that maximises the training, talent-building and employment of the local and regional Traditional Owners and other Aboriginal organisations as part of the project • Local procurement strategy that maximises the employment and use of suppliers of people and businesses from Mid-Western Regional LGA and surrounds, then people from NSW more broadly, and then people throughout the rest of Australia • Engaging regularly with stakeholders to communicate regional and local participation opportunities • Monitoring and communication of outcomes • Exploring community initiatives that are linked to outcomes that meet community priorities identified in the SIA to increase community resilience and response to change • Dedicated economic impact assessment that considers likely socio-economic impacts
Ecosystem services	• As per EIS Scoping report, the project will avoid and minimise impacts to biodiversity through the avoidance of high condition native vegetation • Preparation of a Biodiversity Development Assessment Report and where relevant, presentation of mitigation and avoidance measures

Impact theme	Project refinement and potential mitigation measures
Environmental assessment and approvals process (processes)	• Open, transparent, and accessible communication of project information • Industry advocacy to streamline whole of industry impact themes • Adaptive management and monitoring framework to assess social performance, including compliance monitoring
Health and wellbeing	• Open, transparent, and accessible communication of project information including any available research on health impacts of solar farms • Targeted consultation with RFS and Fire and Rescue NSW to create a construction emergency response plan and initiate proactive and early engagement about an operational emergency response plan • Consultation with sensitive user groups including vulnerable communities • Complaints management procedure
Land use conflict	• Open, transparent, and accessible communication of project information in relation to the identified location of the project, and why it was chosen • Individual property agreements
Social amenity	• Neighbour/adjacent property impacts and mechanisms to address personal issues on a case-by-case basis • Open, transparent, and accessible communication of project information • Compliance monitoring • Feedback management procedure
Visual amenity	• As per EIS Scoping report. where relevant, the visual impact assessment and EIS will include mitigation measures to help reduce the project's impacts on visual amenity • Consideration of neighbour/adjacent property impacts and mechanisms to address personal issues on a case-by-case basis • Open, transparent, and accessible communication of project information • Compliance monitoring • Feedback management procedure.

5 SIA research methodologies and engagement

5.1 SIA research methodologies

The scoping phase has identified a range of impact themes of relevance to various stakeholder groups. These will be further explored and validated during the EIS preparation phase using several research methodologies including, but not limited to, those outlined in Table 5.1.

Table 5.1 Research methodology for SIA

Research methodology	Description
Participatory engagement	Refer to section 5.2.
Exploratory research	Exploratory research involves familiarising a researcher with a topic to satisfy curiosity and improve understanding. Exploratory research is often conducted in areas of inquiry, where the goals of the research are "to scope out the magnitude or extent of a particular phenomenon, problem, or behaviours, to generate some initial ideas (or "hunches") about that phenomenon, or to test the feasibility of undertaking a more extensive study regarding that phenomenon (Bhattacherjee, 2012). For instance, if a community is generally dissatisfied with the operations of a business or government body, exploratory research may be directed at measuring the extent of dissatisfaction or frequency of complaints, and the presumed cause of such complaints. For this assessment, research will include comparative analysis of similar operations including reviews of submission reports, social commentary and engagement outcomes.
Desktop analysis based on specialist studies	The term 'desktop analysis' refers to a study that is carried out primarily through the integration of technical assessments into the SIA, rather than physical investigations. For this assessment, several social impacts, including aesthetics and amenity, and cumulative impacts will be mostly assessed in other technical studies in the EIS.

5.2 Participatory engagement approach

A participatory and impartial engagement approach will be undertaken to inform the SIA and will build upon the engagement carried out by VEA as part of the development of the EIS.

The proposed tools that will be used to achieve the desired SIA consultation outcomes are shown in Table 5.2.

Table 5.2 SIA engagement approach and timing

Engagement Technique	Level of participation	Description	Targeted stakeholders
Semi-structured interviews	Consulting to collect information and insights	Interviews will be used to further explore the social impacts of the project and to collect data, evidence, and insights for those stakeholders nearest to the project area. The semi-structured interview format provides a flexible structure which allows the interviewer to create and ask	Host landholder, Nearby neighbours, First Nations, Aboriginal and Torres Strait Islanders, Community groups,

Engagement Technique	Level of participation	Description	Targeted stakeholders
		questions about situations as they emerge, and the interviewee to digress and express views freely. The work of Bradshaw and Stratford (2005) regarding qualitative research design and rigour is beneficial in designing the semi-structured interview methodology and the online survey (mentioned below). The authors provide guidance in relation to participant selection and sampling. Their work explains that in qualitative research, the number of people we interview, communities we observe, or texts we read, is less important than the quality of who or what we involve in our research, and how we conduct that research. Their work emphasises that 'purposive' sampling is typical in this type of research, and that the sample is not intended to be representative given the emphasis is usually on the analysis of meanings.	Local business and suppliers, Mid-Western Regional Council
Online survey	Consulting to collect information and insights	An online survey will be administered to help further inform the scoped impacts and collect data, evidence, and insights for the EIS.	Local business and suppliers, General public, Community groups, NGO's
Online forums / face to face meetings / workshops or focus groups	Consulting to collect information and insights / Collaborating in decision making	Engagement techniques that present opportunities for either consulting to collect information and insights or collaborating in decision making are used in the social impact assessment to further inform perceived impacts, involve vulnerable or marginalised groups, encourage collaboration in project design and refinement strategy on key impact areas and future monitoring and management measures.	Key stakeholder groups specific to relevant impact themes, e.g., Fire and Rescue NSW, Rural Fire Service, EnergyCo, nearby neighbours and community groups.
Open days and contact points (e.g., phone, email)	Sharing information	Helping people to understand the role of the social impact assessment, identify affected and interested people, groups, organisations and communities. Provide people with a forum to identify social impacts in relation to the project.	General public
Fact sheets / newsletters	Sharing information	Provide input into project information prepared by the VEA to help people understand the social impact assessment and ways that the can get involved.	General Public

6 Conclusion

This report documents the process and outcomes of the scoping phase of the SIA undertaken for the project. Specifically, it has:

- Demonstrated an understanding of the project's social locality
- Considered the characteristic of the communities within the social locality (the social baseline)
- Identified likely social impacts for different groups in the social locality and the level of assessment required for the assessment phase.

The report has identified key social impact themes that required detailed assessment as part of the EIS including social impacts relating to:

- Access to and use of infrastructure and services
- Economic contributions and sustainability
- Social amenity
- Land use change and conflict
- Visual amenity
- Culture and heritage
- Ecosystem services
- Health and wellbeing
- Social amenity
- Environmental assessment and approvals (processes)

As part of the EIS, future stages of SIA for this project will analyse and predict the unmitigated and mitigated social impacts and develop strategies to avoid or mitigate negative impacts and enhance positive impacts.

Subsequent phases of the SIA program will include:

- A detailed update of the baseline social profile to ensure that any further baseline data relevant to the impacts identified is obtained
- Further validation of the area of social influence and identification of affected communities and vulnerable groups
- Participatory engagement methodologies to understand the perceptions of the identified stakeholders within the social locality and those indirectly affected by the project
- A comprehensive assessment and evaluation of social impacts against existing baseline conditions.

The SIA will seek broader involvement across the stakeholder groupings identified, over the subsequent phases of the EIS.

The scoped issues will be further explored and validated during the EIS preparation phase using several research methodologies, including a participatory and impartial engagement approach to inform the SIA. This engagement will build upon the engagement carried out by VEA as part of the development of the EIS.

7 References

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Appendix 1 Community Profiles

Data sources:

- Primary Health Network, LGA Population Health Snapshot (2021) (PHIDU)
- Australian Bureau of Statistics 2016, quick stats
- Australian Bureau of Statistics 2016, Community Profiles

Indicator	Beryl SSC*	Tallawang SSC*	Gulgong SSC*	Mid-Western LGA	NSW
People - Demographics and Education (Source ABS 2016)					
Total population (2016)	132	168	2521	24076	7,480,228
Male	52%	53.3%	49.5%	50.3%	49.3%
Female	48%	46.7%	50.5%	49.7%	50.7%
Aboriginal and/or Torres Strait Islander people	2.3%	0.0%	7.7%	5.4%	2.9%
Age Structure (Source ABS 2016)					
% Population under 14 and under	22.8%	22.2%	21.9%	20.4%	18.5%
% Population over 65 years.	15.4%	21.1%	20.0%	19.7%	13.2%
Median Age (years)	44	45	41	42	38
Social Marital status (Source ABS 2016)					
Registered Married	56.3%	63.9%	45.2%	48.6%	48.3%
De facto marriage	12.6%	9.6%	13.1%	12.6%	9.4%
not married	31.0%	26.5%	41.7%	38.8%	42.3%
Education					
Pre-school	0.0%	10.4%	7.1%	5.7%	5.7%
Infants/Primary	31.5%	11.9%	27.6%	28.1%	26.2%
Secondary	16.7%	7.5%	17.6%	18.2%	20.1%
Technical or Further Educational Institution	5.6%	4.5%	6.8%	6.6%	6.2%
University or other Tertiary Institution	5.6%	0.0%	4.3%	4.7%	16.2%
Other type of educational institution	0.0%	0.0%	0.7%	1.2%	2.7%
Not stated	40.7%	65.7%	35.8%	35.7%	23.0%
Level of highest education attainment (Source ABS 2016)					
Bachelor's degree level and above	11.9%	5.8%	6.7%	10.9%	23.4%
Advanced Diploma and Diploma level	9.9%	6.6%	5.8%	6.8%	8.9%
Certificate level IV	0%	0.0%	3.2%	3.3%	2.8%
Certificate level III	18.8%	14.6%	17.9%	18.2%	12.0%

Indicator	Beryl SSC*	Tallawang SSC*	Gulgong SSC*	Mid-Western LGA	NSW
Year 12	10.9%	10.9%	9.8%	10.2%	15.3%
Year 11	0.0%	0.0%	3.2%	3.7%	3.3%
Year 10	18.8%	22.6%	19.4%	16.7%	11.5%
Certificate level II	0.0%	0.0%	0.2%	0.1%	0.1%
Certificate level I	0.0%	0.0%	0.0%	0.0%	0.0%
Year 9 or below	17.8%	5.1%	14.3%	11.6%	8.4%
No educational attainment	0.0%	0.0%	0.2%	0.2%	0.9%
Not stated	14.9%	29.2%	16.7%	15.3%	10.3%
People - cultural and language diversity (Source ABS 2016)					
Australian ancestry	53.1%	36.0%	37.4%	35.6%	22.9%
English ancestry	21.8%	28.0%	30.0%	30.0%	23.3%
Italian ancestry	6.8%	na	na	na	2.8%
Scottish ancestry	3.4%	4.5%	6.2%	6.6%	5.9%
Irish ancestry	2.7%	9.5%	8.5%	8.5%	7.5%
German ancestry	Na	1.5%	2.6%	3.0%	2.4%
Country of birth					
Australia	82.4%	72.4%	82.8%	81.2%	65.5%
Languages (Source ABS 2016)					
English only spoken at home	85.7%	74.6%	87.9%	87.4%	68.5%
Employment Type (Source ABS 2016)					
Worked Full Time	59.6%	58.1%	53.8%	56.4%	59.2%
Worked part-time	25.5%	37.1%	32.5%	31.6%	29.7%
Away from work	0.0%	4.8%	5.1%	5.5%	4.8%
Unemployed	14.9%	0.0%	8.7%	6.5%	6.3%
Labour force participation (15-85 years) (including those are unemployed looking)	47.1%				65.2%
Occupation (Source ABS 2016)					
Professionals	16.7%	6.0%	9.7%	13.2%	23.6%
Technicians and Trades Workers	26.2%	6.0%	19.0%	17.6%	12.7%
Managers	7.1%	38.8%	10.8%	14.6%	13.5%
Clerical and Administrative workers	11.9%	6.0%	9.3%	10.1%	13.8%
Labourers	7.1%	23.9%	13.5%	12.0%	8.8%
Machinery Operators and Drivers	16.7%	10.4%	17.0%	12.6%	6.1%
Community and Personal Service Works	7.1%	4.5%	10.7%	9.8%	10.4%

Indicator	Beryl SSC*	Tallawang SSC*	Gulgong SSC*	Mid-Western LGA	NSW
Sales Worker	7.1%	0.0%	8.7%	9.1%	9.4%
Industry of employment (Source ABS 2016) (Top 5)					
Hospitals (except Psychiatric Hospitals)	15.8%				3.5%
Secondary Education			3.2%		1.7%
Supermarket and Grocery Stores			4.3%	2.7%	2.2%
Primary Education			3.5%	2.7%	1.9%
Beef Cattle Farming (specialised)	15.8%	16.1%		2.9%	0.4%
Sheep-Beef Cattle Farming		10.7%			0.1%
Sheep Farming (specialised)		12.5%			0.2%
Aged Care Residential Services	21.1%		3.8%	2.6%	2.0%
Coal Mining	15.8%		19.2%	13.7%	0.6%
Other Automotive Repair and Maintenance	15.8%				0.6%
Landscape Construction Services		8.9%			0.4%
Building and Other Industrial Cleaning Services		8.9%			1.2%
Median weekly income (Source ABS 2016)					
Personal	$455	$493	$523	$547	$664
Family	$1375	$1208	$1343	$1433	$1780
Households	$1312	$1145	$1086	$1131	$1486
Method of Travel to Work (Source ABS 2016)					
Walked only	9.1%	na	7.6%	4.4%	3.9%
Worked at home	9.1%	29.5%	5.0%	7.4%	4.8%
by car as driver or passenger	59.2%	56.7%	72.5%	72.5%	64.6%
Truck	6.8%	4.9%	1.8%	1.6%	1.0%
Public Transport	na	na	na	0.4%	16%
Unpaid work (Source ABS 2016)					
did unpaid domestic work	66%	50.0%	65.1%	67.7%	67.7%
cared for child/children	28.8%	18.6%	26.3%	26.8%	27.2%
provided unpaid assistance to a person with a disability	4.0%	4.7%	11.5%	11.0%	11.6%
did voluntary work through an organisation or group	22.5%	12.7%	20.8%	21.7%	18.1%
Family composition (Source ABS 2016)					
Couple family with no children	50%	55.0%	40.6%	42.3%	36.6%
Couple family with children	41.2%	37.5%	40.3%	40.9%	45.7%
One parent family	8.8%	7.5%	18.2%	15.5%	16.0%

Indicator	Beryl SSC*	Tallawang SSC*	Gulgong SSC*	Mid-Western LGA	NSW
other family	0.0%	0.0%	1.0%	1.3%	1.7%
Employment status of couple families (Source ABS 2016)					
Both employed, worked full-time	25.8%	25.8%	12.2%	17.7%	22.6%
Both employed, worked part-time	0.0%	9.7%	6.8%	4.9%	4.0%
One employed full-time, one part-time	12.9%	22.6%	24.2%	23.7%	20.6%
One employed full-time, other not working	29.0%	9.7%	15.7%	14.7%	15.0%
One employed part-time, other not working	9.7%	0.0%	6.6%	5.6%	6.1%
Both not working	22.6%	19.4%	24.2%	22.2%	21.0%
other (includes away from work)	0%	0.0%	5.0%	5.6%	5.1%
Labour force status not stated	0%	12.9%	5.2%	5.9%	5.7%
Dwellings					
Internet accessed from dwelling	84.8%	75.0%	72.6%	74.3%	82.5%
Occupied private dwellings	70.2%	66.2%	89.4%	84.1%	90.1%
Unoccupied private dwellings	29.8%	33.8%	10.6%	15.9%	9.9%
Separate house	100%	100%	90.3%	91.4%	66.4%
Semi-detached, row or terrace house, townhouse etc.	0.0%	0.0%	4.8%	3.8%	12.2%
Flat, unit or apartment	0.0%	0.0%	0.3%	2.5%	19.9%
Other dwelling	0.0%	0.0%	3.1%	1.4%	0.9%
Average number of bedrooms per dwelling	3	3.2	3.1	3.2	3.1
Average number of people per household	2.8	2.7	2.4	2.4	2.6
Owned outright	44.1%	37.7%	36.7%	38.0%	32.2%
Owned with a mortgage	26.5%	35.8%	30.1%	30.6%	32.3%
Rented	29.4%	18.9%	27.8%	27.4%	31.8%
tenure type not stated	0%	7.5%	4.7%	3.4%	2.8%
Household composition (Source ABS 2016)					
Family	91.4%	74.0%	66.7%	68.3%	72.0%
Single (or lone)	8.6%	26.0%	31.3%	28.9%	23.8%
Group households	0%	0.0%	2.0%	2.8%	4.2%
Household income (Source ABS 2016)					
Less than $650 gross weekly income	25%	22.7%	28.7%	26.9%	19.7%
More than $3000 gross weekly income	12.5%	0.0%	7.8%	11.3%	18.7%
Median rent	$270	$250	$250	$270	$380
Households where rent payments are less than 30% of householder income	92.3%	100.0%	87.6%	90.0%	87.1%

Indicator	Beryl SSC*	Tallawang SSC*	Gulgong SSC*	Mid-Western LGA	NSW
Households with rent payments greater than or equal to 30% of household income	7.7%	0.0%	12.4%	10.0%	12.9%
Households where mortgage payments are less than 30% of householder income	100%	89.7%	94.8%	94.1%	92.6%
Households with mortgage payments greater than or equal to 30% of household income	0%	10.3%	5.2%	5.9%	7.4%
Low-income households (households in bottom 40% of income distribution under financial stress from mortgage or rent (source PHIDU 2016)	na	na	na	22.4%	29.3%
Car ownership per dwelling (Source ABS 2016)					
None	0.0%	0.0%	4.4%	4.9%	9.2%
One	30.0%	8.7%	35.1%	31.0%	36.3%
Two	47.5%	45.7%	36.1%	38.0%	34.1%
Three of more	22.5%	39.1%	18.5%	21.0%	16.7%
Not stated	0.0%	6.5%	5.8%	5.3%	3.7%
Population mobility (address) (Source ABS 2016 Community Profile)					
Proportion of population with a different address 1 year ago	5.0%	6.0%	13.0%	14.0%	14.0%
Proportion of population with a different address 5 years ago	29.0%	23.0%	34.0%	37.0%	39.0%
At risks and vulnerable groups					
Aboriginal and/or Torres Strait Islander people	2.3%	0.0%	7.7%	5.4%	2.9%
Provided unpaid assistance to a person with a disability (last two weeks before Census night) (%)	4.0%	4.7%	11.5%	11.0%	11.6%
Highest Educational attainment: Year 9 or below (%)	17.8%	5.1%	14.3%	11.6%	8.4%
Population aged 65+ (%)	15.4%	21.1%	20.0%	19.7%	13.2%
People with profound disability (source PHIDU 2016)	na	na	na	5.8%	5.4%
% Learning or earning at ages 15 to 24 (source PHIDU 2016)	na	na	na	77.2%	85.0%
Estimated number of people aged 18 years and over who were obese (modelled estimates) (ASR PER 100) (source PHIDU 2016)	na	na	na	41.0%	30.9
SEIFA Index of Relative Socio-economic Disadvantage (IRSD)	na	na	na	960	na

* ABS State Suburb

Appendix C

Biodiversity Scoping Report

Bellambi Heights Renewable Project

Biodiversity Scoping Assessment

Prepared for Premise Australia Pty Ltd on behalf of Vena Energy Services (Australia) Pty Ltd
November 2020

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Bellambi Heights Renewable Project

Biodiversity Scoping Assessment

Report Number

J180343 RP2

Client

Premise Australia Pty Ltd on behalf of Vena Energy Services (Australia) Pty Ltd

Date

15 November 2020

Version

v3 Final

Prepared by

Steve Williams
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15 November 2020

Approved by

Nathan Garvey
Associate Director
15 November 2020

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Appendices

Tables

Figures

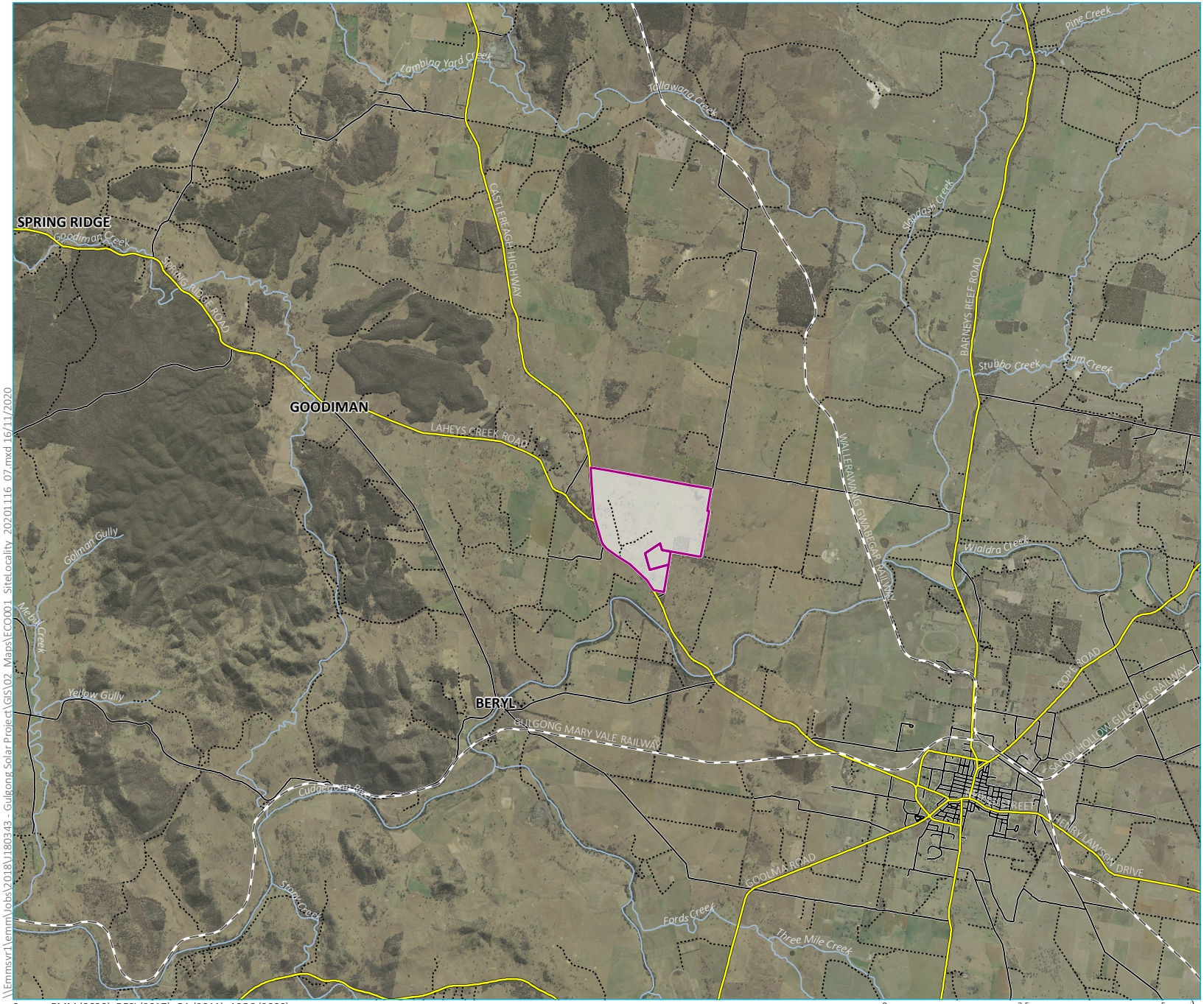
1 Introduction

Premise Australia Pty Ltd (Premise) is preparing a Scoping Report on behalf of Vena Energy Services (Australia) Pty Ltd (Vena Energy Australia (VEA)) for the proposed Bellambi Heights Renewable Project (the project). The project will be a large-scale solar photovoltaic (PV) generation facility plus Battery Energy Storage System (BESS) located west of Gulgong in the locality of Beryl on the Central Tablelands in Central-Western NSW.

The project area, located in the Mid-Western Regional Council Local Government Area (LGA), includes Lot 102 DP 1203462, to be utilised predominantly for solar and ancillary infrastructure including the BESS, and Lot 101 DP 1203462, the proposed site for the relevant project network infrastructure to be owned and operated by TransGrid, representing a cumulative project area of approximately 300 ha (the site, Figure 1.1).

It is anticipated that the project will be a State Significant Development (SSD) under the *State Environmental Planning Policy (State and Regional Development) 2011*. The project will be subject to assessment and determination by the New South Wales (NSW) Minister for Planning and Public Spaces (the Minister).

EMM Consulting Pty Ltd (EMM) was engaged by Premise on behalf of VEA to undertake an assessment of biodiversity values within the project area. The results of this assessment are outlined in this report, which will be submitted to the NSW Department of Planning, Industry and Environment (DPIE) as part of the request for the Secretary's Environmental Assessment Requirements (SEARs).



KEY

- Site boundary
- Rail line
- Major road
- Minor road
- Vehicular track
- Named watercourse

Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006)

0 2.5 5 km

GDA 1994 MGA Zone 55

N

\\Emmsvr1\emm\Jobs\2018\J180343 - Gulgong Solar Project\GIS\02_Maps\ECO001_SiteLocality_20201116_07.mxd 16/11/2020

Locality and site boundary of proposed, Bellambi Heights Renewable Project

Bellambi Heights Renewable Project
Biodiversity scoping asessment
Figure 1.1

EMM creating opportunities

2 Methods

This assessment has been completed in accordance with the NSW Biodiversity Assessment Method (BAM, OEH 2017) and includes desktop research and detailed field surveys. Methods employed are outlined below.

2.1 Desktop assessment

Prior to field surveys, a desktop review of relevant databases was undertaken to assess potential environmental constraints. Databases included:

- Matters of National Environmental Significance (MNES) accessed via the Protected Matters Search Tool (PMST);
- BioNet Atlas of NSW Wildlife;
- Directory of Important Wetlands in Australia (DIWA);
- BioNet Threatened Biodiversity Data Collection (TBDC);
- PlantNet NSW (http://plantnet.nsw.gov.au); and
- State Vegetation Type Map: Central West / Lachlan Region Version 1.4. VIS_ID 4468 (OEH 2016a).

Spatial analysis was undertaken, including a review of regional vegetation mapping datasets, to assess the number and extent of plant community types (PCTs) that could be present on the site. This was utilised to calculate the number of BAM plots that would be required for preliminary assessment.

2.2 Preliminary field assessment

A preliminary field assessment was undertaken in November 2018, with follow up surveys in February 2019. The preliminary field assessment was based on desktop spatial analysis and consisted of the following activities:

- mapping of vegetation, including PCTs and vegetations zones (PCTs in same broad condition state);
- assessment against the criteria for relevant threatened ecological communities (TECs);
- completion of 28 plots (across the broader study area), in accordance with the BAM;
- mapping of paddocks trees;
- general habitat assessment for the threatened flora and fauna species associated with the grassy woodland, derived native grasslands and forested woodland comprising 35 rapid assessment points;
- opportunistic fauna survey; and
- general survey for threatened flora species.

2.3 Candidate species assessment

Desktop database searches identified a significant number of potential threatened species that could occur on the site, these include 20 flora and 48 fauna species. A candidate species assessment was undertaken in accordance with the BAM (OEH 2017) based on the PCTs present on the site. The results of this assessment are presented in Table 2.1.

Table 2.1 Candidate species assessment

Scientific name	Common name	Habitat type	Survey required and timing
Flora			
Acacia ausfeldii	Ausfield's Wattle	Grows in eucalypt woodland in sandy soil; often in remnant roadside patches of woodland. Predominantly in the northern part of the Central Western Slopes.	Yes– woodland areas. All year
Ammobium craspedioides	Yass Daisy	Grows in sclerophyll woodland, forest and on roadsides, rare, confined to the Yass district.	No – geographic limitations not present.
Cullen parvum	Small Scurf-pea	Prefers grassland or understorey in forests on plains of Murray and Murrumbidgee Rivers.	No – outside range.
Dichanthium setosum	Bluegrass	Grows in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	Yes – all areas. Dec – May
Euphrasia arguta	-	Grows in grassy areas near rivers, recorded from Bathurst to Walcha area.	No – suitable habitat not present.
Grevillea wilkinsonii	Tumut Grevillea	Known only from remnant bushland along the Goobarragandra Road. (Near Tumut), growing on flood terraces and adjacent slopes.	No – geographic limitations not present.
Pomaderris queenslandica	Scant Pomaderris	Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks.	No – suitable habitat not present.
Prasophyllum petilum	Tarengo Leek Orchid	Grows in patchy woodland in fertile soils.	No – geographic limitations not present.
Swainsona recta	Small Purple-pea	Grows in grassland and open woodland, often on stony hillsides.	Yes – woodland areas. Sep - Nov
Swainsona sericea	Silky Swainson-pea	Grows in grassland and eucalypt woodland, sometimes with *Callitris* species; widespread.	Yes – areas not subject to cultivation. Sept - Feb
Tylophora linearis	-	Grows in dry scrubland that may have a eucalypt, *Callitris glaucophylla* and/or *Allocasuarina luehmannii* overtopping the scrub, in the Barraba, Mendooran, Temora and West Wyalong districts.	Yes – woodland areas. All year

Table 2.1 Candidate species assessment

Scientific name	Common name	Habitat type	Survey required and timing
Zieria obcordata	Obcordate-leafed Zieria	Grows in eucalypt woodland or shrubland dominated by species of Acacia, on rocky hillsides.	No – suitable habitat not present.
Fauna			
Anthrochaera phrygia	Regent Honeyeater (breeding)	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. Feeds mainly on the nectar from a relatively small number of eucalypts including Yellow Box and White Box.	No – site not located within mapped important areas.
Aprasia parapulchella	Pink-tailed Legless Lizard	Inhabits sloping, open woodland areas with predominantly native grassy ground layers, sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks.	No – habitat constraints (rocky areas) not present.
Burhinus grallarius	Bush Stone-curlew	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	Yes – woodland patches. All year
Callocephalon fimbriatum	Gang-gang Cockatoo (breeding)	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	No – outside species breeding range.
Calyptorhynchus lathami	Glossy Black-Cockatoo (breeding)	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur, Dependent on large hollow-bearing eucalypts for nest sites.	No – geographic limitation not present and no suitable breeding habitat present.
Cercartetus nanus	Eastern Pygmy-possum	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath.	Yes – woodland patches. Oct - Mar
Chalinolobus dwyeri	Large-eared Pied Bat	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features.	No – no suitable roosting habitat.

Table 2.1 Candidate species assessment

Scientific name	Common name	Habitat type	Survey required and timing
Delma impar	Striped Legless Lizard	Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland.	No – outside species distribution.
Haliaeetus leucogaster	White-bellied Sea-Eagle (breeding)	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as guard roosts.	No – suitable nesting habitat not present.
Hamirostra melanosternon	Black-breasted Buzzard (breeding)	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall where it occurs in range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat.	No – suitable breeding habitat limited to riparian vegetation along Wialdra Creek which will be avoided.
Hieraaetus morphnoides	Little Eagle (breeding)	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	No – nests observed during survey.
Hoplocephalus bitorquatus	Pale-headed Snake	This species has a patchy distribution from north-east Queensland to the north-eastern quarter of NSW. Inhabits dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas.	No – suitable habitat not present.
Lathamus discolor	Swift Parrot (breeding)	On the mainland they occur in areas where eucalypts are flowering profusely or where there is abundant lerp (from sap-sucking bugs) infestations.	Mapped important areas to be obtained from OEH.
Litoria booroolongensis	Booroolong Frog	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins.	No – no suitable habitat present.

Table 2.1 Candidate species assessment

Scientific name	Common name	Habitat type	Survey required and timing
Lophoictinia isura	Square-tailed Kite (breeding)	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a preference for timbered watercourses.	No – suitable breeding habitat limited to riparian vegetation along Wialdra Creek.
Miniopterus schereibersii oceanensis	Eastern Bentwing-bat (breeding)	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	No – suitable breeding habitat not present in or near the site.
Myotis macropus	Southern Myotis	The Southern Myotis is largely coastal, and rarely found over 100 km inland. Prefers mesic environments for roosting and breeding and forages over streams and waterways.	No – medium to large permanent creeks, rivers, lakes or other waterways supporting pools 3m or wider not present.
Ninox connivens	Barking Owl (breeding)	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils.	No – site does not support suitable breeding habitat.
Ninox strenua	Powerful Owl (breeding)	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	No – site does not support suitable breeding habitat.
Petaurus norfolcensis	Squirrel Glider	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Require abundant tree hollows for refuge and nest sites.	Yes – woodland patches. All year
Petrogale penicillata	Brush-tailed Rock-Wallaby	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	No – habitat constraint (rocky outcrops and cliffs) not present.
Phascogale tapoatafa	Brush-tailed Phascogale	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.	No – outside species range.
Phascolarctos cinereus	Koala (breeding)	Inhabit eucalypt woodlands and forests.	Yes – woodland patches and paddock trees. All year

Table 2.1 Candidate species assessment

Scientific name	Common name	Habitat type	Survey required and timing
Polytelis swainsonii	Superb Parrot (breeding)	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest.	Yes – woodland patches. However, suitable breeding sites limited, and outside breeding range.
Pteropus poliocephalus	Grey-headed Flying-fox	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	No – no camps in study area.
Synemon plana	Golden Sun Moth	Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which ground layer is dominated by wallaby grasses. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat.	No – geographic limitations not present.

2.4 Targeted flora surveys

Targeted flora surveys were undertaken in February 2019 in accordance with *Surveying threatened plants and their habitats* (EES 2020). Transect surveys were undertaken across all woodland areas at 10 m spacing, while 10% of remaining areas of low-quality derived grassland (62.1 ha) were sampled using transect surveys spaced at 100 m following consultation with the Biodiversity and Conservation Division (BCD) of the Department of Planning, Industry and Environment (DPIE) in March 2019 (Appendix A). In total, over 77 km of transect survey were undertaken across the project area.

2.5 Targeted fauna surveys

Targeted fauna surveys were undertaken in February 2020. Surveys included:

- bird surveys targeting the Superb Parrot and Bush-stone Curlew;
- terrestrial trapping surveys targeting the Eastern Pygmy-possum;
- arboreal trapping surveys targeting the Squirrel Glider;
- camera surveys targeting the Eastern Pygmy-possum and Squirrel Glider;
- spot assessment technique surveys targeting the Koala; and
- spotlight surveys targeting the Bush Stone-curlew, Eastern Pygmy-possum, Squirrel Glider and Koala.

Survey methods and effort are outlined in Table 2.2.

Table 2.2 Methods and survey effort – small terrestrial mammals

Method	Survey description	Survey effort
Bird surveys	Bird surveys were undertaken in accordance with the following guidelines: • Land based areas searches and transects. • Surveyors undertake area searches within a 1-3 ha area (other areas). • All calls and habitat features were investigated. • Birds observed or heard were recorded.	DEC (2004) has not resolved bird survey requirements. DSEWPaC (2010) was reviewed and sympatric species survey efforts indicated a requirement for 10 hours over 5 days (2 hours per day) for sites less than 50 ha. No survey effort for larger sites is provided. Based on surveys being undertaken across woodland areas (see Table 3.1) 10 hours of bird surveys undertaken over 5 days would be required. Eleven bird surveys were completed over five days across all woodland vegetation zones.
Terrestrial trapping	25 Elliot A traps were placed 10 m apart in a 5 x 5 grid: • Traps were baited with a mixture of peanut butter, rolled oats and honey. • Traps were checked early in the morning and closed for the day. • Traps were opened and rebaited in the late afternoon. • Animals were temporarily marked to allow mark-recapture data to be collected. • Traps were left in place for four nights.	DEC (2004) specifies one site per 50 ha stratification unit with replication of effort for every additional 100 ha. Based on surveys being undertaken across woodland areas (see Table 3.1) two survey sites would be required (one in each PCT). Three sites were completed (one in PCT 277 and two in PCT 266) equating to 300 trap nights. Minimum survey effort was exceeded.
Arboreal trapping	Ten Elliot B traps were placed at 2-4 m above the ground, 50 m apart in two parallel lines separated by 50 m: • Traps were baited with a mixture of peanut butter, rolled oats and honey. A mixture of water and honey will be sprayed on tree trunk. • Traps were checked early in the morning and closed for the day. • Traps were re-opened and rebaited in the late afternoon. • Animals were temporarily marked to allow mark-recapture data to be collected. • Traps were left in place for four nights. • Trapping was undertaken in conjunction with terrestrial mammal trapping where suitable habitat occured.	DEC (2004) requires a minimum of 24 trap nights over 3-4 consecutive days per 50 ha of stratification unit, with replication for every additional 100 ha (or part thereof). Based on surveys being undertaken across woodland areas (see Table 3.1) two survey sites would be required (one in each PCT). Three sites were completed (one in PCT 277 and two in PCT 266) equating to 300 trap nights. Minimum survey effort was exceeded.

Table 2.2 Methods and survey effort – small terrestrial mammals

Method	Survey description	Survey effort
Remote cameras	Remote camera surveys were undertaken in accordance with the following guidelines: • Two cameras were placed at least 100 m apart. • Cameras were attached to tree or stake and positioned approximately 25cm above ground with bait stations placed 1.5m away. • Bait stations were baited with a mixture of peanut butter, rolled oats and honey. • Cameras were left in place for a minimum of 14 nights.	DEC (2004) does not include remote camera surveys. However, as cameras are used to replace hair tubes a similar survey effort was utilised. DEC (2004) recommends ten hair tubes left in place for at least four days and nights per 50 ha stratification unit, with replication for every additional 100 ha. Based on surveys being undertaken across woodland areas (see Table 3.1) , ten remote cameras were required. Camera surveys were undertaken at six sites, with 12 cameras deployed (two at each site), with cameras left in place for a minimum of 14 nights. 168 nights of survey were undertaken. The minimum survey effort required was exceeded.
Spotlighting	Spotlight and thermal imaging surveys were undertaken using handheld LED spotlights and a handheld forward looking infra-red (FLIR) camera and included: • Minimum 1 km transects were undertaken by two observers (2 km total transect length), with 25 m spacing between observers. • Observers moved at a speed of less than 1 km per hour (ie one hour for the 1 km transect) scanning vegetation and trees for animals using both spotlights and the FLIR camera. • All animals observed were recorded, including the distance of the animals from the observer.	DSEWPaC (2011) recommends two parallel transects per 5 ha site, while DEC (2004) recommends two transects per 200 ha of stratification unit, repeated across two nights. Based on the area of each PCT (see Table 3.1) two 1 km spotlighting surveys, repeated on two occasions (four transects) would be required. Five transects (1.6 km to 3.9 km in length) were completed across two days, totalling 11.6 km in length. The minimum survey effort was exceeded.
Koala Spot Assessment Technique (SAT)	The SAT method (Phillips and Callaghan 2011) was undertaken, as follows: • Centre tree was located and marked with flagging tape. • The 29 nearest trees to the centre tree were also identified and marked. • Koala faecal pellets were searched for beneath each of the 30 trees within a distance of 100 cm. Initial inspections were checked in undisturbed ground surface, followed by a more thorough inspection involving disturbance of leaf litter and ground cover (if no faecal pellets were initially detected). • An average of approximately two person minutes per tree were dedicated to the faecal pellet search. Activity levels can be interpreted using Table 2 from Phillips and Callaghan (2011).	A total of four Koala SAT surveys were undertaken across the project area.

3 Results

3.1 Plant community types

Three PCTs were mapped across the project area. These PCTs were stratified into eight vegetation zones based on broad condition state. Vegetation was found to be in varying conditions across the project area and included a range of moderate condition woodlands to high degraded pastures and derived grasslands.

PCTs 266 and 277 are considered representative of White Box Yellow Box Blakely's Red Gum Woodland critically endangered ecological community (CEEC) listed under the BC Act. PCT 277 in Good condition is considered representative of White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands CEEC listed under the EPBC Act.

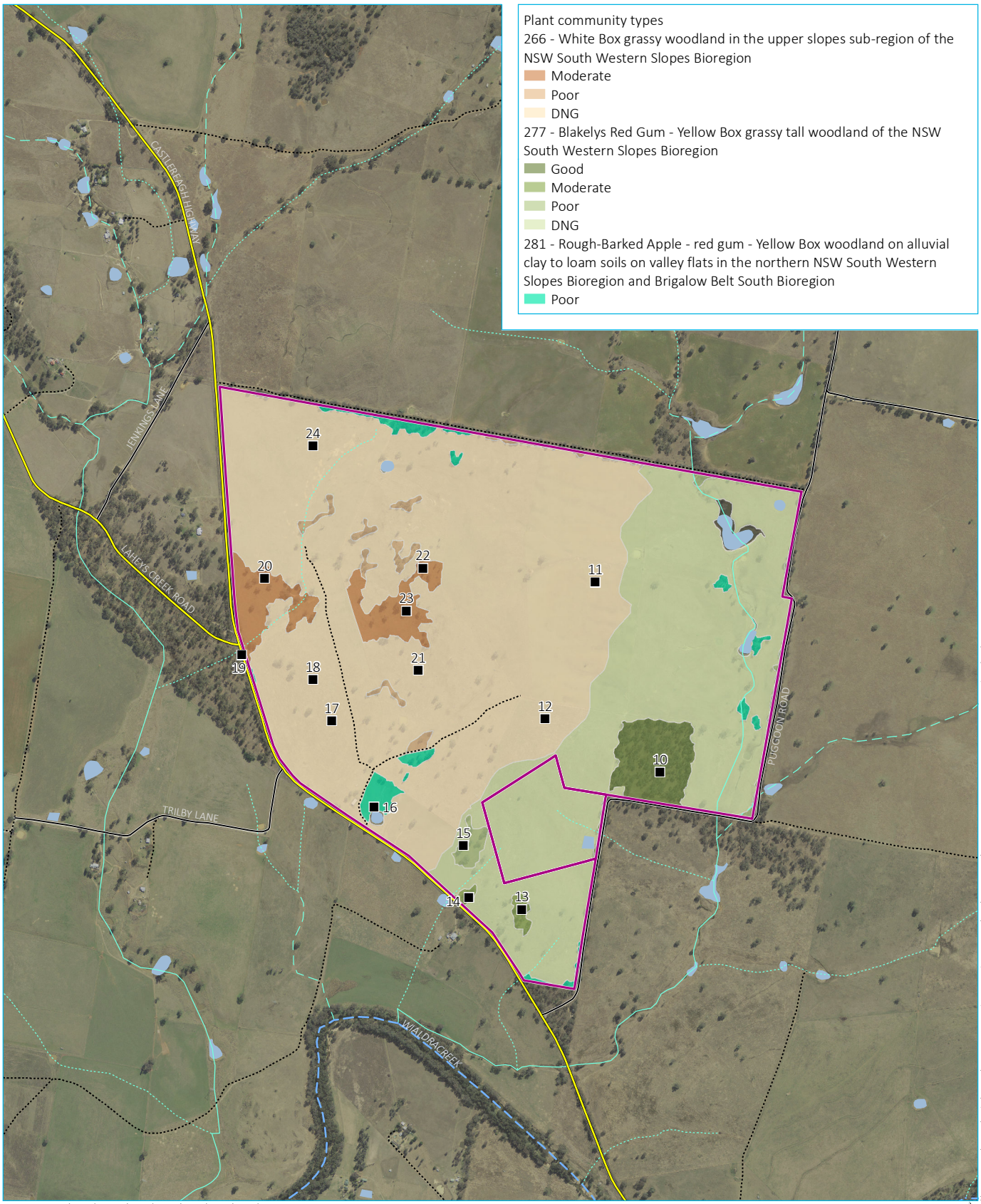
Table 3.1 provides a summary of the PCTs identified on site and details of their condition. Figure 3.1 provides a visual representation of the PCT mapping as well as plot locations.

Table 3.1 Plant community types and condition in the project area

PCT	Description	Condition	Area (ha)	Threatened Ecological Community (TEC)
266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	Moderate	11.09	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). Does not meet condition thresholds under the EPBC Act.
		Poor	3.29	Not a TEC. Vegetation is too degraded, and unlikely to be able to be rehabilitated.
		Derived Native Grassland (DNG)	172.46	Not a TEC. Vegetation is too degraded, and unlikely to be able to be rehabilitated.
277	Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion	Good	8.21	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). White Box – Yellow Box – Blakely's Red Gum grassy woodlands and derived native grasslands CEEC (EPBC Act).
		Moderate	1.38	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). Does not meet thresholds under the EPBC Act.
		Poor	2.25	White Box Yellow Box Blakely's Red Gum Woodland EEC (BC Act). Does not meet thresholds under the EPBC Act.
		DNG	99.29	Not a TEC. Vegetation is too degraded, and unlikely to be able to be rehabilitated.
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	Poor	5.03	Not a TEC.

3.2 Threatened species

Targeted flora and fauna surveys did not record any threatened species within the project area.



Source: EMM (2020); DFSI (2017); DPI (2013); GA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 55

N

\\Emmsvr1\emm\Jobs\2018\J180343 - Guilgong Solar Project\GIS\02_Maps\ECO002_SitePCTs_20201116_08.mxd 16/11/2020

KEY

- Plot location
- Site boundary
- Major road
- Minor road
- Vehicular track

Strahler stream order

- 1st order
- 2nd order
- 3rd order
- 7th order

Plant Community Type (PCT) mapping and plot locations, Bellambi Heights Renewable Project

Bellambi Heights Renewable Project
Biodiversity scoping assessment
Figure 3.1

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4 Conclusion and recommendations

The project area has been impacted by past land use, including agricultural activity, with remnant vegetation ranging from Good to Poor and derived grassland condition. Areas devoid of tree cover are heavily impacted by grazing activities and show little native cover or diversity. These areas are considered to be of minimal biodiversity value. Most woodland areas are also in Poor to Moderate condition and show impacts from grazing. However, these areas show some native cover and diversity. High condition vegetation is restricted to a small area in the east of the project area.

Comprehensive targeted surveys undertaken across the site have not recorded any threatened species to date.

The biodiversity values of the site will be considered as a part of the detailed design.

References

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Appendix A

Consultation with NSW Biodiversity and Conservation Division, March 2019

DOC19/183290

Mr Nathan Garvey
Associate Director – Ecology
EMM Consulting
ngarvey@emmconsulting.com.au

Dear Mr Garvey

Gulgong Solar project – biodiversity information

Thank you for your email of 11 February 2019 seeking comment from the Office of Environment and Heritage (OEH) regarding your proposed approach to assessment of biodiversity for the Gulgong Solar project.

You have requested advice from OEH on three aspects of the Biodiversity Assessment Method:

1. Threatened species to be assessed, particularly any species requiring further consideration (candidate species list)
2. Suitable experts for *Prasophyllum petilum and Swainsona sericea*
3. The suitability of your proposed threatened plant survey methodology

1. Candidate species list

Based on the information provided, the candidate species list seems appropriate. Note that Glossy-black Cockatoos may use the area for foraging or as transitory habitat.

2. *Prasophyllum petilum* and *Swainsona sericea*

OEH notes that the required months of survey for the *P. petilum* are September to November. Months of survey for *S. sericea* are September to December. In accordance with the Biodiversity Assessment Method, as you are likely to be surveying outside of the required months of survey, you will either need to assume the species are present or obtain an expert report.

If you are surveying within the required months of survey, you will need to check local analogue sites known to contain the species to determine whether they can be identified at the time of survey.

Recognised experts for *Prasophyllum petilum* include Rainer Rehwinkel (rainer.rehwinkel@hotmail.com; retired, former accountable officer), Mark Clements (Mark.Clements@csiro.au; CSIRO), Suzanne Prober (Suzanne.Prober@csiro.au; CSIRO) and Lachlan Copeland (lachlanc@ecoaus.com.au; EcoLogical).

OEH does not have a recognised expert for *Swainsona sericea*. We recommend that you contact the Royal Botanic Garden and enquire whether they know of an expert who meets the criteria in section 6.5.2 of the Biodiversity Assessment Method.

3. Proposed threatened plant survey

The *NSW Guide to Surveying Threatened Plants* requires field traverses separated by 10 metres across the entire area (1 kilometre per hectare) which, at the Gulgong Solar site would total approximately 660 kilometres of traverse.

We understand that you propose to sample all woodland areas (approximately 38 hectares in moderate and poor condition) using transects spaced 10 metres apart. Degraded vegetation (approximately 621 hectares of Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland) would be sampled using transects spaced 100 metres apart.

Your proposed sampling strategy would require approximately 40 kilometres of traverse in woodland and 60 kilometres of traverse in degraded vegetation. OEH considers this to be a reasonable level of sampling for the site.

OEH recommends the following:

- Intensive sampling of all woodland sites (ie 10 metres spacing)
- Low intensity sampling in the “degraded” vegetation (ie 100 metres spacing)
- If threatened plant species are located on the site, a more intensive survey to identify the extent of the population will be required.

If you have any queries, please contact Liz Mazzer, Conservation Planning Officer on 6883 5325 or email liz.mazzer@environment.nsw.gov.au.

Yours sincerely

PETER CHRISTIE
Director, North West
Conservation and Regional Delivery

5 March 2019

Contact officer: LIZ MAZZER
6883 5325

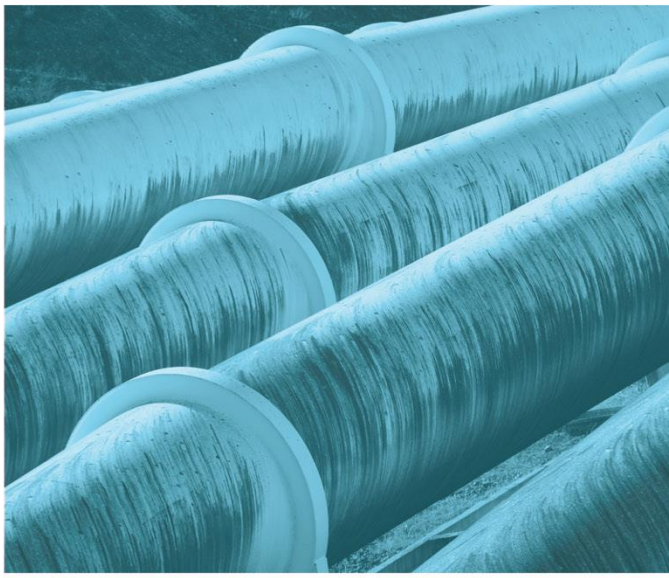
Appendix D

Aboriginal Heritage Preliminary Constraints Assessment


Bellambi Heights Renewable Project

Aboriginal Heritage Preliminary Constraints Assessment

Prepared for Premise Australia Pty Ltd on behalf of Vena Energy Services (Australia) Pty Ltd
February 2022

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Bellambi Heights Renewable Project

Aboriginal Heritage Preliminary Constraints Assessment

Prepared for Premise Australia Pty Ltd on behalf of Vena Energy Services (Australia) Pty Ltd
February 2022

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Bellambi Heights Renewable Project

Aboriginal Heritage Preliminary Constraints Assessment

Report Number

H210313 Bellambi Heights Renewable Project

Client

Premise Australia Pty Ltd on behalf of Vena Energy Services (Australia) Pty Ltd

Date

14 February 2022

Version

v7 Final

Prepared by

Morgan Wilcox
Senior Archaeologist
18 May 2021

Approved by

Ryan Desic
Senior Archaeologist
18 May 2021

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Appendices

Tables

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Plates

1 Introduction

1.1 Purpose

Premise Australia Pty Ltd (Premise) is preparing a scoping report on behalf of Vena Energy Services (Australia) Pty Ltd (Vena Energy Australia; VEA) for the proposed Bellambi Heights Renewable Project (the Project). It is anticipated that the Project will be a State Significant Development (SSD) under the *State Environmental Planning Policy* (State and Regional Development) *2011*. The Project will be subject to assessment and determination by the New South Wales (NSW) Minister for Planning and Environment (Minister). SSD projects comprise development that is deemed to have state significance due to their size, economic value or potential impacts.

EMM Consulting Pty Ltd (EMM) has been engaged by Premise on behalf of VEA to prepare an Aboriginal Heritage Preliminary Constraints Assessment. The information in this assessment will inform the Aboriginal cultural heritage section of the Project scoping report, which will be submitted as part of the request for the *Secretary's Environmental Assessment Requirements* (SEARs). Advice is provided as to subsequent investigations that will be required to complete the Aboriginal heritage assessment to meet legislative requirements for an Environmental Impact Statement (EIS) pending the receipt of project SEARs.

1.2 Background

The Project will involve establishing a large-scale solar farm and a utility-scale Battery Energy Storage System (BESS), including the ancillary infrastructure within Lot 102 DP 1203462. The Project will be connected to the national electricity network via infrastructure to be developed within Lot 101 DP 1203462, which will be developed in consultation with TransGrid. Access will be via Puggoon Road inclusive of a small portion of Crown Land (Lot 137 DP750762). The cumulative project area is approximately 300 ha (Figure 1.1).

1.3 Assessment approach

This assessment has been completed in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a).

The aim of the preliminary assessment is to assist in the development of the Project's developable footprint by identifying known or anticipated Aboriginal heritage values and areas of sensitivity within the project area.

This assessment provides preliminary advice based upon desktop level assessment and visual inspection of the project area. It is not intended to fulfil the anticipated SEARs relating to Aboriginal cultural heritage for the project, but to guide the refinement of the project footprint and contribute to the scoping report by identifying the next steps required in the assessment process.

Source: EMM (2019); DFSI (2017); GA (2011)

0 1 2 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Rail line
- Main road
- Watercourse/drainage line
- Cadastral boundary

Project area location

Bellambi Heights Renewable Project

Preliminary Aboriginal Heritage Assessment

Figure 1.1

EMM creating opportunities

2 Assessment

2.1 Desktop assessment

As noted in Section 1.3, the current assessment has been completed in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010a) and includes a desktop level examination and collation of readily available information including existing knowledge of Aboriginal cultural heritage within the locality sourced from registers, and previous heritage studies or archaeological reports.

2.1.1 Register searches

i Aboriginal Heritage Information Management System (AHIMS)

An initial search of the Aboriginal Heritage Information Management System (AHIMS) database conducted on 14 January 2019[1] identified 36 recorded Aboriginal sites within a 15 km by 11 km area, centred on the project area. The search area was sufficient to define the pattern of previously recorded Aboriginal sites in the landscape as it covered adjacent catchments. A breakdown of AHIMS sites by type is provided in Table 2.1 and shown on Figure 2.1.

Table 2.1 AHIMS extensive search results

Site type	Number of sites	Representation (%)
Open camp sites	35	97%
Artefact scatter	*4*	*11%*
Isolated artefact	*1*	*3%*
Artefact site (number of artefacts not specified)	*30*	*83%*
Quarry site	1	3%
TOTAL	36	100%

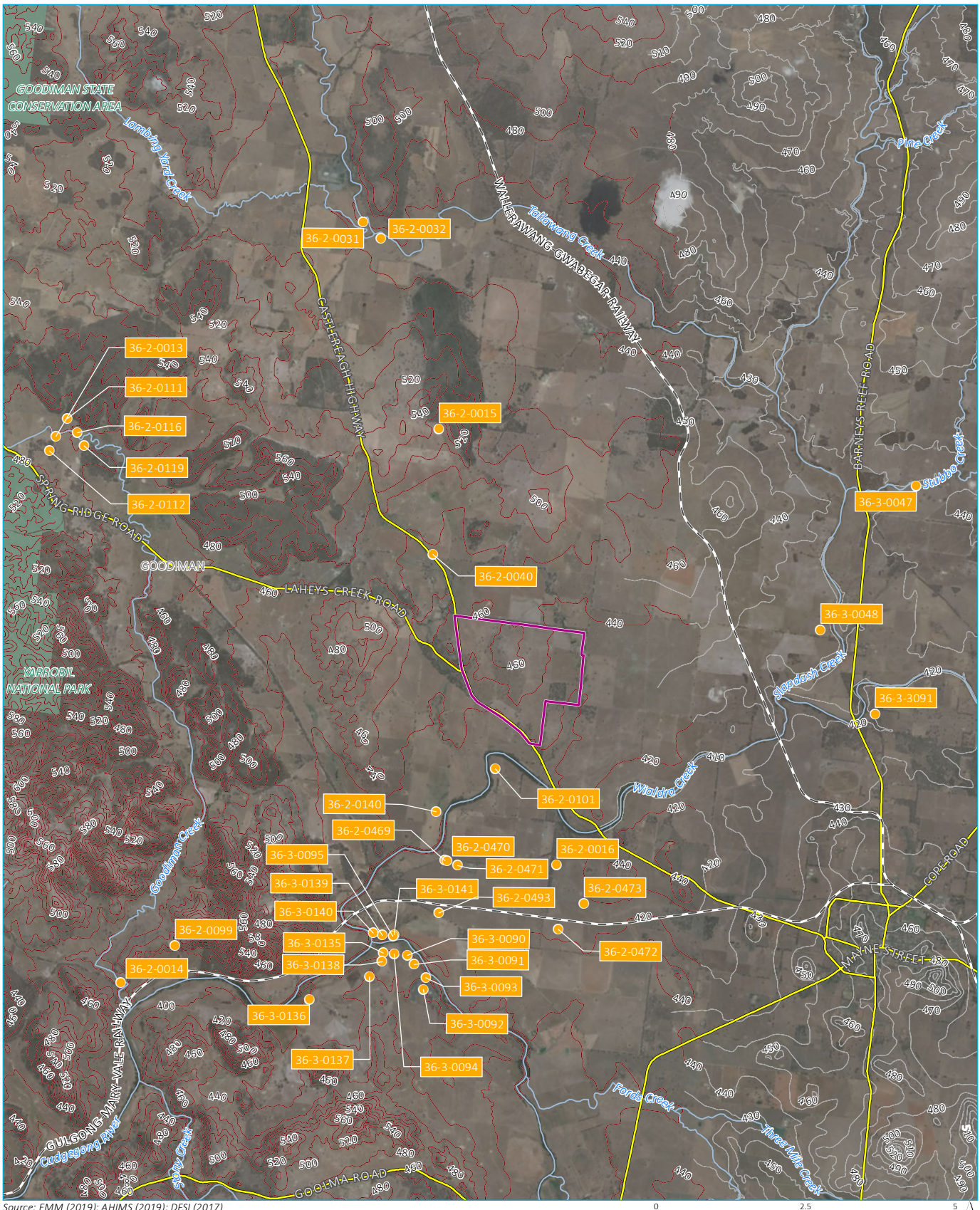
Open camp sites (artefact scatters and isolated finds) represent the dominant site type for the area (n=35, 97%). The only other site type identified is a stone quarry with associated artefact scatter. Five of the sites are registered as destroyed, whilst the remainder are listed as valid.

There are no previously recorded Aboriginal sites within the project area. It is important to note that a lack of sites identified on the AHIMS database does not necessarily correlate with a low frequency of sites being present, rather it is more often a reflection of the amount of archaeological survey that has been completed in the area.

ii Local Environmental Plan

The project area is located in the Mid-Western Regional Council Local Government Area (LGA). There are no declared Aboriginal places or archaeological sites listed in Schedule 5 Environmental Heritage of the *Mid-Western Regional Local Environmental Plan* (LEP) *2012* within the project area. The nearest LEP listed heritage item is "The Lagoon" Homestead (Item 391), located within Lot 1 DP 1144337 approximately 1.6 km southeast of the project area.

[1] An updated search of the AHIMS database was conducted on 8 April 2021. The updated search results included the 36 previously noted sites, and additional seven Aboriginal sites identified by EMM visual inspection, two of which are located within the project area (refer to Section 2.2.2i).



Source: EMM (2019); AHIMS (2019); DFSI (2017)

0 2.5 5 km

GDA 1994 MGA Zone 56

N

KEY

- Project area
- AHIMS site
- Rail line
- Main road
- Watercourse/drainage line
- Contour (20 m)
- NPWS reserve

AHIMS data and the project area

Bellambi Heights Renewable Project

Preliminary Aboriginal Heritage Assessment

Figure 2.1

EMM creating opportunities

iii Native Title claims and Indigenous Land Use Agreements

Searches of the National Native Title Tribunal (NNTT) *Register of Native Title Applications, Registration Decisions and Determinations* completed on 13 March 2019 and 15 April 2021 identified no determined native title or land claims over the project area.

The project area falls within the boundary of an active native title application, "Warrabinga-Wiradjuri #7" (Tribunal No NC2018/002, Fed Court No NSD857/2017; extract provided in Appendix A). The application was registered on 22 November 2018 and covers an area of 13,681 km^2 incorporating lands with Mid-Western, Bathurst, Lithgow, Blue Mountains, Hawkesbury, Muswellbrook, Upper Hunter, Singleton, Dubbo, and Warrumbungle local government areas (map provided in Appendix A).

2.1.2 Aboriginal heritage context

The following is a summary of previous investigations undertaken in the locality, addressing all sites identified by the AHIMS extensive search. The nearest registered Aboriginal site is located 750 m southeast of the project area, on the eastern bank of Wialdra Creek. The following discusses registered Aboriginal sites in order of proximity to the project area.

i Maynard (2003) *Shane Park Subdivision, Beryl Road Gulgong*

In 2003, David Maynard completed an archaeological assessment of the "Shane Park" property where subdivision of the property for grazing use was proposed. No report associated with this assessment is available, so the following information has been obtained from the site card "Wialdra Creek 1" (AHIMS 36-2-0101).

"Wialdra Creek 1" is located within 750 m of the current project area, on the eastern bank of Wialdra Creek. The site comprises an unspecified number of artefacts located on a second terrace overlooking a bend in the creek. Artefacts identified at the site were limited to a 100 m by 30 m exposure, however Maynard addresses this as a product of poor visibility outside of the exposure as opposed to an absence of additional artefacts and states that the scatter is likely to be larger than its current visible extent. Management recommendations were for the site to be left undisturbed and for the area to be subject to the continued grazing land use.

ii Jo McDonald Cultural Heritage Management Pty Ltd (1998) *Archaeological investigation along the proposed AGL lateral gas pipelines, Central Ranges Project, NSW*

In 1998, Jo McDonald Cultural Heritage Management was commissioned by AGL to complete an archaeological assessment of proposed lateral gas pipelines for the central ranges project. One site, artefact scatter "DM/OC1 Puggoon" (AHIMS 36-2-0040), identified by the study is located within 1 km of the current project area. "DM/OC1 Puggoon" is an open artefact scatter consisting of two stone artefacts recorded on the lower hill slope, approximately 50 m from a small, unnamed tributary near the eastern shoulder of the Castlereagh Highway. Artefacts included one flake of very fine pale chert with possible retouch on the right lateral margin and one milky quartz distal flake fragment. The artefacts were recorded 8 m apart on the graded entrance to a gate and vehicle track. Dimensions of the site are recorded as 20 m by 20 m acknowledging that there was zero visibility away from the 400 m^2 exposure within which artefacts were identified. The site has been heavily disturbed by grading and clearing associated with construction of the highway and by vehicle moment on the unsealed access track. Other impacts include fence lines and cultivation. Given the extent of disturbance the site was assessed as having a low likelihood of intact, sub-surface deposit.

iii OzArk Environmental & Heritage Management Pty Ltd (2005) *Indigenous and Non-Indigenous Heritage Assessment: Wollar – Wellington 330 kV Electricity Transmission Line*

In 2005, OzArk Environmental & Heritage Management Pty was commissioned by International Environmental Consultants P/L on behalf of TransGrid to conduct both Indigenous and non-Indigenous heritage assessments of

the proposed 116 km 330kV transmission line extending from Wollar to Wellington, NSW. A total of 28 Aboriginal sites were recorded, including ten artefact scatters with associated archaeological deposit, nine artefact scatters, seven isolated finds, and two areas of potential archaeological deposit. One site, isolated find "WC-IF1" (AHIMS 36-2-0140) identified by the study is located within 1.9 km of the current project area.

"WC-IF1" is recorded as a good quality quartz flake in a surface exposure associated with grazing on floodplain soils (OzArk 2005: 40). The artefact was identified at the proposed location of a transmission tower and the recommendations of the assessment included applying for a permit seeking consent to collect and relocate the site however "WC-IF1" is still listed as valid on AHIMS.

iv NGH Environmental (2017) *Beryl Solar Farm Aboriginal Cultural Heritage Assessment*

In 2017, NGH Environmental was contracted by First Solar Pty Ltd to conduct an ACHA for the Beryl Solar Farm. The location of the proposed Beryl Solar Farm included 332 ha of land on the eastern side of Wialdra Creek. The assessment identified five Aboriginal sites including one artefact scatter and four isolated finds, located within 2.5–3 km of the current project area in cleared paddocks with a history of agricultural use.

Artefact scatter "Beryl Solar Farm AS1" (AHIMS 36-2-0469), consisted of two quartz flakes on reddish brown sandy loam deposits in an area of low visibility approximately 220 m from Wialdra Creek. Isolated finds "Beryl Solar Farm IF1" to "Beryl Solar Farm IF4" (AHIMS 36-2-0470, 36-2-0471, 36-2-0472 and 36-2-0473) included, respectively, a tuff bifacial flaked hand axe, a tuff multi-platform core, a quartz multi-platform core, and a split ground-edge axe of volcanic material with some anvil damage. All five Aboriginal sites were salvaged in 2018 by OzArk Environmental & Heritage Management (OzArk 2018) under an approved Aboriginal Heritage Management Plan and are now listed as destroyed in the AHIMS database.

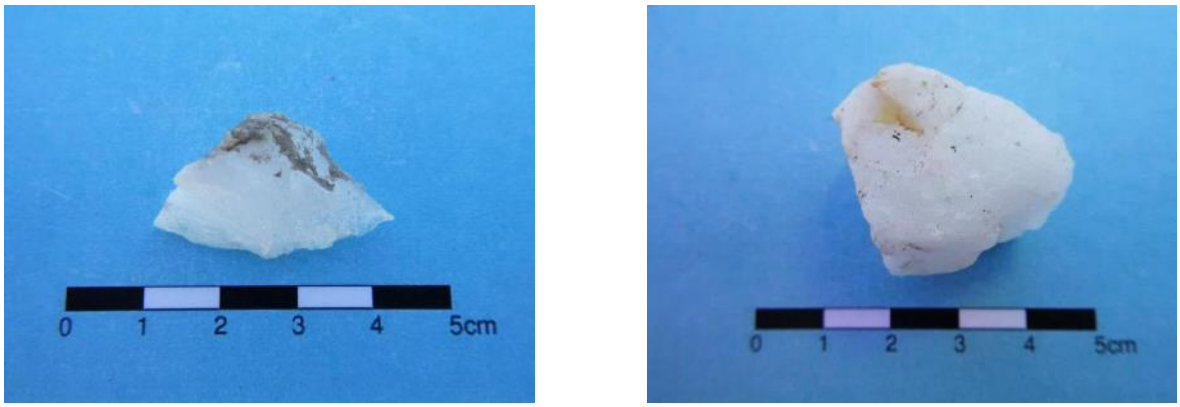


Plate 2.1 Artefacts from "Beryl Solar Farm AS1" (AHIMS 36-2-0469) (Source: OzArk 2018: 5)

Plate 2.2 Tuff core from "Beryl Solar Farm IF 2" (AHIMS 36-2-0472) (Source: OzArk 2018: 10)

Plate 2.3 Hand axe from "Beryl Solar Farm IF 1" (AHIMS 36-2-0473) (Source: OzArk 2018: 11)

v Cubis (1981) *Archaeological Survey of the Proposed Beryl to Ulan 132 kV Electricity Transmission Line*

In 1981, Cubis completed an archaeological survey on behalf of the Electricity Commission of NSW for 32 km of proposed 132 kV transmission line between the Beryl and Ulan substations. A total of ten Aboriginal sites were identified as a result of the survey, including "Slapdash Creek 1" (AHIMS 36-3-0048) and "Stubbo Creek 3" (AHIMS 36-3-0047) located 4 km and 7.5 km, respectively, from the current project area.

"Slapdash Creek 1" is an artefact scatter comprising a chert scraper and a quartzite core found 19 m apart on the surface of a heavily ploughed field. "Stubbo Creek 3" is an artefact scatter located on an indurated white clayey soil exposure in the vicinity of several historic sawpits. The site consisted of artefacts including scrapers, flakes, cores and a bifacially flaked axe. Raw materials consisted of quartzite, chert/siltstone, basalt, quartz, and greywacke.

vi Smith and Rich (1985) *Proposed Magnetite Mine at Tallawang: Archaeological Survey for Aboriginal Sites*

In 1985, Smith and Rich were contracted by R. W. Corkery & Co. Pty Ltd to conduct an archaeological survey for an open cut magnetite mine at Tallawang NSW. Seven open artefact scatters were identified as result of the survey, and two of these sites; "Tallawang Ck 5" (AHIMS 36-2-0031) and "Tallawang Ck 6" (AHIMS 36-2-0032) are located within 6 km of the current project area.

"Tallawang Ck 5" is an open artefact scatter extending across an area of approximately 50 m^2 located in a natural basin consisting of mussel shell, quartz artefacts and one basalt flake. "Tallawang Ck 6" was also an open artefact scatter consisting of a dense artefact scatter of quartz, fine grained siliceous, indurated mudstone and one greywacke. The site was located on the edge of the river flats and extended across a 90 m by 5 m area.

vii Haglund (1985) *Assessment of the Prehistoric Heritage in the Mudgee Shire*

In 1985, Haglund conducted a prehistoric assessment of the Mudgee region on behalf of the Mudgee Shire Council. The purpose of the study was: (a) to outline and evaluate the sources of information available to give a broad picture of environment and Aboriginal life in the Mudgee region; and (b) assess the potential of the area with regards to Aboriginal sites and provide recommendations relating to the identification and management of such sites (Haglund 1985: 1).

The assessment identified 70 Aboriginal sites including open sites, rock shelters, grinding groove sites, quarries, stone arrangements, modified trees, bora grounds and one burial site. Four of these sites, "Spring Ridge" (AHIMS 36-2-0013), "Two Mile Flat" (AHIMS 36-2-0014), "Puggoon" (AHIMS 36-2-0015), and "Beryl" (AHIMS 36-2-0016) are within 7 km of the current project area. The level of information provided about the sites is limited. All are described as open camp sites of poor condition whilst "Two Mile Flat" is noted to contain grindstones, axes and flakes, and "Beryl" to contain Bondi point artefacts (Haglund 1985: 11).

viii Brayshaw (1987) *Archaeological Survey of a Hard Rock Quarry Near Gulgong, NSW*

In May 1987, Helen Brayshaw conducted an archaeological survey on behalf of Boral Limited for a proposed hard rock quarry located 9 km west of Gulgong. The archaeological survey identified six open artefact sites and one isolated find which are located within 8 km of the current project area.

All of the recorded Aboriginal sites were located within 260 m of the Cudgegong River on flat areas adjacent to the river or on ridgetops or hillslopes overlooking the river. Artefact types identified only cores or flakes. From a total of 78 artefacts identified by the study, the majority were made of quartz (54.5%), followed by chert (35%), mudstone (9%) and basalt (1%).

In October 1987, Smith was commissioned by Boral Limited to conduct a second archaeological assessment of the proposed quarry location in preparation of an Environmental Impact Statement. Seven more sites were identified during Smith's survey, including six open campsites identified on the Cudgegong River flat and one quartz quarry site identified on a ridge line. All artefacts identified were quartz.

ix Purcell (2002) *Aboriginal Cultural Heritage Assessment, NSW Western Regional Assessments*

In 2002, the NSW National Parks and Wildlife Service (NPWS) conducted an ACHA on behalf of the Resource and Conservation Assessment Council as part of the Western Regional Assessments of NSW. This project was a State funded investigation of the biodiversity and cultural heritage of various regions, in this case the Brigalow Belt South bioregion. The Brigalow Belt South bioregion covers an area of 52,409 km^2 covering 6.5% of New South Wales (Purcell 2002). The purpose of the project was to gain a better understanding of the cultural heritage of the region to improve future management of public lands and provide better protection for Aboriginal cultural heritage.

Four sites identified by this study, identified only by their AHIMS registrations 36-2-0111, 36-2-0112, 36-2-0116 and 36-2-0119, are located within 9.5 km of the current project area near the Goonoo State Forest. All sites are identified as large artefact scatters featuring between 20 to 30 artefacts.

2.1.3 Predictive model

A predictive model of Aboriginal heritage values within the project area has been devised based on the data presented in the preceding sections. In summary the model has been developed through the analysis of:

- landscape features and disturbance in the project area and its surrounds;
- pre-colonial period ecological conditions;
- ethno-historical information about Aboriginal life and material culture; and
- the type and distribution of Aboriginal sites described in previous reports and AHIMS data.

The project area contains a number of landscape features, which are often associated with Aboriginal objects and archaeological sensitivity as a result of Aboriginal people's use of those features in their everyday lives and for traditional cultural activities. Proximity to Wialdra Creek and other ephemeral waterways and the subsequent availability of animal and plant resources in addition to natural materials suitable for artefact manufacture indicate that the project area would have been a locale highly likely to have attracted Aboriginal occupation. It must be noted that landscapes possessing archaeological sensitivity identified through desktop studies may not deliver on that potential as a result of natural processes (ie flooding events or erosion) or as a result of anthropogenic disturbances such as farming activities including tree clearing at initial settlement and cultivation for cropping and/or improved pasture.

On the basis of previously identified sites in the locality as discussed in Section 2.1.2, the following areas within the project area have been identified from desktop level as areas of potential archaeological sensitivity:

- within 30 m of ephemeral waterways;
- within 200 m of permanent waterways;
- level areas associated with ridge lines and hill crests; and
- areas of stone outcropping.

Predictions for the types of Aboriginal sites likely to be identified within the project area are as follows:

- Open stone artefact sites (scatters and isolated finds) are the most likely site types to occur in the project area due to the prevalence of this site type in the locality and the proximity of the project area to Wialdra Creek. Due to historical ground disturbances and it is unlikely that fully intact surface assemblages will be identified;

- Areas of potential archaeological deposit (PAD) have the potential to occur within the project area given its proximity to Wialdra Creek. The project area exhibits varying levels of disturbance and it is possible that less disturbed areas may retain archaeological deposit;
- Modified trees (scarred or carved) may occur if mature trees of a sufficient age to bear the marks of traditional Aboriginal scarring or carving are present. The project area has been subject to a high level of historical land clearing practices; however, a number of isolated mature trees remain present across the project area which have the potential to display evidence of cultural modification;
- Quarry sites are possible as a quartz quarry was previously identified south of the current project area. Within the project area it is anticipated this site type is less likely due to a predominance of granite outcropping which is not a material suitable for artefact manufacture;
- Grinding grooves and rock shelters are unlikely to occur as the geology within the project area does not present any sandstone outcropping typically associated with this site type; and
- Ceremonial grounds, mythological sites, and burials can occur anywhere in the landscape, but their identification is very rare. Generally, they would be visually identifiable by mounds of earth or stone markers arranged in a conspicuous layout. These are highly unlikely to occur or survive in the project area because of the high levels of ground disturbance.

2.2 Visual inspection

Over two days, 30 January to 31 January 2019, Morgan Wilcox (EMM Senior Archaeologist) and Taylar Reid (EMM Consultant Archaeologist) completed a visual inspection of the project area.

The objective of the visual inspection was to complete targeted inspection areas of archaeological sensitivity as identified by the predictive model outlined in Section 2.1.3; and complete broader inspection of as much of the project area as possible within the allocated timeframe.

2.2.1 Methodology

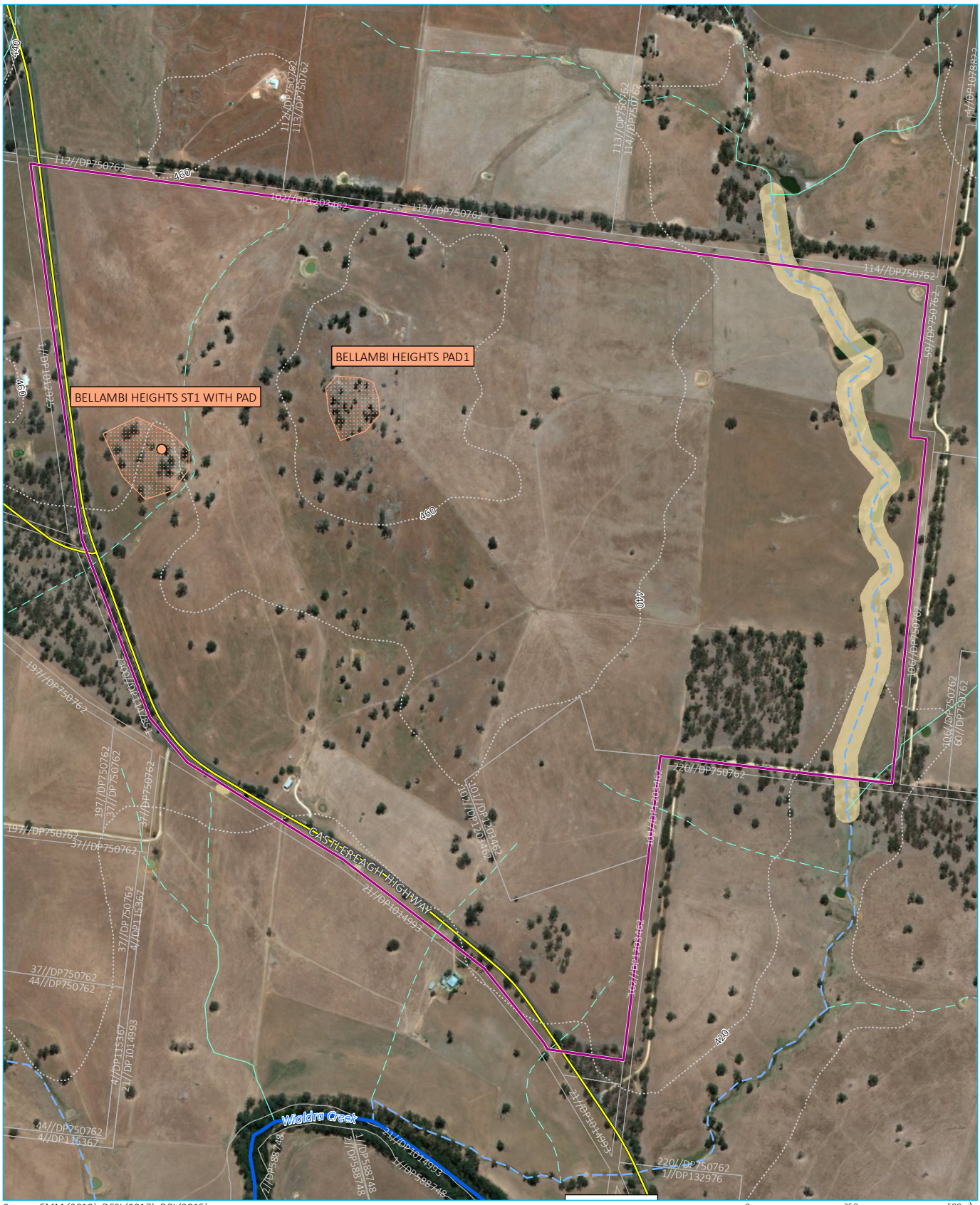
Field inspection was completed both on foot as well as utilising vehicle reconnaissance. A hand-held non-differential GPS unit (MGA94 Zone 55) was used to record inspection coverage and separated pedestrian and vehicle inspection modes. The landscape context including existing levels of disturbance was documented throughout the inspection including accompanying photographs to aid description and recording.

All Aboriginal sites identified during the inspection were documented to the standard outlined in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) and recorded using a hand-held non-differential GPS unit (MGA94 Zone 55).

2.2.2 Results

Results of the visual inspection are shown on Figure 2.2. Photographs of the project area provided in Plate 2.4 as a summary of the environment at the time of visual inspection.

Two Aboriginal sites were recorded within the project area as a result of the visual inspection, as well as an area of archaeological sensitivity which has been defined as any lands within 30 m of an ephemeral waterway which intersects the Lot 102 DP1203462 on a north-south alignment.



Source: EMM (2019); DFSI (2017); DPI (2015)

0 250 500 m

GDA 1994 MGA Zone 56

N

KEY

- Project area
- Main road
- Contour (10 m)
- Cadastral boundary
- Aboriginal site
- Potential archaeological deposit
- Areas of archaeological sensitivity

Strahler stream order

- 1st order
- 2nd order
- 3rd order
- 7th order

Visual inspection results

Bellambi Heights Renewable Project

Preliminary Aboriginal Heritage Assessment

Figure 2.2

EMM creating opportunities

Northeast corner of Lot 102 DP1203462 (view to southwest)

Southwestern portion of Lot 102 DP1203462 (view to north)

Southeast corner of Lot 102 DP1203462 dominated by large granite boulders (view to northeast)

Crest feature in upper central portion of Lot 102 DP1203462 (view to west)

Northwester corner of Lot 102 DP1203462 overlooking drainage line towards dam (view to south)

Creek line intersecting eastern portion of Lot 102 DP1203462 (view to north)

Plate 2.4 Project area landscape summary photographs

i Aboriginal sites recorded as a result of the visual inspection

Table 2.2 provides a summary of the Aboriginal sites recorded within the project area as a result of the visual inspection.

Table 2.2 Aboriginal sites recorded as a result of the visual inspection

Site Name	Description	Location (GDA 94 Zone 55)
Bellambi Heights PAD 1	Potential archaeological deposit delineated as the hill crest central to the Bellambi Heights property approximately 150 m by 125 m.	732359E 6421870N
Bellambi Heights ST 1 with PAD	Possible culturally scarred grey box with potential archaeological deposit approximately 200 m by 200 m. Dimensions of the scar: length 68 cm, width 29cm, regrowth 35 cm, height above ground to base of scar 118 cm.	731792E 6421773N

Plate 2.5 Bellambi Heights PAD 1

Plate 2.6 Bellambi Heights ST 1 with PAD

2.3 Summary of constraints

Visual inspection of the project area confirmed that a significant level of anthropogenic disturbance is present across the project area including land clearance, damming of watercourses, cultivation and livestock grazing.

The visual inspection confirmed the assumptions of the predicative model outlined in Section 2.1.3, with two Aboriginal sites located within the project area in proximity to waterways and/or in association with crest landforms. Areas of PAD have been identified where topographical features can be clearly delineated and are anticipated to contain sub-surface archaeological deposits. Within the project area, these PADs have been defined by benched crests clearly discernible from surrounding undulating hills. Any proposed impacts within areas delineated as PAD would need to be preceded by test excavation to confirm the presence of sub-surface deposit, its nature and extent, and its assessed significance for the purposes of future management.

By contrast, areas of archaeological sensitivity have been identified as a broader characterisation of the landscape on the basis of known archaeological values, predictive modelling and visual inspection. Areas of archaeological sensitivity acknowledge that archaeological material has a higher likelihood of occurring within these areas in contrast to the surrounding landscape. Any proposed impacts within areas of archaeological sensitivity would need to be subject to further assessment (ie survey) to establish if archaeological values are present which may include isolated artefacts, artefact scatters and/or PAD.

Areas containing Aboriginal heritage constraints are not automatically excluded from consideration for development but are identified as a guide to areas that will require additional investigation and management should project impacts be proposed to occur within them. Avoidance of identified Aboriginal objects, areas identified as PAD or archaeologically sensitive areas would result in a significant reduction of future assessment requirements.

3 Recommendations

The aim of the preliminary assessment is to assist in the development of the project footprint by identifying known or anticipated Aboriginal heritage values and areas of sensitivity within the project area. Areas containing Aboriginal heritage constraints are not automatically excluded from consideration for development but are identified as a guide to areas that will require additional investigation and management, should project impacts be proposed to occur within them.

The presence of Aboriginal heritage values and their assessed significance will directly influence the management of Aboriginal cultural heritage for the Project. Any proposed impacts to identified Aboriginal objects, areas identified as PAD or archaeologically sensitive areas would need to be the subject of additional assessment; which may include test excavation during the EIS phase of the project and possibly salvage excavation as a management strategy subsequent to project approach.

The following recommendations are provided as to subsequent investigations that will be required to finalise the Aboriginal heritage assessment to meet legislative requirements for an EIS:

- An Aboriginal Cultural Heritage Assessment (ACHA) must be prepared in accordance with *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011);
- The ACHA must be supported by an archaeological investigation that complies with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b); and
- Members of the local Aboriginal community who register for the project as part of the ACHA process must be consulted. Consultation must be undertaken in accordance with *Aboriginal Consultation Requirements for Proponents 2010* (DECCW 2010c).

References

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Appendix A

Register search results

Office of Environment & Heritage

AHIMS Web Services (AWS)

Your Ref/PO Number : J180343

Client Service ID : 392153

Note: This Excel report shows the sites found in AHIMS on the 08/04/2021. If this date is not the same as the original date of the Search Results letter obtained during the Basic Search, then the search results might be different. The PDF version of this report will always coincide with the Basic Search Results letter.

Site ID	Site name	Datum	Zone	Easting	Northing	Context	Site status	Site features	Site types	Recorders	Reports	Permits	Longitude GDA94	Latitude GDA94
36-2-0040	DM/OC1 - "Puggoon"	AGD	55	731150	6423350	Open site	Valid	Artefact : -	Open Camp Site	Stephanie Garling			149.45612351	-32.30114987
36-3-0135	CR10;	AGD	55	729950	6416750	Open site	Valid	Artefact : -	Open Camp Site	Laura-Jane Smith	1236		149.44498832	-32.36088353
36-3-0136	CR11;	AGD	55	728670	6416050	Open site	Valid	Artefact : -	Open Camp Site	Laura-Jane Smith	1236		149.43156471	-32.36745564
36-3-0137	CR12;	AGD	55	729700	6416370	Open site	Valid	Stone Quarry : -, Artefact : -	Quarry	Laura-Jane Smith	1236		149.44242567	-32.36435996
36-3-0138	CR13;	AGD	55	729920	6416610	Open site	Valid	Artefact : -	Open Camp Site	Laura-Jane Smith	1236		149.44470372	-32.36215153
36-3-0139	CR8;	AGD	55	729950	6417050	Open site	Valid	Artefact : -	Open Camp Site	Laura-Jane Smith	1236		149.44491552	-32.35817962
36-3-0047	Stubbo Creek 3;	AGD	55	739276	6424042	Open site	Valid	Artefact : -	Open Camp Site	L Cubis	234		149.54217938	-32.29320516
36-3-0048	Slapdash Creek 1;	AGD	55	737542	6421727	Open site	Valid	Artefact : -	Open Camp Site	L Cubis	234		149.52435941	-32.31443862
36-3-0140	CR9;	AGD	55	729800	6417100	Open site	Valid	Artefact : -	Open Camp Site	Laura-Jane Smith	1236		149.44331057	-32.35775985
36-3-0141	CR7;	AGD	55	730150	6417050	Open site	Valid	Artefact : -	Open Camp Site	Laura-Jane Smith	1236	53	149.44703928	-32.35813841
36-2-0013	Spring Ridge;	AGD	55	724971	6425674	Open site	Valid	Artefact : -	Open Camp Site	R Hawkins,Hawkins	1299		149.38999956	-32.28146193
36-2-0014	Two Mile Flat;	AGD	55	725544	6416502	Open site	Valid	Artefact : -	Open Camp Site	Moore,R Hawkins,Hawkins	1299		149.39825843	-32.36401773
36-2-0015	Puggoon;	AGD	55	731367	6425435	Open site	Valid	Artefact : -	Open Camp Site	R Hawkins,Hawkins	1299		149.45791896	-32.28231281
36-2-0016	Beryl;	AGD	55	732922	6418057	Open site	Valid	Artefact : -	Open Camp Site	R Hawkins,Hawkins	1299		149.47622671	-32.34848763
36-2-0031	Tallawang Ck 5 Gulgong "Nungarrin".	AGD	55	730300	6428950	Open site	Valid	Artefact : -	Open Camp Site	Elizabeth Rich,Laura-Jane Smith	851,1173	192	149.44574781	-32.25085147
36-2-0032	Tallawang Ck 6 Gulgong;Nungarrin "Nungarrin".	AGD	55	730580	6428670	Open site	Valid	Artefact : -	Open Camp Site	Elizabeth Rich,Laura-Jane Smith	851		149.44878534	-32.25331761
36-3-0090	CR 1	AGD	55	730350	6416693	Open site	Valid	Artefact : -	Open Camp Site	Helen Brayshaw	1125,1504,102800		149.44924982	-32.36131481
36-3-0091	CR 2	AGD	55	730458	6416531	Open site	Valid	Artefact : -	Open Camp Site	Helen Brayshaw	1125,1504,102800		149.45043610	-32.36275262
36-3-0092	CR 3;	AGD	55	730586	6416108	Open site	Valid	Artefact : -	Open Camp Site	Helen Brayshaw	1125,102800	72	149.45189832	-32.36653869
36-3-0093	CR 4;	AGD	55	730637	6416306	Open site	Valid	Artefact : -	Open Camp Site	Helen Brayshaw	1125,1504,102800		149.45239172	-32.36474358
36-3-0094	CR 5;	AGD	55	730133	6416731	Open site	Valid	Artefact : -	Open Camp Site	Helen Brayshaw	1125,1504,102800		149.44693624	-32.36101707
36-3-0095	CR 6;	AGD	55	730128	6417026	Open site	Valid	Artefact : -	Open Camp Site	Helen Brayshaw	1125		149.44681150	-32.35835925
36-2-0099	Stony Creek 3 SC3	AGD	55	726480	6417070	Open site	Valid	Artefact : -		Mr.David Maynard		1845	149.40806281	-32.35870866
36-2-0101	Wialdra Creek 1. WC1	AGD	55	731990	6419720	Open site	Valid	Artefact : -		Mr.David Maynard			149.46592445	-32.33369310
36-2-0119	BBS; Dubbo LALC; "Makuba Shukran"	AGD	55	725433	6425487	Open site	Valid	Artefact : 30		Phil Purcell,Dubbo LALC	99169		149.39494582	-32.28305454
36-2-0112	BBS; Dubbo LALC; property	AGD	55	724850	6425437	Open site	Valid	Artefact : 30		Leila McAdam,Dubbo LALC	99169		149.38877173	-32.28362244
36-2-0116	BBS; Dubbo LALC; property 1	AGD	55	725331	6425711	Open site	Valid	Artefact : 20		Phil Purcell,Dubbo LALC	99169		149.39381049	-32.28105605
36-2-0111	BBS; Dubbo LALC; " Makuba Shuka"	AGD	55	725180	6425960	Open site	Valid	Artefact : 22		Phil Purcell,Dubbo LALC	99169		149.39214941	-32.27884206
36-2-0140	WC IF 1	AGD	55	730960	6419061	Open site	Valid	Artefact : 1		Mr.David Maynard,Murong Gialinga Aboriginal and Torres Strait Islander Corporation,Doctor Jodie Benton,Warrabinga Nativ			149.45515058	-32.33984602
36-3-3091	Old Barneys AFT 1	GDA	55	738486	6420460	Open site	Valid	Artefact : -		Niche Environment and Heritage,Ms.Clare Anderson			149.53354182	-32.32733487
36-2-0469	Beryl Solar Farm AS1	GDA	55	731174	6418420	Open site	Destroyed	Artefact : -		OzArk Environmental and Heritage Management,Mr.Matthew Barber,NGH Heritage - Fyshwick,Miss.Philippa Sokol			149.45642247	-32.34725688
36-2-0470	Beryl Solar Farm IF 4	GDA	55	731214	6418411	Open site	Destroyed	Artefact : -		OzArk Environmental and Heritage Management,Mr.Matthew Barber,NGH Heritage - Fyshwick,Miss.Philippa Sokol			149.45684936	-32.34732972
36-2-0471	Beryl Solar Farm IF 3	GDA	55	731385	6418330	Open site	Destroyed	Artefact : -		OzArk Environmental and Heritage Management,Mr.Matthew Barber,NGH Heritage - Fyshwick,Miss.Philippa Sokol			149.45868471	-32.34802438
36-2-0472	Beryl Solar Farm IF 2	GDA	55	733005	6417165	Open site	Destroyed	Artefact : -		OzArk Environmental and Heritage Management,Mr.Matthew Barber,NGH Heritage - Fyshwick,Miss.Philippa Sokol			149.47617121	-32.35818773
36-2-0473	Beryl Solar Farm IF 1	GDA	55	733453	6417569	Open site	Destroyed	Artefact : -		OzArk Environmental and Heritage Management,Mr.Matthew Barber,NGH Heritage - Fyshwick,Miss.Philippa Sokol			149.48082886	-32.35445301
36-2-0493	Beryl Solar Farm - Salvaged Artefact Relocation	GDA	55	731024	6417553	Open site	Valid	Artefact : -		OzArk Environmental and Heritage Management,Miss.Philippa Sokol			149.45504105	-32.35510218
36-2-0501	Bellambi IF 1	GDA	55	731941	6420363	Open site	Valid	Artefact : 1		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.46409116	-32.32958576
36-2-0502	Bellambi PAD 1	GDA	55	732443	6420072	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.46949129	-32.33210429
36-2-0503	Bellambi PAD 2	GDA	55	732682	6419854	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.47208185	-32.33401939
36-2-0504	Bellambi Heights ST 1 with PAD	GDA	55	732359	6421870	Open site	Valid	Potential Archaeological Deposit (PAD) : 1, Modified Tree (Carved or Scarred) : 1		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.46815966	-32.31591646
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		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.45541018	-32.34439092
36-2-0506	Bellambi OS 1 with PAD	GDA	55	731340	6419416	Open site	Valid	Artefact : 1, Potential Archaeological Deposit (PAD) : 1		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.45794212	-32.33824558
36-2-0507	Ballembi Heights PAD 1	GDA	55	732359	6421870	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		EMM Consulting - St Leonards - Individual users,Miss.Morgan Wilcox			149.46815966	-32.31591646

National Native Title Tribunal

Extract from Schedule of Native Title Applications

Application Reference:	Federal Court number: NSD857/2017 NNTT number: NC2018/002
Application Name:	Warrabinga-Wiradjuri #7
Application Type:	Claimant
Application filed with:	Federal Court of Australia
Date application filed:	31/08/2018

Current stage(s):	Notification Complete
Registration information:	Please refer to the Register of Native Title Claims/National Native Title Register (as appropriate) for registered details of this application. **Date claim entered on Register of Native Title Claims:** 22/11/2018 **Registration decision status:** Accepted for registration **Registration history:** Registered from 22/11/2018

Applicants:	Wendy Lewis, Mavis Agnew, Martin de Launey
Address(es) for Service:	Simon Blackshield Blackshield Lawyers Level 28, AMP Tower 140 St Georges Terrace Perth WA 6000 **Phone:** 08 97111 2051

Additional Information

Not applicable

Persons claiming to hold native title:

The application is made on behalf of the descendants of the following persons:

Diana Mudgee Peggy Lambert
Jimmy Lambert James “Tracker” Macdonald
Thullagumaulli

Native title rights and interests claimed:

Native title where traditional rights are wholly recognisable

1. Paragraph [2] applies to every part of the claim area:

(a) where there has been no extinguishment to any extent of native title or where any extinguishment is required to be disregarded; and

(b) which is not subject to the public right to navigate or the public right to fish.

2. Where this paragraph [2] applies the right possessed under traditional law and customs is properly interpreted as, and the native title right recognised by the common law of Australia is, the right of possession, occupation, use and enjoyment of land and waters as against the whole world.

3. For the avoidance of any doubt, the right of possession, occupation, use and enjoyment of land and waters as against the whole world is not claimed in relation to any area where a previous non-exclusive possession act covered by para 61A(3)(b) of the Native Title Act 1993 has been done.

Native title where traditional rights are partially recognisable

4. Paragraph [5] applies to every part of the claim area to which paragraph [2] does not apply.

5. Where this paragraph [5] applies, the rights and interests possessed under traditional laws and customs are properly interpreted as the rights of possession, occupation, use and enjoyment of land and waters as against the whole world, but the native title rights and interests recognised by the common law of Australia are the rights to do all such things as may be done under the right referred to in paragraph [2] save for controlling the access to or the use of land or waters by others; being the (non-exclusive) rights to:

(a) have access to, remain on and use the land and waters;

(b) access and take the resources of the land and waters; and

(c) protect places, areas and things of traditional significance on the land and waters.

6. The members of the native title claim group acknowledge that their native title rights and interests are subject to and exercisable in accordance with valid and current laws of the Commonwealth and the State of New South Wales including the common law.

7. For the purposes of paragraph 5(b) above, "resources" means anything that has utility or potential utility, excluding such minerals, petroleum, geothermal energy or geothermal energy resources, if any, as are, under the laws of the Commonwealth and the State of New South Wales including the common law as at the date of this application, wholly owned by the Crown.

Application Area:

State/Territory: New South Wales
Brief Location: Central West NSW
Primary RATSIB Area: New South Wales
Approximate size: 13681.8714 sq km
(Note: There may be areas within the external boundary of the application that are not claimed.)
Does Area Include Sea: No

Area covered by the claim (as detailed in the application):

1. For a written description of the external boundaries of the area covered by the application, see Attachment B

2. Subject to (3) below, the areas of land and waters within the boundaries referred to in (1) above that are not covered by the application include:

(a) Any area that is, or was, subject to any of the following acts as defined in the Native Title Act 1993 (Cwlth) or the Native Title (New South Wales) Act 1994 (NSW):

i Category A past act
ii Category A intermediate period act
iii Category B past act that is wholly inconsistent with the continued existence, enjoyment or exercise of any native title rights or interests
iv Category B intermediate period act that is wholly inconsistent with the continued existence, enjoyment or exercise of any native title rights or interests
v previous exclusive possession act

(b) Any other area in relation to which native title rights and interest have otherwise been wholly extinguished

(c) Any area for which there is an approved determination of native title, as defined in the Native Title Act.

3. Subject only to (4) and (5) below, the area covered by the application includes any area in relation to which the non-extinguishment principle (as defined in section 238 of the Native Title Act) applies,
including any area to which section 47, 47A or 47B of the Native Title Act applies. Particulars of these areas will be provided prior to the hearing but any area as may be listed in Schedule L is included in the area covered by the application.

4. The areas covered by the following applications for determinations of native title are excluded from this application: NSD 543 of 2013 and NSD 1786 of 2016.

5. The areas covered by EL 7517, MLA 376, MLA 392 and MLA 393 are excluded from this application.

6. Where there is any discrepancy between the map provided at Attachment C and either the written description contained in Attachment B on pages 11 to 15 of the application,
or the list in Attachment B on page 15 of the application (which confirms that the external boundary does not overlap with the certain adjoining claimant applications), the latter prevail.

Combination Details

Date of order to combine: 12/12/2017

This application is a combination of the following applications:

Application number(s)	Application name	Date application lodged/filed	Date claim entered on Register*	Registration History
NSD857/2017,NC2017/001	Wendy Lewis & ORS	29/05/2017	N/A	Registered from 1/09/2017 to 22/11/2018

NSD443/2016,NC2016/002	Warrabinga Wiradjuri #4	26/03/2016	N/A	Registered from 29/04/2016 to 22/11/2018

*For further information on pre-combined applications, see the Schedule extract for each pre-combined application.

Attachments:

1. Attachment B External Boundary Description, 5 pages - A4, 22/11/2018
2. Attachment C Map, 1 page - A4, 22/11/2018

NNTT Contact Details

Address: National Native Title Tribunal
Sydney Office
Level 14, Law Courts
Queens Square
SYDNEY NSW 2000

GPO Box 9973
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Freecall: 1800 640 501
Fax: +61 8 9425 1193
Web Page: www.nntt.gov.au

End of Extract

National Native Title Tribunal

Native Title Determination Application

NSD857/2017
Warrabinga Wiradjuri #7
(Amended)

Commencement Point

Native Title Determination NSD818/2011 Mudgee Local Aboriginal Land Council (NND2013/003)

Excluded area covered by EL 7517, MLA 376, MLA 392 and MLA 393

149°30'E 150°0'E 150°30'E
32°0'S 32°30'S 33°0'S 33°30'S

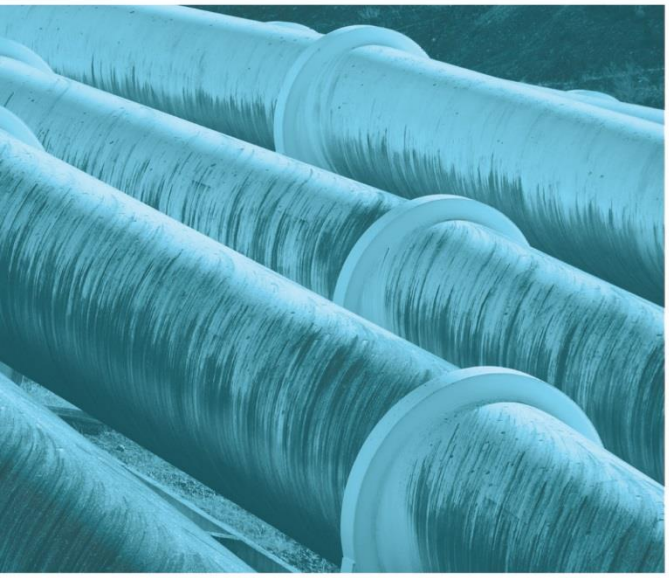
Boundary

0 15 30
Kilometres

Geocentric Datum of Australia 1994

Prepared by:Geospatial Services, National Native Title Tribunal 4/06/2018

Data Sources:
Applicastion and Agreement boundaries compiled by National Native Title Tribunal based on information or instructions provided by the applicants.



Appendix E

Landscape and visual scoping study

78 Macgregor Terrace, Bardon 4064
PO Box 189 Red Hill 4059
ABN 72166862157

iris

MEMO

To: Kori Law, Manager Planning, Media, and Community, Vena Energy

From: Suzie Rawlinson, Director

Date: 26 May, 2021

Re: **Bellambi Heights Renewable Project**

Landscape and visual amenity input for project scoping report

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Visual attributes of the study area

The Bellambi Heights Renewable Project (BHRP) is located in the Central Tablelands of NSW, on the Castlereagh Highway, approximately 6.5 kilometres north-west of Gulgong. The site is located within a broad valley, with an undulating landform and a rural character.

This landscape includes dense vegetation along Wialdra Creek in the south, trees intermittently along the Castlereagh Highway, corridors of trees along field boundaries and scattered individual trees across the open paddocks. There are several blocks of vegetation including at Puggoon Road as well as a Travelling Stock Reserve at the junction of the Castlereagh Highway and Laheys Creek Road.

There are several utility scale electricity transmission lines crossing the study area. This includes one crossing the highway through the site, and a second to the south of the site, connecting to the Beryl substation to the south-west of the site. The Spring Ridge and Yarrobil National Park form a vegetated mountain range to the west of the site and are an important local visual feature. There are westerly views from the Castlereagh Highway towards the range and some rural properties are oriented west to enjoy this outlook.

Planning considerations

Planning Priority 3 of the **Mid-Western Regional Local Strategic Planning Statement** (LSPS) 2020 aims to *'maintain and promote the aesthetic appeal of the towns and villages within the Region'*, such as Gulgong. It further states: '*The unique landscapes surrounding the towns and village are highly valued and contribute to the overall appeal of the Region. Protecting these landscapes and rural settings into the future will ensure a positive experience for visitors and a good quality of life for residents*.' (Planning Priority 3)

The structure plan for Gulgong, illustrated in section 4.3 of the LSPS (Figure 5), visually depicts the layout of the urban area. It identifies the Castlereagh Highway as one of the '*Main Entrance Corridors*' to Gulgong and considers '*district views*' from the '*elevated town centre*' of Gulgong to be important. The structure plan also identifies a group of properties south to south-east of the site as future '*Large Lot Residential*'.

A key action for Planning Priority 3 is to prepare a 'Scenic Lands Study' including statements of significance for high value landscapes, to identify the scenic and aesthetic qualities of the Region and to assist land use decisions. However, these statements are not yet available.

A key objective of the **Mid-Western Regional Council Local Environmental Plan** (LEP) is to protect, enhance and conserve the region's '*scenic values*' (cl.1.2(2)(b)(v)). The plan also aims to protect the rural settings of Mudgee and Gulgong by:

(i) managing the urban and rural interface …

(iii) promoting urban and rural uses that minimise land use conflict and adverse impacts on amenity, and

(iv) conserving the significant visual elements that contribute to the character of the towns, such as elevated land and the rural character of the main entry corridors into the towns (cl.1.2(2)(e))

The site is located on land zoned RU1 – Primary Production under the Mid-Western Regional LEP. A key objective of this zone is to '*maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes'* (Land Use Table Zone RU1).

There are two areas surrounding the site where there is land zoned R5 – Large Lot Residential. This includes a group of properties north-west of the site and a group of properties south to south-east of the site, between Wialdra Creek and extending south-east across the Castlereagh Highway. A key objective of this zone is to '*provide residential housing in a rural setting while preserving, and minimising impacts on, environmentally sensitive locations and scenic quality*' (Land Use Table Zone R5).

Items of historic and cultural importance which contribute to the visual character of the surrounding rural landscape of Gulgong include "The Lagoon" a rural homestead on the southern banks of Wialdra Creek (1.5 kilometres south-east of the site). This property is unlikely to have views of the proposal.

The LEP identifies '*Visually sensitive land*' with the intention of protecting … '*the visually and environmentally significant upper slopes on the urban fringe south of the town of Mudgee*' (cl.6.10). However, Gulgong and the surrounding rural area (including the site and surrounds) contains no '*visually sensitive land'* identified in the LEP or the Mudgee and Gulgong Urban Release Strategy (2014)..

The Mid-Western Regional Comprehensive Land Use Strategy (2017) describes ridgelines as '*visually important elements of the rural landscape'* that require protection (Part C - Strategy Revision E, 2017, Section 2.3.9). The site is not located on a ridgeline. Furthermore, the need for a 'gateway treatment' was identified by the community as being a 'significant issue' for towns such as Gulgong. In this strategy, Council recommends a '*substantial vegetated buffer along the major roadways*' and incorporation of '*gateway treatments including vegetation, fencing and signage*' well in advance of any urban development (Section 2.2.2). The Strategy also suggest the '*spilt use of the parcels fronting the Castlereagh Highway such as part infrastructure, part urban (industrial, residential or whatever the case may be) within 50m of the Castlereagh Highway*' (Section 2.2.2).

The Development Control Plan, Amendment 5, indicates that solar energy farms are not to '*impact on the scenic value and character of the locality*' within a 5-kilometre distance from Gulgong (Amendment 5 of the DCP, 2020). The site is located more than 5-kilometres from Gulgong.

Site analysis and development footprint refinement

In determining the preferred site location and development footprint (area containing panel arrays, inverters, site offices, access tracks, parking etc.) for the BHRP a process of 3D viewshed modelling and visibility analysis was undertaken using LIDAR point cloud data. This process maximises the potential for natural screening of the site by the existing landform and vegetation of the site and surrounding areas to minimise the potential visual impact of the project, (Refer Figure C). The selection of a preferred site area also considered the local landscape features, important view corridors, public viewing locations and the number and proximity of sensitive receivers.

Based on this analysis, as well as a several other environmental and operational factors, a preferred site proposed development footprint was identified which minimises potential visual impact, (Refer Figure D).

This refinement has included removing an area of land located to the east and west of the Castlereagh Highway, about 1km to the north of Jenkins Lane (site investigation area 3); and removing an area of land to the south of the Castlereagh Highway and extending to Wialdra Creek, south-west of the site (site investigation area 2).

The resulting development footprint (site investigation area 1) decreases the potential visual impact by:

- removing development from a local highpoint (site investigation area 3), located on land to the north of Jenkins Lane. Areas of elevated land are more visually prominent and their importance is recognised in the LEP: '*conserving the significant visual elements that contribute to the character of the towns, such as elevated land'* (LEP 2013, cl.1.2(2)(e)).

- removing development from the foreground of views to the Spring Ridge and Yarrobil National Park (south of the Castlereagh Highway) (site investigation area 2), retaining views to this important local visual feature. (Refer Figures E-G).

- utilising existing landform and vegetation (within and surrounding the site) to shield the site. This includes areas of existing vegetation within the landscape, including the Travelling Stock Reserve (located at the junction of the Castlereagh Highway and Laheys Creek Road), vegetation along the unformed Crown road on the northern boundary of the site, at the corner of the Castlereagh Highway and Puggoon Road, vegetation along Puggoon Road, and along Wialdra Creek which would provide some immediate visual screening of the project.

- consolidating the site to one contiguous footprint rather than one that is spread over several separate paddocks so that it would be viewed from a smaller number of vantage points, can be more effectively screened by vegetation, and appear as a single visual element within a broader patchwork of paddocks.
- consolidating the proposed development footprint into a single site which does not span the Castlereagh Highway, so that the proposal would only be viewed from the perimeter of the site, rather than viewers on the Highway passing through the development footprint.
- Removing the development footprint from the north-western corner of the site which would be prominent in southbound views from the Castlereagh Highway. (Refer Figures E-H)
- to reduce the potential for cumulative visual impact with other solar farm developments in the region.

Overall, the proposed development footprint substantially reduces the number of potential visual receptors to the site; reduces the number of viewers with a higher visual sensitivity (including rural residential properties), reduces the number of potential receptors (both associated and non-associated dwellings) within 500 metres of the site, and reduces the duration of views to the site from the Highway.

Proposal site visibility

The visibility of the site is influenced by both landform and vegetation (Refer Figures A, B, and D). The landform of the site rises to a local highpoint in the central north of the site, with some local undulations including a small spur located generally parallel to the highway and extending south-east from this highpoint. This spur divides views into smaller visual catchments, containing views from the east and west somewhat.

The following describes the potential visual catchment of the site:

- There are short and mid- range views from the rural areas to the north of the site. These are filtered and screened by the existing mature trees and vegetation along the unformed Crown road that adjoins the northern site boundary. As the land rises, there would be views from the paddocks about one to two kilometres to the north of the site.

- There would be some views to the eastern areas of the site from the paddocks to the east and south-east, between Jacksons Lane and Wialdra Creek extending about two kilometres from the site.

- To the south, the vegetation within the site, along Puggoon Road, the Castlereagh Highway and Wialdra Creek, combine to filter and enclose views from the south, including locally elevated properties in the locality of The Lagoon.

- There may be views from areas to the south-east of the site, viewed at a distance of over four kilometres. However, at this distance the solar farm infrastructure would not be discernable and would appear as a block of colour amongst distant paddocks.
- To the south of the site, vegetation along Wialdra Creek screens areas to the south of the creek. There may be some views from high points along Beryl Road at a distance of about two kilometres.
- In views from the west, south of Laheys Creek Road, the site would be visible from some areas within one kilometre of the site and then again as the landform rises to a small ridgeline about two kilometres west of the site.
- Areas to the north-west of the site are mostly screened by vegetation within the Travelling Stock Reserve and local landform, with some distant views possible from paddocks about three kilometres away.

Overall, the site has a relatively small visual catchment with only small areas where there would be greater than 30% of the proposed developable area visible. The existing mature vegetation surrounding the site would reduce the visual prominence of the project, by screening and filtering views, and providing a vegetated backdrop to views particularly from the east, south-east and south. The vegetation and undulating local landform increase the visual absorption of the proposed development into the surrounding landscape.

Views from residential properties

While the project is mainly visible from rural areas which contain few residences, there are some locations where views to the site are likely.

There would be views from two properties within 500 metres from the site where views to the project are likely. One dwelling is located to the west of the Castlereagh Highway on a rise, and the other on a paddock to the north of the site.

Further to the north of the site, at a distance of one to two kilometres, there are two dwellings with potential views to the site viewed over the vegetation along the northern unformed Crown road.

There would also be views from several dwellings west of the site east of Spring Ridge Road where there may be distant views to the west facing slopes of the project.

Views from properties on the lower lying areas, to the south of Wialdra Creek, would be largely screened by creekside vegetation. There are locally elevated areas on Beryl Road, where there may be distant views to the project.

Many of these dwellings include existing views to the Highway and transmission line infrastructure crossing the valley. These locations would be of lower sensitivity as these receptors are located within a working rural landscape which includes existing utility scale power infrastructure.

There is a heritage listed residence (Lagoon Homestead) to the south of Wialdra Creek, which would have higher visual sensitivity, however, this property is unlikely to have views to the site due to intervening vegetation and the landform of the site.

Views from the Castlereagh Highway

When travelling from north to south along the Highway, approaching the Gulgong township, there is a long view directed along the Spring Valley, as the highway passes over a small rise, north of the site. The journey includes a series of small visual catchments of rural landscape as the Highway meanders south. Vegetation within the Travelling Stock Reserve, at the intersection with Laheys Creek Road, encloses views for a short section. To the south of Laheys Creek Road, views open-up to the west to include distant views of the vegetated hills of Spring Ridge and Yarrobil National Park to the west of the valley. The vegetation along Wialdra Creek creates a strong visual element, identifying the crossing of the creek.

Views from the Castlereagh Highway are of higher sensitivity due to the number of people who use the Highway, and its role in the experience of approaching the township of Gulgong from the north as referred to in the LEP (s.1.2[2e]).

While this section of the highway is on the north westerly approach to Gulgong and identified as one of the 'Main Entrance Corridors' to Gulgong in the LSPS (2020), this section of the highway has a visual character consistent with the experience of passing through the broader rural landscape. The outskirts of the township of Gulgong, begins to the south of Wialdra Creek, where the density of rural residences begins to increase and the approach to town becomes apparent with an avenue of trees and signage marking the approach to the township itself.

There would be views from the Highway to the project as it forms the western boundary of the site for about two kilometres. On this part of the journey, groups of trees along the Highway partly obstruct and filter views towards the site intermittently from the Highway. In some locations, the site is viewed in the context of existing overhead transmission lines and with existing blocks of vegetation.

The views from the highway to the vegetated hills of Spring Ridge and Yarrobil National Park, to the west of the site, would continue to be viewed from the highway without interruption from the project. The vegetation at Laheys Creek Road in the Travelling Stock Reserve, and the Wialdra Creek crossing would also remain unchanged as visual features along this journey.

Opportunities for landscape and visual mitigation

A solution would be designed for the proposal, building upon the landscape character of the site, and valued landscape elements of the site, determined in consultation with the community.

The landscape strategy would specifically address views from the highway and the experience of passing through this section of the landscape. This is likely to include providing areas of dense screening interspersed with areas where screening is combined with scattered trees to provide a site responsive roadside landscape that further reduces views to the project.

Long view lines from the highway, such as the approach from the north, would also be prioritised with adjustments to the development footprint combined with planting maximising the screening effect of the local landform.

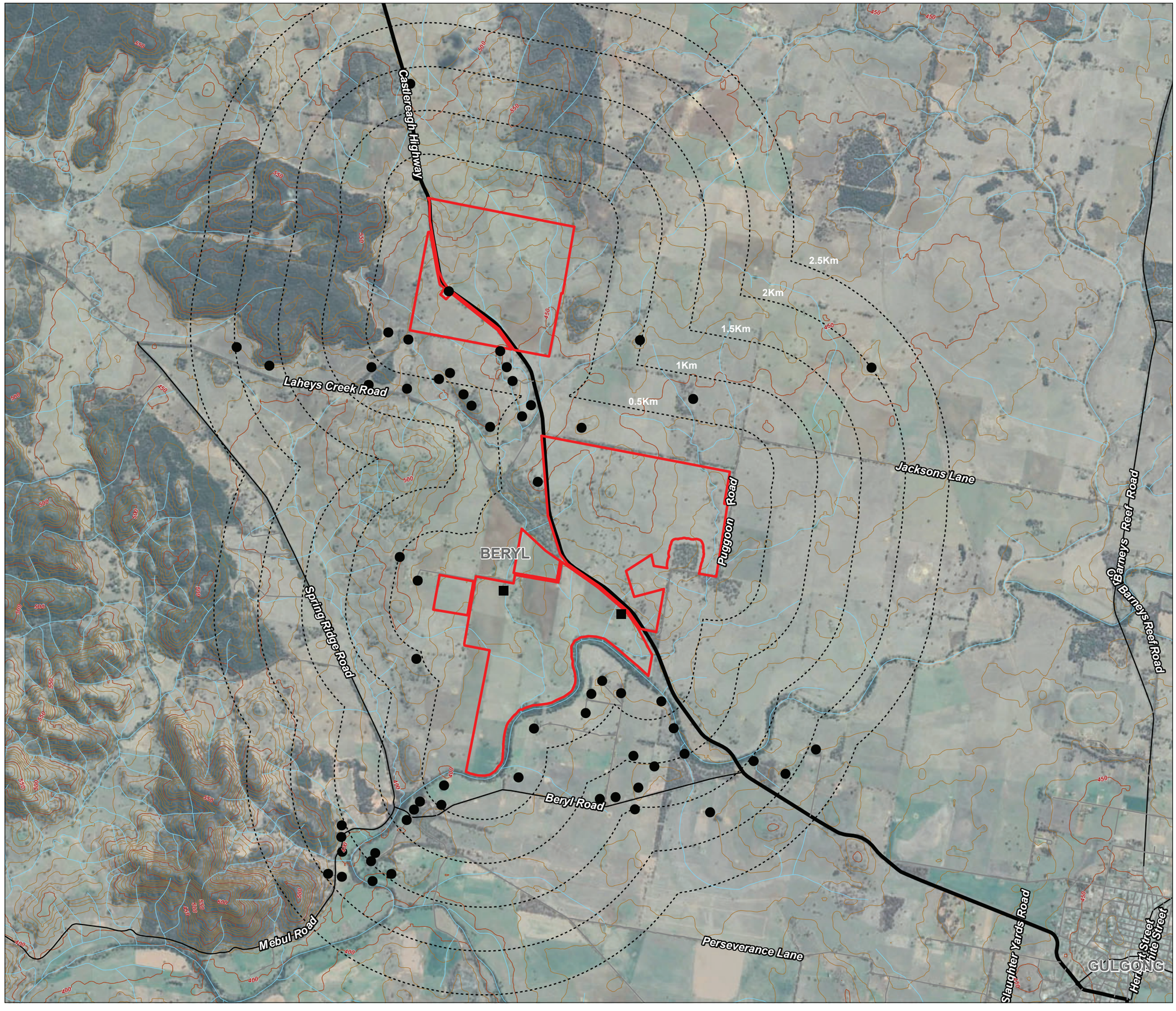

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Figure A:
Renewable Project investigation area

- Renewable project investigation area
- Watercourse
- Contour (50m)
- Contour (10m)
- Distance from the site
- Associated receiver
- Non-associated receiver

SOURCE:

Surface analysis: Derived from SRTM-derived 1 Second Digital Elevation Models Version 1.0 Commonwealth of Australia (Geoscience Australia) 2011
Watercourse: Geoscience Australia 2015
Imagery: Google Earth 14/09/2018

N
W E
S

0 0.5 1 1.5 2
Kilometres

A3 Scale: 1:40,000

Date: 20/05/2021

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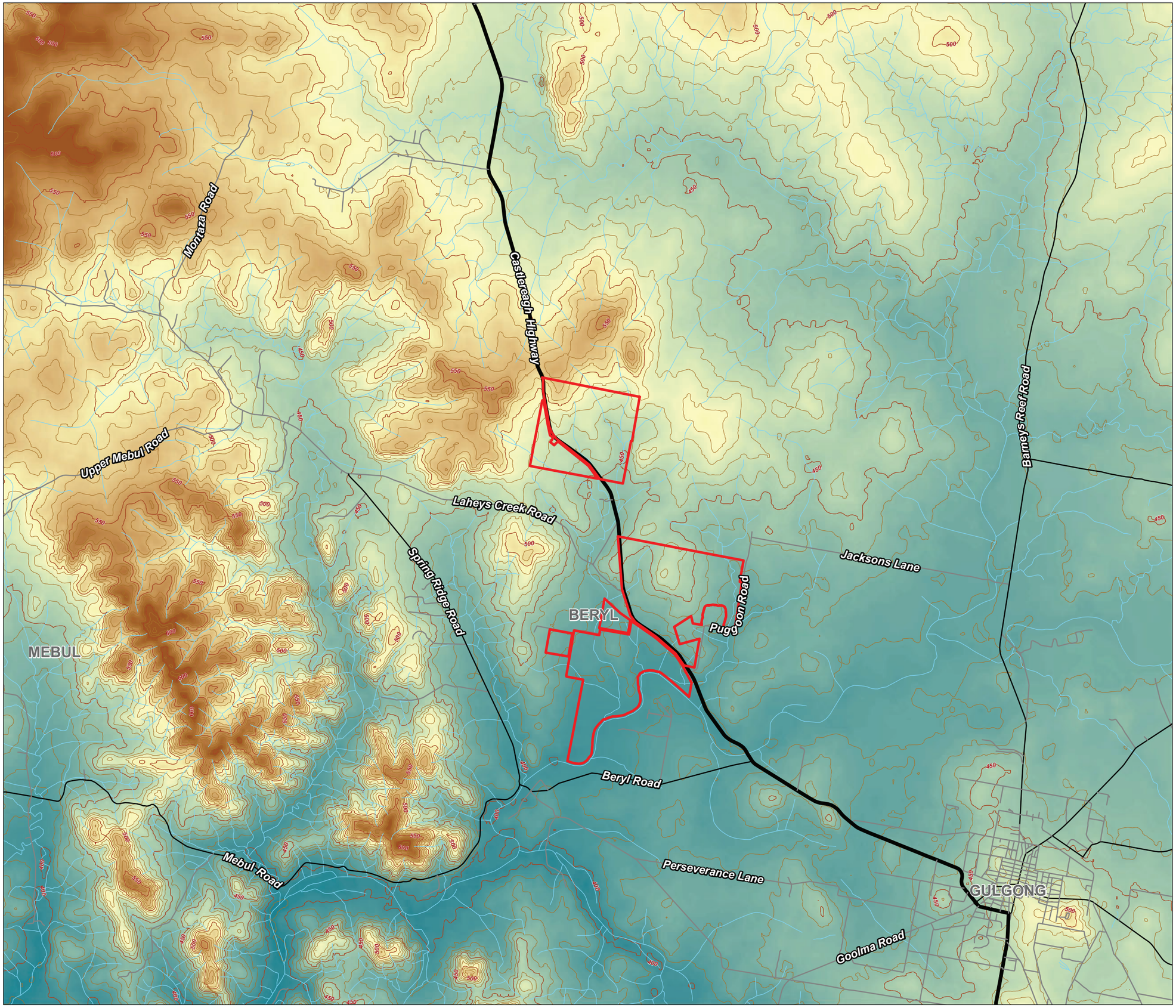
Figure B:
Topography



Renewable project investigation area

Watercourse

Contour (50m)

Contour (10m)

High- 685m AHD

Low- 380 AHD

SOURCE:

Surface analysis: Derived from SRTM-derived 1 Second Digital Elevation Models Version 1.0 Commonwealth of Australia (Geoscience Australia) 2011
Watercourse: Geoscience Australia 2015

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W E
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0 0.5 1 1.5 2 2.5 3
Kilometres

A3 Scale: 1:60,000

Date: 15th December 2020

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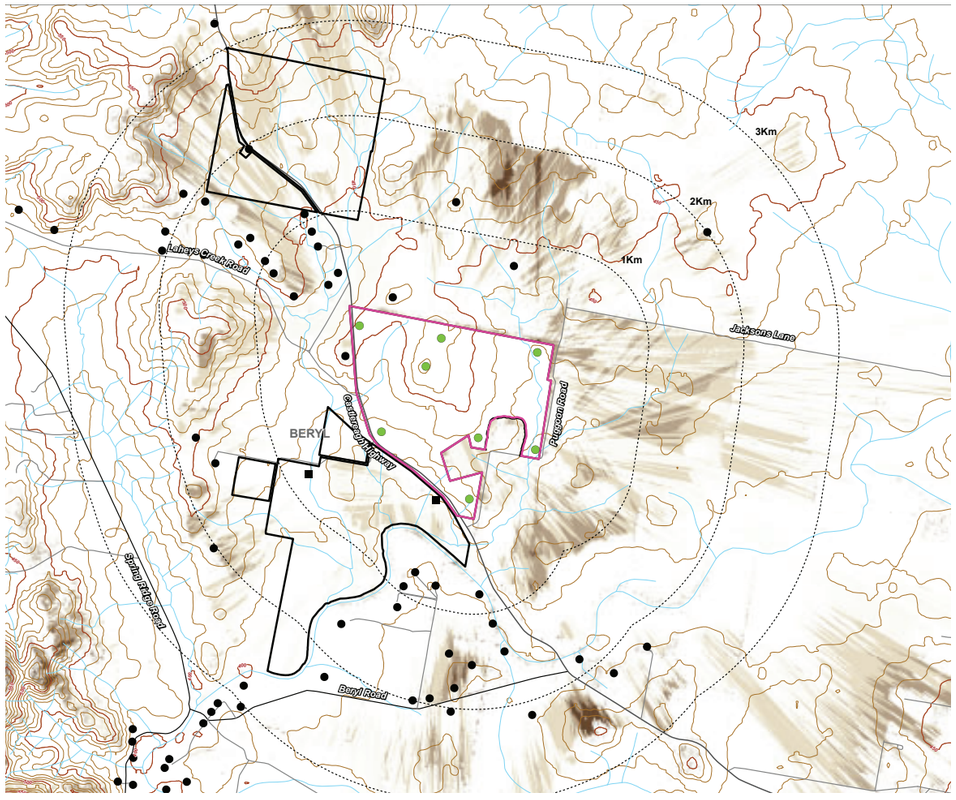
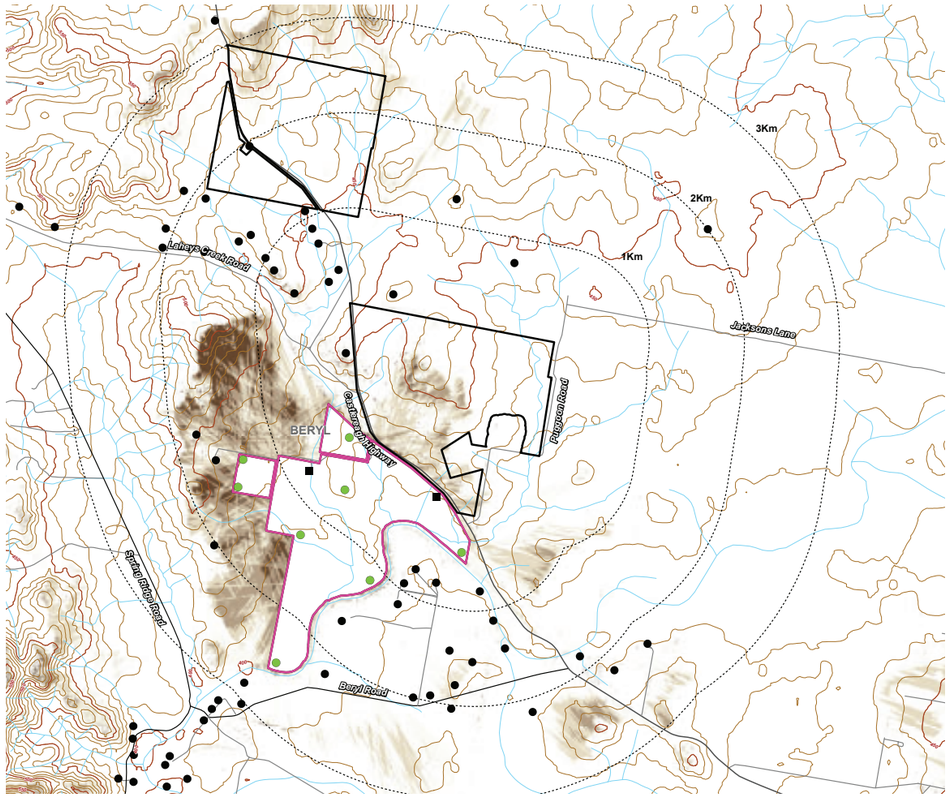
Analysis method:

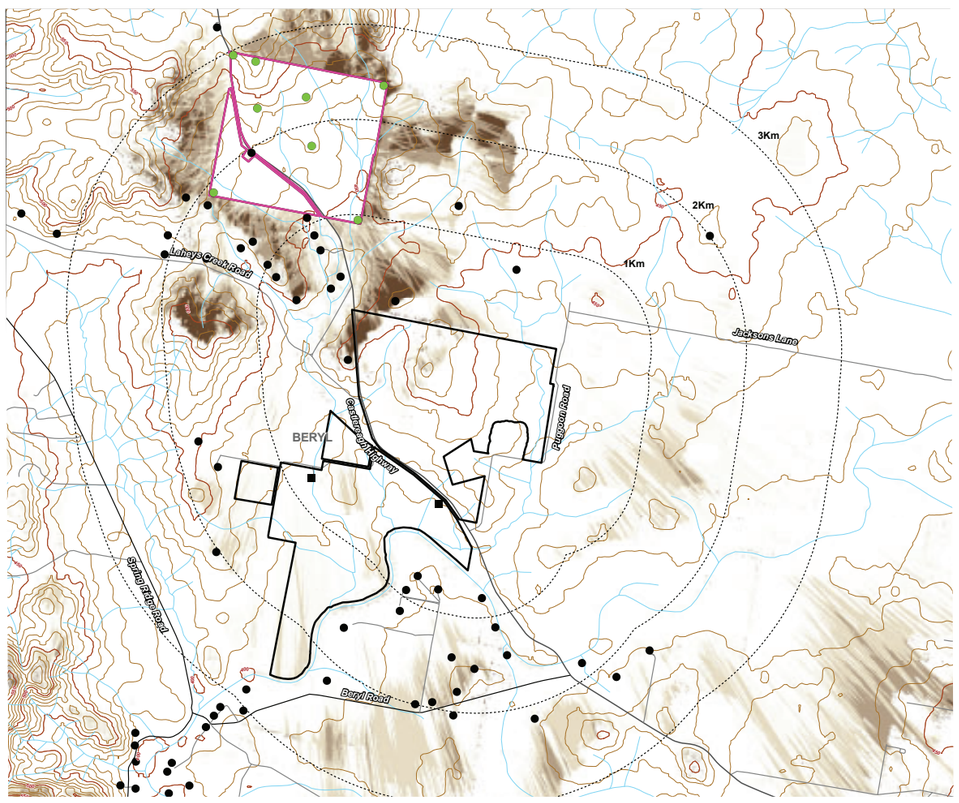
- A digital surface model was created for the study area at 1 metre pixel resolution. The model consists of ground surface terrain only (with an accuracy of +/-30cm vertical and +/-80cm horizontal, 95% confidence Interval).
- 8 points were modelled across each potential development area at a height of 5 metres to represent an indicative panel height.
- This map shows the areas where there is a directline of sight between the surface and these these modelled points. The colours illustrate the % of the development area which would be visible.
- This mapping is indicative only.



Area 1



Area 2



Area 3

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Figure C:
Visual catchment by site area

- Site area
- Renewable project investigation area
- Watercourse
- Contour (50m)
- Contour (10m)
- Distance from the site
- Modelled point at 5m above ground level
- Potential receiver (associated property)
- Potential receiver (non-associated)

Potential visibility

- No visibility identified
- Low(1-3 points)
- Moderate (4-5 points)
- High (6-8 points)

SOURCE:

Surface analysis: Derived from COBBORA 2012 & GULGONG 2015 2kmx2km LiDAR LAS Point Cloud: NSW DFSI
Watercourse: Geoscience Australia 2015

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Kilometres

A3 Scale: 1:30,000

F Date: 15th March 2021

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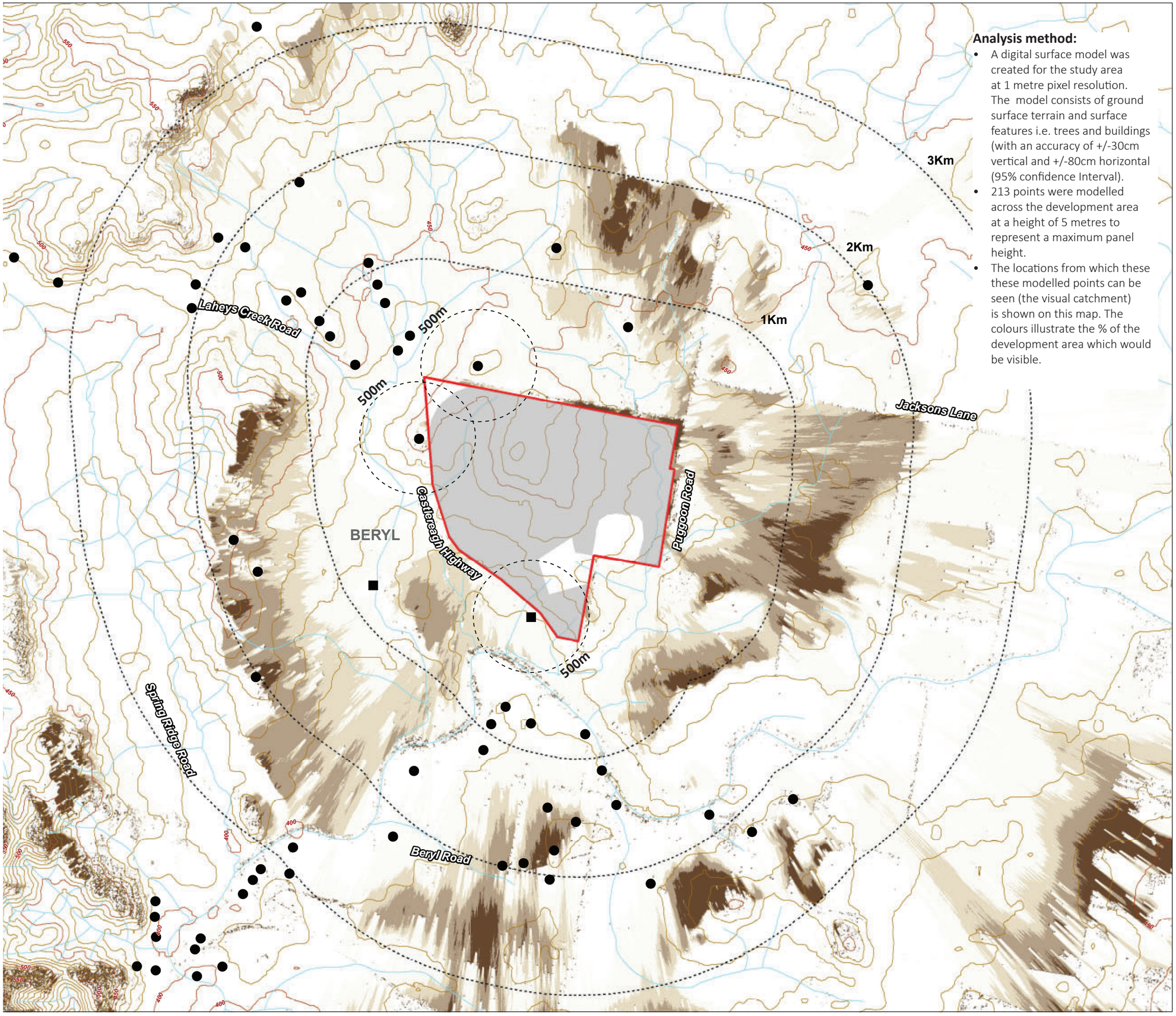

Analysis method:

- A digital surface model was created for the study area at 1 metre pixel resolution. The model consists of ground surface terrain and surface features i.e. trees and buildings (with an accuracy of +/-30cm vertical and +/-80cm horizontal (95% confidence Interval).
- 213 points were modelled across the development area at a height of 5 metres to represent a maximum panel height.
- The locations from which these these modelled points can be seen (the visual catchment) is shown on this map. The colours illustrate the % of the development area which would be visible.

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Figure D:
Visual catchment

- Site area
- Indicative panel array area
- Watercourse
- Contour (50m)
- Contour (10m)
- Distance from the site
- Associated receiver
- Non-associated receiver

Visibility

- 1-12% of site visible
- 13-20%
- 21-33%
- 30% + of site visible

SOURCE:

Surface analysis: Derived from COBBORA 2012 & GULGONG 2015 2kmx2km LiDAR LAS Point Cloud: NSW DFSI
Watercourse: Geoscience Australia 2015

N W E S

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Kilometres

A3 Scale: 1:30,000

File:BHRP_Visibility_210524 Date: 24/05/2021

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Key:

Local ridgeline

Cutting

1. View across the northwestern corner of the site to local ridgeline. (refer existing views a, b, and c)

2. Highway in cutting and the site is elevated above the highway and largely out of view. (refer existing view d)

3. Primary view along the road, site can be screened to reinforce this view (refer existing views e and f)

Views enclosed by vegetation within the Stock Route (refer existing view g,h and i)

4. Open views across the rural landscape towards distant hills (refer existing view j.)

5. View across rural landscape to local ridgeline (refer existing view k.)

6. View through existing trees to local ridgeline (refer existing view l.)

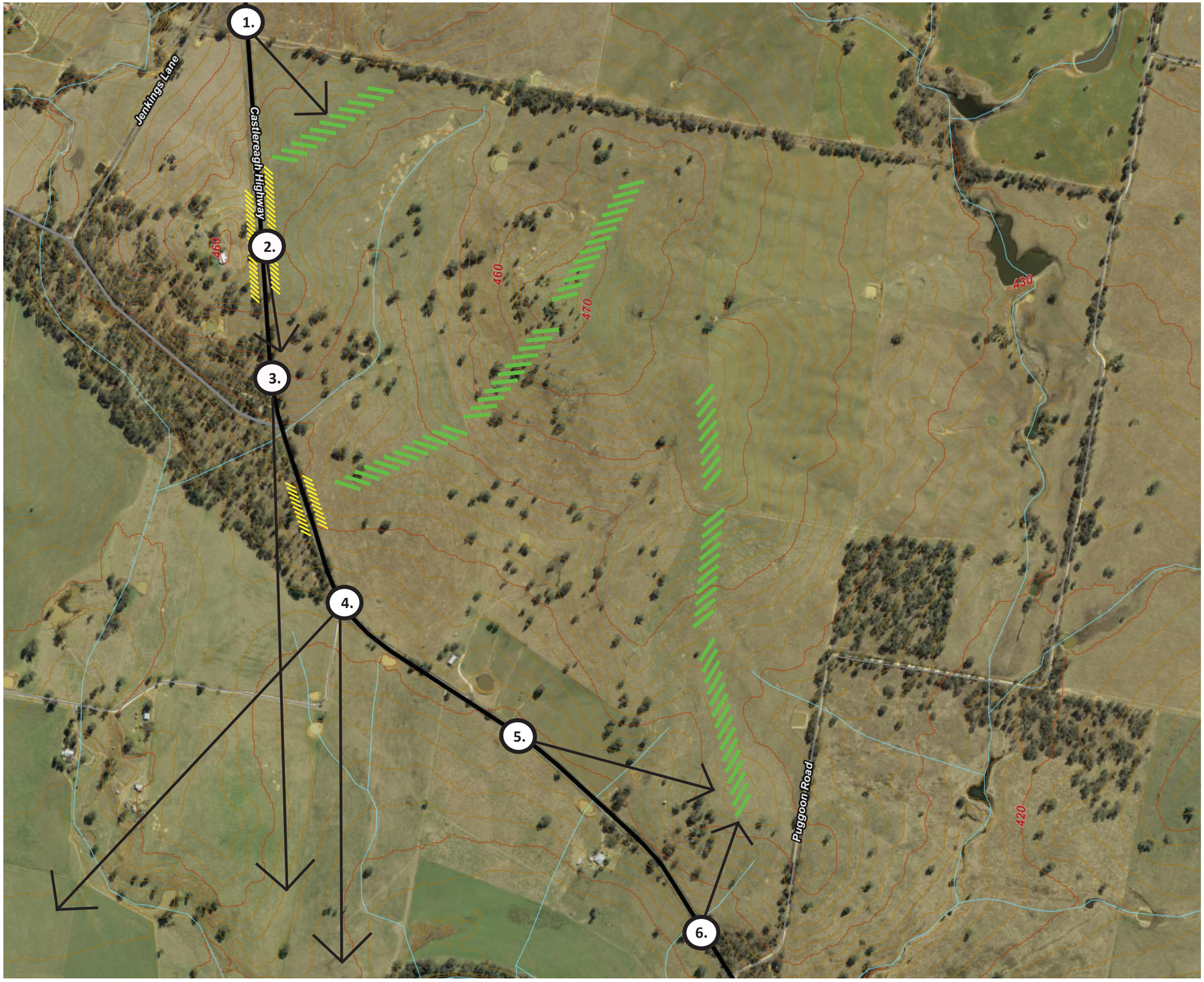

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Figure E: Castlereagh Highway - View Analysis

Date: June 2020 Drawn: SR

Job Number: 2018-108 Issue: REV1 Scale: NTS

Highway views, travelling north to south

a.

b.

c.

d.

e.

f.

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Figure F: Castlereagh Highway - Existing Views (Sheet 1)

Date: May 2021 Drawn: SR

Job Number: 2018-108 Issue: REV2

Highway views, travelling north to south

g.

h.

i.

j.

k.

l.

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Figure G: Castlereagh Highway - Existing Views (Sheet 2)

Date: May 2021 Drawn: SR
Job Number: 2018-108 Issue: REV2

View south from the Castlereagh Highway

a. Existing view

d. Artists impression

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Vena Energy

Figure H: Castlereagh Highway Views - Site area refinement

Date: May 2021 Drawn: SR

Job Number: 2018-108 Issue: REV2

Appendix F

EPBC Act Protected Matters Report

Australian Government
Department of the Environment and Energy

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.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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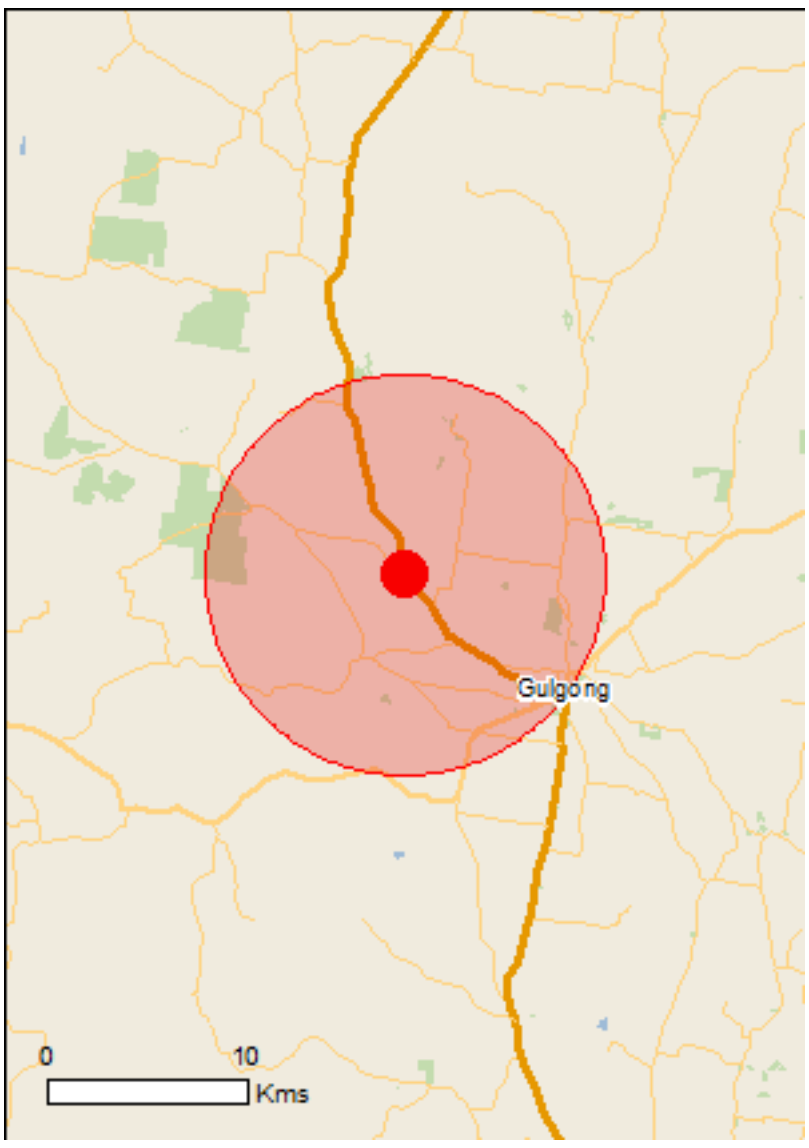

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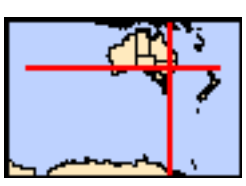

Summary

Matters of National Environmental 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:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	30
Listed Migratory Species:	11

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 http://www.environment.gov.au/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 Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	28
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	800 - 900km upstream
Riverland	800 - 900km upstream
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream
The macquarie marshes	200 - 300km upstream

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.

Name	Status	Type of Presence
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within 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
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
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
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within 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
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat may occur within 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]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Plants		
Androcalva procumbens [87153]	Vulnerable	Species or species habitat may occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Homoranthus darwinioides [12974]	Vulnerable	Species or species habitat may occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat likely to occur within area
Philotheca ericifolia [64942]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area
Tylophora linearis [55231]	Endangered	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Delma impar Striped Legless Lizard [1649]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [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.

Name
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans		
Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Yarrobil	NSW

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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.

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

Where very little information is available for 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 reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-32.319195 149.460544

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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